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GORGAS

BY FRANKLIN MARTIN, M.D.

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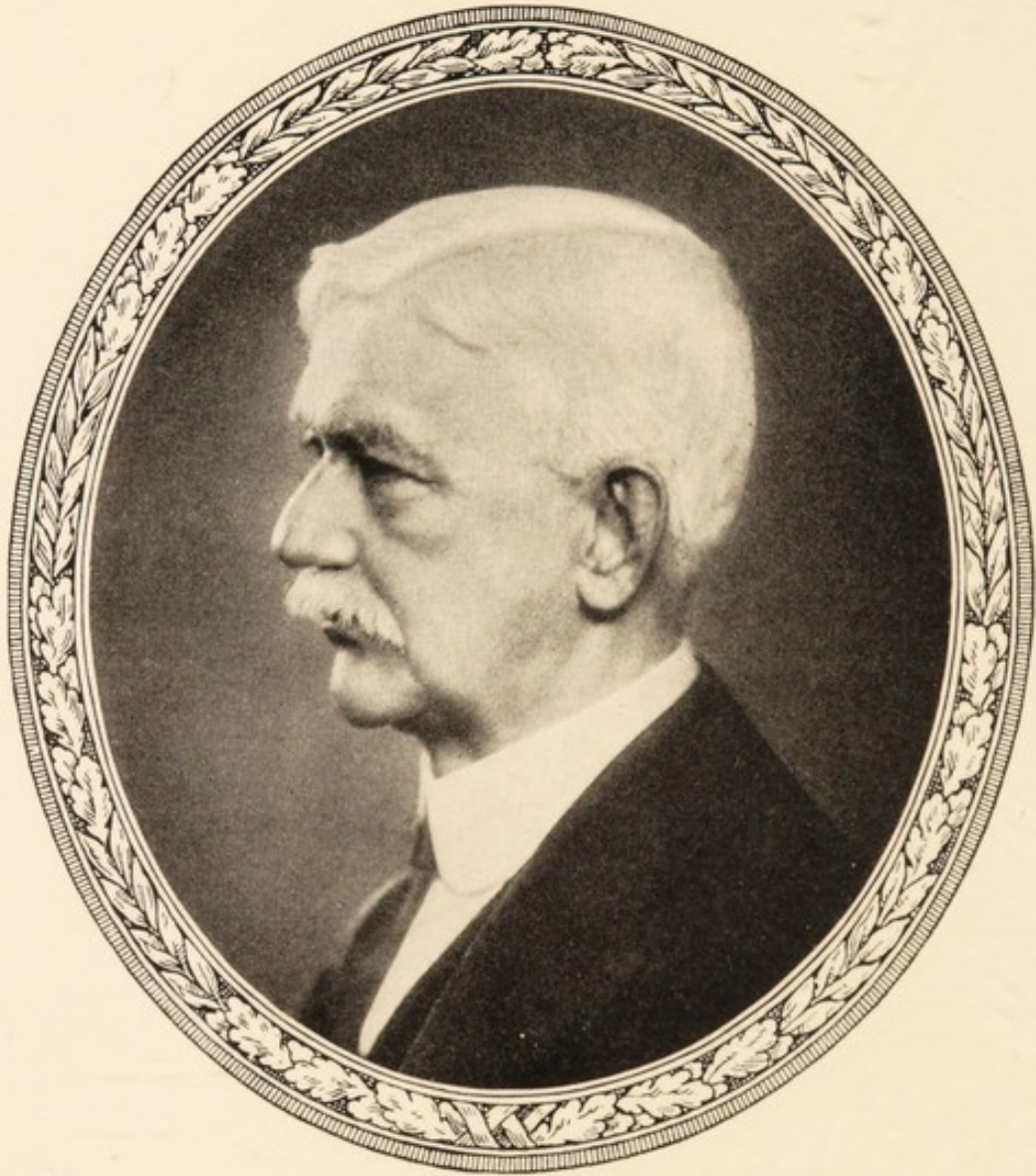


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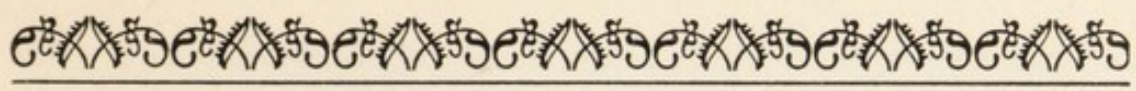
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MAJOR GENERAL
WILLIAM CRAWFORD GORGAS
M.C., U. S. A.



WILLIAM CRAWFORD GORGAS
1854-1920



Major General
William Crawford Gorgas
M.C., U. S. A.

BY FRANKLIN MARTIN, M.D.
PRESIDENT, AMERICAN COLLEGE OF SURGEONS, 1929
CHAIRMAN, GENERAL MEDICAL BOARD,
COUNCIL OF NATIONAL DEFENSE
COLONEL, M.C., UNITED STATES ARMY, 1917-18



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FRANKLIN MARTIN, M.D.

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William Crawford Gorgas

GENERAL GORGAS was an international character and his professional career, medical and military, covered accomplishments of supreme importance, and involved great responsibilities.

In this brief sketch of his life it is important that we should emphasize a few of the salient points only and refer the student desirous of perusing the interesting details of his labors to an unabridged biography. For our purpose we shall endeavor to cover the following points:

- I. Biography
- II. The Genius
- III. Sanitation in Havana
- IV. Building of the Panama Canal
- V. Surgeon-General of the United States Army during the World War
- VI. Work in Connection with the International Health Board, Rockefeller Foundation
- VII. Councillor

I. BIOGRAPHY

William Crawford Gorgas was born in Mobile, Alabama, on October 3, 1854. He was the son of General Josiah Gorgas, the chief of ordnance of the Southern Confederacy during the Civil War, and later the president of the University of the South at Sewanee, Tennessee. His mother was Amelia

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(Gayle) Gorgas, daughter of Governor Gayle, of Alabama.

Gorgas was graduated from the University of the South with the degree of A.B. in 1875, and from Bellevue Hospital Medical College with the degree of M.D. in 1879. He entered the Medical Department of the United States Army on June 16, 1880, as first lieutenant, was advanced to captain in 1885, and to major in 1898.

In 1880, yellow fever was prevalent in Brownsville, Texas, in violent epidemic form. Conditions were bad beyond the power of words to portray to those who have no knowledge of conditions in a yellow fever stricken city prior to 1880. The government as well as the people at large had been appealed to.

Gorgas, with the rank of lieutenant, was sent to Fort Brown, near Brownsville, to assist in the medical care of the civilian population. There he first met Miss Marie Cook Doughty, who was seriously ill of yellow fever, and there he also contracted the disease. He married Miss Doughty in Cincinnati on September 15, 1885.

Later, Gorgas was in active service in Florida, in the West, in the Dakotas, and in the old Indian Territory. He accompanied the military expedition against Santiago in 1898. Fate, possibly with a purpose, visited his system with yellow fever in early life, thereby making him immune to the disease. Because of his practical knowledge of yellow fever transmission, he was appointed chief sanitary officer of Havana, which post he occupied from 1898 to 1902.

It was in 1900 that Gorgas was in close contact with the investigation into the course of yellow fever

Biography

that was being conducted in Havana by the Walter Reed Board. The memorable discovery made by this board revealed the cause of the disease; but it was Gorgas who applied these principles and effected the eradication of yellow fever from Havana.

In 1904, Gorgas was appointed chief sanitary officer of the Panama Canal Zone, and in 1907 he was made a member of the Isthmian Canal Commission. In recognition of his work in Havana, his rank was increased to that of colonel by a special act of Congress in 1903, and he became assistant surgeon general of the United States Army. In 1915, Gorgas and his associates on the Isthmian Canal Commission received a vote of thanks from Congress for distinguished service rendered in connection with the construction of the Panama Canal. This is one of the few instances in history in which sanitary achievement has been recognized by the state since Hippocrates was awarded a civic crown by the citizens of Athens for averting a pestilence from that city. This reflects much credit on our national legislature as well as on Gorgas, for republics are usually unappreciative of the quiet conquests of science.

In 1913, General Gorgas went to Rhodesia, South Africa, at the invitation of the Chamber of Mines, Johannesburg, to advise as to the best means of preventing pneumonia and malaria among the native mine workers. He was appointed surgeon general of the United States Army, with the rank of brigadier general, on January 16, 1914, and was promoted to major general in 1915. He served with great distinction as surgeon general during the trying period of our participation in the World War, until

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his retirement, at the age of sixty-five, on October 4, 1918.

He never lost his interest in world sanitation. While he was stationed in the Canal Zone, he visited Guayaquil, Ecuador, and mapped out a plan for the control of yellow fever in that disease-ridden district. In 1916 he was made chief of the special Yellow Fever Commission of the Rockefeller Foundation, and spent several months in South America making surveys and laying plans for the eradication of yellow fever from localities in which it still prevailed.

After his retirement as surgeon general, he immediately accepted the assignment to direct the yellow fever work which had been undertaken by the International Health Board of the Rockefeller Foundation. On May 7, 1920, he sailed for England, en route to West Africa, where he was to investigate the yellow fever situation. He fell ill in London on May 30, 1920, and died on July 4, 1920.

II. THE GENIUS

To write of Gorgas is to attempt to write of the infinite—the subject is fascinating, but one's powers of analysis become exhausted in the face of its mystery and masterfulness. Gorgas was a genius whose life and achievements as they will be recorded in history are comparable with those of Lister and Edison. Each of these men, with a mind untrammelled and open, wrought miracles from the commonplace materials which were at hand, the real significance of which was not recognized either by his contemporaries or his predecessors.

The Genius

In Gorgas one finds the same outstanding qualities which are the embodiment of the mind and character of every genius. He visualized a conspicuous object that demanded attainment. With an open and untrammelled mind, which could disregard tradition, he utilized the essential materials at hand and conceived a simple formula which enabled him to accomplish his task. With his clear vision and this formula, the direct mind of the genius ignoring all irrelevancies, he proceeded to execute his plans. Then followed the stupendous task of achievement, which required the exercise of patience, tolerance, untiring perseverance that could circumvent unwise opposition, and, finally, unconquerable industry.

Gorgas possessed not only the attributes of a genius, but as well the admirable traits of character that made him a normal man in the midst of conventional surroundings. Gorgas was princely, with the simplicity of a child. He loved his fellowmen to the extent that he saw good in all; and by his tolerant sympathy, he drew to him thousands who claimed him as friend. With almost unerring judgment he selected able contemporaries to serve him as aids. The pride of proprietorship in his work, if he possessed it at all, was obscured by his desire to accomplish a useful thing, and he utilized every legitimate factor that would bring success to his enterprise. He commanded his great armies of aids, in his civil work and in his war work, not by autocratic methods, but by power of persuasion and the example of his own industry. In his official life, in his social life, and in his family life, he was the true friend of mankind, the courteous gentleman, and always the cavalier.

III. SANITATION IN HAVANA

*Preliminary Investigation of Course of
Yellow Fever*

Many names have become historical in connection with the preliminary work which was pursued to discover the course and means of transmission of yellow fever. Dr. Walter Reed, who was at the head of the sanitary board that finally succeeded in working out in detail and demonstrating the course of this disease, said of one of these early workers: "To Dr. Carlos Finlay, of Havana, must be given, however, full credit for the theory of the propagation of yellow fever by means of the mosquito, which he proposed in a paper before the Royal Academy in that city at its session on the 14th day of August, 1881."

