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### PETTENKOFER ON VIRCHOW'S CHOLERA THEORIES.

It is interesting to find that the contagionist views respecting cholera which now predominate in Germany are not held universally by all German authorities. The Contagionists, as opposed to the Localists, ascribe cholera to a something which is derived from the sick, whilst the Localists, of whom MAX V. PETTENKOFER is the most distinguished representative, regard it as a something which originates in, and issues from, a choleraic locality. RUDOLPH VIRCHOW has lately come forward as a thorough-going advocate of the contagionist theory of cholera; and in a recent number of the *Nation* he asserted that PETTENKOFER must force the facts in order to reconcile the occurrence of cholera on board ships with his (PETTENKOFER'S) views regarding the necessity of the soil for epidemics of the disease. PETTENKOFER has replied to VIRCHOW'S strictures in a communication to the *Allgemeine Zeitung* of July 24th, in which he sets forth the arguments in favor of the Localists with characteristic clearness and power.

PETTENKOFER says: "This fight round the ships is waged with very unequal weapons. The Localists maintain their ground on the fact that, as a rule cases of cholera occurring in ships remain isolated, and that no diffusion of the disease occurs. The Contagionists appeal to the fact that in spite of this epidemic outbreaks do occur in ships. The contagionist gentlemen either do not know or do not consider that among about 1,000 ships leaving choleraic ports, at the utmost a single epidemic outbreak occurs. This exceptional case, however, forms their only bulwark, and they leave the remaining 999 lying at rest around them like dead bodies.

"A couple of examples may illustrate what I mean. According to the returns of the Emigration and Post Offices in New York not less than 316,956 persons arrived there in 760 vessels from various parts of the world in the year 1873, and of this total 266,055 came from Europe alone. Of these 113,920 came from England which at that time was free from epidemic cholera in spite of unrestricted intercourse with European localities infected with the disease. The remaining 152,135 came from the Continent, and were conveyed in about 400 emigrant and passenger-ships starting from choleraic ports.

"What now were the facts regarding the occurrence of cholera in these ships? Cases of cholera were

only observed in four ships:—1st, on the steamer *Westphalia*, which left Hamburg on the 27th August and reached New York on the 10th September, 11 cases occurred; 2nd, on the steamer *Ville du Havre*, which left Havre on the 12th September and arrived on the 24th with one fatal case; 3rd, on the steamer *Washington*, which left Stettin on the 6th October with 298 passengers, and arrived on the 26th with three fatal cases; 4th, on the steamer *Holland*, which left Havre on the 20th September and arrived on the 28th October with one fatal case. Two of the ships, therefore, had only one case, one had three, and one, eleven cases.

"The opportunities for personal contagion on board ships, and specially on board emigrant ships, are much greater than in the most densely populated quarter on shore, and it appears then that cholera found no suitable soil on board these ships, unless, perhaps, in the case of the 11 cases in the *Westphalia*, which a Contagionist might cite in favour of his views. But when one proceeds to enquire who the 11 cases were, one again encounters an insoluble problem for the Contagionists. All 11 cases belonged to two German families; two of them died during the voyage (on the 1st and 3rd September), 9 were found sick on board on arrival, and were transferred to hospital, where one died and the rest recovered.

"How it is possible to explain the fact that the contagion should be limited to these two German families, and decimate them without spreading to any of the many others on board? According to my view the explanation is, that these two families embarked in Hamburg—an infected locality already affected by the disease. An epidemic outbreak may occur, as was once the case on board the *Franklin*; granted that a corresponding number of passengers have been in the same locality previous to embarkation, as the two families had been in this instance. But in such a case, one has no right to ascribe the outbreak of the epidemic to the presence on board of people attacked by cholera. But Herr VIRCHOW next reminds us that there are, in addition, well known instances in which cholera has occurred epidemically in ships, and has lasted for such a considerable time as to render it impossible to ascribe the phenomena to infection previous to embarkation. In reply, I ask whether this proves that, as a rule, cholera is incapable of acting infectiously on board ships. The Contagionists argue in a very convenient fashion; they select, as has been already mentioned, the most unusual cases of cholera in ships so long as these suit them, and pass over the great majority in dead silence. In spite of my localist stand-point I have never shut my eyes to the exceptional occurrence of ship-epidemics, but have very specially studied such cases. In regard to this point I would refer to my communications

