1902.

NEW ZEALAND.

DEPARTMENT OF PUBLIC HEALTH

(REPORT OF THE) BY THE CHIEF HEALTH OFFICER.

Presented to both Houses of the General Assembly by Command of His Excellency.

The Hon. the MINISTER of PUBLIC HEALTH to His Excellency the GOVERNOR.

MY LORD,— Public Health Office, Wellington, July 28, 1902.

I have the honour to submit to Your Excellency the report of the Public Health Department for the year 1901–2.

I have, &c.,

J. G. WARD,

His Excellency the Governor of New Zealand. Minister of Public Health.

The CHIEF HEALTH OFFICER to the Hon. the MINISTER of PUBLIC HEALTH.

SIR,— Department of Public Health, Wellington, July 28, 1902.

The dying words of the African empire-builder form a not unfitting introduction to this the second report of the Health Department—"So much to do, so little done." That there is much to do ere New Zealand can be said to be free from reproach in a sanitary sense is admitted even by that greatest of all philosophers, "the man in the street." Not even in his most vain-glorious moments would he hesitate to admit that all is not as it should be in this fair land of ours. Though little has been done that is apparent, the groundwork of many sound sanitary reforms has been laid. To insure that all steps taken in the future must be in the true and right direction has occupied a large amount of the attention of the officers of the Department. This certainly can be said, and with absolute truth: that, no matter how our colony may progress in respect to population, there need be no harking-back to unravel the web we are now weaving. The pattern now being laid will form a homogeneous whole with the larger schemes which our greater growth will necessitate. This in itself is a factor of no little value. The larger part of our work, however, has been far from partaking of this negative character; positive results have been obtained which have made, and are making, for the betterment of the health and the safety of the community. Several of the larger cities have actually embarked upon schemes of drainage and water-supply in consequence of the reiteration by the Department of their necessity, and works have been put aside on our recommendation which, if carried out, could only have ended in failure and waste of public money. This in itself is a matter for congratulation. Wherever local authorities require to borrow money for sanitary purposes the plans and specifications of all such works have to be submitted to and approved of by the Department. This, as can readily be understood, entails a large amount of work and technical knowledge. Occasionally it has required not a little persuasion to divorce a local authority from some scheme to which it has become wedded, but in most instances when the separation has been effected it has been grateful.

The continued presence of

PLAGUE

in some of the Australasian Colonies has been a source of considerable anxiety. When in Hobart last February an informal discussion was held by the official representatives of the various States of the Commonwealth and New Zealand on the vexed question of quarantine. It was clearly evident that some change of opinion had taken place with regard to this most important subject. It was urged strongly by some of us that it was useless to impose the same restrictions against plague as against small-pox. Plague, as I have often pointed out, is rarely communicated by one person to another, unless when the form of the disease is that known as the pneumonic. Small-pox, on the other hand, is pre-eminently an infectious disease of the most virulent type.

Acting on this belief, we have established in New Zealand a counterpart of the system which was adopted by Great Britain some years ago in the face of a pronounced Continental opposition—an opposition which is gradually getting less, however. At the conference in Hobart all were agreed upon the excellence of the method, the only objection urged against it being its cost; this several of the Commonwealth delegates considered insuperable. The system in brief outline is as

follows: All passengers by ships from infected ports are carefully inspected by the Port Health Officer before pratique is granted. Where no sickness exists on board, the passengers are allowed to land on condition that they report themselves for medical inspection twice until ten days have elapsed from the time of departure from the infected port. Ten days was chosen as being the extreme period of incubation of plague. All the personal luggage of the passengers is carefully fumigated before it is allowed to be taken ashore. The passengers may then proceed to any part of the colony, provided they report themselves at the appointed times set forth in their licenses. Should a passenger fail to report, his name is immediately handed over to the police. For not reporting a passenger is liable to a fine of £300. The system is now working very well. Now and again we have some trouble, arising mainly through the ignorance or forgetfulness of passengers. Such a system of surveillance seems to me to give the maximum amount of safety to the colony, while it causes the minimum amount of interference with our lines of communication with the outside world. Were it possible for us to live unto ourselves alone, the procedure often urged by the unthinking makers of history might be capable of adoption—that is, to have nothing to do with those countries in which any dangerous infectious disease exists. This, of course, is quite out of the question.

In addition to the careful examination of the passengers and crew at the port of arrival, and the fumigation of their personal luggage, the ship herself is held in the stream for eight hours, during which time her cargo is fumigated. When she comes alongside certain precautions are taken, so that not only is no invitation held out to rats to come ashore, but every obstacle is placed in their way. After working-hours the ship is held off at least 4 ft. from the wharf, lights are placed between the ship and the wharf, and rat-guards are placed upon all hawsers. Though all these things are done, and thereby a considerable measure of safety is assured, there is no need to disguise the fact that they fall far short of offering an impregnable front to that enterprising "undesirable immigrant," the rat. Fumigation while the ship is empty is by far and away the best time for the operation, and this is always done by the Union Steamship and Huddart-Parker Companies. It has been alleged by those who sit in high places that the fumes cannot possibly reach the inside of the packages, even if it affects the outside. While agreeing in the main that something more powerful than SO_2 is desirable, it is difficult to reconcile this alleged inertness with the many claims which now and then are proffered by the indignant lady passenger who asserts that her costume from Worth's has been utterly spoilt, though it was packed in a tin-lined case, or the baker who threatens the Department with an action because the "life has been knocked out of his flour." Experiments have been and are being made with other disinfectants, the result of which I shall communicate later.

The only objection offered against this system of allowing passengers to land under license—namely, the monetary one—was overcome by our asking the shipping companies for the money. Under "The Public Health Act, 1900," the cost of most matters pertaining to quarantine is cast upon the shipping companies. Here I would like to put on record the extreme courtesy by which any suggestions of the Department have always been received by the agents of the various shipping companies. Looking to the fact that the steps taken to protect the colony against infectious diseases from the outside must necessarily interfere more or less with the shipping and commercial lines, it says much for the tact and good sense of all parties that the system now at work should have been inaugurated and is now working as well as it is. In order to cover the expenses of the medical examination of passengers, all the larger passenger-boats are required to deposit £100 with the Department before pratique can be granted; smaller vessels, £50; and the coalers trading to the smaller ports, £25. These deposits are made in order to cover fumigation charges as well. As soon as a ship's account is finished any balance that remains is handed back to the shipowner. The colony in this way is provided with a scheme of defence against infectious diseases at absolutely next to no cost to the State. Some idea of the work involved in carrying out this system may be gathered from the fact that in every town, large and small, from the North Cape to the Bluff, there had to be appointed a medical examiner. Not the least difficulty in closing a ship's account is the difficulty in convincing the various medical men that in order to pay them it is necessary that they should send in their accounts for such work more frequently than once in three months.

As has been already stated, we find that almost all passengers help the departmental officers in every way they can. As, however, at the inception of this scheme one or two seemed to labour under the impression that for the 13th the 15th might be read, or for the 20th the 24th, just as it seemed best to them, that 12 noon might stand for any hour up to 9 or 10 at night, it was decided to prosecute one or two of the offenders as an object-lesson for the rest. One gentleman was fined £5 and costs, one lady 1s. and costs, and since then we have had little cause for complaint. The police have been of the very greatest assistance to us in hunting up the non-reporters. They have helped us in these and other measures which have been taken, and the thanks of the Department are due to the Commissioner and his staff.

As was pointed out in my last report, the danger from plague lies not so much in our communication with infected countries as it does on our unpreparedness should the disease break out. Plague has rarely been transmitted from one human being to another directly; the main object, therefore, of this elaborate system of supervision is that the Department may know at once should a case manage to pass our first line of defence. Small-pox, not plague, is the disease we have most to dread. I will, however, refer to this matter in a later part of my report.

Internal Precautions against Plague.

While the careful guarding of our seaports against the possible introduction of a case of the disease is a most important matter, we must not forget that it is within our walls that the main dangers lie. If we be clean, if our houses be well ventilated, and we have our vermin under control, it would not greatly endanger the public health even if cases of plague were landed. The

Department has been urging the various local authorities to put their houses in order, and, while most municipalities have seen the wisdom of following our advice, some there are which have not rendered the same hearty agreement.

The death from plague of a worker on one of the quays in Auckland in April last (a full report of which appears in Dr. Makgill's summary of work) gave an exactitude to the danger which hitherto the local bodies had not quite realised. In 1900, when the first case died, your officers underwent the treatment almost invariably meted out to those whose duty requires them to acquaint a community with the fact that plague has at last appeared in their midst. Then not only did we find merchants and those whose interests would be largely affected by the announcement that a death from plague had taken place up in arms, but we had also a feather-bed sort of opposition from some of the medical men, which did not redound to their credit. Now, however, I am very pleased to say all this is changed. We are receiving all the help they are able to render. As you are aware, despite all our precautions a death occurred from plague on the 28th April. This man had been engaged in handling cargo which had come from an infected port. The course of the illness is detailed in Dr. Makgill's report. A matter worthy of note in connection with this unfortunate case was the readiness with which all concerned strove to minimise the risk and allay unnecessary alarm. His Worship the Mayor of Auckland (Mr. Alfred Kidd), the Chairman of the Hospital Trustees (Mr. Stichbury), and Dr. Collins, Medical Superintendent of the Auckland Hospital, all tried to make our difficult task as easy as possible. As soon as it was evident that the poor man could not recover I brought his wife to see him. The Rev. Mr. Budd was good enough to call and see the patient in answer to my request. With your consent and that of His Excellency the Governor, I, with the help of Dr. Makgill, had the body cremated. This, so far as I can learn, is the first cremation which has been effected in Australasia. In order that everything should be done in decency and good order, the Rev. Mr. Budd was asked if he would be good enough to hold a service, and be present during the operation: this he did. Personally I collected the ashes and placed them in a coffin, which was buried next day. As the fact that a crematorium had been erected was not generally known, some strange rumours went afloat; these were effectually silenced, however, when all the facts were disclosed.

I would respectfully suggest that there should be attached to every hospital for infectious diseases an up-to-date crematorium, which could be used by any one who considered cremation a better way of disposing of the dead than earth burial. The ease with which the operation can be done, the absolute safety to the general public, and the small cost are points which appeal to me. The sentimental and *quasi* religious objections which have sometimes been urged could, I think, be gradually overcome if opportunity were given to the general public to see the operation performed.

In the treatment and management of this case, and all his other work, Dr. Makgill has evidenced a zeal for the service, combined with a high scientific ability, which cannot be too highly rated. Owing to an outbreak of scarlet fever and diphtheria at that time, the hospital which was erected in the Domain for the reception of plague cases was full, and could not be used, and our patient had to be placed in a cottage near by. During the whole course of V.'s illness Dr. Makgill was practically in attendance night as well as day. Believing as we did that the source of infection was the ship's cargo, and, further, that although rats had been regularly examined all over the colony, none had been found affected with plague for the past two years, I advised you that I did not think there was much fear of the disease spreading, provided the campaign against dirt and rodents was continued with vigour.

Early this year a circular was issued to all the medical men in the colony, asking them to be good enough to report any cases of unusual glandular swellings which might come under their notice. The wisdom of this was soon seen. Men were put upon their guard, and, although we had many false alarms, it was in consequence of this reminder that the Port Lyttelton case was detected at the early stage that it was. It will be seen by the following report of the case that but for Dr. Upham's promptitude in reporting it risk to the other members of the house and country must have been incurred.

As you are aware, there have been a great number of cases investigated which afterwards were shown not to be plague. The question of an absolute diagnosis has occasioned an enormous amount of work. With points of attack so far apart as Auckland and Lyttelton, it requires no great demand upon one's imagination to picture the amount of travelling which is involved. This, of course, will gradually get less when permanent officials have been appointed to all the districts, and suitable officers and laboratories have been arranged for in each of the larger centres. Although some of the cases examined could not bacteriologically be shown to be plague, there is no doubt in my mind that we are face to face with a disease which has in some instances preceded outbreaks of plague in other countries, and therefore everything ought to be in readiness. The cases I refer to present the following symptoms: They occur mostly in children. The child is, after a period varying from three to four days, sufficiently ill to require to be sent to bed. The medical man called in finds that the child complains of pains all over, has a temperature of 103° or 104° F.; very often there is difficulty in swallowing, sometimes redness and swelling of the tonsils and fauces are present. The main point of interest, however, is that the glands all over the body are enlarged and tender, not only in the neck, where enlargement might not occasion much surprise, but while the cervical glands often escape, the inguinal and axillary seldom do. The glands rarely go on to suppuration, and after a period varying from two to four weeks the child gets quite well; all the glandular swellings disapper. From none of these cases have we been able to obtain the characteristic organism of plague. In most countries, certainly during a time of epidemic, all such cases would without doubt be labelled plague. One such case was placed in the isolation ward at Bottle Lake; the others were treated in their own homes, with all the proper precautions necessary. In no instance has one child contracted the disease from another.

While it is desirable in every suspected case to endeavour to demonstrate bacteriologically the true nature of the disease, it is well to bear in mind that bacteriology has also a limitation. We have had cases where the clinical symptoms were suggestive of plague. Smears have been made and no bacilli found; cultures have been made, and they were not absolutely diagnostic. A guinea-pig inoculated with the first culture survived the operation, while a sub-culture killed it in the usual time. The practical rule to follow, therefore, is to err on the side of safety, and at least isolate all cases presenting symptoms which point to plague.

The case S., from Lyttelton, was unfortunately taken to the general Hospital instead of to the small-pox reserve hospital. There he was examined by the medical staff, who decided that the symptoms presented were compatible with plague and nothing else. Meanwhile I was on my way to Christchurch. From a clinical point of view there was no doubt as to the nature of the disease. The man was at once removed from the general Hospital to the small-pox reserve building with all due precautions. When I say that Christchurch was unprepared for such a case I am only stating the truth. Like other large centres, Christchurch paid little or no attention to our warnings given before. Verily mine was a voice crying in the wilderness. The presence of the enemy within our gates seems the only argument which can convince the people, and in this sense Case 1 may be truly looked upon as a blessing in disguise. The fact that plague was actually present quickened the efforts of the authorities, and, as I will point out later on, within a very short space of time suitable premises for all such cases was agreed upon, and the larger question of the housing of all infectious diseases has practically been settled for a long time. Dr. Symes, strange to say, experienced considerable difficulty in procuring trained nurses for this case in Christchurch. This is in marked contrast to what took place in Auckland or Wellington. In these places the difficulty lay not in finding suitable nurses, but in selecting from a vast number of well-trained volunteers. In consequence of this difficulty he allowed the sister of the patient, who had previously been in attendance, to continue as one of the nurses. Although this lady showed great bravery and capacity, I considered it better to relieve her of the nursing, and another nurse was engaged. Later on, I am sorry to say, she caught cold, and suffered from a slight attack of pneumonia. She is now, I am happy to say, quite well. Dr. Stewart was placed in charge of the patient, and continued until Dr. Fenwick relieved him.

Several suspicious cases have been placed in the observation tents at Bottle Lake, and as soon as the true nature of their ailment has been ascertained they have been sent out, or if too ill to be removed have been treated until well.

In consequence of instructions to District Health Officers to, if possible, inquire into all cases of sudden death in their districts, a great number of *post-mortem* examinations have been made. On the 26th May Dr. Makgill made an examination of a man who had been attended by a duly qualified medical practitioner, and who had certified the man to have died of choleraic dysentery. As a matter of fact, the man died of plague. Though late in the day, in consequence of the medical attendant's mistake in diagnosis, all precautionary measures possible were taken, and I am glad to say no further cases arose out of this one. This illustrates another of the difficulties which any Health Department must occasionally have to face. As time goes on, however, there will be less and less possibility of such a mistake taking place. The detailed accounts of all these cases are contained in the District Health Officers' reports.

Stated briefly, there have been three cases of plague the diagnosis of which has been confirmed bacteriologically, in addition to several cases of what may be termed "pestis minor" among children. While there is therefore no need for alarm on the part of the public, we cannot hope to be able to snap up and confine these cases to themselves unless all local authorities make strenuous efforts to so clean up their various towns that rats cannot live. Not once, but many times have I pointed out that now is the time to wage warfare against our rodents—that is, while to all intents our rats are unaffected with plague. If we wait until disease occurs again amongst them, all our efforts to clean up will only tend to drive into hitherto clean areas messengers of death whose potency for evil cannot be easily estimated.

It would be an interesting, if not a useful, task for some one with a philosophical turn of mind to try and demonstrate the reason why, while the individual constituents of a local authority are generally very amenable to argument, in their composite capacity reasonableness is not infrequently not their strongest claim to the admiration of the outside world. It may happen—it has happened—that every member of a Council has expressed his approval of a scheme, and then, somehow or other, as soon as he donned his robes, so to speak, his previous convictions seemed to melt away, and his voice sang a song which to all intents and purposes was not on the programme. I am bound to mention this, because last year most of the towns in constant communication with the outside world agreed that our suggestion in reference to providing for any case that might occur was good and ought to be carried out at once. As a matter of fact, only two out of all these cities saw fit to go further than consider our proposals. Now that plague has appeared, things, I am glad to say, are somewhat altered. At a meeting convened at my request by His Worship the Mayor of Auckland in April last the representatives of all the local authorities in the Auckland hospital and charitable-aid areas passed the following resolutions: (1.) "That this meeting affirms the absolute necessity of at once proceeding with the erection of a hospital for the reception of infectious diseases." (2.) "That the Chief Health Officer be asked to exercise the powers vested in him by sections 37 and 38 of 'The Public Health Act, 1900,' and proclaim the Auckland Hospital and Charitable Aid District an area for the purpose of erecting a hospital for infectious diseases." They further agreed to ask me to fix upon a site. The cost of erection will be defrayed in the usual way. The site selected is at Point Chevalier—it is the best; in fact, the only one—its distance from the centre of town being about half an hour's drive, and the neck of land can be completely cut off. Plague, small-pox, and all infectious diseases can be treated here. I undertook to remove the Plague Hospital from the Domain as soon as the other was

ready. This I consider one of the greatest triumphs we have been able to secure. Much of the credit of this stroke of diplomacy is due to Mr. A. Kidd, the Mayor of Auckland. But for his help I am afraid we must have failed. Plans have been made, so that within a very short space of time Auckland, as far as these protective works are concerned, will be in a fair way of being considered safe.

The good example set by Auckland strengthened my hands greatly, and since then Christchurch and Nelson Districts have passed the same resolutions. Wellington and Wanganui have already provided hospitals, and now there only remains Dunedin to complete the cordon of defence. The place chosen for Christchurch is a portion of land which had been set aside as a cemetery reserve, near Bottle Lake. I have to thank Mr. Rhodes and the present Mayor of Christchurch, Mr. Wigram, for their sympathetic help in bringing the various local bodies together in reference to these matters, as well as in other things pertaining to the public health of the district. It was only after careful examination of the land about Lyttelton that it was decided to erect the hospital at Bottle Lake. It was clearly realised that in all probability most of the cases of plague occurring in Christchurch District would come from Lyttelton; and had the hospital been only for such diseases as plague and small-pox it might have been advisable to put up a temporary building at Lyttelton. The housing and treatment of infectious diseases generally, however, was the question that had to be faced. For long this had been in a most unsatisfactory condition. Under the Hospital Act hospital trustees cannot, it has been held, set aside any of their revenue for the erection of a hospital. Under "The Public Health Act, 1900," the onus of providing hospitals for infectious diseases is cast upon the local authorities. It has happened that cases of diphtheria have been refused admittance to a general hospital in one district; another set of trustees, while they are willing to accept diphtheria, are disinclined to take in scarlet fever, and so it goes on. Now, when these hospitals under construction are ready, all these difficulties will be removed. No longer will every one operated on suffer as a matter of course from scarlet fever, as was unfortunately the case in a hospital in one of our principal towns.

The following are the arrangements made for infectious disease occurring in Lyttelton: A special car has been set aside for the purpose of conveying the patient through the tunnel; an ambulance will meet the train on the Christchurch side. In this way, without much fatigue to the unfortunate patient, and with absolutely no danger to the general public, the difficulty of serving our sparsely placed population with something approaching modern hospital treatment has been overcome.

The cost of erecting several small hospitals would not be great, and, if necessary, they will have to be put up; but the maintenance and providing of separate and distinct staffs would, I am convinced, not only be a great and unwarrantable waste of money, but the efficacy of these several small hospitals would not be equal to that of one central one. With these views, I am pleased to say, most of the local authorities are in complete accord.

The selection of the site for all such hospitals has been a difficult and a delicate task. In the cases of Auckland, Christchurch, and Nelson this task has been undertaken at the request of the local authorities by myself. That my selections could possibly be made without arousing opposition from those residing in the neighbourhood was not to be expected. I have been most agreeably surprised, however, to find that in all cases a personal interview with the aggrieved people has ended in our parting the best of friends, and my being able to convince the protesters that our attitude was honest and unbiassed, and that, as a matter of fact, my selection was as good as could have been made. This happy ending of our differences was due in not a small degree to the broad-hearted and public-spirited way in which the delegates of the several local bodies concerned were pleased to view these matters. Even then it remains not an easy task to persuade a man, the value of whose property you will in all probability depreciate, that there is no other way out of the difficulty. This has been done, however, and I am glad to say that all over the colony the departmental suggestions in reference to these matters have been received in a most gracious spirit. The meeting in Nelson was most enthusiastic. The hospital question was decided in the course of an interview of something like an hour's duration, without an inharmonious note being struck. Much of the credit of this was due to the Mayor (Mr. Baigent) and his able Town Clerk (Mr. Gully).

The following telegram was drafted for your consideration, and sent by you to all local bodies and newspapers in the colony: "In view of the continued presence of plague in Sydney and Brisbane, and a recent occurrence of a death from the disease in our own colony, it behoves every one, private as well as public, to do everything in their power to destroy all rodents. A careful house-to-house inspection of all back yards, &c., should be undertaken by every local body. No waste food ought to be thrown upon the yards, and all house refuse should be kept in a covered metal box, so that rats cannot reach it. All local authorities should institute a bi-weekly removal of all house refuse. No fowls ought to be kept, except in properly constructed pens. Special men should be told off in every borough to trap and kill rats." The replies from many of the recipients were most encouraging, but there is lack of continuity in the efforts of many. Were it fully realised that plague has visited our shores, that rats and dirt are the most potent allies of the disease, more, I feel, would be done. That good will come of the iteration and reiteration of this truth I feel certain, but, like the pagan warrior, "I would that some of the future rewards might be translated to the present."

Profiting greatly by my stay at the Sydney Plague Hospital, I suggested that those officers of the Department who had not had a personal acquaintance with plague should visit Sydney, and make themselves conversant with the methods of treatment, &c., practised in that city. Dr. Valintine has returned from a very profitable trip, and Dr. Makgill will leave for New South Wales as soon as he has been able to clear up the more urgent matters in his district. I have to thank the Chief Health Officer (Dr. Thompson), Dr. Tidswell, Dr. Salter, Dr. Henry, and all the other officers of the Health Department over there for the great kindness shown by them to Dr.

