

The Sewerage System of Honolulu

By *Marston Campbell*, Assistant Superintendent of Public Works.



MARSTON CAMPBELL.

Marston Campbell was born in Oakland, California, February 24th, 1867. He was educated in the schools and colleges of California and early determined upon a career as an engineer. He first entered upon the practice with his brother, who was in charge of water development in Southern California, and worked under T. W. Morgan, C. E., when that officer was in charge of the engineering department of the city. In 1886 he was appointed as inspector in charge of sea wall construction at the foot of Market street in San Francisco, and the following year became assistant engineer for the California Board of Har-

bor Commissioners, serving as assistant to the famous engineer Marsden Manson, C. E. Ph. D., until 1893. After that date he practiced his profession in Oakland, varied by two years' service as Deputy City Engineer, also in street department of city of Oakland until in 1899 he came to this city as engineer upon the work of the construction of the naval docks. February 24th, 1900, he was appointed by the Hon. Alexander Young as Road Supervisor, and was reappointed by Superintendent of Public Works McCandless. June 1st of this year he became Assistant Superintendent of Public Works by appointment of Superintendent Boyd.

The question of sewerage for Honolulu was first brought up when Mr. George Alardt, C. E., of San Francisco was employed by the Department of the Interior to report on a system for Honolulu.

His report was made on May, 1890, and can be found in the reports of the Minister of Interior of that date.

Nothing however was done in the matter of sewerage construction, although the Board of Health, and the Department of the Interior continuously and consistently urged upon the Government, the necessity of some decisive action being taken to place the City of Honolulu in a sanitary condition.

It was not until Hon. W. O. Smith, the then President of the Board of Health, and Attorney-General wrote to the Minister of Interior, that the matter began to assume some definite shape. The following quotation from Hon. W. O. Smith's letter expressed fully the conditions and needs of proper sanitation.

"When proper sewerage is provided and the water and slops, that are now deposited in the back-yards and under buildings in the densely settled parts of the city, are thus disposed of, there will be less chance for epidemic diseases."

Again recognizing the insanitation of Honolulu, he used the following words:

"The Board of Health has had occasion repeatedly to urge the construction of a sewer system in Honolulu. The necessity has been generally recognized and discussed for many years. It is of very great importance that the work be undertaken. While the cost may seem large, it would not equal the cost to the country of two or three epidemics of infectious diseases to say nothing of the loss of life."

From our experiences of the plague epidemic of 1898, one can fully appreciate the force of the above words.

During that entire period, the method of removing the sewage matter from the City of Honolulu was by means of three odorless excavator wagons, which, working 24 hours a day could not remove more than 30,000 gallons of sewage matter. With a population of approximately 30,000 people, and under an assumption of 60 gallons per capita, there was a total of 1,800,000 gallons of sewage matter disposed daily in the cesspools of the City of Honolulu. The total amount that could be removed by the excavators being 30,000 gallons, there was then a daily amount of 1,770,000 gallons of sewage matter that had to be absorbed by the soil.

This condition had been going on for many years, and one can realize what must have been the condition of the soil in the thickly populated districts of Honolulu. This was well exempli-

fied during the construction of the sewers, when the excavation of the necessary trenches was made throughout the city. The affluvia that was given forth was very offensive, and many cases of disease can be attributed to the disturbing of the soil. Many strong men who worked in these ditches were laid up with typhoid and malaria.

The seepage which came into these ditches was of a nature nothing more or less than sewage, which contrary to the general belief did not find its way to the sea but was held in the soil.

The actual work on a sewer system for Honolulu commenced, when Mr. Frank S. Dodge was sent to the United States to investigate the matter of sewerage, and it was upon his recommendation that Hon. J. A. King, Minister of Interior, sought and obtained the services of Mr. Rudolph Hering, C. E., one of the recognized authorities in the United States on sanitation. This was in 1896.

On January 5th, 1898, he supplied the Department of the Interior with complete plans and specifications for the sewerage and drainage of Honolulu; and in his report acknowledged his indebtedness to the Cabinet; the Bureau of Surveys; and in particular to Hon. J. A. King, Minister of the Interior; Hon. W. O. Smith, Attorney-General and President of the Board of Health; Mr. William D. Alexander, Surveyor-General; Mr. Frank S. Dodge, City Engineer; and Mr. W. E. Rowell, Superintendent of Public Works, for the much valuable information and assistance kindly rendered.

On November of the same year, Mr. Rudolph Hering's services were engaged as supervising engineer. He appointed Mr. F. B. Edwards, C. E., as resident engineer in charge of construction.

In January, 1899, a contract was entered into with Messrs. Vincent & Beiser to construct the sewers within the area bounded by the harbor, River street, Beretania street, Alapai street, South street, and the street leading from South street across to Ala Moana road. This also included the main sewers on King street from Alapai to Thomas Square, and the construction of the sewerage reservoir. This contract was entirely completed under the direct supervision of Mr. F. B. Edwards, C. E., resident engineer.

On April 7th, another contract was let to the same parties for the extension of the system covering the most of the remaining portion of the town between Liliha street on the Ewa side, to Artesian street, beyond Punahou, and as far mauka as Judd street, including the Kewalo district. Due to lack of funds, work under this contract was suspended December 11th, 1900. A large portion of this work yet remains

to be done. See cut.

Many sewers in this district have been put in by the property owners, the government furnishing the pipe, brick, manhole covers, etc., and the property owners paying for the cost of labor; all having been done in accordance with the original plans and specifications and to the grade and line set by the engineer.

In July, 1899, a contract was entered into with Mr. J. H. Wilson for the construction of the sewer outfall. After completing 1,500 feet of the vitrified 24-inch pipe, he threw up the contract. From this point it was taken up by the Department, under the direction of Mr. W. E. Rowell, assistant superintendent of public works, when 2,300 additional feet were constructed to a depth of 40 feet of water.

Funds at this time giving out, it was impossible to carry the work as contemplated to a depth of 100 feet.

So far there have been no defects noticed at the end of the outfall. The sewage only slightly discolors the surface of the water; there have been no deposits along the beach, even when our southerly winds are blowing.

On January 8th, 1900, a contract was made with D. L. Davis & Company for the construction of a pump house and screen house. The buildings are substantial as well as ornamental, being built of native stone. (See cut.)

The specifications for the construction of the sewer system were particularly severe and rigid as regards leakage. When work was suspended by order of Hon. James A. McCandless, superintendent of public works, tests were made for leakage by F. B. Edwards, resident engineer. Many leaks were found which were remedied by the contractors and on final examination, the leakage did not exceed that permitted under the specifications.

In July, 1901, the system so far as constructed under contracts (1) and (2) were accepted by the superintendent of public works.

On July 18th, Mr. F. B. Edwards, the resident engineer, severed his connection with the department of public works, and returned to the East.

The insanitary and disgraceful condition of Kewalo district made it imperative that some action be taken toward the construction of the sewerage and drainage systems.

The legislature having made an appropriation of \$25,000 for the sewerage, and \$26,000 for the drainage, I was instructed by the superintendent of public works to commence the construction of the sanitary sewers. This work has progressed rapidly, all in accordance with the original plans and specifications as designed by Mr. Rudolph Hering, C. E.



SEWER PUMPING STATION.