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in men a spiritual sense of present personal communion with God, and present individual contact with the unseen universe, and after-death accountability before the judgment-seat of Christ, so should a like quickening of the spiritual sense in man be the principal aim of the modern preacher. But while in fundamental purpose and essential aim modern preaching should be practically identical with the preaching of Apostolic times, yet, in outward appearance, in phraseology, in illustration, modern preaching may wisely strike out new paths of its own. It should present old truths in new lights, and cast a glow of fresh, modern interest around ancient and eternal truths. For as all preaching is weak which overshadows the momentous and abiding issues of eternity with the fleeting topics of the transient age; so all preaching is strong which illuminates the current topics of the age with the light which beams down from the abiding suns of eternal truth.

JOHN WILLIAM DIGGLE.

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ART. IV.—CHOLERA.

*Notes of "Lectures on Cholera" delivered at Gresham College.*

BY E. SYMES THOMPSON, M.D., F.R.C.P.

II. AN EPIDEMIC OF CHOLERA.

IN the first article was given a *résumé* of the history of cholera, and it was shown how, starting in Lower Bengal, where it is endemic, the disease spreads with more or less rapidity westwards along the lines of commerce and of congregations of human beings. In the present article we must consider an epidemic of cholera in more detail, showing more exactly the mode of its spread and the effects that it produces in the regions that it attacks, while at the same time a few words will be said about the ultimate cause of the disease, and a brief description will be given of the symptoms in a patient. As, of course, THE CHURCHMAN is not a medical journal, this last, as well as the medicinal treatment, will not by any means be given in full, but in a later article the most important form of treatment, viz., the preventive, we shall consider at some length, inasmuch as not only is prevention better than cure, but it is also a great deal easier. For our purpose we shall confine our attention principally to epidemics that have occurred in our own country, and especially to those of 1854 and 1866, for not only are these epidemics of more interest to us as Englishmen, but also better and more detailed information is available. Nevertheless, it will be necessary to travel beyond the confines of the British Isles in order to gain a con-

ception, however inadequate, of the meaning that is conveyed by the expression "an epidemic of cholera" to those unfortunate inhabitants of towns where such an epidemic is raging or has raged. Partly from its insular position, and partly from the fact that, though very far from perfect, England has always been some distance ahead of other nations in sanitary arrangements, our country has never known the *full* significance of a cholera epidemic, in spite of the fact, which we fully bear in mind, that in the 1848-51 epidemic it killed over 50,000 persons in our islands. Those who recall to mind Charles Kingsley's description in "Two Years Ago" must remember that that description is true of a small village only, and that the distress does not increase in direct ratio with the population, but far more rapidly.

It is important, moreover, to note that a very considerable difference obtains when the disease affects persons of various nationalities. Though the cool-headed Englishman and the phlegmatic Dutchman become panic-stricken in the presence of an epidemic, yet they manifest that condition of mind in a very different way to that in which the ignorant and fanatical South Russian or Tartar manifests it. Compare, for example, the two following extracts, both of which describe occurrences in the 1892 epidemic. The first is from a letter written September 11th, 1892, by a volunteer nurse at the Eppendorfer Hospital, Hamburg, and appeared in the *British Medical Journal* of September 17th, 1892. She said :

The city was panic-stricken, the citizens were fleeing in all directions, and a terrible gloom lay over everything. . . . As I drove along it looked serenely quiet, the streets being strangely empty, giving the impression that the inhabitants were sleeping or had gone in a body to church. Several cabmen, on learning my destination, shook their heads and declined to take me ; no one, they decided, would go willingly to the Eppendorfer Hospital unless already infected.

The other extract is from the *Times* of July 15th, 1892, and was written by the correspondent of that newspaper at St. Petersburg. It is as follows :

A repetition of the horrible cholera riots at Astrakhan has taken place at Saratoff. On the 10th instant the populace, which is said to have been infuriated by a preposterous belief that cholera patients were being buried alive, attacked and pillaged one of the police-stations, the house of the chief of police and the lodgings of several doctors. They then proceeded to the temporary cholera hospital, whence they dragged seventeen of the cholera-stricken inmates. The mob also did violence to the doctors, the attendants and many private individuals, killing two persons. At last troops were summoned from the camp, and fired on the rioters, killing three and wounding four.

A disease that can lead to scenes such as the above must be a formidable foe !