Valintine and myself. In Sydney the same uphill battle against ignorance, old institutions, and not infrequently something more is going on. The task of cleaning up and exterminating plague in Sydney is indeed a Titan's work. In addition to a very large permanent staff two medical men are in constant attendance at the office. Should any suspicious case be reported, immediately notice is given one of the doctors proceeds to examine the case. Where no doubt exists as to the case being one of plague the patient is at once sent down to Little Bay Hospital, under the care of Dr. Salter, a gentleman who has been engaged in plague almost entirely for the last three years. Should the visiting surgeon be in doubt he draws a small quantity of serum from the enlarged gland, which on his return to the laboratory is at once examined. If the *Bacillus pestis* is present the case is at once declared plague, and the case sent on to the hospital. A gang of workmen are then put on to clean up, and, if not kill, drive away all rats from the infected building. Wooden floors are torn up and concrete put down, walls are whitewashed, and not until the Health Officer is satisfied that all precautions have been taken are the people allowed to return to their homes.

While it is difficult to point out any better course of procedure which might be adopted, when the rodents are infected with plague, it cannot be gainsaid that the disturbance of infected rats and the driving them away into possibly hitherto unaffected areas must result in the dissemination of the disease. This is clearly realised by those in authority in New South Wales. Here in New Zealand we ought to profit by the unfortunate experience of other countries. As I have already said, so far as repeated examinations go to show, our rodents at the present time are not affected with plague; clearly, then, any war which we may wage against them cannot endanger the other parts of the community. Should we, however, wait until through outside sources or otherwise our rats become infected, any effort towards their extermination must be followed by the same undesirable results as has followed such delay in all other countries. In season and out of season I have dinned this into the ears of the various local authorities; some have listened and profited by the counsel, others have suggested delay. It is very gratifying to have to record that the various Harbour Boards throughout the colony have consistently striven to help the Department in all its efforts towards the extermination of rats.

Last year instructions were issued to the various authorities advising them to offer certain bonuses for rats caught and delivered at their destructors. At the time it was pointed out that considerable danger to the ratcatchers, who in many instances are boys, might result from the indiscriminate handling of any rat infected with plague; sufficient cause has been shown lately to justify us in again drawing attention to this danger. It was then proposed that no fee should be paid for any rat handed over at the local destructor unless such animal had been previously carefully singed. All that is necessary is simply to sprinkle some kerosene over the rat and set fire to it; in this way the vermin which infects the skin and fur of the rat are completely destroyed, and one at least of the sources by which infection is conveyed is eliminated.

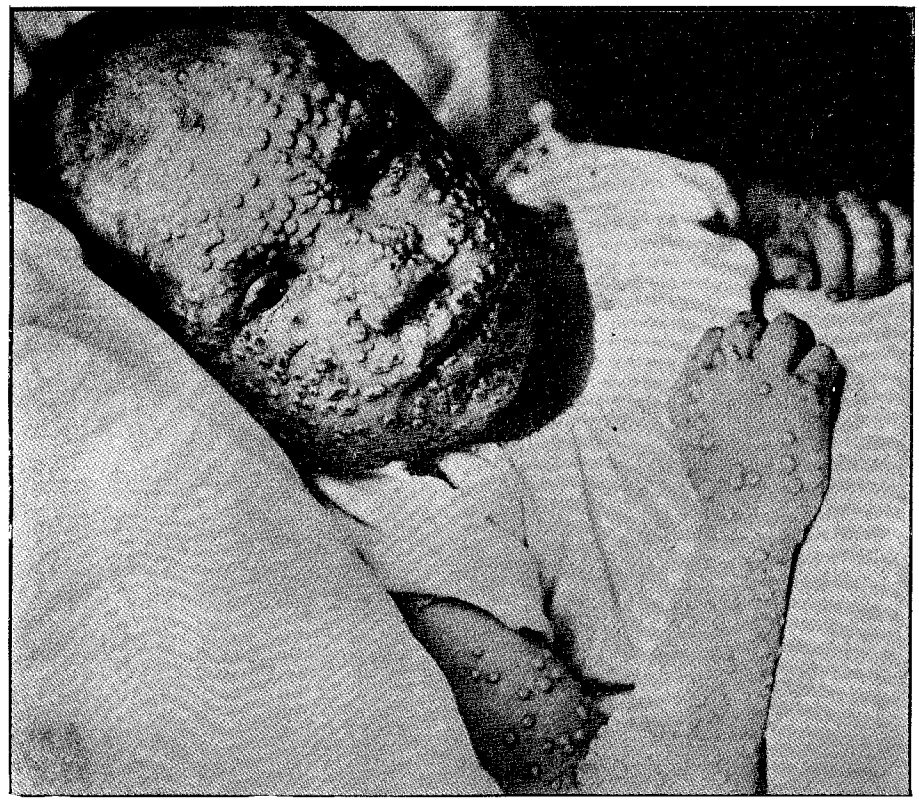
In concluding this brief and general survey of plague as it affects, and has affected, the colony, I would reiterate the necessity of all medical men practising in New Zealand reporting at the very earliest opportunity the presence of any glandular enlargements unexplainable (by ordinary causes) occurring in their practice. Naturally all men are desirous of preserving the fair name of the city in which they reside, but when it is clearly realised that only by an early knowledge of all these minor cases can general safety be insured, local feeling and parochial sentiment ought to go to the wall. Each man should put the safety of the colony in the forefront; only in this way can the Department hope to cope with plague, or any other of the infectious diseases which may be introduced from the outside world.

Small-pox.

The presence of small-pox in London, Belfast, Glasgow, and other places with which our ships are in constant communication is a matter for the most serious consideration. The non-observance for the last few years of vaccination in this colony is a condition of things which must cause every one interested in public health the deepest regret. Speaking roughly, only some 25 per cent. of our child population are protected against small-pox. As compared with a case of plague, the danger which would arise from the introduction of a case of small-pox into this country is so great as to be almost inconceivable. The careful medical inspection which the Department has insisted upon of all oversea passengers is directed as much, if not more, to the detection of small-pox as of plague. There are some protective barriers which make for our safety: there is the length of time it takes a ship to come from the infected ports to New Zealand; the fact, also, that in most cases they either call at some port in Australia or at Hobart lends a certain amount of safety; but even with all these safeguards it is perfectly possible for a case of small-pox in its early stage to escape the vigilance and carefulness of the Port Health Officer because of the long period of incubation which this disease has, and the similarity of the symptoms in the early stage with that of other diseases which are usually considered not of very great importance. While it would be no reflection upon the professional skill or earnestness of a Port Health Officer to allow a case of small-pox in its incubation period to pass through his hands unnoticed, the physical damage to the younger part of our population would be almost incalculable.

As has been pointed out in a circular issued recently by the Department, the colony has, owing to the long absence of this disease, been lulled into a sense of false security. Among the ranks of those who impugn the virtues of vaccination, under the banner of the so-called Anti-Vaccination Army, there are many diverse units. In this band we have—small in number they certainly are—individuals who have carefully and honestly considered the statistics as to the minimising power of vaccination, but by far the great majority of the objectors to this protective inoculation are gathered under that flag in virtue of their ignorance. The logical fallacy of arguing from a particular to a general is nowhere better illustrated than in the majority of the objections

SMALLPOX AS MODIFIED BY VACCINATION.



SMALLPOX IN AN UNVACCINATED CHILD.

CASE OF CONFLUENT SMALLPOX IN UNVACCINATED PERSON.

This illustrates the protective power of Vaccination. The figure standing was vaccinated, and shows only a few spots. The child lying down was not vaccinated.

offered to vaccination: a man or a woman refuses to protect their child by vaccination against small-pox, in nine cases out of ten, upon some personal or family experience of injuries which they believe have been caused by vaccination. While in no way agreeing with those who urge that all sorts of diseases, such as consumption and syphilis, can be transmitted by means of humanised lymph, it was decided last year that only pure calf-lymph should be employed. It is now an offence against the law for any medical man to use other than the lymph supplied by the Government. This lymph is prepared under the most careful conditions, and recently arrangements have been made whereby all calves used for the purposes of vaccination are first tested by tuberculin by a competent officer in order to prevent the possibility of a tubercular animal being employed; not only this, but a large proportion of the calves are killed immediately after the lymph has been taken from the vesicles, and not until the *post-mortem* examination discloses the fact that the animal is quite well and healthy is the lymph allowed to be sent into circulation. I am very pleased to say that a revolution is taking place all over the colony in favour of vaccination. Special facilities have been given to parents, so that their children may be vaccinated free of charge and under conditions which insure not only purity of the lymph, but safety during the operation.

Last session, 1900, following the example of the Imperial Parliament, the House of Representatives introduced what is called the "conscience clause" into the Vaccination Act. While, as a sanitarian pure and simple, I consider this was a mistake, yet I would hesitate to recommend that this clause be deleted from the Act. Legislation too far ahead of public opinion must necessarily incur want of confidence, and, while it might be possible to enforce the provisions of any Act at the point of the bayonet, so to speak, there can be no doubt that such a course would be very inadvisable. The better plan, and the course which will make for the more lasting peace and satisfaction, is one whereby all and sundry can be convinced logically of the value of any measure which may be passed. It is in this direction that the Department has been working during the last year, and the results are very far from being disappointing. It would be advisable, however, that Parliament should see its way to empower the Governor in Council to declare any area which in the opinion of the Health Officers is more than usually open to the introduction of small-pox a vaccination area in which for the time being vaccination should be compulsory. The danger from small-pox is, as I have already said, very much greater than that to be anticipated from plague, and I sincerely hope that the movement which has already attracted a great many adherents will go on increasing in force until an unvaccinated child shall become almost as rare as the dodo. It is only fair to point out to those members of the House who, relying on the Commission appointed at Home to inquire into efficacy of vaccination against small-pox, have chosen to follow the Imperial example with regard to the conscience clause, that the introduction of this clause was a tentative experiment: it was in no sense a final judgment upon the matter; it was intended that the experiment should be finite, and a period of five years was suggested. The whole question will therefore be reopened in the Home Parliament in the course of another year.

Under "The Public Health Act, 1900," any Registrar of Vaccination was entitled to grant an exemption upon the parent of the child declaring that he or she had a conscientious objection to the child being vaccinated. Feeling certain that in the majority of cases these exemptions were asked for under the belief that there was little or no danger owing to the long absence of small-pox from the colony, and in not a few instances was due to a desire on the part of the parents to avoid any little trouble consequent upon vaccination, it was suggested that the right to grant these exemptions should be placed in the hands either of a Stipendiary Magistrate, or, as an alternative proposal, that the District Health Officer should exercise this right. My object in limiting the list of exempting officers was based upon the belief that, if the full facts with regard to the protective power of vaccination against small-pox could be put before every mother and father in the colony, not a tithe of the exemptions granted would be even asked for. There is no desire on the part of the Department to override the convictions of parents which have been arrived at after careful and judicious consideration of the whole data. What we ask for is simply that the right should not be left in the hands of men who have no special knowledge of the value of vaccination, and who possibly may undertake the duties with a prejudice against the operation. I would suggest, therefore, for the consideration of the House of Representatives, that the practice of granting exemptions by Registrars or Justices of the Peace should be entirely abolished. The District Health Officer, in the course of the prosecution of his duties, of necessity has to visit all the outlying parts, as well as those in the centre. It would be an easy matter for him to hold a Court, so to speak, where he would have an opportunity of laying before all those interested in the matter the results of all the latest experiences with regard to vaccination and small-pox. At the present time every facility is being offered by the appointment of numerous Public Vaccinators, the supply of pure calf-lymph free of charge by the Government, and the only thing wanting is an opportunity of speaking to and meeting those who at present object to avail themselves of this safeguard against one of the most infectious and deadly of modern diseases. There will be found in the appendix copies of several circulars which have been issued by the Department in reference to this matter, and also some photographs which were taken of patients attacked during the recent epidemic in London. If only those objecting could be brought face to face with a case of confluent small-pox, I feel perfectly certain no further arguments on my part would be necessary.

Leprosy.

During the past year some forty or fifty cases of alleged leprosy among the Native population have been investigated by officers of this Department. It has been repeatedly urged by some of the older medical men in the colony that leprosy does exist to a considerable extent among our Native brethren. This, after careful investigation, has been proved to be in the main incorrect. So far as I am aware, there are only two cases of leprosy in the colony—that is, of course, excluding those

cases which exist in some of the recently annexed South Sea islands. One case, of which a full report is adhibited, was that of a Chinaman living at Macrae's Flat. This case, in conjunction with Dr. Ogston, I personally examined. The patient had suffered from the disease for a great many years. His condition when examined was that the greater part of the fingers of both hands, the toes, and anterior part of both feet had withered away. The Chinaman suggested that his hands had been frost-bitten, but an examination of the affected parts showed clearly that, while the greater parts of the fingers had been absorbed, the nails were still present. There was no doubt whatever as to the nature of the disease, but it is interesting from a clinical point of view to remember the alleged cause of the malformations. During conversation with the patient he was asked if he had ever seen any similar cases in his own country, and he replied that he had seen a great many. The type of the disease was that very commonly seen on the streets in India and China. There was no erosion of the surface tissues, and consequently, looking to the fact that leprosy is spread mainly by means of inoculation, just as plague and syphilis are, there was little or no danger to be apprehended from a public-health point of view. The patient is a gold-seeker, and lives in a very secluded part of the once-popular Flat. Arrangements were made by the County Council whereby he is to be supplied with food, in return for which they take his gold. His house is situated some half-mile from the nearest neighbour, and several miles from the nearest village. The food is placed in a box about a quarter of a mile from his hut; the gold is boiled before being handled by the bank, and in this way all possible source of infection is destroyed. The police authorities have been asked to keep an eye upon the man to see he does not break bounds. (Several photographs of this case are attached.)

The majority of the Maori cases inquired into have turned out to be a mixture of syphilis and tuberculosis. The one exception is that of an old man situated in the Raglan County. In his case, owing to the fact that there are abrasions of the surface tissues, more stringent precautions have been taken in order to prevent his communicating with the rest of his people. A house has been obtained in an isolated part, and a special attendant has been employed.

Although there is no reliable information with regard to the alleged cases in Penrhyn Island beyond the fact that a surgeon of one of His Majesty's gunboats visited the place and described several cases which he saw, it is intended, at as early a period as the business of the Department will permit, that either myself or one of the other officers should make a survey of our newly acquired dependencies. Should it be found that there are any great number of cases of leprosy amongst them a scheme will have to be evolved for their complete isolation and protection. There are many diseases peculiar to the islanders which it would be well the Department should thoroughly investigate in view of the possible greater intercommunication with New Zealand, and this will be part of the work of the officer appointed to visit these places to investigate.

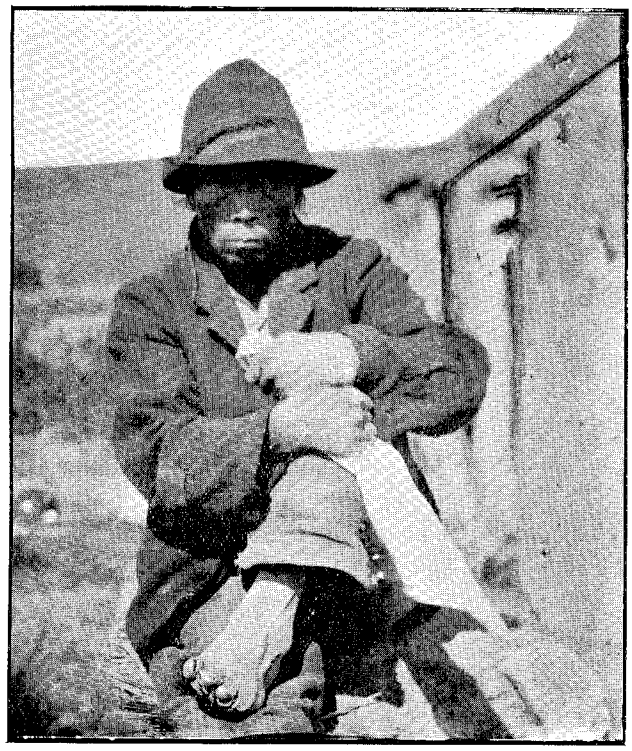
Examination of Returned Troopers.

Early in October Cabinet decided that this Department should undertake the examination of all troopers returning from South Africa. Further, that the various District Health Officers should act as members of the various Pension Boards throughout the colony. When it is pointed out that no less than 400 have been examined between the begining of October and the 31st March, you will easily see that very great demands have been made upon the officers of this Department. The home-coming of so large a number of men who have been exposed to the privations and diseases consequent upon such a struggle as the Empire has been engaged in during the last two years and a half has occasioned the appearance in the colony of some diseases which hitherto were not present. A great number of cases of measles occurred through the introduction of that disease by some of the troopers on board the troopship "Tagus" which landed at Port Chalmers. In consequence of the statement made to me that the men had been supplied with blankets which had previously been infected, and the occurrence of several cases among the Defence people whose duty it was to store these articles, I advised that they should be thoroughly disinfected or destroyed, and as a precautionary measure that no blankets should be allowed to land in any other instance.

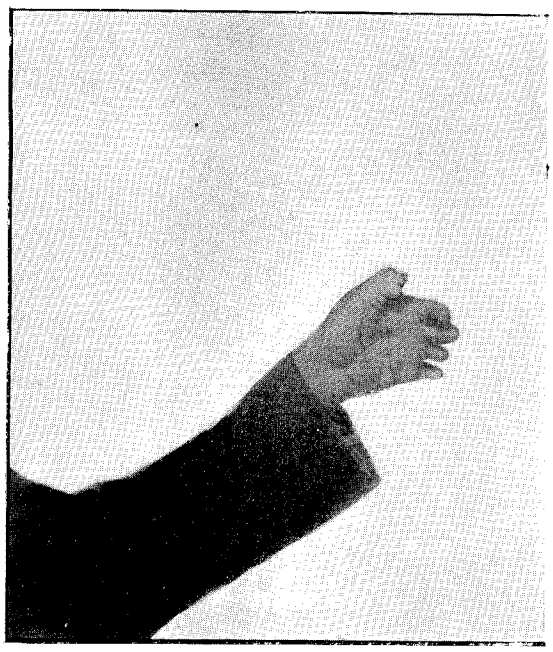
In addition to the gunshot wounds from which a good many of our returned men suffered, there were a large number of cases of malaria. In these instances we endeavoured to find the specific organisms in the blood of those affected, and in some cases we were successful. Contrary to what might have been expected, there has been no case of the disease occurring in any one who has not at some time or other been absent from the colony. It is at present the subject of experiment whether any of the variety of mosquitoes which we have in New Zealand are capable of acting as a medium of the disease between an infected person and an otherwise healthy one. The result of this experiment will be detailed in a later report.

There have been several cases of what is termed hæmaturia. This disease is prevalent in a great many parts of Africa, as well as other tropical parts. It is due to the organism bilhartzia hæmatobia. The presence of these organisms in the urine during the acute stage of the disease has been detected on many occasions. An unusual number of cases of dysentery of very intractable type occurred during last year. As Dr. Makgill in his report points out, such cases are said by the medical men of long standing in Auckland never to have occurred before, and it is suggested that the disease has been introduced by our returned soldiers.

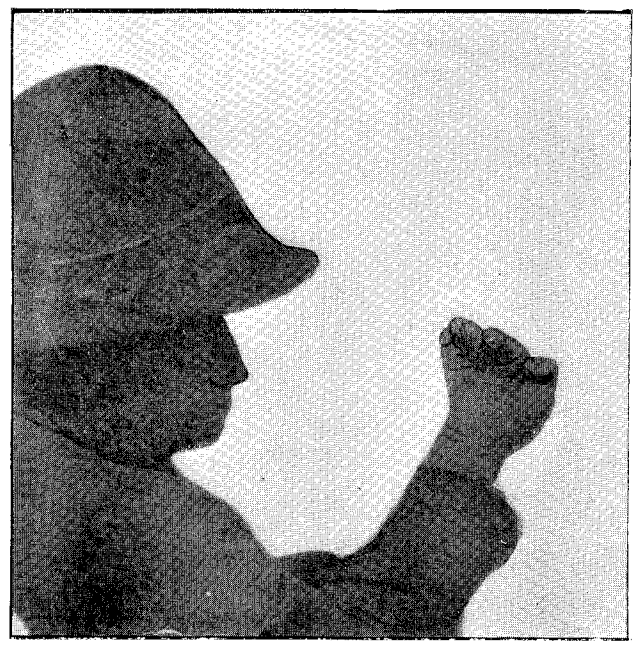
As indicative of the mindfulness and interest taken in the health and welfare of those of our sons who, answering to the Empire's call, went to South Africa, the fact that we tried to protect them against enteric ought to be recorded. Impressed by the value of Dr. Rideal's paper upon the bactericidal effect of the acid sulphate of soda, and fortified by the result of some experiments made here, I suggested that each member of the Tenth Contingent should be provided with a tin case containing 100 5-grain tabloids. 300,000 of these tabloids were cabled Home for so that they could meet our men on their arrival at the Cape.



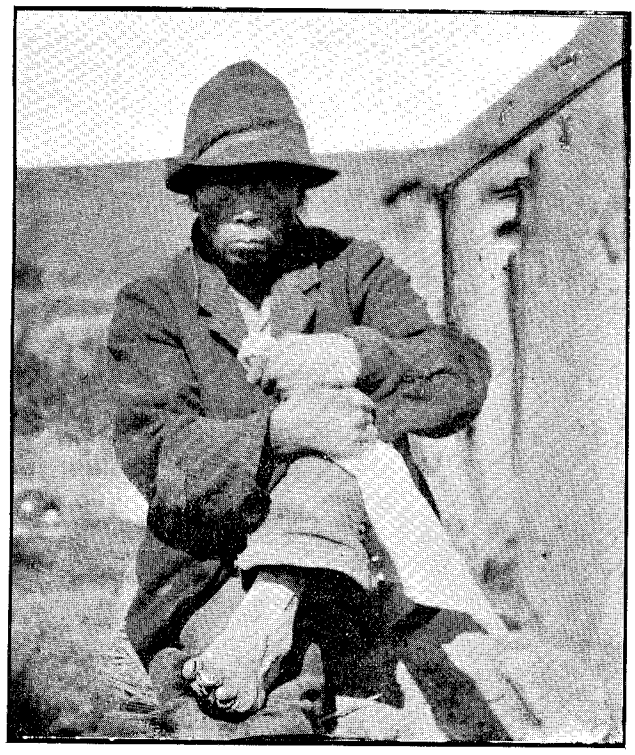
CASE OF LEPROSY, SHOWING LOSS OF TOES.



CASE OF LEPROSY.



CASE OF LEPROSY, SHOWING LOSS OF FINGERS.



