guaranteed, and the manipulation be in more experienced hands.

The swabs are prepared by cutting No. 15 steel wire into 6 inch lengths, roughening one end by a few strokes of a chisel-edged hammer, and firmly winding on a little ordinary cotton wool, so as to make an applicator of about a quarter of an inch in diameter. The other end of the wire is then passed through a tapered cork, of best quality, which fits into the non-lipped mouth of a stout, well annealed, test tube, of 15 mm. external diameter, by 100 mm. in depth (say five-eighths of an inch by four inches).

The object should be that of preventing the infected material from soaking into the swab, and preference is, therefore, given to ordinary cotton wool, rather than the absorbent kind hitherto recommended. A cork will also be found an improvement on the usual plug of cotton wool, and is practically a sufficient protection from extraneous germs. The tubes containing the swab are sterilized by one and a half hours' exposure to a dry heat of 150 degrees C. The swabs are supplied free to any physician requiring them.

Culture.—Experiments have been made with various media, but Lœffler's blood serum mixture, prepared by the quick method, has been found to best answer the requirements, though, when recently made, and bearing water of condensation, it does not appear to give such good differential staining as when dry, or older. The white and yolk of an egg, with one-third its bulk of bouillon, containing one per cent. of glucose, may on occasion be used, as also glycerin-agar, which is, however, slower than serum, though yielding much better macroscopic preparations. Park and Beebe claim that glycerin-agar is not so reliable for diagnostic purposes, as is serum, and I have noticed that the growth of Lœffler's bacillus, on this medium, is less luxuriant, while the cocci appear to develop more rapidly and vigorously.

In making a culture the infected swab should be lightly but firmly passed over the surface of the slanted serum, but not with such force as to abrade it. The infected tubes are then kept in an incubator, at 35 to 37 C., for say 12 hours, when the growth will be easily recognized. As a matter of fact the cultures are set one day, and examined next morning.

Cultural characteristics are of value as affording collateral evidence of the presence of the specific organism, and on transparent media the colonies are more or less easily recognized. It is, however, on morphological characters, and peculiarities of staining, that reliance must be placed.

Staining.—A smear from a swab is made directly on a slide, and is dried, fixed, and stained with Lœffler's blue. In making a preparation from a culture, a small drop of water is put on a slide, by means of a platinum loop, and a portion representing the entire growth on the surface of the serum is removed by a platinum needle, and evenly distributed in the water, and is then dried, fixed, and stained. A drop of cedar oil is put on the slide, and the examination made by a $\frac{1}{12}$th oil immersion lens. Staining directly on the slide, as in the recognition of bacillus tuberculosis, is quicker and handier than using a cover glass, and, with proper skill in using the objective, is practically safe.

Characteristics of the Diphtheria Bacillus.—It will be unnecessary to repeat the well known descriptions of this organism, and I would only emphasize its great liability to variation in form and size. This sportive tendency is sure to puzzle the inexperienced observer, though, when understood, it becomes diagnostic. The organisms found in the exudate are often presented as diplobacilli, which stain more or less uniformly, and, at most, show polar darkening, while, in other, and much rarer cases, they are exceedingly characteristic, resembling those grown on serum, and possessing strongly marked interruptions. The cause of this variation may possibly be found in the condition as to reaction, or composition of the mucous membrane or secretion, in the throats of different patients. This seems likely, as under artificial cultivation the character of the medium greatly influences the appearance of the bacillus. I may say that I have found these characteristic specimens most frequently in the exudates from adults.

The variations shown in the bacilli of cultures are not, however, to be wholly accounted for by the character of the medium, nor the temperature, or staining manipulations. Cultures of different exudates, grown together, under conditions precisely similar, and stained in like manner, often show very different results. In some the bacilli