The Doctrine of Finlay

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> "The confirmation of Dr. Finlay's doctrine is the greatest step forward made by the medical sciences since Jenner's discovery of the vaccination; this accomplishment alone justifies the war against Spain."
>
> **General Leonard Wood.**

It is just one century since Carlos J. Finlay was a student at the Jefferson Medical College of Philadelphia, the renown medical school where such eminent graduates as James Marion Sims, a gynecologist who pioneered in the surgical field and Samuel D. Gross, one of the outstanding teachers of surgery in the United States; the renown medical school where he was a disciple of Dunglison, Pancoast, Huston, Den Mutter, Meigs, Bache, John Kears- ly Mitchell and his son Silas Weir Mitchell, then, recently arrived from Paris, private preceptor. Today in all solemnity, we are commemorating the centenary of the graduation of Carlos J, Finlay from the Jefferson Medical College. At the time of his graduation, yellow fever was something more than a disease; it was a fantastic unseen force which ripped out the lives of men as a tornado rips the grains of wheat loose from the stem. Although yellow fever was endemic to Havana and other places, it was not the exclusive inheritance of the tropics. Often the disease left its natural habitat and travelled far and wide. Even in this city of Philadelphia, death sometimes came swinging its scythe in the robes of yellow fever.

When Finlay graduated on March 10, 1855, his favorite teacher and preceptor, S. Weir Mitchell, a bond of friendship was established between them, in all reason the city of fraternal love, founded by William Penn, has been surnamed ''the City of Homes", Weir Mitchell urged Finlay to establish his practice in New York, where many Spaniards and Cubans lived at the time. But Finlay had the spirit of a researcher and decided he would rather establish himself in his native land. Finlay was born in Camagiiey, Cuba, on December 3, 1833, to a Scotch father and a French mother. Although he began his work as a general practitioner with

emphasis on ophthalmology, he also spent a great deal of time investigating the cause of yellow fever. Thus in 1865 he presented before the Academy of Sciences of Havana, a paper entitled 'Report on the Etiology of Yellow Fever", which was published in complete form in the **Medical Gazette of Havana (Gaceta Mé- dica de la Habana)** in 1879. This report begins with the following words: "Towards the end of 1858, I accidentallyAIiscovered a notable alkalinity in the atmosphere of Havana, and I decided to investigate what influence this circumstance might exert with relation to the development of yellow fever..'

He discussed this atmospheric alkalinity observed in Havana in his lecture upon becoming a member of the Academy of Sciences, and he also wrote several articles about it. In 1879 the U. S- Yellow Fever Commission, with Dr. Stanford E. Chaillé as President and Dr. George M. Sternberg as Secretary arrived in Havana. Others who came with the Commission were Guiteras, a Great Cuban health officer who had served as a professor in Philadelphia for many years, and Rudolph Matas, who at that time was a student and who later became a noted surgeon. It is a great satisfaction to add that Dr. Matas is still alive and resides in New Orleans. The Government of the Island of Cuba designated a local commission to serve as advisers to the U. S. Commission. Finlay had been designated to this commission inasmuch as he had done considerable research in yellow fever. In spite of all the efforts made at this time, no important advances were made by this group.

After the U. S. Commission left Cuba, Finlay continued working on investigations related with this dread disease: he studied the early history and epidemics of the disease and conceived the idea that the mosquito was the transmitting agent of yellow fever. He began searching for the species which transmitted the "black vomit" disease. He had few resources to aid him in this search —only his firm faith in his ideas and a microscope he had obtained when he was a student in Philadelphia.

With these two arms he determined to solve the mystery of yellow fever. He continued on this search until February, 1881, when he was designated to form part of the Cuban and Puerto Rican Delegation to the International Sanitary Conference held in Washington. During this conference many contrary opinions were expressed* At that time Finlay made the following declaration: "I beg leave to remind my colleagues here present that thé sanitary measures now generally recommended against yellow fever are founded upon a mode of viewing that disease which is completely at variance with a considerable number of observed facts. We have on one side the contagionists and, on the other, the non-contagionists each endeavoring to deny the importance of the cases brought forward by the contrary party in support of their respective opinions".