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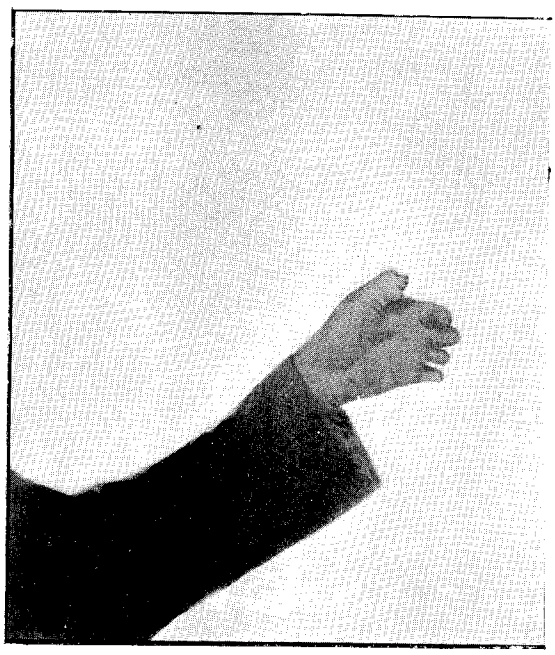
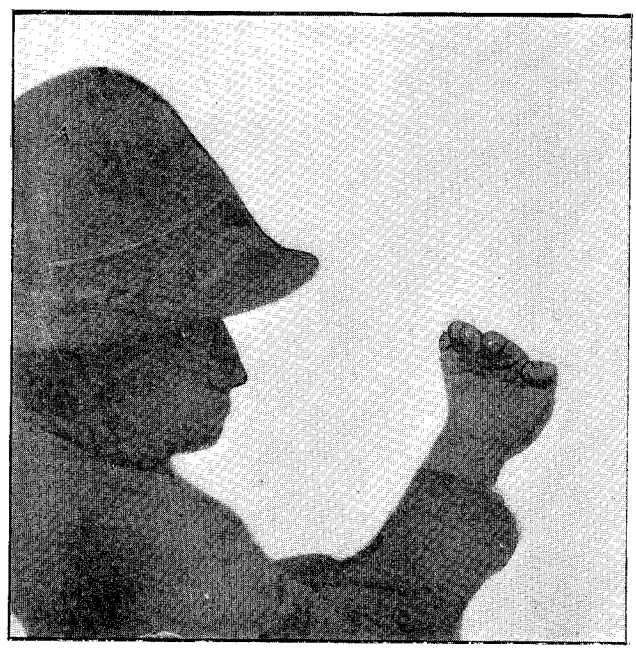


CASE OF LEPROSY.



CASE OF LEPROSY, SHOWING LOSS OF FINGERS.

Sanatoria.

As you are aware, we are still without any hospital in which consumptives can be treated upon modern scientific lines. The necessity for the establishment of such institutions is every day becoming more and more clamant. The residents in the various resorts to which consumptives go have become alarmed. They have already had ocular demonstration of the infectivity of the disease, and they rightly refuse to expose themselves or their children to the undoubted danger of housing a careless or ignorant consumptive. The result is that the life of these unfortunate people has been in some cases made harder. In the scheme which I set out for your consideration it was pointed out that the establishment of even two sanatoria would not meet the requirements of colonial safety. From a public-health point of view there is more danger to be apprehended from those cases of the disease which are not suitable for treatment in a sanatorium. The incurable and the indigent incurable must be provided for, or otherwise, while we may benefit some, all hope of the exterminating the disease must be given up. To use a properly equipped sanatorium of the modern type for the reception of incurable cases of the disease would not only savour of using a razor to cut grass, but it would militate against the usefulness of the institution. The scheme which was recommended was to erect a sanatorium in the North Island and one in the South, to which all cases susceptible of cure or improvement should be sent. For the more unfortunate cases which offered little or no hope of cure special provisions in connection with one of the small country hospitals in selected districts should be made. A few tents or wooden sheds could be erected in the hospital-grounds. The cost of erection would not be great, and the supervision and maintenance would be small compared with the cost of installing a separate staff to look after the patients. Remembering that the great cause of the spread of the disease is the infected sputa, by placing these incurable cases under treatment all danger from this cause would be removed, and the patients would have the advantage of a modified hospital treatment. There is no doubt whatever that the adoption of some such scheme is a matter of the very greatest urgency, and should not be postponed another day. Since writing a splendid place has been bought near Cambridge in the Waikato.

School Hygiene.

The occurrence of a considerable number of cases of tuberculosis among the children attending a school in the South Island, referred to in Dr. Symes's report, while it emphasizes the necessity for at once making provision for consumptives, also illustrates some conditions which obtain in many parts of the colony. There is no question whatever that many of our State schools are overcrowded. There is no need in a country of unlimited space such as New Zealand why the most generous treatment should not be meted out to our children. It may be difficult in the larger towns where land is dear, but in the country districts—and it is there that most overcrowding is found—there is no justification whatever for not allowing each scholar at least 200 cubic feet. The standard adopted by the London School Board, which is often quoted, is a measure born more of expediency than of mature and untrammelled conviction. The Inspector-General of Schools (Mr. Hogben) is wisely insisting on greater air-space for the scholars. Another point of great importance is the regular disinfection of schools, especially where any of the scholars have suffered from an infectious disease. It would be a very great help to the officers of this Department if there was attached to each school a medical man, retained as consultant. Only the other day, in consequence of the prevalence of scarlet fever and diphtheria in Wellington, Dr. Valintine, Assistant Chief Health Officer, made a surprise examination of the scholars in one of the city schools. Out of ten swabs taken from the throats of children then in school Mr. Gilruth found the *B. diphtheria* in four. I am reluctant to add to the task already imposed upon the medical attendant on a case of infectious disease, but it would be of the very greatest assistance if, in the case of children, the school which they attended was mentioned. On the 16th June a circular was sent to all the local authorities and schoolmasters, pointing out that under section 87 of the Education Act members of a family in which a case of infectious disease existed could be prevented from attending school. This was of great service, but something more is required. There is now among the proposed amendments to the Public Health Act a provision whereby the District Health Officer may, if he considers it necessary, cause a school to be closed. This important matter was omitted from the main Act.

Inspection of Dairies.

This matter has been the subject of several reports to you during the last year. By the passing of the Dairies Inspection Act of last year the control and supervision of all dairies was removed from the local authorities and placed in the hands of the Agricultural Department. As the various District Health Officers point out, the condition of things at present is very much worse now than it was under the old law. Take Wellington, for instance. Prior to the passing of this Act the City Council employed an officer whose sole duty it was to inspect and report upon the dairies within their district. As soon as the new Act came into force that official was dismissed, and since then not a single dairy or milk-shop has been inspected except by an officer of the Health Department. At present our staff of Inspectors is too small to permit of systematic and thorough inspection. The supervision of the treatment of foodstuffs is naturally a work which the Health Department should be asked to undertake, but with the present staff it is impossible, and yet the present state of affairs ought not to be allowed to continue. I am anxious that the position of this Department should be made quite clear with regard to this matter, as we are constantly receiving complaints, not infrequently mingled with abuse, for our supposed want of attention to what appears to our correspondents to be our obvious duty.

Septic-tank System of treating Sewage.

As the result of an article written at the request of one of the leading newspapers in the colony, we have had hundreds of applications for information on the subject. A sketch-plan of an installation suitable for a house of about ten people was issued by the Department, and has been made

great use of. All over the colony I have inspected tanks that have been put down, and most of them are working excellently. Apart altogether from its suitableness for use by municipalities, this system has undoubtedly settled one of the most difficult problems in rural sanitation. With a small tank and aerating-bed a resident in the country can dispose of all his sewage cheaply, and without risk of creating a nuisance. Masterton has installed a system. Palmerston North has the question under consideration, and so has Nelson.

Amalgamation of Sanitary Bodies.

As was pointed out in my last report, the necessity of, in the near future, urging local authorities with a community of interest from a sanitary point to join hands is a step without which no great progress will ever be attained. Dr. Makgill, in his report, draws attention to this. Local and interparochial jealousies make it almost impossible, unless with a great amount of personal canvassing, to get any great sanitary reform effected. Later I propose to submit for your consideration certain amalgamations which I suggest should be brought about whether the local bodies concerned agree or not. In many instances they will be quite agreeable; in fact, we have been often asked to exercise the power given us under the Act. So long as the pressure is applied by an agent not within the area, no great objection will, I think, be offered if the question of expense can be arranged.

Infectious Diseases.

With the meagre data at our command, it would be rash indeed for us to attempt to make any general deductions. By another year we may be able to arrive at some accurate idea as to the case-incidence of the several infectious diseases as compared with the death-rate from them. At present our only data for exact comparisons are the records kept by the various hospitals. Scarlet fever of a mild type has spread over the greater part of the North Island; fortunately, there have been very few deaths. Diphtheria assumed the magnitude of an epidemic in Lyttelton during the latter part of 1901 and early part of 1902, some sixty cases in all occurring. That the non-ventilation of the sewers had not a little to do with this outbreak I am quite certain. This has in part been remedied. The main factor in the causation lies not in this, however, so much as in the pollution and dampness of the soil around the houses. Since the occurrence of several cases of glandular swelling among the children active steps have been taken by the Mayor (Mr. Grubb) in order to remove these agents for evil. Lyttelton, nestling as it does along the base and sides of the Port Hills, is necessarily cramped for room. Many of the houses are placed very close together, and some of them are very old. Owing to the angle of the ground upon which some of the houses are built, the front has to be supported upon piles 10 ft. or 12 ft. long, while the back of the house rests in a hollow cut out of the face of the hill. The result is that the surface-water from the hills runs down and soaks beneath the houses. To make matters worse, until lately it had been a common practice to keep fowls beneath the floor. In consequence of this the ground became quite sodden, and the emanations from it rose up through the kitchen-floor. Again, many of the floors were laid upon the bare earth, with no air-space beneath. A complete list of all such defective buildings is now being made out, and all will be condemned. The Council have recently passed a by-law prohibiting the keeping of fowls. I sincerely trust that we shall see no recurrence of what is assuredly a disease due to insanitary conditions. Several cases were reported from the West Coast, with, I regret to say, a few deaths. This outbreak was clearly traced to the insanitary condition of the house where the patients resided. Instructions were given and at once carried out, and since then no further cases have occurred. There have been recently notified in Wellington nineteen cases of diphtheria, which have been the subject of special inquiry by Dr. Valintine.

Enteric Fever.

Out of a total of 338 for the whole colony, Auckland District, as will be seen, is responsible for 182. This is truly a deplorable state of matters. As Dr. Makgill points out, the general death-rate from zymotic diseases all over the colony is 10·26 per thousand, while the rate for Auckland is 30·8. While doubtless the warmer, moister climate may have something to do with it, the chief cause lies in the disgracefully insanitary condition of the city generally. That a great deal of sanitary work of much value has been done during the last year and a half cannot be denied; but while the system which they are pleased to call a drainage system continues I consider it not far short of culpable negligence to spend money on such things as tramways. "Evil communications corrupt good manners," so the copybook heading of old asserted, and it may be that the long presence of preventible disease has dulled the Auckland sense of the fitness of things. But, as Dr. Makgill points out, "what they have done to deserve the intervention on their behalf of a special Providence it is hard to see." I can only hope that the full disclosure of their shortcomings, as disclosed in the report on the Auckland District, will awaken them to a sense of their duty.

Analysis of Foodstuffs and Beer.

On the 18th May Dr. F. T. King, Medical Superintendent of the Seacliff Asylum, advised Dr. Ogston, District Health Officer for Otago, that a patient had been admitted to the institution under his charge suffering from lead-poisoning, and suggesting that the poison had been introduced through the medium of beer. The following is Dr. King's description:—

"A patient named E. S. was admitted to the Asylum from the Hospital suffering from what were described as 'rheumatic pains.' He had delusions, and was violent and dangerous, but has now recovered as far as mental symptoms are concerned. The salient features may be summarised as follows:—

"*Patient's Account.*—'Four months ago I was treated at home for inflammation of the bowels. The bowels had been very bound for a long time previously, and I had been taking salts. The doctor had to give me an enema when I got the attack. I suffered from extreme pain in the lower part of the belly. It made me writhe and twist and beat my hands, and my brain was nearly

turned with the agony. My belly was not tender when pressed. It felt as if there was a round lump in it below the navel. I was laid up about a fortnight. When I went into the Hospital a week or so ago the same kinds of pains came on very severe, though not so bad as the other time, and the nurse had to keep putting red-hot clothes on to me all the night. I was very constipated. I had suffered from cramp in the legs, &c., ever since I went to the factory, some two years ago. There is a great deal of wet and damp there, and the brines are so cold that when you put your hand under the water coming out of a cold tap it feels warm by comparison. The other pains I had in the Hospital were not in the joints, and the joints did not swell. The pains were constantly shifting and shooting. The worst seemed to spring from the back of the neck, and to go down the arms to the wrists. In the lower limbs the pains were mostly in the upper parts of the calves and in the insteps. The weakness of the hands was not noticed earlier than about a month ago.'

"*Physical Examination.*—Temperature has not been above 99·4. Complexion very pale and cacahectic. Nothing special about heart or lungs. Urine contained both albumen and sugar on admission, but these have now disappeared. There is no typical bilateral wrist-drop, the extensors being almost completely paralysed, muscles wasted, flabby, very marked tremors. Supinators not affected. Sensation acute. The gums showed marked and typical blue line of plumbism.

"*Habits, &c.*—'For nearly all the time I have been in the factory (nearly two years) I have been more or less boozed almost every night. Not drunk so much as fuddled. I rarely stayed in of an evening, and when I went out and met my friends I always drank on an average five to six long glasses, holding nearly a pint each. On Saturday I have all the afternoon as well as the morning, and then I'd take about ten glasses.'

"The water-supply seems unimpeachable so far as he knows, being at home the town's supply, and at the factory a special source.

"One point of interest is that the factory-hands are in the habit of filling up the jugs or crocks, which have had pure acid (probably HCl) in them, with fresh water in order to form cooling acid drinks for themselves in summer.

"The hotel at which E. S. habitually drinks is ——

"I need not say that, even apart from the constipation, colic, and blue gums, the extensor paralysis of the forearms, without anæsthesia, is by itself almost pathognomonic of lead-poisoning. Wrist-drop suggests lead even more surely than foot-drop suggests alcohol. At first I thought that the peripheral neuritis might be alcoholic in view of the history, but there is no doubt that the essential malady is chronic lead-poisoning.

"The special importance of the case appears to me to be in the fact that the man is not a worker in lead, and that therefore, presumably, there are others besides himself exposed to similar risks, which ought not to exist."

In consequence of this letter a complete analysis was made of the beer supplied at most of the hotels in the district. The use of lead pipes to convey beer from the cellar to the tap has long been known to be dangerous. The barkeepers have been warned, and for the future all lead pipes will be done away with, and either iron or rubber ones substituted. Instructions are being issued to all Licensing Boards to disallow the use of pipes made of such material as can possibly contaminate the beer.

Ptomaine-poisoning.

The occurrence of several cases of death from this cause, and the wholesale poisoning of the occupants of an hotel at Okoroire, prompted me to have a careful analysis made of many of the cheaper brands of tinned meat. The result of these examinations have not yet all come to hand. There is no question, however, that a considerable quantity of inferior meat comes into the colony, more especially from one country in particular. As the experiments are still going on, it would not only be unfair but impolitic to mention any names. The following is Dr. Makgill's account of the Okoroire cases:—

"I was notified of the occurrence by Dr. Roberts, of Cambridge, who had been called in. The police took the matter up, and made a full inquiry. The history of the case is that on the night of Tuesday, 18th March, of thirty-nine persons staying in the O. Hotel fifteen were taken ill with severe abdominal pain, vomiting, diarrhœa, and great prostration, and two more were attacked next evening. Of the thirty-nine persons in the hotel, nineteen were guests and twenty were servants, or the family and friends of the proprietor. The cases were not specially confined to guests, as of the seventeen cases eleven were employees of the hotel and six were guests.

"Through some attempt on the part of those interested in the hotel to keep the matter quiet nothing was heard until two days had elapsed, when, owing to the severity of some of the cases, Dr. Roberts was called in. One case—a Mrs. C., a guest—died the same day. The inquest held was perfunctory, and it was not until Inspector Cullen, of Auckland, was notified that any active steps to investigate the matter fully were taken. Valuable time was therefore lost, and all traces of the food made use of on the evening the outbreak occurred had been destroyed. Dr. Roberts, however, obtained samples of the vomit, and these, with the stomach and liver of Mrs. C., were submitted to Mr. Pond, Government Analyst, for investigation, as also were various samples of food from the larder seized by the detectives on their arrival.

"The larger number of the cases seem to have first shown symptoms of illness about 1 a.m. on Wednesday, although one or two seemed to have complained of headache, &c., on going to bed. The symptoms in all were much alike, although great variations in severity were evidenced. They were, in general, those of irritant poisoning, with, in the worst cases, extreme collapse, and coldness of extremities. Severe cramp and pain in the thighs and back seems to have been a marked feature, while one or two informed me that rigors were experienced early in the illness.

"When I arrived at Okoroire almost all the guests had left; but I had previously visited one or two in Auckland who had returned, but were not affected. I was able to get the histories of seven cases, mostly employees, remaining at the hotel, and examined others who were not affected.

"Inspector Cullen has kindly supplied me with a table giving the food taken by each guest and employee in the hotel on the afternoon and evening of Tuesday, 18th March. There was some difficulty in obtaining this information owing to a feeling of resentment evidenced on the part of the hotel employees and their friends, and in one or two instances it is doubtful whether the statements given are in accordance with fact. Again, so many were ill that matters were in a state of confusion, and a panic set in which caused some to believe they were sick, and this was seen even in residents in the district not connected with the hotel. So much so that rumours were circulated—fostered doubtless by interested parties—that there was an epidemic abroad of an infectious nature. A study of Inspector Cullen's table shows that the cause was to be found in one of two articles of diet. Mrs. C.—the fatal case—partook of the following articles at dinner: Barley-soup, roast chicken and bread sauce, with ham, lemon sponge with whipped cream, tea with milk and sugar. Four relatives who were with her and escaped illness also partook of the roast chicken and ham and barley-soup—but, instead of lemon sponge or whipped cream, had plum-pie or sago-custard by way of sweets. Following this up, it is found that the illness was confined to those who partook of lemon sponge and whipped cream, while those who escaped had not so partaken. No other article of diet at the dinner-table shows the same unvarying result. It may be stated thus:—

"*Those who escaped.*—Nineteen did not take lemon sponge, while three partook; twenty did not take whipped cream, two did take it."

"*Those who were sick.*—Fourteen partook of lemon sponge, three did not; fifteen partook of whipped cream, two did not.

"As regards the exceptions (of the three who did partake of lemon sponge and whipped cream) two state they only 'tasted' it; the third—a relation of the proprietor—we had reason to believe was distorting the facts. One of those 'tasting' lemon sponge and cream was slightly sick; the other only tasted the sponge but not the cream, and escaped. Of those who were sick and were said not to have had lemon sponge or cream, one was an infant about whose diet there seems some doubt, and who played in the kitchen and may have got hold of the articles in question unknown. The other was a relative of the proprietor; moreover, she was hysterical and confused. It is evident, on the whole, that the cream seems to have been the source of trouble, as one who escaped tasted the sponge but not the cream, while one who was sick took the cream but not the sponge. That the infected article was used at the dinner on Tuesday is shown by the fact that one guest who took ill only arrived late in the afternoon, and this was the only meal partaken, while another was not present at dinner, and so escaped.

"The lemon sponge was composed of gelatine, white of eggs, sugar, and sliced lemon. The cream was found by the cook (who is a Japanese) to be sour, therefore he whipped it up with bicarbonate of soda and sugar. Both these dishes were made, according to the cook, twenty-four hours before being used, and stood in the interval in a pantry—a dark and not too clean a place.

"All the ingredients entering into the two were examined chemically by Mr. Pond, who failed to detect any mineral poison, such as arsenic; while the stomach and liver also gave a negative result, nor was any alkaloid discovered. Dr. Roberts, who made the *post-mortem*, informs me that the stomach of Mrs. C. showed acute congestion, especially at the pyloric. While the cause has been ascribed to ptomaine poison, I think it is equally probable that some infective agent was at work, such as *B. enteritides* sporogenes, or one of the Proteus group, such infection having been conveyed in the cream. The invasion was rapid, but this was the case in the meat-poisoning cases investigated by Klein some years ago.

"I took samples at random from the milk-dishes in the dairy, heated them, guessing roughly, at a temperature of 80° C., and brought them down for examination. Anærobic and ærobic cultures failed to show any bacterial growth of any description. This might have been expected, as the pans had doubtless been cleaned with extra care since the occurrence. Examination by anærobic methods of the gelatine used in the lemon sponge revealed an organism growing after exposure to a temperature of 80° C.—incubated anærobically at 35°. It produced spores much like those seen in *Œdema maligni*. As, however, time and appliances would not admit of a full investigation here, a culture has been submitted to Mr. Gilruth for examination.

"The sanitary condition of the premises was on the whole satisfactory; certainly not less cleanly than most dwellings and hotels in New Zealand. The dairy was in the usual state of superficial cleanliness, and no drains, &c., were so placed as to be likely to affect the milk. The pantry where the food was stored was of the dark, damp pattern common to many houses. The drainage arrangements were good. The water-supply from a large rapid stream was unlikely to have been an agent in the case, though some pigsties about 300 yards above where the water was drawn from must have drained into the river. The cow-shed was the usual clay-floored, and therefore dirty, type universal in the country, and in close proximity was a heap of rubbish and house refuse.

"While there were plenty of such sources from which infection might have carried to the milk, they were no more aggravated than obtains in almost every dairy in the province. The occurrence was, I consider, an accident which is fortunately rare, but which in our present state of rural sanitation might happen in 99 per cent. of the dairies in the district."

At various times during the last year quantities of fruit, potatoes, meat, and fish have been seized and condemned at the instance of the Department.

Spitting in Public Places.

Realising to the full the part which infected sputum plays in the spread of tuberculosis, several of the larger municipalities have passed a by-law prohibiting spitting in public places. I am afraid the laxity with which these laws have been enforced have militated very much against their value and usefulness. One or two convictions would do much to educate the public. The Railway authorities have agreed to draw the attention of its passengers to the danger of indis-

criminate expectoration. If only some of the leaders of society would use their influence in the direction of curtailing the length of the garment which clothes the lower part of the lady on shopping bent, one powerful agent in the distribution of germs of all sorts and conditions would cease to wield its influence. Anything more disgusting than the condition of a skirt which has collected its toll from one of our busy thoroughfares can hardly be imagined. Greater experience on the part of our staff is possibly necessary before the Department can evolve a graceful and hygienic dress; but the undoubted danger which lies in the graceful train of her ladyship is one which is great, and easy of removal. Till it has passed away I would remind these microbe-collectors that it is the maid whose duty it is to brush and clean it that runs most risk. They should be careful not to inhale the dust which rises from the "hem of her garment."

Bacteriological Work.

A vast amount of most useful work has been done, as can be seen by a glance at the report of Mr. Gilruth, Pathologist to the Department, and those of the District Health Officers in their respective districts. The medical men all over the colony are gradually realising the advantage of availing themselves of the help of our officers in the elucidation of doubtful cases. I have on several occasions drawn the attention of the profession generally to our willingness to examine free of charge any specimens which they may care to send. The work in this Department has, in Wellington, been carried out under conditions which ought not to be allowed to continue. The completion of our new laboratory will in some degree lessen the undoubted danger under which Mr. Gilruth and his staff have laboured; but it is absolutely necessary that further provision should at once be made for the carrying-on of experiments upon the larger animals. The present place is quite unsuitable, and it is not saying too much to state that the present laboratory is a menace not only to the health of those working there, but in some measure to the general public. A scheme is, I understand, under consideration at present for the removal of the laboratory out to the country. This I consider is the proper step to take. With suitable and get-at-able paddocks much better work could be done. It is proposed that as soon as it is ready all work with dangerous diseases, like plague, diphtheria, &c., shall be done in the special laboratory. Some of the experiments, more especially those of plague of a mild type, are most interesting. In some cases where the organisms were few and not very virulent the guinea-pig survived the ordinary lethal dose; but when a small quantity of diphtheritic or even streptococcic culture was given along with the *Bacillus pestis* the animal died with all the usual symptoms of plague, and the bacillus was obtained from the various tissues and fluids. All this is set out in Mr. Gilruth's report. The practical bearing of this is great, as it goes to show the interdependence which exists in the microscopic world. It gives an exactitude to what has often been noted before—that while filthy surroundings cannot produce a disease like plague *per se*, yet the vitiated atmosphere may so depress one's power of resistance that exposure to contagion is more likely to be followed by infection. This hunting in couples, so to speak, of pathogenic organisms has been noted in other diseases, but never before perhaps with such practical bearing.