regarding cholera in ships in the German *Vierteljahresschrift für öffentliche Gesundheitspflege*, and in the *Zeitschrift für Biologie*. One hears a great deal now-a-days of the untrustworthiness of cholera statistics in ships, and there certainly are cases in which the facts have been falsified, but this is of no importance in the present question, which deals, not with isolated sporadic cases, but with the epidemic occurrence of the disease. Where a considerable number of cases occur on board a ship, it is impossible that the fact could be masked or falsified.

"As an example I select not an emigrant ship, but a ship of war, in which the occurrences are as trustworthy as possible. During the Crimean war (1855-56,) the English and French fleets in the Black Sea suffered from cholera, some ships suffering more, others less, and the same phenomena presented themselves in the ports. The ordinary nautical prophylactic rule was adhered to of putting out to sea whenever cholera began to manifest itself among the crew of any ship lying in Varna or Balaclava. Removal from an infected coast, as a rule, was followed by a favorable result, even although the ships retained their sick on board, but cases did occur in which the procedure was of little or no benefit. The worst of these was that of the *Britannia*, the flag-ship of Vice-Admiral DUNDAS. This ship arrived in Varna from England, in the end of July, in a perfectly clean and healthy condition. The crew (sailors and marines) numbered 1,040. Soon after arrival cholera and isolated cases of cholera began to make their appearance. "It was therefore deemed advisable to put out to sea with the hope of getting rid of the disease on abandoning the anchorage close to the coast. This appeared on the first day to do good, but from the following night things rapidly became worse, and on the following morning the appalling outbreak began. Of the 1,040 persons on board 229 were attacked by fully developed cholera, and 139 or 13% died." The epidemic lasted for more than a week.

"This is a case of an explosion of cholera as well pronounced as any of those which sometimes occur on shore in barracks or jails. In the jail at Laufen, for example, in the year 1873, 82 prisoners out of a population of 522 or 16% died of cholera within a fortnight. In these cases the contagionists assume that we must come to the conclusion that the disease was due to direct infection from the sick. But the history of the *Britannia* itself has furnished proof that in that case infection could not have proceeded from those sick of cholera. Under the appalling circumstances in which the ship was, it is self-evident that it was impossible to keep her out at sea, and she therefore put into Varna, as the number of sick on board was greater than could be attended to. In Varna, however, the sick were not discharged into

hospitals on shore, but in spite of the protests of the captains—necessity knows no law—were transferred to other ships which were free from cholera. 'From this moment the attacks rapidly diminished, without any communication of the disease or any other detriment to the other ships.'

"I regard it as a matter of simple irresistible logic or of common sense to conclude that the infection on the *Britannia* did not originate from the sick, as otherwise these should have produced similar effects in the ships to which they were transferred. In my opinion the crew had carried the cholera out to sea with them from Varna.

"Is the forcing of facts on the localistic or the contagionistic side? As a rule, cases of cholera do not occur in ships from choleraic ports later than 20 days after departure. But if an infective material have been actually taken on board from the land, it may occasionally happen that it may remain adherent to certain objects for more than 20 days—the assumed maximum period of circulation in the human subject, and that it may here and there serve to infect persons who have never been on shore, just as occasionally happens in the case of malarial fever. Unfortunately the local predisposition for cholera is much more widely diffused than that for malarial fever. The area for the spread of yellow fever, for example, is much narrower than that for cholera. In regard to this I would call to mind the exact descriptions of the epidemics of yellow fever in Montevideo given by Dr. BRENDÉL.