The two chief causes that lead to this panic are the rapidity

with which the disease runs its course in an individual, and the high rate of mortality that accompanies it. There is something singularly awful in sudden or very rapidly supervening death. To speak to a man in perfect health on Friday, and hear that he is dead on the following Sunday, is appalling; but when such events follow upon one another with the rapidity that they do in a widespread epidemic, two results are sure to follow—general panic and general unbridled license—and it is difficult to decide which is the more terrible in its effects. As far as the mortality is concerned, a very large proportion of English men and women cannot have the slightest conception of what an epidemic of cholera means, for the last epidemic in our country was in 1866, and consequently the younger half of the population only knows of it by hearsay; but it may assist us in some degree to understand it if we compare the unknown with the known, and place side by side what happened in Hamburg in 1892, what happened in England in the early part of the same year as the effect of influenza, and what resulted from the very extensive epidemic of scarlet fever that prevailed in the autumn also of 1892 in London generally, but particularly in the western portion of it. The highest death-rate during the last influenza epidemic was 60·9 per 1,000 at Brighton; the highest death-rate during the prevalence of scarlatina in London was about 16·9; but the *cholera* death-rate in Hamburg during August was at least 130, and for one week—August 28th to September 3rd—it was over 250 per 1,000. It is impossible to tell the proportion of deaths to patients attacked with influenza, but in the cases of scarlet fever and cholera we have a means of comparison. On September 3rd 3,280 patients were suffering in London from scarlet fever, and 62 deaths occurred during the week ending on that date from the disease; but in Hamburg, according to the official returns of the total number of cholera cases from the outbreak of the epidemic to September 24th, 1892, 17,157 persons were attacked by the disease, and of these 7,339 succumbed. In a word, a patient's chance of recovery if he have scarlet fever is about 23 times as good as if he had cholera. Lastly, let it be remembered that the population of London is about nine times as great as that of Hamburg, and then an idea will be obtained of the dimensions of an epidemic of cholera. What disease, other than cholera, has come under our notice, except as a matter of history, to which the following words written by a correspondent to the *St. James's Gazette* on September 28th, 1892, could be applied? He is speaking of the Hamburg cemetery, and writes:

The ground is laid out in oblong spaces some seventy or eighty yards wide, and trenches have been cut right across from path to path. These

are about four feet deep, and wide enough to take two rows of coffins set foot to foot. Here they are laid side by side, as close as may be, all along the trench, perhaps about 200 in each. . . . Trench after trench has been dug, space after space occupied, and still it goes on. One hundred and fifty gravediggers have been at work here night and day for weeks. At night they work by flaring gas-jets supplied by portable hand-reservoirs on iron rods that can be carried about and stuck into the ground. It is a weird scene. Many of the trenches are already filled up, and the long mounds levelled; others are still being dug by gangs of diggers; others, again, are half filled with coffins, and the men are already shovelling earth on them at one end, while fresh ones are being brought up to complete the tale at the other. Even now comes one. The funeral attendants step hastily over the ground, carrying it by the handles like a portmanteau, drop it in its place without a word, and hurry off: there are so many others.

Such is the effect of a cholera epidemic upon communities, and we have strenuously avoided giving any descriptions that could in any way be regarded as extravagant, principally because an enemy is better grappled with if we neither underestimate nor over-estimate his strength. But certainly enough has been said to put people on their guard against neglecting those precautions which, if taken early, will save them from the disease when it comes, or at all events will put them under the best possible conditions to withstand it should they be attacked. We learnt from influenza the importance of not neglecting the early days of an attack, and it will be well for us if we apply our experience to the case of cholera.

We will next briefly consider cholera as it affects the patient, and the chief points of interest, apart from the actual symptoms, such as vomiting, severe diarrhoea, cramps, and collapse, none of which it concerns us here to dilate upon, are the suddenness of onset and the rapidity with which the disease runs its course, and terminates either in death or recovery. It is unnecessary to go into the question of the danger to life further than we already have done when considering the effect of a cholera epidemic upon a community, for our object is not that of writing a medical essay. Our purpose is to present cholera to the readers of *THE CHURCHMAN* as it was the purpose of one of us to present it to the audience at Gresham College, in the light of an intensely interesting and important subject. The subject of capital punishment is highly interesting and important, but we do not all of us consider it with the mental feeling that it may one day, perhaps, personally interest us. There is one point, however, in both cases that is of the utmost personal importance to each and every one of us, and that is the question as to how we are to act so as to avoid the penalty in either case. Hence the preventive treatment of cholera is the most important part in any consideration of cholera, just as the preventive treatment, so to speak, of capital punishment—that is

to say, the improvement of morals—is the most important point in any consideration of capital punishment. Nevertheless, in order to make that portion of our subject fully intelligible, information on a few details is necessary.

