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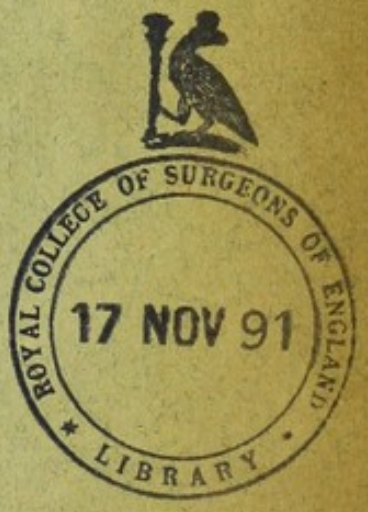
INSPECTOR-GENERAL OF HOSPITALS.



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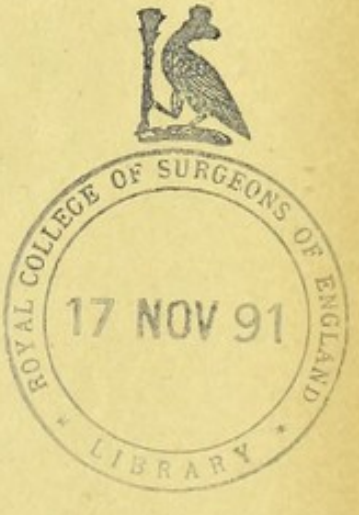

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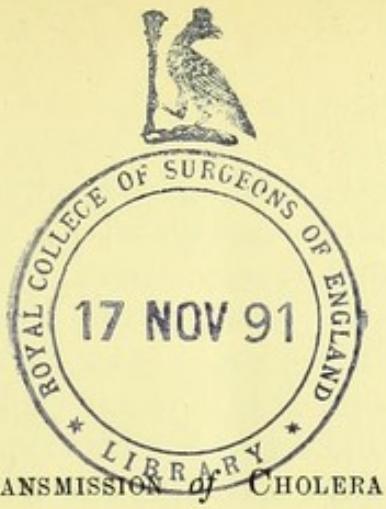

Notes *on the* Transmission *of* Cholera *from one* Country *to* Another.

By Robert Lawson, LL.D., Q.H.P., *Inspector-General of Hospitals.*

[Read in Section I of Seventh International Congress of Hygiene and Demography, 11th August, 1891.]

To draw up a plan to prevent the extension of disease, say cholera, from one country to another, with any prospect of success, it is necessary that we should have a general acquaintance at least with the different factors which contribute to this result, and of their mode of operation. The information on these points, among the members of the medical profession, is at present very far short of these requirements, and its increase has been enormously impeded by the mass of the profession having adopted the belief that man himself was the chief agent in diffusing this disease, by their formulating on this assumption modes of operation which they deem it should follow in its development, and their interpreting the evidence derived from various sources with a strong bias in favour of the theory.

There has been, in short, and still remains, a most serious error in assuming that personal communication was so powerful a factor as many believed, and a no less extensive error in the methods and reasoning by which the central idea of diffusion by man were advocated. Before efficient progress can be made there must be a complete change in all these respects; the character and causes of cholera must be derived from a critical examination of *all the evidence* nature presents us with, and we must look for their elucidation to the study of the real methods she herself adopts, instead of endeavouring to lay them down for her from our *à priori* deductions.

It is generally recognised that cholera presents itself in two distinct forms, viz., that of simple or summer cholera, or cholera nostras, in which, with cramps and vomiting, and diarrhœa, the evacuations remain bilious, there is but rarely collapse, and the

mortality is but small; and that in which the evacuations become like rice water, the urine is suppressed, collapse often profound, and the mortality always great; this is usually called Asiatic, or Indian, or epidemic cholera, but which, as avoiding any hypothesis, had better be denominated malignant cholera.

Cholera nostras is usually attributed to warm weather, the use of unripe fruit, and such like, and is not believed to have any connection with previous cases, or to have any disposition to spread.

