The Koch Remedy.

A short statement of the nature of the material which is exciting so much interest in the world at large in connection with the disease called tuberculosis, and to give some idea of the man who has presented it to the world, and the methods which are used in its preparation, will be interesting.

It is a difficult task to make the matter perfectly plain to those who are not accustomed to hear the terms commonly used in such discussions by men of science. But I shall try to exclude scientific terms as far as possible, and to give a plain statement of the facts.

In the first place, a word in regard to Doctor Koch. He is a man who now stands, at the age of forty-seven, at the head of the medical world of scientific experimenters. He began his medical life in the Franco-Prussian War as an assistant surgeon in the army, and served through that war. He established himself after peace had been restored in a small country town in North Germany, and there attempted build up a practice.

While doing this, his interest was excited in the low forms of life which are known as bacteria; and he occupied all the leisure that came to him in the study of these forms. It was through work in this field that he first secured prominence in the scientific world, and it is scarcely fourteen years since his first work was published.

This work was printed in a journal called "Cohn's Beitrage zur Biologie der Pflanzen." It was more a study of the general characteristics of the lower forms of life than an effort to connect them with special forms of disease; but these first papers were followed by the publication of a little book upon "Wundinfektions-Krankheiten," which attracted attention among all scientific medical men, and secured for its author a call to Berlin.

He was given a position there under the Imperial Board of Health, with all the facilities necessary for the prosecution of further work in the study of the cause of disease.

The work that Doctor Koch carried on before he went to Berlin was prosecuted under great difficulties, and he overcame obstacles that would have blocked an ordinary man's efforts and discouraged him entirely. But, animated by the same scientific enthusiasm and dogged spirit of persistence that he has shown ever since, he conquered all obstacles.

From the time of his removal to Berlin, and for a time before that, his main effort was toward the solution of certain problems in connection with the disease that is known by the scientific term "tuberculosis."

This is a disease which may attack any part of the body. It occurs very commonly in the lungs, and is there called "consumption." It may also occur upon the skin, and there are different forms there, the most common and terrible of which is that known as "lupus."

There is even a possibility that the dreaded disease called leprosy may be classed as a variety of tuberculosis. It occurs in the bones, in the joints and in the lymphatic glands of the body, and may also attack the various mucous membranes.

Inasmuch as tuberculosis is said to produce, in the form in which it appears in the lungs alone, one-seventh of all the deaths that occur among civilized people, it is plain how important must be anything that will permit of even a hope of its arrest or of its prevention.

There is hardly a family of which at least one member has not been attacked by this disease, and it is its wide-spread existence that accounts for the great interest and excitement that has attended the announcement of the probable discovery of a means of its arrest after it has attacked a victim.

My own acquaintance with Doctor Koch, began in the fall of 1885, after his return from India, where he had been sent by the German Government at the head of a commission for the investigation of cholera.

At that time he had been made Professor of Hygiene in the University of Berlin, and had had placed at his disposal a building which occupied as much space as the whole of the Medical School building in Boston does, for purposes of general medical education.

At that time—and there was no change when I saw him last in December—he would impress one as a self-contained, thoroughly balanced man of science, modest and unassuming. Close contact with him confirmed this impression.

Two months ago, when he was surrounded by all sorts of men, all full of praise and excitement in connection with the announ ments that he had made in regard to tuberculosis, these same characteristics were those which struck one first.

The great modesty and unassuming character of the man, in the face of one of the most tremendous and momentous discoveries that medical science had seen, and the fact that was borne in upon one, that all the work and all the sacrifices that he has made, have been done purely for the sake of humanity at large, and not for personal aggrandizement or pecuniary reward—this is the most striking thing at first sight in the character of the man; but it is not in the least surprising to one who has known him before.

So far as the experiment has gone, he has been perfectly justified in what he has claimed for his material, as employed against tuberculosis. But this is something very different from what newspaper accounts have led most people to believe.

The modesty of his announcement and the modesty of his claim are in accord with the character of the man, and have at no time meant that there has been a cure discovered for the most advanced form of the disease.

The implication and assertion that such has been the case have led to many painful scenes, and many fatal disappointments on the part of patients who have had false hopes aroused.

The implication and assertion made by authority are that in the external forms of tuberculosis the process may be arrested by the employment of this material; that in the early stages of pulmonary tuberculosis is furnished.

So far as our knowledge yet goes, these assertions are borne out by what has occurred in the hospitals.

The material which is used, and to which the name paratoloid has been given, is one of extreme power and activity; but the method of its action is very different from ordinary drugs.

The disease tuberculosis is produced by one form of the low plant life called bacteria. It is a special bacillus, a minute body having a rod shape, which is possessed of very great vitality, that is to say, which is difficult to destroy, and which grows in the different parts of the body where the disease is situated.

This organism, was first discovered, studied and described by Koch, and it was the evidence furnished by him that this minute plant was actually the cause of tuberculosis, that furnished the possibility for the first great advance in the study of this human scourge.

Having shown this, the next step was, of course, to attempt the solution of the problem, to wit; the discovery of something that would prevent the advance of the disease by preventing the growth of this minute plant in the body.

The difficulty of such a research is emphasized by a knowledge of the fact of the minute size of the organism with which we have to deal. It varies in length from one-half the diameter of the red blood corpuscle to the full diameter of the same object. It can be seen only with the very best microscope, and, in dealing with such minute bodies, the difficulties are almost insurmountable.

But the solution of his problem, with many others, has been becoming more and more clear, as work in the department of science called "bacteriology" has progressed parts of the world.

From the knowledge gained in laboratories devoted to this specialty, it was not difficult to determine very closely what this particular material, used against tuberculosis, is, even before the announcement by Koch of its composition.

