

of its venom as compared with that which is displayed by the venom of other blood-sucking insects. The yellow-fever germ will thus pass unharmed into the stomach of the *Stegomyia* and continue therein the mosquito phase of its existence, while in the case of any other blood-sucking insect it would have been destroyed or inhibited by the venom. So long as the true germ of yellow fever remains unknown, this hypothesis can not be directly verified under the microscope; but the principle seems to be confirmed in the case of the malaria parasite, which passes unscathed through the buccal cavity of the *Anopheles* and continues to develop in the stomach of its host, while in the other species of gnats it reaches the stomach already doomed to degeneration and death.

Having thus presented what I consider to be a plausible explanation of the fact that only certain kinds of blood-sucking insects are capable of transmitting certain germs, and that some species of the same family of insects may exhibit that peculiarity while the other species do not, I have only to add that so far, no valid reason has been brought forward for supposing that any other insect but the mosquito is capable of transmitting yellow fever, nor even that any other species of mosquito but the *Stegomyia fasciata* is capable of doing so.

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**(2) PROPHYLAXIS AGAINST YELLOW FEVER.**

**HABANA AS A MODEL CITY.**

By Dr. JUAN GUTERAS.

Habana is the first among the large cities of the world to have instituted a systematic campaign against the mosquito as a prophylactic measure against malaria, yellow fever, and filariosis. The success attained with respect to yellow fever is one of the greatest triumphs of preventive medicine. We owe this practical application of the doctrine enunciated by Finlay to the conclusive demonstration made by the U. S. Army board, and to the well directed zeal of the American Government in Cuba through its representatives, General Wood and Major Gorgas.

The city of Habana, under the direction of the great founder of the mosquito doctrine, Dr. Finlay, now health officer of the island, has kept up and carried to perfection all the practical measures of prophylaxis that are based upon the said doctrine. In doing this, Dr. Finlay is carrying out the plan outlined by him since 1881, and presented again by himself, with all details, to the American Government of intervention immediately after the occupation of Habana.

The measure of success that has been thereby attained is such that we can not help but regard with apprehension the evidences of unwillingness to accept this doctrine as the sole basis upon which the prophylaxis against yellow fever should rest. We are in possession of a specific treatment for the prevention of this disease. No other epidemic disease can be so perfectly controlled, and a grave responsibility rests upon the leaders of medical opinion who fail to educate their people and to prepare them in the practice of the new methods.

We feel apprehensive in Habana because we know that the Southern States still continue to rely solely upon maritime quarantine for the

prevention of yellow fever. This barrier once broken, as it has often been in the past, there is nothing to prevent a widespread outbreak. The modern method of mosquito disinfection, to be successful, requires, in part at least, the cooperation of the population, the sympathetic support of a people convinced of the soundness of the doctrine.

The people of the Gulf coast are not prepared to assume this attitude. We see no evidences that they are being prepared by their officers in charge of the public health. I have no doubt that a case of yellow fever coming into Galveston, New Orleans, or Jacksonville would create to-day the same excitement that it has in the past. The patient, in all probability, would be met by a shotgun quarantine, instead of an ambulance with a mosquito bar.

The latter method is employed in Habana with the fearlessness that comes from absolute security. Here the patient is not isolated, in the ordinary sense of the word; he is not detained at quarantine. He is brought through the heart of the city to a hospital where nonimmunes are treated, and where a number of the nurses and help are non-immunes. This has been done for two summers in succession, with the result that yellow fever rapidly disappeared during the first summer, and did not recur in the following season. One year was completed last September since the city of Habana saw her last autochthonous case of yellow fever.

We welcome the few who have come to study the simple methods of procedure that are employed in Habana. We wish, for our own interest and theirs, that the cities of the Gulf and South Atlantic States had shown a practical and enlightened interest in this matter.

The gentleman from Louisiana tries to create the impression that our work is based on theoretical grounds. He claims to stand on facts, and urges that we should make haste slowly. He may find to his sorrow that he has gone too slowly. And where are his facts? We are dealing with the only facts that have been brought forward in this controversy. We have shown beyond all doubt that yellow fever is propagated by the bite of the *Stegomyia fasciata*. Our opponents admit this. We have done everything that it was possible to do to show that the disease is not transmitted by other of the means that were supposed to be responsible for the propagation of the epidemic. To counterbalance our facts, the opponents of the mosquito doctrine have unearthed a number of old stories which, even in their day, when fomites and contagiomiasmatic theories prevailed, were considered highly improbable. In all these stories the first reported case of a local epidemic is attributed to contact with some bundle of clothing that had been brought from an infected place in the previous season. I know too well the history of yellow-fever epidemics. The first reported case is never really the first case. Were it possible now to investigate any of these stories thoroughly, and were the facts proven to be, in all the particulars, such as they are reported, it would still remain to be shown that no infected mosquitos had hibernated during the winter in the incriminated clothing.