It was not until 1899 that the then Surgeon General Sternberg, of the United States Army, who was one of the leading bacteriologists of the profession and also one of the leading known authorities on yellow fever, induced the secretary of war to appoint a board of army medical officers to investigate the entire subject of yellow fever. This board consisted of Doctors Reed, Lazear, Carroll, and Agramonte, and proceeded with its investigations in Havana, where General Gorgas was stationed at the time as chief sanitary officer. Necessarily, Gorgas had much contact with this board and with its individual members. The Sanitary Department of Havana had a commission of medical men to whom all cases of yellow fever were referred for diagnosis. This commission was comprised of General Gorgas, Dr. Carlos

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Finlay, Dr. Antonio Albertini, and Dr. Juan Guiteras, and co-operated closely with the Walter Reed Board. The latter board, of which General Gorgas speaks as "this now famous and immortal board," completed its comprehensive investigations and presented its findings or conclusions early in 1901.

Findings of the Walter Reed Board

1. Yellow fever is conveyed from man to man only by the bite of the female *stegomyia* mosquito; the mosquito, to become infected, must suck the blood of the yellow fever patient within the first three days of his disease.

2. After the mosquito has bitten the victim, from twelve to twenty days must elapse before she herself is able to transmit the infection. This period is known as the period of extrinsic incubation, which, in Havana, was found to consume a longer period of time during the cool months of winter than during the warm months of summer.

3. After the non-immune human being has been bitten by the infected *stegomyia* mosquito, there is an incubation period of from three to six days before man begins to show symptoms of yellow fever. The shortest period of incubation in Dr. Reed's cases was two hours less than three days, and the longest period, two hours more than six days.

4. The blood taken at the proper time and injected into a non-immune would also cause yellow fever.

5. The disease is caused by a parasite, and the parasite is sub-microscopic.

Gorgas, who had watched the experiments, immediately recognized the trustworthiness of the findings

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of the Walter Reed Board, and looked upon its discovery with the eye of an appraiser. He had followed the process of development, and from his knowledge of the subject, he judged of its value and was convinced that the experiments of the board left no doubt of the reliability of its claims. He was not only impressed with the scientific achievement, but his practical mind was immediately busied to translate it into a workable formula that would eliminate yellow fever from pest-ridden Havana. There was no circumlocution; he acted directly, used the means at hand, and enlisted the aid of the people about him.

Yellow fever was caused by a germ that was transmitted to man by the bite of a female *stegomyia* mosquito. This mosquito must bite a yellow fever patient during the first three days of the onset of the disease. Within the period of from twelve to twenty days after biting the yellow fever patient, the mosquito was able to transmit the disease to a non-immune individual. This was the theory furnished by the scientists, which Gorgas pondered over and which made him realize that to him had come the opportunity to utilize it in controlling or eradicating yellow fever.

Eradication of Yellow Fever

With these facts before him, he plainly saw that yellow fever could be eradicated if no yellow fever victims were bitten by a *stegomyia* mosquito during the first three days of the disease. It was obvious also that yellow fever could not develop if a female *stegomyia* mosquito that had bitten a yellow fever

Sanitation in Havana

patient did not bite a non-immune individual within the period of from twelve to twenty days afterward. Therefore, if a patient having yellow fever were isolated to the extent that no mosquito could bite him, there could be no transmission of the disease from that patient.

These facts formed the basis of his labors. He foresaw that he must eliminate all traditional, irrelevant notions about the development of yellow fever, and concentrate on this new theory that he was convinced was true. First, then, he must, so far as possible, destroy the *stegomyia* mosquito; second, he must screen all victims of yellow fever so as to prevent them from being bitten by mosquitoes that would transmit the disease; and, third, he must screen all non-immune individuals against the bite of the *stegomyia* mosquito. How simple!

But he had the traditions of ages to combat, and he had to deal with thousands of people of a great city, few of whom knew anything of science, and to whom it would be difficult to explain his problem. Then, too, there was the medical profession itself, which is too often too slow in adopting new theories which are established by scientists. He had to re-educate society and change its attitude toward the control of disease, and supplant the traditional teachings of years—viz.: that the disease was caused by filth, miasma, night air, and contagion through personal contact—with the new theory of mosquito propagation. He had before him the problem of discovering a method to destroy the mosquito where every condition existed which was most favorable to its development. He had to supervise the care of sick individuals who

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must be served by trained assistants who believed in and understood the work in which they were engaged. Those people whose houses had to be rid of mosquitoes, necessarily had to be put to great inconvenience and expense. A government had to be convinced that past methods, in the pursuit of which it had spent vast sums of money, were all wrong, and that it must appropriate sufficient funds to make possible a trial of the new theory.

But his enthusiasm, his staunch belief in his proposed methods, his immediate initiative, and his great industry overcame all obstacles, and between the time of the announcement of the plan on February 1, 1901, and September 15, 1901, a period of less than eight months, he eradicated yellow fever from Havana, where it had existed continuously for over 150 years.

The Achievement

In his mind, clear as crystal, was his formula for applying successfully the Reed theory to eradicate yellow fever from Havana. There could be no deviation from the direct course which he proposed to follow. Diplomacy, industry, and firmness of purpose, applied to his plan, would accomplish the practical result. And this is the way in which it was done:

To prevent yellow fever patients from being bitten by mosquitoes, a regulation was adopted that all yellow fever cases which developed in the city must be reported to the central sanitary department, of which Gorgas was the head. These patients were at once visited by an official diagnostician, and if they were found to have yellow fever, they were taken to

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Las Animas Hospital in a screened ambulance, and placed in screened wards. The routine in this hospital precluded the possibility of these patients being bitten by mosquitoes.

Screening

If the patient elected, he could remain in his own home, where the room or rooms to be screened were agreed upon. In such event the sanitary department would provide a skilled force of carpenters who thoroughly and carefully screened the designated apartments. Only one point of exit was provided, and this was protected by a vestibule and double doors. Screening squads, with wagon loads of screens and necessary accessories, were on duty night and day, and usually within an hour after the registration of a yellow fever case the patient was either in a hospital or in properly screened rooms in his own home.

An officer of the sanitary department was always on duty to see that sanitary regulations were carried out, and that only authorized persons were admitted within the screened quarters of the patient. This officer sat in the vestibule and required that one door should be closed before the second was opened. There were three relays of these officers in each twenty-four hours. It was apparent that this routine would be successful if the patient's disease was diagnosed before he had been bitten by a *stegomyia* mosquito. But as it would be from twelve to twenty days before the mosquitoes would become infectious if they did bite a patient within the initial three days, "we had" said General Gorgas, "plenty of time to attend to them. From the known habits of the *stegomyia*

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mosquito we did not think they would leave the house in which they had become infected. . . .”¹

Fumigation

“To meet this condition of affairs, as soon as the case was concluded, the house in which the patient had been sick and all contiguous houses were fumigated with such material as would kill the mosquitoes.” Fumigation had to be done with great care. All crevices were stopped up, and the rooms made as air-tight as possible. Rolled sulphur was used at the rate of one pound to each one thousand cubic feet of space.

“We generally used a Dutch oven placed in a box of sand or vessel of water so that in case of a leak, or in case of the oven’s getting too hot, the floor would not catch on fire. With a large force of ignorant men engaged in this work, constant watchfulness had to be used to see that fires did not occur.”

It was found that sulphur fumigation, while very effective, could not be used in all cases because of its tarnishing effect on certain metals, picture frames, etc., and in tobacco warehouses, because it spoiled the flavor of the leaf. Pyrethrum powder was substituted in this preliminary step, as it neither tarnishes nor injures delicate fabrics. Pyrethrum, however, only intoxicates the mosquito; it does not kill. Within two hours after fumigation with this powder, the intoxicated mosquitoes had to be swept up and burned.

Later a fumigating mixture which was found to

¹ This and other quotations appearing in following pages, Parts III and IV, are from the book “Sanitation in Panama.”

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be effective, and which would not injure fixtures and fabrics, was made of one part of camphor and three parts of carbolic acid. This was vaporized from a tin dish by a spirit lamp.

In fumigating tobacco warehouses, Mr. Joseph LePrince, who was in charge of this work, found that the fumes from tobacco stems did not affect the flavor of the tobacco, and that they were almost as deadly to the mosquito as the sulphur.

Life History of the Mosquito

A study of the life history of the mosquito was made to discover the most effective means of preventing its development. It was known that the larval stage of the insect consisted of nine days, during which period it lived in water. Therefore, collections of water were necessary to the development of the mosquito. Clean water was the favorite breeding place of the *stegomyia* mosquito. If these collections of water were protected from egg-depositing mosquitoes, there would be no larvæ and no mosquitoes. The larvæ, in their development, periodically rise to the surface for air. It was found that a thin film layer of oil on the surface of the water suffocated the larvæ and caused their destruction.

From this study it was apparent that all receptacles containing water for domestic purposes must be protected with screens; that all receptacles used within or about the house, or flower pots and bottles, must have their contents changed frequently; and that pools of water about the premises or in vacant lots or water gutters must be drained or oiled to prevent the development of the larvæ.

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Practical Plan for Destruction of the Mosquito

Hence Gorgas divided Havana into twenty inspection districts, with each district under the supervision of a sanitary inspector. Each inspector was required to visit every house in his district once a month, to make a careful inspection with regard to mosquito breeding, and to report the condition found to the central office on a printed blank. An order had been promulgated making it a sanitary nuisance for any householder to have mosquito larvæ on his premises.

The health officer, who was authorized to impose a fine which was collected by the Cuban courts, had authority to remit the fine at any stage of the proceedings. In practice, all cases, as a rule, were settled in the sanitary department. The householder was reported and fined five dollars, with assurance that the fine would be remitted if the nuisance were abated. Usually the condition was improved, and the inspector, on confirmation, returned the fine. This peculiar administration procedure succeeded in effecting a return of all but fifty out of a total of twenty-five hundred fines that were imposed in 1901.

General Gorgas summarized his chapter on the destruction of the *stegomyia* mosquito in Havana as follows: "It is very surprising and impressive to see how rapidly such a system will free a city of mosquitoes, and how, after a few months of such work, you cease to be annoyed by them. In yellow fever work this system of destroying mosquito larvæ is essential; everything else is secondary to it. In the built-up portions of a city such as Havana, caring for

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the cisterns, water barrels, and containers is the essential work; but as you approach the suburbs, pools and puddles become more frequent and this character of mosquito-breeding places should be drained; though oiling in this class of work has a very useful field. In the suburbs in these pools and puddles, the anopheles, the malarial mosquito, becomes common, and this disease has to be looked after. We had fifty men engaged in this work, under a different set of inspectors from those doing stegomyia work. This was made necessary, as the men doing the anopheles work were occupied almost entirely in the suburbs."

Quarantine

To prevent yellow fever cases from being brought into Havana, a quarantine was established against all ships entering the harbor on which yellow fever existed or was suspected. Any ships coming in with yellow fever aboard were placed in quarantine and the vessels themselves were fumigated so as to kill all the mosquitoes. This rendered them safe. All the non-immunes were taken off and carried to a quarantine station, where they were cared for during a period of six days. If no sickness developed during this time, it was concluded that the infected mosquitoes aboard the ship had not bitten these non-immunes up to the time of their departure. They were therefore released and allowed to return.

