CHOLERA IN GIBRALTAR IN 1885.

By General Sir JOHN ADYE, Governor.

IN view of the expected reappearance of cholera next summer, the following account of the measures adopted with such signal success for the prevention of the spread of the disease at Gibraltar in the year 1885, under the direction of the writer, who was then Governor, has a special interest. The views expressed, and the practical character of the action taken, are commended to the thoughtful consideration of sanitary authorities and medical officers of health.

The account is communicated by Dr. Armstrong, to whom it is addressed.

92, St. George's Square, London, S.W.,
January 16th, 1893.

DEAR DR. ARMSTRONG,—As you are now engaged with other medical officers of health in considering precautions to be taken against an apprehended attack of cholera, I thought it might be of some service if I were to give you a short account of the steps taken at Gibraltar when it was visited by cholera in 1885, and which were very successful in mitigating the attack. I may mention that I was Governor at the time, and was cordially assisted by the Sanitary Commissioners and also by two army medical officers (Drs. Staples and Collins), who had had experience of cholera in India.

The rock of Gibraltar, as you are aware, is an elevated promontory, its highest point being about 1,400 feet above sea level, and it is joined to Spain by a flat sandy isthmus a few hundred yards wide. The city is built on the steep western slopes, and the population is nearly 24,000, including between four and five thousand British soldiers. The Spanish town of Linea, at the other end of the isthmus, is less than a mile distant, is built on the flat, and is dirty and badly drained, and has about 12,000 inhabitants.

Gibraltar is now a great place of call for vessels, chiefly steamers entering and leaving the Mediterranean. Between fifteen and twenty large ships call on an average daily throughout the year for coals, foods, and to land goods and passengers, etc.

There is also constant communication all day with Spain by land. Between three and four thousand people come to Gibraltar every day for purposes of trade, etc., and leave it at night, as no one can remain without special permission. The chief supplies of meat, fish, poultry, vegetables, fruit, flowers, forage, and charcoal, etc., come from Spain.

In 1884 Spain was visited by cholera, but, although cases occurred in the neighbourhood, it did not come to Gibraltar. As regards vessels arriving, should they come from ports infected by disease, such as cholera, yellow fever, etc., they are put into quarantine according to circumstances.

In the summer of 1885 the greater part of Spain had a severe attack of cholera, which gradually spread southwards; and, as it was anticipated that it would reach Gibraltar, precautions were taken, which I will describe. Early in August there were a few cases of illness (bowel complaints, etc.), premonitory symptoms, and on August 6th the first case of cholera occurred. As regards the persons successively attacked, we could not trace any connection between them and the vessels arriving; nor could we ascertain any special circumstances which could lead us to a conclusion that they had brought the disease from Spain. As to the absolute origin of the disease in Gibraltar, I am, therefore, unable to offer an opinion whether it came by sea or land, or to what cause the visitation was due. I may mention that as soon as it arrived, Gibraltar itself was put in quarantine by other nations; and, in fact, vessels as a rule avoided coming, and great distress occurred among the poorer classes from want of work, and large numbers of families were fed by the establishment of public soup kitchens. I will allude to this point again later on.

Now as to precautions. One of the first points for consideration was that of water. A great difficulty at Gibraltar at all times is an adequate supply of good drinking water. There are few wells, and the supply from that source is limited and impure. A considerable supply of water is pumped up into the city from shallow wells outside on the sandy isthmus; but it is brackish and unfit for drinking, although it is available for washing and for flushing drains, etc. The chief and best supply is obtained from rain-water collected from the surface of the rock and from roofs of houses in large reservoirs.

There is also a considerable trade in water brought in from Spain in barrels on donkeys, and sold in the streets. When cholera threatened, I made inquiries, and found that the amount from Spain was about 1,200 gallons a day; and as on analysis it was proved to be very impure its introduction was entirely prohibited. Fortunately, my predecessor as Governor at Gibraltar (Lord Napier of Magdala), with a view to the possible requirements of a state of siege, had commenced in 1882 the erection of works for distilling sea-water in considerable quantities, and they were completed shortly before the attack of cholera in 1885. This source of supply was at once taken advantage of by the Sanitary Commissioners, and about 8,000 gallons a day were distilled and sold on the spot to all comers at the rate of six gallons for a penny. Commissariat carts with barrels were sent round the streets selling water, especially in the poorer quarters, so as to prevent the donkey-boys who purchased the distilled water having a monopoly and thus raising the price. Every effort was made to point out to the poorer classes that the water so supplied was perfectly wholesome, and I attribute our escape from a severe attack of cholera very much to this

supply of pure water, as an addition to that in the reservoirs.