The same doubts may be raised with respect to the breaking out of yellow fever on board vessels soon after their arrival in quarantine. The ship has been supposed in these stories to be the carrier of fomites that, for some unknown reason, became suddenly active soon after arrival. And the quarantine itself; are we sure that it was not previously infected? How do we know that it was not? Are not the

quarantine crews usually made up of immune persons? More than once have I seen the most stringent quarantine measures enforced precisely when it was already known that yellow fever had penetrated the defenses.

Not that I deny the possibility of infected mosquitoes being carried on board ship. The whole question of mosquito transportation requires careful study, but we should not, meanwhile, misuse this possibility to support the failing theory of fomites infection.

I shall now detail the most important features of the system of yellow fever defenses as they are practiced in Habana.

If the case be an imported one, an ambulance is sent to the wharf and the patient is carried to Las Animas hospital under a mosquito bar. There he is placed in a mosquito-proof room. The whole building, besides, is protected throughout by metallic gauze. When the patient arrives in the hospital, he is considered as a suspect; he may have any other infectious disease. As a matter of fact, all cases of fever found on board a vessel coming from suspected ports are treated in the same manner. Under these circumstances, of course, the clothing is at once disinfected. After the recovery or death of the patient, if the disease has been confirmed as yellow fever, the room is fumigated with pyrethrum as an extra precaution, and it is ready to receive the next patient. Other precautions are taken if the disease be not yellow fever. The diagnosis is determined as soon as possible after arrival by the commission for infectious diseases. Passengers arriving in good health from infected ports, who can not prove their immunity, are sent to the immigration station outside of the city, where they are held in quarantine five days. Their temperature is taken twice daily, and at the slightest indication of fever they are placed under mosquito bar and sent to Las Animas hospital.

Let us suppose, on the other hand, that a suspicious case presents itself in the city. It is obligatory, under penalty of the law, for all physicians to report at once all cases of a suspicious character. Our list of diseases to be reported corresponds with the one generally adopted; but we add also "suspicious of yellow fever," "fiebre de borras," and "infectious fever." The report of a suspect is received in the statistical division of the health department, and is transmitted at once to the executive officer. This officer passes it to the section for the inspection of infectious diseases, and to the commission for infectious diseases. If the inspector can not, with absolute certainty, exclude all suspicions, he proceeds at once to bar the room occupied by the patient against the ingress or egress of mosquitoes; he allows one person to remain with the sick, and places a guard at the door. Meanwhile, the case is visited by the commission, and the latter decides finally upon the nature of the disease. According to their finding the prophylactic measures are continued or not. In the summer of 1901, when we were still having a few cases of yellow fever, we generally succeeded in persuading such patients to go to Las Animas Hospital. We offered every facility and encouragement. We would take the mother with her children, or husband and wife, in the conviction that the disease would not be propagated there.

The prophylactic measures are carried out by a section of the mosquito brigade in the following manner.

I should state that this disinfection squad is prepared to disinfect for other diseases besides yellow fever. The equipment consists of a

special wagon, manned by six men and drawn by two mules. The wagon carries—

- A tank of water with a capacity of 100 liters.
- Packages of 100 grams of bichloride of mercury.
- Common salt with a measure.
- A box of pyrethrum powder, with measure for 1 pound.
- A hand pump with a 50-foot hose.
- A No. 2 formyl generator.
- Four brooms and 2 scrubbing brushes.
- Four buckets.
- Two buckets with paste.
- Twenty-five iron pans.
- A box containing brushes, ax, wrench, hammer, nails, knives, alcohol.
- Packages of newspapers cut into strips.
- Large roll of stout manila paper.
- Bunches of rods for improvising screens.
- A tape measure.
- A fine broom, to sweep up the insects after fumigation.
- An extension ladder.
- Two cans of crude petroleum.
- Solution of formyl.
- A bucket with chlorinated lime.
- A shovel.
- Blankets in pieces, for wiping floors.

Many of these implements are not used in the disinfection for yellow fever. The squad and the wagon above described are employed in all sorts of disinfections.

