free of thrombus, and the intima, smooth and glistening. There was no deposit of fibrin on the lines of suture. In spite of the infection, the union of the vessels was excellent. The skin and the muscles were cicatrized and the ends of the femur firmly united by the ligature.

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The bacteriotherapy of leprosy.

By **PAUL G. WOOLLEY** (by invitation).

[*From the Government Serum Laboratory, Phrapatoom, Siam.*]

That a given organism either cannot be grown outside the body, or can only be grown with great difficulty and uncertainty, would appear, at first sight, to offer an insuperable obstacle to the development of any method of therapeutic vaccination, — vaccination, that is, during the course of a disease, by inoculations with the specific bacteria, or their products, — such as has been practiced by Koch in connection with tuberculosis, and by Wright to arrest suppurative and other conditions. Preëminent among microbes belonging to this category is the leprosy bacillus : the difficulties in the way of gaining adequate growths of this organism have thus far prevented the development of any bacteriotherapeutic means of treating the disease due thereto.

A possible method of overcoming the obstacle has suggested itself to me ; and I am already testing it. But in Siam, the number of suitable cases presenting themselves is not great. The value of the method can only be determined by noting the results gained in a relatively considerable number of cases ; hence it has seemed to me advisable to describe it in the hope that others having fuller opportunities may be induced to test the procedure and its value. My somewhat remote station is against a familiarity with the most recent literature : to my knowledge the method has not hitherto been published, and is original. The nearest approach to it, that of *preventive* vaccination against black-leg by means of the desiccated spore-bearing muscle tissue of a previous case, differs in many important particulars.

Briefly, it seemed to me that lacking pure cultures for the purpose, I might make the leprosy patient serve as his own culture medium. It is well known how abundant are the bacilli in the

lepra nodule. I thus sought a leper who would, for a small inducement, place himself under treatment and succeeded in gaining a beggar for what thus became in truth an *experimentum in corpore vili*, for he is an advanced and wretched case of the tubercular form of the disease. I excised a nodule from his arm; found it very rich in bacilli; ground it with sand and salt solution; centrifugalized; heated to 65–70° C. for fifteen minutes, and added enough 5 per cent. carbolic acid to make a suspension containing 0.5 per cent. of the acid. This suspension is rich in bacilli; of it I make at intervals subcutaneous inoculations of 0.01 ccm., the intervals depending on the general condition of the patient. Experience with the more exact methods possible with the analogous disease, tuberculosis, indicates that minimal inoculations of the dead bacilli must be continued over a long period before a genuine arrest is attained; even, therefore, with the most favorable outcome, I cannot expect to record the results of this treatment for months to come; on the other hand, the case was already so advanced when inoculation was begun that I am not sanguine of any pronounced favorable results. I would only repeat that the method appears to deserve publication, that others with fuller opportunities may test and, it may well be, improve upon it.

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Direct silver staining of spirochetes and flagellated bacteria.

By **SIMON FLEXNER.**

[*From the Rockefeller Institute for Medical Research.*]

The discussion of the nature of the structure now called spirochete (Treponema) pallida — whether a microorganism or some histological elements — led me to try to effect the silver staining directly upon smear preparations prepared from serum exudates obtained from syphilitic lesions. While engaged unsuccessfully in this endeavor, Stern[1] of Prag published a simple method for staining the spirochetes directly with silver nitrate. When the deposit of silver presents a metallic sheen, the impregnation is regarded as sufficient. I have found the method very simple and sufficient; but I have obtained better results from long (3–4 days)

[1] Stern: *Berl. klin. Woch.*, 1907, xliv, 400.