In the first place, then, the incubation period of cholera is very short. In a series of 64 cases the periods of incubation were as follow :

In 11	the incubation period	was under	1 day.
„ 35	„	„	from 1—2 days.
„ 11	„	„	„ 5—7 „
„ 6	„	„	„ 8—12 „
„ 1	„	„	(?) 24 „

Thus in over 70 per cent. of the cases the disease showed itself within two days from the entrance of the poison into the body. It is interesting to note in this connection that typhoid fever, which in many other respects bears a great resemblance to cholera, is in this point very different from it: the incubation period of typhoid fever, though irregular and uncertain, is to be reckoned by days, whereas that of cholera is to be reckoned by hours. Moreover, the same difference may be observed in the course of the disease: a typhoid patient rarely dies until he has had the disease for over a fortnight; a cholera patient may die after being ill only twelve hours. And supposing they both recover, the typhoid patient will pass many a weary week before he is fully returned to health, whereas the rapidity with which cholera patients recover is peculiarly and strikingly noticeable :

They seem to get well all at once, scarcely anything of their terrible pain and exhaustion remaining. This is due, one would suppose, to the short duration of the illness, there being no time for radical deterioration of strength and constitution. But it is difficult to believe that the woman who to-day is walking about the wards, assisting a little with its domestic duties, is the same who for four days before lay prostrate and comatose, vomiting violently every ten minutes, painfully purged almost as frequently, her face pinched and dusky, her limbs and body shrunken, her eyes sunken and black-ringed, praying only for speedy and merciful death. Her whole appearance was so absolutely changed that her nearest relatives might scarcely have recognised her. One can hardly credit that any but a prolonged illness could so alter the aspect.

We will now turn our attention to considering what is the ultimate cause of cholera. This will be, chronologically, an anticipation of the subject-matter of the next section, for it was only after the actual mode of spread of the disease had been so well worked out as to become almost a mathematical certainty that scientists knew where to look for the cause, and had an idea of the direction in which it would probably be found. It was only in 1883 that Dr. Robert Koch, of Berlin, made known the fact that he had discovered a bacillus which he asserted was the real cause of cholera. It is unnecessary here to enter

into any discussion of whether this is so or no, but it will be sufficient to state simply that the greater number of medical men by far recognise in the bacillus described by Koch that specific cause which was being sought for on all sides. The "comma bacillus," as it is called, from its greater or less resemblance to a printed comma (,), is something less than one twelve-thousandth part of an inch in length, while it is only about one-third of that length in width. Like all other bacilli, it is a kind of fungus, and has its position right at the very bottom of the vegetable kingdom; it is provided with a kind of whip-shaped extremity, with which it lashes the liquid in which it finds itself, and so executes rapid movements across the field of the microscope when under observation. It very rapidly increases in numbers, and reaches the height of its proliferation in a few days. When it is remembered that it multiplies in geometrical progression, and consequently doubles its numbers every few minutes, it is conceivable how in the course of a few days the excreta of one cholera patient, themselves containing probably many millions of bacilli, can provide the means of infection for a whole community, even if only an infinitesimally small quantity finally succeeds in effecting an entrance into other persons. In point of fact, we can only wonder that under the circumstances the spread of cholera is so limited as it is. Such being the case, it is easily intelligible that drinking-water should be the chief mode whereby one case infects a multitude; for drinking-water is usually supplied to a large number of persons from one source, and if that source be infected, then the rapid and extensive spread of the disease is possible, and even probable, while each of these secondarily affected persons in his turn becomes a source of danger to other members of the community in exactly the same way. The cholera bacillus is never found but in the intestines or in the intestinal dejecta of a patient suffering from cholera, and it is not difficult to understand how, when sanitary arrangements are not of the best—and especially in such cases as occurred in Hamburg, where the town-sewage is poured into the Elbe, and the drinking-water is taken out of the Elbe—that wide-spread epidemics of cholera should occur. Nor must we hold up our hands in horror at the disgusting idea of drinking-water that is contaminated with sewage; unfortunately, that is by no means unknown here in England, and there are rivers not very far removed from the "healthiest city of the world" which serve to supply us with water for household purposes, and which also serve as receptacles of our drainage. Admit cholera to England, and let it have a week's full play, and our population would be decimated.

