directing council

PAN AMERICAN HEALTH ORGANIZATION

XV Meeting

regional committee

WORLD HEALTH ORGANIZATION

XVI Meeting

Mexico, D.F.
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Provisional Agenda Item 18

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18 June 1964
ORIGINAL: ENGLISH

REPORT OF PROGRAM REVIEW OF A SAMPLE OF LONG-TERM PROJECTS OF THE ORGANIZATION

The Director has the honor to report to the Directing Council that, in accordance with the request made by the United States Delegation to the XIV Meeting of the Directing Council, he submitted to the 50th Meeting of the Executive Committee a Program Review of a Sample of Long-Term Projects of the Organization. The projects represent the oldest 10 per cent operating as of 1963.

After considering the document, the Executive Committee adopted the following

RESOLUTION IV

"THE EXECUTIVE COMMITTEE,

Having considered the report of the Director on the program review of a sample of long-term projects of the Organization (Document CE50/3),

RESOLVES:

1. To take note of the report of the Director and to express its satisfaction with the general progress of the projects covered by the review.

2. To congratulate the Director and the staff of the Bureau on the analysis and the report (Document CE50/3)."

In view of the foregoing, the Directing Council may wish to adopt a resolution along the following lines:

Proposed Resolution

THE DIRECTING COUNCIL,

Having examined the report of the Director of the Bureau on the Program Review of a Sample of Long-Term Projects of the Organization; and

Considering the discussion at the 50th Executive Committee and the resolution approved,

RESOLVES:

To take note of the report of the Director and to express its satisfaction with the general progress of the projects covered by the review.

Annex: Document CE50/3

executive committee of the directing council

PAN AMERICAN HEALTH ORGANIZATION

working party of the regional committee

WORLD HEALTH ORGANIZATION

50th Meeting
Washington, D. C.
April-May 1964

Draft Agenda Item 10

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A PROGRAM REVIEW OF A SAMPLE OF LONG-TERM PROJECTS OF THE ORGANIZATION

During the discussion on the 1965 budget at the XIV Meeting of the Directing Council of the Pan American Health Organization the United States Delegation requested that an analysis be made of a sample of the oldest projects appearing in the budget. The procedure suggested was that 10 per cent of the oldest projects be selected and that they be the subject of an analytical study which would make it possible to establish the progress made, whether they continued to appear in the budget for routine reasons, whether or not they had changed their characteristics, and so on.

In response to this request a selection was made of 26 projects which were begun in 1952 or earlier and which still appeared in the budget of the Organization, either with the same title or with a new one that was a consequence of the evolution which has taken place in the course of time.

These projects are divided by field of activity into projects for the eradication of the urban vector of yellow fever; malaria eradication; yellow fever control; yaws eradication; foot-and-mouth disease control; training in biostatistics; national health services; and nutrition.

An analysis has been made of the development of these projects, covering their background, evolution, and achievements.

AËDES AEGYPTI ERADICATION PROJECTS

The following projects have appeared in the budgets of the Organization since 1952 or earlier: French Antilles and Guiana-2; Netherlands Antilles-1; Colombia-22; West Indies-1; Jamaica-13; Mexico-26; and Dominican Republic-8.

These programs, which form part of the Aëdes aegypti eradication campaign in the Americas, stem from the resolution approved by the Directing Council at its first meeting in Buenos Aires, in 1947.

In compliance with that mandate, the Bureau has, for the last 16 years, cooperated with all the countries and territories of this Hemisphere that have striven to eradicate the urban vector of yellow fever and has provided them, within its budgetary limits, with technical assistance, supplies, and equipment.

Up to the present time Aëdes aegypti has been eradicated in British Honduras, Bolivia, Brazil, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and the Canal Zone.

In French Guiana where the mosquito had already been eradicated, the town of Cayenne has become reinfested.

The campaign is in its final phase in Argentina, which will probably be declared free from the mosquito in 1964; in Colombia; in Trinidad; and in other islands of the Caribbean Area; and is progressing satisfactorily in Cuba and Venezuela. However, it has recently been initiated in the United States of America and has been interrupted in Jamaica, Haiti, Dominican Republic, Guadaloupe, Dominica and the British Virgin Islands. In the remaining islands of the Caribbean Area the campaign is progressing very slowly with not very promising results.

Table 1 shows the status of the Aëdes aegypti eradication campaign in 1962 in the 7 projects under study, with the date of initiation of the project; the date of the last available report; the area infested and the inspections carried out and their results. It also shows the present status of each of the campaigns.

French Antilles and Guiana-2

This project covers French Guiana, Martinique, Guadaloupe and the French part of St. Martin.

The Organization's assistance to this project is at present limited to advisory services, which are supplied by the consultant to project AMRO-8 when the Government so requests.

French Guiana began Aëdes aegypti eradication in 1949. From the beginning of the campaign the results obtained were satisfactory, and, in 1958, after verification that the mosquito had been eliminated from all the initially positive localities, this territory was declared free from the vector.

In 1959, however, Cayenne and a few other localities were found to be reinfested, possibly by Aëdes aegypti introduced from Surinam. The Government quickly took the necessary steps to eliminate this reinfestation, and in 1961 Guiana was already negative again. This situation was maintained until September 1963 when the town of Cayenne again became infested.

At the present time the Government is trying to ascertain the exact extent of this reinfestation in order to eliminate it.

In Martinique, there is no specific campaign against A. aegypti. Since 1953 the Government has been carrying on a campaign against insects in general, but the results obtained, as far as A. aegypti eradication is concerned, have not been satisfactory.

In Guadaloupe the eradication campaign was initiated in 1956 with the cooperation of the Organization. However, the results were poor, principally because the campaign never had a satisfactory budget or administration.

From 1960 onwards, the situation became complicated because of the resistance of the mosquito to chlorinated insecticides so that since 1961 there has been only a small mosquito control service at the airport and the seaports.

As to the French part of the island of St. Martin, which is administered by Guadaloupe, it was found positive in 1959 and sprayed. Subsequently, it was stated to be negative but its present status is not clear because of lack of recent information.

Netherlands Antilles-1

This project, which has been in operation since 1952, covers all the territories of the Kingdom of the Netherlands in the Caribbean, with the exception of Surinam where the A. aegypti eradication campaign constitutes a separate project. (Surinam-51).

The Organization has been providing these territories with a sanitary inspector and with technical advice which is supplied by the consultant to project AMRO-8.

In Curaçao the results of the campaign were not satisfactory to begin with, but in 1955, when DDT was substituted for dieldrin in intradomiciliary spraying, all the positive localities soon became negative, so that by 1961 A. aegypti was found only in Willemstad, the capital of the territory, and the low level of infestation of the town indicated that the eradication of the vector would be soon completed.

In 1962, however, owing to the development of a strain of mosquito resistant both to dieldrin and to DDT, the situation worsened considerably. The infestation of Willemstad increased and spread to the surrounding areas. There is a possibility that by now other more isolated localities have become reinfested.

In view of the double resistance of the vector, an attempt is being made to have the campaign resume the classical methods of A. aegypti eradication for as long as no new residual insecticide that can replace the chlorinated ones is available.

The selection of the new insecticide is the main object of the studies the Organization is carrying out in Jamaica on A. aegypti resistance, as will be seen below.

In Aruba the campaign began in 1952 and the results were satisfactory. The island has been negative for several years, and a new verification made in 1962 confirmed the absence of the mosquito.

The island of Bonaire, where eradication was began at the same time as in Aruba, was also negative for several years. However, the island has become reinfested by a strain of A. aegypti that is resistant to the chlorinated insecticides, possibly introduced from Curaçao.

As in Curaçao, attempts have been made in Bonaire to have the campaign resume the classical method of A. aegypti eradication.

On the islands of Saba and St. Eustatius the campaign began in 1958 and the results obtained were satisfactory. At the present time the two islands are considered to be negative. However, no recent information confirming the absence of the vector is available.

On the Netherlands part of the island of St. Martin, the campaign was begun in 1958 and A. aegypti was easily eliminated. However, this territory became reinfested in 1961 and up to now, for financial reasons, eradication has not been recommenced.

Colombia-22

The Organization has been actively cooperating with the Government since the initiation of A. aegypti eradication campaign in Colombia in the latter part of 1950.

For the first two years collaboration included direct responsibility for the administration of the campaign and the supply of equipment and materials, in addition to technical guidance, but since January 1952 the Organization's collaboration has been limited to advisory services.

In the initial phase of the campaign the Organization assigned to this project two medical officers, four sanitary inspectors, and an expert in administration. However, as soon as the organization of the campaign was complete and local personnel trained, the international experts were reduced so that from July 1951 onwards there was only one medical officer and two sanitary inspectors, and from January 1954 onwards, one medical officer and one sanitary inspector.

In January 1959, when the campaign was already in its final phase, the sanitary inspector was transferred to Venezuela, although he continued to make periodical visits to Cucuta, the only locality in Colombia which was still positive. These visits were continued until January 1960 when the last foci of A. aegypti in Cucuta were eliminated and the country was considered to be free from the mosquito; at that time the medical officer was also transferred to Venezuela and advisory services to the Colombia program were discontinued.

In August 1961, however, Cucuta was found to be reinfested and the Colombian Government reinitiated the eradication campaign in that city. In April 1962, in response to a request from the Government, the Organization resumed advisory services to this project.

Since February 1963, a sanitary inspector designated by the Organization has been stationed in Cucuta. He receives guidance and supervision from the medical consultant attached to a similar project in Venezuela, who makes periodical visits to Colombia.

The results obtained in the Colombia campaign were satisfactory from the beginning. The duration of the first phase, about 10 years, is due to the restricted budget which made it possible to use only 10 to 12 brigades, each consisting of 5 inspectors and 1 foreman, for the whole country.

In its present phase, which began in 1961, the campaign is using 4 or 5 brigades only, but owing to the small amount of work that remains to be done, this number of personnel is sufficient to meet all needs.

When the project was begun in 1950 the area of Colombia, which was considered to be infested by A. aegypti, was about 320,000 Km^2. It contained a population of about 7,200,000 distributed in 25 of the 26 departments of the country and encompassed 370 of the 849 municipalities.

