

ANOTHER OUTBREAK OF CHOLERA

Aged Native Woman Found Sick at Kikihale Yesterday.

USED WATER OF NUANAU STREAM.

Fourteen inmates of the House Placed in Quarantine—Special Meeting of Health Board—Report on Contaminated Soil and Water—Recommendations.

(From Saturday's Daily.)

Once again cholera has made its presence felt in Honolulu. It was believed by the physicians and many of the citizens that more cases of the disease were likely to make their appearance, but as eight days had gone by without any indication of the dread monster, it was hoped the town had seen and heard the last of the disease.

Detective David Kaapa reported the case to Dr. Day at 6:40 o'clock yesterday morning. The woman was taken sick early the night before. When the authorities reached the house the woman was found lying in the corner of a room on the ground floor and but a few inches above the water of Nuanau stream. Evidence of vomiting were found on the floor. The patient was removed to the cholera hospital at once, and fourteen other residents of the house placed in quarantine at the same place.

It is believed the woman ate crabs caught from the stream. Just under the floor of the room in which she was found were numerous crabs floating in the water. Dr. Day is of the opinion that the woman became ill from drinking or using the water of the stream. The case is said to be a very pronounced one and the patient was very ill when removed to the hospital.

As the hospital was in order for the reception of patients, it took but a few minutes for Armstrong Smith and Louisa, both having acted in the capacity of nurses, to arrive and assume their former positions. The total number of cases has now reached eighty-six, with sixty deaths.

Physicians say the new case of cholera is another and separate outbreak and must be treated as such. The woman had but little communication with persons outside of the fourteen residing in the same house where she lived, and it is believed the infection will not spread.

MEETING OF HEALTH BOARD. A special meeting of the Board of Health was held yesterday morning at 11:30, the new case of cholera being responsible for the session. All the members of the Board and several physicians were present.

In opening the meeting, President Smith spoke of the new case of cholera. He was of the opinion that the woman had been using water of the Nuanau stream, which caused her illness.

The following letter was read from the Kanae Health Committee: "The undersigned, representing the Health Committee of this island, appointed by the Central Board, and feeling that the recent events have put us in an uncertain position, beg to say that we have no desire now to try of Health, and will leave the matters of quarantine of passengers and disinfection of freight with the authority of the Honolulu Board, and would suggest further that we be relieved of our responsibility."

C. WALTERS, R. W. T. PETERIS, A. S. WILCOX, S. D. G. WALTERS, S. W. WILCOX, J. WEDDICK.

Lihoe, Kaula, Sept. 28, 1895. President Smith believed that the action of Drs. Walters and Weddick and the Government, should be commended and the officials named discharged. The physicians must continue to act as health agents.

There was some discussion regarding the Australia landing her freight at the Pacific Mail dock. It was found this course would result in heavy expense to the local agents. In order that the cargo of the ship might be handled without fear of the least possible contagion, fifty native laborers went into quarantine yesterday. The Australia will be due on Monday next, but on account of having to make necessary repairs at the California end, she may not arrive till two or three days later. All sailing vessels coming from the Coast will discharge at the Pacific Mail wharf.

The usual requests for shipping different articles to the other islands came up for consideration. Several of the members were opposed to making any new additions to the list. After considerable discussion this was decided on. Machine oil, which has been stricken off the list, was ordered replaced. With this exception there is no change in the list of goods that is allowed to be shipped.

The Board was informed that the new fumigating plant would be ready for service during the latter part of October.

C. Von Hamm, having spent ten days in quarantine, was granted a permit to go to Kaula.

A communication from the San Francisco office of the Pacific Mail Company informed the Board that the freight for Honolulu which had been carried by, had been thoroughly fumigated. They wanted to know whether there would be any objection to its being landed. Action deferred.

Another outbreak of cholera having occurred, it was not deemed advisable to open the schools on the 30th of the present month. They will remain closed until further notice.

people desired to leave for home as soon as possible. It was decided to use the quarantine station for the purpose. Those intending to go into quarantine there for a period of five days must be at the place by 9 o'clock Saturday morning. All expenses to be borne by the individuals.

The committee appointed to report on the matter of soil and water presented the following: HONOLULU, Sept. 25, 1895. HON. W. O. SMITH, President Board of Health.

