

The BUILDING OF THE PANAMA CANAL

By MAJOR-GENERAL GEORGE W GOETHALS GOVERNOR OF THE PANAMA CANAL

VI.—The Reorganization of the Force.



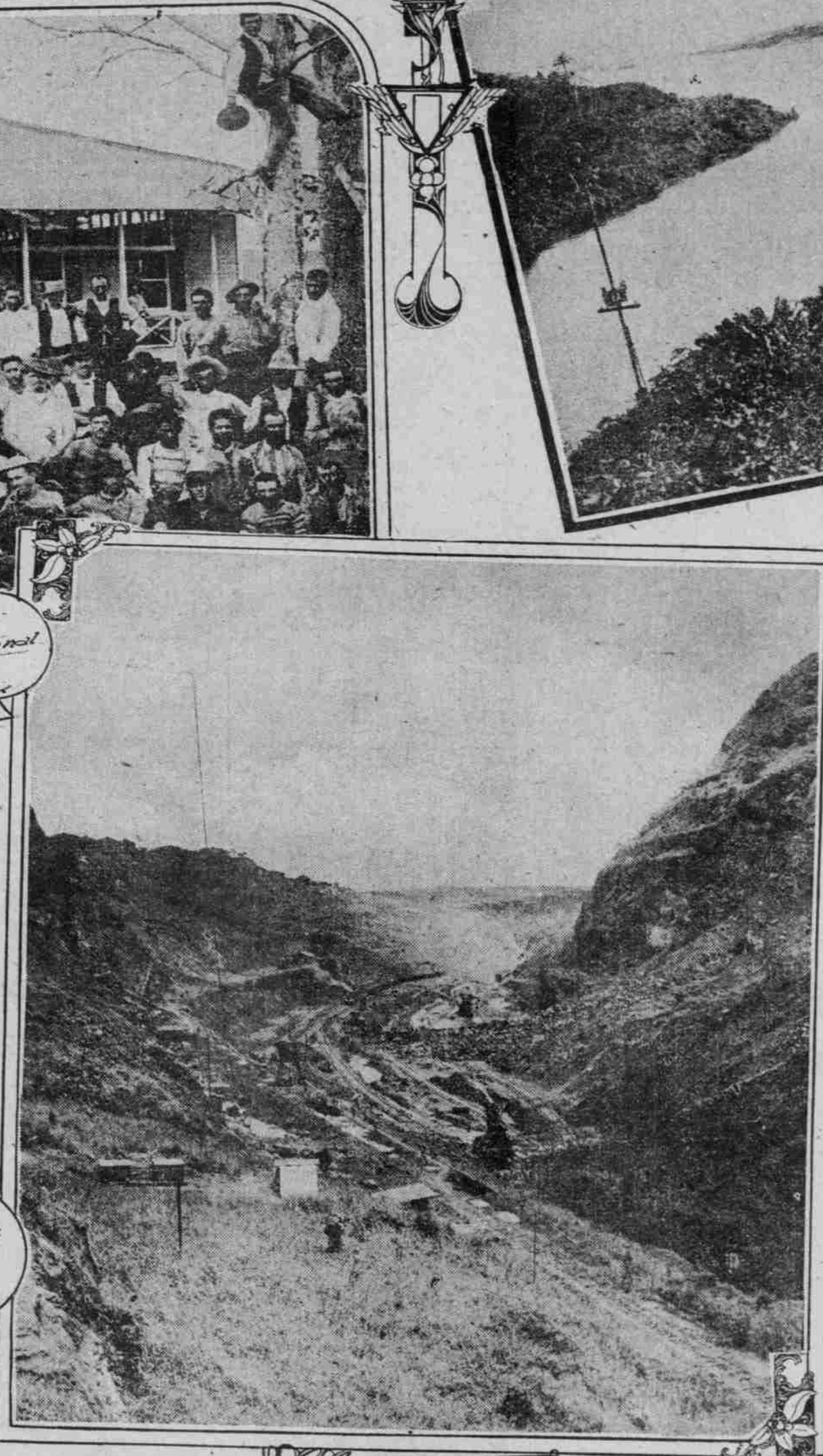
(Editorial Note.—In last week's installment of his story of the building of the Panama Canal, General Goethals described under what form of organization the force for the building of the Canal worked prior to the promulgation of President Roosevelt's one-man control of the Canal, concentrating authority in his hands and holding him alone responsible for the work. Under the power conferred on him by this executive order, Colonel Goethals, in today's installment, tells how he reorganized the force; and it was with this reorganized force that he built the Canal in less than the time that had been estimated necessary to complete the work.)