Finlay added: "It is my personal opinion that three conditions are necessary in order that the propagation of yellow fever shall take place:

1. The presence of a previous case of yellow fever within certain limits of time counting from the moment that we are considering.
2. The presence of a person apt to contract the disease.
3. The presence of an agent entirely independent for its existence both of the disease and of the sick man, but which is necessary in order that the disease shall be conveyed from the yellow fever patient to a healthy individual".

He concluded with these words: "It will be objected that this is a mere hypothesis, and indeed, it is only as such that I give it. But I believe that it is a plausible one, which has, at least, the merit of explaining a certain number of facts which have remained hitherto unaccounted for by the current theories. I do not ask for anything else, as my only object is to show that, if my hypothesis, or some other analogous to it should be realized, all the measures which are now employed in order to disinfect and to check the progress of the disease would turn out to be without effect, inasmuch as the principal efforts should have been directed against the third condition, by endeavoring to destroy the agent of transmission or to divert it from the path that it follows in communicating the disease.

You see, therefore, gentlemen, how important it is that this question should be thoroughly studied if we do not wish to be led upon a false track while recommending certain measures against the propagation of the disease".

As a responsible person, he understood that the proof of his statements must be given. He did not speak as yet of the type of intermediate agent, and with extraordinary plainness, he only indicated 'the presence of an agent entirely independent for its existence both of the disease and of the patient".

He continued to work relentlessly, increasing the number of experiments and making inoculations. August 14, 1881 is the memorable day on which he presented to the Academy of Sciences of Havana his basic thesis: "The Mosquito Hypothetically Considered as the Agent of Transmission of Yellow Fever".

In this paper, the conclusions were definitive, the arguments decisive. No longer did he speak of the presence of an agent; he now declared that "three conditions will be necessary in order that yellow fever may be propagated:

1. The existence of a yellow fever patient into whose capillaries the mosquito is able to drive its sting and to impregnate it with the virulent particles, at an appropriate state of the disease-

Dr. Lewis C. Scheffey, President of the Biographycal Symposium given by the Medical College of Philadelphia. (From left to right) Doctors Johnathan Rhoades, Horacio Abascal, Samuel Rabdill, President of The Medical History Section, Nicholas Padis, Leandro M. Tocantins, Lewis C. Scheffey and Dr. Philip Heanch from the Mayo's.

2. That the life of the mosquito be spared after its bite upon the patient until it has a chance of biting a person in whom the disease is to be reproduced.
3. The coincidence that some of the persons whom the same mosquito happens to bite thereafter shall be susceptible of contracting the disease".

Finlay, in concluding, declared that not only was the mosquito the transmitting agent of yellow fever, but, in a demonstration of accurate observation, that the specific variety of the mosquito was the **Culex** mosquito, later known as **Stegomya Fasciata,** and finally as **Aedes Aegyti.**

Basing his report on proofs obtained in experiments, he did more than explain a theory; his work is the cornerstone of the doctrine of Finlay; the doctrine which states that diseases are transmitted from person to person, by intermediate agents which suck the blood. Nevertheless, many tound it strange that Finlay, who had already made a number ol experiments with human beings to prove his theory on the transmission of the disease, used the word ''hypothetically" in the title of his basic report on the subjects. This is very easy to understand if we take into account Finlay's sense of responsibility as well as his cultural, religious and philosophic background. Sometimes ago I read a paper before the Academy of Sciences entitled The Philosophic Thought of Finlay", in which I explained why, in accordance with the ideas of philosophy and logic he expressed in a lecture delivered in 1876 under the title of "The Scientific Truth", he considered his theory hypothetical.

Not willing to conform to the reality of an effect without knowing the cause, the man creates the hypothesis, germ of all invention, essential part of intellect mechanism. Finlay comports himself as a Positivist from the Cartesian root, and he considered the logical function of the hypothesis very different when it dealt with the procedure of experimentation and when it referred to the results- When dealing with the first, inventiveness should be given full rein; when dealing with the second, "the results of the experiment should be observed with fredom from prejudices and preconceived ideas". For that reason Finlay, prototype of the cultured man, learned in science, philosophy and religion, uses the term "hypothetically", and could not use other while considering the truth as the "convenience of the things with the ends which our knowledge authorizes".

The Academy of Sciences of Havana did not lend any interest to the communication of Finlay. Nobody refuted it: on the contrary, it was looked upon with disdain. It is the eternal history of the great discoveries. Jenner, as an answer to his first communication about vaccine, received a request from his medical society not to deal with that matter any further in the future sessions, if he did not wish to be expelled.