SIR:—Your committee appointed to investigate the matter of contamination of soil and water by cholera germs, begs leave to submit the following report: Every locality in which cholera has occurred has been visited and surveyed by the committee. A list of seventeen localities was furnished the committee by the Board of Health office. Of this number five general localities claim special attention, on account of their close proximity to large bodies of water which may have become contaminated by the introduction of infectious material from persons sick with cholera previous to removal to the cholera hospital.

These localities are Waipiololo, the banks of the Nuanau stream, the harbor and vicinity, Kunawai and Punui. Waipiololo is the region directly



MAP SHOWING CONDEMNED RICE FIELDS AT PALAMA ALONG BRANCH OF OAHU RAILWAY, REFERRED TO IN THE COMMITTEE'S REPORT ON SOIL AND WATER TO THE BOARD OF HEALTH.

makai of the tramways terminus, near the Kamehameha schools, comprising a strip of land running from King street southwest to the sea. A map of this locality is attached to this report.

The dry land here is high, of coral formation and descends abruptly to the wet low-lying rice land which borders it on the southeast. For a distance of about 600 yards from King street the high land borders directly on the rice fields. From this point down to the sea a shallow ditch intervenes. Reference to the appended map will make this clear. Native houses were scattered along down this strip of land from King street to the sea, standing back, as a rule, from twenty to fifty yards from the edge of the rice field. Most of these houses have been burned.

The first house in this locality in which the disease made its appearance stood about 200 yards from King street and about thirty yards from the rice field. This was a two-story house in which twenty-four people were living. About four feet from the edge of the rice field was a washing-stone and four feet or so from this was a surface well. Water drained from the washing place directly into the rice field and also into the well. It is known that clothing stained with the infectious discharges of persons sick with cholera were washed on this stone.

The rice field into which this infectious material found access lies just mauka of the O. R. R. track and is about one and three-quarter acres in area. It is well bounded on the mauka and Walkiki sides by a high limiting bank. It drains through a culvert in the B. R. track across to a rice field lying mauka of the track. This latter field has an area of about three and three-quarter acres, and empties into the ditch mentioned above, which at this point intervenes between the high land and the large extent of rice land lying off to the south.

This shallow ditch runs along between the high land upon one side and the rice fields—as far as they go—upon the other. As it approaches the sea the rice land gives way to marsh and fish ponds. The fish ponds connect with each other but have no connection with the ditch until just before it empties into the sea. The ditch is separated from the rice fields by a slight mud bank, but in numerous places this bank is so low and frail that the danger of these large rice lands becoming infected is imminent.

At short distances along down the course of this ditch are washing places in the ditch and surface wells near its border. Just below the point where the infected rice fields empty into the ditch stood the second house where cholera made its appearance. The house stood back from the ditch about twenty-five yards and a beaten path led from the house to the washing place in the ditch. Clothing stained with cholera discharges are known to have been washed here.

About 200 yards farther down the course of the ditch the next case occurred. The fourth and last house in this locality in which cases occurred stood about 70 yards from the point at which the infected ditch empties into the sea.

Just beyond the washing hole are two old taro patches, at present grown, and beyond these a large extent of growing taro. From a point just above the washing hole a small drain leads water from the ditch into the unused taro-patches, and through them directly into the patches of growing taro.

The soiled clothing of the sick man was washed on the grass near the edge of the washing hole. There is no direct drainage from this place into either the taro-patches or the ditch, but a heavy rain could undoubtedly wash material from the edge of the washing hole, on the surface of the ground, into the old taro patches and thence into the growing taro.

About one-eighth mile to the eastward of this locality is the Kunawai spring, from which the people in the neighborhood generally get their water for drinking purposes. It is impossible for surface water to drain into this spring.

We found that the Board of Health agents had been to the infected premises and used lime generically all over the neighborhood.

The house has been burned. The infected house in this locality stood on the water of a taro quarry, at a point to the east of the extension of Liliha street, about one-sixth of a mile above Judd. The land upon which the house stood is about

thirty feet square, and is surrounded upon all sides by taro patches. It is itself only a dry portion of a taro-patch, and can be reached only by a path upon the mud wall dividing the patches of growing taro.

