The Spread and Control of Diphtheria Epidemics.

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III.—FOMITAL.

If the discharges from the nose of an infected person be allowed to dry on fomites, and these then be kept in an ill-lighted and stagnant atmosphere, the bacilli will retain their virulence for a long period. Trevelyan succeeded in cultivating diphtheria bacilli from a handkerchief which eleven weeks before had been used by a child suffering from diphtheria, and Roux from a piece of membrane dried in cloth which had been kept three months. It is interesting to note that cases are on record where soiled linen conveyed the infection after an interval of a month. I have even found one case where diphtheria was taken from fomites which four months before had been in contact with a diphtheritic patient. Here is an instance of the shorter period, recorded by Dr. Parsons:—

Diphtheria appeared in a carpenter's family, whose neighbour, Mrs. F., on a few occasions nursed the children during their illness. A fortnight later Mrs. F.'s daughter contracted the disease, and died of the complaint after three weeks' illness. After this death the house was thoroughly fumigated, the paper stripped off, the walls limewashed, and, as was thought, all infected clothing was washed or fumigated. It was now hoped that the disease was at an end. But five weeks later it broke out in the household of Mrs. F.'s son, who lived in a neighbouring cottage. After great difficulty it was ascertained that some of the clothing infected by Mrs. F.'s daughter had been put away unwashed, and that another daughter, who came home a month later to live at her brother's, had turned it out and washed it. She caught diphtheria and died.

IV.—DIRECT CORPOREAL.

By this is meant the conveyance of the diphtheria bacillus from a patient to a healthy person directly. This is easily effected by the act of kissing, when the infection is most readily handed on to the fresh host. Included in this category also must be the infection of nurses and others in close apposition with the patient, when a cough scatters infected sputum in fine particles into the air, these particles being then inhaled and lodged in the upper air-passages of those near by.

Another cause which we ought all to be prepared to meet is that in which the person has no clinical signs of diphtheria save a slight discharge from the nose. If this discharge be examined and diphtheria bacilli are shown to be present, a ready cause for the spread of the disease is proved, especially if, in similar cases, no bacteriological examination be made until after diphtheria in its worst form has appeared in those around the unsuspected person. Both Dr. Sidney Davies, Medical Officer of Health for Woolwich, and Dr. Mackenzie have quoted instances of rhinitis, while many others are on record showing how diphtheria bacilli may be spread from this unsuspected source. Here is one of Dr. Davies's cases. He writes:—"On November 22nd, 1902, R. B., aged fifteen, commenced with diphtheria, and on November 23rd, her brother, W. B., aged seventeen. These persons were not attending school, but their brothers attended a school where several cases of diphtheria had recently occurred. I accordingly suspected an undetected case in the house, and on visiting discovered that V. B., aged six, attending the school referred to, had had, on November 15th, a cold, slight sore throat, earache, and was feverish, and had been kept at home since. I found he had a slight mucous discharge." Burnett gives an interesting instance:—A schoolboy was supposed to be suffering from a severe cold, with a profuse nasal discharge. On bacteriological examination diphtheria bacilli were found. No other case of catarrh in the school had these organisms. After the discovery every boy and master (save one master) had a prophylactic dose of antitoxin. The master who had not been given the dose contracted the disease, but no one else did. The bacilli lingered in the boy's throat for three months, despite treatment. Finally, after three consecutive negative examinations, he returned to school when term commenced, the master being kept away owing to diphtheria bacilli being still found in his throat. Soon after the beginning of term a fatal case of diphtheria occurred, when the boy's throat was again tested and diphtheria bacilli found in it, and in the throats of three others. This case serves to illustrate three points well:—

1. How diphtheria may be spread by a throat supposed to be free from it.
2. How efficient antitoxin is as a prophylactic agent.
3. How diphtheria bacilli may persist for long periods in a throat which shows no membrane.

A mild sore throat is often associated with diphtheria bacilli, though no other sign of their presence may be apparent. Bisset relates a case in which a child, who had had a mild sore throat two months previously, went to pay a visit. Diphtheria occurred in the household visited, being transmitted by the child mentioned, as far as could be ascertained. Many more such instances have been published.

Post-scarlatinal diphtheria is held by many authorities to be due to the introduction of unsuspected cases of diphtheria into the wards of fever hospitals, and certainly statistics support this point. If all patients admitted be examined bacteriologically, and those having diphtheria bacilli in their

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