The next precaution taken was the establishment of a camp for the inhabitants of houses attacked. Indian experience has proved that, whilst cordons are useless, it is of great advantage to regiments when visited by cholera, to place them at once under canvas on fresh ground, and to make short marches from one camp to another.

Although there is no space available at Gibraltar for marching or moving, a camp capable of accommodating about 100 persons or more was established on clean ground just outside the city, on the north front, and field kitchens, latrines, etc., were prepared, together with an adequate supply of distilled water. Many of the poorer families of Gibraltar live in single rooms opening from a corridor, and are much crowded. Two or three of the earliest cases occurred in a house of this kind. Those attacked were taken, if possible, at once to the Civil Hospital. I visited the house in which the earliest cases occurred, and informed the inhabitants (about ninety) that the camp was ready, and that they must go to it at once. Although much frightened, they went with their children, and were given accommodation in the tents according to the numbers of their families, but they were in no sense isolated, and were free to go to the market or wherever they chose. In a day or two they became quite reassured. As soon as they had left their house it was closed to the public, the drains were examined and disinfected, water cisterns emptied, rags and rubbish burnt, and the house generally whitewashed and cleaned, etc. In the course of a week or ten days the poor people went back to their residence, and the cholera, so far as they were concerned, was at an end. The same course was pursued in other cases as they arose; and there was only one instance in which a case of cholera occurred after their return to their homes. I attach great importance to the system of encamping families of houses attacked by cholera.

Other precautions were taken as follows: Refuse was removed from dust-bins daily. Disinfectants were freely used in the sewers, which were flushed twice a day; unwholesome food, and fruit, etc., was rejected at the market.

In order to mitigate the distress caused by so many of the poorer classes being out of work a committee was formed, and open air soup kitchens were established; and for some time about two thousand rations a day of good soup, I heard, were issued free.

I may now give the results of the visitation of cholera at Gibraltar, and also in the neighbouring Spanish town of Linea.

The first case of cholera at Gibraltar occurred on August 6th, and the last on October 13th, 1885. During that time thirty-two persons were attacked, of whom twenty-four died. Amongst the civilians all

were of the poorer classes. Of the military one officer and two men were attacked, and all three died. The population, as I have said, was about 24,000 in all. I may mention that in the case of soldiers attacked, the men in the barrack-room where it occurred were at once placed in camp, and the room closed for the time.

At the neighbouring Spanish town of Linea, which contains about half the population of Gibraltar, the first case is said to have occurred on August 14th, and the last on October 17th. There were 429 cases in all, of whom 206 died. The figures were given me by the Spanish authorities. Therefore in Gibraltar about 1 person in 700 was attacked, whilst in Linea it was 1 in 28. I have made the comparison between the two places because they are in close proximity, although their circumstances are different. No doubt the attention given to sanitation in Gibraltar for years past has had a very beneficial result, and it is now a very healthy station, as is proved by the following table of the annual death-rate per 1,000 amongst the military population in the United Kingdom and various foreign stations, calculated on statistics of ten years from 1879 to 1889:—

	Deaths per 1,000.
United Kingdom...	6'40
Gibraltar ...	6'55
Malta ...	8'99
Bermuda ...	9'81
Ceylon ...	14'34
India ...	16'36

There is one more point of great importance connected with the visitation of cholera at Gibraltar in 1885, which requires a few remarks, namely, the question of a cordon. When cholera appeared at Gibraltar, and when Linea and other places in Andalusia were severely attacked, I was much pressed by many persons to place a military cordon across the north front isthmus, and thus to prevent all communication with Spain. I have already stated that Gibraltar was placed in quarantine by all the various Mediterranean ports, that few vessels arrived, and that in consequence great poverty and distress were caused amongst the poorer classes.

