live for a time in sewage, according to Dr. Gordon Sharpe.

This authority has also published a paper on the results he obtained from chemical, physical, and bacteriological tests on various soils. He found that a moist rather than a water-laden soil seemed to be the home of the diphtheria bacillus, so long as this soil was rich in organic material. However, I cannot say that I was convinced by his results, as, although he isolated a diphtheria-like organism, he did not put it through the crucial inoculation tests. Moreover, his paper was written before the discovery of the pyogenio soli group of bacilli, organisms which, culturally and microscopically, closely resemble the diphtheria bacillus. Notter and Firth agree with him so far as to think soil dampness may favour the spread of diphtheria, and they add that diphtheria bacilli can remain indefinitely in soil as long as they are protected from light and excess of oxygen. The actual composition of the soil has, apparently, little effect on the spread of the disease, though richness in organic material is held to favour it. In this connection it is interesting to remember that diphtheria used to be a distinctly rural disease, whereas now it is chiefly found in towns. No reason has been assigned for this change in its habitat from a soil presumably rich in decaying organic material to places where this cannot exist to such a marked degree. It is possible that the stress and strain of modern town life is such as to lower the resistance of the tissues themselves.

Lewis and Balfour, in their treatise on Public Health and Preventive Medicine, summarise the methods of spread of diphtheria bacilli into five classes:—(1) Aërial; (2) alimental; (3) fomital; (4) direct corporeal; (5) indirect corporeal; and we cannot do better than discuss each of these in detail.

I.—Aerial.

The same authorities state that diphtheria bacilli may be spread over vast distances by wind convection. I have been unable to find any proof in support of this statement, but I have no doubt that these authors consider it well established, although they bring forward no instances of it. Richardière and Tollemer have certainly found virulent diphtheria bacilli floating in the air of diphtheria wards before disinfection, controlling their results by inoculation. At one time it was thought that diphtheria was due to defective drainage, the gases given off being the cause. No doubt the inhalation of sewer gas lowers the power of the resistance of the mucous membranes against the diphtheria bacillus, and so it was suggested in 1902 that the increase of diphtheria during the last sixty years corresponded with the growth of indoor closets. The idea was quickly overthrown when the epidemic at Goole was considered. For in this place, out of 300 cases of diphtheria, 90 per cent. occurred in houses in which there were no water-closets actually in the house. Further, the bacillus diphtheriæ has not been found in sewer gas, even though it may be present in the sewage itself. Shattock found by laboratory experiments that lowly-virulent diphtheria bacilli, cultivated in broth over which fæcal air was passed, did not acquire toxic properties, even though the treatment was prolonged for a period of two months. These facts agree well with what is found in practice. Consequently, the idea is now no longer tenable that diphtheria is the direct outcome of defective drainage.

II.—Alimental.

This is a much more definite channel by which diphtheria epidemics may be spread, for the milk supplies of cer ain large towns have been found to contain virulent diphtheria bacilli, and outbreaks of the disease have been found to correspond with the distribution of milk from a certain farm or dealer. Klein, analysing 100 samples of country milk, found the bacillus diphtheriæ in only one; but, even if found in only 1 per cent., the possibility of an epidemic arising in the district to which this milk was sent is shown by the following cases:—

At Leeds last June and July, Dr. Spottiswoode Cameron traced the outbreak to the milk supplied from one definite farm which was in a very insanitary condition. The epidemic was stopped when the milk supply from this source was cut off, recurring when the milk from this farm was again allowed to be used, although the farm and its surroundings had been put into good condition. Further investigations followed, which showed the presence of diphtheria bacilli in the throats of some of those, apparently quite healthy, who handled the milk before its transmission to the retailer. After the *personnel* of the farm had been changed, diphtheria ceased to occur amongst those to whom the milk was supplied.

Also at Edinburgh in 1900 there was a sudden increase in the number of notified cases in June, the origin of which was traced to an infected milk supply. The same has been found true in other epidemics, with the details of which I need not weary you. Klein, investigating an outbreak of diphtheria amongst the cats at the Brown Institute, traced the source of the infection to the milk supplied; and this experimenter has conveyed the disease to healthy cats by feeding them on milk artificially inoculated with diphtheria bacilli. The diphtheria bacillus is stated to have been conveyed in cheese and in butter, but never to have been traced to water supplies.

(To be continued.)

The German Central Committee for the erection of Sanatoria for the cure of consumption is making arrangements for the delivery of public lectures on tuberculosis.

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