In 1881,when Finlay presented his report, he had completed five experimental inoculations of healthy individuals with mosquitoes which had previously bitten yellow fever victims. He began his experiments anew on June 22, 1883, and continued them until July 10, 1900, with a total of 102 inoculations. 1'he doctrine, to repeat the word used by General Leonard Wood, was completely proven; the prophylactic measures indicated by Finlay were easy to apply. However, the indifference of the mej^of science and the Spanish authorities was greater, in comparison, than the havoc of yellow fever.

Very few people believed in Finlay; in Cuba, Claudio Delgado; in New Orleans, Rudolph Matas; in Philadelphia, Weir Mitchell, who in congratulating him on Christmas, 1888, said, "Neither Sternberg nor anybody else will really shake it or make me believe that you are wrong in a matter of observation, until you yourself tell me so".

The yellow fever was, to use a current expression, the principal "shock troop'' which our Cuban leaders, in the war of Independence, had against the Spanish Army. But upon landing on our Cuban beaches, the North American soldiers who had come to our aid, also found themselves fighting against the "shock troop", which daily reduced the fighting lines without consideration for nationality.

The United States were concerned. Surgeon General Wyman appointed Drs. Wasdin and Gedding, surgeon of the Marine Hospital Service, to study the etiology of yellow fever in relation to the **bacilus icteroides** of Sanarelli, which was reported to be the cause of the disease, and which infected the individual through the respiratory system.

Dr. Sternberg who occupied the position of Surgeon General of the Army for a short period, was not satisfied with the report given and designated an official commission including Dr. Walter Reed as surgeon and Drs. James Carrol, Aristides Agramonte and Jesse W. Lazear as assistant surgeons, to undertake a study of contagious diseases in Cuba with preference for yellow fever. Major W. M. Gorgas was already serving as Chief of Sanitation in Cuba. But neither the Commision headed by Walter Reed, nor Gorgas, nor Sternberg believed that the mosquito was the means of transmission—an idea which had been proclaimed and proven by Finlay since 1881.

The Commission began its work by investigating the bacillus **icteroides,** searching for it in the blood, in the interior of the blood vessels; but their efforts were met with negative results. The situation got worse. The greater the cleanliness, the greater was the enigma. All roads were taken except the only which led to the truth- the Finlay tripod: a sick subject, a mosquito, a healthy subject. General Wood's participation was needed. A man of vision and character, he was a physician as well as the

Governor, and gave the Commission the order to get in touch with Finlay and to proceed to do experiments based on his doctrine. Then Dr. Reed and other members of the Commission visited Finlay, who, with his characteristic open-heartedness, placed all of the data he had in the hands of the Commission; and, in addition, he gave them a number of the eggs of Culex mosquito so that they could undertake their experiments. In the Philadelphia Medical Journal of October 37, 1900, Dr. Walter Reed wrote: ''We here desire to express our sincere thanks to Dr. Finlay who accorded us a most corteous interview and has gladly placed at our disposal his several publications relating to yellow fever during the past nineteen years, and also for ova of the species of mosquito with which he has made his several inoculations . . . With the mosquitoes thus obtained we have been able to conduct our experiments"-

The Medical Commission of the U. S. Army fully agreed with the postulates of Finlay. To save life, death is necessary, and the official verification of the doctrine cost a number of lives. There were many volunteers who agreed to be inoculated, and many paid for their heroism in the extreme degree. We limit ourselves to mention the noble figure of Lazear, a real martyr to science, and the sacrifice of the nurse, Miss Clara L. Maas.

The glory of confirming the doctrine of Finlay fell to the Reed Commission; the glory of making the doctrine reality through the sanitation of Havana, long a terror spot of the tropics, fell to Mayor William C. Gorgas.

General Leonard Wood, Military Governor of Cuba during the North American occupation of Cuba, wanted to honor Dr. Finlay's achievement, even before the Commission had finished its work; and he sponsored the organization of a banquet which was held on December 22, 1900. The banquet was presided by General Wood; special guests of honor were Major Gorgas, Chief, Health Services and the members of the Commission, Drs. Walter Reed, James Carroll and Aristides Agramonte. In this way public homage was paid to the Cuban genius.

