2.6 per cent. of the cases in the Vienna hospitals;²⁰¹ 6.6 per cent. of the admittances into the Paris hospitals;²⁰² 2.5 per cent. of the sickness in the Berlin hospitals;²⁰³ 2 per cent. in those of Stuttgart;²⁰⁴ and 17 per cent. in Salpêtrière of Paris.²⁰⁵

Pneumonic fever prevails, in comparison with certain other diseases, as shown in table VII.²⁰⁶

TABLE IX.—SHOWING FLUCTUATION OF PNEUMONIC FEVER.
Morbidity.

HOSPITAL.	Per ct. of admissions				
	Years.	Mean.	Maxim.	Minim.	Fluctuation.
German Hospital, Philadelphia	7	1.3	3.0	.9	2.1
Kieler Poliklinik	30	3.6	6.3	2.1	4.2
Newport Hospital	3	2.8	4.0	1.6	2.4
New York Hospital	10	1.3	1.8	.8	1.0
Pennsylvania Hospital	15	1.5	2.7	.6	2.1
Roosevelt Hospital	15	1.9	2.8	.8	2.0
St. Louis City Hospitals	3	1.6	1.8	1.4	.4
St. Mary's Hospital, Cincinnati	5	1.2	2.1	1.4	.7
St. Paul's City Hospital	2	2.4	3.4	1.5	1.9
University of Pennsylvania Hospital	4	.1	.2	.1	.1
United States Marine-Hospital Service	10	.9	2.1	.5	1.6
Means of totals		1.5	2.4	.9	1.4

The annual prevalence of pneumonic fever in any given locality will vary from time to time, within wide limits, as shown in tables VIII and IX.²⁰⁷

Huss²⁰⁸ found the admissions for pneumonic fever into the Seraphim hospital of Stockholm during sixteen years to vary from 6.5 per cent. to 15.4 per cent. of internal diseases. His statistics give a mean of 10 per cent. and a fluctuation of 8.9 per cent.

THE DETECTION OF THE BACILLUS TUBERCULOSIS, TECHNIQUE.

Read before the Chicago Medical Society February, 18, 1889.

BY FRANK BILLINGS, M.D.,
OF CHICAGO.

The form of the bacillus tuberculosis is not characteristic, and it cannot, therefore, be differentiated from other pathogenic and non-pathogenic bacteria by its form alone. It is a very thin bacillus, about 2 to 5 micromillimetres in length (from one-quarter to one-half the diameter of a red blood-corpuscle). It is usually slightly bent.

Like all protoplasmic cells it has an affinity for the aniline colors, and its reaction to these colors is characteristic when the aniline is combined with a mordant.

To elicit the characteristic reaction of the bacillus to the aniline colors it is necessary to proceed in a methodical manner. The instruments used, forceps, needles, etc., should be clean, sterilized by heating in a gas or other flame. The cover-glasses and slides should be cleansed in fine alcohol.

The material supposed to contain the bacilli should be collected in a clean vessel, and when collected should be protected from contamination by the air, etc.

The material should be spread in a very thin layer upon a cover-glass, by means of a needle, or by placing a small amount upon one glass and then pressing another cover-glass upon the first, thus making a thin layer upon the two cover-glasses. The thin film is then allowed to dry upon the cover-glass, or the drying may be hastened by warming it over a gas flame. Then, when dry, by passing the cover-glass quickly two or three times through the flame, the albumin usually present in the medium, fixes the film upon the glass.

The cover-glass is now ready for the aniline dye. One may use any color, but aniline violet, methyl blue or fuchsin is usually employed. Fuchsin is the most often used, because its bright red renders the bacilli more prominent to most observers; and, too, one may use with it, better than with the other colors, a contrast color for the ground substance on the cover-glass.

The color used must be combined with a mordant, which so fixes it in the bacillus of tuberculosis as to render it very much less susceptible to the bleaching effects of the mineral acids, while it does not so affect other bacteria, with but two exceptions, which I shall mention later.

There are several substances that may be used as a mordant; aniline water, carbolic acid, tannic acid, and others. Aniline water was first used, and is still by some, but the mordant now in common use, and the one used by Prof. Koch, is carbolic acid. It has the advantage over aniline water that a solution of it with the color may be kept indefinitely, while the aniline water solution must be made each time it is used.

The following solution of fuchsin (Ziehl & Neelson) is a satisfactory one in every way:

Take of Fuchsin 1 part,
Acidi carbolic 5 parts,
Alcoholis 10 "
Aque distillatæ 100 "
Mix in the order given.

A few drops of the staining fluid are placed upon the cover-glass, held in a forceps with the film upwards over a gas or alcohol lamp flame until the solution boils or gives off steam. It is then washed in water and is ready for the process of bleaching.

For bleaching, any of the mineral acids may be used. A 25 to 33 per centum watery solution of

²⁰¹ Juergensen, op. cit., S. 12.