"Cholera is just as dependent on the soil as yellow fever or common intermittent fever, and it would indeed be strange were intermittent fever, as the contagionists appear to assume it to be, the only infective disease in regard to which the soil plays an essential part. Intermittent fever, according to the observations of KLEBS and TOMMASI-CRUDELI, is also an infective disease of bacillar origin, without the patients being capable of infecting others. In the case of intermittent fever also, just as in the case of cholera, instances occur in which isolated attacks of the disease occur in persons on board ships from malarial localities who have never been on shore. Here also the ships evidently conveyed active infective material from the land."

Concerning the finding of the comma-shaped bacillus in a Calcutta tank PETTENKOFER says, "VIRCHOW looks upon the relation of cholera to water quite in the sense of an adherent of the water theory, and regards the demonstration of KOCH'S cholera bacillus in a tank in Calcutta as a 'drastic' confirmation of his views. *In the interest of the adherents of the Water theory it would have been well had this case never been published, as it only shows a loss of critical faculty in favour of preconceived opinion.* KOCH was led to

make the investigation, by the prevalence of cholera in the neighbourhood of the tank. But the inhabitants did not merely drink from this tank, they also bathed and washed their clothes in it. It was therefore to be expected that the cholera bacillus would inevitably be present in the water. It has not been shown that the bacillus was present in the water before the occurrence of cholera in the vicinity, but *it is only shown that it was present after choleraic clothes had been washed in the tank*; and finally, it is shown that the bacillus disappeared when the cholera disappeared, that is, *when there were no more choleraic clothes to be washed.*"

The clothes of choleraic patients at present play the leading part in the prophylaxis of the contagionists, and they support themselves on Koch's discovery that the bacillus survives and multiplies rapidly in damp clothing. "They, however, must allow, that the care of the sick, who discharge pure cultivations of the bacillus in their excreta, does not cause any appreciable infection of physicians or attendants. As a rule they remain remarkably exempt, as is also the case with those who have to deal with the bodies of those who have died of the disease. When now and then any such people do sicken and die, this gives no ground for the assumption that their infection was derived from the evacuations of the sick, or the contact with the dead, for the facts show that these, as a rule, are not infective, and one must therefore trace the infection, as in other cases, to the influence of a choleraic locality. In a hospital into which choleraic patients are admitted and treated with other sick, it is a matter of experience that the latter and the attendants frequently remain entirely free of any symptom of cholera. In regard to this I would call to mind the facts regarding the hospital in Altenburg in 1865, the military hospital Oberwiesefeld in Munich in 1873-4, and the cholera-hospitals of the Indian troops. Attendants and others are attacked only where the hospital has itself become a choleraic locality, like any other house or area. The clothes of choleraic patients, then, are not infective in and for themselves, but only so far as they are derived from a choleraic locality, or have been in one.

"I may recall the well known case from the epidemic of 1854, in which a patient went from Munich to Stuttgart and there infected his attendant, the woman who washed his clothes and her husband. Three cases of infection may be traced to the choleraic clothing from the case coming from the epidemic area of Munich. This suffices to the contagionists for a proof of the direct infection of the healthy by the sick, and they forget to ask why the three cases thus originating failed to infect any one else. One case produced three, then three cases ought to produced nine more! But with these three cases cholera died out in Stuttgart, although they also

had choleraic evacuations and clothes to be washed. The choleraic clothing of the Stuttgart cases was harmless, only that which came from Munich was infective, and I, therefore, conclude that some local product of Munich adhered to the latter, which was absent from the Stuttgart clothes. I only regard choleraic patients and clothing as infective in so far as they are materials derived from a choleraic locality, to which infectious material generated in that locality may adhere.

