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Report to the XV Pan American Sanitary Conference

One of the major concerns of the Pan American Sanitary Bureau has been to carry out, as rapidly and effectively as possible, the terms of the resolution of the I Meeting of the Directing Council of PASO (Buenos Aires, 1947) that entrusted to the Bureau the coordination of the continent-wide campaign against the Aedes aegypti. After only slightly more than a decade, and considering the nature of the campaign and the difficulties that have arisen, the present situation is deemed to be encouraging. A summary of the status of the eradication campaign in the Americas is presented below, in alphabetical order by countries and other areas, according to the latest available reports for 1958 and prior years.

COUNTRIES

Argentina. Of the 2,051 localities inspected, 141 were found to be aegypti-infested. Among the latter, elimination of the mosquito has been confirmed in 106 of 110 localities examined after treatment was applied. The results thus far show that infestation in the tropical and subtropical areas of Argentina is low, though widely dispersed, a fact indicating that railroads have played the key role in spreading the infestation. Few investigations have been made in the temperate zone, where Buenos Aires is located, but two areas outside the city limits were found to be infested, and this fact indicates the degree to which the vector has penetrated. The eradication campaign, undertaken on an intensive scale only since 1955, shows promise of achieving conclusive results in the next few years.

Bolivia. A. aegypti is considered to have been eradicated from Bolivia since 1948, according to the standards established for the campaign.

Brazil. As revealed in the latest checks, the extensive areas in the eastern and northeastern regions where aegypti were until recently present have now been found to be negative. The vector has not been found elsewhere in the country for several years. In order to confirm

eradication, the final verification in what were previously the most highly infested areas is now being made with the cooperation of PASB technical personnel. As of the date of preparation of this report, the results have continued to be negative.

Chile. All of the 44 previously infested localities showed negative results in the checks made from 1954 to 1955. In a check made in May 1958 with the cooperation of PASB staff, one locality was found to be positive in the area where aegypti eradication operations proved to be the most difficult.

Colombia. The campaign in Colombia is nearing completion. All of the areas bordering on the Caribbean and along the Magdalena River Valley are considered to be free of A. aegypti. Checks are being made in a sector of the Cauca highlands, a sparsely populated eastern region and in the Pacific coastal area. It is expected that infestation there will be very low and that the campaign may be terminated by the end of 1958.

Costa Rica. The campaign has been in its final phase since 1952. Only the final verification remains to be made; this will be undertaken in September 1958 with the cooperation of PASB personnel.

Cuba. The nation-wide campaign, initiated in March 1954, could not be carried through as foreseen because of the shortage of personnel. All the available personnel were concentrated in Havana, in the expectation that within a short time the campaign could be extended to the entire island, at present one of the major aegypti strongholds in the Americas.

Dominican Republic. Anti-aegypti activities have been carried on since 1952 under the direction of the antimalaria campaign. The results have not been satisfactory because operations in the urban areas were conducted only irregularly and, in addition, the aegypti showed a certain resistance to DDT. Measures were taken to redefine the campaign and to replace DDT with another residual-action insecticide.

Ecuador. Ecuador has been considered to be free of A. aegypti since 1953, when the last focus was discovered. The final verification, now under way with the cooperation of PASB technical personnel, is confirming this fact.

El Salvador. The capital of the country was the only point found to be positive in the checks made in 1956. The 190 localities previously infested continue to be negative. The areas not previously investigated have been found to be negative. Verification is now being made, with the collaboration of PASB technical staff, in all localities where aegypti could possibly be present, so that the campaign may be terminated by mid-1959.

Guatemala. All the previously infested localities have been found to be negative. The number of checks made is sufficient to permit a confirmation of eradication, once the supplementary operations of mosquito-capture in

urban areas and search for foci in rural areas have been completed. Guatemala is expected to be one of the countries soon to be declared free of A. aegypti.

Haiti. The situation in Haiti is not satisfactory. Of the 2,377 localities inspected, 603 were found to be positive. In the latter, negative results have been obtained in 408 of 435 localities examined after treatment was applied. The campaign in this country is being reorganized.

Honduras. The anti-aegypti campaign, interrupted in 1955, when all 53 previously infested localities were already negative, has now been resumed. Campaign operations are being extended to the areas not yet investigated, so that a final verification may be made in the urban zones, with the cooperation of PASB technical staff, in order to confirm eradication of A. aegypti by mid-1959.