In this presumably infested area 3,801 localities were inspected during the initial survey, and of these 354 were found to be infested with A. aegypti. This, however, did not represent the true initial infestation of this area since before being inspected by campaign workers a high proportion of the 3,801 localities surveyed had already been sprayed with DDT, one or more times, by the malaria control program which, from 1952 to 1957, was operating in the Atlantico, Bolivar, Cordoba, and Magdalena Departments.

By December 1959, all the area of Colombia with ecological conditions favorable to A. aegypti had already been inspected; the 354 localities initially found infested had been treated and verified, and all of them with the sole exception of Cucuta were negative.

Cucuta, with about 20,000 houses, and situated a few kilometers from the Venezuelan frontier, was the only locality in Colombia where serious problems in eliminating the mosquito were encountered.

In August 1957 a strain of mosquito highly resistant to DDT was found in this town.

It was decided to use dieldrin and in April 1958 the first treatment of the city with this insecticide by the perifocal method was made. The results obtained were highly satisfactory in that, in a verification made in February 1959, only 9 houses with A. aegypti were found in the whole city whereas, in September 1957, 2,117 had been found.

From March to December 1959, after a new partial treatment of the town, three complete verifications were made; the first two gave negative results, but during the last one made in December, 4 positive houses were found.

These few foci were eliminated by means of a new partial treatment of the town, and the four subsequent verifications, which covered all the houses and were completed in March, June, September, and December 1960, respectively, were negative.

The town was then considered to be free from A. aegypti and the whole country in a position to be declared free from the mosquito. However, in August 1961, the vigilance service, which had been maintained in the country, found that Cucuta was again reinfested, probably by A. aegypti introduced from Venezuela.

The eradication campaign was restarted in the town, and at the same time all the other localities in the area were inspected in order to ascertain whether any of them had also become reinfested.

One further locality was found to be positive and eradication activities were immediately extended to it. The locality concerned was San Luis, containing about 3,000 houses and situated a few kilometers from Cucuta on the road which runs from this town to the Venezuelan frontier.

The results of the work in Cucuta and San Luis have been satisfactory and at the present both localities are negative.

However, Colombia cannot be declared free from A. aegypti until the necessary verifications to establish the eradication of mosquito from all localities have been completed and the absence of the vector from other areas of the country exposed to reinfestation has been confirmed.

This is now being done, and it is hoped that it will be completed by the end of 1964.

West Indies-1

This project covers all the British territories in the Caribbean with the exception of the British Virgin Islands. The Organization has furnished advice in the orientation and supervision of the campaign through a medical consultant and two sanitary inspectors attached to project AMRO-8. It has also furnished supplies and equipment.

The campaign in these territories began in 1950 at different dates and the present situation is summarized below.

Bermuda, Grenada, St. Kitts and Nevis, and St. Vincent are considered to be negative.

British Guiana, which had been free from A. aegypti for many years, was found to be reinfested in 1962. The infestation was high and generalized in Georgetown, and in many other localities in the coastal region were also positive. However, for financial reasons, the Government has not as yet been able to reinitiate the eradication campaign.

The campaign in Dominica was interrupted a few years ago, also for financial reasons. In the same way, in Anguilla and the Bahamas lack of funds and a consequent shortage of personnel have hampered the progress of the campaign.

Antigua, Montserrat, and St. Lucia, after being negative for some years, have been found to be extensively reinfested and, to date, it has not been possible to initiate operations to eliminate the mosquito.

In Barbuda the campaign has not have sufficient personnel from the beginning so that the work cycles have been unduly long and the results obtained up to 1963 have not been satisfactory. At the end of that year, however, the Government increased the budget for the campaign, and the work cycles could be shortened so that it is expected that better results will be obtained in the future.

In the Grenadines group, the islands of Carriacou and Little Martinique are still infested and the Government has not yet decided to eradicate the mosquito.

Trinidad and Tobago, which despite their being independent states, are still included in this project, had been negative for some time up to 1961, when A. aegypti was found in a locality in the interior of Trinidad and on the quays of Port of Spain. The necessary measures were then taken to eliminate the mosquito from those areas and Trinidad was again considered negative.

However, during 1962, foci of A. aegypti were again found on repeated occasions on the quays of Port of Spain until in August of this year it was discovered that the sources of these reinfestations were probably the small vacation islands situated close to the port, which up to then had not been treated.

These islands were sprayed as soon as the infestation was discovered and at the present time Trinidad is again negative.

As for Tobago, the whole island is considered free from mosquito.

Jamaica-13

Jamaica only became a separate project in 1962. Up to that time the country was included in project West Indies-1, and its campaign received advisory services in technical orientation and supervision from the personnel of project AMRO-8.

Eradication in Jamaica was begun in 1950, but the results obtained by the campaign have never been satisfactory, mainly owing to the shortage of personnel that has existed since the beginning.

In view of the impossibility of obtaining better results, the Government decided to suspend the campaign in 1961 and to initiate it again later when it would be possible to reorganize it effectively. Since then, the campaign activities have been limited to mosquito control work in the ports and airports of Kingston and Montego Bay.

Surveys made by the Government in 1962 showed that the country was extensively infested and that in some areas A. aegypti was resistant to the chlorinated insecticides.

In order to make a thorough study of the problem of mosquito resistance to insecticides, the Organization provided the services of an entomologist, who began his work in October 1962.

The results of this study show that A. aegypti resistance to DDT, dieldrin and BHC in Jamaica, is more intense and is more widespread than was originally thought, so that it is not considered advisable to again launch the eradication campaign in the country until the investigations, still in progress, indicate which insecticide should be used against the mosquito.

In almost all the countries and territories of the Caribbean A. aegypti is resistant to chlorinated insecticides and this is one of the most serious difficulties the campaign has to surmount. The conditions in Jamaica are similar to those in most of the Caribbean area, so that a solution of the resistance problem in this country would be immediately applicable throughout the area.

Hence, the importance of the investigations being made in Jamaica for the whole of the Caribbean area. These investigations will be extended in due course to other countries or territories in the area where they are considered necessary.

Mexico-26

This project is now finished. Mexico completed the eradication of A. aegypti in 1961, after nearly 10 years of struggle against the mosquito.

From October 1961 to August 1963 the Organization collaborated with the Government in a special verification of the country in order to confirm the absence of the vector.

The results of this verification, which was guided and supervised by PASB technicians, confirmed that the mosquito had been eliminated from the initially infested area, and in September 1963, by a resolution approved at the XIV Meeting of the Directing Council, Mexico was declared free from A. aegypti.

Dominican Republic-8

The A. aegypti eradication campaign in the Dominican Republic was begun in 1952 as part of a program for the control of malaria in the country.

From the beginning the campaign has had an inadequate budget and administration so that the results achieved have not been satisfactory.

In 1962, susceptibility tests made with A. aegypti larvae from various regions of the Republic not only confirmed previous reports of the existence of mosquito strains resistant to chlorinated insecticides in certain towns but also showed that the resistance of the vector to these products was widespread throughout the country.

For this reason it was decided to suspend the campaign in November 1962 until the investigations being carried out in Jamaica show which residual insecticide can replace the chlorinated insecticides in the eradication of A. aegypti.

MALARIA ERADICATION

In many countries malaria control projects were initially combined with A. aegypti eradication projects. In this form and under the generic name of "insect control" the projects mentioned below were conducted.

The following were projects of this type and have appeared in the budgets of the Organization since 1952 or earlier: British Honduras-1, Costa Rica-2, El Salvador-2, Guatemala-1, Honduras-1, West Indies-17, Jamaica-2, Nicaragua-1, Panama-2, Dominican Republic-2, Surinam-1, and Trinidad-3.

In 1954 the XIV Pan American Sanitary Conference meeting in October in Santiago, Chile, approved the historic resolution calling upon the countries and territories of the Americas to adopt measures to eradicate malaria.

In 1955 the Organization established an office for the coordination of the malaria eradication campaign in the Continent and began to furnish advisory services to Governments in the planning, execution and evaluation of their respective projects. From the beginning of 1955 this office furnished advisory services at the request of Governments and provided technical guidance for the conversion of the so-called malaria control campaigns into malaria eradication projects. This coordination office was later converted into the Malaria Eradication Branch which is operating at the Headquarters of the Pan American Sanitary Bureau.

In 1955 PASB gave technical advice and assistance to 21 out of the 36 countries and territories infected by malaria in the Western Hemisphere. UNICEF also participated by providing supplies and equipment to 19 of them and the International Cooperation Administration of the United States of America gave assistance to 4 countries. In that year 13 insect control programs were in operation and of these, 6 were programs combined with A. aegypti eradication.

In 1956 all the countries and territories had converted or were in the phases of converting control campaigns into eradication campaigns.

The 12 projects included in this study were originally combined malaria control and A. aegypti eradication projects. Table 2 gives an historical summary of the 12 projects from their beginning as combined programs in 1950, 1951 or 1952 and the date on which the new agreement was signed converting them into malaria eradication programs proper. Information is also given on the various agreements signed with the countries and the technical problems encountered as well as the solutions applied.

The last part of the table gives the date on which spraying began in each of the programs and the population which is at present in the consolidation phase. In addition, it shows the current phase of the A. aegypti eradication campaign in the same countries.

Two of the projects, that of St. Lucia and Grenada, were completed in 1962 when malaria eradication was completed. In St. Lucia it lasted for 6 years, 3 for the attack phase and 3 for the consolidation phase, and in Grenada eradication was achieved in 5 years, 2 for the attack phase and 3 for the consolidation phase.

The current duration of a malaria eradication campaign, as stated by the WHO Expert Committee, is seven years of which four are devoted to the attack phase and three to the consolidation phase. These results can be obtained of course, only if there were no special technical and administrative problems.

In 1958 the vector A. albimanus was found to be resistant to dieldrin. This insecticide was being used throughout or in parts of El Salvador, Guatemala, Nicaragua, Trinidad and Tobago. In certain limited areas of El Salvador the vector was also resistant to DDT. In 1959, with the intensification of the susceptibility tests vector resistance to dieldrin was also encountered in the British Honduras, Dominican Republic, Honduras and Jamaica programs. At the same time it was found that in certain areas of Guatemala, Honduras and Nicaragua the vector was also resistant to DDT.