"The actual existence of insusceptibility (immunity) of many places, and among these are large towns, to epidemics of cholera is entirely inexplicable on the contagionist point of view. In 1849 cholera prevailed in Paris and Marseilles. At this time Lyons, regarding itself as the second town in France, wished to be independent, and had revolted. The town was invested, taken and garrisoned by regiments which brought cholera with them from Paris and Marseilles. The disease confined itself to the troops from these infected localities, and did not spread in the injured town, in which filth and want and misery prevailed, as they had never done previously, and which then had the worst water-supply which can be imagined.

"Just as little can the contagionists explain why here as well as in India the occurrence of epidemics of cholera is so strikingly limited to certain times, and that it is only at certain times that even susceptible localities are susceptible. One of the most remarkable and trustworthy peculiarities of Koch's cholera-bacillus is, that it can hardly survive for a couple of hours in a dry state. It is, however, very remarkable that in Lower Bengal, the endemic area of cholera, the disease moves in a precisely opposite fashion, and that the maximum prevalence of cholera in Calcutta occurs during the hot and dry season, (March and April), and the minimum prevalence in the hot and damp season—July and August. That periods when the soil is dry are most favourable to cholera, and periods when the soil is damp most unfavourable to it, comes out even more remarkably in Europe. In the Kingdom of Prussia cases of cholera occurred every year from 1848 to 1860, although of varying intensity and in different provinces. BRAUSER has collected all the cases recorded during this period in Prussia during each month. Of the fatal cases in these 13 years, 112 occurred in April, 446 in May, 4,392 in June, 8,480 in July, 32,640 in August, 56,561 in September, 35,271 in October, 17,630 in November, 7,254 in December, 2,317 in January, 842 in February, and 214 in March.

"In addition to the local and periodical predisposition I may finally direct attention to another circumstance for which the contagionists appear to have no eyes, and which appears to me to be connected

with the periodical predisposition. This is the variation in the course of epidemics, which are sometimes rapid, sometimes protracted; sometimes mild, sometimes severe. In some cases indeed they may even temporarily become dormant, and then subsequently waken up again to activity. That the germ of cholera is capable of lying for a long time latent in a locality, and of subsequently revealing its presence after months, is shown not merely by the periodic occurrence of epidemics in the endemic area in India, but also by European phenomena. In considering the diffusion of cholera we frequently encounter the so-called "over-wintering" of cholera in a district. PISTOR, who has most thoroughly followed out the occurrence of cholera in the district of Oppeln from 1831 to 1874, points out that there, even in 1831, on the first appearance of cholera in Europe, the epidemics in many places lasted until the beginning of winter, but then entirely disappeared, and only again broke out in July, August and September, and that without any demonstrable re-introduction.

"The last epidemic in Munich lasted from July 1873 to the end of April 1874, and was divided into two sharply defined and isolated outbreaks, a relatively insignificant summer one, the maximum of which occurred in the first half of August, and a much greater winter epidemic with a maximum in the first half of December. The previous epidemic in 1854, on the contrary, had only a single maximum which occurred in the second half of August. The third epidemic from which Munich ever has suffered, that of 1836-37, was a winter one which followed a continuous course and had a single maximum only. Whence comes the abnormal subdivision of the epidemic in 1873-74, and how will the contagionists explain it? Had the sick in August no evacuations, or did these and the choleraic clothing go away somewhere else then and only returned in the middle of November? The localists know that an event occurred in the first half of August 1873, which must be regarded as a periodic determinant for cholera, namely, a rainfall of 171 millimeters, a rainfall such as has never been observed in Munich since observations on the point have been recorded. This entirely abnormal rainfall in Munich in August exerted an effect on the cholera similar to that which the south-west monsoon normally exerts in Calcutta, and it was only after a subsequent, persistent and abnormally dry period that the cholera again developed itself as a winter epidemic in Munich. If, however, the imported cholera germ is capable of remaining dormant for months in places in which it has previously manifested itself in activity, and then of again awakening, it is a mere matter of common sense to conclude, that on importation it may remain dormant for a time and awaken to activity on the incidence of periodic predisposition, without hav-

ing given any immediate indications of its importation. This explains the frequently observed phenomenon of the origin of local epidemics of cholera in regard to which any immediately antecedent importation by means of cholera patients, or cases of choleraic diarrhoea, or choleraic clothing, is absolutely excluded, and on the other hand reduces the frequently observed coincidence between outbreak of the disease and arrival of a choleraic patient to the level of a coincidence.