In order to understand what it is, a few words in regard to the development of bacteria in general are necessary.

This "paratoloid" is not a chemical that can be made like other drugs by an ordinary chemist in an ordinary laboratory. Its chemical nature is not yet understood, and the probabilities are that it will be a long time before it is understood. It is not a compound that can be made by ordinary chemical reaction; but it is a result of the vital activity of the bacillus of tuberculosis when grown under artificial conditions in the laboratory.

It is only one of a great class of complex chemical compounds that have come into our knowledge within the last few years, as the study of the life history of bacteria has progressed.

A short account of what occurs in the test tubes used in the bacteriological laboratory for the cultivation of bacteria will serve better than anything else to make plain how these compounds are formed, and what this material in particular is supposed to do when it is introduced in the human body.

When one attempts to grow a pure culture of bacteria, it is done by transferring a minute quantity of the bacteria upon the point of a needle to the interior of a tube which contains a substance in which they will grow and which will give nourishment. The plants are sown by plunging the needle through his substance from top to bottom.

This being done, for a few days the bacteria go on developing into what is called a colony, a mass of them becoming large enough to be perfectly distinguishable by the naked eye.

After this development has gone on, however, for a short time, it ceases, and the colony does not enlarge at all, although the vitality of the bacteria contained in the colony is unaltered.

Now this cessation of growth is a constant occurrence, and is not due to the fact of the exhaustion of the nutrient material—of the elements proper for the growth of the bacteria. It is due to the formation of a new series of compounds on the edges of the colony, between it and the remainder of the nutrient medium, compounds prohibit the further development of the bacteria themselves.

These compounds are made up of the chemical elements left behind in the substance which nourishes the bacteria after they have taken out the other chemical elements necessary for their own development. They are of extremely complex organization, and are exceedingly unstable, so that they cannot yet be studied by the ordinary means at the command yet be studied by the ordinary means at the command of analytical chemistry. But they are of constant occurrence in all nutrient media in which bactera are grown, and each bacterium,—not each individual, but each variety,—so far as our knowledge yet extends, produces a special form of compound which prohibits its own development, and may have no influence upon other bacteria at all.

Such compounds form parts of a new class, to which has been given the name of ptomaines. They are apt, when extracted in a pure state, to be extremely virulent poisons. They certainly do prevent the growth of the bacteria that produce them, and if introduced in sufficently large quantities into nutrient media, will actually destroy the bacteria themselves

They are easily destroyed by heat; at any rate, that has been supposed to be case with all of them until recently; but there are now known to be a few which resist the temperature of boiling water—that is to say, are not destroyed or decomposed by it; and that is the case with this meterial of Koch's, which resists with more or less persistency the application of heat up to the temperature of boiling water.

Now, bearing in mind what has been said of the formation and action of these compounds in the experimental laboratory, that they prevent the further development of the bacteria about which they are formed, it is not difficult to understand what occurs in the body about tuberculous nodules when this material is introduced.

It does not cure by destroying the bacilli, but, in a way, by erecting a wall of necrotic tissue about them, so that they spread no farther in the body, and are deprived with greater or less certainty of means of nutrition. That is what is supposed to go on when this material is employed.

Certainly its action is as wonderful as anything that has been used in remedial medicine. It is used in extremely small doses; usually, to begin with, not more than one milligram of the original material, and it is not taken by the mouth, but is introduced directly into the lymphatic circulation by injections under the skin.

It produces no effect when taken by the mouth; nor when introduced under the skin even in exceedingly large does, unless the person be affected with tuberculosis.

The results that have been obtained thus far are most encouraging in cases of externas tuberculosis, as well as in the tuberculous affections of the bones and joints. One reason for this is that the results can be more easily seen, and another that the opportunity for getting rid of the diseased material is greater.

So far as the cases of tuberculosis of the lungs are concerned, the results are not yet definitely obtained. Certainly, in many cases, there has been a very marked improvement in the general condition, and equally an improvement in the local disease of the lungs; but sufficient time has not yet gone by to enable us to determine exactly how far these beneficial results will extend.

There is no question, however, that one of the greatest boons has been conferred upon suffering humanity, and that, while its benefits may not extend so far as our desires may at first have led us to hope, we nevertheless have reason to believe, that in the early stages of all forms of tuberculosis, pulmonary as well as others, we already have a means at our command for the prevention of their further development.

The especial lesson that this fact should teach, particularly to the medical profession, is the absolute importance of making an early diagnosis of the existence of the disease; or, as one of my own patients put it the other day, "that no cough or peol should be neglected," and that every case of the kind should be subjected to all the modern means for diagnosis that scientific resource has placed at our command.

After a Match.

The average person notices the arrangement of a room surprisingly little, says the Albany *Argus*. Its dimensions and the relative positions of the furniture may seem to be familiar to him, but in reality they seldom are. The way to become convinced of this is to hunt for something, a match for instance, in the dark.

You have the mantel, and make a grab where you imagine the match safe stands. Down goes a piece of bric-a-brac to the floor.

More care is used. You find the end of the mantel, and run your hand along the marble slab. Off goes a vase or two. You strike the clock; you've got it. No, it's on the other side. Not there! Ah, then it's on the table.

After running against the stove and tripping over the chair, you find—the sofa. Keep cool and take your bearings. The table is north of the sofa, and the sofa runs east and west; north, therefore is in front of you. Now you have it. That article that dropped to the floor sounded like the match-safe. But it's the ink-well, and your fingers are dyed with a color warranted not to fade.

A bright idea—the stove! You burn your fingers, and warp your patience, but you secure a light. And the match-safe? it is on the mantel-piece in front of the clock—the only place you didn't search.

A Jewish lawyer of St. Petersburg writes a letter stating that all the Jews residing in that city have been ordered to leave by May 3.