

23. Cohabitation, therefore, of the diseased and healthy animals is a fertile source of spread of the malady.

24. (2.) *Swallowing*.—Numerous experiments have similarly been performed upon the possibility of the tubercular virus entering the body through the alimentary canal. In these experiments, tubercular secretions, *i.e.*, mucus, saliva, milk, &c., portions of tubercles from diseased tissues and cultures of the bacilli, have been swallowed by various animals (calves, pigs, sheep, rodents, fowls, &c.), with the effect that the disease has fatally followed the ingestion of such infective material.

25. It is obvious, therefore, that the digestive fluids do not necessarily exert an injurious influence upon the poisonous bacilli.

26. (3.) *Direct introduction into the tissues beneath the skin or beneath the mucous membranes*.—If tubercular material, that is to say, secretions from a tubercular animal, or portions of tubercles, be introduced into the loose tissues beneath the skin or mucous membranes, the bacilli cause a local inflammatory swelling (*i.e.*, a tubercle) at the seat of infective inoculation, and then grow along the lymphatic vessels, causing similar inflammation of these latter, and, finally, reach the nearest glands. These also become diseased, and from them the microbes pass through the large lymphatic vessels, which subsequently discharge into the veins, so that the virus is distributed throughout the body, and the disease, at first local, becomes general, affecting most of the organs (but especially the lungs, see Parts 37 and 42).

27. Undoubted instances have been laid before us of such inoculation occurring, and others are on record in which the human being has become affected with the disease by the microbe entering the system through a scratch or sore on the hands which have been brought in contact with tubercular sores or secretions.

28. Similarly, cases probably falling within this category have been recorded, and one or two stated in the evidence, in which a bull has given the disease to cows, and the converse has also occurred, namely, that a bull has contracted the disease from cows.

In the former of these instances, of course, the virus may have been contained in the secretions, and it may have thus reached the ovary, and so affected the system generally.

29. (4.) *Heredity*.—While it is undeniable that the disease runs through certain families or strains, there is considerable doubt as to whether this is simply because the tissues of one particular breed or race are especially favourably disposed to nourish the tubercle bacillus, or whether the bacillus is actually contained in the ovum or spermatozoon, and so becomes a constituent part of the embryo and foetus, and develops within the uterus. The former view has already been referred to.

30. In favour of the latter, it may be said that Baumgarten has actually, in the rabbit, observed the bacillus within the ovum, and, further, that the bacilli have, by different observers, frequently been seen mingled with active spermatozoa.

31. Finally, in one striking case found by Professor Johné, of Dresden, an unborn calf of seven months' intra-uterine growth was discovered to present numerous tubercles in its lungs, showing that if the ovum had not been inoculated it had received the virus through the placenta, which amounts practically to the same thing. Similar intra-uterine infection has been shown to be more than probable in the human being.

32. Against this view of the infection of the ovum and embryo it has been suggested that the disease-producing influence of the bacillus would prevent the ovum from arriving at maturity.

33. Whichever view be accepted, the solution of the practical problem, as far as it is connected with this part of the subject, is easy, as all breeders have discovered the infinite risk of breeding from tubercular stock (see also Arts. 78–80).

34. It has also been stated that in-and-in breeding will of itself give rise to the disease. This is, of course, erroneous, but no doubt such breeding in one line predisposes to general infection if the virus is at any time introduced into the herd.

Mode of Attack and Distribution of the Disease within the Body.

35. The disease, as already referred to, may attack the body of an animal in two different ways.

36. It may, for instance, be introduced into the blood, and be distributed generally over the body, spreading so rapidly as to make its entry difficult of discovery, and to gain for it under this condition the name of acute or general or miliary tuberculosis.

37. On the other hand, it may, as already stated, affect for a considerable time only the point of entry and the neighbouring lymphatic glands, becoming consequently distributed over the body from these latter. This is called in the first instance local tuberculosis.

38. Local tuberculosis is also occasionally seen to follow the circumstances which usually produce general tuberculosis: thus in cattle the malady shows itself locally under the form known as grapes, where the pleura is alone attacked, this condition differing markedly from the form in which the alveoli of the lung itself are crammed with the tubercles and the other organs also affected.

39. Local tuberculosis is more common in man than in the lower animals. In him it frequently attacks one point, whatever be the mode of its original introduction into the body. In cattle this is very exceptional.

40. The distribution of the disease in the body is difficult to connect with any special mode of introduction of the virus, save, perhaps, inhalation.

41. Undoubtedly, in cattle, the lungs and pleurae and the serous membranes generally are the favourite seats of the malady; any and each of the other organs being occasionally affected. In pigs it commonly attacks the glands in the neck; in rodents, the spleen, the liver, the lungs, and the bones; in fowls, the nose, mouth, and spleen; in horses, the glands; and in man the glands, the lungs, the joints, and the nervous system.