"In Damietta and in Toulon fruitless attempts are made to determine who was the choleraic patient, or which was the choleraic ship that did the mischief. Both in Egypt and France it appears probable that traffic imported the transportable germ half a year before it encountered local conditions allowing of its development. On these grounds all barriers and disinfections directed merely to the travelling cases of cholera at the points of disembarkation are useless, for they will always be too late. Cholera will extend to Italy although that country now enforces as strong measures against materials coming from France, as France enforced against traffic with Egypt last year. The motto of cholera is the same as that of the Master of Ravenswood: it bides its time. VIRCHOW concludes with an appeal to the powers, which are represented in the present Egyptian conference in London. In Egypt, 'before all, establish a barrier, and specially an effectual, strong, and uniformly applied one, in order to close this European water-gate to the Asiatic pestilence.' The Suez Canal, this water-gate was, I believe, opened in 1869, and cholera has since then not invaded Europe any oftener than it did previously. I also fully believe that human intercourse is necessary for the diffusion of cholera from India, and that cholera introduced into Europe always dies out after some time, and must be imported anew from India. I believe, moreover, that we should remain free of cholera, were intercourse with India again as small and as slow as it still was in the beginning of the century, but any mere supervision of traffic which confines itself to a consideration of whether cholera patients or choleraic clothing are introduced, appears to me mere love's labour lost."

"The prophylaxis of cholera is not affected by KOCH'S discovery of the comma-like bacillus. The connection of this organism with the well established facts of local and periodical predisposition must be ascertained, ere any practical regulations can be founded upon it. Meantime we know that prophylactic measures against cholera, in so far as they have shown any appreciable result rest upon localistic and not upon contagionist grounds. One part of local predisposition consists in the pollution of the porous soil of the site of our habitation with the fluid waste matters derived from

houses, with the nutritive solutions for low organisms in the soil, to which the as yet undiscovered resting form of the comma-bacillus in any case belongs. During the 3rd, 4th and 5th decades of the century England suffered from as severe epidemics of cholera as the Continent. In order to bar cholera from entering the country, no obstruction was laid in the way of traffic which was allowed to follow its own development undisturbed, but measures were taken at home, arrangements were made in all great centres of traffic for the efficient watering of the streets and houses, and for the sufficient supply of pure water to secure the demands of improved cleanliness generally. Every sink or cess-pit in connection with a house, even if only for rain-water, is to be regarded as an injury to that house. Even the epidemic of the sixties affected England very little, and during the seventies, when the European continent suffered in so many places from epidemics of cholera, and when cases of cholera were frequently imported into England, the country remained entirely exempt. I doubt much whether this fortunate result is to be ascribed merely to failure in-periodic predisposition; at that time it appears to me to have been due to a diminution in the local predisposition, since on the Continent also one finds many examples of the action of water-supply and drainage on the prevalence of diseases originating in the soil, such as cholera and typhoid fever.