Mexico. When the campaign was interrupted for the second time in August 1955, among the 482 localities initially positive there were 223 in which negative results had still to be obtained or confirmed. It is expected that spraying operations of the antimalaria campaign, started in 1956, will considerably reduce the aegypti-infestation in rural areas and that the problem will be confined to the large cities of the Yucatán Peninsula and along the seacoast.

Nicaragua. The final verification completed in 1957 with the collaboration of PASB technical staff confirmed the eradication of A. aegypti in the 18 areas previously infested in the country.

Panama. A. aegypti eradication was also confirmed in Panama in the final verification made in June 1957 with the collaboration of PASB technical personnel. However, an area of 13,295 km² has yet to be investigated.

Paraguay. A. aegypti eradication was confirmed in Paraguay in 1955, through the final verification made with the assistance of PASB technical staff.

Peru. The 191 localities previously infested are considered to be free of A. aegypti. The final verification is under way with the cooperation of PASB technical personnel, and completely negative results are expected.

United States. The most recent information indicates that of 15 cities in the south of the country which had indices of from 1 to 21 per cent during World War II, 10 were still positive in 1952, when inspections in 32 cities revealed, in 21 of them, indices ranging from 0.5 to 50.0 per cent. In surveys made in July 1956 and in 1957 in San Antonio, Texas, indices of 4.5 and 13.0 per cent, respectively, were found. Of the 38 cities inspected during 1957 in the states of Florida, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, North Carolina, Tennessee, Arkansas, Oklahoma, Virginia, Kentucky, Missouri, and Kansas, 17 were

found positive, with indices ranging from 1 to 52 per cent. The United States Government, greatly interested in solving the problem, has installed a pilot project in Pensacola, Florida, in order to establish a plan of operations covering all regions of the country where A. aegypti may possibly exist.

Uruguay. The verification made in Montevideo with the cooperation of PASB technical staff again produced negative results. This was the last test made prior to considering this country free of A. aegypti, for the mosquito has been eradicated since 1955 in all the 132 previously infested localities in the interior of the country.

Venezuela. The emergency campaign carried out in Caracas and other cities as a protective measure against the 1954 yellow fever outbreak appears to have produced good results, though some important cities, including the capital, continue to be positive. In certain areas A. aegypti has shown resistance to DDT, and it is therefore imperative that the latter be replaced by another residual-action insecticide. The Government has made an important budgetary provision for the fiscal year 1958-59, which will make possible the initiation of a campaign to eliminate the mosquito in Venezuela.

OTHER AREAS

Antigua and Barbuda. Of the 49 localities found to be infested when the campaign was initiated, 13 continue to be positive.

Bahamas. The anti-aegypti activities are limited to the island of New Providence, where only 3 of the 11 localities originally positive continue to be infested. The situation in the remaining 20 inhabited islands of the archipelago has yet to be determined.

Barbados. Of the 95 localities initially infested, 13 continue to be positive for aegypti.

Bermuda. After repeated applications of DDT, this island is considered to be free of aegypti.

British Guiana. After elimination of the reinfestation in Georgetown, it appears that the results in the other localities previously infested continue to be negative. The final verification will be made as soon as possible.

British Honduras. The final verification made late in 1956 with the collaboration of PASB personnel confirmed the absence of A. aegypti.

Canal Zone. This Zone was found free of A. aegypti.

Dominica. Of the 66 localities originally infested, 16 continued to be positive in October 1956, the last month under report.

French Guiana. French Guiana is considered to be free of A. aegypti, inasmuch as all the 55 originally infested localities continue to be negative.

Grenada and Grenadines. All the 13 previously infested localities, except the islands of Bequia and Carriacou are now negative.

Guadeloupe and Dependencies. In Guadeloupe 21 localities were found to be infested, and 12 of these continue to be positive. Désirade and Marie-Galante have not as yet been investigated. A. aegypti were found in the islands of Saint-Barthélemy, Les Saintes, and Saint Martin (northern part), but an eradication program has not yet been started.

Jamaica. A. aegypti were found in 42 of the 63 localities inspected. Only 10 of these have shown negative results, a fact indicating that the campaign in Jamaica is not being carried out satisfactorily.

Martinique. Of the 34 localities found to be positive on this island, 27 were still infested as of the end of March 1958.

Montserrat. Of the 33 localities inspected after treatment was applied, 9 were still positive at the end of June 1958.

