

times there is congestion of the mucous membrane of the stomach and of the ileum; occasionally there are patches of venous extravasation (rarely gangrenous) in the colon, though usually it is pale, but all these congestive changes in the mucous membrane of the intestinal tract are so frequently absent that they cannot be regarded as pathognomonic. The intestines are usually filled with the same rice-water contents as formed the characteristic discharges during life, not always liquid, but sometimes inspissated, so as to form a creamy, pasty or gelatinous mass, adhering to the coats of the bowel, this consisting of amorphous granular matter, granular cells, and a small quantity of scaly epithelium. The right side of the heart, the lungs and liver, and the kidneys contain a considerable quantity of dark inspissated blood in the large vessels, while the capillary vessels in these organs and in other parts of the body are empty or nearly so. This change in the condition of the blood is the most remarkable and the most constant of the *post mortem* changes, and concerning the cause of it there are two views held which we may briefly consider: (1) That it is due to the great and rapid loss of the watery constituents, and (2) that it is due to the direct action of the poison of the disease, by which ptomaines are developed and the character of the blood is chemically changed, so that it becomes thickened, and instead of passing freely through the capillary vessels, excites spasm of their coats so that they are unable to receive or convey it.

The first view that the condition of the blood is due to the removal of its water constituents, was formerly received without question as being in accordance with the familiar phenomena of the disease, and accounting rationally for the pallid and shrunken appearance of the surface of the body as well as for the comparative absence of blood from the internal organs of the body except in the larger vessels. Yet of late years doubt has been thrown upon the correctness of this explanation.

It has been shown that the same condition of the blood exists in those cases of cholera in which death has taken place with extreme rapidity, and without the development of the usual characteristic symptoms of vomiting and purging, nay, even when these have been altogether absent. It has been further pointed out that no such change in the blood is seen where death has occurred from

copious hæmorrhage, the blood retaining its healthy characteristics to the last, with the exception that the proportion of corpuscles is diminished and that of the watery constituents increased, the latter being taken up from the tissues to make up for the deficiency in volume. I may here remark that this hardly appears to be a parallel case, since in hæmorrhage the loss of bulk includes all the constituent parts of the blood, and not, as in cholera, of the liquid portion only. Leaving, however, this part of the argument out of the question, as inconclusive, there appears abundant reason for believing that the view now generally held is the correct one, and that the tarry condition of the blood, although, doubtless, partly due to the loss of water, is chiefly caused by the chemical action of the morbid material. What this material is was long a matter of doubt, but is now generally believed to be a form of bacillus, first described by Dr Koch in 1884, and asserted by him to be peculiar to cholera. His statements were received with incredulity at first, other observers who had been investigating in the same direction denying that they were peculiar to cholera, and claiming that similar forms were present in the colon even during health, and especially during unhealthy conditions, such as dysentery.

More extended observations have, however, confirmed the correctness of Dr. Koch's statements, and marked differences between the bacillus coli and the cholera bacillus have been shown to exist both in form and mode of propagation, till now few persons are to be met with who will dispute the existence of the cholera bacillus, or its constant relation to the disease itself. Those who do are probably chiefly to be found amongst those who, from international differences, refuse to accept as authentic discoveries of German origin.

So much has been said and written of late years about this common bacillus or spirillum, that its description must be familiar to every one of you, and I feel unwilling to trespass on your time by describing what has already been so fully described by others who are, from direct observation, able to do what I could only do by copying from sources as accessible to you as they are to me. I will therefore only refer to those points connected with it that are of importance to us as regards the prevention of the disease.