

men who have adequate training along certain lines could be induced to give their time to the institution, say one forenoon a week each, constituting a consulting staff.

This staff no doubt would be interested to have advanced modern laboratory work done here, to keep up the activity and interest in the institution's medical department, as is done the country over, in hospitals of charity nature. Of this laboratory work I need only mention the Wasserman test for syphilis, the Widal test for typhoid fever. The identification of the particular germs in a given infection, the making of autogenous vaccines, etc., etc. Before concluding this paper, I desire to call attention to several general phases of the work that have struck my mind frequently during my ten months' service at the M. S. R.

Many of the guards and officers consider the inmate merely as a crook, which he is in fact and frequently a most mean customer, but they have little conception of the reform idea, and it depends to a great extent on the influence of these gentlemen whether a man is going to be bettered or not. Educational discussions and lectures would be in place.

2. That a great number of inmates suffer greatly with their feet—deformed toes, nails, corns, bunions, callouses, etc., and these conditions are aggravated in the majority of instances by the footwear.

3. The digestive disturbances are "very frequent, and that little can be accomplished towards a cure unless facilities are created for systematic dietetics appropriate to the condition. Any of us who ever had a corn or any other foot ailment and not a proper shoe, or an acid stomach without the proper diet, can realize in a way the predicament of some of these individuals. Adding these aggravations to a nervous system already below par by heredity and environment certainly is little conducive to a raising in the standard of the individual.

4. Errors of refraction are common, as also abnormal conditions of the nose and throat, a good field for real work. Having consumed more time than was perchance intended for my use, I shall abruptly conclude my remarks.

Trusting that they may have been of some interest, if they have in any way helped a trifle in the advancement of methods of reform in those unfortunate human beings who have become morally shipwrecked not altogether through faults their own, I shall be more than satisfied.

SOME LABORATORY WORK IN DIPHTHERIA AT THE MINNESOTA SCHOOL FOR FEEBLE-MINDED AND COLONY FOR EPILEPTICS.

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The occurrence of sporadic cases of diphtheria among our institutional population, where exposure to other cases is denied, and where the entrance of the infective agent cannot be accounted for, has led to the following study, which may be outlined as follows:

To determine: First, the percentage of the institutional population harboring the Klebs Loeffler bacillus; second, what proportion of those harboring this organism are to be considered true "carriers," the organisms present being virulent; third, what conditions, if any influence the presence or absence of these organisms, increasing or decreasing their viru-

lency; fourth, to learn if a practical means can be devised of clearing the throats of these "carriers" of virulent organisms.

The following repeated experiences emphasizes the importance of this problem: A clinical case occurs, runs its course, the throat is free from organisms, the case is released from quarantine, the room disinfected, and our patient returned to his grade. We feel that our duty has been well performed; but, after a longer or shorter period, apparently in no way corresponding to the incubation period for this disease, new cases develop—one here, one there, neither having any apparent connection with the other or with previous cases. This naturally raises the question, why should these cases occur?

For some years past considerable attention has been directed toward the study of cultures taken from the throats of normal school children, both at times of epidemics of diphtheria and at times when the school had been free from the disease for a long time. These studies have shown that there are at present in the throat of supposedly healthy people bacilli, which in their morphological appearance correspond to the Klebs Loeffler bacilli. Some of these organisms, while appearing in all cultural characteristics similar to the bacillus of diphtheria, do not have the same reaction on certain special media. While others fail to show evidences of virulence when injected into susceptible animals.

1. Statistical records have been published covering the study of some few thousand cultures from the throats of school children, and a small number are also on record coming from the study of the throats of people confined in institutions. Unfortunately, much of the value that should be attached to these records is lacking, since in most instances the study has been confined exclusively to the morphology of the bacteria. The number in which the study of morphology has been confirmed by a careful examination of the cultural characteristics, chemical reactions in special media and virulence tests, is extremely small. The most important of the careful studies have been made by Graham Smith of England and by Dr. Westbrook and his staff at the University of Minnesota in connection with the public health work.

In our studies the following outline has been very closely followed. Twelve hundred and fifty children have been studied, 630 females and 620 males, this number comprising the population in which it was possible to obtain throat cultures. These cultures were taken not earlier than one hour after meal, and most of them from two to three hours after meals. The media for the primary culture has in all instances been the standard Loeffler's blood serum mixture. The examination of the growth has been macroscopic and microscopic, the gross appearance of the colonies growing on blood serum being very characteristic. For the primary examination a stroke through the various colonies is made with the platinum needle in order that we may have present on our slide individuals from many colonies for study. Where we find organisms that in their morphology appear to be Klebs Loeffler bacilli, we proceed to streak out subcultures on blood serum until the individual colonies can be recognized. In some instances we have used for the last subculturing a modified blood serum which contains 1 per cent of sulphocyanate of potassium and 2 per cent

of a .5 per cent solution of neutral red. This media has two advantages: First, the neutral red acts as an indicator of any acid present and the sulphocyanate of potassium inhibits the growth of other organisms to a considerable extent. From the last subculturing individual colonies are fished and studied, during which study we satisfy ourselves as to the morphological identity of the organism.

After being satisfied that we are dealing with an organism having the appearance of the diphtheria bacillus, our next step is to determine whether it will or will not produce acid in suitable media in which is present 1 per cent of glucose. For this purpose we have used either the media modified from the regular Loeffler's blood serum, as mentioned above, or a 1 per cent glucose beef bouillon, using litmus as an indicator. When the former is used, and acid-forming bacteria are present, the colonies appear pink. When the latter is used the whole media has a pink tinge.

Results. Up to the present time our studies have been confined to the first two portions of our problem—the establishing of the morphology and the determination of the acid-forming power of the bacilli found in the cultures taken from the throats of our children. We have examined cultures from 1,250 throats, 630 females and 620 males. We have found the diphtheroid bacillus present in 134 instances, 82 females and 52 males. This number includes cultures from the throats of seven clinical cases—two males and five females. We have tested for acid-producing power 81 pure cultures, finding 52 positive and 29 negative. The 52 presenting positive findings show 23 males and 29 females. The 29 negative findings show 10 males and 19 females. From the above figures we find that 10.72 per cent of the total cultures taken show the presence of organisms having the morphological appearance of the Klebs Loeffler bacillus. And that 4.16 per cent of the total cultures show organisms producing acid in the presence of glucose. But since we were unable to examine 53 of the specimens for their acid-producing powers, either because there were so few organisms found that we were unable to get pure cultures, or because the examinations were made before our plans were completely systematized, we must presume that this latter percentage should be considerably larger if results had been obtained for those cultures. Two or three facts stand out as of great interest. First, there has been only one clinical case among the male children; second, the male custodial and the epileptic colony have contributed no clinical cases, although cultures showing the morphological and acid-producing characteristics of typical Klebs Loeffler bacilli were found in approximately the same ratio as in the other group. In two instances clinical cases have occurred in individuals who were harboring these diphtheroid organisms for some time prior to the onset of the diseases; third, the larger proportion of the organisms found were classed among the lower types of the diphtheroid group. The appended table shows in detail the classification according to the morphological appearance of the bacilli. This classification is according to the scheme outlined by Dr. Wesbrook. Beside the morphological classification there is also given the acid-producing results of these bacteria in the presence of dextrin with the reaction of the same organisms toward sacchrose in media, the latter being used as a control.

As yet we have been unable to undertake the studies in virulency owing to our lack of guinea pigs.

The work of determining the possibility of modifying the virility of the organisms and of devising ways and means for the clearing of throats harboring them cannot be taken up until the virulency tests are completed