Malignant cholera on the other hand is supposed by many to be derived from previous cases, and always to have a disposition to extend to those who come into close communication with persons labouring under it; but, since the first appearance of the epidemic disease in Europe in 1832, there has been, from time to time, a considerable increase of attacks from the so-called cholera nostras, and among them no inconsiderable number of instances in which the disease presented all the symptoms of the malignant form so characteristically that, if they had occurred in the middle of an epidemic, they would have been received without hesitation as well marked cases of the prevailing disease, but because these could not be affiliated to a previous one, or were not followed by an extension to other persons in the vicinity, their identity with malignant cholera was denied, and they were regarded as cholera nostras only, and of no importance in this inquiry.

On other occasions a person who may have come from a point where malignant cholera was prevailing, to another where it may not yet have appeared, if cholera do spring up among those around him in the new locality, he is considered as having introduced the disease, especially if he have had diarrhœa in the interval, or even when he has not had that at all. These two contradictory propositions are found necessary to enable the theory of personal communication to embrace the facts. There are now however no inconsiderable number of instances of well marked epidemics having sprung up in limited localities, at a long distance from where the disease was already prevailing, and among persons who had not been absent from the locality for months, without its having been possible for them to have had personal communication either direct or indirect with any one already affected. Those who advocate the diffusion of cholera by man, have a ready method of dealing with what they consider such anomalies of evidence; they designate all occurrences that support their theory as positive facts and worthy of the highest confidence, while all such as may be opposed to their opinion they describe as negative facts, and as entitled to no consideration whatever; but investigation into obscure operations of nature are not to be elucidated by this mode of dealing with evidence, and the sooner the medical profession

condemns it, the sooner are they likely to open up another leading to more precise and abiding results.

Among the instances which have occurred of late years of the outbreak of malignant cholera at points in advance of those the disease had already reached in the epidemic form, three may be particularised as having been carefully examined into by most able investigators, viz., those at Southampton in 1865, by Dr. Parkes, and at Theydon Bois, in Essex, the same year, by Mr. Radcliffe; that at New Orleans, in 1873, by the board of health there; and that at Toulon and Marseilles, in 1884, by M. Fauvel, Drs. Brouardel and Proust, and others from Paris, and at Toulon. In none of these was there any trace of communication by sick or fomites detected.

As the time for reading each paper is but fifteen minutes, it is necessary to confine the remarks here to the barest details, to keep within the prescribed limits.

In the summer of 1865, it will be remembered that the whole of the northern coast of the Mediterranean was invaded by cholera, and this advanced northward gradually, reaching Paris in the end of September only, though there were well marked indications of its approach at many points to the north of Paris even months earlier.

Thus there was a fatal case in the "Borough" (London) on 28th June, with all the characters of malignant cholera, and another, which recovered, in Guy's Hospital, in the beginning of July. There was a case of the same description at Southampton on 12th August, and through England and Scotland, and even in Denmark, and south of Sweden, cholera nostras was unusually frequent during the summer and early autumn, and with many more cases of the malignant form than in ordinary years.

At Southampton the outbreak commenced with a man named Rose, who resided in Brew House Court, five furlongs west of the railway station, who was seized on 22nd September, and died on 24th; the next case was in a lad named Hill, who resided with his family at Weston Common, two miles from Southampton, who was attacked on the 23rd September, his father and sister following on the 26th. On 27th a man named Staveley and his son were attacked at Bitterne, a village two miles from Southampton in a different direction. On the 28th there was another attack of cholera in Southampton itself, and the disease went on from this date to the 4th November, when, including all the localities named, there had been 60 persons attacked.

In the Theydon Bois case Mr. Groombridge and his wife had been at Weymouth and Portland for change, in September. After exposure to a cold wind on the 23rd Mr. Groombridge had

severe griping and diarrhœa on 24th, and he and his wife returned home on 25th by rail to Southampton and London, but neither left the train or station. On 26th Mrs. Groombridge had diarrhœa, sickness and cramp followed on 28th, collapse on 29th, reaction commenced on 30th, fever succeeded, and she died on 11th October. On 30th September a daughter, aged 8, was seized with cholera and died the same night, and in the next week six other persons connected with the family contracted the disease (including Mr. Groombridge himself on 6th), and some others followed. It was subsequently found that the soil-pipe from the water-closet leaked into the well from which the water for the household use was obtained. From the appearance of the spot this had been going on for a considerable period. As neither Mrs. Groombridge nor her husband had been exposed to any previous case, it is clear that, had the contamination of the well water been the cause of her attack, that must have been produced by some other factor than choleraic evacuations, which could have had no access to the well until after she herself was attacked. That the local conditions around Theydon Bois were unusual at this time, however, is indicated by the fact that several cases of cholera nostras occurred in the neighbouring districts of Epping, Harlow, and Mitchingham, quite unconnected with the Groombridge family.