The recommended change from dieldrin to DDT was not an easy task since the frequency of the spraying cycle had to be changed from one to twice a year. This operation was accomplished relatively quickly except in Trinidad and Tobago, where the eradication of A. aegypti was extremely urgent owing to an outbreak of yellow fever. For that reason the Government insisted on the use of dieldrin until 1960 when the vector or urban yellow fever was stated to have been eradicated. Since then, only DDT has been used in the malaria eradication campaign.

In Costa Rica DDT has been used since 1958 in a 6-month spraying cycle.

In Panama dieldrin was chosen as the preferable insecticide with a 12-month spraying cycle. However, three years ago it became clear that despite the fact that the vector continued to be susceptible to dieldrin and that transmission had been reduced it was not possible to achieve malaria eradication. In 1962 an agreement was made with the Government to use DDT with a 6-month spraying cycle. The same reason gave rise to change to DDT in Surinam in 1960.

Table 3 shows the projects classified according to their age in years calculated from the beginning of the malaria eradication program as such, or when spraying operations began, and also shows the results obtained up to November 1963 in terms of the percentage of population living in malarious areas still in the attack phase, in the consolidation phase and, finally, in the maintenance phase.

It is clear that the projects in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Dominican Republic, and Surinam are not following the normal course of a malaria eradication project. However, the change to DDT was sufficient to interrupt transmission in British Honduras and Jamaica. In Trinidad and Tobago massive drug administration was used, in addition to the change to DDT, as an additional attack method in areas where the vector was A. (K) bellator and malaria transmission was also

interrupted. Since the change to DDT the attack phase was completed in three years in British Honduras and in two years in Jamaica and in Trinidad. In all these countries 100 percent of the population was formerly living in originally malarious areas, which at present are in the consolidation phase.

Unfortunately, the change to DDT was not sufficient to solve all the problems in the projects of the other countries which are being examined here. All these have technical problems which have induced the Organization to undertake research aimed at finding the causes of the persistence of transmission and the corresponding solutions.

The evolution and present situation of each of the programs is presented below:

British Honduras.- The original agreement between WHO and the Government of British Honduras was signed on February 12, 1951 for a program of malaria control and eradication of A. aegypti. It was converted to malaria eradication on March 27, 1957, calling for total coverage and using dieldrin once every 12 months. The first year of spraying operations started in February 1957 and was completed in January 1958, with 17,082 houses sprayed. However, during the rest of the year of 1958, due to financial and administrative difficulties, it was not possible to continue the regular work, so only emergency spraying operations were conducted. Early in 1959 the first evidence of dieldrin resistance was found in A. albimanus. An appraisal of the situation revealed that: the main vector, A. albimanus was becoming resistant to dieldrin in certain localities; the epidemiological evaluation operations were not satisfactory for a malaria eradication program; there was a practice among the population of cleaning the walls of the houses more frequently than the intervals of the application of insecticide. The Government accepted PASB's recommendations and decided to use DDT at the dosage of 2 mg per square meter every six months. The change was made in April 1959. Another interruption of the spraying operations occurred in 1961 as a result of the destruction caused by Hurricane Hattie which struck the country on 31 October, but no resurgence of malaria followed. Before the completion of the 8 cycles of DDT (four years) the transmission of malaria had been interrupted throughout the country, and spraying operations were terminated on August 2, 1962.

Epidemiological evaluation activities have been carried out from the beginning, and have been progressively improved. During the years 1962 and 1963 there were a total of 130 notification posts throughout the area and 9 evaluation technicians were employed by the Service. The evolution of the malaria incidence is good, and shows an overall reduction from 12.0% of positive slides in June 1958 to 0.0% in July 1962. During the first year of the consolidation phase (August 1962-September 1963), 15,681 blood slides were examined (15.7% of the population of malarious area). A single outbreak occurred with 22 positives for P. vivax (0.1%),

in 4 small but related localities (San Narciso, San Victor, Douglas and Shipyard). Respraying, and treatment of cases was sufficient to terminate this outbreack.

Following the disaster of Hurricane Hattie, the PAHO made a grant of US$25,042 to the Government to permit the program to be continued during the period May 1-December 31, 1963.

The Government is carrying on a successful malaria eradication program and the end is in sight. The prospect seems good for the certification of eradication during 1965.

Costa Rica.- PASB cooperation in the insect control program of Costa Rica began officially in September 1950. It was converted to malaria eradication and total coverage started in July 1957. The only insecticide used was DDT twice a year until the present. At the end of 5 years of spraying, much of the Atlantic slope of the country was placed in the consolidation phase and this phase has been progressively expanded until in 1963 more than 70% of the area and 60% of the population of the originally malarious area were under surveillance instead of attack. Case detection has been maintained at very high levels, upwards of 35% of the population per year, although not always well distributed geographically.

Even in 1963, a difficult year financially, there was further reduction in the malaria of the country, to about 1,300 cases and autochthonous cases of P. falciparum disappeared entirely. No resistance of the vectors has been found, but there has been stubborn persistence of transmission in limited areas of the Pacific coastal plain due to irritability of the vector, poor housing, and to rapid growth of communities and building of new houses or alteration of old ones.

A field trial of a mass drug treatment program was started in 1962 in portions of the problem area with promising results. Since November 1962, an intensive program was carried out among 9,970 persons in the problem area, with nearly perfect results, but during the rainy season, several untreated areas nearby experienced explosive outbreaks. It has been agreed to:

(a) Expand the treated area to include the worst of these localities. Since November 1963, 11,778 persons have been in the mass treatment program.

(b) Change the insecticide to dieldrin which is not irritating, and therefore likely to be more effective in killing vectors which enter houses, than DDT which often drives them out before they receive a fatal dose.

(c) Spray new houses built between cycles in localities which are expanding rapidly.

The population among which malaria continues to be a problem is so small, less than 30,000 that final elimination of the parasite ought to present no great difficulty. There is, however, immigration from infected portions of Panama and Nicaragua, and occasionally other Central American countries still infected, which threatens and actually has caused renewed outbreaks in consolidation areas. Other outbreaks in the consolidation area have been the result of local movement from problem areas, plus sometimes inadequate surveillance within the area itself, but both of these factors are being improved steadily. There is no doubt that malaria transmission is almost at an end, but it will be impossible to reduce the effort very much until neighboring countries are cleaned up.

Dominican Republic.- Since the beginning of this program, administrative, operational or financial deficiencies have prevented success in the malaria eradication activities.

The first cycle of the atack phase, using dieldrin, began in June 1958. Resistance of the vector A. albimanus to that insecticide was discovered in certain areas of the country in 1959, and a change of insecticide to DDT, was recommended. For lack of adequate financial support it was impossible to provide for sufficient local personnel and supporting services to complete the spraying cycles within the recommended six month period. It was agreed that under those circumstances, a nine month cycle might be employed experimentally. Again, due to continued lack of financial support, and for other reasons, the completion of the nine month cycle as originally scheduled has not been possible. Furthermore, it has not been possible to expand the epidemiological evaluation services as was originally planned.

In August 1963, the Government completed a basic reform in the structure of the Malaria Service. It is worthwile to mention that the organization for the direction and operation of the malaria eradication program will include: a) a Technical Council (composed by the Minister of Health and Social Welfare, as the president and as members the General Director of Public Health, the Director of the Division of Epidemiology, the Chief of the Zone II of PAHO/WHO or his representative and the Area Director of UNICEF. The Co-Director of NMES will serve as the Secretary of the Council); b) the National Malaria Eradication Service (NMES) will have two Co-Directors, one national and the other will be the malariologist, Team Leader of the PAHO consultants in the malaria program. The functions of the Council and Co-Directors are spelled out in the Tripartite Plan of Operations signed by the parties concerned in September 1963.

The Government is now giving a high priority to the malaria eradication program. Flexibility was given to the program in order to speed the acquisition of supplies, hiring and dismissal of personnel and many

other activities. PAHO has also appointed an Administrative Consultant who is the executive administrator of the program. A marked improvement already has taken place in all sections of the NMES, due to tighter discipline among all employees.

In addition an intensification of case finding activities by hospitals, dispensaries, health centers, and voluntary collaborators, has been ordered, and the number of microscopists increased. The reorganization of the spraying operations is showing results since the number of squads, spraymen, and working areas have been increased.

It should be pointed out that there are no known technical reasons for expecting that an eradication program, properly executed, will fail to eradicate malaria in the entire country.

El Salvador.- This highly malarious country has long antecedents of malaria control operations in limited localities under various sponsorship. The first PAHO/WHO insect control program was started in January 1951. It was expanded to total coverage in July 1956, with two thirds of the country under DDT twice a year and one third under dieldrin once a year. In 1957 this ratio was reversed, but in 1958, due to marked increases in malaria and the discovery of high resistance of the vector to dieldrin, the entire program was converted to DDT at a considerable increase in local costs.

From the time of change until May 1960 there was a rapid decline in malaria, but this was reversed during the second half of 1960 and 1961 which were abnormally rainy. Even when financial difficulties forced a suspension of spraying in the second half of 1962 the incidence in most of the country remained far below former levels, although some severe outbreaks occurred 7-10 months after the last spraying in the western part of the coastal plain. One locality of about 5,000 persons experienced 1,354 cases in 6 months time.

Although A. albimanus was resistant to DDT as well as dieldrin, the area of resistance to DDT was smaller and the degree of resistance to DDT was lower so that this insecticide was still partially effective in most areas, even against population of the vector which were composed entirely of resistant individuals. This finding justified the continued use of DDT while search went on for a more effective insecticide, and tests were made of methods for supplementing the attack by house spraying.

By mid-1962, when spraying was stopped, transmission had been interrupted in most areas above 200 meters, where the vector is generally susceptible. In most of the area below 200 meters, the vector is resistant to DDT, and this area accounted for 80 percent of the cases of malaria in the country in 1962 and 1963. With very few exceptions, the area of DDT resistance coincides with that of cultivation of cotton.

Many epidemiological and entomological studies have been carried out in El Salvador, supported in whole or in part by PAHO, in order to discover all the factors contributing to persistence of transmission in the Central American problem area, as well as to try out various methods of overcoming them. An Insecticide Testing Team was activated in 1959, and a Malaria Eradication Epidemiology Team in 1960, both of which contributed much to understanding and solving these problems.