THE organization for the construction of the Canal, adopted in 1907, did not work satisfactorily. There was an overlapping of work between the departments which resulted not only in friction but in placing subordinate officials under two heads, making it difficult at times to fix responsibility. The departments which formed part of the organization of construction and engineering were doing taking work and issuing instructions of which the chief engineer had no previous knowledge, and the latter was not in as close touch with the work as his position warranted and required.

There were too many heads, with the usual accompanying under such a situation, of unnecessary expense. The designs for the locks and their appurtenances were not keeping pace with the work, for it was difficult to get anything definitely decided or adopted. While in Washington in January, 1908, I divorced the lock-gate designing force from the authorities on the Isthmus and placed it under Colonel H. F. Hodges (he had received his promotion to Lieutenant-Colonel Corps of Engineers on August 27, 1907), for I found that the distance from the Isthmus prevented proper supervision of the work and also was causing delay. Furthermore, Colonel Hodges was peculiarly fitted for the work through his previous experience and training.

With Such Hardy Laborers as These the Canal Was Built in Record Time.

General George W. Goethals, Probably the Best Photographic Likeness of the Canal Builder.



How the Culebra Cut Looked, in August, 1913, Showing the Lower Part of the Famous Cucaracha Slide, on the Right.

Failure and Success Seen Together—Where the French Canal Crosses the Panama Canal at Mindi.

took on Appropriations which visited the Isthmus in the Fall of 1907, and asked me to look into the matter suggesting that when Major Devoil came down it might be possible for him to take over the work in much the same way as post quartermasters perform the work for hospital authorities at military posts. He expressed the belief that economies might be effected, and if so, a change should be made.

Reorganizing Sanitation Methods.

I had paid little attention to sanitary work other than to attempt to have grass cut by scythes and mowing machines instead of machetes, for the estimates that had been submitted for constructing the canal were exclusive of sanitation and civil administration. After examining the work being done, the methods of its doing, and discussing the matter with Major Devoil, I felt that a reduction in the expenditures could be made and better co-ordination secured if the grass cutting and garbage and night soil collection were turned over to the quartermaster's department and the drainage work turned over to the construction divisions.

By this arrangement the sanitary department would prescribe what should be done in the various localities requiring improvement, but the actual work would be executed by the forces of other departments, thereby doing away with the duplication of supervisory forces that existed. The health statistics were prepared by Colonel Gorgas, and on looking into them I felt that there were some grains of truth in Lindon W. Bates' charges in his "Retrieval of Panama"; and I hesitated about ordering the change, for, if this course were taken, an unfavorable change in statistics might force me to return to the existing system, which would have been awkward.

I discussed the matter with Colonel Gorgas, and, though I failed to convince him that the work could be done just as well, if not better, I finally secured his consent to have the scheme tried; he was to prescribe the areas where grass and brush were to be cut; and, as he held that, as a rule, engineers were not competent to drain lands for sanitary purposes, I agreed to have his engineer prepare such plans and to carry them out if they conformed to the engineering standards. The change was put into effect September 1, 1908. There was considerable friction for some time, but this was finally eliminated.

I watched the statistics carefully for some months, but, finding that the percentage of sick continued to drop, I felt that the new method of doing the work was producing the results expected, and the cost was less, notwithstanding that greater areas of grass and brush were cut. In 1910 Colonel Gorgas stated that the work was not being done so well as formerly and requested a return to the old system, but, as economies had been effected and the statistics continued to show a constantly decreasing percentage in the sick rate, I declined to comply. I laid the facts before President Taft, who visited the Isthmus shortly afterward.

The organization of the sanitary department was top-heavy, and this was overcome by abolishing some of the existing positions. The general policy of concentration was made applicable to the hospitals. In 1907 the health branch of the department consisted of seven hospitals, located one each at various settlements along the line of the Canal, in addition to the main hospitals at Ancon and Colon. While in 1908 the line hospitals had been eliminated, with the exception of the penitentiary located at Culebra; the sick were carried to the terminal hospitals on hospital cars attached to passenger trains.

Changes in Administrations.

The method of accounting for property was not satisfactory, and steps were taken to change the existing system, resulting in a corresponding change in the organization. The method in use was modeled, it is believed, after that in common use by the railroads, the records being prepared from the monthly abstracts of receipts and issued by the division of material and supplies, which therefore were duplicates of the record kept by the chief of the division, yet the latter was the responsible officer.

The system proposed for substitution was to have the chief quartermaster take up on returns all property as it arrived or was purchased on the Isthmus. The property would then be transferred to the various divisions or departments for which ordered, or turned over to the main storehouse, which was to be in charge of an accountable officer. All officials having property were to render returns for that in their possession to be checked against the records.

A change in the personnel of the accounting branch of the work brought to the Isthmus Mr. W. W. Warwick as an examiner of accounts, whose thorough

closely in touch with the work than formerly.

Col. Goethals' Right and Left Bowers.