I have to thank the medical officers in charge of the various hospitals throughout the colony for their help, more especially Dr. Crooke, of Christchurch, for the use of his laboratory during my bacteriological investigation of the first case in Christchurch, and Dr. Collins, of Auckland, for the services which he rendered with respect to the case of V., in Auckland.

Notification of Infectious Diseases.

The following diseases have been put upon the list of those which it is required the medical attendant and householder must notify the Health authorities of: Typhus fever, enteric fever (typhoid), scarlet fever, small-pox, diphtheria, blood-poisoning, bubonic plague, tuberculosis, measles, leprosy, cholera, yellow fever, influenza.

As it was obviously unfair that a medical man should be not only required to perform a service to the State in notifying the existence of a case of infectious disease occurring in his practice, but should be liable to a heavy penalty for not so doing, you agreed early this year to pay the sum of 3s. 6d. in respect of each house notified as containing some one suffering from an infectious disease. Since then the system has been working well.

The procedure adopted on receipt of a certificate that a person is suffering from an infectious disease is for an officer of the Department or of the local authority in whose district the case occurs to visit the house and see that all due precautions are being taken. As soon as the case has recovered or been removed the local authority is required to thoroughly disinfect the house to the satisfaction of the Health Department. It cannot be said that all local authorities are provided with efficient servants for this work, but we are gradually shepherding them in the direction of appointing a sufficient number of suitable men as Inspectors for sanitary purposes.

There is one disease upon the notifiable list (tuberculosis) which is treated in a way different from all the others. Medical men are allowed great license with regard to this disease, because until the Government has provided sanatoria for the reception of such cases it would be unjust to do more than counsel the poor sufferer. Only those in that stage when expectoration is free and contains bacilli are required to be recorded. As soon, however, as proper provision has been made for such cases something more may be done.

Sanitation among the Maoris.

Dr. Pomare's report will be read with interest.

One serious obstacle in the way of any great sanitary reform among our Native brethren is the poverty of many. They are generally quite willing to fall in with our suggestions that they ought not to all sleep together, that the house ought to have a floor that could be easily cleaned, that they ought not to drink the water from the swamp, that they should put up a tank and catch rain-water; but the invariable answer is, "Kahore te munie." A great improvement has, however, been effected in some parts, and doubtless with perseverance greater reforms will result.

Drunkenness has in a very great measure disappeared, and now the Maoris may truly be termed a sober race. One great lesson he has to learn, however, ere his emancipation can be assured, is, that to live and be healthy he must acquire the habit of steady and continuous work. When he has freed his mind clearly from the past method of paying his debts, when he realises that land once sold belongs to the vendee, and that therefore it ceases to be an asset of the vendor, a great step in the forward direction will have been taken. Previous to the coming of the pakeha land was in no sense a negotiable instrument; only with the advent of the white man did it acquire a value outside what it was capable of producing in the way of foodstuffs. For an acre of land which he did not want the Maori could get the horse and trap that he had long envied his white neighbour the possession of; but not infrequently when that horse had turned out to be a bolter, and the varnish had disappeared from off the trap, the vendor might be seen sitting on the doorstep of the house that had been built upon their equivalent in land, explaining to his "sib," "*Kapai te whare*—that my land." Steady work and a complete adoption of the pakeha customs and clothing is what is necessary, not the buying of a nicely enamelled bedstead and then the betaking of themselves to an outhouse to sleep, not the dressing in warm woollen clothing during the hot part of the day and then sitting in a thin cotton blouse and skirt in the evening. When he comes to a full realisation of the fact that for better or worse he must decide whether he will stick to the old customs *in toto*, or throw off the flax mat and don the pakeha substitute for that picturesque if airy garment; then only will his salvation be assured.

Enteric Fever and Oysters.

Early this year the various District Health Officers were requested to examine the oyster-beds especially with regard to their possible contamination with sewage, the methods employed in storing oysters, and the condition of the wholesale and retail shops where they were sold. That this examination was undertaken none too soon is clearly seen by the disclosures made in the reports. There have been at least two outbreaks of enteric fever traceable to pollution of the storage-beds or uncleanly handling of oysters. In Blenheim there were several cases of this disease which were traced to this source. Hitherto it has been the common practice for the oyster-sellers to store the oysters along the foreshore not only that the oysters might be handy, but in order that they might be fattened. It was found in several instances that the dealers were in the habit of placing them in baskets made of flax at the mouths of the sewers. This, I need hardly say, has been put a stop to. There were in all ten cases of enteric fever in Picton and Blenheim in which oysters were the only thing common to the patients, and, as a matter of fact, no other cases occurred after the above filthy procedure was abolished. Although the outbreak in Nelson could not be traced to the oysters, yet Dr. Roberts very wisely had the storage-beds shifted out to the Boulder Bank, where there is no possibility of their coming in contact with sewage. In Auckland the oysters undoubtedly, in the great majority of the cases, were wholesome at the time of collection, and were contaminated during their sojourn in the shops, as will be seen by Dr. Makgill's report on the Auckland District.

The Auckland District in June is, as a rule, fairly free from enteric fever, the District Hospital returns showing that the average of admissions in this month of enteric cases is only three or four. This year, however, proved to be an exception, as there was a distinct outbreak in the city and its neighbourhood during the first three weeks of June. As the system of notification has not yet come into full use, it is difficult to arrive at any exact idea of the extent of the epidemic. The numbers notified to the City Council were: In May, 1; June, 8; July, 1. The Parnell Borough Council received two notifications in June—the only cases this year; and the Newmarket Council had one in June, also the only case.

An examination of the Hospital records gives a better idea of the outbreak, thus: During May 3 cases admitted, 1 from country; in June 21 cases, of which 6 came from up country and 2 off intercolonial steamers. The Hospital returns for July are not yet complete, but the number of cases fell again in this month to five or six.

Of the six country cases I was able to interview three, all of whom might well have received infection from Auckland, as will presently appear. Taking all sources of information together, I have been able to collect twenty-three cases of enteric whose illness may well be associated with the Auckland outbreak in June, while six others must remain uncertain in the meantime.

It may fairly be presumed that some special source of infection was the cause of so unusual an epidemic, and this the more probable when we compare the histories of the patients, since of the twenty-three cases investigated eighteen occurred during the week 10th June to 17th June—that is to say, were admitted to Hospital or diagnosed by their medical attendants during that time, and almost all gave the same history of one to two weeks' vague illness. Of the five remaining cases, one occurred on the 2nd, two on the 18th, and two on the 21st June, and may be taken as being part of the same epidemic.

There is a very generally accepted theory in Auckland, originating, I believe, with certain medical men, that this outbreak was caused by oysters; indeed, so many people have taken up the idea that the oyster trade in the last two months has suffered seriously. Many of the dealers themselves hold the same view, and are anxious, in the interests of the trade, to have the matter settled. I have interviewed all the larger dealers on the subject, but it is scarcely necessary to report their opinions, although I was surprised to find how intelligent and accurate a grasp of the subject many of them had. All agree that oysters from the upper reaches of the creeks and harbours, where the water is often brackish, are inferior in quality, especially if the shore and bottom be muddy. They generally realise the dangers of those growing near sewage-outfalls. I could obtain no evidence that the oysters here are put to "fatten" or "ripen" after picking, as is done for the English market, during which process the greater part of the contamination was shown to occur.

The evidence which I have been able to collect associating the eating of oysters with the outbreak is sufficient to incline me to agree with the popular belief, which was chiefly founded on the case mentioned in the telegram from the Chief Health Officer of the 8th August, where three young men met for supper and partook of oysters from a bottle bought in a shop in town. In a fortnight or three weeks from this date all three were attacked by typhoid. As this was their only meeting after some months, and these oysters were the only eatables they had in common at all likely to carry infection, it was very natural to conclude that this was the source of the illness, and this supposition was strengthened by the fact that about the same date as the three took ill a lad who worked in the oyster-shop—son of the proprietor—also was attacked by enteric, so severely that after a short illness he died in the District Hospital.

At first sight this might be regarded as a localised outbreak arising in the shop, the lad who worked there, already suffering from enteric, having infected the particular bottle used by these young men. But a study of the other cases arising at the same time shows that many had no apparent connection with this shop, so that a more general source must be sought for. I propose giving as far as possible in tabular form the essential points in each case I have been able to examine. It should be mentioned that the cases have come from districts so widely separated that it is difficult to conceive any other point common to all.

TABLE A.

No.	Name.	Date of Admission to Hospital, or "Laying-up."	Date on which Patient first felt ill.	Residence.	History as to Oysters.	Remarks.
1	K.	About June 12	About June 7	Auckland (took ill in Wellington)		
2	J.	"	" 7	Ponsonby, Auckland ..	Bottle of oysters eaten at supper on 25th May	These three are the young men whose illness first led to the report as to oysters being the cause.
3	R.	"	" 7	Vulcan Lane, Auckland ..		
4	F. W.	Hospital, June 13	" 8–9	Queen Street	Worked in his father's fish-shop, from which the bottles came used by 1, 2, and 3	No direct history of eating oysters. Patient died.
5	E. W.	" " 13	" 7	Albert Street	Oyster-opener in B.'s shop	This shop has no connection with W.'s, but young W. (No. 4) often came to visit him at B.'s oyster-store.
6	G. B.	" " 17	" 10	Newmarket	No correct date, but was in the habit of eating oysters at W.'s or "the D."	
7	A. M.	" " 16	" 6	Queen Street	Frequently ate oysters before illness. Could not give dates	Lives next door to W.'s fish-shop, and back premises adjoin.
8	J. B.	" " 16	" 7	Napier Street	Ate oysters at a supper in a café, 18th May, only occasion he can remember till he began to feel ill	This is the only case of typhoid occurring amongst those present at this supper, although many others partook of the oysters. A doubtful case therefore.
9	A. T.	" " 17	" 10	..	Ate oysters at the C. Hotel about a fortnight before his illness began	Somewhat vague as to date.
10	E. C.	" " 13	(?)	Tuakau (thirty-seven miles up country)	Got oysters in a bottle some weeks before admission	J. and S. deal direct with the pickers.
11	J. C.	" " 2	(?)	Grafton Road, Auckland	Brother of No. 10, and shared the oysters ..	" "
12	P. K.	" " 18	About June 4	Parnell	His mother got a bottle of oysters in Victoria Street three weeks before admission, and patient ate some	
13	P.	" July 2	" 14	Grafton Road	Ate oysters at D.'s a few weeks before illness	Very vague as to date.
14	J. F.	" June 14	" 7	Eden Crescent	Got oysters about the end of May at a shop in Victoria Street, and also at B.'s	
15	F. S.	" " 17	" 10	Warkworth (forty miles north of Auckland)	Had three bottles of oysters sent up from town three weeks before illness	It is just possible these oysters came from W.'s, as the shop is near the wharf.
16	H. P.	" " 17	" 6	Waitara, near New Plymouth; came to Auckland about beginning June	Ate oyster about three weeks before he got ill while at Waitara, and again in Onehunga, a few days before at W.'s shop	Not a very definite case, but striking owing to the history of Auckland oysters. S. was dealing in Onehunga oysters as well as from Russell.
17	Q. H.	" " 21	" 19	Arch Hill, Auckland	Ate oysters about three weeks before her illness, the last week in May	The only case where Auckland-grown oysters could be traced. About same time had oysters bought at B.'s store.
18	L. S.	Notified, June 15	" 8	Parnell	Frequently ate oysters before illness. Patient has left Auckland, so that I could not find dates or source	
19	Mrs. M.	Hospital, June 15	" 8	Baker Street	Ate oysters often before illness	Vague as to dates.
20	M.	" " 18	" 12	Queen Street	Kept a small eating-shop. Did not deal in oysters, but about 6th June ate some mussels. Medical attendant informed me that patient had oysters towards end of May	Patient died, and therefore history is not reliable.

As these tables show, a history of oyster-eating can be obtained in every case which I have been able to investigate. The remaining cases are as follows:—

1. M. E., Hobson Street, admitted to Hospital 13th June.
2. C. G., Hobson Street, admitted to Hospital 14th June.
3. E. M., Waihi, admitted to Hospital 10th June.
4. K. S., Helensville, admitted to Hospital 7th June.
5. M. S., Helensville, admitted to Hospital 9th June.
6. J. M., Helensville, admitted to Hospital 1st June.
7. H. E. W., Avondale, admitted to Hospital 10th June.
8. E. B., s.s. "Manapouri," admitted to Hospital 1st June.
9. G. H., s.s. "Waihora," admitted to Hospital 17th June.

The first two I have been unable to trace. They may well have been infected from the general source, judging by the dates of their illness. The country cases may possibly be a repitition of Nos. 15 and 16 in the table. I shall make inquiries when I am in those parts. Case 8 is unlikely to have had any origin in Auckland, as the boat had been away a month. Case 9, however, might have been part of the Auckland outbreak, as only a fortnight elapses between the visits of the boat to this port.

Oysters are so universally eaten that it is not in itself a very striking fact that such a history should be obtained in these twenty cases. When, however, we consider the uniformity in the dates of the attacks, the fact that all ate oysters about the same time, the unusual time of year for such an outbreak, that cases coming from places so far apart as Waitara, Tuakau, and Warkworth should have this history in common, and that two of the patients were actually engaged in the oyster trade, it appears to me that the only reasonable conclusion is that oysters were the common source of the infection, and that all may be put, therefore, into the same category as the three lads—Nos. 1, 2, and 3—where undoubtedly this was the case.

As a contrast, I may mention the histories of three cases admitted to the Hospital in July.

1. Had eaten oysters (stewed) about three months before his illness.
2. Never ate oysters.
3. Only remembered eating oysters during the first week of her attack, when they were taken as being suitable for an invalid.

Source of Oysters.

While it was without much difficulty that one could arrive at the verdict that oysters had disseminated the infection, the next step in the inquiry—the tracing of the oysters back to a common source of pollution—has given far more trouble; indeed, I cannot pretend to have come to a satisfactory solution. The dealers are naturally on their guard, much damage having already been done to the trade, and even when they are willing to give every assistance it is hard to get accurate information as to events which happened three months beforehand. There is one definite date—25th May, the day on which the three lads bought the bottle of oysters at W.'s shop—therefore infected oysters were in Auckland at that time.

It will be seen from the tables that the suspected oysters were bought at eight different dealers. If, therefore, all these cases are genuine instances of oyster-borne infection, we must conclude that there is some widely distributed area where the beds are polluted, as most of the dealers have their own staff of pickers. On the other hand, by ignoring certain cases it is possible to give the outbreak the appearance of having a much more localised origin.

Pollution may have occurred—(1) at the oyster-beds, (2) during picking and shipment, (3) at the hands of the retail dealer. It will be as well to take each of these possibilities into separate consideration.

The Oyster-beds.

Mr. Rose, Collector of H.M. Customs, who acts as Commissioner for Oyster-beds, kindly supplied the following facts as regards the sources from which the supply is drawn:—

There are five divisions of the coast-line recognised as oyster-fisheries,—

1. Waitemata Harbour, embracing Coromandel, Great Barrier Island, and north as far as Whangarei.
2. Russell South, part of the Bay of Islands, and all the small harbours down coast-line to Whangarei.
3. Russell North, from the above to the North Cape.
4. Kaipara Harbour.
5. Manukau Harbour.

Only in the case of the Manukau Harbour are beds leased to individuals. Elsewhere certain persons are licensed to pick, and can do so on any part of the beds. Waitemata Harbour has been closed for oysters this season—a good deal of smuggling takes place, however.

Russell South supplied the greater part of the oysters sold in Auckland early in the season. It was, however, closed on 23rd May by the Government, but, as a number of oysters had been already picked, shipments continued to come down till the beginning of June. A return kindly supplied by the accountant of the Northern Shipping Company, which does almost the entire carrying trade in oysters from Russell, shows that the usual shipments were brought down on 25th May and 1st June, and a small number on 7th June, after which no more were carried. At the time (25th May) that the infected oysters were on sale all the dealers whose names appear in tables were being supplied from these Russell beds. Yet it is difficult to conceive any general infection of the oysters growing in these parts: the coast is so very sparsely populated, and there are no long tidal creeks. Russell Township is the largest settlement, but few oysters grow in its immediate vicinity. The beds most in use are those in Whangaruru Harbour, a part of the country with only a few houses scattered about.

Russell North beds have supplied very few oysters to Auckland this season, and the dealers chiefly concerned in this investigation have not had any. The chances of these beds being contaminated are extremely remote.

Kaipara Harbour has been open to the pickers all the season, but only came into use when the Russell beds were closed. A return supplied to me by the Traffic Manager of the Railways shows that the first oysters from Kaipara were consigned at Helensville on 30th May. As this was after the date on which we know the infected oysters were sold, we need not consider these beds further, although at first I was suspicious of them owing to the fact of there having been some cases of enteric at Helensville early in June.

Manukau Harbour has supplied oysters all through the season. These beds are the ones popularly supposed to be the cause of the outbreak, and it must be confessed that here we have in some parts of the harbour sufficient danger of pollution to make it a serious question whether the oysters are safe for consumption. These beds are leased mostly to residents of Onehunga. One Auckland dealer (B.) has a bed—that on Weakes's Island—but it is so situated that there is little risk of contamination, being well down the harbour and opposite the Heads, and there are few houses inshore from it. An Onehunga dealer (W.) owns a bed in the upper reaches of the Mangere Creek above the bridge, and sub-rents the next bed (D.'s). From these two beds he supplied several dealers in Auckland during May and June, as well as his own local trade. Sixty-six sacks were taken from D.'s bed between 13th May and 24th June. A glance at the accompanying rough map will show that all the beds above Mangere Bridge are in some danger from the various businesses established about these shores. Neither Otahuhu nor Onehunga have any drainage system, so the pollution from these townships is a less serious item; but we have to consider the following:—

The Freezing Company's slaughter-yards, &c., the Chemical-manure Works, a soap-boiling establishment, and a tannery are situated on the shores at the head of the Mangere Creek, and the drainage from these, with a fair number of employees' residences, enters this shallow inlet, which at lowtide is a mere stretch of bare mud. Just opposite D.'s bed (No. 2 on map) a small glue-works discharges a continual stream of offensive washings, &c., from the scraps of hides, &c., used for boiling down. A few yards away is a small slaughter-yard, also draining on to the shore. The woollen-mills employ from seventy to eighty hands, and have for their use a well-arranged

water-closet system, which discharges amongst the rocks which form D. and N.'s oyster-beds (Nos. 2 and 3 on the map). The wool-scourings also discharge here. Inshore from N.'s and M.'s beds are a cemetery, a fellmongery, and a tannery, all draining on to the beach. There is, then, plenty of opportunity for these oysters to receive pollution. The beds below the Mangere Bridge are only threatened by the ebb from the Mangere Creek, and it must be fairly diluted by them, as there is a large volume of water up to Onehunga Wharf and a swift tide. I have had a good deal of experience of boating, &c., in this part of the harbour, and never found any signs of pollution visible to the senses. The Puketutu (No. 10), Ihumatao (11), and Pukaki Creek (12) beds are free from all possible danger. Although the beds (1 and 2) from which W. was supplying certain dealers in Auckland are thus open to risk, I do not think that there is any good evidence that they were responsible for the typhoid outbreak. A large amount of the products of all these beds above Mangere Bridge is consumed locally in Onehunga; yet here we have not had a single case of enteric reported, and Dr. Scott, Health Officer for the port, informs me that, while there have been one or two cases in the neighbourhood this year, all were imported from other parts, none arose locally. Had these oysters been at fault it would be reasonable to expect a local outbreak in June. Again, the dealer in Auckland (W.) to whom the greater number of the typhoid cases can be traced (see Table B) has not at any time this year bought Onehunga oysters (so he and the local man, W., assure me). On the other hand, B. was dealing in Onehunga oysters at the time his employee (E. W., case 5) received the infection. Also we have the one patient (H. P., case 16) who got oysters directly from W.'s shop, but as he took ill almost immediately after, and had oysters from Auckland shortly before, this is not an absolutely clear case. It is possible, of course, that the parties interested may be concealing the facts. One dealer asserts that about the end of May and early in June Auckland was entirely supplied from Onehunga, as the influx of visitors for the Duke and Duchess of York's arrival had produced a great demand, and dealers who otherwise disliked using the inferior oysters from Manukau were driven to do so, especially on the closing of the Russell beds. But this was probably at a later date than 25th May, and we see from the shipping returns that W. and J.—both of whom deny having Onehunga oysters, while both have many cases traceable to them—were getting their usual supply from Russell. I think, on the whole, the weight of evidence is against Manukau oysters being at fault, dangerously situated as some of the beds are. As B. was shipping Onehunga oysters at the end of May down to New Plymouth, it would be important to learn whether they had caused an outbreak there.

Another source of supply to be considered is the smuggled oysters picked in the Waitemata Harbour. Two dealers have assured me that they were aware such oysters were sold in Auckland at the end of May, and added that W. had bought them. As they were trade rivals it cannot be looked on as reliable evidence. Yet it is certain that smuggling does take place, the Customs officials having detected a case in June; and, as the closing of the Russell beds produced a shortage at a time when visitors were crowding into Auckland, the increased price would be a great inducement to the dealers. The pickers cart these oysters round to the retail houses and sell them at the door. It is, of course, difficult to obtain any history of such transactions, and probably they are not recorded in the books. We have an instance (case 17, Q. H.) where the patient may have been infected by oysters taken directly from the rocks around Ponsonby, and there is sufficient sewage running into the harbour to render dangerous the beds here and further down about Mechanics' Bay and Parnell. Again, I am told that the smugglers are in the habit of concealing the sacks until convenient times, in shallow parts of the harbour, such as Mechanics' Bay, where the outfall from the Grafton Road sewer is. This theory would explain the outbreak completely, a cartload of such sacks—having lain for twenty-four hours or so near a sewer—being taken round and sold to the various shops concerned. I was at first inclined to believe that this was the case.

Picking and Transmission.

Taking now the question of the possibility of pollution during picking and shipment, there is a difficulty in imagining a wholesale infection in this way. The oysters are torn from the rocks by means of shovels, and at once placed in sacks; these are then brought in boats to the port of shipment (Russell), where they may lie for a day or two awaiting the steamer. All the dealers agree that it is unnecessary to keep them in sea-water, as they continue to live in the sacks for some weeks after storing. It is improbable that they were kept at Russell in the sea near the village. In the case of the Mangere beds the oysters are sacked and carted directly into town. On board the "Clansman" (the steamer running to Russell) they were in the habit of loading the oyster-sacks last, putting them on the top of the hatchway-covers. There is then small chance of contamination here. As an argument against the infection having been at Russell or during transmission, I may mention that the shipping returns show that the same picker who was in the habit of supplying W. and B. also supplied a merchant in Paeroa, and on 16th May, and again on 23rd May, shipped loads of oysters to all three. Dr. Buckby, of Paeroa, informs me that there has been no enteric there for eighteen months (one case came from Waihi in June, however). Had these loads been infected it would have been reasonable to expect an outbreak there also.