Some of the findings and conclusions of these studies are:

(a) That the vector is resistant to DDT and to dieldrin throughout the cotton-growing zone along the coast at an altitude of below 200 meters where extensive use has been made of insecticides sprayed from aircraft for agriculture purposes, and that at the edge of the area, this resistance varies greatly from month to month.

(b) That the vector, whether susceptible or resistant to DDT, is excited or repelled by the insecticide in the coastal area, but not inland in the susceptible area.

(c) That some transmission takes place outside of dwellings, in the evening hours, where the inhabitants remain for some time before going to bed.

(d) That the dwellings in rural areas have walls that allow mosquitoes to enter and leave after feeding.

(e) That the period of major transmission in the area is from June to October of each year.

(f) That most of the repairs to houses such as putting on new roofs, repair of walls, etc., are made immediately before the beginning of the rainy season. For this reason spraying operations carried out in 6-months cycles are not the most effective.

(g) That despite resistance to DDT there is evidence that the residual action of this insecticide in the houses appreciably reduces the number of contacts between man and A. albimanus.

(h) Mud walls vary greatly in their sorptiveness for all insecticides, even DDT, but they usually are so deleterious to newer more volatile insecticides that none have as yet been found to be a satisfactory substitute for DDT.

(i) Larviciding by various methods was field tested: Paris green was unsatisfactory; aircraft application was cheaper and more effective than hand application when large surfaces were involved.

Simultaneously with epidemiological and entomological studies field investigations were begun with other insecticides; malathion was field tested but did not give satisfactory results owing to the predominance of houses with mud walls.

Since 1961 pilot studies have been made to develop a satisfactory method of administering drugs to the civil population. Tests were made in an area of 200 Km^2, with very good results, a combination of chloroquine and primaquine being used in a single tablet. All the inhabitants over 6 months of age received treatment every 15 days and did not show any adverse effects of the drug. The routine of administration and supervision was simplified in 1962, and further reduction in malaria was achieved.

In view of this result, in May 1963 a drug administration program was begun in the Western coastal area of El Salvador up to the Guatemalan frontier. The population numbers 60,000 and the results to date have been excellent. This program is being expanded in 1964, to include the entire problem area if funds can be obtained to permit this.

Although many technical problems have delayed eradication in the coastal area, these have been shown to be soluble at costs which are not unreasonable.

Guatemala.- The PAHO-assisted insect control program of Guatemala dates back to January 1951. It was converted to malaria eradication with the first cycle of total coverage beginning in August 1956, using dieldrin annually. Before the end of the second year, it had been shown that transmission was not being controlled, dieldrin resistance was high and rather widespread, while DDT resistance was much less in degree and extent. The change to DDT was made in September 1958, and since it was applied twice a year this increased the local costs virtually 100%.

Eradication of malaria progressed very well in most of the country after the change to DDT. The percentage of slides positive decreased from 24 before the change to less than 3 within 1 1/2 years. Large areas were put into consolidation beginning in January 1962 (after 5 1/2 years of total program or 3 1/2 years of DDT). However, there were a number of small problem areas becoming apparent by 1960. These were limited to parts of the coastal area where there was some DDT resistance, and where several agricultural redevelopment projects created many new houses between cycles. There were also a few areas of high DDT resistance in river valleys at intermediate altitudes.

In the latter areas, cleaning of the river banks and larviciding with chlorothion was rapidly and completely effective.

The installation of permanent spraymen-evaluators in the areas of agricultural redevelopment on the coast was partially effective, much more so where there was little or no DDT resistance, much less so where DDT resistance was moderate to high.

Unfortunately, there has been a tremendous increase in cotton growing in the coastal area during the last few years, followed by a rise in levels of DDT resistance, and a great increase in its extension. The result was a 2 1/2 fold increase in malaria in the country as a whole in 1963, a 400% increase in the number of malaria cases in the western half of the coastal plain, and a general increase in cases throughout the consolidation area, which naturally resulted from the enormous migration of labor from cleaned areas into problem areas and back again.

After the installation of permanent spraymen-evaluators failed to halt transmission in Nueva Concepción, the largest of the agricultural redevelopment projects, a field trial of mass drug distribution was initiated in August 1962 in one half and larviciding in the other half. The mass drug distribution program promptly produced a 75% reduction in malaria, but no further progress was made because of a low percentage of persons taking treatment, (60-75%), and because of very high transmission in the vicinity. The larviciding program was expensive and not very effective because the terrain was not suitable, with many breeding areas in the flat land during the rainy season, and a dispersed rural population.

By late 1963 it was apparent that although transmission had been halted among 60% of the population living in malarious areas, the disease was becoming an increasingly serious problem in the DDT-resistant areas of the coast and from here, it was threating the success of the program. Expansion of the mass drug treatment program to all the cotton plantations was the first of several steps put in progress to reverse the trend. An evaluation team in February of 1964 recommended mass treatment for all residents, permanent and temporary, of the coastal problem area, larviciding in the problem valleys of the upland country, and improvement of the surveillance operation in the consolidation area. By this time malaria had become re-established in several localities where spraying had been stopped for 15 months or more, and where surveillance was inadequate.

A lack of funds has prevented the employment of all the personnel needed to carry on the basic operations plus the supplementary attack necessary in recent years.

Honduras.- The PAHO-Honduras agreement on a malaria control-A. aegypti eradication program goes back to April 1951. When aegypti eradication was completed in 1959, the program was converted to malaria eradication, with

total coverage starting in July of that year. DDT was used from the beginning, and improvement was rapid. The percentage of slides positve dropped from 8 during the first year to below 2 in the third. A small area was placed in consolidation in 1962, 3 years after total coverage began, and increasingly large sections have since been entered into consolidation until these now constitute 65% of the 2 million people living in originally malarious areas. This has been achieved in less than 4 years.

There are two main problem areas, the Pacific coastal belt, bordering the gulf of Fonseca where cotton is extensively grown and resistance to DDT has been increasing; and one central valley, Talanga, where resistance is very high, and where 7,000 persons had 2.500 cases of malaria in the last 6 months of 1963. The first area is responding fairly well to malathion because a goodly percentage of its houses are of wood. The second has responded very well to larviciding, some drainage and filling operations, and a short course of mass drug treatment.

In some of the northern departments, malaria has disappeared slowly due to a failure of coordination. When the fruit companies abandoned certain lands, they stopped spraying the houses, and the malaria service often did not discover the fact until a year or two latter, with incomplete coverage resulting in the meantime. This problem has been overcome and no more trouble is expected.

The Honduras program is going very well, except for some reservations as to its success in the cotton-growing belt. Here it is too early to say with confidence that malathion will solve the problem. It probably will not be fully effective where an appreciable portion of the houses have mud walls.

Jamaica.- This country carried out malaria control activities until the end of 1957 as a part of a malaria control and Aëdes aegypti eradication program begun in 1952. At the beginning of 1958 a total coverage program of residual house spraying was begun using dieldrin once per year. Early in 1959 it was established that the vector A. albimanus, was resistant to dieldrin and the decision was made to change from dieldrin to DDT, the latter to be applied twice annually in 6-month cycles. By October 1959, this changeover had been accomplished.

The program received good support from the Government and proceeded according to schedule without encountering further technical problems. In July 1960, approximately one third of the population was withdrawn from spraying and placed in the consolidation phase. In December 1961, spraying was discontinued and the entire island placed in the consolidation phase. Intensive surveillance activities have revealed a few cases of P. malariae, classified as induced or late relapses, and one imported case of P. vivax. It is clear that there has been no transmission since 1961 and it appears that eradication may be declared late in 1964 or early in 1965.

Nicaragua.- A cooperative agreement for malaria control and A. aegypti eradication was initiated in January 1951. A. aegypti eradication was declared achieved in 1957, and the program converted to malaria eradication in that year. After a partial year of dieldrin, spraying began full scale in November 1958 with DDT twice a year. Progress was rapid in the Atlantic portion of the country, and about a third of the population in originally malarious areas was placed in consolidation in July 1962 after 3 1/2 years of DDT. Since then sizeable additions to this group have been made each 6 months. In the year 1963, there were some localities adjacent to problem areas which became reinfected, and among these, about 36,000 persons had to be put back under attack. Nevertheless, at the present time (March 1964) 818,586 inhabitants or 49% of the population in the originally malarious area are in the consolidation phase.

Nicaragua has had more persons living in areas with very high levels of DDT resistance than any other country. The Pacific coastal plain with much cotton and sugar cane cultivation, and the Estelí valley, a cotton growing section for many years, have had the highest resistance. Between these areas and the areas of susceptible vectors on the Atlantic side are found populations of A. albimanus that are partially resistant, where progress continues but more slowly than where the vectors are fully susceptible.

The type of DDT resistance in the Pacific coastal region began to change in recent years, the mosquitoes becoming less irritated by DDT and at the same time more resistant to it. This so reduced its value that in these areas, the use of DDT was suspended in 1963, so that the personnel and funds thus saved could be used to mount attacks with drugs in the Estelí valley. No immediate effects of placing the coastal Departments "in recess" was observed during the rest of 1963 because they retained for the most part their normal residues during the period of highest transmission.

Mass drug treatment campaigns have been successful in 75% of the population of the Estelí valley in 9 months, and malaria incidence in the remainder has been greatly reduced although transmission is not completely halted. This failure is due to the lower acceptance of drugs and the very high transmission potential existing. Additional measures are planned for the limited areas of persistence. A similar program of drugs was used in an area with about 6,000 people just east of Managua, and was successful after 16 months.

Larviciding along the shores of Lake Managua was found to be the best method of protecting the city of Managua, although not 100% effective. This will be expanded and improved by the use of fenthion applied from aircraft, and supplemented by drugs if and when needed.

Malathion was field tested in 3 sugar estates and in Estelí, a town of 13,000 people, all with vectors resistant to DDT and susceptible to malathion. It produced excellent results when applied in 4 month cycles, where the houses are nearly all of wood, but poorer results in proportion to the percentage of houses with mud or thatch walls. It is planned to use malathion in areas of high DDT resistance in localities where a high proportion of houses are of wood, and to use drugs or larviciding operations in the others.

Techniques exist for the eradication of malaria in Nicaragua, but the necessary funds for supplementary attack have not yet been made available. These are not prohibitive, less than 20 percent increase in local costs, and about double the cost for outside purchases.