General Wood, a serene, energetic, ocassionally cold man, with an exaggerated sense of justice and duty, did not limit himself to the organization of a ceremony of homage. In an official report, proud of his govermental record, he explained the eradication of yellow fever, and eh explained it with a truthfulness which many others did not have:

"During the summer of 1900, the Commission of the American Army and the physicians of said army, presided by Walter Reed, M. D., were sent to Cuba to investigate and study yellow fever. Thanks to the cooperation given to this Commission by the Military Governor, it was possible to make the experiments on human beings. The physicians took into consideration the theory expressed

A most interesting exhibition on the life of Dr. Carlos Finlay was arranged in the Medical College of Philadelphia.

by Dr. Carlos }. Finlay in 1881 to the effect that the "mosquito was the only transmissor agent in yellow fever. Dr. Finlay had sustained this theory for twenty years and had completed a great deal of experimental work in this connection. The Commission, by means of further careful experiments, proved that this theory was true. "In February 1901, appearing before the Third Pan American Medical Congress neeting in Havana, Dr. Reed made public the results of his experiments.

Major Gorgas had formerly stated: "Dr. Finlay's theory was taken by Commander Reed and the Army Commission, and using human beings to experiment with, they proved the theory with a rapidity that no other theory in medicine had ever been proven —all was done within a period of one year. The results of the work of this year are set forth in a practical manner in the report. The Military Governor of Cuba accepted the report, and he made a practical application of it in a place where yellow fever had been endemic for 200 years, and the disease was eliminated within one year. I do not know of any other medical theory which was proven so rapidly and brilliantly and which was applied with such success by those in power" to do it".

The eradication of yellow fever was such an outstanding event, an achievement of such importance, that there was glory and to spare for everyone concerned. But nevertheless, it is an inexplicable phenomenon, product perhaps of passions or subconscious ambitions, from the time Reed's paper was read before the Third Pan American Medical Congress, the important role Finlay had played became ignored.

This was so much to the case, that even Gorgas felt he had to write from New York to John Guiteras in September 1903, "I am very sorry to see Carroll taking the stand he does with regard to Dr. Finlay. I think it is a mistake. All the facts in the case have been published in the original papers, and they will show for themselves. Posterity will give the credit where it is due, and there will be honor enough for all. I do not know anything in medicine more clear than Dr. Finlay's reasoning from the facts known at his time, that the mosquito was the transmitter of yellow fever, and nothing more persevering and plucky than his sticking to the idea, working at it constantly, publishing papers on the subject from 1881 to 1901

The truth will always be established finally, although personal interests may try to hide it, and there are always those who defend justice and truth. In 1905, John W. Ross, Medical Director, U. S. Navy, who had been director of the "Las Animas" Hospital during the First American Intervention, wrote to the Royal Caroline Institute in Stockholm proposing Dr. Finlay for the Nobel Prize in Medicine for 1906: "I have for a long time , wrote Ross, "felt that there was no one who so richly deserved the Nobel Prize as Dr. Finlay, in recognition of his brilliant

and beneficent service to science and humanity in discovering the mode of propagation of yellow fever, as well as means of eradicating and preventing epidemics and endemics of that formerly dreadful scourge“ "Furthermore,” continued Ross. ‘‘Finlay read before the International Congress of Hygiene and Demography at Budapest, in 1894, a paper in which he laid down clearly the measures necessary to prevent the propagation of yellow fever by mosquitoes. These measures were practically the same as those which were so successfully employed by Colonel Gorgas, U. S. Army, in eradicating yellow fever from Havana in 1901, by which he justly won world-wide fame”.