Netherlands Antilles. In Aruba, after one application of dieldrin, all of the 9 previously infested localities continue to be negative. In Bonaire, DDT is being applied by the perifocal method to eliminate the aegypti in 6 localities of the island. Of the 155 originally infested areas in Curaçao, only 4 continued positive after domiciliary application of dieldrin in 1955. Saba, Saint Eustatius, and Saint Martin (southern part) are considered to be infested.

Puerto Rico. As of June 1958, 114 of the 248 originally infested localities, including San Juan, continued to be positive.

Saint Kitts - Nevis - Anguilla. Of 33 localities found initially to be infested, 21 are still positive.

Saint Lucia. Of 50 localities found to be infested, 46 are now negative.

Saint Vincent. All 8 of the previously infested localities were found to be free of A. aegypti in 1958.

Surinam is considered infested and it is hoped to put a plan of eradication into effect.

Trinidad and Tobago. Improvement was seen in the Trinidad campaign after its reorganization and after DDT was replaced by BHC applied in short cycles. Of the 121 previously positive localities, 45 continue to have aegypti. The situation in Tobago has improved, as revealed by the latest index in 1958, which was under 0.2 per cent.

Virgin Islands (UK). These islands (Anegada, Virgin Gorda, Tortola, and Jost Van Dyke), continue to be infested.

Virgin Islands (USA). According to the local health authorities, the A. aegypti has been eradicated from the island of Saint Croix. The others (Saint Thomas and Saint John) continue to be infested.

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As can be seen from the above summary and from the attached map and table, the status of the anti-aegypti campaign in the Americas is satisfactory. In South America it has been verified that Bolivia, Brazil, Ecuador, Paraguay, Peru, Uruguay, British Guiana, and French Guiana have already met the conditions under which they can be declared free of A. aegypti. The same is true in Central America with reference to the investigated section of Panama and to the Canal Zone, Nicaragua, British Honduras, and Guatemala; and in the Caribbean area with respect to Aruba, Grenada, and Saint Vincent, excluding the Grenadines.

The criterion for accepting eradication, established in the "Manual of Operations for an Aedes aegypti Eradication Service", has been strictly adhered to. In addition to the three consecutive negative verifications for urban areas and two consecutive negative verifications for rural areas, mosquito-capture was undertaken in one third of the houses in urban areas, together with search for foci in all houses in rural areas, when the final verification was made with the cooperation of PASB technical staff.

The nature of the A. aegypti campaign in the Americas is such that this undertaking has been an arduous task, owing principally to the fact that, since there is no imminent danger of yellow fever in some countries, there has been a certain indifference toward making the concerted, decisive effort necessary to assure the success of the eradication campaign. In many countries, yellow fever still constitutes a serious problem, one that causes great concern and absorbs much time, effort, and money. In some, the problem is not so evident; in others, this disease, which formerly made violent incursions in port cities, has become almost a memory of the past.

From the epidemiological point of view, the problem will affect all the Americas so long as the urban vector exists, for although many areas are now free of the mosquito, reinfestation can easily occur. Such was the case recently in Cúcuta, Colombia, near the Venezuelan border. There is no possibility of blocking off the virus in the forest areas of South America, owing to the vastness of those areas and the role played by insects, monkeys, and perhaps other animals in spreading the virus, even though one may admit the possibility of immunizing all persons coming into contact with the infested jungle. In spite of the fact that the vaccine used at present is efficacious and of lasting effect, it can fail in some individuals and it would therefore be necessary to maintain permanent inoculation work to protect those individuals coming into contact with the forest areas for the first time, a task that is practically impossible

to achieve. The urban vector, on the other hand, can and should be eliminated from the entire Hemisphere.

The attached map and table indicate the degree to which the problem has been reduced since the initiation of the campaign against the A. aegypti. If one were to measure the problem throughout the Americas in terms of 100 points, it can be considered that at least 80 of these have already been covered.

Countries or areas free or practically free of the mosquito already include Bolivia, Brazil, Chile, Costa Rica, Ecuador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Uruguay, Aruba, Bermuda, British Honduras, British Guiana, French Guiana, Grenada, and Saint Vincent. These results are due in large measure to the work previously conducted, up to 1940, in Bolivia, Brazil, Colombia, and Peru under the sponsorship of the Rockefeller Foundation. Beginning in 1948 the Pan American Sanitary Bureau took on the responsibility for expansion of this collaboration to almost all the other countries and for establishing a coordinated campaign technique based on the systematic application of DDT. To extend and improve the campaign, the PASB has advocated a strategy of attack that begins in the vector's most powerful strongholds and reaches out in two vast tong-like maneuvers, with bases in the southern and central regions of the Continent, that will eventually close together in the northern region. This final operation, or the closing of the pincers at the points represented by the Caribbean area and the Gulf of Mexico, to the mosquito's last place of retreat, has yet to be carried out.