The Dealers.

In the hands of the dealer there is every chance for infection of the oysters. I have inspected the premises of most of the retailers in Auckland, and in none can the conditions be called ideal, while in some there are evident dangers. The oysters are stored in sacks in a cellar or the back premises of the shop. As required, they are taken out and opened on a rough block of wood (usually very dirty); then placed in basins, tins, or bottles, none of which have been cleaned with any special care, generally only rinsed with cold water. When more oysters have been opened than can be sold immediately, some of the dealers—B., S., and W.—store the bottles or cans in cool-chambers at the freezing-works, each having his own compartment. I have inspected these chambers, but did not find any likely source of contamination there. Foul cellars, dirty pails and bottles, the hands of the oyster-opener, all afford a ready means of infection. It is noticeable that a large number of the enteric patients bought their oysters in bottles.

Table B.

Name of Dealer.	Cases certainly owing to Oysters got here.	Probably obtained here.	Possibly obtained here.	Total.	Source of Oysters.	Remarks.
W.	3 cases, Nos. 1, 2, and 3	5 cases, Nos. 4, 5, 8, 9, and 20	2 cases, Nos. 7 and 15	10 cases	Russell ..	No. 7 may have got the infection at this shop, living, as he does, next door.
B.	..	1 case, No. 5	2 cases, Nos. 15 and 17	3 "	Russell and Manukau	No. 15 may have been infected here or S.'s, or possibly W.'s.
S.	..	..	4 cases, Nos. 10, 11, 15, and 16	4 "	Russell and Manukau	None of these cases are very clearly attributable to S.'s.
J.	..	..	4 cases, Nos. 10, 11, 13, and 14	4 "	Russell ..	None very certain as to origin.
C.	..	..	2 cases, Nos. 7 and 19	2 "	Russell ..	Both doubtful.
B.	..	..	2 cases, Nos. 7 and 14	2 "	Russell and Manukau	
W.	..	..	1 case, No. 16	1 "	Manukau	Very doubtful.

Possibility of Pollution from Bottles.

In this connection I may recall an outbreak I was asked to investigate three years ago, where a family of children were attacked by typhoid after eating oysters from a bottle. One child had been away the night the oysters were used, and he only of the family escaped. I am unable to trace these bottles, as they were bought from street hawkers by the fishmongers, none of whom have any regular supplier. It is, of course, most unlikely that five or six dealers should simultaneously have allowed infection to reach their wares, but a close examination of the cases shows that it is not impossible that the whole outbreak case can be traced to the one shop—namely, W.'s; for, although certain of the histories seem to show no connection with his shop, I have found frequently that the patient has forgotten where the oysters came from, and, after much cross-examination, will give quite a new version of the case. It has been impossible to personally interview all. Many I saw once at the Hospital, but, having now gone out, I have been unable to put questions to them which further investigation has shown to be necessary. Very much reliance, therefore, cannot be put on the statements as to shops, and this is shown in case 13, where the same case appears against the names of two or three dealers. Again, there are instances where a shopkeeper sends round for a few bottles to a neighbouring shop, his own supply running short. These small transactions might easily be overlooked or wilfully concealed, and so the track would be lost. It will be well to take each dealer in turn. W.—to whom by far the larger number of cases can be traced, and some with the greatest certainty—has a shop in the lower end of Queen Street, and a store for fish, oysters, poultry, &c., down on the Railway Wharf. He does a large retail trade. The sacks of oysters are kept partly at the wharf store, where there is little to render them unsafe, and partly at the back of Queen Street shop. The room in which the opening and bottling is done is kept fairly clean. Some of the bottles and receptacles in use might have been kept cleaner, but, on the whole, efforts evidently were made towards keeping things sweet. There is a small sink, with a trapped waste-pipe connected directly with the sewer, with city water laid on. Here the oysters are washed before opening, and the bottles and such utensils scoured. Hot water is not used. Below this room is a paved cellar where oysters and so on are stored. It was clean, and had cross-ventilation from a window at the back to a grating in Queen Street. There was no gully-sink in the floor. An earthenware soil-pipe from a closet and the waste-pipe from the sink above join in this place, and run along the wall into the main sewer.

Sewage Pollution of Lower Queen Street.

This cellar, in common with all the cellars in Lower Queen Street, is subject to flooding with sewage from the main sewer when there is a heavy fall of rain during high tide. These cellars are then below sea-level, and, as there is no arrangement to prevent the tide running up the main sewer, the contents get backed up, and force their way through the traps, &c., and flood the basements. In W.'s cellar it is not in any quantity, merely damping the floor, probably from faulty drains; but in the basement of the hotel next door, and in cellars higher up the street, the whole place is flooded. This constitutes a most serious defect in the sanitary state of Auckland, and one which demands immediate attention. I am convinced that much of the typhoid which annually breaks out in the district could be traced to this cause. The cellar next door to this fish-shop is used by an auctioneer, and here I saw fruit and vegetables stored. These must be exposed to the same risk of sewage pollution, and it is easy to see how the infection can be spread throughout the whole district by such means. An attempt has been made in some instances to prevent this backflow by fitting a cap tightly over the gullies, &c. This, of course, is mere tinkering, and until some proper means of disposing of the sewage is adopted Auckland will remain a grossly insanitary town, since the most important business and commercial area is subject to this disgusting condition.

In addition to the cellar defects, the back premises of W.'s shop are threatened by the state of an alley-way on to which they open. Here there is a urinal attached to the hotel, but used by the general public, who gain access from a door in the alley-way, which itself is evidently used as an urinal, the whole place smelling most offensively. W., jun., and an employee complained to me of this, and I shall bring it to the notice of the City Council at once.

Here, then, we have all the elements necessary to originate the epidemic, and it is worth considering whether all the cases may not have had their infection from this shop.

Of cases 1, 2, and 3 there is no doubt, and as case 4 (young W.) lived and worked here he pobably got infected here also, whether from oysters or not is immaterial. Case 5, although working in another oyster-shop, was (he tells me) well acquainted with young W., who used to come up to B.'s store where No. 5 was at work opening oysters. Here there is a link by which the cases Nos. 5, 15, and 17, opposite B.'s name, might really have originated at W.'s, the infection having been conveyed to the oysters by either 4 or 5.

Case 7 lives next door to W.'s, being barman in the hotel, and, though there is no history of his having oysters there, the same defective sanitary arrangements would apply to him.

Cases 6, 8, 9, and 20 admittedly ate oysters from W.'s. Case 8 might be objected to, because he was the only one out of many guests at a supper who contracted enteric. However, on looking up the literature, I find similar cases mentioned by Drs. Newsholme and Winter Blyth.

Cases 10, 11, 12, and 19 are uncertain as to where the oysters came from, which leaves but three patients who can in no way, so far as I can gather, have received the infection from W.'s shop. This result is arrived at only if we permit ourselves to adapt the facts to the theory, but it is as reasonable an explanation as any other I can offer.

B. has a store in Albert Street, where case 5 worked, and a retail shop in Lower Queen Street. He does a good deal of exporting, and has sent many shipments to New Plymouth and Wellington. The Albert Street store, where the oysters are opened, is an old shed, much out of repair, and the arrangements are none too clean. Although an employee suffered from typhoid, only two other cases can be attributed to his oysters, so that there can have been no very general infection there. The store is too high up to be affected by the backing-up of the sewage. As many of the oysters sent south by B. were in sacks and not bottled, it would be interesting to know whether any typhoid cases can be traced to them, especially as they were picked from the Onehunga beds.

S. has the largest fish business in Auckland. His store and retail business is in Customs Street. There is no cellar to be affected by sewage. The arrangements here are cleaner and better organized than in the other shops. The four cases against his name are only doubtful, three being shared as possibly caused by other dealers, while the fourth (No. 16) is put in only because S. alone sends oysters to Waitara. Investigation there will throw light on the question.

J. has a small retail business in Lower Grey Street, but supplies oysters to a number of smaller dealers. Premises fairly well kept; some of the utensils looked dirty. Stores and opens oysters in a cellar below the shop, not affected by sewage. No cases very clearly traceable here. He deals directly with the pickers, and the shipping returns show that during the whole of May he was being supplied from Russell. Has had no transactions with W.

The C. Café, a purely retail business in Queen Street, in conjunction with some dining-rooms: Oysters are stored in a room at the back of the shop, and opened as required at the counter. Fairly clean, no cellar. Of the two cases possibly originating here, No. 7 more probably was infected at W.'s, and No. 19 could not be clearly traced.

B.'s, a retail business in Queen Street: Oysters stored in a cellar (being towards the upper end of the street it is not so directly affected by sewage), and opened as required in the front of the shop. Premises are kept clean. Neither case is likely to have originated here. Deals in Manukau oysters, leasing the Puketutu bed, which is in all probability quite safe.

The D., an eating-house in Lower Queen Street, situated in a cellar, and therefore affected by sewage: A cap has been fixed on the gully to prevent this backflow; otherwise premises are kept scrupulously clean. Only one case ate oysters here, and it is more probable that he got the infected oysters at W.'s.

W., Onehunga: Picks for himself, and does a large retail business as well as supplying other dealers. I have already dealt with this case.

CONCLUSIONS.

1. In June last Auckland was visited by an outbreak of typhoid traceable to the eating of oysters.
2. It is improbable that the oysters were infected at any of the beds or during transport. The conditions of the beds above Mangere Bridge, in the Manukau Harbour, though probably not responsible for the outbreak, deserves consideration.
3. The infection was probably received after the delivery in Auckland. This may have occurred in one of three ways:—
(*a.*) If the contaminated oysters were being sold by many of the large dealers—
(1.) They may have been "smuggled" from the closed beds in the Waitemata Harbour along the city frontage, or deposited for concealment near sewer outlet;
(2.) Infected bottles may have been sold by a hawker to these dealers.
(*b.*) The insanitary surroundings of one dealer's (W.'s) place of business might be the origin of the outbreak. I am inclined to think this the most probable theory, as the small retail shops might have been supplied from here, and the larger part of the cases are certainly traceable to W.'s.
4. Special regulations would be desirable for businesses which include the opening and storage of oysters.

1st September, 1901. R. H. MAKGILL.

As will be seen from the above extract from Dr. Makgill's report, many of the sale shops were in a most insanitary condition; but those situate in Queen Street were no worse than many of the other shops with cellars in that street. To require screw-down traps in order that the sewage may not enter the cellar discloses a state of affairs which could only be found in our fair city of the North.

STAFF.

During the past year Port Health Officers have been appointed at the following ports—Whangarei, Westport, Timaru, Oamaru, Wanganui, and Picton—in addition to those already holding such offices: Dr. Frengley, M.D., has been appointed a District Health Officer, and he has proceeded to Auckland to relieve Dr. Makgill during his visit to Sydney. Dr. Valintine has been gazetted Assistant Chief Health Officer. I would be absolutely wanting in a sense of justice if I did not record the very valuable work which this gentleman has done. Much of the smoothness with which the Department has run is due to his tact and knowledge of human nature. He has conducted difficult negotiations with great skill, and has been in the fullest sense of the word my right-hand man. The control of the Otago District has not, perhaps, given such opportunities for public display of ability as some of the others, but Dr. Ogston has consistently done excellent work. Dr. Roberts (Nelson) and Dr. Anderson (Blenheim) have kept a watchful eye upon their several districts. Owing to the occurrence of plague in Lyttelton, Dr. Symes has had cast upon his shoulders an enormous amount of work and responsibility, and he has never spared himself throughout it all. Dr. Finch, as Dr. De Lisle's deputy, has done good work in the Hawke's Bay District. In the strictly departmental part of the work Mr. Horneman has been of great service. I have no need to speak of the excellent work done by Mr. Gilruth, Mr. Aston, and, later on, by Dr. Maclaurin—it speaks for itself.

In closing this discursive summary of the work done by the Department during the last year, I have to ask for your indulgence on the score that we have been so busy working that little time has been left us in which to tell of it. The difficulty which the various District Health Officers speak of in keeping in touch with the many local authorities under their charge is intensified manifold in the case of the Chief Health Officer. With many points of attack from the outside world, the great extent of country to be traversed, the necessity for personal acquaintance with the members of the governing bodies all over the colony, has entailed an amount of travelling and public speaking which would do credit either to an aspirant for political place or the ambassador of a sewing-machine company. Some part of the immunity which the colony has had from plague may not unfairly be ascribed to these peregrinations. The *entente cordiale* which exists between the Department and the local authorities was one of the greatest objects I had in view, and the labour has been fully justified. While there lies to our hands "so much to do," it affords no outrage to our modesty to suggest to you that good seed has been sown—seed which, in the fullness of time, will bring forth good fruit.

I have, &c.,
J. MALCOLM MASON, M.D.,
Chief Health Officer.

APPENDIX A.

DR. MAKGILL'S REPORT ON A CASE OF BUBONIC PLAGUE OCCURRING IN AUCKLAND IN APRIL, 1902.

ON Saturday, 19th April, Dr. Sharman reported to me that he had been called in to see a case which he suspected might be bubonic plague.

I visited the patient with him, and found the conditions as follows:—

Patient, T. V., a wharf-labourer, aged thirty-seven: Had been well till day before (Friday, 18th), when in the forenoon, during working unloading the s.s. "Te Anau," he was seized with severe pain in back and groin and vomiting. He found a lump in the left groin, and returned home to bed.

On examination this bubo was tender, and consisted of deep-seated glands in the femoral line, hard, clearly defined, and slightly mobile. No abrasions on leg to account for the condition, except a spot of discolouration which might have been a flea-bite on the outer side of foot, and another on the leg. Temperature 103·4°, tongue furred, pulse 98, respiration 20, face and eyes suffused. No other glands enlarged.

Inquiry showed that he had been working on the following boats during the month: 7th April, "Mararoa," from Sydney; 9th April, "Hauroto," Sydney *viâ* Pacific islands; 10th,

11th, 12th April, "Moura," South Island ports; 14th April, "Zealandia," from Sydney; 17th and 18th April, "Te Anau," South Island.

The house: A five-roomed cottage in Richmond Road, Grey Lynn Borough. Surroundings fairly clean and comfortable; neighbourhood fairly open; small cottages on either side, all in fair sanitary condition.

Family in house: Mrs. V. and eight young children. Mrs. V. did laundry-work.

Thinking the case suspicious, I directed his removal to the Isolation Hospital in the ambulance kept for infectious cases, arranging with the Secretary, Hospital Board, for his admission, so that Dr. Collins, Medical Superintendent, had every preparation made when the case arrived.

I ordered that the family should remain in quarantine in the house, arranging with Dr. Sharman that he should visit them and make a daily inspection, and with Mr. Simmons, Town Clerk of the borough, that he should see that the quarantine was observed, and that the family were supplied with what was necessary. Inspector Winstanley proceeded up that afternoon, and saw to the desinfecting of the room, clothing, and bedding used by the patient—taking with him the materials required—Mr. Simmons undertaking that the Borough Council would meet all expenses. Formalin spray and subsequent fumigation with sulphur was used, and all rubbish, &c., round the house cleared up and burned.

I visited the wharf to get names of other men working on the boats with V., but being Saturday afternoon all were gone and the offices closed. These details were subsequently obtained by Inspector Winstanley.

I visited the patient on his arrival in the Hospital. Owing to the Plague Hospital being occupied by cases of scarlet fever and diphtheria, Dr. Collins had placed him in the isolation building, originally used for general infectious disease, but which had been recently fumigated, and now stood empty. This arrangement was in accordance with an agreement I had made with the Hospital Board some weeks before when the Plague Hospital was taken possession of. Nurse Woods and Nurse Holman volunteered for duty, and were placed in charge, and a special man was told off to act as porter, &c. During investigation of case Dr. Collins undertook medical charge. It was subsequently arranged that all dejecta were to be disinfected six hours in corrosive sublimate 1–1,000.

Treatment: 10 c.c. Yersin's serum was administered, and 5 gr. calomel; while $\frac{1}{200}$ gr. hyoscine was injected hourly owing to patient's restlessness. I drew off 5 c.c. of bloodstained serum from the bubo by means of a syringe, but failed either by culture or direct examination to detect any germs of any description. Wired suspicion to Dr. Mason.

Sunday, 20th April (third day of illness).—Visited case about midday. Had a fairly good night, and seemed better. Temperature 102°, pulse 88. Examined urine and found fairly large amount of albumen. Patient is sleepless and complains of deafness in left ear. Dr. Collins had ordered hypodermic injection of hyd. perchlor. into bubo, and painting surface with ichthyol and glycerine. Cultures made on Saturday were sterile. Some rumour of the nature of the case had got about, as I received an inquiry from the *Herald* newspaper office as to the case. I asked them not to make any mention of it, but next morning published a paragraph mentioning that a suspicious case had been removed to Hospital.

Monday, 21st April (fourth day).—Visited case 9 a.m. He had been delirious in the night and slept badly. Temperature 103·4°, pulse 100. Whisky and hypodermic of strychnine ordered every four hours. I drew off some more serum per syringe, and again failed to detect anything by direct examination (cultures also were sterile). Glands larger and more inflamed. I saw patient again at 10 p.m. with Dr. Collins, who agreed to incise bubo. A small portion of the gland was removed, and on direct examination numbers of short bacilli with rounded ends, and exhibiting marked polar staining, were detected. Cultures on broth, serum, and agar were made. At 12 p.m. wired results of examination to Dr. Mason, and returned to Hospital and administered Haffkine serum 10 c.c.

Tuesday, 22nd April (fifth day).—Visited case at 9 a.m. Patient had slept well after receiving a draught of pot. brom. and chloral hyd. Temperature 101·6°, pulse improved (88). On agar and blood-serum inoculated from the portion of gland-substance typical cultures nearly pure were obtained. In reply to an inquiry from the Hon. the Minister of Public Health, I wired that I believed the case to be one of plague. I also informed Mr. Stichbury, Chairman of the Hospital Board, and suggested the appointment of a medical man to attend the case. To this he objected, and it was agreed that I should take charge until Dr. Mason's arrival next day. I therefore spent the night at the Hospital, visiting the case at 8 p.m. and about midnight. Temperature rose to 104° and pulse to 120, but patient seemed better than previous night, and slept well after a draught of bromide and chloral.

Wednesday, 23rd April (sixth day).—Saw case at 8 a.m. He seemed much weaker and pulse was not so good. Nurse reported an appearance of cyanosis of face at an earlier hour. I ordered increase in stimulants. Dr. Mason arrived in the forenoon, and we visited the patient at 2 p.m. and again at 11 p.m., when he seemed stronger than in morning. Temperature 113·5°, pulse 120. A guinea-pig was inoculated on right side with portion of gland, and on left with some broth inoculated forty-eight hours previously, and which hitherto had failed to show any growth of the bacillus; agar and serum cultures, however, were abundant.

Thursday, 24th April (seventh day).—Visited patient at 8.30 a.m. He seemed better and asked for food. Pulse, however, was not so satisfactory, and nurse reported urine scanty and frequent. Albumen still present. Temperature dropped rather suddenly to 100° Fahr. Digitalin, $\frac{1}{100}$ gr. hypodermically, ordered every four hours. The broth cultures made from the gland-tissue now began to show some growth (after sixty hours' incubation). Dr. Mason visited the patient during the afternoon, and I saw him again shortly after midnight, when nurse reported that he had coughed frequently, and brought up some bloodstained mucus, a specimen of which was saved. Perspiring freely; temperature 101·2°; delirious, and passed motion involuntarily—some diarrhœa.

Friday, 25th April (eighth day).—Visited case at 9 a.m. Diarrhœa continued, and there was a tendency towards collapse in earlier hours of morning. Temperature 100·8°. Urine scanty but frequent, and passed involuntarily; no albumen present. Pulse 84, but weak and irregular. Respirations 28. On examining the sputum coughed up during the night previously it was found to contain large numbers of bacilli—showing bipolar staining, and resembling in every way those present in the bubo. During the afternoon Dr. Mason visited the patient and administered 5 c.c. of Yersin's serum. He also inoculated the nurses with Haffkine's serum. During evening patient was violently delirious, and Dr. Horsfall, the resident physician, attended, and ordered a draught containing chloralamide. This, however, had very little effect. Owing to the tendency to collapse, Dr. Mason ordered the legs to be bandaged up to thighs. Much care was exercised by the nurses to prevent passive congestion of lungs—the back of the chest being rubbed with turpentine liniment, and the position of the patient altered as far as the conditions would permit. It was, however, necessary, owing to his violent delirium, to keep guide-straps on the wrists.

Saturday, 26th April (ninth day).—Visited case at 9.30 a.m. He was much weaker. Temperature 101°. Pulse 130, and respiration 36, being hurried and irregular. Diarrhœa had been very troublesome during the night. Dr. Mason and I visited the patient again at 2.30 p.m., when 5 c.c. of Yersin's serum was administered, and ordered to be repeated in three hours' time. Bromide was administered, and the injections of strychnine and digitalin increased in frequency. An abundant crop of petechiæ was present on the skin of the abdomen and thighs. I saw him again at 9.30 p.m., when he seemed less delirious, but weaker. Temperature was rising again—102·8°. In the evening it was noticed that the guinea-pig inoculated from the gland-tissue was beginning to show signs of weakness—loss of appetite, coat rough. This was on the third day after inoculation.

Sunday, 27th April (tenth day).—At 2 p.m. Dr. Mason and I saw the patient, who was collapsed and unconscious. Nurse reported that he had taken nourishment well up till midday. Saline injections were ordered per rectum, and the Yersin's serum and stimulants four-hourly as before. Temperature had been rising steadily since Friday night, and reached 104° during evening, when we again saw the case about 9 p.m. During the evening Dr. Mason despatched a friend of V.'s in a cab to bring Mrs. V. to see the patient. Till then (the ninth day since removed) the family had been kept isolated. Virtue was partially conscious of his wife's arrival. He had taken little in the way of nourishment all day, except some champagne. Temperature continued to rise steadily, and pulse towards midnight could scarcely be counted, being weak and fluttering.

Monday, 28th April (eleventh day).—In view of the patient being almost moribund, Dr. Mason decided to permit the attendance of the clergyman. Accordingly, at 2 a.m. Dr. Mason and I visited the house of Rev. Mr. Budd, Church of England Chaplain to the Hospital, and accompanied him to the bedside of the patient, where a short service was held. I remained at the Hospital afterwards, and saw the patient at 3.45 a.m. He was then quite unconscious and moribund, and died quietly shortly afterwards. The temperature just before death rose to 107° Fahr. At 7.30 a.m. I performed a *post-mortem* examination of the body, examining only the abdominal cavity and contents and the bubo. During this examination the body was placed on a stretcher, covered with a large mackintosh sheet and a linen sheet soaked in formalin 1–20. When the examination was complete I wrapped the sheet and mackintosh closely round the body, and fastened them there, and it remained undisturbed until the body and stretcher were placed in the crematorium.

Disposal of the Body.