The procedure in the case of yellow fever is as follows:

The room occupied by the patient is at once closed by wire gauze. False windows and doors of all sizes are provided by the department, and they are at once adjusted to the openings in the room. One person, as nurse, is allowed to remain in the room, and a guard is placed at the wire-gauze door. The latter, and other openings that may communicate with other apartments in the house, are temporarily closed with stout manila paper in order to prevent the entrance of pyrethrum smoke in the room occupied by the patient. The rest of the house is now fumigated. To do this all compartments are carefully closed. Strips of paper are pasted over all cracks. Even open halls and courts are closed with screens of manila paper. A good deal of ingenuity is displayed in rapidly constructing and putting together these improvised screens, so that the most irregular and open places are converted into closed chambers hermetically sealed against the exit of smoke and mosquitoes.

After the fumigation of the house the patient is transferred to one of the fumigated rooms, previously closed with wire gauze, and the sick chamber is then disinfected in the same manner. Neighboring houses, unless evidently incommunicated with the infected house, are treated in the same way. As previously stated, the process is often much simplified by removing the patient to Las Animas Hospital.

The routine of disinfection is as follows: The inspector or chief of the squad assigns one man to each of the windows or openings in the room. The duty of each man is to close the opening perfectly by pasting strips of newspaper over all cracks and joints. Upon completing his work he must write his initials on the window frame. While this is being done the inspector has measured the cubic space of the room. If possible, an opening is left somewhere for the admission of light; it may be a glass pane or an opening covered with manila

paper. On the window sill or floor beneath this opening a sheet of moistened white paper is placed. It has been found that the mosquitoes, during the fumigation, flock toward this opening, and when paralyzed by the smoke they are apt to fall upon the paper below, where they can be more easily gathered afterwards. The pyrethrum powder is now placed in pans and ignited by setting fire to a small amount of alcohol in each pan. One door has been left open for the exit of the men. Before leaving, all clothing is shaken and scattered about the room. The exit door is now closed from the outside, its joints and cracks are pasted over, and the seal of the department is placed upon the strips of paper. Pyrethrum is burned in the proportion of 1 pound to every 1,000 cubic feet of space.

At the expiration of four hours the squad returns and the door is partially opened to allow the men to enter. The walls, ceiling, and floor are carefully swept, and the clothing is once more shaken. Any mosquitoes found to be still living are thrown into the pans and those that are dead are kept in small boxes to be sent to the laboratory of Las Animas Hospital for identification.

Petroleum is now poured into all receptacles where mosquito larvæ may grow. The inspector meanwhile makes an inquiry as to the place where the patient may have been infected, the places he visited in the last five days previous to his illness, and the persons that are likely to have been bitten at the same time and place with the patient.

The inspector takes also a census of the nonimmunes who live in the house and its immediate neighborhood. All this information is made the subject of a report to the city health officer. The report should contain also any recommendations that may be deemed useful as to the general sanitary condition of the house.

The health department of Habana is prepared to disinfect, in the manner above described, 24 houses in one day. As many as 22 have been disinfected with an expenditure of 500 pounds of pyrethrum.

Before leaving the house a certificate is obtained from the family to the effect that no damage has been done to the property in the process of disinfection, or, if otherwise, a note is taken of complaints that may be made.

With respect to the pyrethrum powder, it should be stated that the smoke does not kill all the mosquitoes; but at the end of four hours those that are not killed are paralyzed and can be readily gathered in the manner I have described. The smoke produces, also, a very faint cast upon exposed surfaces of white goods when they are lying in a horizontal position. Tobacco is as effective as pyrethrum, but it leaves a very offensive odor and a more decided stain than pyrethrum. Guava leaves have also been tried, but they are less effective.

APPENDIX D.

[Letter from the Minister of Guatemala.]

LEGATION OF GUATEMALA,  
*Washington, December 1, 1902.*

DEAR SIR: By an unexpected delay the appointed delegate of Guatemala to the sanitary convention has been unable to arrive on time for the opening of the congress, which he regrets exceedingly.

In notifying you of this fact, I request that you consider my country as taking part in the conference. I request also that the resolutions of the conference be communicated to the legation, to the effect that my Government may accept them.

Thanking you beforehand for this favor, I remain,

Very sincerely yours,

ANTONIO LAZO ARRIAGA,  
*Guatemalan Minister.*

To the PRESIDENT OF THE  
SANITARY CONVENTION, *Washington.*