The comments or observations that can be made on the campaign undertaken give proof of the rigor with which the guiding principles are being applied. From the technical point of view, the greatest obstacle thus far encountered in the campaign has arisen from overconfidence in DDT. There is still time, however, to remedy the situation. The moderate resistance that has been observed cannot serve as a pretext for abandoning the use of DDT, which is still effective in all the other regions where it is correctly applied. Also, there are other insecticides, such as BHC and dieldrin, that can be used in emergencies. Additional ones are undergoing experimentation, and new and even more effective substances will undoubtedly be discovered. Good organization and supervision of activities are the most important factors in the campaign against A. aegypti. The value of insecticides is relative, as was demonstrated by the results obtained with the use of petroleum in Brazil.

There is no doubt that the greatest obstacle yet to be overcome prevails in the Caribbean area, because of its geographic location and the difficulties encountered in attempting to coordinate efforts. The majority of the islands in the area, some widely spread and others grouped in archipelagos, are infested and conditions there are very favorable to the breeding and spread of aegypti, for the shortage of water makes it necessary to store water in containers or deposits and transport it from one place to another. The Greater Antilles are faced with the problem of

having an extensive territory to cover. This is particularly true of Cuba, which has approximately 100,000 km² of almost entirely flat land where there is a population of more than 5 million and where all the conditions favorable to the spread of the mosquito are present.

Because of the difficulties present, the problem in the Caribbean area has not yet been dealt with adequately. It was not until after the 1954 yellow fever outbreak in Trinidad that the governments directed the necessary attention to the recommendations of the PASB. The irregular application of DDT resulted in the resistance that A. aegypti has been showing toward this insecticide in Trinidad, Puerto Rico, and the Dominican Republic. To cope with this situation, much more time and money are being expended than would be required for a normal campaign. It is evident that, from the technical point of view, the campaign in the Caribbean area constitutes the most difficult phase yet to be covered in the fight against aegypti.

The development of the program in Argentina and the possibility that the United States may initiate a campaign have called attention to the need for searching for more rapid and economical methods. These two countries have vast areas in which the aegypti can persist throughout the year and spread to susceptible areas during the summer. A campaign aimed at eradication requires that those areas be treated and kept under observation for as long as necessary to ensure the elimination of A. aegypti, for what is important is not the quantity but the mere presence of the mosquito. Therefore, in these two countries the same general standards as those adopted in other countries should be followed with the adjustments made necessary by the biology of the mosquito. Thus, the summer months would be devoted to mosquito-capture and the winter months to the application of insecticides in localities found to be positive. In this way, the campaign personnel -- a staff that cannot be improvised -- would be kept at work throughout the year.

The most pressing problem in the anti-aegypti campaign is the need for accelerating the operations in those countries where lack of financial support or failures of a technical nature have delayed the completion of the work. In some countries, real difficulties are being encountered in obtaining the funds required. In others, however, it is a question of willingness and resolve to deal with the problem promptly. With an insufficient and inadequately remunerated staff it will not be possible to carry out a campaign aimed at eliminating the mosquito in a period of from two to four years, when in the majority of cases this goal cannot be attained in twice that time.

The PASB has made every effort, within its budgetary limitations, to meet the needs of all programs in which it participates, by providing international consultants, vehicles, and other material not easily obtained in the particular country, such as insecticides, flashlights and batteries, spray pumps, etc. It would be desirable that in certain cases the PASB also be in a position to contribute toward increasing both the number and

the remuneration of local personnel, and that it have available the funds needed to cope with certain difficulties that are hindering the campaign. Unfortunately, no appropriations are available for covering such expenditures.

Under the circumstances, it is necessary that during the next four years a special allotment be made available for the purpose of dealing with all the problems in the anti-aegypti campaign, so that a concerted effort may be made to achieve eradication within that period. The appropriations for this purpose in the 1958 budget come to a total of approximately \$250,000, an amount that is insufficient to meet the costs of intensifying the campaign. The amount required reaches almost \$500,000, or double that allotted, a sum that would, however, decrease progressively as the problems are solved in countries where activities have not yet been developed adequately.

