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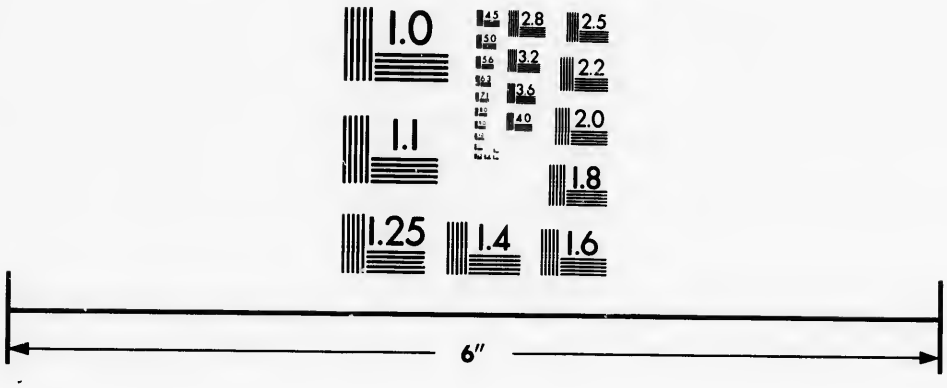

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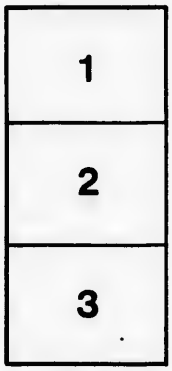

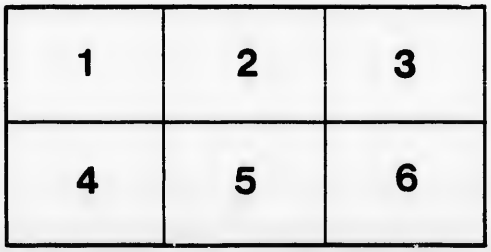

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HAMMOND - F - W -

A SIMPLE AND RAPID METHOD OF DETECTING TUBERCLE BACILLI IN FLUIDS.

BY

E. W. HAMMOND.

(From the Molson Pathological Laboratory, McGill University.)

Anyone who has attempted to detect tubercle bacilli in fluids, knows how wearisome and uncertain are the ordinary methods. Numerous suggestions have been made with regard to the shortening of the process of detection; some workers have employed caustic potash to dissolve out mucous and proteid materials, and have obtained fair results by decanting. Others again have employed the centrifugal machines and the hæmatocrit. In neither case do the results obtained appear to be so certain and the process so satisfactory as that here given.

Some authorities have used very complicated methods:

Ilkavitch[1] coagulates 20 ccm. of milk by dilute citric acid and dissolves the coagulum by phosphate of soda (saturated aqueous solution); then sulphuric ether and water are added, the mixture is shaken for 15 minutes, the solution is allowed to stand, and after the fat has separated the remainder of the liquid is taken and dilute acetic acid is added until the first sign of coagulation appears. It is then transferred to the centrifugal machine giving 3600 revolutions per minute and the deposit is conveyed to two slides and examined with oil immersion.

However, as a result of a series of studies in which at the suggestion of Dr. Adami, I tried various methods of separating the bacilli and gaining them from milk, I have eventually discarded one after another of the solvents of the various constituents of the milk, and have devised a method which appears to be at the same time accurate cleanly and fairly rapid. The method is briefly as follows:

Taking milk to which preferably, in order to arrest the growth of other bacteria (which are apt to hide the tubercle bacilli), 5 per cent. of glacial carbolic acid has been added, I take 30 cc. 15 cc. in two tubes, and centrifugalise in Purdy's electrical centrifuge, or even preferably in the hand centrifuge of Bausch and Lomb or Queen, for the latter appears to give easily more rapid revolutions per minute. After centrifugalising for about 15 minutes, the supernatant fluid is poured off; the precipitated debris, which contains the bacilli, is then

[1] Munchen. Med. Wochenschr., 1892, p. 5.

treated while in the tube with about 3 cc. of a 5 per cent. caustic potash solution, is mixed up thoroughly by giving a good shake, and is left for two or three minutes. The tube is then filled up to the 15 cc. mark with distilled water and centrifugalised for about 20 minutes. If now the supernatant fluid be taken off, the minute quantity of the debris at the base of the tube can be examined at once, or if the material be required in a still purer condition completely free from caustic potash, a series of dilutions and centrifugalisations with distilled water can be carried on.

By this method a film can be made upon a slide or coverslip which is free from fat and proteid granules, and which contains only the bacteria present together with any solid debris which may be in the milk or other fluid. To get rid of this foreign matter, if present in any large amount, one may safely filter the fluid at the beginning of the process through the finest gauze. It is wholly unnecessary, I find, to treat milk with sulphuric ether in order to separate off fats, the caustic potash being useful to remove both fats and proteids from the deposit after the first centrifugalisation in a way that is completely satisfactory.

I have employed this method and have been able to detect bacilli in the milk in which they were present in such small numbers that Dr. Martin, inoculating 15 to 35 cc. of the same milk into a series of over 50 guinea pigs and rabbits, has only once obtained a development of tuberculosis, and I will go so far as to say that this fact indicates that the method affords a more sure diagnosis of the presence of bacilli in milk than does inoculation. It may be added that using this same milk I have concentrated down 70 cc. using distilled water alone and have inoculated the deposit into a rabbit which now after 14 days is showing definite emaciation and indications of the progress of tuberculosis.

It is scarcely necessary to add that this same simple method can be most satisfactorily employed for the detection of tubercle bacilli in other animal fluids; it gives excellent results for example, with sputum from suspected cases of tuberculosis, and although as yet I have had no undoubted example of tuberculous urine, I have found that it gives a very clear precipitate of bacteria in urines containing a large amount of mucus and pus.