"I entirely agree with VIRCHOW when he calls on England to carry out those sanitary improvements in India and Egypt which have approved themselves at home. I expressed myself in this sense as long ago as the cholera conference in Vienna in 1874, but *I am not inclined to risk any great sacrifices in order to carry out rigid quarantines on the Suez Canal under the conviction that we could then keep cholera out of Europe.* For it then might happen to me, as has happened to M. FAUVEL, who like VIRCHOW is a determined contagionist, and who two years ago affirmed, that France would never more be an entrance gate for cholera into Europe if the Government would do as he wished. The Government agreed to his demands, and last year when cholera became epidemic in Egypt, all the desired arrangements appear to have been fully carried out, but this year cholera breaks out in Toulon without the presence of any epidemic anywhere else throughout the entire Mediterranean area. I do not regard this as an indication that the quarantines in Toulon and Marseilles were worse than those in Naples and Brindisi—how defective the quarantine at Naples is, was pointed out in the beginning of June in the *Allgemeine Zeitung* by Dr. GUSTAV WILD a physician who had the luck to be subjected to it—but it is certain that that maintained in Toulon has done no good, and I am inclined to predict that in spite of quarantine the turn for Naples will come too when

the right time has arrived, although perhaps not this year. The traffic which bequeathed the cholera germ to Toulon has probably already imported it into Naples. A full conviction of the efficiency of quarantine led M. FAUVEL to believe that the disease in Toulon was not Asiatic cholera, seeing that this according to his view could no longer obtain access to the place. I fear greatly that a similar fate—in part at all events, might befall VIRCHOW were his strong barriers on the Suez Canal carried out. One thing which happened to FAUVEL would certainly not happen to VIRCHOW, the universally recognised pioneer of Pathology and Pathological Anatomy. VIRCHOW would never hold an epidemic of cholera on the Suez Canal to be an epidemic of cholera nostras."

Considerable colour is lent to PETTENKOFER'S views by the discovery, since the publication of the above article, that a case of undoubted cholera occurred in Marseilles last year, but was hushed up by the Mayor. And Dr. DUTRIEUX BEY of Alexandria has found that, long before the disease became epidemic, isolated cases had occurred in the South of France: one so far back as January last. PETTENKOFER'S belief has also been realized that cholera would extend to Italian seaports notwithstanding the strong measures enforced against materials coming from France.

Although accepting the comma-like bacillus as a possible link in the choleraic process, on KOCH'S statement that this organism is peculiar to the intestines of cholera patients alone, PETTENKOFER is careful to point out that no practical regulations can be based on this discovery, until some substantial information has been obtained with respect to the relations which it bears to outbreaks of the disease. He believes it in the highest degree improbable that KOCH'S micro-organism can be the direct cause of the disease. For mere contact with the evacuations of cholera-patients does not cause any appreciable infection of physicians or attendants—the soiled clothes of cholera-patients do not appear to be infective in and for themselves, but only so far as they are derived from a cholera locality or have been in one. And KOCH'S comma-shaped bacillus can hardly survive for a couple of hours in a dry state, while the disease moves in Bengal—the home of cholera,—in quite an opposite fashion, the maximum prevalence being during the hot and dry season. All these considerations go against the idea of KOCH'S comma-like bacillus being the cause of the disease.

It must be conceded that PETTENKOFER in this masterly exposition of the facts attending outbreaks of cholera on board ships, has successfully vindicated himself from the charge of inconsistency and forcing of facts — a charge which now, on the contrary, must attach itself to VIRCHOW and the contagionists. Indeed the admirable feature of PETTENKOFER'S writings is the easy naturalness of his expositions, the outcome of a life-long study of this most intricate subject. Through the tangled jungle of cholera facts he guides us with extraordinary skill: the clue, so far as it goes, can always be held firmly and followed unhesitatingly.

#### A CAUTION TO VACCINATORS.

THE Local Government Board has published the details of Dr. CORY'S experiments in which he vaccinated himself with lymph taken from the vaccine-vesicles of syphilitic children. Dr. CORY operated with lymph taken from the arms of children who were suffering from acute syphilis with well-marked cutaneous eruptions; and the utmost care was taken to obtain the lymph free from admixture with blood. The first three inoculations were unattended by any positive result. At the fourth inoculation Dr. CORY succeeded in infecting himself with syphilis; and a committee consisting of Dr. BRISTOWE, Dr. HUMPHREY, Dr. BALLARD, and Mr. HUTCHINSON, appointed to investigate these most important experiments, report that in their opinion it is conclusively proved "that it is possible for syphilis to be communicated in vaccination from a vaccine-vesicle on a syphilitic person notwithstanding that the operation be performed with the utmost care to avoid the admixture of blood."