So far the occurrences which precede an epidemic of cholera in full force, and which the late Dr. Bryden proposed to name the aura of the epidemic. In this instance the epidemic soon followed, for in 1866, England, the east coast of Scotland, northern France, Belgium, Holland, and all the country up to the shore of the Baltic, came under it during the summer.

Its influence was also experienced half way across the Atlantic early in the year, as the following facts show distinctly.

The steamship "England" sailed from Liverpool on 28th March, with 37 cabin and 1,059 steerage passengers, Germans, from East Friesland. Cholera appeared among the latter 3rd April. She put into Halifax on 9th, having had 150 attacks with 46 deaths in the interva.l The people were landed, and from this time the attacks diminished, the last being a mild one on 30th April. The greatest mortality was in the night 10th—11th April, when 40 deaths occurred. It was estimated that there had been from 500 to 600 cases of developed cholera, and that from 280 to 300 had died; 1 steward, 2 sailors, and 3 firemen died, but none of the cabin passengers were affected.

The steamship "Virginia" left Liverpool with emigrants on 4th May. On 12th 3 of them died of cholera, 8 more on 13th, and 7 on 14th. On 22nd when the passengers were removed to the

"Falcon" quarantine vessel at New York, the deaths had amounted to 50.

The steamship "Union" left Liverpool on 12th May with 434 passengers, 231 of them foreigners. On 18th May cholera appeared in a Dane, and 33 died of it during the passage to New York, where she arrived about 30th, with 34 more under the disease, many of them moribund.

The steamship "Peruvian" left Liverpool for New York about same date as the "Union," with 758 passengers, and seems to have arrived there about the same time; 35 deaths had occurred from cholera during the passage, and 28 were affected by it on arrival.

The steamship "Helvetia" sailed from Liverpool on 2nd May with 801 passengers, but in her the disease broke out before she reached Queenstown, and she put back.

The "England," "Virginia," and "Union" were all very close to the same point in the Atlantic when cholera appeared in them, viz., latitude 48° 50′ N. and longitude 28° 40′ W., and the "Peruvian" being a steamer also, and sailing about the same time as the "Union," must have passed over nearly the same track as she did, and consequently in the vicinity of the same locality where the others contracted the disease.

I have collected and published elsewhere many instances of ships carrying troops, European passengers, or Indian coolies, both in the Indian and Atlantic Ocean, which have contracted cholera at sea, at various intervals, without any communications with persons labouring under it, but limits as to space and time preclude farther notice of them at present.

The foregoing facts connected with the diffusion of the cholera epidemic of 1865-66 in Europe, cover a sufficient space, and embrace a sufficient period to bring out many relations Epidemiologists seldom concern themselves with, but any one who attempts to explain the spread of cholera whose theory does not account for every one of them without straining the evidence, may rest assured his speculations are faulty and require emendation.

The outbreak of cholera at New Orleans in 1873 was the commencement of the epidemic which overspread the valleys of the Mississippi, Ohio, and Missouri in the course of the summer of that year, but which nowhere reached the Atlantic coast, was of the same description as to origin as the epidemic at Southampton in 1865. The first cases occurred in persons who had been in the country for long periods. Up to the beginning of April 31 had been met with, of which two only recovered. In very few instances had any of these had communication with those immediately preceding. The members of the Board of Health, after inquiring into every circumstance connected with the earliest and

subsequent attacks, came to the conclusion that no vessel had arrived recently in which cholera had existed, and that it was attributable to factors acting locally and had not been imported.