Results of Gorgas' Work in Havana

Ten years preceding the time of the Spanish-American war, there had been an average of five hundred

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deaths per year from yellow fever, and according to statistics the disease had been continuous since 1762. In 1900, there were 310 deaths from yellow fever. In February, 1901, the measures described in a foregoing chapter were begun, and yellow fever rapidly disappeared. In September, 1901, the last case of yellow fever occurred, and, except in very rare instances, there have been no cases since that date.

As Gorgas' methods were succeeding in combating yellow fever, the same methods, his practical mind argued, could be carried on simultaneously to circumvent the activity of the anopheles mosquito that Ross had announced as the means of transmission of malaria. Without hesitating for red-tape, he included this job with the extermination of yellow fever, and as a result malaria was reduced in a most marked degree. Before 1901, Havana, dating back to 1872, had an average yearly death rate from this disease of over 300; in 1898 it rose to 1,900. Since 1901, after the systematic destruction of mosquitoes inaugurated by Gorgas, malaria steadily decreased until in 1912 there were only four deaths. This means practically the extinction of malaria in Havana, as these four deaths could be attributed to patients brought from infected districts outside of the city.

General Gorgas said of the extinction of malaria: "It did not attract anything like the attention that the extinction of yellow fever had aroused. The work of Sir Ronald Ross and his co-workers with the anopheles mosquito and of Reed and his associates with the stegomyia, undoubtedly gave the knowledge whereby the practical extinction of malaria

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and yellow fever was accomplished in Havana, but the accomplishment of this work with regard to yellow fever was the event which attracted the greatest attention. It seems almost providential that we had all the machinery at hand whereby the discoveries of the Reed Board could be immediately tested and demonstrated."

Appreciative of His Contemporaries

General Gorgas at all times was the most modest of men, and never for one moment did he fail to minimize his own work in comparison with that of his contemporaries or predecessors. This is shown in the following paragraph in which he summarized the accomplishment in Havana:

"There has been a great deal of discussion as to who deserves the credit for this great discovery. Undoubtedly Reed and his board brought all the threads together and actually made the great discovery; but Finlay, Sternberg, Carter, and others started the spinning of many of these threads. Like all great discoveries everywhere, it was gradually led up to by many workers."

IV. BUILDING OF THE PANAMA CANAL

Yellow Fever Eradication

Although it was urged that a medical man should be made a member of the Isthmian Canal Commission, since sanitation at Panama, as demonstrated by the experience of the French, was fully as important as engineering, the commission, under the Spooner

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Act, consisted of seven members, five of whom were engineers, but no physicians were appointed.

During the latter part of March, 1904, General Gorgas, with three associates appointed at his request—Medical Director John W. Ross, U. S. N., Major Louis A. LeGarde, M.C., U. S. A., and Major Cassius E. Gillette, Corps of Engineers, U. S. A.—was ordered to accompany the Panama Commission as its sanitary advisor for the purpose of drawing up a scheme of sanitation whereby the force might be protected during the construction of the Canal. "After much study and careful consideration," he said, "we submitted a report which embodied the organization which we thought necessary to accomplish the desired ends. The report gave detailed estimate of the cost of this organization."

In April, 1904, General Gorgas was ordered to report to the commission as the chief sanitary officer for the Isthmus. He was authorized to employ a certain number of men for the preliminary work, and given an appropriation of \$50,000. On May 4, the French company formally transferred the Canal property to the United States, and early in June the work began.

Lack of proper organization was one of the difficulties which had to be met with at the beginning. The supply departments in the United States were slow in furnishing supplies, and few requisitions were filled. This was due to the attempt of the first commission to manage from Washington. Gorgas, however, had taken the precaution to bring with him his \$50,000 worth of supplies and his picked personnel, which enabled him to start without undue embarrass-

Building of the Panama Canal

ment, in direct contrast to the showing of the Engineering Department or the Quartermasters' Department for the same period.

From the careful study made by Gorgas, he realized that the subject of yellow fever was by far the most important phase of sanitation with which he had to deal. The enormous death rate from this disease that the French had suffered would make it very difficult for the United States to supply officials and laborers for the digging of the Canal. The cost for labor would become prohibitive, and the appalling death rate would make Congress hesitate to take the responsibility of continuing the work. The best statistics available showed that the French lost yearly by death from yellow fever about one-third of their entire force. At this rate, with the number of men employed, the United States would lose by death from this dread disease about thirty-five hundred men yearly.

“The two principal foci of infection for yellow fever were the towns at either end of the railroad—Colon at the northern end on the Caribbean Sea, and Panama at the southern end on the Pacific Ocean.”

The sanitary problem in Panama was many times greater than that in Havana; the commission in control of the construction of the Canal was located in Washington, and the sole point of contact with this supreme authority was through the then resident governor of the Canal Zone, General George Davis.

Here General Gorgas had an opportunity to demonstrate that he possessed unusual qualities as an organizer, as an administrator, and as a manager of men, with an appreciation of political forces. In

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Cuba, Governor General Wood, who was present with executive authority, was in sympathy with the accepted scheme of sanitation and co-operated with Gorgas in every detail of his work and gave him the required financial support; but in Panama at the beginning, General Gorgas reported to Governor George Davis, who was the only member of the commission who lived continuously on the Isthmus. While the commission as a whole, at the beginning, was prone to underestimate the magnitude of the sanitary problems as well as the cost, and was inclined to look upon the extensive plans of General Gorgas as visionary, Governor Davis gave him his heartiest support. It was difficult, however, even with this sympathetic attitude on the part of the Governor, for Gorgas to convey his desires to the commission through the governor in the same convincing manner that he could have done by direct and personal contact.

Attempt to Duplicate Methods Employed at Havana

Gorgas, with his entire force and financial resources, began his work in an effort to destroy the yellow fever mosquito; to repeat, but with greater intensity, the work that had been so effective in Havana.

“So when we commenced work in the City of Panama, we relied principally upon this method. We carried fumigation in Panama, however, much further than we had ever dreamed of doing at Havana. Besides carrying out the method which we had developed at Havana of fumigating the house where a case of yellow fever had occurred, together with all the contiguous houses, we adopted the following plan Instead of waiting for the slow proc-

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ess of fumigating the house where a yellow fever case occurred, with the contiguous houses, and thereby killing the infected mosquitoes concerned in that particular case, we ought to be able, we said, in a small town like Panama, to fumigate every house in the city within a comparatively short time, and thereby get rid of all the infected mosquitoes at one fell swoop."

New Difficulties

"This would certainly have been the result if our premises had been correct, namely, that it was the fumigation that had caused the disappearance of yellow fever in Havana. With this object in view, we commenced at one end of the city and fumigated every building. . . . Cases of yellow fever still continued to occur after we had finished. We, therefore, went through the procedure a second time. Still other cases occurred, and we went over the city a third time. We used up in these fumigations in the course of about a year some hundred and twenty tons of insect powder, and some three hundred tons of sulphur. . . . "

The story is so interesting, and the problems to be handled were so complicated and so stupendous, that General Gorgas' way of telling it in his own simple words is worthy of quotation.

One problem that was not present in Havana but that had to be overcome in Panama was the care of the enormous influx of unacclimated and non-immune whites who were being brought in as officials and employes of the commission.

"Our force," says Gorgas, "of unacclimated whites liable to yellow fever rapidly increased during the

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winter of 1904 and the spring of 1905. Yellow fever increased with still greater rapidity. The authorities became more and more alarmed. In January, 1905, the first commission was asked to resign. . . .

“Even after this change, the sanitary department was in no better condition than it had been under the old commission. The chief sanitary officer was still subordinate to the governor of the Canal and had no means of access to the chairman except through the governor. Such sanitary measures were carried through, the importance of which the chief sanitary officer could impress upon the governor. Those the importance of which the governor could not see, were with great difficulty carried into effect.”

The condition of affairs must have been most harrowing to the sanitary authorities who had no doubt of the ultimate success of their plan, based on their experience in Havana, if they were only allowed, unhampered, to carry out their program. The full support of the members of the commission was difficult to obtain.

Conditions with regard to yellow fever, because of the difficulties encountered in carrying out every detail of their plan, “kept going from bad to worse,” says Gorgas, “during the first six months of 1905. In April, 1905, several of the higher officials died of yellow fever. This caused widespread panic among the whites, and very great demoralization to the work itself.”

Commission Recommends Gorgas' Removal

“Finally, in June, 1905, the governor and chief engineer, members of the executive committee of

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the commission, united in a recommendation to the secretary of war that the chief sanitary officer and Dr. Carter, and those who believed with them in the mosquito theory, should be relieved, and men with more practical views be appointed in their stead. They stated that the sanitary authorities had visionary ideas with regard to the course of yellow fever and no practical methods even for carrying their ideas into effect."

Here is where Gorgas demonstrated that he had the courage of his convictions. It would have been an easy matter, and a course sanctioned by general usage in political affairs, for General Gorgas, in these months of obstruction caused by the ignorance of superior officials, to have compromised and resorted to makeshifts to curry favor with his superior in rank. By these means he might have gained temporary advantage. But Gorgas was too honest to pursue such a course, and it would have been incompatible with his direct way of doing things.

President Roosevelt Supports Gorgas

"Fortunately, the then President of the United States had been in office when the work at Havana had been done by us," says Gorgas. "He told the commission that the mosquito theory had been established beyond peradventure; that its application had been entirely successful at Havana where yellow fever had been more firmly established and established for a longer time than in Panama. He declined to sanction the change recommended, and directed that every possible support and assistance be extended to the sanitary officials."

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About this time Mr. John F. Stevens was appointed chief engineer of the commission and he recommended that the sanitary department should be made an independent bureau and report directly to himself. This enabled the chief sanitary officer, General Gorgas, to make known his needs directly to the highest authority, and there he was accorded loyal support.

"This," remarks Gorgas, "was the high-water mark of sanitary efficiency on the Isthmus, and more sanitation was done at this time than during any other period of the construction of the Canal."

With Full Power Came Quick Results

With full authority granted to Gorgas and his aids a repetition of the remarkable accomplishments in Havana came to Panama.

"During the Fall of 1905, yellow fever rapidly decreased, and by November, the last case of this disease had occurred in Panama. This fact quieted alarm on the Isthmus, and gave the sanitary officials great prestige, not only among the large body of Canal employes, but also among the native population living on the Isthmus.

"In looking back over our ten years of work . . .," says Gorgas, in a burst of justifiable exuberance, "1905 and 1906 seem the halcyon days for the sanitary department. . . . By the fall of 1907, about all of our sanitary work had been completed. Our fight against disease in Panama had been won, and from that time on our attention was given to holding what had been accomplished.

"One more case of yellow fever occurred in Colon

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during May; but since May, 1906, now more than eight years, not a case of yellow fever has originated on the Isthmus."

Organization

Each of the twenty-five districts into which the Canal Zone was divided, as far as the general sanitary work was concerned, was under the supervision of a sanitary inspector who had under him a force of from twenty to one hundred laborers, with assistants and foremen. The districts varied from fifteen to thirty-five square miles in area, according to the population. The Zone of the Canal extends for five miles on either side of the Canal, a strip ten miles in width and fifty miles in length.

Sanitary work, generally speaking, was done only within a mile or so of the Canal. All brush and undergrowth were cleared within two hundred yards of houses and villages, and the ground was carefully drained within the same area.