Panama.- A combined malaria control and Aëdes aegypti eradication program was formally established in March 1952. The latter goal was achieved in 1957, and the program was converted to malaria eradication in the same year. Total coverage began in August 1957 using dieldrin once a year. The response was only fair due to operational inadequacies such as 14-15 months expended completing one cycle, poor supervision and incomplete coverage. In addition, there were many changes made in the deposits of insecticides during the course of a year, washing, painting or papering walls, alterations, new houses, etc., which reduce the effectiveness of deposits. No resistance to either dieldrin or DDT has been found.

Due to failure of annual cycles, it was decided to suspend this operation in 1961, and convert to 6 month cycles, using DDT because it was less expensive. Additional PASB personnel were provided in order to improve administrative aspects of the program, and great effort was made to provide a stronger organization before starting the program.

Spraying was started again in May 1962, using DDT twice a year. Administration still leaves something to be desired. The response has been very good in all but 5 limited problem areas, where agricultural redevelopment is causing a rapid influx of inhabitants with the building of many new houses between cycles. The houses are often precarious in construction, and the phenomenon of irritability to DDT may have some role in reducing the effectiveness of residual spraying. Special squads are used to spray the new and altered houses in problem areas between cycles, and to give radical treatment to discovered cases.

Epidemiological data are good, and show an overall reduction from 8.0% of slides positive in 1958 to 2% in mid-1963, and a reduction in falciparum cases from 40% of the total to 10% in the same period. Except for the 5 problem areas, malaria incidence is declining in accordance with expectations. An evaluation of the comparative effectiveness of DDT and dieldrin, both on 6 month cycles, is in progress.

Surinam.- A combined program of malaria control and Aëdes aegypti eradication was began in 1953. In 1957 the malaria control part of this program was converted to malaria eradication and total coverage was started in 1958. The eradication program was based on six-month cycles with DDT in the coastal and savannah areas and annual cycles with dieldrin in the interior.

Spraying operations were carried out on schedule in the coastal region and the savannah areas and after 5 cycles a large portion of the coastal region was withdrawn from spraying and placed in consolidation. There has been no evidence of transmission in this region since that time.

Considerable difficulties were encountered in the interior and in some parts of the savannah. These difficulties centered around the habits of the people of the interior and resulted in many unsprayed houses with continued transmission as the net product. In January 1961, it was decided to spray DDT in 2 cycles per year in the interior and to increase the health education activities in these areas. The difficulties, however, remained and were even increased when the cockroaches became resistant to DDT and people refused to permit spraying. In the 6 month period July-December 1962 only 6,397 houses were sprayed compared to 17,095 which were scheduled for spraying.

In January 1963, DDT was discontinued and dieldrin was substituted for it. This improved acceptance somewhat but approximately 25% of the houses still remained unsprayed.

The elimination of malaria from the coastal area is a big achievement but the problem of the interior makes progress there very slow.

Trinidad and Tobago.- The malaria eradication program was preceded by a malaria control and Aëdes aegypti eradication program which was begun in 1953. Although the first TPO for malaria eradication was signed in July 1959, total coverage spraying was actually begun eighteen months earlier in January 1958. The insecticide of choice was dieldrin but in 1958 it was confirmed that one of the principal vectors, A. aquasalis, was resistant to that insecticide and a change of insecticides ensued.

In addition to the problem of resistance in A. aquasalis, Trinidad also encountered a technical problem of no small dimension in the other principal vector A. bellator, which bred in the bromeliads that invested the shade trees in the coco plantations in the northeast part of the island. A. bellator was a notorious exophagic vector and although some reduction of transmission accompanied spraying in that area it was not sufficient to interrupt transmission. A mass drug administration program using chloroquine and pyrimethamine was initiated in 1959, and the combination of chloroquine and primaquine was introduced in March 1960. By mid 1960 transmission had been stopped in the A. bellator area.

Residual house spraying in other parts of the island was successful in stopping transmission and spraying and mass drug administration were discontinued at the end of 1961 and all areas were placed in consolidation.

The absence of cases since 1961 indicates that it may be possible to certify Trinidad and Tobago as having eradicated malaria by the end of 1964.

West Indies

Dominica.- Malaria control work was begun in 1955 as a part of an expanded program of insect control under the auspices of the Government and PASB/WHO. The principle objectives of this program were as follows:

1. To control malaria on an island wide basis.
2. To eradicate Aëdes aegypti .

In 1959, the Government, with the assistance of UNICEF and PASB/WHO, embarked on a program of malaria eradication. This program involved the spraying of some 2.800 houses in the northern part of the island with the surveillance necessary to evaluate progress plus surveillance as the sole measure among approximately 53,000 people living in other parts of the island. DDT was the insecticide chosen for spraying operations.

The program was strongly supported by the Government and it progressed according to expectations. In November 1962, spraying was suspended after six cycles of six months each and the entire island was placed in the consolidation phase. No malaria cases were found during 1963. The prospects seem good for the certification of eradication late in 1964.

Grenada.- The malaria eradication program was an outgrowth of the malaria control and Aëdes aegypti eradication program begun in 1952. In 1957 the anti-malaria effort was converted to a full eradication program and DDT spraying was begun. The scheduling set forth in the original plan of operations was followed and in February 1960, spraying operations were discontinued. A careful search for malaria cases has not produced any since March 1959. In November 1962, Grenada was certified as having achieved malaria eradication.

St. Lucia.- This island was known as one of the most malarious islands in the Caribbean and attempts had been made to control the disease for twenty years before the establishment of eradication as a goal in 1956. Residual house spraying using DDT was begun in that year and after a prolonged first cycle normal eradication procedures were followed. The five subsequent cycles were carried out on schedule and spraying operations were discontinued in September 1959. No autochthonous cases were

found from June 1957 to May 1963. There were 5 cases of P. malariae which appeared as relapse during that period.

In December 1962, St. Lucia was registered as having achieved malaria eradication.

YELLOW FEVER CONTROL

Brazil-51, Colombia-52

Pursuant to the resolution adopted by the First Directing Council of the PAHO at its meeting in Buenos Aires in 1947 which entrusted the Bureau with the solution to the continental problem of urban yellow fever, at the same time as the campaign for the eradication of the urban vector of yellow fever was initiated, it was considered necessary to reach an understanding with two specialized laboratories in Latin America to assist the other countries in their campaigns for the control of yellow fever. In 1950 agreements were signed with the Oswaldo Cruz Institute in Brazil and the Carlos Finlay Institute, which is part of the National Institute of Health of Colombia, whereby these two institutions agreed to produce yellow fever vaccine 17-D and to distribute it free of charge to the countries which requested it. Epidemiological studies were made on yellow fever and other infections caused by arboviruses and serological tests and pathological studies were made both in the countries concerned and in those that asked for them.

The Organization made a grant of $35,000 to the Colombian National Institute of Health and of $6,000 to the Oswaldo Cruz Institute of Brazil.

Between 1956 and 1962 these two institutions distributed free of charge to the countries of the Americas and also to a few countries in Europe and in Africa 8,970,827 doses of yellow fever vaccine (Carlos Finlay Institute 4,313,827, and the Oswaldo Cruz Institute, 4,653,000). As long as jungle yellow fever which represents a menace to the whole Continent continues to exist, a method for the control of this disease will be necessary.

YAWS ERADICATION

Haiti-1

In 1950 the Government of the Republic of Haiti with the assistance of PASB and UNICEF initiated a campaign for the eradication of yaws.

There are no definite data about the prevalence of the disease at the time the eradication program was begun. However, there are general appraisals which put the prevalence of the disease at 60 per cent or more of the population of the country. This high prevalence made it necessary, for the purposes of eradication of the disease, to regard the whole of the population as exposed to the risk of this disease, for which reason they were to be given massive treatment with penicillin in different dosages according to whether they were patients or contacts.

The yaws eradication program was begun in July 1950. Initially the system of mobile clinics was used, but after one year it was replaced by the method of house to house visits.

Between July 1950 and December 1954 patients numbering 1,281,666 and contacts numbering to 2,225,216 were examined and treated with penicillin. According to these figures 97 per cent of the population of the country was examined and the prevalence of the disease was put at 36.5 per cent of the population examined.

Once the whole country has been covered, the organization of the program was changed so as to allow of the detection of new cases as soon as they occurred. The system of massive treatment of the population was replaced by that of epidemiological investigation of each new case, followed by the treatment of patients and their contacts. In this way in 1955 and the first eight months of 1956, 16,202 patients and 93,858 contacts were treated.

In 1958 the vigilance phase was begun. A special case-reporting system was organized, special attention being given to the ulcerous forms of disease since they are the most infectious. The diagnosis of treponema pertenue showed that only a very small percentage of the ulcers suspected to be yaws ulcers were so in fact and that the great majority were nothing but tropical ulcers. Of 138 specimens examined in 1960 treponema was found in only 1.5 per cent of them.

Between January 1959 and July 1962, 5,736,105 persons were examined and among them 50 patients with yaws in an infectious form were discovered.

For all the persons examined the prevalence of infectious forms was 0.9 per 100,000 in 1959; 0.3 in 1960; 0.13 in 1961, and 0.6 in 1962.

Various steps have been taken to take advantage of the activities of this eradication program to control or eradicate other communicable diseases. The first attempts to include a syphillis control program and smallpox vaccination program had to be abandoned, mainly for financial reasons. However, since 1962 the yaws eradication campaign has been utilized to conduct a smallpox vaccination campaign, with the aim of raising the percentage of the immunized population to 80 per cent. Table 4 shows the development of the yaws eradication campaign in Haiti from 1950 to mid-1962.

FOOT-AND-MOUTH DISEASE CONTROL

AMRO-77

Improved nutrition is an essential factor in the development of the human potential and in the economic and social development of the countries. The production of meat is important for the Latin American economy, especially for the countries which are exporters of this product, but it is also the main source of proteins in domestic consumption. Nutrition studies in Latin America have shown that there is a deficiency of proteins and especially of animal proteins. Control of foot-and-mouth disease in cattle produces a rapid increase in animal proteins for human consumption. It has been calculated that owing to foot-and-mouth disease 25 per cent of the livestock production is lost, including meat and milk. In the Northern region of South America -Venezuela, Colombia, and Ecuador- there are two types of virus in a population of approximately 22,000,000 animals. The Central region -Peru and Bolivia- has three types of virus with approximately 5,500,000 heads of cattle, while in the Southeastern region -Brazil, Paraguay, Uruguay, Argentina, and Chile- where there are more than 130,000,000 head of cattle there are three different types of virus. Assuming an average value of $50.00 per animal and a population of 157,500,000 with a 20 per cent morbidity rate the countries of South America are losing about $400,000,000 a year because of foot-and-mouth disease alone.

