

Pacific Coast Section.

Stanford University, October 20, 1934.

7647 P

Brucella Phagocytic Index Test.

K. F. MEYER, B. STEWART, L. VEAZIE AND B. EDDIE.

From the George Williams Hooper Foundation, University of California,
San Francisco.

Epidemiologists have observed that (a) a percentage of persons exposed to the risk of infection with *Brucella*-type abortus or suis show either agglutinins or complement fixing antibodies in their serum and (b) clinical undulant fever is relatively infrequent in the occupational groups who come continuously and intimately in contact with *Brucella* organisms. Various inquiries leave no other explanation than that the *Brucella abortus* and probably the *Brucella suis* and *melitensis* as well are organisms endowed with a moderate degree of virulence, which rather frequently infect persons who are exposed either by contact through the skin or by alimentary ingestion. These infections are quite often subclinical and remain latent. Surveys in occupational groups have shown that the serologic tests fail to furnish a true picture of the number of unrecognized infections and therefore the allergic skin tests have been employed. Although a much more sensitive reagent to detect the existence of latent infections, the skin allergy is a variable state and in part influenced by the occupational activity. With the aid of this test one may recognize the allergic but not necessarily the latent infected and immune human being. The observations made by Huddleson, Johnson and Hamann¹ that the polymorphonuclear cells of persons who have had undulant fever in the past years or are actively infected or have no definite history of the disease may show a strikingly increased phagocytic activity offers a third procedure to detect latent infections. With the aid of a slightly modified *Veitch technique*² the usefulness of the method has been verified.

¹ Huddleson, Johnson and Hamann, *Am. J. Pub. Health*, 1933, **23**, 917.

² *J. Path. and Bact.*, 1908, **12**, 353.

One or 2 drops of 1.6% sodium citrate solution are dried in a small tube. At the time of the test 1 or 2 drops of human blood, either obtained from a skin puncture or by syringe, are placed in the tube. To the fluid blood are added within 30-45 minutes 1 to 2 parts of a suspension of Brucella organisms (48 hours old culture in buffered salt solution with a density of Gates 2; suis type culture No. 80 is particularly suitable). The blood-bacterial suspension is gently shaken and incubated in a water bath for 30 minutes at 37°C. Smears are then made from the sediment, air dried, fixed with methyl alcohol and stained with polychrome methylene blue. The number of ingested bacteria in 25 to 50 granulocytes is counted and the average estimated.

The data presented in Table I indicate that persons who never had contact with Brucella organisms furnish a phagocytic index below 1, the clinic patients, the medical and dental students, with few exceptions, belong in this group. Those who had leucocytes with an increased phagocytic activity came from rural communities and their histories suggested an exposure to the Brucellas in the past. By comparison the high indices from 1 to 28.4 in groups of clinical undulant or recovered cases, the laboratory workers and veterinarians strongly suggest that the enhanced specific phagocytic activity is the sequel of a recognized or latent infection. The same deductions are probably applicable to the majority of indices determined on the employees of several meat packing plants. The opsonophagic power of whole blood expressed as an index is simple and the method lends itself to epidemiologic and clinical studies. Although some persons with an index below 1.0 have developed undulant fever since the examinations had been made, it appears premature to conclude unconditionally that one phagocytic index test may decide the susceptibility or resistance to a Brucella infection. In the course of several surveys of groups exposed to the hazard of occupational undulant fever persons were found who gave a strong allergic skin test, a definite agglutination or complement fixation reaction (1:40, 4+) with a phagocytic index below 1.0. Neither their past nor present history suggests that these employees are infected or susceptible.