Mosquito Work

The great task of the sanitary inspector was his anti-mosquito work. In the early days he paid particular attention to the *stegomyia* mosquito, but after the fall of 1905, when yellow fever had been conquered, attention was given to the elimination of the *anopheles* mosquito, which is the means of transmission of malaria.

To eliminate the *stegomyia* mosquito from these country districts, the same method was pursued that had been carried out in Colon and Panama. As an anti-malarial measure, there were sufficient laborers

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under foremen in proportion to the size of the district to cut the brush and undergrowth within two hundred yards of all villages, houses, and dwellings, and also to cut the grass within this area whenever it reached a foot in height. Thus the adult mosquitoes were deprived of protection from wind and sunlight, by which they are destroyed. Also, the small pools of water, in which the mosquitoes bred, were dried up.

Drainage

Likewise the inspectors had to look after the drainage. This was a much more difficult task, and was carried on by specially trained workers, for not only the cleared zone had to be drained, but the water courses leading from the area had to be attended to. Open ditches and concealed, covered hollow drain pipes were the means through which this was accomplished. The sides of the open ditches were filled with broken stones or, where practicable, covered with concrete. This prevented grass from growing on their edges, and deprived breeding places of protection.

Various methods had to be adapted to the conditions, and as a result about one hundred square miles of territory were drained, some five million feet of open ditch were dug, a half million feet of concrete ditch and one million feet of rock-filled ditch constructed, and about one million feet of subsoil tile laid.

Oiling the Water

Where drainage was difficult or impossible, kerosene oil was sprayed over the pools or streams of

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water. Later crude oil, because of its cheapness, supplanted the kerosene oil. About fifty thousand gallons a month were used over the one hundred square miles. When the use of oil was impracticable, a mixture of carbolic acid and rosin, called larvicide, was employed to destroy the larvæ in the grass at the sides of running streams.

Inspectors Must Recognize Different Species of Mosquito

As there are six or seven hundred species of mosquito, it was necessary that the inspectors, to reach their maximum efficiency, should be furnished with the life-history of the mosquito. The choice breeding place of the stegomyia, the yellow fever mosquito, is in clean rain water, principally found in cisterns and water barrels around dwellings in towns and cities. Therefore, the stegomyia is known as a "town mosquito." The larvæ of the anopheles, the malarial mosquito, also breed most abundantly in clear, clean, fresh water; but they require grass and algæ for their protection. As these conditions are most prevalent at the edges of ponds and running streams, the anopheles is known as a "country mosquito."

The stegomyia has prominent white markings on its body and white bands around the joints of its legs; and while these cannot readily be distinguished by the naked eye, they give it a gray cast which distinguishes it from other species in a locality such as Panama. The hind legs of the anopheles are very much longer than the forelegs, which gives one the impression that it is standing on its head.

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The inspectors, too, had to have a knowledge of the many varieties of larvæ which differ in appearance for each species of mosquito.

Screening

Trained inspectors were responsible for the screening of the several thousand buildings scattered in thirty-two towns on the Isthmus. These buildings were supposed to be mosquito-proof. Architects planned and developed types of structures that could be economically and effectively screened, and that would be suitable as well for a tropical country. With the exception of the one general entrance or door, the houses were planned to be completely and permanently screened in, the screens to extend around open porches, thus insuring adequate circulation of air in the apartments. The screens were made of non-corrosive metal, and were durable even in a hot, humid atmosphere.

Even with perfect screening, it was found necessary, because of the carelessness of employes, to destroy the mosquitoes by general sanitary measures so that the careless might be protected without reference to screens. Many of the inspectors succeeded in eliminating the mosquitoes from their territory.

In badly infected malarial regions, even the mosquito catcher was employed. Each day the mosquito catcher would go through the houses in districts where workers were lodged in groups of structures, and catch all of the mosquitoes he could find; this was continued day after day. As the female anopheles mosquito cannot transmit malaria until twelve days after she has bitten a victim of the disease,

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under the above régime no mosquito succeeded in living long enough to become disease-bearing.

Hospital Accommodations

Besides the elimination of mosquitoes and the reduction of disease, while malaria was decreasing rapidly and continuously, the men with malaria had to be cared for in hospitals. A part of General Gorgas' program, not a small one, was to furnish hospital accommodations and medical and surgical care to a large number of men. The great Ancon Hospital and the Santo Tomas Hospital are monumental inheritances of this system.

Results of the Campaign against Malaria

The following is the result of the campaign against malaria: In 1906, 821 of every thousand patients admitted to the Canal Zone hospitals had malaria. In 1907, this number in each one thousand was reduced to 426 malaria cases; in 1907, to 282; in 1909, to 215; in 1910, to 187; in 1911, to 184; in 1912, to 110; and in 1913, to the small number of 76.

Inasmuch as a victim of malaria seldom dies of the malady, but is capable of supplying its germ to any female anopheles mosquito within three years of first infection, the abolition of malaria was practically impossible with seventy-five per cent of the population of the Canal Zone carrying the germs of the disease in their systems.

Bubonic Plague

In 1905, a case of bubonic plague appeared in Panama. This disease is transferred from the rat to

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the human being by the rat flea. The systematic campaign that was instituted rid the Canal Zone of rats.

Results of Sanitation in Panama

In summing up the results of sanitation in Panama, General Gorgas says:

"We have no means of telling what was the sick rate with the French but we know it was very large. [According to General Gorgas' figures, a conservative estimate of the French rate of sickness throughout their operations from 1881 to 1889 would be 333 per thousand, or one-third of their force.] Our force during the ten years of construction averaged 39,000 men. If we had had a similar constant sick rate, we should have had 13,000 sick employes in our hospitals every day during the ten years of construction. As it was, we had only 23 per thousand sick each day, a total of 900 for the whole force; that is, we had about 12,000 fewer men sick every day than the French. . . .

"We had an average of 900 men sick every day. For the year this would give us 328,500 days of sickness, and for the ten years, 3,285,000 days of sickness. If our rate had been 300 per thousand, a very moderate figure compared with what it was under the French, we should have had 11,700 sick every day, and for the year 4,270,500, and for the ten years, 42,705,000, or an increase of 39,420,000 days of sickness for the whole period. . . .

"It cost about one dollar a day to care for a sick man on the Isthmus. The commission cared for the sick free of charge. Every day of sickness prevented on the Isthmus lessened the expense which the commission had to bear by one dollar. The commission was therefore saved

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by this sanitary work, for ten years, \$39,420,000. . . .

“During the ten years of construction, we lost by death 17 out of every thousand of our employes each year. That is, from the whole force of 39,000 men, 663 died each year, and for the whole construction period we lost 6,630 men. If sanitary conditions had remained as they had been previous to 1904, and we had lost as did the French, 200 of our employes out of each thousand on the work, we should have lost 7,800 men each year, and 78,000 during the whole construction period.”

Thus the Gorgas sanitary program saved the difference between the 78,000 estimated deaths under the old régime, and the actual 6,630 deaths under the new, or a total of 71,370.

Economic Value of Sanitation in Panama

General Gorgas estimated that the work of sanitation saved the United States government \$80,000,000, taking into consideration the loss that would have occurred on account of poor morale, and the excessive wages that would have been demanded under less favorable health conditions, in addition to the hospital days saved.

Then, too, one must take into consideration the fact that our great force of men in Panama, because of the sanitary arrangements, was privileged to live in a tropical paradise, where the health conditions were as safe as in any habitable place on earth. “The Canal Zone,” says General Gorgas, “for the past four hundred years, ever since it has been known to white man, has been one of the most unhealthy spots in all the tropical world. And now it is one of the garden spots of our civilized world, with a health condition excelled by no land.”

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V. SURGEON GENERAL OF THE UNITED STATES ARMY DURING THE WORLD WAR

Reorganization of Medical Corps and Medical Reserve Corps of the U. S. Army in 1916

Gorgas, the sanitarian, had reached the acme of his fame; and at the honorable age of sixty-three, as surgeon general, he was at the head of the peace-time Medical Corps of the United States Army. In 1916, although the President of the United States and a large majority of the American people were definitely opposed to entering the European struggle, it was apparent that our country would be drawn into the greatest war of history. Therefore, General Gorgas, while hoping for an early peace, began to urge the reorganization of his corps.

During the spring and summer of 1916 he appeared almost daily before the Military Affairs committees of the Senate and House, and personally advised with the legislators in their preparation of the army bill. The courtesies of the floor of the Senate Chamber were extended to him as the authorized head of the Medical Corps of the United States Army.

It was during this time that the writer, at General Gorgas' request, met him for the first time in his office in Washington. His cordial greeting, and his kindly but direct approach to the purpose of the interview, is a never-to-be-forgotten incident.

He was anxious to expand the Medical Reserve Corps, and as he desired to secure the best men obtainable, he consulted those who were in authority

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in the leading medical organizations of the country and asked them to aid him in making his selections. His direct way again. There could have been no safer method, and the results immediately justified his judgment. Throughout the war it was his policy to utilize every available means to add to the number and efficiency of his corps.

When war seemed inevitable, the President established a Council of National Defense, which was comprised of his cabinet members and an Advisory Commission which included a medical representative. Prior to this time, the Committee of American Physicians for Medical Preparedness, organized by Dr. Frank F. Simpson, to represent the outstanding medical and surgical organizations of the United States, had been recognized by the President because of the preliminary work it was doing in an effort to aid the Surgeon General of the Army in enlarging and strengthening his Medical Reserve Corps. The work started by this committee was carried forward under the jurisdiction of the medical representative of the Advisory Commission, and General Gorgas and the Surgeons General of the Navy and the Public Health Service were quick to recognize its importance as a means of obtaining co-operation with the lay profession. The three Surgeons General became the backbone of an executive committee which established a very close relationship between all medical bureaus in the government, and the 140,000 lay physicians of the United States.

General Gorgas, at the beginning of the war, immediately sought the co-operation of the medical schools in his intensive drive for medical reserve officers and

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he was keen in council that brought the deans of these schools to Washington. This resulted in releasing for service in the Army many eligible men whose teaching positions could be filled by the older men.

Early in the war an impression was abroad that certain societies were dictating the selection of medical men for service. General Gorgas promptly proved this assumption to be false by declaring that any legal practitioner of medicine without regard to school, who could meet the requirements, would be accepted. He asked the critics to test this statement by bringing men to him for enrollment. This they did, and whenever they qualified they were accepted.

General Gorgas was not a narrow man, nor did he allow a pride of proprietorship to outweigh the prompt accomplishment of the task in hand. He realized that his rapidly expanding department would soon be overwhelmed by the details of enrollment and he welcomed the program for securing medical officers which was formulated by the Medical Section of the Council of National Defense in Washington, and the American Medical Association in Chicago. He repeatedly said: "I want all the help I can get." And that was his true attitude.

The most obscure doctor in the United States could be assured of access to General Gorgas in Washington. This generous man would take the time to explain carefully to some doctor from afar off how he should proceed to accomplish his end, while eminent men in the profession, colonels, and brigadier generals, were waiting their turn to consult their General. This does not imply that petty details were allowed to interfere when important matters were pending.

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He could say "NO," and he carefully discriminated in the disposal of his time. But he had the most generous feeling toward men, all of whom were brothers to him. As a military man he respected rank, but as he wanted the help of everyone, in his daily contact with men he proved that he was anxious to help them and he did this in a direct way, with the greatest friendliness and without ostentation. Because he shrank from the semblance of secluding himself from anyone who wished a personal interview, three distinct offices were established by his subordinates who desired to protect him and who took this method of making him more difficult to find.

