

a few drops of blood from the finger tip, and as soon as the serum was separated from the edge of this, mixing it with a drop of actively mobile typhoid culture, whereupon the reaction could be satisfactorily observed under the microscope and was usually complete in a few minutes.<sup>1</sup> Dieulafoy testifies to the remarkable accuracy of the test and its value in diagnosing obscure cases.

My attention was first directed to the test through having been consulted by physicians as to the nature of suspected cases of typhoid, and my experience has been thoroughly in accord with that of Widal and others as to its great value as an aid to clinical diagnosis.

As the reaction appeared to depend probably upon the presence of some substance analogous to the ordinary toxins, and as many of these preserve their characteristics in a dry state, it naturally occurred to me that this might be true of the substance producing the serum reaction. The advantage of being able to operate with a dried substance was obvious, especially with reference to the possible application of the method to the rapid bacteriological diagnosis of typhoid fever in municipal laboratories, just as is now done in the case of diphtheria, and my observations have been made with this end in view.

Instead of taking the serum as soon as it exuded, I allowed the drop to dry, and found that upon moistening it subsequently the solution obtained was just as efficacious as the pure serum for the diagnostic purposes of the test.<sup>2</sup>

This power appears to remain practically unimpaired even after the blood has been allowed to dry for many days. My experiments upon how long the blood will continue to react when in this dry state are not yet finished, but blood drops dried for from two to four weeks still give the reaction.

In this manner I have tested the blood of ten patients suffering from undoubted and typical attacks of typhoid. The reaction was obtained conclusively in every instance. In eight cases the loss of mobility and the agglutination was complete in from two to fifteen minutes. Of the two others, one, in a very early stage of the disease, required thirty minutes for the completion of the reaction, while the other in a very late stage, following a relapse, required one hour.

The blood of ten other hospital patients, as well as a number of healthy individuals, was next tested, and in no single instance was the reaction obtained. Occasionally a pseudo-reaction with some agglutination was observed within a few minutes of the mixture of blood solution and culture, but some movements of translation (wandering through the field)

<sup>1</sup> This plan of observing the reaction directly under the microscope had been published by Gruber and Durham some months previously.

<sup>2</sup> Since writing the foregoing, I have been able to obtain fuller accounts of Widal's work than were at first available, and find it stated by him that dried serum, and to a lesser extent dried blood, are capable of furnishing the reaction. This circumstance does not appear to have been hitherto utilized practically.