

Middle Ages, leprosy which had spread to an alarming extent in Central Europe, was completely stamped out. In Norway quite recently the segregation of lepers has been ordered by law, but it is not found necessary to execute this law strictly, as the segregation of the worst cases sufficed to produce a diminution of the disease.

Dr. Koch, therefore, argues from the experience gained in dealing with the infectious diseases above mentioned, that "in combating pestilences we must strike at the root of the evil, and not squander force in subordinate ineffective measures. Now the question is whether what has hitherto been done, and what is about to be done against tuberculosis really strikes at the root of tuberculosis, so that it must sooner or later die."

Starting from the fact that in by far the majority of cases of tuberculosis the disease has its seat in the lungs, and has also begun there, Dr. Koch concludes that the germ of the disease, *i.e.*, the tubercle-bacilli, must have got into the lungs by inhalation. As to the question where the inhaled tubercle-bacilli come from it is known with certainty that they get into the air with the sputum of consumptive patients, which contains them sometimes in almost incredible quantities. Dried sputum containing bacilli may also become pulverised, and get into the air in the form of dust which may find its way into other organs and originate other forms of tuberculosis. Such cases are, however, comparatively rare, and the sputum of patients is now regarded as the main source of infection in tuberculosis.

INFECTION FROM TUBERCULAR CATTLE.

Dr. Koch then discussed the possibility of tubercular infection by means of the transmission of the germs from tubercular animals to man, more especially of the tuberculosis of cattle through drinking the milk, and eating the flesh of diseased animals.

The point manifestly is a most important one—so far as the susceptibility of cattle to human tuberculosis is concerned. Dr. Koch, while desiring further research on the part of others, in order that his conclusions may be verified, feels "justified in maintaining that human tuberculosis differs from bovine and cannot be transmitted to cattle." He then asks:—

"How is it with the susceptibility of man to bovine tuberculosis? The question is far more important to us than that of the susceptibility of cattle to human tuberculosis, highly important as that is too. It is impossible to give this question a direct answer, because, of course, the experimental investigation of it with human beings is out of the question. Indirectly, however, we can try to approach it. It is well known that

the milk and butter consumed in great cities very often contain large quantities of the bacilli of bovine tuberculosis in a living condition, as the numerous infection-experiments with such dairy products on animals has proved. Most of the inhabitants of such cities daily consume such living and perfectly virulent bacilli of bovine tuberculosis, and unintentionally carry out the experiment which we are not at liberty to make. If the bacilli of bovine tuberculosis were able to infect human beings, many cases of tuberculosis caused by the consumption of aliment containing tubercle-bacilli could not but occur among the inhabitants of great cities, especially the children. And most medical men believe that this is actually the case.

"In reality, however, it is not so. That a case of tuberculosis has been caused by aliment can be assumed with certainty, only when the intestine suffers first, *i.e.*, when a so-called primary tuberculosis of the intestine is found. But such cases are extremely rare. Among many cases of tuberculosis examined after death, I myself remember having seen primary tuberculosis of the intestine only twice. Among the great *post-mortem* material of the Charité Hospital, in Berlin, ten cases of primary tuberculosis of the intestine occurred in five years. Among 933 cases of tuberculosis in children at the Emperor and Empress Frederick's Hospital for Children, Baginsky never found tuberculosis of the intestine without simultaneous disease of the lungs and the bronchial glands. Among 3,104 *post-mortems* of tubercular children, Biedert observed only sixteen cases of primary tuberculosis of the intestine.

"Though the important question whether man is susceptible to bovine tuberculosis at all is not yet absolutely decided, and will not admit of absolute decision to-day or to-morrow, one is nevertheless at liberty to say that, if such a susceptibility really exists, the infection of human beings is but a very rare occurrence. I should estimate the extent of infection by the milk and flesh of tubercular cattle, and the butter made of their milk, as hardly greater than that of hereditary transmission (a form of transmission which Dr. Koch considers extremely rare), and I, therefore, do not deem it advisable to take any measures against it."

MEANS OF COMBATING TUBERCULOSIS.

Among the effective means of combating tuberculosis Dr. Koch discusses the isolation of all persons whose sputum contains tubercle-bacilli in separate establishments. This course he considers absolutely impossible and also unnecessary. The important point is that the sputum should be properly removed and rendered innocuous. In the first stages, and amongst those

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