A couple of examples of the mode in which this spread

takes place will be of interest, and we will take them from the epidemics of 1854 and 1866.

In 1854 the death-rate from cholera in the district of St. Ann's, Golden Square, was at the rate of 128 for every 10,000 persons, the general death-rate of the Metropolis being only 60 to the same number.<sup>1</sup> It seems that at 40, Broad Street (St. Ann's), a child having been ill for three or four days, died from cholera on September 2nd, her excreta having during her illness been emptied into a cesspool only three feet from the well supplying the pump used by the people in Broad Street. The contents of this cesspool drained into the well, as was subsequently discovered. On the night of August 31st cholera broke out among the inhabitants of Broad Street, the greater number of cases occurring on September 1st. "Nearly all the persons who had the malady during the first outbreak drank of the water from the Broad Street pump, and very few who drank of this water during these days escaped having cholera."

In the weekly return of deaths for September 9th the following was recorded as occurring in the Hampstead district: "At West End, on September 2nd, the widow of a percussion-cap maker, aged 59 years; diarrhoea two hours, cholera epidemic sixteen hours." Dr. Snow was informed by this person's son that she had formerly resided in Broad Street, but had not been in the neighbourhood for many months. A cart went from Broad Street to West End every day, taking out among other things a large bottle of water filled from the pump in Broad Street, the lady in question preferring this to any other water. The bottle of water was carried out to Hampstead as usual on Thursday, August 31st, and she drank some of it that evening and more on the following day. She was seized with cholera on the evening of the latter day, and died on Saturday. A niece who was on a visit to this lady also drank this water; she returned to her residence in a high and healthy part of Islington, was attacked with cholera, and died. There was no cholera at the time either at West End or in the neighbourhood. Besides these two persons only one servant partook of the water at Hampstead West End, and she did not suffer, or only to a slight extent.

In 1866 the parts of the Metropolis mainly affected were the eastern districts, and Mr. Netten Radcliffe, who investigated the matter for the Privy Council, found that there

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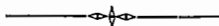
<sup>1</sup> The death-rate is usually calculated for every 1,000 persons living, but as this and the following paragraph are taken from the "Report of Committee for Scientific Inquiries into the Cholera Epidemic of 1854," we have thought it advisable to adhere strictly to the text and make no alterations, beyond condensation.



was a great preponderance of cases among persons whose water, supplied by the East London Water Company, had passed through the reservoirs at Old Ford, whereas comparatively few cases occurred among those who received water supplied by the same company, but pumped directly from the filtering-beds at Lea Bridge into the mains. Now, shortly before the epidemic in East London began, a man and his wife, living in Priory Street, Bromley, near the banks of the Lea, had died of cholera, and their evacuations had entered the river at a part which was, in fact, a canal with locks, and received a large quantity of sewage, so that it was a little better than a cesspool. Now, all the water supplied by the East London Water Company was intended to have been filtered at Lea Bridge, but some of that which was stored in the Old Ford reservoirs was sometimes drawn from two other reservoirs, which differed from the rest in being uncovered, and which freely communicated by soakage with the contaminated portion of the river Lea above mentioned. So that the two primary patients infected the river Lea, the river Lea infected by soakage the uncovered reservoirs, which in turn carried infection to the Old Ford reservoirs, and so led to an epidemic which affected 27 of every 10,000 persons who drank this water, whereas in other parts of London only 5 in 10,000 persons were attacked by the disease.

To sum up, therefore, there is a small bacillus which multiplies with inconceivable rapidity, gains access to water, is taken into the bodies of hitherto healthy persons, produces in them a series of symptoms always alarming and very frequently fatal, passes with their intestinal dejecta again into water, and thus causes a wide spread epidemic of that disease which we designate Asiatic cholera. No case of cholera arises but from some other case of cholera, and every case of cholera which is not isolated and watched with the utmost care is a source of infinite danger to the whole community in the midst of which he is situated.

E. SYMES THOMPSON,  
WALTER S. LAZARUS-BARLOW.



#### ART. V.—THE CHURCH IN WALES.

THE Church in Wales was originally a part of the Church of Christ planted in the Roman Province of Britain about the middle of the third century, which gradually extended itself over the length and breadth of the land south of the Firth of Forth. When the English tribes conquered Britain it is well known how the British race retired fighting before them until