It is evident that, if the PASB contribution were increased, further resources would be made available by the countries, and with that additional effort great progress in the A. aegypti campaign could be achieved -- to the point where, quite possibly, the final extinction of this vector from all the Americas could be announced in a declaration to the next Pan American Sanitary Conference.

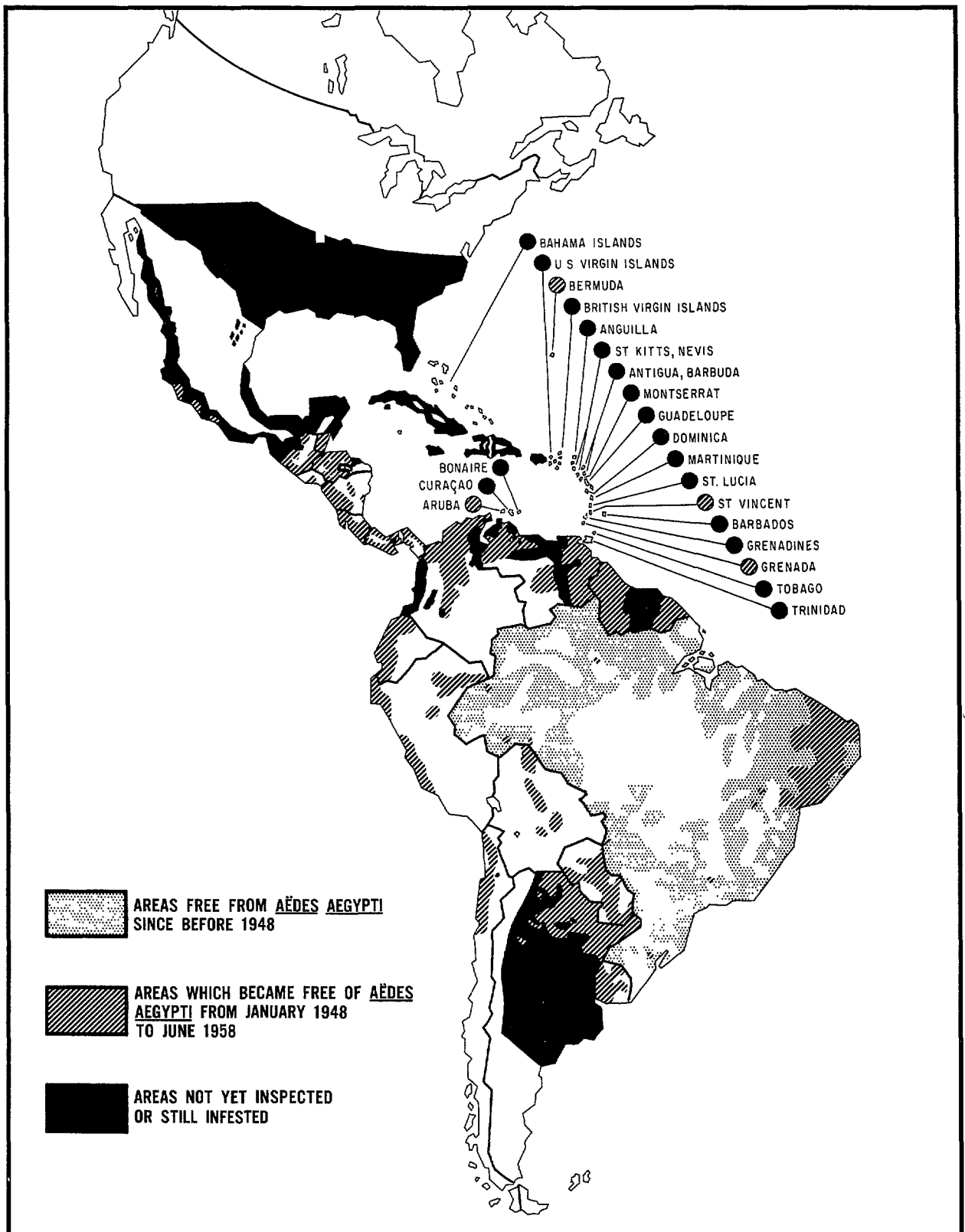
ANNEX I (table): Summary of the Aedes aegypti Eradication Campaign in the Americas