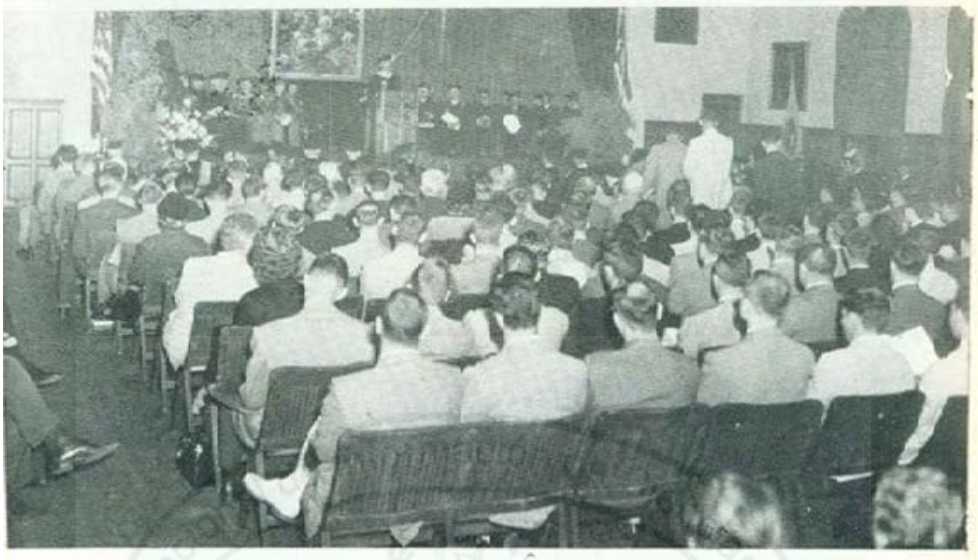
For reasons which are not necessary to clarify here, the Nobel Prize was not awarded to him, but international recognition came and many honors were awarded to him. His Alma Mater, Jefferson Medical College conferred him the honorary degree of Doctor of Laws, and his oldtime friend S. Weir Mitchell of the College of Physicians of Philadelphia appointed him an Honorary Fellow. He was awarded the Medal of the Mary Kingsley School of Tropical Medicine of Liverpool, the insignia of Official of the Legion of Honor of France, the title of Member of the Academy of Medicine of Paris and the Breant Prize. But “the most lovable man in character and personality”, as Gorgas called Finlay in his book “The Sanitation of Panama”, the genius who created and proved the doctrine of the transmission of diseases from man to man through intermediary agents sucking human blood, tbe researcher who used the motto of the family coat of arms as his own, “I will be wary”, was modest and unpresuming, and with his simplicity and modesty, he continued working in favor of humanity until he died on August 20, 1915.

The homages given to him continued after his death. In 1933, the Fouth Congress of the Pan American Medical Association held in Texas, established December 3, Finlay’s birthday, as American Medical Day. The centenary of his birth was commemorated in all of the American nations and many European ones, also. Paris named a street in honor of Finlay, universities, schools and laboratories unveilled busts of the great investigator; placques honoring him were placed on buildings. The city of New Orleans commissioned an engraved placque. And in this way, day after day, academies, colleges, congresses have paid homage to the genius who needed two decades and a great deal of tenacity to succeed in having his theory recognized. At the Tenth International Congress of History of Medicine, held in Madrid in 1935, the glory of Finlay was proclaimed and he was honored as the initiator of the scientific struggle against yellow fever by identifying the mosquito as the transmitting agent. In 1943, the U. S. Congress paid homage to Carlos J. Finlay. Mr. Sol Bloom, President of the Foreign Relations Committee of the House of Representatives, gave a brilliant lecture filled with

sincerity and reality. He said, "Even after forty years, Carlos Finlay is scarcely known as the true conqueror of yellow fever. The glory has been given to others not because they wanted it that way, but principally because the proving of the theory and the eradication of yellow fever in Havana and Panama was so dramatic, that the United States public's attention was caught more by the result of the theory than by the discovery Finlay made in tearing away from Nature the secret of yellow fever".

At last in September 1954, in the plenary session presided by Dr. John F. Fulton, profesor of Yale University, it was unanimously aggreed that "The Fourteenth International Congress of the History of Medicine, held in Rome, Italy, ratifies once more that only Carlos J. Finlay of Cuba, and only to him is credited the discovery of the transmitting agent of yellow fever and the application of his doctrine in the sanitation of the tropics".

President Kauffman and Dean Bennett head the procession from McClellan Hall at conclusion of the ceremonies.



A view of the act.

Mr. Alfredo Finlay, the scientist's grandson, together with Dr. Kaufman, President of the Jefferson Medical College, and Dr. Carlos Salas Humara, President of the Cuban Group, uncovers Dr. Carlos J. Finlay's statue, at present of the President of Cuba Major General Fulgencio Batista y Zaldivar.

Vice-Admiral James L. Kauffman, opening the memorial ceremonies.

Mr. Foendeur reads citation presenting Dr. Alberto Recio for the degree of Doctor of Laws, conferred upon him in absentia. Dr. Carlos S. Hamann (left) is receiving the degree for Dr. Recio.