The result of his efforts in reorganizing the medical corps of the Army is almost unbelievable. One year before the war there were approximately 435 regular army medical officers. There were about 2,500 medical men in the medical reserve corps. In November, 1918, at the time of the Armistice, there were more than 32,000 medical officers in active service, and over 35,000 civilian doctors enrolled in the medical reserve corps. Besides these reserve officers there was an enlisted personnel of approximately 250,000 men and 22,000 nurses in the medical department under General Gorgas, probably the largest corps, in the aggregate, that was ever under the command of one major general. When the war ended, General Gorgas had increased this personnel to such an extent that the medical department of the army was larger than the entire standing army of the United States had been prior to the outbreak of hostilities.

From the time the American soldier became sick in camp in the United States, or on the battlefields

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abroad, the Surgeon General was responsible for him. In France he saw that accommodations were provided for twenty-five per cent of the American soldiers in the field. One hospital with 27,000 beds was constructed by his orders, and there were many smaller hospitals. In pre-war days, the army hospital capacity in the United States, outside of the limited facilities at Army Posts, was for 3,843 men. When the war ended, General Gorgas had provided hospital accommodations in this country for 100,000 men. There were seven Army hospitals in the United States when the war began. He increased the number to more than one hundred, which included three great embarkation hospitals and two base hospitals. He established a fully equipped hospital at each of the Army camps and cantonments.

General Gorgas urged from the beginning of the war that special effort should be exerted to protect our millions of boys going into training camps and overseas, from venereal diseases. He urged co-operation with the Red Cross, the Y. M. C. A., the Knights of Columbus and the Salvation Army in furnishing wholesome entertainment and diversion to the men. He welcomed the establishment of the Fosdick Commission, which had for its purpose zoning the camps to protect the men from drink and dissolute women, and with his counsel and advice, co-operated to the fullest extent. He insisted that every man exposed to venereal disease must accept prophylactic treatment, not only to protect the man himself, but to prevent the spread of disease among his associates.

One of the principal achievements of General Gorgas was the attracting to his aid in war work of

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surgeons and physicians of national and international reputation. His staff included the names of those renowned in the fields of surgery, medicine, neurology, orthopedics, and the treatment of every known disease and disorder. With such excellent aid as they gave him, he was able to declare truthfully that the world's military hygiene record for deaths from sickness had been reduced more than fifty per cent in the United States Army. The record which until that time had been held by the Japanese was 21 deaths per thousand troops. Deaths from sickness in the United States army dropped to 10 per thousand. The mortality rate in the United States Army was reduced to six-tenths of one per cent. Ninety per cent of the American soldiers wounded on the fighting fronts of France and Flanders were cured in from three to four weeks and returned to the front—another record-breaking achievement. Prior to the close of the war, General Gorgas was active in the solution of problems connected with the care of the American soldier who returned from abroad, temporarily or permanently disabled. His plans included provision for surgical and medical attention in reconstruction hospitals and curative workshops, for re-education in the United States, and studies of industrial and agricultural conditions so as to enable disabled soldiers to return to civilian life on a self-supporting and useful basis.

Specialties

General Gorgas early recognized the value of the specialist in the treatment of the sick and injured. Until the World War an army surgeon was supposed

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to be an all-round medical and surgical practitioner, prepared to assume the responsibility of administration and detail paper work. To a marked degree this practice prevailed in the armies of Europe when the United States entered the war. With the development of our base hospitals and our casualty clearing stations, the reserve medical officers were segregated according to specialties, which is the prevailing condition in civil practice. As the civilian doctors of every specialty in medicine enrolled for military service, they naturally requested that they should be allowed to do the work in which they specialized in their home practice, and for which they were best fitted. This was particularly urged as it applied to base hospitals, the casualty clearing stations, and training camps. At first the departments were conservative in sanctioning this innovation. It even became the subject for jest among the regulars, who asked what was to be done with the obstetricians. But one by one committees of civilian doctors were formed by the General Medical Board in Washington, including orthopedists; eye, ear, nose and throat specialists; internists; brain surgeons; genito-urinary surgeons; psychiatrists; general surgeons; and clinical laboratory workers. As General Gorgas was aware of the importance of this segregation of work in medicine, these informal committees were soon taken over by the rapidly expanding medical department, and were made distinct divisions with a well-known specialist at the head of each. One of his chief aids in the late war, an officer in the regular army medical corps, Colonel George E. Bushnell, writes the following words about the early

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recognition of the importance of specialization by Gorgas:

His readiness to delegate responsibility contributed not a little to the success with which the Surgeon General's office was conducted during the war and especially as relates to the professional divisions, for the most part under the charge of distinguished physicians from civil life. The introduction of specialism on so large a scale into the Medical Department of the Army was quite unprecedented and was naturally not contemplated by existing regulations. Many complications arose; some mistakes were inevitable; but on the whole the experiment was a success, largely because of the attitude of General Gorgas, who, after providing for guidance from more experienced medical officers while the newly-appointed men were becoming initiated into army ways, left the chiefs of divisions alone to work out their problems. . . . It was his duty to fuse into the framework of his organization the expanding activities of the professional divisions to the end that there should be no impairment of military efficiency. With the purely professional aspects of the work he was wise enough not to interfere, content to trust the masters of civil medicine temporarily under his direction to develop their plans, and to rejoice over the results which so amply justified his course.

It may safely be predicted that in the future, army medical corps of all nations will be organized with full recognition of the importance of the specialist, and the reserve officers will be asked to fill the particular place for which they have been trained in civil life and in which they can render the highest service.

Congressional Investigation

But it was late in 1917, or early in 1918, when the famous investigation of the conduct of the War Department was being pursued, and when the department was being handled rather roughly, that General

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Gorgas definitely changed the drift of criticism and did much to save the situation by placing matters in their true light.

There had been much suffering on the part of our newly recruited soldiers, especially in some of the partially constructed camps in the south. Particularly was this true among the sick because of inadequate hospital facilities. The policy had been to hasten the completion of the living quarters for the men, thereby delaying the construction of the hospitals. There was much complaint, too, because of an insufficiency of clothing and blankets. The death rate among the sick was considered appallingly high and the whole country was aroused. The question was being asked: "Are we to have a fall-down of the medical administration in this war similar to the notorious failure in the Spanish-American War?" This was a direct charge aimed at the War Department, and a serious reflection on all in authority, from the President down.

When the investigation, which is the inevitable result of the arousing of public opinion, was started by the Committee on Military Affairs of the Senate, General Gorgas, as Surgeon General of the Army, was called upon to testify. Instead of attempting to explain away or to excuse the obvious lack of perfection of organization or administration in those early days, in his characteristically dignified and patient manner he presented an outline of his department in peacetimes, and its sudden expansion from a personnel of less than five hundred to thirty-five thousand in less than a year; its transition from a group of trained military medical officers to this large corps, ninety

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per cent of whom, six months before, were civilian doctors, untrained in military life; the expansion of his field organization, including transportation, equipment, hospitals, medical supplies, nurses, orderlies, and an enlisted personnel of thousands of untrained men—all to be molded into shape to care for the sick among two million men who had come from all sorts of environment and were brought together to be converted into a homogeneous army.

For one whole day, January 25, 1918, General Gorgas was subjected to a running quiz by the different members of the Committee on Military Affairs of the Senate. He explained patiently the efforts that he had put forth to complete his organization, and also reviewed his personal visits to many camps. He outlined the architectural construction of the camp hospitals; the effort that had been made to obtain the required number of cubic feet of air space for each man, etc., *ad infinitum*. He was asked if he could tell the exact number of windows in a certain structure that had been inspected. He admitted, with patience, that he could not describe definitely from memory the arrangement of the windows, but that those details, of course, were familiar to his experts. One of the Senators asked if he should not be required to know these details personally. General Gorgas brought forth many smiles by saying that it might be convenient for him to know these things, but that he was convinced that he was already attempting to carry too many details.

Finally he said: "Gentlemen, it must be apparent that mistakes are inevitable in such a great and rapid

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expansion of a small organization of experts to an organization of the size of this present corps, with many inexperienced men. However, while we may have made mistakes and may make other mistakes, I can assure you that we shall endeavor not to make the same mistake twice."

Every member of the Senate Committee was a friend of General Gorgas at the close of this all-day grilling. Every newspaper man present became his friend. This gentleman, at the head of the most important corps of the Army, and in whom every father and mother who had sons in the service was interested vitally, was pronounced a safe executive.

The feeling of confidence in General Gorgas was carried by the newspapers to the home folks of the whole country, and criticism of the medical conduct of the war ceased; also the attitude of the people toward the administration and the early conduct of the war was changed from violent criticism to admiration and profound confidence.

General Gorgas, by his positive but winning personality, and by a patience that assumed that the Senate and the people were willing to have their erroneous impressions corrected, quietly persisted in telling the whole story of the early days of that marvelous reorganization of departments.

He compelled his audience to realize the bigness of the task, and, finally, sympathetically to appreciate that the men who were carrying on, while human, were men of patriotic devotion to their tasks who were endeavoring with all their might to make good.

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Increased Rank for Medical Officers

It became apparent early in 1917, shortly after our country entered the war, that a provision should be instituted that would make it possible for our Medical Reserve Officers to receive rank higher than that of major.

Surgeon-General Gorgas was always very much concerned and interested in all subjects that had to do with medical matters in general. He was keenly alive to the necessity for this increased rank and he never failed to use his influence and initiative to make his desires known. He realized that this was a war that would require the services of the very best of the medical profession, and to its organization would be attracted the most eminent and influential civilian practitioners of medicine, of surgery, and of dentistry.

In the organization of their respective medical reserve corps, during three years of actual warfare, our allies, England, France and Italy, had seen the necessity of giving advanced rank to their medical officers, many of whom were then serving as lieutenant colonels, colonels, brigadier generals, and even major generals. In our overseas armies, our medical officers would soon be associated with these medical officers of European nations. Immediately they would find themselves at a distinct disadvantage in this association, and they would be subjected to unnecessary humiliation because of their lower rank, although they would be performing the same duties and assuming the same responsibilities as their foreign contemporaries.

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Presenting Subject to War College

The executive committee of the Council of National Defense presented the matter to Secretary of War Baker, and through him the committee was invited to present its case to the War College. General Gorgas, Dr. Charles H. Mayo, Dr. William H. Welch, Dr. Victor C. Vaughan, and the writer made up the committee on the occasion of its first appearance before the War College. A strong argument was presented by General Gorgas in favor of increased rank for medical officers, and a general discussion followed in which all members of the committee who were present participated, as well as the group of officers representing the War College. While our requests were not definitely turned down in these early discussions, it soon became apparent to us that no move was being made to change the law or regulations, and finally we were convinced that the initiative along this line would have to come from us.

Senator Owen Presents Bill in Senate

Senator Robert L. Owen was selected to look after our interests in the Senate, and we co-operated with him in formulating a bill. Because of the lack of enthusiasm in our behalf on the part of the secretary of war and the general staff, the whole subject was presented to President Wilson, with a plea for his support. To the great satisfaction of the members of the executive committee of the General Medical Board, the following reply was received from the President:

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March 5, 1918

My dear Doctor Martin:

I read very carefully your memorandum of February twenty-seventh about the rank accorded members of the Medical Corps of the Army and have taken pleasure in writing letters to the chairmen of the Military Committees of the House and Senate, expressing the hope that the bill and resolution may be passed.