The crematorium attached to the Plague Hospital had been prepared on the day previously in order to dispose of the clothing, &c., used in the treatment of the case. The fire was therefore lit already, and during the forenoon of Monday, 28th, fuel was added, until at 2 p.m. it was considered sufficiently hot for use. A carcase of a sheep was placed in it during the forenoon as a test, and was consumed in from three to four minutes.

At 2.30 p.m. the Rev. Mr. Budd was in attendance, and, accompanied by Dr. Mason, Dr. Collins, and myself, the stretcher, still containing the body wrapped as above, was conveyed to the crematorium, where the usual burial service was read. Then the body and stretcher were placed in the chamber, and the doors closed. The fires were kept up during the afternoon, but towards night they were allowed to sink, and at 10 p.m. Dr. Mason and I attended and removed the ashes. They were placed in a coffin, which had meantime been prepared. The process of combustion had been quite complete, and had taken place rapidly without any unpleasant smell or smoke. The coffin-lid was fastened down by Dr. Mason, and on the following day the usual funeral ceremony was conducted by the friends of the deceased.

Three days later, during which time the furnace was permitted to cool, I attended to the drawing of the fires, and personally removed any traces of the cremation, a few fragments of bone having fallen down between the fire-bars. The heat had been very intense, and the bars had in many instances fused or burned away altogether. So far as the disposal of the body was concerned, the process had been very satisfactory, while all that sentiment demanded in the way of the reverent and ceremonious treatment of the dead was performed to the satisfaction of the clergyman in attendance.

Pathological Report.

The first efforts at diagnosis of this case of plague, by means of serum drawn on the second and fourth days of illness from the bubo by hypodermic syringe, proved abortive. Neither by direct examination nor culture could I find any organism to guide me. A pipette of serum was sent to Mr. Gilruth, Pathologist to the Department, who also reported it to be sterile.

On the fourth day of illness a portion of the gland was removed by Dr. Collins, and a smear preparation from this, stained with weak carbol-fuchsine, exhibited a large number of short bacilli with rounded ends, taking the stain more deeply at the poles. These bacilli were decolourised by

Gram's method, but took well all aniline stains, such as methyline, blue, gentian, violet. Cultures were made by smearing the surface of agar and blood-serum with the portion of gland, and placing it in broth, and incubating at 37° C. In twelve hours a growth was observed on the agar, taking the form of round discrete discs, pale or nearly colourless. On the blood-serum a good growth was observed in twenty-four hours, but the broth remained sterile for two days, after which a cloud formed, and later a dust-like deposit settled on the sides and bottom of the tube. I attribute this delay to the fact that this broth was faintly acid (I prefer it so for typhoid cultures when doing Widal examinations). Later, some broth, made faintly alkaline, showed a good growth from sub-culture on agar in thirty-six hours. The bacilli from these cultures on agar-serum and in broth were in all respects the same as those found in direct examination of the gland, and they were found also in the sputum of the patient on the seventh day of the disease. They were also present in a scraping of the gland taken by Dr. Mason on the sixth day of illness, and in the bubo and spleen of a guinea-pig inoculated with the same gland-tissue, as will be afterwards described. In hang-drop culture the bacilli was motionless.

On the eighth day of illness I took a sample of blood from the patient and submitted it to the test, with negative result.

The patient died on the morning of the eleventh day.

Post-mortem appearances three hours after death: Body fairly nourished; passive congestion of skin of back; wound in left groin where bubo had been incised. The bubo involved the inguinal glands on left, along the femoral line, and up to Poupart's ligament, and in this upper portion was a small area of softening, containing thick bloodstained pus. Elsewhere the glands were firm and showed hemorrhages on section.

Abdominal Cavity.

Small amount of bloodstained serum in peritoneal cavity.

Bowels empty, distended. Hemorrhagic patches in mesentery, the glands being in places somewhat enlarged.

Liver large, some degree of cloudy swelling.

Spleen enlarged, and soft and friable.

Kidneys enlarged; small hemorrhages under the capsule.

Bladder empty.

Portions of spleen and kidney were removed and forwarded to Wellington for examination, as also a pipette of spleen-pulp.

Bacteriological Examination.

Spleen: A pipette of spleen-pulp was secured. Smears taken direct from this failed to show the *Bacillus pestis*.

Inoculation in broth after forty-eight hours showed a scanty growth of a short bacilli with rounded ends—not, however, showing bipolar staining.

On agar: One tube gave a growth of a coccus (*Pyogene albus ?*). The other remained sterile.

The pus from the broken-down portion of the bubo showed abundant bacilli, in staining reaction resembling the *B. pestis* mixed with cocci of various types.

Inoculation Experiments on Guinea-pigs.

A large female guinea-pig was inoculated in the right groin with a portion of the affected gland on the 23rd April. The gland-tissue had been removed on the evening of the 21st April, with aseptic precaution, and had been kept in a sterilised tube of nutrient broth. On the 26th April, three days after inoculation, the guinea-pig showed signs of illness—rough coat, loss of appetite, &c., and a swelling at the seat of inoculation and in the groin at the right side. Death took place on the 29th April after six days and a quarter of illness. *Post-mortem.*—Bubo on right groin about the size of a hazel-nut, and some breaking-down in its centre on section. Liver enlarged, swollen, friable, with a small hemorrhage on anterior surface. Spleen enlarged, mottled, and swollen, showing grey patches on surface and in section. Intestines congested, bloodstained serum in peritoneal cavity. Lungs congested. Smear preparations of spleen, liver, and bubo showed the *B. pestis* in abundance, some good specimens of bipolar staining being observed. *Spleen Cultures.*—Broth: A scanty growth obtained; after about two weeks the bacilli took on involution forms—large club-shaped, &c. Cultures on agar from bubo showed a very abundant growth, the *B. pestis*, however, being mixed with a coccus and some putrefactive bacilli. Liver: Culture on agar showed a good growth of *B. pestis*, mixed with other types, probably putrefactive.

A second guinea-pig was inoculated in groin with a portion of the sputum coughed up by the patient V. on the seventh day of illness. In about three days' time this animal showed signs of illness, with lack of appetite and rough fur, and slight swelling in groin inoculated. However, after about three days more it improved; the swelling cleared up and the animal recovered. The sputum had been kept two days in a tube before it was inoculated into the guinea-pig, which may account for its lack of virulence.

Summary.

B. pestis found in bubo of patient V., both *ante-* and *post-mortem*, and also in sputum; in cultures from bubo (nearly pure); in guinea-pig inoculated from patient V.; in smear preparations of bubo, liver, and spleen, and bi-culture in spleen and liver in satisfactory amount.

NOTES ON TWO CASES OF SUDDEN DEATH IN APRIL, 1902.

The following cases were investigated owing to their occurrence coincidently with the appearance of the plague case in Auckland.

CASE 1.—J. B., AT RICHMOND, GREY LYNN.

On the night of 22nd April Inspector Cullen reported to me that a case of sudden death had occurred at Richmond, near the house of the plague patient V., and that a *post-mortem* would be held next day. Through the courtesy of Mr. Gresham, District Coroner, I was present at the *post-mortem*. The general conditions were not such as to lead one to suspect plague. There were no hemorrhages; spleen was small and rather tough in texture. The lungs showed chronic venous congestion and old-standing pleuritic adhesions; right heart somewhat dilated.

I obtained pipettes of blood and spleen tissues. In the blood no organisms were detected. Spleen: Smears showed under the miscroscope a number of short cocco bacilli—not, however, with bipolar staining. Streak cultures of agar in twenty-four hours showed an abundant growth almost colourless, consisting of the same short oval bacilli seen in the smears. It did not stain by Gram's method. There was, however, no bipolar staining, and it was shorter than the *B. pestis*. Moreover, in hanging-drop culture motion was marked, while on potato an abundant growth was present in twenty-four hours resembling *B. coli*. A guinea-pig inoculated in the groin with part of the agar culture showed no evil effects. I consider this bacillus to be the *B. coli*.

CASE 2.

A man brought into the Hospital on the evening of the 26th April died the following day with somewhat vague symptoms and history.

An inquest was held on 28th April, at which I attended. The most marked feature was the advanced fatty degeneration in almost all the organs, especially liver and kidneys. Pipettes of spleen-tissue were examined, but no organisms were detected by direct examination or by culture.

It was afterwards shown to be probable that death was caused by phosphorus-poisoning.

APPENDIX B.

REPORTS OF DISTRICT HEALTH OFFICERS, ETC.

AUCKLAND DISTRICT.

Dr. Mason, Chief Health Officer, Wellington.

VITAL STATISTICS FOR THE AUCKLAND DISTRICT.

The Auckland Health District is large and straggling, being about 360 miles in length, and varying in width from 180 to three or four miles. The total population is 175,000, exclusive of Maoris, who number perhaps 20,000, and are by no means to be ignored as an influence on the health of the district. Auckland City and suburbs have a population of 51,000, the city itself contributing 34,000. As regards density of population, the census of 1901 showed 6·83 per cent. per square mile, exclusive of Maoris.

The large sea-coast line tends to humidity of climate, and also renders difficult the administration of public health, making the means of communication imperfect, and resulting in isolation of certain districts. It is to be regretted that the statistics available deal only with the larger centres of population, and that no account can be given of the general health of the district. Records for a few years relating to Auckland City and some of the larger suburbs are to be found in the Year-book, but except for Thames Borough no other portion of the Auckland Province is mentioned; thus, over the larger area we are shut off from that valuable index of the sanitary state of the district—the birth and death rates.

Birth-rate.

The general birth-rate for the colony is 25·6 per thousand, being the lowest of any of the Australasian Colonies, and considerably under that for England and Wales. In Auckland and suburbs it is somewhat higher than any of the other large centres, being 27·83.

Death-rate.

The general death-rate for New Zealand is lower than any other colony, being 9·43 per thousand of the population, or nearly half that of England and Wales.

I cannot find any record for the whole Auckland District, but the Registrar-General's returns give full particulars for the four chief cities and their immediate suburbs, and the following comparisons made from these are not without interest. Taking the last three years, 1899 to 1901, it appears that the death-rate in Auckland has been somewhat higher than in the other centres.

Death-rate in the Four Centres.

	Auckland and Suburbs.	City alone.	Average of Four Centres.
1899	12·00	13·00	11·50
1900	11·81	13·60	10·71
1901	11·80	13·10	11·50

While for the first four months of the year 1902 the death-rate per thousand in Auckland is—

	Auckland and Suburbs.	City.	Average of Four Centres.
Average per 1,000 per month ...	1·28	1·42	1·01

It is evident that the city itself is largely responsible for this higher rate. Closer examination also shows that it is in infant mortality that the unfavourable comparison is found. Excluding deaths under one year of age, the results read as follows:—

	Auckland.	Average of Whole Four.
1898	8·97	8·94
1899	8·40	8·68
1900	8·20	8·27

Auckland, has on the whole, a lower death-rate for those above the age of one year.

Infant Mortality.

Deaths under five years of age in 1900 in Auckland and suburbs formed 36·22 per cent. of the total deaths in that district, while in the other three centres the average was 24·01 of the total deaths. As regards death under one year to one thousand births, we find as follows:—

	Auckland and Suburbs.	Average in all Three Centres.
1898	15·10	10·90
1899	14·17	11·78
1900	12·78	8·70

Excluding the suburbs, the mean for the last five years of deaths under one year per hundred births is 15·05 for Auckland City, while the average in the other three cities was 10·85. By thus considering the rate of deaths to births we eliminate the factor of increase which the higher birth-rate of Auckland would give, yet the same disquieting results remain, the infant mortality approaching that of England and Wales (16 per hundred births), and being out of all proportion to the general death-rate.

Death from Zymotic Disease.

The general death-rate from zymotic disease all over the colony for the five years ending December, 1900, is 10·26 per thousand population. For the last three years the Auckland figures are as follows: 1898, Auckland and suburbs, 117 deaths; total for the four centres, 304: percentage of total contributed by Auckland, 37 per cent. In 1899, Auckland and suburbs, 110; total for four centres, 360: percentage for Auckland, 30·8. In 1900, Auckland and suburbs, 93; total for four centres, 214: percentage borne by Auckland, 42·7. Thus the zymotic death-rate in Auckland is much higher than in the other centres, being an average of 36 per cent. of total deaths from zymotic disease; while the population is but little over 25 per cent. of the total.

The chief zymotic diseases are, first, diarrhœa; second, influenza; third, whooping-cough; fourth, typhoid; adding to the general death-rate of the colony in the order given.

Diarrhœa.—In the last three years 155 deaths have been registered in Auckland and suburbs through this cause, the total for the four centres being 204; thus Auckland's share amounts to as much as 41 per cent.

Enteric Fever or Typhoid.—In the last four years forty-six deaths from this cause have been registered in Auckland, as against fifty in the other three centres, Auckland's share in this case being 48 per cent. of the total. In 1900, however, there was a fall, the same number being registered in Auckland as in Wellington—this year being the lightest death-rate over the whole colony from enteric for the last ten years.

Whooping-cough and *Influenza* present no features of striking interest. There has been no death from whooping-cough in the past two years in Auckland.

Deaths from Causes other than Zymotic Disease.

There is little comparative value in these diseases, deaths from tubercle being in Auckland slightly below the average of the other centres.

Statistical Details of the Past Four Months.

During this period the same high infant mortality and zymotic death-rate is observed in Auckland, and is of special interest as referring to the summer season, when the zymotic diseases are most rife. Of the total deaths from zymotic disease from December, 1901, to April, 1902, Auckland was responsible for 60·5 per cent., while 30·6 per cent. of the deaths under five years of age during these months were registered in Auckland. Of the total deaths in Auckland for this period 42·75 per cent. were among children under five years; while in the other three centres the average was 25·7 per cent. The actual numbers were 117 deaths among children under five years of age in Auckland, and of these 62·7 per cent. were due to diarrhœa, gastritis, enteritis, or other inflammatory conditions of the digestive tract. It is evident then that infantile diarrhœa is the principal cause of the higher death-rate in Auckland. Telluric conditions are generally considered to have an influence on these diseases, and a loose porous soil with much organic pollution is the factor which sanitary authorities are agreed on as favouring the outbreak. This is exactly the position of affairs in Auckland, and indicates the need of reform in drainage and refuse-removal.

The appearance during the last few months of a form of dysentery hitherto unknown in Auckland has been commented on in several of my monthly reports, and is of interest in the light of the above statistics.

Notification of Infectious Disease.

The lack of systematic notification heretofore has made it impossible to form an accurate idea of the sanitary conditions of the Auckland District, and, apart from the loss from a statistical point of view, has resulted in a general indifference on the part of the public through lack of knowledge of the actual state of affairs, and a carelessness as regards disinfection and isolation.

Since 1901 the notifications have been, I believe, fairly complete, especially since the introduction of notification fees at the beginning of March. There is still room for improvement, however, especially as regards the notification of the local body by the householder. There is still a slight element of resentment on the part of both patient and medical man that any control should be exercised by the State over what they have hitherto regarded as a matter affecting themselves only. But this is to be expected on the introduction of any reform, and I feel sure is lessening, and will shortly disappear when they become more accustomed to it and realise that it leads to measures being taken for the protection of public health. The issue to public bodies of notices to disinfect premises has had a very good effect, as, apart from the actual preventive measures taken, it serves to keep the local authority alive to its sanitary functions. In the same way I have found it of benefit to publish in the Press a monthly list of the diseases notified in each district, as it stimulates to efforts on the part of the local bodies to keep their name out of the list, and it is a satisfactory sign that each bitterly resents any error on my part in attributing to them a case which may have occurred just outside their borders.

Medical men frequently complain to me of the number and elaborateness of the forms they are required to fill in notifying each case. Whether there is justification for this complaint or not, I believe it would tend to accuracy were it made as simple as possible. This same form could be made to serve for the notification of both by being forwarded to the local body by the householder —the medical man at present fills in the S.A. Form as well as the other two. One addition, I think, would be of value—that is, in the case of children in the household, the insertion of the name of the school they attend. Warning could then be issued to the school authorities to prevent the children attending during the necessary period of quarantine. Of course, where the Sanitary Inspector can visit the infected houses and get such details this would be unnecessary, but in outlying suburbs and in the country this is at present impossible.

The attached table gives in detail the particulars of notifications received during the ten months from August, 1901, to the end of May, 1902, from each sanitary area, typhoid and scarlet fever being the chief diseases dealt with during that time, and in all the City of Auckland shows perhaps a higher proportion than the population actually warrants:—

Summary of Infectious Diseases from August, 1901, to May, 1902.

[Figures in brackets indicate total number known to have occurred in the year June, 1901, to May, 1902.]

City, Suburb, and County.	Enteric.	Scarlet Fever.	Diphtheria.	Measles.	Blood-poisoning.	Influenza.	Tuber-culosis.
Auckland City	61 [80]	35	27	17	14	16	17
Mount Eden	14	1	2	2	1	1	3
Grey Lynn Borough	1	6	..	2	..	..	3
Eden Terrace	5	5	1	1	..	..	..
Newmarket Borough	2	1	1	..	..	..	..
Epsom	..	..	2	2	..	..	..
Onehunga	6	2	2	2	2	1	4
Remuera	1	1	1	1	1	..	1
Mount Albert	3	4	2	..	..	..	..
Devonport Borough	4	1	..	6	..	..	5
Parnell Borough	18 [20]	3	2	..	..	..	1
Mount Roskill	1	..	..	1	..	..	..
Avondale	[1]	..	1	2	..	..	..
Arch Hill	[1]	9	1	2	2	..	..
Mount Wellington	1	..	..	..	..	..	..
One-Tree Hill	1	..	..	..	..	..	..
Tamaki West	..	..	..	..	..	..	1
Coromandel County	..	1	..	4	..	..	..
Manukau County	9	..	..	3	1	1	..
Waitemata County	2 [5]	6	1	..	..	..	1
Hobson County	..	..	..	2	..	1	1
Cambridge Borough	..	7	6	..	..	1	..
Rotorua Town Board	5	9	..	..	..	..	..
Hamilton Borough	1	3	..	1	..	..	6
Thames County and Board	19 [48]	1	1	1	1	..	10
Tauranga Borough	..	2	..	..	..	..	..
Waikato County	4	3	..	1	1	..	10
Marsden County	1	..	..	..	..	..	..
Ohinemuri County	9 [12]	4	..	1	..	1	2
Bay of Islands County	6	1	..	..	1	..	..
Raglan County	1	..	..	..	..	..	..
Taupo County	..	..	..	..	..	..	2
Whangarei County	3	12	..	1	..	..	1
Rodney County	1 [2]	..	..	..	..	..	..
Otamatea County	..	..	..	..	..	..	1
Piako County	1	..	1	2	..	..	..
Waipa County	1	..	..	..	..	2	..
Mongonui County	1	..	..	..	..	..	..
Totals	182 [241]	117	51	54	24	24	69

Enteric Fever.

The total of 181 cases notified is certainly an indication of the backward state of affairs sanitary in this district. Moreover, to complete the year (June, 1901, to May, 1902) it is necessary to add fifty-nine cases which occurred before notification came into force, the occurrence of which I ascertained during investigation into special epidemics. While the factors which tend to keep up the prevalence of typhoid are doubtless lack of drainage and other sanitary defects, we must also consider whether the warmer climate in this part of New Zealand has not also an influence. Lack of statistics make this question difficult to answer accurately; we have, however, the records of the District Hospital for the past forty years, which no doubt give a fair estimate of the annual and monthly incidence. At my suggestion, a few years ago Dr. Baldwin, then Chief Medical Superintendent, compiled tables showing these data. By taking the total admissions per month for many years back he was able to trace the curve shown in black on the accompanying diagram. It will be seen that from November to April there is a fairly steady rise attending this maximum in the latter month. In May a sudden drop occurs, and from June to October the cases are at their lowest. This follows the experience of other countries, that the hot, dry months, such as we have in autumn, show the heaviest enteric bill. The rainfall curve, shown by dotted line, is almost the reverse of that of enteric, the rise in rainfall from April to May corresponding to the sudden fall in number of cases.

It follows almost too closely to regard the rainfall as the principal factor when we consider that a certain amount of time elapses between the infection and the appearance of the disease in a recognisable form; and, further, that climatic conditions, such as rainfall, take some little time to exert their influence on the water-supply, ground-water, and so forth. The temperature curve (shown in blue) corresponds fairly accurately with the typhoid curve, preceding it in the rise and fall by a month or so. This doubtless has a strong influence on the prevalence. The fall in temperature begins about March, and the rise in October, the typhoid curve being a month later. Probably the two factors, rain and temperature, both have their influence. In any hot, dry weather typhoid is more rife; but I scarcely think, however, that the climatic differences between Auckland and the more southern towns are sufficient to warrant the belief that these are solely, or indeed much, to blame for the high typhoid rate. On the chart the curve of incidence for 1901 to 1902 is marked in red, the figures indicating those actually known to have existed. It will be seen that some variation takes place from the normal curve. In June, July, and August the number of deaths is much higher than one would expect. The sudden rise in June is accounted for by the outbreak in Auckland due to infected oysters—a subject on which I have already furnished a report. In July and August, and to some extent in September, the line is higher than normal, owing to the outbreak of typhoid at the Thames caused by infected milk. We learn from the chart, therefore, that these two sources of infection were an unusual feature.

To the total number city and suburbs contributed 141, and the country districts 100.