It is worth mentioning also that this disease does not only entail an unnecessary expense for the countries which are infected but for also the countries which are free from the disease for they must maintain a continous and stringent vigilance which also represents a significant financial burden.

The Pan American Foot-and-Mouth Disease Center began its activities in 1951 with funds coming from the Technical Cooperation Program of the Organization of American States, in compliance with a resolution of the Inter-American Economical and Social Council. Each year the funds and the budget of the Center are approved by the above-mentioned Council and in 1962 additional financial support was obtained from the Agency for International Development in order to accelerate the Center's program.

The purposes of the Center are to aid the Governments of South America in which foot-and-mouth disease exists in the control and, where possible, the eradication of this disease and to assist the other countries of the Hemisphere to keep themselves free from this serious disease. The program of the Center is carried out through a series of services. These include the training of national personnel in both field activities and laboratory activities; laboratory reference service including typing of specimens of the virus collected during epidemics; technical advice to national services for the prevention of foot-and-mouth disease and coordination of national programs on a regional basis. The Center also carries out research on problems relating to the control and eradication of foot-and-mouth disease in the Hemisphere.

Most of the research efforts have been devoted to improving methods of diagnosis and of improving existing vaccines and also developing a new vaccine which will produce a more lasting immunity.

The activities the Center has carried out in its 12 years of existence may be arranged under four heads:

1) Training.- 18 training courses have been held in the Center and in different countries. The duration of these courses varied from two weeks to two months. They have provided training to professionals for each of the countries of the Hemisphere. About 60 per cent of the participants of these courses have been awarded fellowships financed by the budget of the Center itself.

In addition to group training courses many professionals have remained at the Center for individual training over a period ranging from 3 to 12 months.

From its establishment up to 1963 inclusive, the Center has provided training in special courses or individually for 287 professionals, of which 231 were awarded fellowships; the remainder were financed by their respective countries.

2) Laboratory services.- Laboratories in South America had been provided with sera, virus strains, laboratory animals for breeding purposes, and other supplies. Currently specimens of virus are being received, especially from countries in which epidemics are ranging for the purpose of identifying the type and subtype of the causal virus. This identification has special importance since it ensures that the vaccines used will be specific to the strain of virus producing the epidemic. With the exception of the United States of America and Mexico, all the countries free of the disease, do not have any facilities for differential diagnosis and are also serviced by the Center.

3) Technical advisory services.- These services are provided to Governments through correspondence, visits, and by personnel from the Center stationed in some of the countries. Advisory services cover all aspects of the national programs for the control of this disease, including legislation, personnel training, laboratory services, field control programs, and production and testing of vaccines.

In addition, the Center is studying the disease as a continental problem in order to delimit its regional nature, and has established regional projects covering more than one country.

4) Research.- This program is one of the most important activities of the Center.

For many years the only vaccines available were dead virus vaccines which were high in cost, difficult to prepare, and not very efficient. In addition, the immunity induced in animals lasted only for 4 to 6 months so that it was necessary for cattle owners to vaccinate cattle two or three times a year in order to protect them.

The Center has devoted a great deal of effort to research in developing techniques for producing a cheaper more efficient vaccine.

At the same time serious efforts have been made to find a method of testing the vaccine in small laboratory animals in order to measure the potency of the vaccine. Up to now the tests involved the use of large animals, which made them expensive. Because of this, many of the vaccines placed on the market have not been tested for potency and safety. The studies which the Center is carrying out in this field are very promising and it is hoped that they will soon be successful.

Together with other research institutes throughout the world, the Center has been investigating different methods of developing and selecting attenuated virus in order to produce a live virus vaccine. In many aspects these studies have been similar and parallel to the studies for the production of the poliomyelitis vaccines developed by Salk and by Sabin.

Success has been obtained in the development of vaccine strains for each of the three types existing in South America "A", "O", and "C". These strains are still at the development stage but some have been used in field tests, and, on two occasions at least in epidemics, with very promising results.

There is no doubt that live virus vaccines will mean a great advance over dead virus vaccine, the production costs are less and the studies made up to date show that the immunity induced in animals lasts for at least one year.

The services of the Pan American Foot-and-Mouth Disease Center will be necessary until the disease has been completely eradicated from the Western Hemisphere.

TRAINING IN BIOSTATISTICS

AMRO-10

This project, which was begun in 1952, has passed through 4 succesive phases. These have been necessary in order to meet the needs of the countries of the Americas for trained personnel in the field of vital and health statistics. The four phases are as follows:

1) Inter-American Biostatistics Center in Chile, 1952 to 1955.

2) Program for biostatistics education, with courses at the intermediate level in Chile, 1956 to 1960.

3) Program for biostatistics education, with high level specialization in Chile, 1961.

4) Program for biostatistics education, with courses at the intermediate level in different countries, 1963.

1. In August 1952 the Inter-American Biostatistics Center was established under the auspices of the Government of Chile, the United Nations, and the World Health Organization. Its main purpose was to give an annual course in vital and health statistics in the School of Public Health of the University of Chile for intermediate level officials in Latin American countries. However, other equally important activities were carried on, such as the organization of demonstration centers for students; translation, reproduction, and distribution of technical material, and so on. In this period, from 1952 to 1955, 55 fellows studied in the Center, 16 with fellowships from the United Nations, 38 from the Organization, and 1 from the Government of the United States of America. In the first three courses 96 intermediate level statisticians were trained in courses lasting for 9 months. The United Nations and the Organization provided consultants and administrative officials to organize and conduct the courses during this period. The United Nations ceased to participate in December 1955.

2. In 1956 a new agreement was signed whereby the annual courses in vital and health statistics were to be continued in the same School of Public Health under the auspices of the Government of Chile and the Organization. In this phase there was a considerable reduction in the participation of the consultants of the Organization since trained personnel were available locally. The School of Public Health took on the responsibility for the administration of the training program, the principal function of which was the collection, analysis, and publication of statistical data and the teaching of vital and health statistics in the countries of Latin America.

The financial contribution of the Organization consisted of a grant to cover professional, technical, administrative, and auxiliary staff for all the services necessary for the program. However, the Organization continued to provide, consultative services and fellowships although to a rather limited extent.

3. A specialization course in biostatistics for medical officers following the main course at the School of Public Health was begun as an experiment in 1960 and, subsequently, in 1961, was put on an official basis. The first course, which was attended by 11 students from 5 different countries, was begun in 1961 and was completed in 1962. In 1962 an intermediate level course was given; it lasted for 6 months and was attended by 34 students. The course which began in March 1963 and is to finish in mid-1964 was again for professional personnel.

4. At the present time instruction in biostatistics has been extended to several countries. In addition to the fellowships which are being given for courses in Chile some fellowships have also been given for courses offered in Schools of Public Health in Argentina and in Mexico.

In the 11 years -1953 to 1963- 338 students have been trained in this project in 20 different countries. Many of these students are at present serving as professors of statistics; others are working as statisticians in health services; and some are engaged in scientific research.

This project (AMRO-10) has made a major contribution to the training of personnel in statistics and has lead to the establishment of a good department of biostatistics in the School of Public Health of the University of Chile, with several full-time professors.

It is interesting to note that whereas at the beginning of the program part of the instruction had to be given by special consultants recruited in the United States of America, in the final stage special short-term consultants were only very occasionally contracted for special subjects.

NATIONAL HEALTH SERVICES

Colombia-4

At the end of 1950 the Government of Colombia began to show interest in developing a program for the improvement of its health services in cooperation with the Organization. The negotiations extended over a period of some months and in the course of 1951 the first agreement relating to this project was signed.

This first stage, which lasted until 1956, had as its purpose that of assistance in developing a Department of Obstetrics, which was later expanded to become a Maternal and Child Health Department in the Higher School of Hygiene, which was responsible for the training of public health personnel. It included in particular the organization of demonstration courses in obstetrics and the development of a training program in maternal and child health for medical students.

In the first five years of this project the Department of Maternal and Child Health was established in the School and six courses were held; the first three were exclusively devoted to obstetrics and were for graduate nurses. In 1954 a basic change was introduced by adding to the course of obstetrics several subjects concerned with public health nursing. Up to 1956 a total of 46 nurses had been trained in these courses. These nurses received fellowships from various organizations, in particular the Ministry of Health and the Department of Health Services, so that when they completed their courses they were to provide services throughout the country.

Since the beginning, UNICEF has cooperated in this project, supplying teaching material, transport for nurses, and working equipment.

In 1954 the Government expressed its interest in beginning a broad program for the development of local health services. For this purpose the Organization cooperated in a complete study of the health problems, resources and needs in five Departments of the country and on these basis a plan of operations was drawn up with a view to training personnel, strengthening the work team, and providing for the appropriate mobilization of a certain number of health centers strategically located in each of the five departments. These centers were to be responsible for providing basic public health services in the area under their jurisdiction. The five departments selected were those of Boyacá, Cundinamarca, Norte de Santander, Nariño, and Valle del Cauca.

In order to ensure the success of this program the Higher School of Hygiene, which is attached to the Ministry of Public Health, was properly reorganized so that it could provide annual orientation courses in public health for physicians, for graduate nurses, for sanitary inspectors, and for statisticians. Steps were also taken to train a sufficient number of auxiliary nurses and this was done locally in each of the departments.

After extensive negotiations with the Government and with UNICEF, which immediately expressed interest in this program, a new agreement was signed in 1956, the general purposes of which may be summarized as follows: to reorganize and progressively raise the technical level of the Ministry of Public Health and its sectional organizations throughout the country, including the training of personnel, and to draw up a long-term general public health plan for the country, including the development of a pilot project in five departments.