Map: Status of the Aedes aegypti in the Western Hemisphere on June 30, 1958

SUMMARY OF THE AÉDES AEGYPTI ERADICATION CAMPAIGN IN THE AMERICAS
FROM ITS BEGINNING THROUGH JUNE 1958 OR LAST REPORTED MONTH*

Country	Month of last report	Area (km ²)			Number	Localities inspected				
		Country total	Presumably infested initially			Total	Treated	Initially positive		To be verified
			Total	Inspected				Total	Still positive	
Argentina	IV.58	2,808,492	1,500,000	380,130	2,054	141	110	110	4	31
Bolivia	XII.56	1,098,581	100,000	100,000	282	65	65	65	0	
Brazil	III.57	8,516,037	5,358,822	5,358,822	270,588	36,119	36,119	36,119	0	
Chile	V.58	741,767	50,000	50,000	81	44	44	44	1	
Colombia	VI.58	1,138,355	280,000	241,000	3,307	353	352	342	16	11
Costa Rica	VI.58	51,011	20,000	20,000	1,238	104	104	104	0	
Cuba	VI.58	114,524	100,000	341	26	26	26	24	18	2
Dominican Republic	V.58	48,734	42,020	33,780	1,328	332	332	259	30	73
Ecuador	VI.58	275,000	69,454	69,454	2,824	337	337	337	0	
El Salvador	VJ.58	34,126	18,675	18,675	989	190	190	190	0	
Guatemala	VI.58	108,889	36,443	36,443	2,485	138	138	138	0	
Haiti	VI.58	27,750	25,000	6,800	2,377	603	602	435	27	168
Honduras	VI.58	112,088	64,929	54,029	639	53	53	53	0	
Mexico	VII.55	1,969,367	1,000,000	100,000	924	482	482	418	159	64
Nicaragua	III.58	148,000	65,263	65,263	3,126	18	18	18	0	
Panama	VI.58	73,475	56,246	42,951	2,845	41	41	41	0	
Paraguay	IV.57	406,752	200,000	200,000	1,561	98	98	98	0	
Peru	XII.56	1,311,030	714,000	638,000	4,320	191	191	191	0	
Uruguay	III.58	187,000	187,000	187,000	1,020	133	133	133	0	
Venezuela	XII.57	912,050	600,000	510,000	3,125	368	335	288	31	80
Antigua and Barbuda	VI.58	441	280	280	49	49	49	49	13	
Bahamas	VI.58	11,396	11,396	150	13	11	11	11	3	
Barbados	VI.58	431	171	171	95	95	95	95	13	
British Guiana	V.58	214,962	4,662	4,662	93	93	93	93	0	
British Honduras	I.58	22,965	22,965	22,965	84	2	2	2	0	
Dominica	X.56	789	789	710	136	66	66	66	16	
French Guiana	III.58	91,000	91,000	91,000	222	55	55	55	0	
Grenada	VI.58	311	311	311	8	8	8	8	0	
Grenadines	VI.58	78	55	55	7	5	5	5	2	
Guadeloupe	IV.58	1,780	1,620	29	32	21	19	15	12	6
Jamaica	IV.58	11,424	11,424	8,835	63	42	42	23	13	19
Martinique	III.58	1,813	1,813	1,813	34	34	34	34	27	
Montserrat	VI.58	85	85	85	33	18	18	18	9	
Netherlands Antilles:										
Aruba	VI.58	181	181	181	9	9	9	9	0	
Bonaire	I.58	285	285	285	6	6	6	6	6	
Curaçao	VI.58	450	450	450	155	155	155	155	8	
Puerto Rico	VI.58	8,896	8,896	5,496	481	248	248	248	114	
Saint Kitts-Nevis										
Anguilla	V.58	396	396	396	62	33	33	33	21	
Saint Lucia	VI.58	603	259	259	50	50	50	50	4	
Saint Vincent	VI.58	345	332	332	8	8	8	8	0	
Trinidad and Tobago	V.58	5,228	3,108	3,108	123	121	121	121	45	

(*) The campaign in Mexico has been interrupted since August 1955. The *Aedes aegypti* has been declared eradicated in Bolivia, Bermuda, British Honduras, Canal Zone, French Guiana, and Saint Croix (U.S.A. Virgin Islands). The campaign in the United States is in its initial stage. Although the *A. aegypti* is present, a campaign has not been initiated in certain islands of the Caribbean area and in Surinam.



STATUS OF THE AÈDES AEGYPTI IN THE WESTERN HEMISPHERE ON JUNE 30 1958