It will be noticed that in the following places the number is out of proportion to their population:—

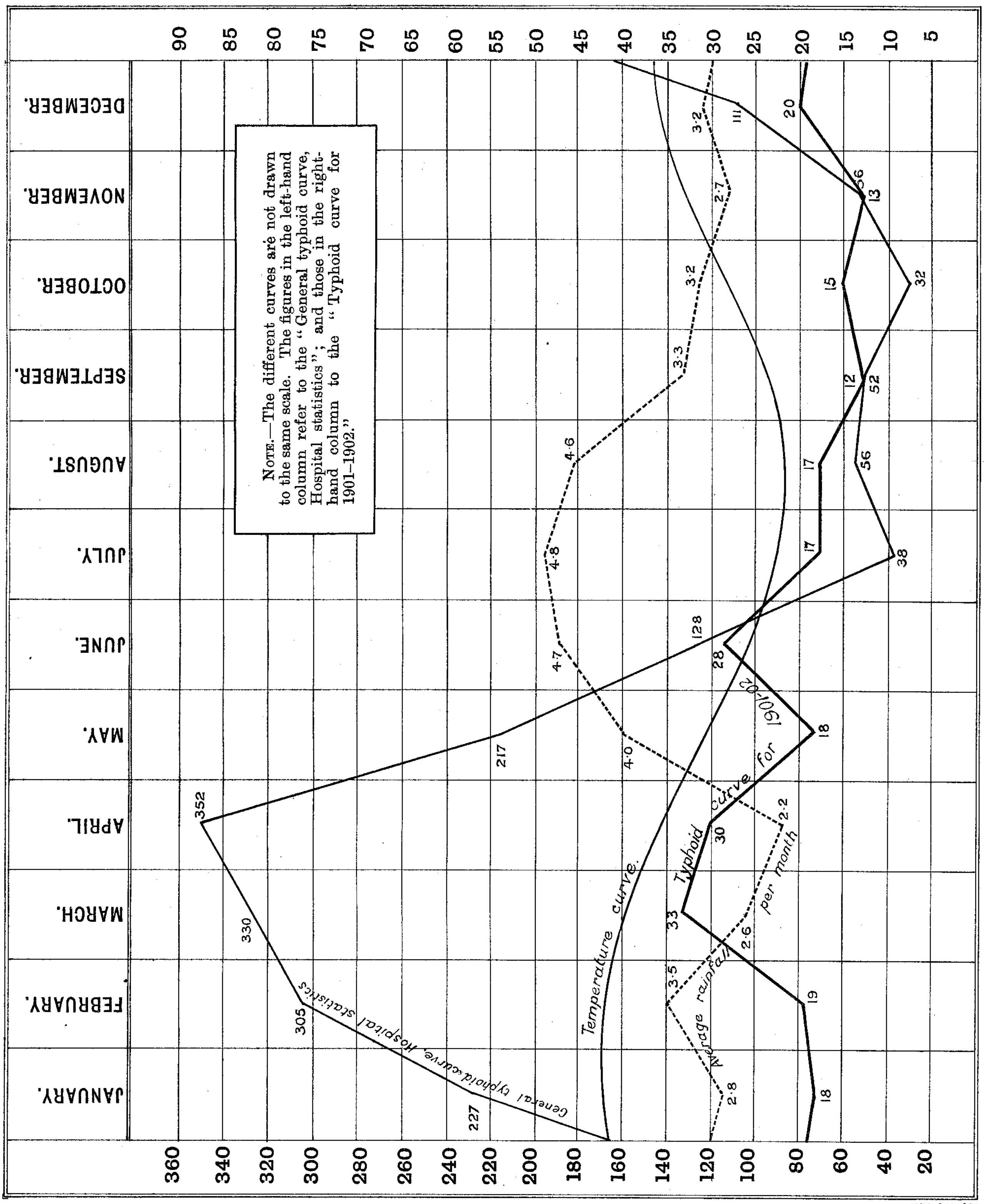
	Population.	Number.
City	34,263	80
Mount Eden	5,129	14
Parnell	4,566	20
Thames County and Borough	9,052	48

City.—In the city this is perhaps not so marked, allowance being made for the large area of dense population. The districts where the largest number of cases arose are perhaps not very well defined; but, on the whole, the older portions of the city—Hobson Street, Cook Street, Queen Street, and Freeman's Bay—suffered most. In these drainage connections are old and faulty; the sewers themselves are probably defective. In making some alterations in the closets of the charitable-aid buildings, where the District Health Officers were at first located, some very primitive house connections were unearthed, and the street sewer, an old brick structure, had partially collapsed. Towards the lower portion of the city, too, the tide washing up in the sewer causes flooding in the cellars, the traps being forced by the pressure. Further, the houses in these parts in many cases are built on reclaimed land. One of the chief factors, however, is the non-removal of house refuse, the accumulated filth in the back yards creating a malodorous condition which has been shown experimentally to predispose to typhoid.

Mount Eden.—The cases occurred chiefly in the lower slopes of the district, where the clay is nearer the surface and the volcanic-rock covering is thin. The whole district is undrained, and, being thickly housed, the waste water from the higher portions doubtless has an influence on the sanitary condition of the lower parts, which have more than enough to do to deal with their own sewage. This portion of the district suffered also from dysentery to a marked extent.

Parnell.—This district on the whole is well drained; but, it being one of the early-day settlements, the older portions have some very defective drain-connections, and are, moreover, somewhat overcrowded, privies being badly situated, yards small, and too often dirty; and it is in these parts that the bulk of cases occurred. The pollution of the foreshore about Mechanics' Bay also has had its influence.

Thames.—The very heavy typhoid incidence here is largely accounted for by the milk-borne epidemic, a special report on which was furnished in October. But in addition to this it must be confessed that the borough, and those parts of the country adjoining, are in a very insanitary condition—nightsoil service defective or not enforced. Drainage is of the most primitive description, and refuse is not removed at all. Then, too, the usual influence of the mining population, with their temporary dwellings and water-supplies, and complete absence of sanitary arrangements, has to be reckoned with in the outlying parts of the country.


NOTE.—The different curves are not drawn to the same scale. The figures in the left-hand column refer to the "General typhoid curve, Hospital statistics"; and those in the right-hand column to the "Typhoid curve for 1901–1902."
JANUARY.
FEBRUARY.
MARCH.
APRIL.
MAY.
JUNE.
JULY.
AUGUST.
SEPTEMBER.
OCTOBER.
NOVEMBER.
DECEMBER.
General typhoid-curve, Hospital statistics
Temperature curve.
Typhoid curve for 1901-02
Average rainfall per month
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5

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Taking now the direct means by which the infection is conveyed, I believe that a large number of causes are at work. In a district like this in which enteric has been endemic for many years it must follow that there is a considerable degree of pollution with infected matter of soil all over. I have made an effort to trace each of the 240 cases, except where they occur in out-of-the-way country districts. I have visited the houses personally, or sent Inspector Winstanley to make inquiries. I prepared a list of questions, chiefly relating to the supply of food and drink of the patient, which the Inspector asks in each case and fills into his report; this we find useful in such questions as conveyance of infection by milk-supply, &c. Close on two hundred houses were thus visited and reported on by Inspector Winstanley or myself. While in a very large number of cases the origin is not definite, and can only be vaguely attributed to general insanitary surroundings, the following have been traced with fair certainty:—

Infected Oysters (20 cases).—These oysters were presumably in all, and certainly in more than half, the cases traced to a retail shop in Lower Queen Street. One point of interest which did not appear in my special report on the subject—as it only came to my notice later—was the presence of a window, generally kept open- opposite which the oysters were opened and bottled—looking on to an alley-way which was bridged over by the wing of a boardinghouse, in which was a defective water-closet immediately above the window. When I noticed it there was a drip from the closet, which must have splashed into the window and doubtless infected the oysters. This seems as likely a source of infection as the soakage from the sewer into a cellar in which oysters were stored.

Milk-supply.—The Thames outbreaks in July, August, and September were certainly milk-borne, the bulk of the cases being traced to a very ill-kept dairy, the owner of which, with his family, had been ailing for some time with vague febrile symptoms—child had indeed died. The closure of this dairy was followed by almost complete cessation of typhoid.

Another instance of probable milk-borne infection occurred (limited to two cases) in Auckland. The patients were young children in families in no way connected, except that both had the same milk-supply, and the cases occurred simultaneously. No other cases were traceable to the dairy supplying the milk, and no source of infection was found. In all some thirty cases may be considered milk-borne.

Picnicking-ground.—Ten cases have during the autumn months been traced with some certainty to a favourite picnic-ground on an island in the harbour called Motutapu. Hundreds of pleasure-seekers every year resort to this ground. As far as can be judged, this must have resulted in pollution of the stream used as drinking-water. In one case the outbreak was amongst the children of two families who had visited this place on the same day, and three cases of typhoid followed about the same time; subsequently seven other cases were found to have picnicked here a week or two before their illness.

Polluted Foreshore.—Six cases may fairly be considered to have got their infection by bathing or playing on the beaches near the outfall of various sewers along the harbour-front. In one instance the municipal salt-water baths were the probable source of infection. Some few years ago I investigated two cases which were with some probability traceable to these baths, both occurring at the same time, both persons having bathed there on the same day, and both having complained of the foul state of the water. An inspection of these baths tends to confirm the opinion, since they are situated near the outfall of Freeman's Bay sewer. On the bottom is a deposit of black foul-smelling organic mud probably silt from the sewer.

This source of infection is interesting and of great importance as illustrating the growing need for some more cleanly method of disposing of the sewage than emptying it into the harbour. In the case of some of the smaller-sewer outfalls the sewer ends well above high-water mark, and the sewage finds its way across a beach, which is used as a playground by children. An instance of this occurred at St. Mary's Beach, Ponsonby, where one at least of the six cases originated. On having their attention drawn to it the Council continued the sewer to below high-water mark; but this is at the best a makeshift.

Of the remaining cases many can certainly be attributed to local sanitary defects. There is one street in Mount Eden district where five cases have arisen in four houses during the year. The lack of drainage is the possible source of infection. The houses are new, the water-supply is the general city supply, and the milk was not supplied from the same dairy in any two cases. The slop-water from the house runs out into the public road, and forms marshy spots at the edge of the footpaths. How the infection is conveyed from here to the house is another question, but it is easy to see that, given an infected bit of ground at the gate, there are many ways of conveying that infection—such as by boots to the hand, and from the hand to the food, and so forth—more especially where children are concerned.

Many instances have occurred which, had time permitted, would have repaid closer investigation. Thus two or three cases in town were traced to visits paid to a township up the line named Mercer, where the scent failed. In two instances the occurrence simultaneously of several cases in families showed some serious defect; but unless much time can be devoted to each, or the origin is very plain, the true source often goes undetected. One thing is certain, that the cases are more prevalent where dirt accumulates and soil is polluted. I have sometimes thought that the infection was conveyed on fruit fallen from the trees near the open ditch in the orchard which serves for the drainage of so many houses.

Some cases occurring in isolated back-country districts were of great interest. It should be easy to trace the infection in such cases, but in one at least nothing in this way of a previous infection could be traced. In this, as in probably many instances up country, the infection was possibly conveyed from Maori settlements. Much typhoid is present among the Natives, and goes undetected. One back-country case was interesting in that there was a history of the patient drinking water from a swampy spring, near which, two years before, two persons had been sick with what was probably typhoid.

Scarlet Fever.

A fairly widespread epidemic of scarlet fever has taken place, and chiefly during the last four months. Out of a total of 117 cases, the city contributes thirty-five, which is perhaps the share one would expect from the most congested part of the district.

Arch Hill.—A small road district of 1,600 inhabitants has too large a share (nine), owing to an outbreak amongst the scholars attending the district school (Newton East), which had to be closed in consequence. Altogether some fifteen children attending this school were affected. On my representation the Board of Education closed the school for three weeks, and had it thoroughly disinfected in the meantime. The epidemic was thus checked.

In *Whangarei County* twelve cases occurred, chiefly in one small district (Kamo), where again the district school was chiefly to blame; as was the case also at *Cambridge Borough* (six cases) and *Waitemata County* (six cases), where the scholars of the Woodhill District School were the sufferers. In these latter two cases the schools were disinfected at my request by the Education Board. The nine cases at *Rotorua* were not traced to the school, but occurred among adults as much as among children.

On the whole, the disease has been of a mild type, and has shown a lesser degree of infection than one has been accustomed to in epidemics in Britain.

Diphtheria.

Of a total of fifty-one cases, twenty-seven have been recorded in this city. This is an undue proportion, and may be taken as an index of the faulty drainage and lack of filth-removal. Every house in which a case occurred has been visited, and in all there were serious local sanitary defects—quite sufficient to account for the disease. Twelve cases of the twenty-seven probably originated at an old stable belonging to the Tramway Company, where the soil had for years been saturated with filth through the faulty flooring of the horse-boxes. The outbreak was coincident with the opening-up of this soil, and the cases occurred chiefly in the families of men employed about the stables. Their children all attended one district school (Bayfield), which as a special precaution was closed for a brief period to allow of a careful disinfection. The Tramway Company were directed to remove all polluted soil, and have it ploughed into a paddock within a specified time. This outbreak has now been checked. The remainder of the cases in the city and suburbs may be fairly traced to the very deficient drainage, as in each case the infected houses were situated near some open foul-smelling ditch in which slop-water sewage had accumulated.

Cambridge Borough is the only other place where the number of cases require comment. The six cases here (too many for so small a place) probably are traceable to the lack of night-soil removal, judging by the report furnished me by Inspector Winstanley, who visited the spot.

Measles.

The fifty-four cases recorded have been fairly evenly distributed throughout the district. The type varies between the ordinary and German measles. Adults seem to be more affected by it than one is accustomed to expect.

Tuberculosis.

The sixty-nine cases cannot be taken to indicate the number of tubercular patients. The notification has been irregular, some medical men being much more thorough than others as regards this disease.

A large proportion came from Waikato County and the Boroughs of Cambridge and Hamilton, owing to this district having acquired the reputation of possessing a climate suitable to the treatment of this complaint; and undoubtedly the atmosphere there is less humid owing to the geographical position and the porous nature of the soil.

In few instances have I taken any special steps in regard to tubercular disease, as until we have some provision in the shape of a sanatorium it is difficult to see what can be done. The unfortunate patients are in evil case just now, as, owing to the spread of knowledge of its infective nature, hotels and boardinghouses refuse to take phthisical cases in, and one can scarcely blame them.

I regard the sanatorium for tubercular cases as one of the most pressing needs of the district. At the Chief Health Officer's direction inquiry was made as to a suitable site for such an institution; and, taking into consideration accessibility, as well as climatic and telluric conditions, it is certain that Cambridge offers every advantage, especially with an improved railway service such as I understand will shortly be initiated. A very suitable property about five miles from Cambridge was visited by Dr. Mason and myself, and it is to be hoped that we shall not be without this most necessary institution much longer.

Influenza.

Twenty-four cases have been notified; these are probably mere catarrhal attacks; nothing in the shape of an epidemic of a specified type of the disease has existed.

The appearance in the Registrar's returns of several cases of death from influenza is worthy of comment. It is to be questioned whether other conditions, such as typhoid, may not escape notice under this heading owing to the difficulties of diagnosis.

Blood-poisoning.

The twenty-four notifications included three cases of tetanus, all of which occurred about the same time in March, though widely separated, two being in Auckland and one in Opotiki. It is worthy of comment that in previous years cases have arisen so concurrently as almost to be worthy of the designation "epidemic."

Of the other forms of blood-poisoning little can be gathered from the number notified, since each practitioner has his own interpretation of the term. Some notify every case of septic trouble, and some only special manifestations, such as puerperal fever.

Plague.

Two cases have occurred in the district, both proving fatal. The one living in Grey Lynn was a wharf-lumper, who doubtless contracted the disease while working on a steamer from Sydney. The other case was a young man residing and working in the city. No connection could be traced between his work, which was sorting kauri-gum, and exposure to infection from Australian shipping or imports. At the same time it cannot be said there is as yet any evidence of the existence of any focus of infection in Auckland, the disease not having, so far, manifested itself among the rats here, these being the usual advance agents of the outbreak. The first case was detected early, and removed to the Isolation Hospital, and the body disposed of by cremation. The second was only detected by *post-mortem* bacteriological investigation after the body had been disposed of in the ordinary way.

Dysentery

has this year made its appearance in Auckland, apparently of a specific type. Among the heaviest sufferers were the members of the Ninth Contingent in camp at Te Papa. The disease was not universally distributed, but followed certain areas, especially those with imperfect drainage. Onehunga suffered most severely, whether because of the presence there of the Te Papa camp or not it is hard to say. The lower slopes of Mount Eden and Eden Terrace also suffered. Devonport apparently escaped.

In view of this disease occurring, and of the heavy diarrhœal mortality, I think useful information would result were acute diarrhœa made a notifiable disease.

Several practitioners have commented on the severity of the epidemic of *chicken-pox* which passed over Auckland during the past six months. In two cases—both adults—I was called in, as the practitioner felt some doubt existed as to the diagnosis between small-pox and the milder disease. The severe epidemic present in London was, of course, a reason for taking precautionary measures; and this was done, the patients being isolated and their rooms and effects disinfected pending complete diagnosis. A few days' observation in the Hospital served to settle the question; but in each it was a most unusually severe form of chicken-pox, with violent constitutional disturbance, the most striking feature being the occurrence in adult life.

PROVISION FOR INFECTIOUS DISEASE.

Most of the local bodies, with the exception of the country Road Boards, have been induced to institute some means of disinfecting premises in which infectious disease has arisen. The process is not very efficient perhaps, but it is better than nothing; hitherto, unless the medical attendant chanced to give directions to the householder, no steps were taken. The pamphlets issued by the Head Office on enteric and scarlet fever have proved most useful in giving directions as to the precautions necessary. A further small pamphlet on disinfection in general, and the materials most suitable, would be of great value; as also one on precautions in cases of tubercular disease.

Infectious-disease Hospitals.

The lack of special provision for isolating infectious disease has for long been in this district a source of danger. The Auckland District Hospital has had two wards devoted to the treatment of typhoid fever, but these and a small isolation building, capable of holding four patients, is the sum total of the provision made. At all times it was inadequate, and in times of epidemics, such as this year occurred, the congested condition of the wards was a serious danger. Thus cases of scarlet fever and diphtheria had to be huddled together in the building in numbers far beyond the limits of safety, even had they been all of one nature. The result was that scarlet-fever cases developed diphtheria, and *vice versâ;* and the nursing staff also suffered. The building itself is insufficiently isolated, and the friends of patients and the general public could at any time mingle with the convalescents round the doors of the building. During the last few weeks, on representation being made by Dr. Mason, the Board have had it fenced off. No adequate means of disinfecting clothing, &c., exists; and though I recommended the City Council ten months ago to provide a steam disinfecting-apparatus, no steps have been taken. Infectious cases are conveyed to the Hospital in the general ambulance or in public vehicles, and though I arranged that an old ambulance be set aside for this special purpose it is not used, except where I specially direct that it be done. That up till now this utter lack of precaution against the spread of such diseases should have been permitted is one of the striking instances of the necessity for control by the State of sanitary matters, and serves as an example how useless it is to expect the local bodies, as at present constituted, to be the guardians of public health.

Special provision in the shape of a temporary hospital for plague cases and a building for contacts was made in 1900 at the instance of the General Health Commissioner owing to the outbreak of plague in Auckland. The burning-down of the latter building, and the emergency which resulted in the Hospital Board being granted permission to use the Plague Hospital for general infectious diseases (that being the only place available to relieve the overcrowding of the Board's own building), brought matters to a much-needed crisis. A section of the public objected, with some justification, to the re-erection of this hospital building on a recreation reserve, while the Hospital Board showed a tendency to annex the Plague Hospital permanently, and to take advantage of the fact that they are not called upon by the Public Health Act to provide for infectious disease, refusing to make even temporary provision for possible plague patients. The occurrence at this juncture of the first case of plague showed the urgent need for reorganizing the whole system, so

that the treatment of infectious cases might be put once for all on a sound basis. As the Act necessitates the calling on each local authority to provide for infectious diseases, Dr. Mason on his visit in April called together the bodies concerned (some fifty-two in number), and explained the necessities of the case to them. He showed how it was possible to combine them for the purpose of building the hospital, and induced all the representatives present to agree unanimously to the proposal. A sub-committee to select a site, draw up plans, &c., was appointed, and they agreed to leave the matter in the hands of the Department. A suitable site has now been acquired, plans are in preparation, and practically all the local bodies have assented to combine voluntarily and save the necessity for compulsion. We shall now have a thorough reform in the whole question of infectious cases—from special accommodation for dangerous cases to disinfection of clothing and proper conveyances for patients. I have lingered somewhat on this subject on account of its being the one far-reaching advance I have to record, and it seems to me to indicate the line on which other necessary reforms should be modelled.

Infectious-disease Hospital at Rotorua.

A small building has been taken over and converted into an isolated ward, in which cases can be placed prior to their removal to Hamilton District Hospital, where a special ward exists. Two rooms were specially lined and painted to permit of disinfection being thorough; the building was put in repair, and then handed over to the Town Board to administer. They have appointed a caretaker, and the building is now ready for use when necessity arises. The need for it was great, as the hotels and boardinghouses naturally refused to take in infectious cases, which now can be quickly removed from the township and receive proper attention.

A Special Wagon

for the conveyance by rail of infectious diseases has been constructed by the Railway Department, and is now complete. It is specially lined and painted, and floored with lead, so that thorough disinfection can be carried out. A closet with a closed pan is attached, and a stretcher with a spring mattress. I believe it will prove comfortable, and will be of great value. Should it be thought possible to supplement this with a small steam disinfector—such as Thresh's or Beck's—mounted on a truck, so that it could be conveyed to various stations on the line where necessity might arise, we should have a very satisfactory equipment for dealing with infection in country districts.

ADMINISTRATION OF PUBLIC HEALTH ACT.

While the Act of 1900 is in many ways in advance of previous Acts, and those of England, I respectfully beg to bring to your notice one or two difficulties which I have met with.

The Combination of Local Bodies for a specific purpose, though provided for in three ways, presents certain obstacles. Under the interpretation clause the Governor in Council can declare districts combined, but the administration has been placed in the hands of one of the local authorities. This is sufficient to prevent the others agreeing to be so combined, and thus one would require to use compulsion. A combination under section 60, by order of the Stipendiary Magistrate, only applies to drainage and hospitals. Further, in large schemes involving large outlay the Magistrate might not feel called on to act as arbitrator. Finally, the clause under the head "Public Works" permits of a combination only under mutual agreement. In dealing with small local bodies, each jealous of the other, and determined to evade as far as it can its share of expense, a mutual agreement seems hopeless.

As my district is subdivided into so many of these small bodies, I despair of getting any work done which necessitates from its extent and importance their co-operation Some wider power placed in the hands of the Chief Health Officer to compel a combination of districts would be of the utmost service.

Machinery for administering the Act.—In recommending work to be done one is often at a loss owing to the technical details which require the opinion of an engineer. Could one form an idea as to the cost and practicability of certain schemes, one's hands would be greatly strengthened when approaching the local bodies; and, again, should occasion arise for the use of the compulsory clauses of the Act and in carrying out work on this behalf, it would be of great assistance were there a Consulting Engineer for the Department from whom one could seek advice. On legal points, too, it would be equally desirable to have a general permission to refer to the Crown Solicitor. At present, when proceedings have to be taken against persons who offend against the Act, it has to be done by the local body, which has to be worked up to the right pitch—a wearisome business at all times; and probably some fault in serving the requisition is discovered at the last, and the process has to be begun over again. Thus valuable time is lost. It would prove more satisfactory had I at command all the machinery necessary to take such actions under section 27—at least, where small Road and Town Boards are concerned. Further, owing to the size of the district, it is impossible to keep in touch with the various works, regarding which requisitions on owners and occupiers have been served. Could one command the services of the police in country districts to take such action on the recommendation of the District Health Officer a great advance would be made, and it would save the appearance of weakness in administration which the present system permits when one learns a month or two after visiting a district that the work recommended remains neglected. Were each district constable an Inspector under the Act all this would be avoided. It is impossible at present to enforce the provisions of the Act systematically, and when once it is discovered that no penalty follows when default is made it is useless to continue making recommendations.

I gladly take this opportunity to recognise the intelligent assistance I have received from the police all through the district, and the hearty co-operation of Inspector Cullen in particular in any case where it was possible for him to give it—it leads one to wish that the Act permitted more

frequent calls on their support. To sum up, I find my position weak from lack of assistance in administering the Act over such a wide area, and from the fact that I am not an expert on legal and engineering questions.

The Clauses re *Nuisances*.—I have had on many occasions cause for complaint as to the careless disposal of nightsoil and refuse by contractors. One firm in particular I find repeatedly creating nuisances by depositing filth in unauthorised places, and in defiance of my directions. I cannot find, however, any clauses enabling me to prosecute in such cases. Where a nuisance exists, the owner or the occupier of the premises has to be proceeded against, and the true offender escapes and repeats the offence elsewhere. So, too, where the contractor neglects his work one can only reach him through the contract agreement with the local body, who will not generally take the matter up. I think that were nightsoil and refuse-removal added to the schedule of offensive trades a greater hold would be possible upon these contractors.

Closure of Schools.

No power is given to the District Health Officer to close a school during an epidemic. This power rests with the Board of Education. I am happy to say I have found this body in all dealings I have had with them ready to carry out my requests in a most satisfactory manner. But occasion might arise where some direct power was required, and the School Committee appear to be to some extent outside the jurisdiction of the Health Act, not being bodies corporate.