Cordially and sincerely yours,
(Signed) Woodrow Wilson.

Dr. Franklin Martin
Advisory Commission
Council of National Defense
Washington, D. C.

The Owen-Dyer Bill

With the introduction of Senator Owen's bill, a prolonged series of hearings on the subject were held before the Senate Committee on Military Affairs. Later a bill was introduced in the House by Representative Dyer, which modified in some unessential details the Senate bill. This brought the matter before the Committee on Military Affairs of the House. After many hearings in these committees, almost all of which were attended by General Gorgas and the writer, and at various times other members of the executive committee, including Dr. William J. Mayo, Dr. Victor C. Vaughan, Dr. Charles H. Mayo, Dr. William H. Welch, Dr. Frank F. Simpson, and others, it was deemed wise to make the Senate and House bills uniform. At a meeting in the writer's office the Owen-Dyer bill was formulated. General Gorgas, Senator Owen, Representative Dyer, and Brigadier General (then Colonel) Noble and the writer were present at this meeting. General Gorgas practically dictated the changes that were agreed upon, and the

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bill was written. The following day the Owen-Dyer bill was presented simultaneously in both houses of Congress, in the Senate by Senator Owen, and in the House by Representative Dyer. After many vicissitudes and alterations, it was attached as a rider to the general appropriations bill.

Before the Owen-Dyer bill was dignified by becoming a rider to the general appropriations bill, a serious propaganda for and against the bill was waged for a considerable period of time. Many hearings were held before the Military Affairs committees, and General Gorgas was at the forefront in his advocacy of our bill. Members of the different medical societies were requested to exert their influence with their Senators and Representatives, urging them, by resolutions and by personal letters, to pass the Owen-Dyer bill. During this time of intense opposition, General Gorgas and the writer were called before Assistant Secretary of War Benedict Crowell (Secretary of War Baker being in Europe) and Chief of Staff Peyton C. March for pernicious activity in behalf of the Owen-Dyer bill. The assistant secretary proceeded to quiz Surgeon General Gorgas regarding his activities in advocating legislation concerned with the corps, the uniform of which he wore and of which he was the head. It was even intimated that he had in public addresses urged men to write to their Congressmen and Senators, instructing them to vote for the bill. When General Gorgas was asked directly if he had committed these indiscretions, he answered that he could not remember that he had been guilty of the particular act of which he was accused. "But," he said, in his direct and

Surgeon General of the U. S. Army

outspoken manner, "you know, Mr. Secretary, I am in favor of the passage of the Owen-Dyer bill, and I would consider myself disloyal to my corps if I did not do everything in my power to bring about its passage."

The assistant secretary was disarmed by this frank statement, and evidently forgetting to make the point that it was contrary to regulations for an officer to interest himself in legislation, he began to argue the merits of the bill for increased rank. He asked General Gorgas if he was not inconsistent in urging higher rank for members of his reserve corps when there were other reserve corps for which such increased rank would be equally desirable. "Not at all," the General replied. "I have no definite knowledge of the requirements of the other corps, and I should never think of interfering in their organization. I do, however, know the needs of my own corps, and I feel that I must favor such a change in the law as will meet them."

General Gorgas was then asked to explain just how the passage of this law would benefit his corps. In his quiet, convincing manner he responded by drawing a mental picture of his vast corps, with its service in the camps of this country; its service overseas where the distinguished members of our medical profession, serving as majors, were working side by side with their distinguished confrères of Europe who, while performing the same duties, were colonels, brigadier generals, and major generals, thus outranking our own men and bringing many unnecessary humiliations to bear upon them. The story was so convincing, so unanswerable, and so pleadingly told

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(the names of well-known civilian doctors serving as illustrations), that the General, obviously, had won his case.

Even the silent listener, the Chief of Staff, was apparently satisfied that the distinguished officer, although a medical man, had turned the tables on the civilian Assistant Secretary of War, who was ready to allow further discipline to remain in abeyance.

Owen-Dyer Bill about to Pass; Final Attack by Officers

Finally, the general appropriations bill, to which the Owen-Dyer bill had become a rider, was passed by the House and the Senate, and was in the hands of the conference committee, appointed by the two Houses of Congress, for agreement. The conference committee was to report that day, and at a given hour in the afternoon the completed bill was to be ratified by both Houses.

At this time (Secretary of War Baker having returned from overseas) a desperate, vicious attack was inaugurated against the bill by the subtle propagandists. A conference between the secretary of war and Senator Owen much disturbed the senator, who was one of the authors of the bill. It appeared that there was much opposition, especially to the creating of the higher ranks of brigadier general and major general. The argument was urged that if the opposition of the secretary of war, and of the War College, represented by the chief of staff, should induce the President to veto the bill because of this rider, the whole general appropriations bill would fail of passage. An appeal to the patriotism of those supporting

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the Owen-Dyer bill, asking them to abandon the essential features thereof, was adopted as a ruse of the opposition in an effort to gain its point.

At nine o'clock in the morning, after an interview with Senator Owen and a conference with the official advisors of his own department, General Gorgas came to the writer's office, much depressed. The conference committee was to report early in the afternoon and the two branches of Congress were to take a final vote on the ratification of the bill. They had urged that he should consent to abandon the superior rank and be satisfied to retain the lieutenant colonels and colonels, or otherwise he would lose all. Before deciding the matter, he wanted to obtain my reaction and advice, inasmuch as we had always been in absolute accord on the subject and had consulted each other on all changes of policy. He recited the whole story and, instead of asking my advice as to what his attitude toward a compromise should be, asked me what I would do under the circumstances. I was deeply concerned at the turn of affairs, and appreciative of the sense of responsibility under which the General was laboring. He had been urged to compromise further. What should he do? He had fought so hard and so long for his precious bill, and by holding out he might lose all, whereas by yielding he might spare something. But he had asked me a question: What would I do? Finally I said: "General, I would not yield another inch." He rose from his chair, rushed over to me, grasped my hand, and said: "I hoped you would say that. In my own mind I had already decided on that course."

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We laughed at each other and went over the whole situation. The opposition had told the General that the President might veto the important appropriations bill because of the supposed opposition in the War Department to the Owen-Dyer rider. Had we not received a letter from the President months before in which he stated that he favored our bill? Would the President veto it without consulting with us and telling us why? Why not tell him of the rumors, remind him of his promise, and ask him, if he were still of the same opinion, to make his views known? I communicated with the White House and explained the situation. At noon, while we were holding an executive committee meeting in my office in the Council of National Defense (with General Gorgas, the surgeon general of the Navy, the surgeon general of the Public Health Service, Dr. Victor C. Vaughan, and Dr. William H. Welch present), Admiral Grayson telephoned to me and said that the President had communicated to the proper authorities his wishes as previously written to me. I assumed that our bill would be ratified that afternoon, and that the President would sign it.

General Gorgas was not very demonstrative, but in those trying days of the war I do not believe I ever saw him so happy as he was later that day. The Owen-Dyer bill was passed by Congress that afternoon as a rider to the general appropriations bill, and was signed by the President.

VI. WORK IN CONNECTION WITH THE INTERNATIONAL HEALTH BOARD, ROCKEFELLER FOUNDATION

In 1915, the International Health Board approved a plan which had for its object the eradication of yellow fever from all parts of the world. This action was taken after consultation with General Gorgas in which he expressed the conviction that the disease could be exterminated, and that he hoped to see it effected during his lifetime and to aid in the undertaking.

General Gorgas made a tour of inspection to Ecuador, Peru, Colombia, Venezuela, Brazil, and the Island of Barbados in 1916, at the head of the Yellow Fever Commission of the International Health Board. He and his confrères were accorded every courtesy by the officials of all of these governments, and they returned to the United States with a definite plan of operation against yellow fever. Because of his reputation as a sanitarian, his accomplishments in Havana and Panama in eradicating yellow fever and malaria, and last but not least, his charming personality, Gorgas was exceptionally well qualified to pursue this work.

In order to carry through the program of the Yellow Fever Commission, Gorgas planned to retire from the United States Army. This he did not do because of our entrance into the World War, and the work of the commission was definitely postponed. However, in the winter of 1918, upon his retirement from the Army because of age, Gorgas took up the

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plans of the Yellow Fever Commission with renewed enthusiasm. But even during the busiest periods of the war, the officials of the International Health Board could count upon his enthusiastic co-operation and advice pertaining to epidemics in different sections of the tropics. It was ever his hope that when the war ended he could have a part in abolishing yellow fever from the earth.

In December, 1918, an active campaign against the *stegomyia* mosquito was inaugurated in Guayaquil, with the result that the number of yellow fever cases was reduced from 88 in December, 1918, to 2 in May, 1919, and since that time no new cases have been reported from that city. General Gorgas had estimated that yellow fever could be eradicated from Guayaquil in three years, and the International Health Board extended this estimate to five years; but the actual accomplishment required less than six months.

In recognition of his services, the Peruvian Government appointed General Gorgas its official Director of Sanitation. This government also placed at his disposal one of its warships to conduct him from Callao to Panama. The Association of Bricklayers of Peru conferred upon him an honorary membership, the highest honor it was within its power to bestow.

In the spring of 1920, Gorgas sailed for London at the head of a commission which was to investigate the yellow fever situation in West Africa, the only known place where it was thought to be active where measures for its control had not been undertaken. He was making his plans for this campaign when he was taken ill on May 30, 1920, and during his

Councillor

illness he continued his advice until the end came on July 4, 1920.

While he was on his sickbed, King George conferred upon him the Knight Commander of the Order of St. Michael and St. George, and upon his death a state funeral in St. Paul's Cathedral was ordered by the British authorities.

VII. COUNCILLOR

The writer of this sketch had many opportunities during nearly two years of continuous association with General Gorgas to judge of him as a councillor, as an advisor, and as an administrator. We were together on many occasions before the military committees of the House and Senate, where he was called to advise about some policy, to defend some course of action that was under investigation, or to advocate some new plan of procedure. General Gorgas attended practically every meeting of the General Medical Board of the Council of National Defense, and with the Surgeons General of the Navy and of the Public Health Service he was not only an interested observer of the deliberations of this important Board, but he was one of its most valuable councillors and advisors. He was a member of the executive committee of the same body, which prepared the plans that were presented for final approval to the Council of National Defense, composed of six members of the Cabinet. He was a regular attendant at the weekly or bi-weekly meetings of the executive committee, and assisted in the formulation of new policies, which involved not only his own department,

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but all of the activities of the government which had to do with medicine, surgery, and sanitation during the entire conduct of the war. The committee, consisting of Drs. Welch, Vaughan, Simpson, Mayo, Admiral Grayson and Surgeons General Gorgas, Braisted, and Blue, and the writer, seemed incomplete, when on rare occasions General Gorgas was absent. He was not a talkative advisor, but a good listener. When he had advice to give, the few words which he used to express himself were simple but effective, and his strong character and charming personality carried great weight with his associates.

He possessed the characteristics of an effective administrator. He selected and depended upon strong men for his aids, and when he had chosen them, his faith in their honesty and integrity was unshaken, even if they were under criticism. He had the courage of his convictions and stood by his judgment when once formed. While he was the mildest of men in dealing with his associates, occasionally he was thought to be stubborn because he failed to yield on some line of action upon which he had determined. Although he was always ready to discuss all sides of any question, he finally made his own decisions, and on these he was most definite in action.