In 1883 cholera appeared in Egypt, and, as was expected, extended into the Mediterranean the following year, where it broke out at Toulon. The first case appeared on 14th June, 1884, in a seaman on board the "Montebello," a line-of-battle ship lying in the southern division of the harbour at Toulon, and the following day another, who was quartered in the same part of the ship, was attacked. Neither of those men had been at sea for many months; the former died in eight days of consecutive fever, and the latter in eighteen hours of algide cholera. On the 21st a case occurred in the Lycée, an establishment in the centre of the town, and a long way from where the "Montebello" lay; this case proved fatal in six hours. The population were dismayed, and the students at the Lycée were dispersed immediately. On the 22nd there were nine deaths from cholera; and from this the disease increased, though but slowly at first, and it gradually extended through the southern districts of France.

The three instances given above show that the efficient cause of the epidemic of malignant cholera can be conveyed to localities a great distance from where it is already prevailing in sufficient quantity to generate an epidemic, without being carried by man or fomites.

In other instances persons coming from a locality where cholera was present, and with the disease either active or incubating, have arrived in a new one where it was impending, or where some sporadic cases may have actually occurred. Under such circumstances the latter are usually put aside as merely cholera nostras, and hence of no significance, and it is forthwith assumed that the fresh arrivals imported the germs of the disease and originated the epidemic which followed.

Before this inference can be established, however, it is clearly necessary that the possibility of the epidemic having arisen altogether independent of the arrival of the sick must be excluded, which the evidence usually presented does not permit of being done. The only other supposition compatible with the facts is that it is conveyed by currents in the atmosphere, not necessarily those experienced on the earth's surface, but by others at some elevation, often moving in the contrary direction. The experience of ships at sea has now accumulated sufficiently to show that the efficient factor is air-borne, and active there as well as on land whenever it meets with the necessary conditions to develop it.

Ships present cholera very differently under different circumstances. Some leaving a place where it is prevailing may have

an outbreak immediately, which disappears within the incubation period, and the remainder of the voyage passes without any further trace of it; others are attacked after they are at sea beyond the incubation period, but the outbreak usually terminates in a few days as in the previous category. In others again the disease, instead of diminishing, increases in frequency, and generally also in severity, and there may be a terrible epidemic, as in the case of the "England," lasting to the end of the voyage. Ships with cholera present much the same combination as those with yellow fever as regards the two diseases. Any number of yellow fever cases may be put on board a healthy vessel, and they will run their course without extending to anyone on board; but if she have the peculiar condition of bilge which causes yellow fever, every one on board or who may visit her who may be exposed to the emanations from it will be liable to contract the disease. Similarly, if a ship have merely an outbreak of cholera on sailing, or a limited one, as noticed above, some time after sailing, no further trouble is likely to ensue, but if there be deficient ventilation, bad food and water, and a want of personal cleanliness among the passengers, and especially if there have been bad weather, and the least inattention to the removal of the evacuations, both of the sick and those in health, a focus of the disease is rapidly generated, as was the case in the "England," and to a lesser extent in many of the vessels carrying emigrants or coolies. For this reason the earliest opportunity should always be taken to remove every person from a vessel with a focus of cholera on board until she can be thoroughly disinfected and cleaned.

The chief factor of cholera being thus carried by atmospheric currents cannot be excluded from any country, and, where it has been distributed over any area, it excites the disease directly in many persons who are predisposed to it, and forms foci of it whenever it finds localities suitable for its increase; these are often very limited in extent, not embracing more than a single house, or even a portion of a house or ship. The mortality among the steerage passengers in the latter is often very great, while the cabin passengers and all the crew have scarcely a case. Such foci are always badly ventilated, and the emanations arising in them acquire much greater density than in the open air; as a natural consequence the clothing of those who reside in them absorbs an amount of the emanation sufficient to produce cholera in susceptible persons outside until it has been dissipated by exposure; those so affected however, and the others who have contracted the complaint apart from such foci, do not seem to have any such influence, it being not the body, but the emanations from the locality which generate the disease.

Cholera therefore cannot be excluded from any country by general quarantine. All that can be done is by hygienic measures to improve the health of the population, and to remove the conditions which favour the formation of foci.

The placing ships which arrive with cholera on board under observation, removing their crews and passengers to suitable localities on shore until the disease ceases among them, are very proper precautions, and may prevent a small amount of the disease among the surrounding population, but can never prevent an epidemic if the necessary factors be in progress.

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