

THURSDAY, OCTOBER 30, 1884

THE CHOLERA EPIDEMIC OF 1884

THE reappearance of cholera in an epidemic form in European countries after a comparatively long absence is a matter of considerable concern, not only on account of the severity of the existing epidemic but also in connection with the prospects which are in view with respect to the coming year. A great westward diffusion of cholera in the Eastern Hemisphere began in 1863, it was continued almost uninterruptedly to 1873, and the disease not only clung with considerable tenacity to certain towns and districts for two and three years at a time, but in some cases after it had apparently subsided for good, there came recrudescences of the disease after long intervals. From 1873 to the present year the greatest danger which Europe has incurred as regards cholera was during the Egyptian epidemic in 1883, but there is no reason to believe that the outbreak which is still prevailing in Southern Europe was in any way connected with that epidemic. On the contrary the evidence tends to show that it was imported by means of an imperfectly disinfected vessel, the *Sarthe*, on which cases of cholera had occurred.

Toulon was first infected about June 18, and from that date up to the present time, when only occasional deaths take place, nearly 880 fatal cases have been officially recorded there. The first cholera deaths in Marseilles occurred on June 27, the disease spread with great rapidity, reached its most fatal stage about the middle of July, and, including the few deaths that are now and again still registered there, the total mortality, according to official records, has fallen but little short of 1700. During the third week of July scattered cholera deaths occurred in a large number of the southern departments, in many localities the disease spread widely, and even during the earlier part of the present month, fresh deaths were still recorded from the department of the Pyrénées Orientales. In all, the French cholera mortality which has been recognised in official publications has, during the present year, not fallen far short of 3500.

Towards the third week in July cholera had made its appearance in Italy, and it spread with great rapidity during the month of August through the north-western part of the kingdom. Towards the end of the month several places in the south, including Naples, became infected. During September the diffusion in the north, as also in and around Naples, greatly increased; the mortality in certain towns, such as Naples, Spezia, Busca, and Genoa being very heavy. A general subsidence of the disease has now set in, but the published mortality already reaches nearly 10,300, over 6500 of the deaths having taken place in the city of Naples.

In Spain the epidemic was first officially recognised during the first week of September; it has been to a large extent limited to the province of Alicante, which abuts on the Mediterranean, and since the middle of October no further cholera deaths have been recorded. Some 600 fatal attacks are, however, known of. But whether it be Spain, Italy, or France that is in question, it is more than doubtful whether the statistics hitherto published by

any means include the total deaths that have occurred. The French records are probably the most correct, but these will have to be revised before they can be regarded as in any way accurately representing the extent of the epidemic.

The very general subsidence of the epidemic which has now set in suggests two questions which are of great international importance. In the first place:—What experience has the epidemic afforded as to the measures which should properly be taken to stay the spread of cholera? The system of sanitary defence which has been adopted by France, Italy, and Spain has been quarantine; the energies of all three countries have been engaged in enforcing the system of land quarantine, with its sanitary cordons, its lazarettos, and its fumigations; and that system has utterly broken down at all points. In France the absolute impossibility of maintaining it and the uselessness of adhering to it only in part led, early in the course of the epidemic, to its abandonment, except in so far as the maintenance of certain processes of fumigation, in order to satisfy the public, are concerned. But with Italy the matter was different. No advantage had been taken of the lesson taught and bitterly enforced during the previous Italian epidemics, as to the intimate connection which exists between cholera and the retention about human dwellings of those conditions which befoul both air and water; filth abounded in by far the majority of her cities, towns, and villages; her only chance was to trust in that which had failed her before, and she clung to her cordons of troops and other allied measures with a tenacity that could not well be exceeded. But, as was pointed out by Mr. Simon many years ago, quarantine is impracticable except when planned with the precision of a scientific experiment and conducted with extreme rigour, and even then it is not conceivable as a system of national defence for the purposes of countries communicating with each other by means of great highways of traffic and of commerce. And so it has turned out. Cholera took no heed of the lines of troops, whether at the frontier or around the infected districts; it diffused itself along the lines of human intercourse as if without let or hindrance, and the very cordons and lazarettos assisted in the process of the spread; for the fear of the cordons led to the flight of an infected population before the line of bayonets could be established, and the lazarettos became, by the mere aggregation of sick and healthy under conditions as unwholesome as can well be conceived, fresh centres of infection. If it were not that the prejudices of an ignorant public had to be taken into account, land quarantine in Western Europe would probably never be heard of again. So far as measures of sea quarantine are concerned, it suffices to say that, according to the *Revue d'Hygiène*, Algeria became infected early in October by means of its communications with the southern ports of France, and that the diffusion of the disease to Spain must be regarded as having taken place by means of the sea-port of Alicante. In short, everything that has occurred during the present epidemic, including such occasional importations of choleraic cases into our ports as occurred last month at Cardiff, has gone to show that the substitution by this country of a system of medical inspection and of isolation in the place of quarantine has, both in its direct application and by the

removal of an untrustworthy system of defence, materially added to our national safety against the importation of infection.