He was dependable to a fault. If the time for a conference was eight thirty, General Gorgas could be depended upon to be on hand at eight twenty-nine. The employes in my office could set their watches as General Gorgas and Professor Welch walked down the long hall to a regular conference of the executive committee.

Councillor

Was he a great executive as well as a great physician? Was he a great administrator as well as a sanitarian? Was he a great accomplisher of definite things as well as a soldier? If there is any doubt in an unsympathetic mind that studies the record of his life, let him consider the following of his accomplishments:

First: In less than eight months he eliminated yellow fever from Havana, where it had been endemic for 150 years.

Second: In less than two years, against unreasonable and almost insurmountable opposition, he transformed the Isthmus of Panama from a charnel house of disease and death, a condition which had existed for 400 years, to one of the healthiest spots on earth.

Third: In two years he organized the greatest medical corps, in points of efficiency and size, to care for the largest army in our history; developed it from a corps of a few hundred to an organization of 35,000 officers and 250,000 enlisted personnel, in addition to a greatly increased Dental Reserve Corps and Nursing Service.

Fourth: From a few small hospitals, he developed the great base and cantonment hospitals required to care for 4,000,000 men on two continents, and provided the equipment necessary for them.

Fifth: His administration headquarters were increased from a suite of three small rooms in the Army and Navy Building to a group of buildings covering two square blocks, to accommodate his greatly enlarged force of assistants and clerical personnel.

William Crawford Gorgas

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- American Laryngological Association
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- American Otological Society
- American Pediatric Society
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Pan American Commercial Congress
Society of Alumni of Bellevue Hospital
South Dakota State Dental Association
Southern Commercial Congress
Southern Surgical Association
Texas State Dental Society
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William Crawford Gorgas

The Gorgas Idea

GORGAS:

The man whose work made the Panama Canal possible.

The economic Saviour of Cuba.

The Father of the Army.

The Redeemer of the Tropics.

The World's Physician.

The most beloved medical officer of the United States Army.

Whose work reflected great glory on the medical profession.

Whose genius placed him with Pasteur and Lister.

Whose accomplishments make all the world his debtor.

A Servant of Mankind and Benefactor of Humanity.

Gorgas Memorial Institute

THE MEMORIAL

I. PURPOSES

The tribute of the nations to William Crawford Gorgas—the establishing of a memorial not of stone or bronze, but a living vital organization which embodies the hope of freeing all the world from disease, the object to which the life of Gorgas was consecrated—such is the Gorgas Memorial. It was established by physicians, dentists, and laymen of national reputation to conduct an intensive drive against unnecessary illness and premature death.

The Gorgas Memorial was incorporated under the laws of the State of Delaware on October 20, 1921, under the name “THE GORGAS MEMORIAL INSTITUTE OF TROPICAL AND PREVENTIVE MEDICINE.” The articles of incorporation provide—

“The nature of the business and the objects and purposes proposed to be transacted, promoted, and carried on, are to do any or all of the things herein mentioned, viz.:

‘To conduct, assist, and encourage investigations in the sciences and arts of hygiene, medicine and surgery, and allied subjects, in the nature and causes of disease and the methods of its prevention and treatment, and to make knowledge relating to these various subjects available for the protection of the health of the public and the improved treatment of disease and injury, particularly as applied to Tropical and Preventive Medicine. It shall be within the purposes of this corporation to use any means to these ends which from time to time shall seem to it expedient, including research, publication, education, the establishment and maintenance of charitable or benevolent activities, agencies or institutions appropriate thereto, and the aid of any

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other such activities, agencies, or institutions already established or which may hereafter be established.'”

2. GORGAS LABORATORY OF TROPICAL MEDICINE, PANAMA, REPUBLIC OF PANAMA

“An Act to authorize a permanent annual appropriation for the maintenance and operation of the Gorgas Memorial Laboratory” in Panama was introduced into the House of Representatives of the United States on December 20, 1927, by the Honorable M. H. Thatcher (Kentucky), in behalf of the Gorgas Memorial Institute of Tropical and Preventive Medicine. The Bill, H. R. 8128, reads as follows:

AN ACT

TO AUTHORIZE A PERMANENT ANNUAL APPROPRIATION FOR THE MAINTENANCE AND OPERATION OF THE GORGAS MEMORIAL LABORATORY

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be permanently appropriated for each year, out of any money in the Treasury not otherwise appropriated, the sum of \$50,000, to be paid to the Gorgas Memorial Institute of Tropical and Preventive Medicine, Incorporated (hereinafter referred to as the Gorgas Memorial Institute), for the maintenance and operation by it, of a laboratory to be known as the Gorgas Memorial Laboratory, upon condition (1) that the necessary building or quarters for said laboratory shall be constructed within the five years next ensuing after this Act shall become a law, either upon the site offered by the Republic of Panama therefor, at,

Gorgas Laboratory of Tropical Medicine

or adjacent to, the city of Panama, or upon a site in the Canal Zone to be provided by the United States; (2) that each of the Latin-American Governments be invited and permitted to contribute annually, on a pro rata basis, according to population, toward the maintenance and operation of such laboratory, the total of such contributions not to exceed 75 per centum of the total contributed by the United States; and (3) that in such manner as the President may determine the United States be represented permanently on the board or council directing the administration of such laboratory, with privilege to the Latin-American Governments contributing as aforesaid to have representation on such board or council; all such representation to be based upon, and in proportion to, the actual respective contributions made to the aforesaid maintenance and operation.

Section 2. That pending the construction of the necessary building or quarters for said Gorgas Memorial Laboratory there is hereby authorized to be appropriated annually, in manner aforesaid, for a period not exceeding the five years hereinbefore named, said sum of \$50,000, payable to the Gorgas Memorial Institute, to enable and permit to be made the organization of the said Gorgas Memorial Laboratory, and its maintenance and operation, in temporary quarters or in any existing laboratory, in the Republic of Panama, or the Canal Zone.

Section 3. The Gorgas Memorial Institute shall make to Congress annually, on the first Monday in December, a full report of the operation and work of the Gorgas Memorial Laboratory up to the first of

William Crawford Gorgas

November next preceding and shall include therewith a complete statement of the receipts and expenditures of said laboratory for such fiscal year. The books and accounts of the Gorgas Memorial Laboratory shall at all times be open to examination by the Comptroller General of the United States.

On January 20, 1928, hearings* were held before the Committee on Foreign Affairs, House of Representatives, to whom the Bill had been referred. Statements were presented at the Hearing by the following:

HON. MAURICE H. THATCHER, representative in Congress from the State of Kentucky.

DR. FRANKLIN MARTIN, Chicago, Ill., president, Gorgas Memorial Institute; director and president-elect, American College of Surgeons.

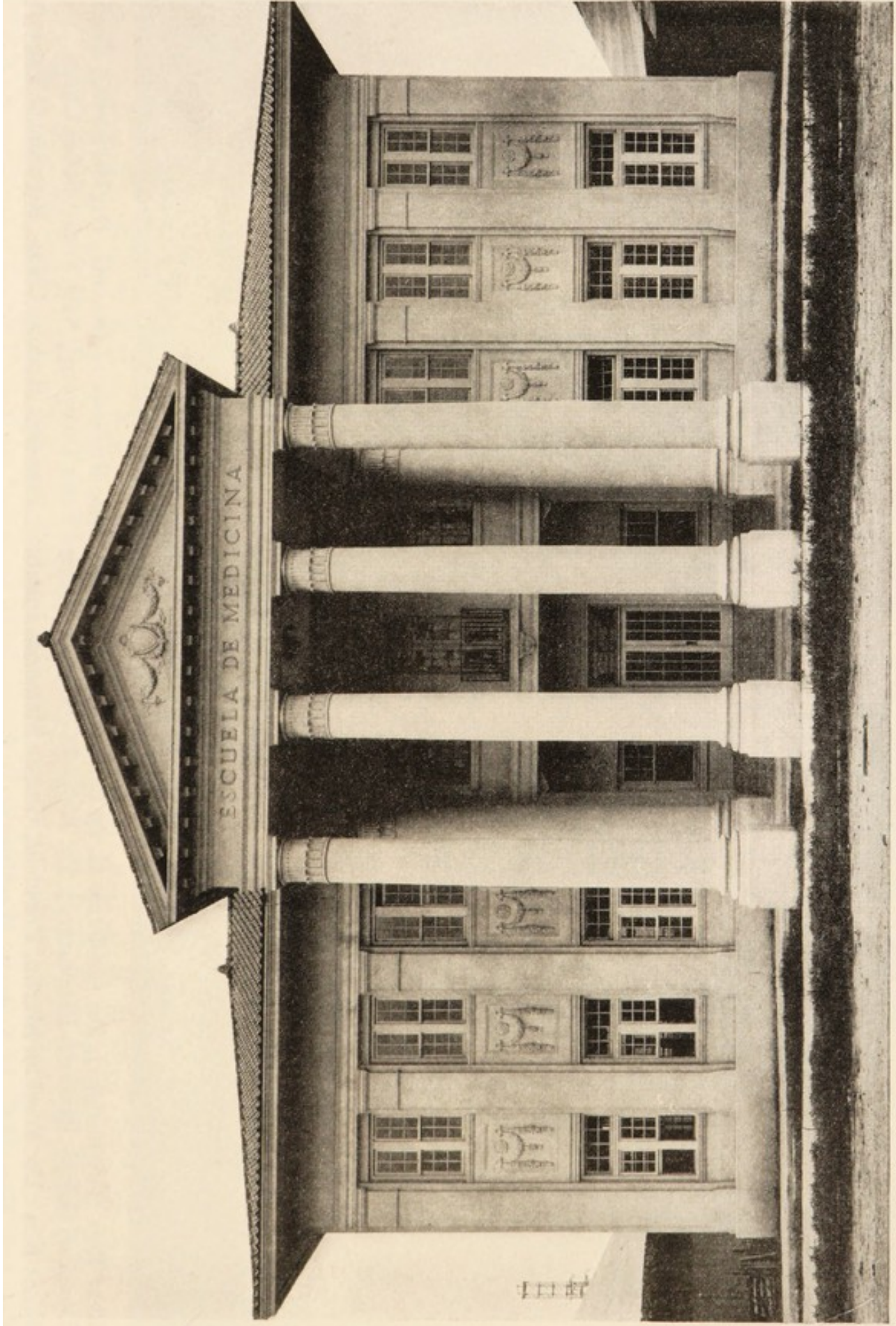
MR. EDGAR WALLACE, legislative representative, American Federation of Labor (speaking for Mr. William Green, president, American Federation of Labor).

DR. BOWMAN C. CROWELL, Chicago, Ill., member of executive committee and director, Gorgas Memorial Institute; associate director, American College of Surgeons; recently director, Oswaldo Cruz Institute for Tropical Diseases, Rio de Janeiro, Brazil.