Although it is true that no careful physician would ever use lymph taken from a child in the acute stage of syphilis with flagrant cutaneous lesions such as existed in Dr. CORY'S case, so that in ordinary practice there may be little likelihood of transferring syphilis, still if the lymph of a syphilitic patient is infective at one time, it may also be at another when no cutaneous lesions are apparent.

Dr. CORY'S experiments, therefore, show that vaccination ought to be practised with increased care, and that when bovine lymph of good quality can be obtained, it ought to be employed in preference to humanized lymph.

## CURRENT MEDICAL TOPICS.

### THE CHOLERA IN EUROPE.

CHOLERA still prevails in Marseilles and Toulon, and many other towns in the South of France, but shows a tendency to subside in France. Outbreaks are reported generally throughout the continents; but the most serious epidemics have occurred in Italy and Spain.

In spite of the stringent quarantine imposed by the Italian authorities, the disease appeared a few weeks ago in Naples, and it has there assumed so intensely severe a form that several hundreds of deaths are occurring daily. The Italians have hitherto neglected home sanitation and depended solely on quarantine to protect them against cholera. As the disease to be barred out was dreaded not so much from the sea as from inland, railway stations, rather than the ports, were the scenes of sanitary imprisonment. The latest European newspapers are filled with absurd stories of the annoyances inflicted on travellers. Trains coming through the Tunnel from France were being emptied into bare roadside waiting-rooms, where the passengers were calmly ordered to stay *five days* before going any further, and for fear lest the enemy should make a flank march—lest the cholera infection should pass round *via* Switzerland and creep into Italy by the St. Gothard Tunnel or across the Austrian Tyrol—the northern frontiers were guarded in a similar way. It is noteworthy that the outbreak did not take place at Brindisi, which receives the Indian traffic, but at Naples, where the Italian Government are free to carry out their quarantine arrangements nearly altogether undisturbed by foreign shipping. It is a striking testimony to the insufficiency of quarantine.

Fortunately no outbreak has occurred in England, although ships with cholera patients are continually arriving at British ports. It is to be hoped that England will again enjoy the same happy immunity which obtained throughout the European epidemic of 1873.

The newspapers are flooded with letters giving directions for the prevention and treatment of the disease. It is needless to say that many of these directions are highly absurd and amusing, and many directly contradict one another. M. Pasteur publicly blames Dr. Koch for having in his printed instructions deprecated the use of water even for the most legitimate purposes, such as watering the streets. M. Pasteur very properly remarks, that a profusion of water is the only means we possess of keeping our streets clean, and that the disinfection of clothes and other property having belonged to choleraic patients will always remain imperfect if water is excluded. He observes, also, that among the precepts laid down by Dr. Koch some are universally adopted and had long been so before he spoke; while others are founded on mere hypothesis, devoid of proof.

### THE CHOLERA COMMISSION.

THE P. & O. S.S. *Ancona*, which arrived in Bombay on the 1st instant, brought as passengers Dr. Klein, F.R.S., and Dr. Heneage Gibbes, who are to form part of the new Cholera Commission. It is stated that after halting at Bombay for a time, and before coming on to Calcutta, they will make a detour through India, reaching Delhi in October and Peshawar in November, and finally return to England at the end of the cold weather. They bring with them a complete set of cultivating apparatus; but no culture operations can be undertaken on a large scale till the beginning of the cold weather.

### THE CHOLERA GERM.

DR. CAMERON'S presidential address before the Belfast meeting of the British Medical Association in the Section of Public Medicine, on "The Cholera Microbe, and how to meet it," contained a very clear statement of how