The second question which suggests itself is:—What are the cholera prospects for Europe and this country during 1885? This question is one which it is by no means easy to answer, for to a great extent it must necessarily depend on the action that may have been and still will be taken for the removal of the conditions which are favourable to the diffusion of cholera. From the middle of 1865 to the beginning of 1869 there was probably no time when Europe could be regarded as free from the disease, and it was doubtless only a recrudescence of the same disease that led to the five years' outbreak which, commencing during the summer of 1869, was destined to prevail in one or other part of Europe up to 1874. Or to take individual countries and towns. According to the report of the late Mr. Netten Radcliffe, all the Italian provinces which suffered from cholera in 1865, with three exceptions, were again affected in 1866; the epidemic culminated in 1867, and only came to an end in January 1868. Again, the disease was more extensively diffused through France in 1866 than even in 1865; in 1867 it continued in departments previously infected, and it reappeared in some where it had ceased. In the province of Naples, cholera, commencing in 1865, did not cease until 1867. But fortunately such maintained and recurring prevalences are not the invariable rule, and even the last Neapolitan epidemic of 1873 was of much shorter duration than the earlier ones had been. The common theory that a cholera outbreak in one year is almost certain to be followed by a second one the next year is not a law of epidemics; the fact is rather due either to the failure to remove infected matter left over from the first epidemic, or, as in the case of England in 1865-66, to fresh importation of infection. In brief, it is the sanitary state of Naples, Spezia, parts of Toulon and Marseilles, and such like places, that mainly affords grounds for the fear that no intervention of winter weather can, apart from the adoption of sanitary measures on a wide scale, free the infected places from a contagium which, if left behind, may renew its activity next season. On the other hand, the maintenance of conditions of wholesome cleanliness should give a guarantee that even a fresh importation may fail to spread. Numerous importations took place into this country in 1873, and all proved abortive. Our sanitary authorities can insure a like success in 1885, even if the disease be either maintained or reappear next year in Southern Europe.

DYNAMO-ELECTRIC MACHINERY

Dynamo-Electric Machinery. By Prof. Silvanus P. Thompson. (London: E. and F. N. Spon, 1884.)

PROF. SILVANUS P. THOMPSON has undertaken the task of filling up a most important want in our scientific and technical literature; and he is to be congratulated and warmly thanked for the manner in which the task has been performed. Of the want of a scientific and practical work on dynamo-electric machinery there can be no question. The subject is at present exciting more general attention than was, perhaps, ever before given to any invention, not even excluding the steam-

engine or the electric telegraph. The electric light effects are fascinating to a degree; and in these days of exhibitions and displays the natural interest in one of the most beautiful inventions has been fostered even beyond that which is natural: while speculation and even the promises of "electric light in our homes" have led to excitement which has been equally disastrous to the hopes of the many and to the progress of electric lighting itself. We are now entering it is to be hoped, or indeed have already entered, upon a more satisfactory state of things, in which hard and steady work and careful scientific investigation of every point on which efficiency and advantage in electric lighting depends will quietly bring forth an appropriate reward; and will gradually sweep away the painful impressions left by the failures of would-be electricians and of bubble companies.

Information on the subject of dynamo-electric machinery up to the present time has been very much diffused and not convenient for access, and there was great need of a careful hand to bring together as much of it as was really valuable. It consisted chiefly of a multitude of articles in the two English and two or three foreign electrical journals, and a few papers to the learned societies, generally on some special class of machine. Of English books we have scarcely any of importance except those of Mr. James Dredge and of Mr. J. E. H. Gordon, useful in their way as very handsome picture-books, and the former affording admirable detailed and figured diagrams, and a complete list of the legion of recent electric patents. A book of moderate dimensions, and written from a scientific point of view, will be welcomed alike by practical men and by theoretical students of this subject.

In Prof. Thompson's "Dynamo-Electric Machinery" we find, in five preliminary chapters, a satisfactory description of the properties of the magnetic field and of the effect of moving a coil within it; of ideal simple dynamos of different forms, accompanied by curves showing the electromotive forces produced by the rotation of rudimentary coils, the effect of superposition of electromotive forces, and the effect of the commutator. The series dynamo, shunt dynamo, and the compound-wound dynamo are likewise described in simplified form in these preliminary chapters, and likewise the various effects of electro-magnetic induction; and from these preliminary remarks there follows a long list of practical conclusions.

Chapter VI. is devoted to the government of dynamos, a subject which has engrossed a large share of the attention of practical inventors during the last four or five years. So long as electric lighting was carried on with arc lamps alone, and when the arc lamps were so imperfect as they were at that period, irregularities in the action of the dynamo machine were little noticeable in comparison with the irregularities of the arc itself. The use of the incandescent lamp, however, soon made these irregularities only too apparent; and attempts to rectify this defect in the dynamo have given rise to improvements of a very substantial character, not only as to regularity but in economy, and also in other and less important matters.

Following these preliminary chapters we find a very full and very interesting description of all the really important existing dynamos, with an account of their peculiarities and of the purposes for which each is specially