There is some doubt about this case having been cholera, the man being dead when reported. If it was cholera, and if the discharges were thrown into the taro patches—which seems probable—it is impossible to say to what extent the disease germs were carried by the water. An attempt at disinfection, short of drying up the entire crop of taro (many acres in area), would be futile.

The Nuanau Stream, in all probability, became infected originally from the case of Lono—a run-away from Wailei—who became sick in a house upon the Pauoa creek, at a point above its junction with the Nuanau stream. This house stands upon the south bank of Pauoa creek, about 135 yards below Vineyard street and 200 yards above the point at which it flows into the Nuanau stream. Near the house, and on the brink of the stream, is a washing place where, undoubtedly, the cholera-soiled linen of the sick man was washed.

The next case reported was on the bank of Nuanau stream, shortly below its continuation by the now-infected Pauoa creek.

This house stands about 330 yards down stream from the one last described. Other cases appeared near the mouth of the Nuanau stream.

To the left of the point at which the Nuanau stream enters the harbor is a coral ledge which is uncovered at low tide. The filth bearing waters of the stream spread over this ledge and sand in pools when the tide is low. Houses have been built upon piles over this coral ledge and in these houses and the neighboring ones upon King street cholera promptly gained a foothold. As all discharges from the persons sick in these houses were emptied into the waters over which the houses stand, fresh contamination was added to the already infected waters.

Across from the Oahu Railway depot is a block of stores fronting on King street. The rear portions of these buildings,—used as dwellings,—overhang an old fish pond, and in one of these overhanging rooms cholera appeared. The discharges were thrown into the fish pond. This pond receives water from other ponds farther mauka and discharges its surplus water through a drain which surges under King street and the Oahu Railway lands into the harbor.

This pond is full of filth and the wash water from the neighboring houses empties directly into it. This appeared in one other house in this locality.

The other localities where cholera has appeared are all remote from any streams or stagnant water. Soil. The infectious material has undoubtedly found its way into the soil in many localities. This is not a serious matter where the land is dry and there is no surface drainage into any well, spring, stream or pool of water.

ference between the results of experiments conducted in the laboratory and those attained in nature. The greatest enemies of the spirillum of Asiatic cholera are other micro-organisms found in nature. At all times many varieties of bacteria find their natural habitat in air, soil and water, both fresh and salt.

The cholera spirillum will for a time live and multiply in the soil and in water, but eventually it will be overcome and destroyed by the other bacteria whose territory has been temporarily invaded.

The following is taken from Sternberg's Bacteriology: "Koch found the cholera spirillum in water in a tank at Calcutta during a period of fourteen days, and in his experiments showed that it preserved its vitality in well water for thirty days, in Berlin sewer water for six to seven days and in the same mixed with faeces for twenty-seven hours only. In the experiments of Nicati and Rietsch the cholera spirillum preserved its vitality in distilled water for twenty days, in sewer water (of Marcellia) thirty-eight days and in water of the harbor for eighty-one days. The numerous experiments recorded by the observer named and by Bolton Hueppe, Hochstetter, Maschek, Krans and others, show that while the cholera spirillum may sometimes quickly die out in distilled water, in other experiments it preserves its vitality for several weeks (Maschek) and that it lives still longer in water of bad quality, such as is found in sewers, harbors, etc."

It has been found that harbor water contains many varieties of bacteria, and that the numbers present near the surface and at different depths do not vary in any great degree. In marked contrast to this it is found that the mud at the bottom of harbors contains many thousands of times as many bacteria per c. c. as are contained in the harbor water.

Water at a temperature of 70° F (or that of the water in and around Honolulu) is much more favorable to the life of the cholera spirillum than water at a lower temperature.

Again quoting from Sternberg, "Glaxa has made extended and interesting experiments with the cholera spirillum, cultures of which he added to different kinds of soil (garden earth, clay, sand) and placed at different depths below the surface—one-quarter, one-half and one metre. Some of the earth was sterilized and some was not. In unsterilized earth he found the cholera spirillum in considerable numbers at the end of twenty-four hours at the greatest depth tested (one metre) but at the end of forty-eight hours it had disappeared in five experiments out of seven. The lowest temperature at this depth was 20° C (68° F).

