

tinised ox serum for more definite bacteriological diagnosis. In only twelve of these cases has the careful bacteriological examination confirmed the suspicion of diphtheria, the result of the remaining twenty-three examinations being negative. Naturally a great number of these specimens were supplied from this city, but a considerable number have been received from other parts of the colony. Here, as in the case of sputum examinations, the preponderance of negative over positive results is no doubt to be explained by the fact that only in clinically indefinite cases was a bacteriological examination deemed necessary.

MICROSCOPICAL EXAMINATIONS OF TISSUES.

Specimens of forty-nine cases, being portions of tumours and various pathological lesions, have been submitted for examination. Naturally, while being material of great interest, these specimens have necessitated the expenditure of much care and time in their preparation for section cutting and mounting for examination. While such examinations have little to do with the general question of public health, they are yet extremely valuable to the surgeon as a guide in diagnosis.

WATER-ANALYSIS.

Thirty samples have been received for bacteriological examination from officers of the Department. In nearly every instance it is satisfactory to note that the result confirmed the suspicions of the officer that the water was not fit for potable purposes. In some instances so many as fifty thousand micro-organisms per cubic centimetre were found, which in itself demonstrated the total unsuitability of such waters for domestic purposes.

WIDAL TEST FOR TYPHOID.

The freedom of the greater portion of the colony from enteric fever has rendered the number of specimens submitted for this test very small. Only six samples of blood have been received, and of these only two gave a definite result on the application of the test. None of the specimens were received from the Wellington District.

BUBONIC PLAGUE.

Specimens from Affected Patients.

No. 1, V.—The first specimen received from Dr. Makgill consisted of smears on slides and pipettes containing blood. The former examined microscopically gave no definite results, and culture-media inoculated from the latter remained sterile. A few days later a culture on agar was received from Dr. Makgill, which, though contaminated with accidental organisms, contained unmistakably the true *Bacillus pestis*. In such cultures made direct from the original bubo contaminations are nearly always present. Further incontestable proof was obtained by the Chief Health Officer and Dr. Makgill by experiments on guinea-pigs, these being ultimately controlled here by subsidiary experiments, a guinea-pig (359) inoculated with a small portion of sub-culture succumbing in seven days and a half after inoculation.

No. 2, S.—Typical cultures made by the Chief Health Officer and pipettes of blood were submitted for examination. Examination of the blood-pipettes by means of inoculation on nutrient media gave at first negative results, but after these pipettes had been in the incubator for forty-eight hours they were found to contain enormous numbers of the characteristic bacilli in a state of purity, from which fresh cultures were made. A guinea-pig (360) was inoculated subcutaneously in the usual way with a small quantity of a sub-culture from Dr. Mason's cultures. Beyond a slight swelling above the seat of inoculation (which disappeared after three days) this guinea-pig showed no evidence of illness. Ten days after inoculation the animal was killed and cremated after *post-mortem* examination. No evidence of plague whatever was found, all the organs of the body being normal. Satisfied from the cultural characteristics, notwithstanding the failure of the experiment, that the bacilli were those of plague, and that the virulence had only decreased, another guinea-pig (361) was inoculated with a sub-culture from the previous one used, the bacilli being mixed with a culture of diphtheria bacilli. Similar methods were adopted two years ago successfully to increase the virulence of plague bacilli. (See last report.) As a result of this mixed inoculation the guinea-pig succumbed in eight days, and the body presented on *post-mortem* all the characteristic appearances of a guinea-pig dead of plague similar to that described in the last report and the accompanying plate. In this case it will be seen that, although ordinary microscopical examination failed to demonstrate the presence of the bacilli in the blood, yet when the blood was incubated and made to act as a favourable culture-medium for the very few organisms present they were readily demonstrable. The liability of the organism to lose its virulence in artificial cultures, and the possibility of its reinforcement, is also demonstrated.

No. 3, Boy, Lyttelton.—Culture-media inoculated by (syringe) needle from bubo: Only one or two large colonies of *Staphylococcus albus* had developed, and, although clinically an undoubted case of plague as observed by Dr. Mason, no colonies of the bacillus developed.

No. 4, B.—Specimens forwarded by Dr. Makgill consisted of portions of tissue from a guinea-pig which had succumbed as the result of experimental inoculation and cultures on nutrient agar, all of which were characteristic of plague.

No. 5, N.—Culture forwarded by Dr. Makgill: Examination showed this to consist almost solely of a coccus, ultimately demonstrated to be the *Streptococcus*, and a short bacillus, which morphologically was similar to that of plague. Efforts were made to separate this bacillus, and a guinea-pig (363) was inoculated with a colony apparently pure. Three days later the precordial gland above the seat of inoculation was found to be enlarged, and at the point of inoculation there was a slight indication of pus, but no swelling. Two days later the glandular swelling had disappeared, and the guinea-pig was quite normal. At that time I was of opinion that the plague-like organism was a purely accidental one. A day or two later, however, on re-examining sub-cultures of this organism, I was struck by their appearance, which was characteristic in every way of