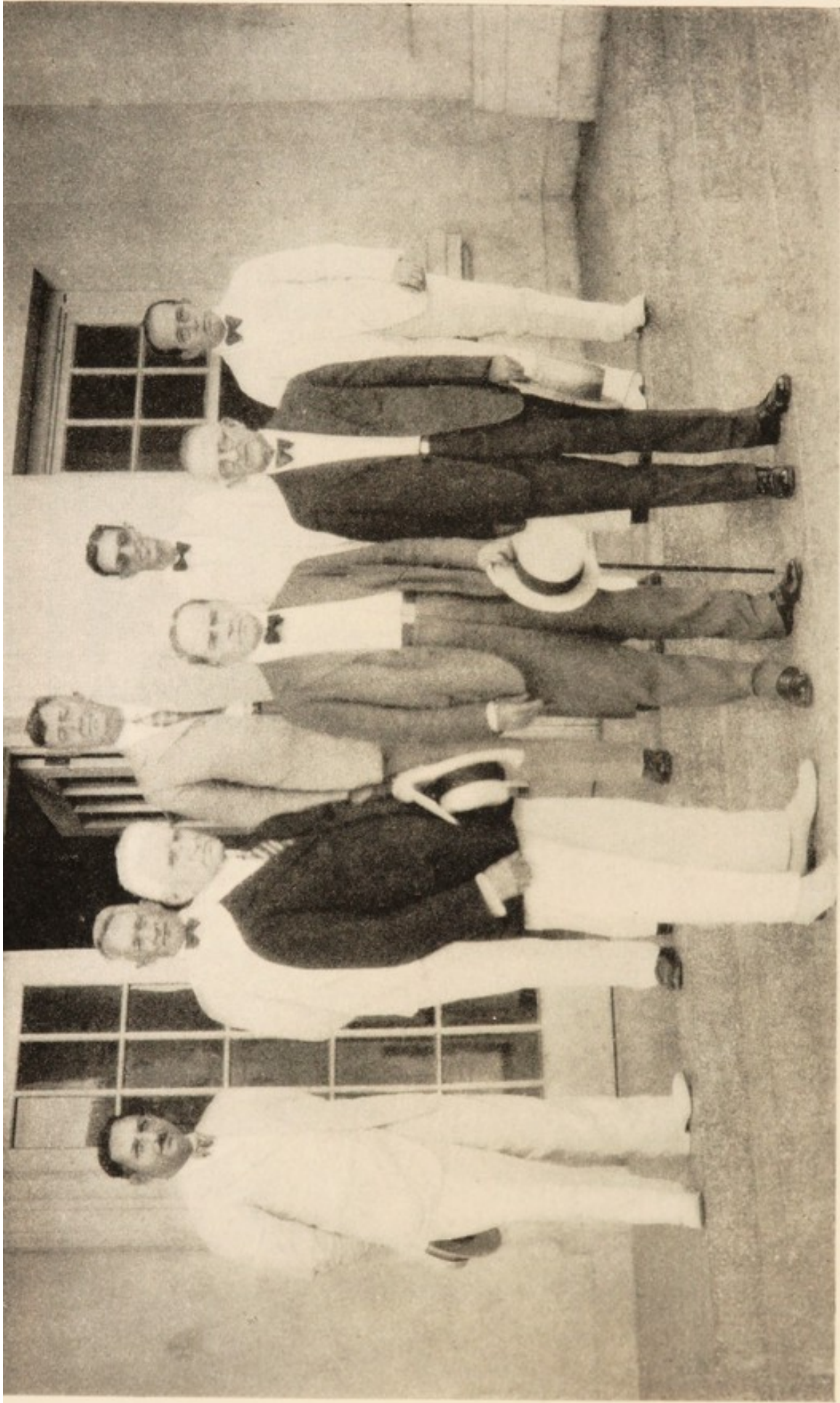
DR. GEORGE W. CRILE, Cleveland, Ohio, director, Gorgas Memorial Institute; president, Cleveland clinic; regent and ex-president, American College of Surgeons.

MR. HENRY S. WELLCOME, Esq., London, England, founder of the Wellcome Bureau of Scientific Research (including Tropical Medicine and Hygiene); the Wellcome Affiliated Research Institutions, the Historical Medical Museum, London; and the Wellcome Tropical Research Laboratories at Khartoum on the Nile, Anglo-Egyptian Sudan, Africa.

*Copies of the complete Hearings may be obtained from the Gorgas Memorial Institute, 1331 G Street, N. W., Washington, D. C.



Present Quarters in Panama of Research Laboratory, Gorgas Memorial Institute of Tropical and Preventive Medicine



Rear Row (left to right): Dr. Guillermo G. de Paredes, Director of Health, Republic of Panama; Dr. Herbert C. Clark, Director, Gorgas Research Laboratory; Dr. Roland C. Connor, United Fruit Company, New York; Señor Chiari.

Front Row: Dr. Franklin Martin, President, Gorgas Memorial Institute; President Rodolfo Chiari, Republic of Panama; Col. J. F. Siler, M.C.; U. S. Army, Washington, D. C.

Gorgas Laboratory of Tropical Medicine

SURG. GEN. MERRITTE W. IRELAND, United States Army, Washington, D. C., director, Gorgas Memorial Institute.

SURG. GEN. EDWARD R. STITT, United States Navy, Washington, D. C., director, Gorgas Memorial Institute.

SURG. GEN. HUGH S. CUMMING, United States Public Health Service, Washington, D. C., director, Gorgas Memorial Institute.

DR. ARTHUR T. McCORMACK, Louisville, Ky., president, Kentucky State Board of Health.

DR. HERMAN N. BUNDESEN, Chicago, Ill., recently commissioner of health of Chicago; president, American Public Health Association; member of executive committee and director Gorgas Memorial Institute.

By unanimous vote, the Bill passed the House of Representatives on March 28, 1928; introduced by Senator Royal S. Copeland (New York) into the Senate on March 29, 1928; referred to the Foreign Relations Committee of the Senate, and passed on April 11, 1928; passed the Senate by unanimous vote on April 24, 1928; and approved by President Coolidge on May 7, 1928.

On authorization of the Gorgas Memorial Institute, in August, 1928, Dr. Franklin Martin (at that time president of the Institute) proceeded to Panama with Lieut. Colonel J. F. Siler (a member of the Scientific Board) to perfect arrangements for temporary laboratory accommodations that would serve for the initial work of the Institute. On August 25, 1928, the Government of Panama made available for the immediate purposes of the Institute an independent building on the grounds of the Santa Tomas Hospital, in Panama. The building (which was originally constructed to house the Medical School of Panama) is in every way suited to the purposes of

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the Gorgas Laboratory of Tropical Medicine. It is of dignified and pleasing architecture, and in close proximity to the permanent site which was formally presented to the Institute by the Government of Panama on February 18, 1923, and on which site the Panaman Government proposes to erect the permanent Gorgas Laboratory of Tropical Medicine.

On November 13, 1928, Dr. Herbert C. Clark (formerly of the United Fruit Company) was appointed director of the Gorgas Laboratory of Tropical Medicine, effective January 1, 1929. Dr. Clark arrived in Panama for active duty on January 7, 1929 (for Scientific Board of the Institute see page 57).

Among the paramount problems for early consideration by the Laboratory will be malaria, which is of so much interest, not only to the scientific medical profession and sanitarians, but as well to the people and industries of all tropical and semi-tropical countries, and to at least one-half of the territory of the United States.

3. PROGRAM OF HEALTH EDUCATION

The program of health education is contemplated to carry on in a permanent way the work so ably started by William Crawford Gorgas, who through the application of proper preventive and curative measures demonstrated the value of periodic health examination.

Gorgas was promoted in rank and influence to the Surgeon-Generalship of the U. S. Army, and in 1917 became the head of a great and important Corps. During the World War, the personnel of his Medical

Program of Health Education

Corps was increased from less than 500 to more than 32,000, and had medical supervision over an army of 4,500,000 troops.

Immediately Gorgas selected his doctors from among the outstanding men in the regular scientific profession of medicine. He advocated that the U. S. Army should be comprised only of men who, from the standpoint of physical health, must be medically sound. He then insisted that these men must be maintained, so far as possible, in a condition of good health through the application of scientific principles of preventive medicine. He was quick to recognize the value and need for reform in the method of examining recruits. He advocated the change, and it became a regulation in the draft law.

In developing the army of 4,500,000 men, General Gorgas found it necessary to examine medically seven million men, 2,500,000 of whom were found unfit; this in spite of the fact that these men apparently were in normal health. It was the duty of General Gorgas not only to select these men and guarantee their fitness at the beginning, but it was also the duty of his Corps to keep them well. Constant inspection and frequent examinations succeeded in discovering the early signs of illness, and prompt treatment when illness developed succeeded in keeping the large majority of them in perfect health. He had the best doctors of all specialties to care for his men, to make frequent inspections, to keep them well, and to care for them when they became ill.

Of the 4,500,000 who entered the ranks of the U. S. Army, the majority, notwithstanding their hardships, developed physically until they outranked in

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fitness their confrères who remained at home. General Gorgas and his Corps, as the physicians of a great army, and with perfect co-operation by the men who were their patients, succeeded in maintaining an extraordinarily low rate of mortality, and from the standpoint of statistics, a lower death rate than was maintained by those in civil life.

PERIODIC MEDICAL EXAMINATION

General Gorgas once said, "Why not apply this periodic medical examination to all people in civil life"? From the three great adventures of Gorgas in scientific medicine—in Havana, in Panama, and as Surgeon-General of the U. S. Army during the World War—the medical man and layman can recognize the advantage in better personal health and better health conditions when complete co-operation is maintained between the doctors and the people—their patients. It also becomes evident, as one reads of these achievements, that scientific medicine is interesting, rational, and absolutely free from mystery and sham.

If the doctors of the United States had the same impelling influence over the citizens of this country that General Gorgas had over the people of Havana and Panama, and over the U. S. Army, preventable diseases would be reduced to a comparable astonishing minimum. Why neglect the opportunity to have the same co-operation, which the physician would be ready to give, even though there may not exist the autocratic and military means of compelling such co-operation?

If the people of the United States would voluntarily insist that they be given a scientific medical ex-

Objects of the Gorgas Memorial

amination by their family physician once a year, preferably on their birthdays, the same health miracle would be wrought in civil life that General Gorgas accomplished with his four and a half million men. Already our scientific health program is reducing the death rate, as shown by the following figures: In 1890, the death rate in the United States and Canada was 19.6; in 1900, 17.8; in 1905, 16; in 1910, 15; in 1915, 13.6; and in 1920, 13.1.

4. OBJECTS OF THE GORGAS MEMORIAL

1. Eliminate unnecessary illness.
2. Prolong life, make it healthier, more productive, and enjoyable.
3. Check many diseases before they reach the incurable stage.
4. Eradicate tropical diseases, open up territories of unlimited wealth and add enormously to the world's assets.
5. Eradicate pestiferous and disease-bearing mosquitoes (malaria alone exacts an annual toll of \$100,000,000).
6. Build up the 25,000,000 youths and adults in the United States now physically below par.
7. Lay the foundation for healthier future generations.
8. Have every individual submit to a periodic health examination by his family physician, who should be the custodian of health.
9. Prevent disease, and thereby—
 - a. Relieve the nation of \$1,500,000,000 of its annual sick bill.

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- b. Prevent the present annual loss of 350,000,000 hours of time caused by preventable illness of 42,000,000 employes.
- c. Save the \$3,000,000,000 lost annually through reduced earning power.
- d. Save 750,000 lives annually.

10. Bring about a liaison between the public and the scientific medical and dental professions, the real health authorities.

11. Free all the world from preventable disease, to which purpose the life of Gorgas was consecrated.

