

realized, Koch's tuberculin still remains an absolute diagnostic agent for the discovery of the dread disease, though the febrile reaction is too violent to allow its use elsewhere than in cattle. If through its use, however, bovine tuberculosis be ultimately stamped out, and infection by milk and meat disappear, Koch's labor will not have been in vain. During the past ten years he has been steadily at work, and the results of his further investigations were summarized in July, '97, by the description of a new antituberculous serum, designated 'T. R., which he claims will be of great value and is now being tested clinically in very many hospitals. Of this I shall speak further on. In the last eight years serum therapy has received great impetus from the work of Roux, Behring, Ytinase, and last, but not least, Widal, who, with Pfeiffer and Wyatt Johnston, are deserving of great praise for their work in the serum diagnosis of typhoid, which must be only a step toward the serum cure of that disease. But much as this is needed and valued, the minds of all scientists turn toward the Mecca of their hopes, the prevention and cure of tuberculosis. Many serums looking to this end have been brought to the notice of the profession from time to time, only to sink back into obscurity. Some excellent results, however, have been credited to them, and in more than one instance it has been hinted that lack of funds to carry on further investigations has alone prevented the consummation of the desired end.

For some time back Dr. Hirschfelder, Professor of Medicine in Cooper Medical College, San Francisco, has been working on a serum which he claims to be possessed of undoubted curative properties, and which he styles "oxytuberculine." Of the details of its manufacture and the mode of its administration I shall now speak, and shall also cite several cases which under my observation have been treated with it.

It may be of interest here to speak briefly of the different methods employed by various workers to produce a serum designed to check or cure tuberculosis, noting also the main points of difference between them all and the new oxytuberculine.

KOCH'S TUBERCULINE (*The Original*).—"Upon the surface of veal bouillon, containing glycerine and peptone, a pure culture of the bac. tuberc. is floated and cultivated at 38° C. After 6 to 8 weeks a pellicle, consisting of tubercular scum and containing the tubercle bacilli, will have covered the surface and sunk to the bottom of the vessel. The supernatant fluid is then sterilized by heat passed through a Pasteur filter, and evaporated to $\frac{1}{10}$ its volume. This is the crude tuberculine such as was formerly used. Now this crude liquid is precipitated with alcohol, washed, and dissolved in water, after which it is ready for use."

KLEB'S MODIFIED TUBERCULINE (*Antiphthisine*).—This is merely an adaptation of the above, being much diluted. Here, as in Koch's tuberculine, an organic acid is developed in process of manufacture, which prevents further growth of the tubercle bacillus. Let the medium be alkalized and growth begins again. We are indebted to Trudeau, of Saranac, for these investigations.

PAQUIN'S SERUM.—The procedure used here follows closely the lines laid down for the preparation of diphtheria antitoxine, and indeed was