The office of the chief engineer was divided into three divisions. Colonel Hodges, after his arrival on the Isthmus, was assigned to duty as assistant chief engineer and put in charge of the first division, under which was placed the design of the locks, including valves, lock gates and protection devices, operating machinery, movable dams, and spillways. Later he had charge of the inspection and erection of the lock-gates and the installation of the operating machinery.

Mr. Rousseau, the remaining engineer member of the Commission, as assistant to the chief engineer was placed at the head of the second division, and had charge of all mechanical matters, preparation of estimates, some of the civil engineering matters that rose, and later the drydocks and coaling-stations, both design and construction. Colonel Hodges and Mr. Rousseau were my advisers, and I have always referred to them as my right and left bowers. To the faithful and loyal support of these two men is attributed in large measure the satisfactory progress of the work.

The third division was put under Mr. Caleb M. Saville, in charge of meteorology, hydrography, surveys and special investigations, the most important of which was the examination of the material underlying Gatun dam. The relocation and construction of the new Panama Railroad was placed under the chief engineer of the Panama Railroad Company, Mr. Ralph Budd, acting through the general manager, Mr. Hiram J. Slifer, until the latter resigned, when the head of the work reported directly to the chief engineer of the commission. Lieutenant Frederick Mears succeeded Mr. Budd and completed the road.

This in brief was the organization of the construction forces that resulted from the changes made in 1908, and which was continued, with minor changes to suit new conditions as they arose, until the water was admitted into Culebra Cut on October 19, 1913. In addition to definitely fixing the work in charge of each subordinate, an effort was made to give him full authority and hold him responsible, thus securing the best that was in him. As a consequence, each individual took a personal interest and pride in the work, feeling that the particular work on which he was engaged was the important piece; it therefore became our canal and we were doing it.

Too Small for Separate Organizations.

When, in 1908, it was decided to fortify the canal, involving the construction of gun and mortar batteries for its defense against naval attack, I took the position that the Isthmus was too small for two separate and independent construction organizations and that all work of this character on the Isthmus should be under one head. This policy was adopted so that the canal forces and plant were utilized for the purpose. In the same way the construction of quarters for the army is now in charge of the canal authorities with resulting economy in both instances. The additional work was taken care of by the creation of units reporting to the chief engineer.

Dividing the Zone.

The plan was to divide the Zone into three construction divisions, one extending from deep water in Limon Bay to Tabernilla, but later reduced so that it did not extend beyond Gatun locks and dam, called the Atlantic Division; one extending from Gatun to Pedro Miguel, called the Central Division; and the third extending from Pedro Miguel to deep water in the Pacific, called the Pacific Division.

Each division was placed in charge of a division engineer, and to him was assigned all work of construction within the territorial limits, including building construction and municipal engineering work, to which was added at a later date sanitary engineering work. To each division was also assigned an assistant division engineer, who shared the work with the division engineer in such a way that one of these officials was in charge of the field work of the division, the other in charge of the office work and such designing as was assigned to the division.

The work in the divisions was subdivided and placed in charge of resident engineers, superintendents, general foremen and foremen in such a way that responsibility could be definitely fixed. Major Gaillard was assigned to duty as division engineer of the Central Division, Mayor Sibert, of the Atlantic Division and S. B. Williamson, of the Pacific Division.

pointment of Colonel H. F. Hodges, General MacKenzie would be retired from service as chief of engineers by the time Mr. Smith's leave of absence expired, and the reasons which interfered with Colonel Hodges' selection in 1907 no longer obtained.

He was pre-eminently fitted to take up the designing work and push it. I had more confidence in Colonel Hodges' ability to act in my place during absences or in case I should be relieved than in that of either of the two Army members of the Commission. In the latter contingency, though I regarded Mr. Rousseau as the one of these available, best fitted temperamentally and professionally to be the chairman and chief engineer, there was no possibility of his advancement to the post if the existing policy of having an Army engineer in charge was to continue. I therefore urged the selection of Colonel Hodges on these grounds. He ranked the two Army engineer members, and his appointment would permit the reorganization of the work along the lines I had laid down in a way more satisfactory than any other that could be devised.

Mr. Taft would have preferred to re-appoint Major Devoil in his place, but such a course would have discredited the officer suggested for relief by the Secretary, and this I wished to avoid. A cable message along these lines was sent to the President, and Colonel Hodges was selected for a place on the Commission, Vice Jackson Smith.

The New Member of the Commission.

The question of a successor was then taken up. Mr. Taft decided to appoint Major C. A. Devoil, of the Quartermaster's Department of the Army. This was agreeable to me. I had served with Major Devoil on the general staff for a short time and was very favorably impressed with him. He had handled work in many respects similar to that required on the Isthmus, both in the Philippines and at San Francisco after the fire. In each instance with much credit to himself. So far as the vacancy on the Commission was concerned, I urged the ap-