²⁰² Grisolle, op. cit., p. 127.

²⁰³ Juergensen, op. cit., S. 12.

²⁰⁴ Ibid.

²⁰⁵ Grisolle, op. cit., p. 127.

²⁰⁶ For further information on this subject consult Huss, op. cit., Juergensen, op. cit., Fritsch, Erlangen Diss., and others.

²⁰⁷ No effort has been made to render these tables exhaustive.

²⁰⁸ Op. cit., S. 63.

hydrochloric, nitric or sulphuric acid is used. Koch prefers nitric acid, his laboratory assistant uses sulphuric, while at Vienna hydrochloric is chiefly used. It is probably immaterial which acid is employed.

The stained cover-glass is immersed in the acid solution for a moment, then in a 70 per cent, water solution of alcohol, and finally washed in water. The immersion in acid, alcohol and water, successively, being repeated until the color is almost or quite bleached. This process leaves the bacillus tuberculosis colored red, while the ground substance and all other bacteria, with the two exceptions mentioned, are bleached. The mordant used enables the bacilli of tuberculosis to retain the color. Too long immersion in the acid will also overcome the action of the mordant and render the examination *nil*. The cover-glass should be finally thoroughly washed in water to remove all acid, otherwise the slight amount of acid remaining will gradually fade the color and in a few months the preparation will become worthless.

The cover-glass may now be mounted on a slide in water or glycerine, or, after drying, in Canada balsam. One may, however, use a contrast color—methyl blue for the ground work. It is only necessary to float the cover-glass, with the film downward, upon a 1 to 2 per cent. watery solution of the methyl blue for five minutes. The excess of blue color is washed off with water, the cover-glass dried and mounted. The bacilli of tuberculosis will be seen stained red and other elements will be blue.

For tissue containing the bacilli it is necessary to immerse the sections for from 12 to 24 hours in the fuchsin solution. They are then decolorized by immersion in the acid solution, the alcohol, etc., until only a faint redness remains. The sections are then dehydrated in alcohol and cleared up in the oil of cloves. When mounted the bacilli are seen red, the tissue decolorized. The methyl blue may be used as a contrast color, also, for sections.

To easily detect the bacilli so prepared, one should have a microscope magnifying at least 450 diameters; however, the bacilli may be seen with a less powerful glass. An ordinary stand and substage will do for cover-glass preparations, but an Abbé substage condenser is a decided aid to the discovery of the bacilli in cover-glass preparations, and it is absolutely necessary in examining sections.

The discovery of the bacillus tuberculosis in the excretions, secretion or exudates examined is positively diagnostic of a tubercular disease. When it cannot be detected its absence is not of much diagnostic value, for it may be present in such small numbers as to render its detection difficult or impossible. When it is not found readily repeated examinations of material collected on

different days must be made to make its absence of any worth as a negative sign.

The bacillus is most easily detected in the sputa of tuberculosis pulmonum. It is most difficult to detect in the blood, even in cases of acute general tuberculosis.

It is not usually difficult, as a rule, to detect it in the exudates into serous cavities; as in tubercular pleuritis, tubercular peritonitis and tubercular synovitis. I have found the bacillus in the contents of a distended Fallopian tube.

In tubercular disease of bone it is usually present in the cheesy infiltrate, but is difficult to find in the pus from sinuses in tubercular diseases of bone.

In the urine the bacillus is difficult to detect because of the bulk of urine and the decomposing effects of the urine. *Then the preputial and labial smegma bacillus* gives the same color reaction as the tubercle bacillus, and its form is so nearly like the bacillus of tuberculosis that it cannot be differentiated from it with the microscope. The presence, therefore, of a bacillus in secretions from the genitals, giving the color reaction and presenting the form of the bacillus tuberculosis is not here, as it is elsewhere, a positive sign of tuberculosis.

In tubercular disease of the skin and mucous membranes the secretion therefrom sometimes contains the bacillus. Sections made from tissue taken from tubercular ulcers usually yield the bacillus.

The bacillus of leprosy is nearly like the tubercle bacillus in form, and it gives the same color reaction. The clinical course of leprosy is so distinct, and the disease is so rare in this climate that it is not difficult to exclude it when considering a tubercular disease.

No. 235 State Street.

COMPLETE REMOVAL OF THE UTERUS AND ITS APPENDAGES FOR FIBRO- CYSTIC GROWTH.

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Reported by T. M. TALBOT, A.M., M.D.

About January 1, 1888, Dr. Pearce, of Urbana, Ohio, was consulted by Mrs. C., æt. 36, in reference to an abdominal enlargement. On examination a globular body, the size of a foetal head at birth, was found in the right hypogastric region. Cystic disease of the right ovary was diagnosed. The tumor being small and the patient anæmic and in poor general health, noninterference for the present was advised. The patient was put upon bark and iron, and a general tonic treatment. Under this treatment she increased in strength and health, but with this improvement