I have also mentioned that the chief supplies of food are brought in daily from Spain, and that between three and four thousand Spaniards are in the habit of entering Gibraltar daily, partly to supply the market and partly to purchase English goods. In fact, it is a place of great commercial activity. If I had placed a cordon across the north front, and had thus interdicted communication with Spain, the necessary supplies to the market would have been rendered very difficult, and prices would at once have risen. Not only that, but almost all commerce would have been at an end. Therefore, not only would the condition of the working and poorer classes have been worse than ever, but the tradespeople also would have been greatly injured. These were serious considerations. But

that was not all. The experienced medical officers by whom I was advised, pointed out that in India cordons and such-like arrangements have long been abandoned as useless for the prevention of the spread of cholera. Cholera, more or less, is always present in India; but the free circulation of the population by road, rail, or river, is not interfered with. Nor, indeed, does the spread of cholera necessarily always follow the course, say, of the railways, which convey thousands daily all over the country.

In short, a line of sentries cannot stop the march of disease. Having taken all these facts into consideration, I decided to leave open the communications with Spain, throughout the whole period, and I think the result proved that the decision was the right one. It was an anxious time.

I have now given as short an account as I could of the precautions adopted at Gibraltar against cholera in 1885. Whether in the event of an attack of cholera in this country, it will be possible to adopt the same measures as I have indicated, I am, of course, not able to say; but I hope that the facts I have given may be of some service to those medical authorities who are now considering the matter.—I remain, yours truly,

JOHN ADYE, General.

MR. B. HORNER, Sub-inspector of Bradford, has been appointed Sanitary Inspector *vice* A. Clarke resigned.

NOTIFICATION AT MALMESBURY.—At a recent meeting of the Town Council, a proposition to adopt the Infectious Diseases (Notification) Act was lost by a small majority.

WEST BROMWICH.—The Town Council in consideration of the extra duties imposed by the Factory Act of 1891, as regards workshops, have increased Dr. Manley's salary from £120 to £170 per annum.

SMALL-POX IN LEICESTER.—According to the *Leicester Post*, the Sanitary Committee of that town have "determined to confine all the official information, with respect to fresh cases of small-pox, to the single total recorded in the official return." This is protested against, as likely to lead to the spreading of unreliable information. In the present state of affairs in Leicester, the best plan would be to give the fullest publicity in order that efficient preventive means may be taken. We learn that 21 cases of small-pox occurred in Leicester during the week ending January 14th. The records of the outbreak will form an important chapter in the history of small-pox. The interest of the record would be greatly increased by a return of the number of vaccinations and re-vaccinations by private and public vaccinators during the last six months.

THE CONTAMINATION OF WATER IN RESERVOIRS BY NATURAL MEANS.

By J. H. GARRETT, M.D., D.P.H., F.L.S., Medical Officer of Health, Cheltenham.

(Read at the December Meeting of the Incorporated Society of Medical Officers of Health).

THE object of my paper is to direct attention to the contamination of waters which were perfectly pure originally, but which, when stored in reservoirs, have become contaminated as a natural sequence of their stagnation. An excellent example of this condition of things has recently come under my notice at Cheltenham, where certain reservoirs from which the town is partly supplied have been affected. The contamination is brought about, primarily at least, by the growth of certain water weeds, and in the instance I have to record the particular weed is a calcareous algoid plant of the order Characeæ—*Chara foetida*—of which I have here a dried and mounted specimen. This plant grows wholly submerged, and at some considerable depth upon the bottom and sides of the reservoirs in patches of greater or lesser extent, the main stems reaching some four or six inches or more in length. The leaves or branches, whichever it is better to call them, are arranged in whorls upon the stem at nodes which are an inch or more apart. The minute structure of this plant is of the simplest description. The stem consists of long tubular cells equal in length to the internode. The branches consist of similar long cells, and at the growing points groups of short, blunt dividing cells are seen, some of which are destined to grow into the long cells of the stem and branches, and others to continue the growth of the plant by continued division. The whole plant is covered externally by an irregular coat of calcareous material which has a glutinous or burst-starch appearance, and which effervesces strongly on the addition of acetic acid and dissolves, when the cellular structure as described may be very clearly seen under a low power objective. The cells contain chlorophyll which gives the plant a sea-green colour; it becomes yellower in portions undergoing decay. After boiling a piece of the weed in water a reaction can be obtained with iodine, proving the presence of starch. In the spring and early summer it would appear that the vegetative growth of this chara is most active, and in the autumn months it undergoes a decay, though it does not wholly disappear, portions persisting in a perennial evergreen state through the winter when its colour also darkens. In the autumn months portions of the plant become diffused through the water, and are found in the sediment of a sample collected, having the appearance of small masses of gelatinous looking material which have resulted from the degeneration of the cells. Numerous parasites infest the plant at all times, but during the time that its cells are breaking down the entire bulk of water contained