During the five years since this agreement was signed, the following has been accomplished:

The reorganization of the Ministry of Public Health at the central level, the preparation of which was begun in 1957, was legally established on 9 June 1960 through a decree of the same date, which created an office of planning and coordination. During this period training of technical personnel was intensified both abroad and in the country in order to have the staff necessary to fill the new posts in the Ministry.

In the course of these five years the Organization has provided 49 fellowships for physicians, nurses, and other professionals to enable them to prepare themselves abroad in their own speciality, and a total of 555 persons, including professionals and auxiliary workers, have been trained in Colombia.

As mentioned above, one of the objectives of the program was to develop a pilot program in a geographical area representative of the country so as to gradually extend services to the rest of the country.

This activity began in 1957 in two of the departments and the intention was to gradually extend it to the other three, to which a sixth department was added during the period. In 1960, 19 centers provided for in the Plan of Operations had been established.

In accordance with the objectives a ten-year national health plan was drawn up, as was a more detailed four-year plan.

In order to improve the departmental health services, posts as deputy departamental director were created and were filled with persons duly trained in health administration.

While the general health activities were being carried on in the local health centers of the above-mentioned departments, a water supply an excreta disposal program was began in the rural areas of the same departments.

By 1961, 12 water systems had been constructed and 8 more begun. Four wells had been bored, and 11 others had been begun, and two water treatment plants for four towns had been constructed. At the same time 10 sanitary workshops were constructed in order to cheapen the cost of producing materials for sanitary privies. By the end of 1961, 36,967 privies had been constructed in the six pilot departments.

In 1962 with the participation of UNICEF a more intensive sanitation program was begun and by the middle of 1963,10 rural water systems had been constructed, 117 wells dug and 50 wells bored in the 6 pilot departments which were functioning at that time. At the same time 14,465 privies were constructed.

Side by side with the execution of the sanitation plan in the pilot departments and thanks to the contributions of the Ministry of Health, water supply systems for some rural sections were constructed in other parts of the country. The works constructed in 1962 in 17 departments included 426 dug wells, 32 bored wells, 113 small water systems and 8,940 domiciliary connections to water systems. The total investment was 1,251,933 pesos.

In 1961 a study was begun on a new plan of operations based on the experience gained in the operation of the earlier plan.

This new plan, in accordance with the logical evolution of the program, was oriented toward the development of health services throughout Colombia. In addition to completing the reorganization at the ministerial level, this plan stated the need for gradualy reorganizing the sectional health agencies, in accordance with the philosophy of centralization of policy-making and descentralization of administration on which the reorganization of the public health administration in the country was based. In this respect it is worth

noting that the study made by a Special Commission appointed by the President of the Republic and advised by specialized officials of the United Nations Technical Assistance based the reorganization of the public administration in the country on the plan for the reorganization of the Ministry of Health which was taken as a model.

One of the objectives of this new plan, which fits in with the ten-year health plan, is the reorganization of local services whereby each health district will contain 100,000 inhabitants or a fraction thereof large enough to justify its being a separate health district. In other words, the intention is to reach a position by 1971 where there are 200 integrated health districts each containing 100,000 inhabitants.

In 1962 and 1963, 14 new districts were established so that at present there are 46. The development of these districts is based on the direct intervention of the community in the execution of the program.

It is also worth noting that, as an expansion and improvement of the orientation courses initiated at the beginning of this program, the School of Public Health was established and began operations in Bogotá and that since 1959 it has been receiving technical advice from the Organization and has already trained a large number of professional medical personnel.

NUTRITION

AMRO-54

In 1946 a Congress on Nutrition was held in the city of Guatemala under the auspicies of the Pan American Sanitary Bureau. It was attended by delegates from the Central American republics and from Panamá, who agreed to establish an institute which would concern itself with the nutritional problems of the people in those countries and help to solve them.

For this purpose an agreement was signed between the countries concerned and the Bureau whereby the countries each undertook to contribute for a period of four years an annual amount of $8,500 in order to finance the institute. The Bureau agreed to accept the responsibility for administering the Institute and undertook to provide or obtain the necessary fellowships for the preparation of the technical personnel.

In 1949 a group of professional technicians who were chosen for this purpose and sent abroad for training, under the auspicies of the Pan American Sanitary Bureau and the W. K. Kellogg Foundation, finished their studies in diverse branches of science related to nutrition. In the same year a meeting was held in Tegucigalpa, Honduras, to decide on the future of the young institution. El Salvador, Guatemala, and Honduras agreed to sign with the PASB a document known as the Protocol of Tegucigalpa which defined in greater detail the technical and administrative structure of the Institute.

This Protocol established a Council composed of a representative of each signatory country and of the Pan American Sanitary Bureau and also a Consultative Technical Committee composed of distinguished scientists in the field of nutrition and related fields.

The Government of Guatemala offered to construct a building to house the main offices and laboratories of the Institute.

The Institute began its work in September 1949 under the direction of Dr. Nevin S. Scrimshaw who served from the beginning to 1960 in a double capacity as Director of INCAP and also as Chief of the Nutrition Branch of the Pan American Sanitary Bureau. Subsequently, the countries which had not been active members of this Institute adhered to the 1949 Agreement. Costa Rica adhered in 1950, Panamá in 1951 and, finally, Nicaragua in 1954. The annual quotas were fixed to $12,500 in 1950 and at $17,500 in 1957. At the XIV Meeting of the Council, which was held in November 1963, the annual quotas were increased to $20,000 from 1964 onwards.

In 1953 the countries signed the Basic INCAP Agreement and requested the Bureau to continue to act as representative of the countries in administering the Institute.

The responsibilities which were assigned to the Institute from the very beginning may be summarized under three basic heads: to investigate nutritional problems in the area; to find solutions to these problems; and to assist the Member Governments in applying the measures recommended as a result of these studies.

In accordance with this responsibilities a plan of work was drawn up, commencing with a detailed appraisal of the nutritional problems in the area. For this purpose a field unit was established in each of the Member Countries in order to make surveys covering representative zones of each country, studies of dietetic habits and food consumption, clinical, nutritional, and laboratory studies, all aimed at defining the nature and magnitude of existing nutritional deficiences. At the same time a start was made on laboratory work to supplement the scanty information available on the composition of foodstuffs in the region, in order to prepare a complete table for interpreting the dietetic studies being carried out among various population groups.

From the very beginning special attention was devoted to the in-service training of the auxiliary personnel from member countries to prepare to cooperate in the studies being developed and later in the action programs.

One of the constant preoccupations of the Institute from the very beginning was the training of a body of professional technicians and for that purpose fellowships were awarded to professionals to enable them to specialize in branches of knowledge which the many-sided work of the Institute required.

From this stage of collecting information on nutritional problems the transition was gradually made to the stage of seeking solutions.

During the early years of work the following came to the fore as problems demanding urgent action: endemic goiter, the average prevalence of which for each of the countries varied from 16 per cent in Costa Rica to 38 per cent in Guatemala; protein deficiency, in particular of proteins with a high biological value, which was very important factor in the high mortality and morbidity in children and also in the marked retardation in their growth and development; vitamin A deficiency, which was responsible for eye lesion, in small children and a frequent cause of blindness; and lack of ribaflavin in the whole area and of calcium in Costa Rica and Panamá.

With these findings as a basis, the Institute directed its studies toward the solutions of these problems. Endemic goiter studies showed that the usual procedure of iodization of salt with potasium iodide, which up to then was the only one recommended, was not applicable to the merit, crude, unrefined salt consumed in the region. With the aid of special consultants the technical, legal, and administrative aspects involved in endemic goiter control measures were studied, and detailed recommendations were presented to the consideration of the countries. These recommendations are at present being put into operation in some of the countries.

However, from the beginning most of the efforts of the Institute were concentrated on the problem of protein malnutrition and of the most effective ways of solving it. Thus in cooperation with agricultural organizations, studies aimed at increasing and improving sources of nutrients in particular of proteins with a high biological value that were lacking in the normal diet of the population, were begun. It should be pointed out that in all these studies the main aim was to make effective use of the resources available, or potentially available, in the area.

The measures necessary to ensure the inclusion of programs of education in nutrition at all levels of teaching were adopted. For that purpose it was necessary to train personnel in each of the countries and to prepare educational reference materials.

So that member countries could make the best possible use of the services provided by the Institute, every effort was made during this period to transform the field units of the country into technical services or departments operating within the Ministries of Health themselves and for them to become responsible for the planning, supervision, and evaluation of all applied nutrition activities.

In addition, at the Institute itself formal programs for training physicians, nutritionists, and for other interested professionals were organized, and the training of auxiliary personnel became a local responsibility of the countries and as one of the attributions of the professional staff that had been trained.

With respect to practical achievements the Institute succeeded in establishing direct collaboration with agricultural organizations in the area by means of programs directed at increasing the availability of the foodstuffs most necessary in the basic diet of the population and at improving the nutritional value of the diet. It was also successful in developing vegetable mixtures from products available locally and in preparing dietary supplements which provide the nutrients lacking in the diets usually consumed (proteins with a high biological value, vitamin B complex, vitamin A, and calcium). These vegetable mixtures not only had to cost less than other sources of nutrients but also had to fit with the eating habits of the country. All these studies led to the preparation and acceptability testing of the product known as INCAPARINA which is at present on sale in Guatemala, and in different phases of study in the other countries of the region, as well as in México, Colombia, and Venezuela.

As the work of the INCAP became more and more known, its prestige as a serious institution began to grow, and its budget was increased, basically as result of grants for research and this in turn led to an increase in the size of its staff. This made it possible to carry out studies of capital importance (on such matters as the relationship between nutrition and infectious diseases; methods for diagnosing subclinical forms of malnutrition that were applicable to population groups; the relationship between diet and atherosclerosis), which could serve as the basis for action programs in the member countries. At the present time INCAP is receiving 20 grants for various types of research.

In the same way, the W. K. Kellogg Foundation gave a grant for an applied education-in-nutrition program, which made it possible for technical advice to the countries to be increased and for work to be done jointly with other international organizations in the organization of coordinated programs of applied nutrition. In these, the health agencies united their efforts to attack nutritional problems with those of agricultural and educational agencies. It is worth pointing out that these joint programs were began as pilot projects in selected areas in each of the member countries, with the aim of extending them in accordance with the possibilities and circumstances of each country.