In sterilized soil the result was different; the cholera spirillum was present in enormous numbers at the end of four days at a depth of a metre and was still found in smaller numbers at the end of twelve days, but had disappeared at the end of twenty-one days.

This indicates that the presence of the common saprophytes in the soil is prejudicial to the development of the cholera spirillum and that under ordinary circumstances it succumbs in the struggle for existence with these more hardy micro-organisms."

The temperature of the atmosphere and of the water in this country, together with the moist condition of the soil and the prevalence of surface pools of water render it extremely probable that the cholera spirillum may live here for a great many days. The Nuanau stream and the harbor seem to possess all of the conditions necessary for the preservation of the vitality of the germ for a long time. That portion of the harbor in the neighborhood of the mouth of the stream is a particularly dangerous locality. The water of the stream carries in solution the elements most favorable to the preservation of the spirillum. The current is sluggish. The bottom of the harbor and the coral ledge bordering it are covered with mud rich in organic material.

The crabs, shrimps and small fish which are found in myriads may have some office in preserving and carrying the germs of the disease.

Bacteriological experiments are now being made with specimens of water taken from various sources known to be infected.

The following are the recommendations of your committee:

GENERAL RECOMMENDATIONS. 1. That the local wash houses in infected localities be torn down and the ground beneath them disinfected and then allowed to dry thoroughly; that all persons be prohibited from washing any clothing or throwing any soiled water, discharges or other organic matter into any stream or pool of water; that all persons who wash their clothing at home be requested to do so in a dry, sunny spot, where there is no drainage into any pool or stream of water.

2. That as far as practicable all unnecessary pools or ponds of stagnant and semi-stagnant water be filled in, beginning with the infected localities. 3. That the building of houses, wash-houses or closets over streams, ponds or portions of the harbor be prohibited; and that all such houses now standing be removed. 4. That all sewer pipes emptying into the harbor be abolished.

SPECIAL RECOMMENDATIONS. 5. In the Waipiololo district we recommend the immediate condemnation of the infected rice fields; the reinforcement of the bank dividing the ditch from the infected rice fields; measures to disinfect as thoroughly as possible the infected rice fields and the ditch; the filling up of all surface wells in the district; the prevention as far as is practicable of all use of this water or the fish therein by any person for any purpose for a period of time to be determined by the Board of Health. 6. In the Kunawai district disinfection seems to have been thorough, and there is considerable doubt as to the infectious material having reached the taro patches. In case it has done so the committee are of the opinion that it has passed beyond control. We recommend keeping up a rigid inspection over this district and all other through which the water from this district drains. If other cases of cholera occur lower down the question of drying up the taro will have to be considered. 7. In the Pauoa district we make the same recommendations as in the Kunawai district.

8. The Nuanau stream. Your committee regards this locality, together with the harbor, to be by far the most serious problem with which the Board of Health has to deal. The lower portion of Pauoa creek and the Nuanau stream, from the point where the Pauoa creek joins it down to the sea, are unquestionably infected, and all persons should be absolutely prohibited from using any water from these infected sources or taking any fish from them until such a time as nature has purified them. It is also important that no discharges, wash water, pot water, sewage or other organic material should be thrown or discharged into the stream for a like period of time. Periodical flushing of the stream should be continued for several months—say, throughout the rainy season.

We urge upon the Board of Health the importance of walling the stream in upon both sides at the earliest possible date as a necessary health measure.

THE HARBOR.

In view of the fact that there is direct evidence that a number of the persons who were taken sick with cholera during the late outbreak had been eating raw fish or crabs from the harbor, and further, that there is good authority for the statement that harbor water is particularly dangerous, the cholera spirillum having been found in at least one instance after eight-one days in harbor water. Your committee recommends that all persons be prohibited from bathing in the waters of the harbor or from taking crabs, shrimps or fish of any kind from the harbor or the coral reef bordering it for a period of three months from the present time. Further, that immediate steps be taken to improve that portion of the harbor in the neighborhood of the outlet of the Nuanau stream in such manner that the present unsanitary condition shall be removed.

10. We recommend the filling in of the old fish pond across from the railway depot.

C. B. WOOD, M. D., J. F. CRAWLEY, B. F. DILLINGHAM.



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