INCAP has insisted that the nutrition programs should not be independent of the regular programs of the health services but should be an integral part of the total effort, and that their priority and intensity should be that indicated by an examination of the problems and resources in each country.

In addition to the direct services which the Institute furnishes to the countries of Central America and Panama, the experience of the Institute specially in the training of personnel is being put to wide use not only by the region but by the whole Continent and also by other areas of the world which have similar nutritional problems. In the same way the original contributions made through research on how to tackle and solve nutritional problems have been utilized beyond the frontiers of the member countries of the Institute.

Between 1950 and 1963 INCAP trained 437 persons. The rhythm at which nutrition personnel are being trained is increasing from year to year as shown in table 5.

Mention should also be made of the fact that the staff of the Institute published 532 articles relating to nutrition problems between 1949 and 1963 and that another 75 articles are ready for publication.

Its staff increased from 25 in 1951 to 48 in 1956 and to 162 in 1963.

Enclosures

TABLE 1

STATUS OF THE AEDES AEGYPTI CAMPAIGN IN THE AMERICAS, 1963

Country or other political unit	Date begun	Date last available report	Area initially presumed infested		Localities inspected since the begining of the campaign				
						Initially positive			
								Verified	
			Total	Inspected	Number	Total	Treated	Number	Still positive
French Antilles and Guiana									
Guadeloupe	Jan. 1957	Oct. 1961	1,619	4.9	53	38	38	27	20
French Guiana	May 1949	Oct. 1963	91,000	100.0	222	55	55	55	1
Martinique	Nov. 1953	March 1962	1,000	100.0	34	21	19	19	2
Netherlands Antilles									
Aruba	March 1952	May 1963	174	100.0	9	9	9	9	-
Bonaire	Sept. 1952	Oct. 1963	246	100.0	6	6	6	6	-
Curaçao	Oct. 1951	Dec. 1963	448	100.0	5	5	5	5	5
Saba, St. Eustatius St Martin	July 1958	Nov. 1963	65	100.0	34	30	30	30	15
Colombia	Nov. 1950	Dec. 1963	280,000	100.0	3.801	355	355	355	2
West Indies									
Anguilla	April 1953	June 1962	88	100.0	19	19	19	19	18
Antigua	Aug. 1954	Oct. 1962	283	100.0	50	47	47	47	25
Barbados	March 1954	Dec. 1963	171	100.0	99	98	98	98	48
Bermuda	Jan. 1951	Dec. 1951	53	100.0	9	9	9	9	-
Dominica	Feb. 1951	Oct. 1956	789	50.0	136	66	66	66	16
Grenada	Nov. 1952	July 1959	311	100.0	8	8	8	8	-
Grenadines	Nov. 1952	June 1962	65	100.0	7	5	5	5	4
British Guiana	March 1946	Dec. 1963	4,662	100.0	93	21	21	21	2
Bahama Islands	June 1954	Oct. 1963	11,396	1.3	13	10	10	10	9
Virgin Islands	March 1960	Feb. 1963	174	74.6	23	23	23	23	8
Montserrat	May 1956	Dec. 1963	83	100.0	33	16	16	16	2
St. Kitts-Nevis	April 1953	Jan. 1963	308	100.0	43	43	43	43	-
Saint Lucia	May 1953	April 1963	259	100.0	50	50	50	50	37
Saint Vincent	March 1953	March 1963	332	100.0	8	8	8	8	-
Jamaica	Feb. 1950	Sept. 1963	11,424	100.0	14	12	-	-	-
Mexico	Jan. 1951	Aug. 1963	1,000,000	100.0	4,272	600	600	600	-
Dominican Republic	Oct. 1952	Aug. 1962	42,020	80.4	1,420	351	351	319	15

TABLE 2

HISTORICAL SUMMARY OF 12 COUNTRY MALARIA ERADICATION PROJECTS BEGAN AS MALARIA CONTROL AND A. AEGYPTI ERADICATION
(As of November 1963)

	PROJECT NUMBER	AGREEMENTS (Dates)						TECHNICAL PROBLEMS FOUND AND SOLUTIONS APPLIED (Dates)					ACHIEVEMENTS						
		Malaria Control and A. aegypti Eradication	Malaria Eradication					Resistance to insecticides:		Switch to DDT spraying	Anti-larval experiments	Malathion experiments	A. aegypti Eradication		Malaria Eradication				
			First-TPO	Amendments												Population in thousands			
				Drugs	Extension	Experiment malathion	Experiment mass drug	DDT	dieldrin				Achieved	Not achieved	Date Spraying began	(1) Original malarious area	(2) 1st area in Consol. phase	(3) Latest figure of Pop. in Consol.phase	Malaria Eradicated
1	British Honduras-1	12 Feb.51 Gov./WHO	27 Mar.57	4 Feb.58	10 May 63				1959	May 1959			1956[a]		4 Feb.57	100	Aug. 1962 100	100	
2	Costa Rica-2	21 Sep.50 Gov./WHO	2 Jun.58	2 Jun.58	14 Nov.61								1961		15 Jul.57	412	July 1962 255	255	
3	Dominican Republic-2	22 Apr.52 Gov./WHO	Aug.55		26 Mar.59				1959	Mar. 1960[b] Aug. 1963				Infested	16 Jun.58	2,647			
4	El Salvador-2	2 Jan.51 Gov./WHO	3 Dec.57	21 Mar.58	4 May 60	8 May 59	26 Jun.61	1958	1958	Aug.1958			1960		1 Jul.56	1,820			
5	Guatemala-1	2 Jan.51 Gov./WHO	7 Nov.57	21 Feb.58	19 Mar.62			1959	1958	Oct.1958			1959		1 Aug.56	1,782	Jan. 1962 175	895	
6	Honduras-1	26 Apr.51 Gov./WHO	27 Feb.58	27 Feb.58				1959	1959	Jul.1959			1959		15 Jul.59	1,561	July 1962 46	526	
7	Jamaica-2	31 Oct.52 Gov./WHO	13 Feb.59		12 Oct.59				1959	Oct.1959				Infested	2 Jan.58	1,282	July 1960 313	1,282	
8	Nicaragua-1	2 Jan.51 Gov./WHO	17 Jun.57	4 Feb.58				1959	1958	Jul.1959	1961	1961	1957[a]		10 Nov.58	1,571	July 1962 515	620	
9	Panama-2	18 Mar.52 Gov./WHO	11 Oct.57	21 Apr.58	14 Oct.58 (vehicles)					May 1962			1957[a]		19 Aug.57	1,091			
10	Surinam-1	27 May 53 Gov./WHO	30 Dec.57	27 Jan.58	15 May 58									Infested	5 May 58	185	Jan. 1961 115	125	
11	Trinidad and Tobago-3	2 Jun.53 Gov./WHO	3 Jul.59	2 Jun.60	10 Oct.60				1958	1960			1963[c]		2 Jan.58	877	1958 160	877	
12	West Indies-17 Dominica	2 Sep.55 Gov./WHO	13 Apr.59	6 Jan.59	13 Apr.59									Infested	8 Jun.59	14	Jan. 1963 14	14	
	West Indies-17 Grenada	11 Jul.52 Gov./WHO	22 Aug.56	17 Jul.59	18 Nov.60								1958[d]		12 Feb.57	37	Feb. 1960 -		37[e]
	West Indies-17 St. Lucia	7 Jan.53 Gov./WHO	13 Aug.56	4 Sep.58	8 Jun.59									Infested	16 Jan.56	82	Oct. 1959		82[e]

a.- Eradication confirmed by the XV Pan American Sanitary Conference, San Juan, Puerto Rico, 1958.
b.- Cycles of 9 months.
c.- Government claims eradication achieved but it was not yet confirmed by PAHO.
d.- Government claims eradication achieved since 1958 but it was not yet confirmed by PAHO
e.- Registered as area of Malaria eradicated by PAHO, in 1962.

(1) Mid-1962. (2) On the dates shown. (3) As of July 1963.

TABLE 3

AGE OF SELECTED MALARIA ERADICATION PROJECTS AND THE PERCENTAGE OF POPULATION OF THE ORIGINALLY MALARIOUS AREA LIVING IN VARIOUS PHASES OF THE CAMPAIGN, AS OF NOVEMBER 1963

Project number	Years of Age		% Population in		
	Since spraying operations began	Since DDT spraying began	Attack phase	Consolidation phase	Maintenance phase
El Salvador-2	7	5	100.0		
Guatemala-1	7	5	49.8	50.2	
St. Lucia- W.I.17	6	6*			100.0
British Honduras-1	6	4		100.0	
Costa Rica-2	6	6	38.1	61.9	
Panama-2	6	1	100.0		
Grenada - W.I.17	5	5*			100.0
Dominican Republic-2	5	3	100.0		
Jamaica-2	5	4		100.0	
Trinidad and Tobago-3	5	3		100.0	
Surinam-1	5	5	32.4	67.6	
Nicaragua-1	5	4	100.0		
Honduras-1	4	4	66.3	33.7	
Dominica- W.I.17	4	4		100.0	

* Project terminated in 1962

TABLE 4

YAWS ERADICATION PROJECT IN HAITI

1950 - 1962

YEAR	PERSONS EXAMINED	PERSONS TREATED	PATIENTS DETECTED		CONTACTS TREATED	PREVALENCE	
			INFECTIOUS	ALL FORMS		INFECTIOUS FORMS	ALL FORMS
July 1950 Dec. 1954	3,506,882	3,506,882		1,281,666	2,225,216		36.5%
1955 1956	110,480	110,060		16,202	93,858		14.3%
1959	625,513		6	635		0.9 x 100,000	100 x 100,000
1960	1,920,701		6	695		0.3 x 100,000	360 x 100,000
1961	2,308,706		32	272		0.13 x 100,000	11.7 x 100,000
1962 (Jan.-July)	881,185		6	80		0.6 x 100,000	9.3 x 100,000
TOTAL:	9,353,467	3,616,942	50	1,299,550	2,319,074		

TABLE 5

NUMBER OF PERSONS TRAINED AT INCAP

IN THE PERIOD 1950-1963

Year	Number of trainees	Year	Number of trainees
1950	11	1957	37
1951	24	1958	42
1952	34	1959	37
1953	19	1960	56
1954	12	1961	48
1955	18	1962	52
1956	28	1963	69
		Total number of trainees:	487