The duty of the schoolmaster in checking the spread of infectious disease among his children should be duly emphasized. In one instance an epidemic necessitating the closure of the school was traced to a child attending with hands desquamating from scarlet fever, detected only by chance by the master. I think that were he to notify the Health Department of such cases, so that prompt means could be taken, much infectious disease would be prevented.

Disinfection by Local Authorities.

Owing to the difficulty I have sometimes met with in getting the local bodies to realise their duty in the matter of disinfection of premises, I should be glad were this matter more clearly defined in the Public Health Act. It has been argued that section 29 leaves it optional on their part, and they point to section 27 as proof that it should be done by the owner and occupier on requisition by the District Health Officer. They complain, too, of the difficulty of recovering costs from the householders for the work done. In two or three instances where disinfection appeared to me to be urgent I have caused it to be done by my Inspector without any more notice than a verbal one to the occupier. The delay involved in the issue of a requisition to the owner as well, as required by section 27, would have proved undesirable, consequently I was compelled to go beyond my legal powers. Perhaps a clause dealing with such emergencies would not be amiss.

Inspection of Dairies.

There appears to be some confusion as to whether the duties of inspecting the dairies of retail milk-suppliers is in the hands of the Agricultural or Health Department. That more stringent inspection is required is evident from the condition in which I found the dairies at the Thames when investigating the outbreak of typhoid there in September. In one or two instances where I thought interference necessary, and notified the Agricultural Department, it was suggested that their duties were only towards dairies concerned in butter and cheese manufacture. In any case dairies in general would benefit by stricter measures and a large staff of Inspectors in whichever Department the control is placed.

Local Authorities.

It is impossible to report in a hopeful manner of the administration of the public health at the hands of these bodies. Even the largest of them, the Auckland City Council, appears scarcely to realise that they are responsible for the conditions which affect the lives of the people whom they control; while with a few exceptions the smaller bodies seem totally ignorant of the fact. As regards the larger communities, this is doubtless owing to the general indifference to sanitary laws which has characterized the general public in the past. We are now about the stage of public opinion at which England was sixty years ago. People wonder if such measures as have been adopted for many years back in more advanced communities are really necessary, and the old out-of-date argument is frequently heard, that our forefathers knew nothing of microbes, and were none the worse. Until the public have been educated to a wider knowledge of modern sanitary requirements I do not believe much voluntary improvement will be made by the civic authorities, and I can only suggest meanwhile a freer use of the powers given under an Act which is much ahead of the times so far as my district is concerned.

The chief fault lies in the subdivision of the district into numberless small local bodies, in which the spirit of Little Pedlington is the chief feature, increasing inversely as the size of the community diminishes. As an example of this subdivision, it is only necessary to state that within a radius of eight miles of the centre of Auckland one finds seven Borough Councils, thirteen Road Boards, one Town Board, and a County Council—each one a separate and independent sanitary authority. The total population of one of these sanitary districts is twenty-six inhabitants.

There are eighty-two independent local bodies in the Auckland Sanitary District—fourteen boroughs, nineteen counties, forty-two Road Boards, seven Town Boards. As with few exceptions each requires much supervision before being worked up to the point of really doing something, the task of the District Health Officer is no light one. Promises are made freely, and you go away feeling satisfied that a real advance is about to be made, only to discover when in the course of time you manage to revisit the district that the same state of affairs exists as at the first.

The larger districts are the most satisfactory to deal with. Thus the County Councils have on the whole done fairly good work when the necessity has been pointed out. So, too, some of the larger boroughs and Road Boards have shown a certain amount of willingness to comply with the suggested reforms. It is dealing with the small boroughs and Road Boards that the difficulty is most marked. There appear to be two reasons for this—one being the personal element which obtrudes itself. Thus Jones, Brown, and Robinson form quite a formidable party in the forthcoming election of Chairman or Mayor, and Smith, the present occupier, knows he need not expect to retain his seat if he prosecutes one of the clique for allowing his tenant's house to become ruinous, and should he be so foolish as to suggest raising the rates to enable the drains to be cleansed or the night soil removed he may as well retire at once. Being between the devil and the deep sea, he finds his only refuge is in pacifying the Health Department with fair promises, while Jones and Co. are satisfied by his subsequent inaction. I have been asked by members of small bodies to send them a peremptory demand to do certain work, so that the blame may be borne by the Health Department, as forcing their hands. The second difficulty lies in the poverty of these small bodies. They are often at the end of their rating-power, and their yearly income is enough only to meet the charitable-aid rate—a really large item—pay road-surfaceman's wages, with a little extra for his valuable services as Sanitary Inspector, and buy a few loads of road-metal. Sanitary measures may be very necessary, but there are no funds available, and it is hopeless going to the ratepayers for sanction for a special loan. The majority of the ratepayers are of the class who think that the whole duty of the civic representatives is to keep down the rates, and they regard dirt and disease as necessary evils. As an official of a local body remarked to me when objecting to the proposed measures for checking an outbreak of enteric, "What is a case or two of typhoid after all?" There is much of this spirit in the Auckland District. Two years ago when plague first reached New Zealand they were alarmed, but rather than bestir themselves preferred to bury their heads after the manner of the ostrich, shutting out facts, and declaring that they could not and would not believe plague had appeared in Auckland They are now more accustomed to it, and remark apathetically that "It is all right: it can't spread in such a city." What they have done to deserve the intervention on their behalf of a special Providence it is hard to see. Thorough reform will come only when the general public has had a sharp lesson, and their eyes are opened to the fact that neglect leads to trouble in this part of the world just as it did in the Old Country.

It would be unjust not to recognise the fact that there are some members of the various bodies who show up conspicuously on behalf of reform, and where by a happy chance they are in the majority their district becomes almost a model of sanitary righteousness. Even certain suburban Road Boards may be thus singled out, where the majority of the inhabitants are of the more enlightened classes, and poverty and overcrowding are unknown. Where the Mayor or Chairman is a strong man, and alive to sanitary needs, even though his followers should be otherwise inclined, his influence is often sufficient to guide their decisions in the right direction.

When it has been possible to spend the time in explaining and arguing the point with the body as a whole, and with the majority of its members, I have generally found that the point could be carried; but with so large a number of districts to deal with it is quite impossible to give each this individual attention.

To sum up the matter, the mechanism requires to be simplified by combining the small elements with the larger bodies, and thus avoiding to a great extent the petty questions which retard progress—local jealousies, want of funds, and the Councillor who represents a clique. Even though by so doing one would merge those districts which have been conspicuous for their advanced condition, they would leaven the whole, and their influence would be more widespread. Auckland City, I think, would be better in every way were it to include Parnell, Newmarket, Mount Eden, Eden Terrace, Grey Lynn, and Arch Hill. The thirteen local bodies which represent the remainder of Eden County could well be combined under one County Council. Country Road Boards and Town Boards are absolutely useless as administrators of public health, and should be merged in the counties of which they form part. The hopelessness of dealing with the twenty-eight little Road Boards which comprise Manukau County would be avoided were the Counties Act to be enforced over this area. Petty boroughs, such as Te Aroha and Birkenhead, would not suffer were they to have their sanitary affairs administered by the Councils of the counties in which they are situated. Larger boroughs, such as Whangarei and the Thames, would be strengthened by including the populous parts of the counties adjoining them.

With this increase in size, greater power of rating and borrowing and of executing works could safely be granted, and reforms would be possible which at present, owing to sub-divisions and lack of cohesion, are out of the question.

The Sanitary Condition of the Different Districts.

Auckland City.

The statistics given above show that Auckland is behindhand in matters hygienic, and an inspection bears out the fact. In every branch of sanitation there is evident room for improvement, from water-supply to refuse-removal. Fortunately there is a forward tendency now, thanks to the energy of His Worship the Mayor, Mr. Kidd. The movement is slow and relapses are frequent, but it exists, and only requires careful nursing. That there has been neglect in the past is evident from the large number of ruinous dwellings—hovels—which would not be permitted in the East London slums. The older parts of the city have fallen into decay, and a clean sweep should have been made years ago.

The drainage in these parts is of that primitive type which has long been abolished in more energetic cities. Even more modern parts show faults which indicate lack of system about the inspection—jerry-built houses, drain-connections which would not stand the slightest test,

plumbing-work of a date forty years back, and so forth. There is the most astonishing ignorance on the part of the Council as to modern sanitary requirements, their idea of sanitary inspection beginning and ending with the removal of rubbish when it has accumulated sufficiently to cause a bad smell. At a recent meeting at which I was urging an increase in the staff of Inspectors I was informed that it was not necessary, as all the backyards had been recently examined and cleaned up. As a matter of fact, there are not many buildings where serious faults do not exist. It must be admitted that they have during the past year caused a large amount of inspection to be done, but it appears to me to have been misdirected, as on examining the premises immediately after the more serious faults remain unchanged. The appointment of a well-trained Sanitary Inspector within the last few weeks should, however, result in this error being rectified.

Water-supply.—In this direction true advance has been made during the last year in the introduction of water from the Waitakerei Ranges. It is only a supplementary supply, and still has to mix with the dubious water from the Western Springs. But there is now a wholesome feeling of distrust regarding the water from this latter source—a feeling which did not exist three years ago, when I ventured to question its purity, as the vehement protests in the Press at that time show. A scheme for the completion of the Waitakerei supply is in hand, and in a few years we shall be able to dispense with the waters which have for their collecting-ground the most thickly populated part of the district.

Drainage.—This remains unsatisfactory from sewer-outfall to house junction. A few bits of patchwork have been done in the newer parts of the district, where sewers have been laid in the streets and carried down in some instances as far as the sea-beach. But the whole system is wrong. The advancing pollution of the harbour and foreshore has already been touched on, but this does not seem to be realised by the Council, for they continue to build vast tunnels (at great expense) which are calculated to take all storm-waters, as well as sewage, to be emptied along the sea-front. An up-to-date system of separating the sewage and dealing with it by septic tanks, or other modern methods, has not yet found a place even in the list of works to be done when funds and energies permit. One great evil which the present method leads to is the backing-up by the tide at high water of the contents of these cavernous tunnels, with the result that at the lower levels, such as the end of Queen Street, the pressure leads to the forcing of traps and the flooding of yards and cellars. The soil in such places must be saturated with sewage, and certainly they are prolific in evil odours.

House connections appear to be made without being officially tested, a mere inspection being apparently considered sufficient. What a systematic testing would reveal it is hard to say, but from the frequency with which the carefully supervised work in other cities has to be renewed it is probable we would find a very insanitary condition. The new by-laws, when they come into force, provide for better work here, and it is to be hoped every effort will be made then to carry out the work as it should be, and that the present pan closets, D traps, and other sanitary crimes will be abolished.

Nightsoil.—A very small proportion of the houses are provided with water-closets, and for this reason the nightsoil service should be carried out in a thorough manner. The use of closed enamel pans was doubtless an advance, but, as these pans are returned unsteamed and reeking with the filth of the tubs in which they are rinsed (in cold water), the system can only be said to attain a small part of its object. As an improvement I suggested the drying of the empty pans before the lids were fitted on, and this had a slight effect; but there is a great need for a well-regulated night-soil depot, where the pans can be steamed and the filth disposed of in a cleanly way. I cannot approve of the lumbering wagons which crawl malodorously over the roads for six or seven miles distance out into a suburb and there deposit their contents, to be ploughed in more or less roughly. With so much sea-frontage it would seem natural to use the waterway the harbour affords, and, though the carts would require to collect as before, their journeying would be shortened and the road saved much heavy traffic by having two or three collecting-wharfs where the pans could be transferred to a barge, and so towed up to some waste lands at the head of the harbour, where a depot could affect no one, and the ground is poor and will stand many tons of nightsoil. Here the apparatus for steaming could be placed, and the pans would be returned in a clean condition. It is a question not for the city alone, but for the suburban bodies to consider, and one on which to take combined action, if that be possible. Readjustment is required also by which the payment of the contractor should no longer be directly by the tenant. This leads to the former refusing to do his work owing to the latter objecting to pay his dues, and a nuisance arises as the result.

Refuse-removal.—At present six-sevenths of the householders dispose of their scraps by letting them accumulate until the stench gets unbearable, then they are burned, dug in, or carted away.

The whole question of refuse-removal is to be placed on a sound footing when the destructor is established. The money has been voted, the reports on the different forms of destructor have been obtained, and it remains only to choose a suitable site to erect the apparatus and frame by-laws dealing with the matter.

I am urging the Council to adopt a closed metal refuse-pan. I trust that in the course of the next few months I shall be able to report the city has at last an up-to-date system of dealing with refuse, and that future statistics will show by a greatly diminished death-rate and by a lower incidence of zymotic disease that this reform has gone far to remove the necessity for adverse criticism on the sanitary state of the city.

Cleansing of Streets.—An important advance is at present in progress in the asphalting of Queen Street. Thorough cleansing will be possible, and the complaint so frequently heard as to the evil odours arising from our main thoroughfare will be thus removed. It is to be hoped that a more cleanly way than the present of disposing of street-sweepings will be introduced. The utilising of such matter to fill up hollows and prepare vacant allotments for building purposes is

to be strongly condemned. The condition of a house built on such a foundation would be most insanitary. In too many places already the houses stand on polluted "made" earth, while the health of those living in the neighbourhood of these filth-tips is likely to suffer. The destructor will doubtless be utilised for the disposal of the sweepings; but mud scrapings and the contents of the silt-traps in the water-tables might be deposited in positions away from the populous centres, and on which habitations are not likely to be built.

Keeping of Animals.—Stables: The lack of impermeable material for the flooring of stables has resulted in most of them becoming dangerous nuisances from the soakage of the soil with urine, manure, and the washings of the vehicles. The case already mentioned where the turning-up of this soil resulted in an outbreak of diphtheria illustrates the necessity of reform here.

Fowls and ducks are at present too often allowed to wander at large about the back yard, even in the most crowded areas. By-laws dealing with this matter are being introduced.

Habitations.—There are a large number of old ruinous buildings totally unfit for habitation, in which the poorer classes are compelled to take refuge. Whole blocks of these exist here and there, and a noticeable feature is the frequency with which the same name is mentioned when inquiry is made as to the owner or agent. The landlords of these unwholesome spots have by their neglect forfeited all right for consideration, and I think the Council should not hesitate about taking over the land under the Municipal Corporations Act. Though there is not the need in this country for the provision of model lodgings for the poor that exist in English cities, still there is, I believe, room for a certain number of such dwellings. It would be satisfactory were there established a number of model dwellings—well-built cottages, with asphalted yards, properly constructed privies, and sound drain-connections—which could be had at a low rental, and whose inmates would be under constant supervision, as is the case in the workers' dwellings in London and elsewhere. I recommend the idea to the City Council, or, failing them, to some charitable body.

The sanitary arrangements of butchers' shops, retail milk-shops, eating-houses, and generally all premises connected with the storing and retailing of foodstuffs require more systematic inspection and control than at present, more especially the small dairies, of which many have no provisions for the storage of milk other than under the counter, &c., while the rule now enforced in England prohibiting the opening of living or sleeping rooms on to such places is frequently broken.

By-laws.—A new set of by-laws is in course of preparation, and should be complete very shortly. When they are in force it will be possible to carry out many necessary reforms, more especially in the direction of drainage-connections, structure of buildings, and keeping of animals. It is to be hoped that the Council will then organize their engineering and sanitary staff in such a manner as to permit of the new laws being strictly enforced. An Inspector of Buildings has, I understand, been appointed, and on the representation of the Health Department a qualified Sanitary Inspector (the choice in this case being left to the District Health Officer) was engaged early in May. If these officials are given the necessary assistance and encouragement in the administration of the new by-laws, it would not be long before the sanitary conditions of Auckland are placed on a satisfactory basis.

The Suburbs of Auckland City.

The bodies which might be included in this term are so numerous that it is impossible to take each in turn in regard to its sanitary condition. I shall briefly mention a few of the more important of them, and then consider their requirements as a whole. It is to be regretted that most of them exist at all as separate sanitary authorities; but the scheme for a Greater Auckland appears to have few supporters as yet; and it must be confessed that for many years the condition of affairs in the city did not tend to encourage a voluntary combination. I believe, however, that with the advances about to be made suburban prejudices will gradually diminish.

Grey Lynn Borough (population, 4,110).—The death-rate is on the whole low in this district, and there has been a most remarkable absence of zymotic disease—notably typhoid fever—only one case being reported during the past year.

Grey Lynn is one of the smaller bodies fortunate in having in its Mayor (Mr. Warnock) a gentleman fully alive to the importance of sanitary matters, and a Council willing to carry out to the utmost of its ability his schemes for improvement.

The drainage scheme is now almost complete; it is founded on sound principles, aiming at the separation of sewage from storm-waters, and therefore the ultimate disposal will not present a serious obstacle.

Nightsoil service has hitherto been bad, the old open wooden receptacles being in vogue, but a closed-pan service is now being instituted.

Refuse-removal is on a sound basis, being compulsory, and payment therefor being out of the general rate. The use of a closed metal receptacle is now being considered, and will shortly be introduced.

The houses are mostly fairly new, and the premises are clean.

The borough is unfortunate in being the recipient of certain undesirable elements from outside. Thus the presence of the city slaughter-yards within their boundaries has been a grievance, especially when the very unsatisfactory state of these premises is considered, and the imperfect manner in which the offal is disposed of.

The refuse-tip for city and suburbs is a fault which the erection of the destructor will remedy.

The stable and cart depots of the nightsoil contractors tend by their presence to make the immediate neighbourhood insanitary. When there is a proper system of cleaning the pans this defect will be remedied to a large extent. At present efforts are being made by whitewashing the carts inside and by cleaning more carefully and drying the pans to keep the nuisance to a minimum.

Parnell Borough (population 4,566).—The heavy typhoid list (twenty) suggests that this suburb is not in a satisfactory sanitary condition. It is one of the districts settled in the early days, and has a large number of old dwellings, with the defects of former years. There are some congested areas also with a population of the poorer classes. This district is perhaps the chief sufferer from the sewage pollution of the harbour, the foreshore in Mechanics' and St. George's Bays being certainly affected.

The drainage system is almost complete, so far as removal of slop and waste water is concerned, and is to some extent a separate one; but, as there are five or six distinct outfalls on the beach, there is much work in the future as regards a scheme for final disposal.

Nightsoil: The old open-box system still continues. The Council have under consideration the adoption of the closed pan, but they appear to be very slow about making the alteration.

Refuse-removal is compulsory on the householder, but there is a lack of supervision, and a bi-weekly service with a metal receptacle is needed.

Houses: Many old and ruinous buildings exist which might well be pulled down.

The Council are in financial difficulties, as there have been heavy calls on their resources over the drainage scheme and the roadwork, and sanitary matters no doubt suffer in consequence.

Newmarket Borough (population, 2,060).—That the death-rate from zymotic diseases is not above the average is to be wondered at so far as this borough is concerned.

The drainage is very deficient, a large number of houses have no sewer-connections, and the slop-waters merely lie in the water-tables, the fall being imperfect. Plans have been obtained for a good sewage scheme, but poverty prevents active steps being taken.

Nightsoil is removed, but in the old-fashioned way, and a fortnightly service is permitted.

Refuse is removed, but there is need of more system and the institution of the closed metal collecting-pan.

Houses are chiefly those of the poorer classes, but fairly new; therefore few are ruinous.

Mount Eden Road District (population, 5,129).—The district being one of the largest of the suburbs, and having a well-to-do population, is yet somewhat backward, largely owing to the rapidity with which it has grown. There is a movement towards improvement now, which seems likely to lead to a better state of things.

Drainage: There is no sewer system, as the residents trust to the loose porous nature of the soil to get rid of their slop-waters, generally digging cesspits for its reception. The volcanic-ash coating over the clay subsoil no doubt admits of its disappearance to the underground watercourses, and ultimately to the Western Springs, which in part form the natural drainage-outlet from this district. The significant appearance of so many typhoid cases about the lower slopes of the district, where the clay comes to the surface, suggests that this haphazard system is beginning to result in pollution of those parts. There are many natural difficulties in the way of a drainage system, owing to the rocky broken condition of the surface. The Board are now obtaining the services of an engineer to report and prepare plans for a comprehensive scheme.

Nightsoil: During the last few months the closed-pan service has been introduced, part of the terms of agreement being that the contractor shall steam the pans, which is a distinct advance on the contracts in any other district.

Refuse-removal is little attended to; the district is sparsely populated in many parts, and there this is not a serious matter, but in one or two places improvement is required.

Houses generally are of a good class, and there are no poor congested areas.

Onehunga Borough (population, 3,000).—This is a very backward township. There is a great need of a drainage system, as at present no means of disposing of the slop-water exists, and there are many thickly populated parts. This is the more important as the borough water-supply is from a spring in the centre of the town, and, as the soil is of a loose porous volcanic nature, the slop-water from the houses and the storm-water washings from the roads filter down into the springs from one-half of the settlement. It is a matter for constant surprise to me that this water remains fairly pure. It, however, shows now a greater degree of contamination than it did when I made an examination three years ago, and probably this will progress till the spring is unfit for use. Steps are about to be taken to better protect the spring from pollution from its immediate surroundings; hitherto it has been open to every chance of contamination from the many cottages in the vicinity.

Nightsoil-removal: The old wooden box is in use, and a fortnightly removal is permitted.

Onehunga suffered heavily from dysentery, or, at least, severe diarrhœa of a dysenteric type. The position of the water-supply suggested its contamination as the source of infection, but I would not say that bacteriological examination furnished any proof of this.

Eden Terrace and *Arch Hill* are two small Road Boards abutting on the city. They furnish excellent examples of the evils of such small bodies acting as sanitary authorities. The Boards are quite willing to follow out the schemes indicated by the Department, but their rating-powers are exhausted, and they find themselves unable to carry out most necessary sanitary works. They have each recently constructed a number of small street sewers, and passed by-laws to control the putting-in of house connections, but this has exhausted their funds completely.

The nightsoil system in these districts is old-fashioned, but by the new by-laws a metal box must be used.

Devonport Borough.—This suburb on the north side of the harbour has a population of 3,800. It is well advanced in sanitary matters, has a good water-supply, and the drainage system is satisfactory, with well-constructed house connections. Few of the houses are without closets, and the nightsoil service is now almost abolished. Refuse-removal might, however, be improved on: a metal bin, with regular and compulsory removal, is required. This borough is fortunate in having a thorough system of sanitary inspection.

The remainder of the suburban districts scarcely demand comment, though one or two, such as *Remuera* and *Mount Albert*, are becoming closely populated in parts, and in these the primitive methods of drainage and nightsoil-disposal are beginning to prove inadequate.

The following is a brief summary of the sanitary conditions in the suburban districts :—

Drainage.—With the exception of Grey Lynn, Devonport, and Parnell, the drainage is very inadequate.

The Hobson Bay Sewage Act, providing for the sewage of Newmarket and parts of Mount Eden, Parnell, Remuera, and the city, will remedy a very serious nuisance in the natural water-courses, the polluted streams being merely open sewers. The usual defect in providing for the ultimate disposal of the sewage exists, however, and a septic tank should certainly be constructed, as the flow is into a shallow bay, which will suffer if untreated sewage discharges therein.

I have been endeavouring to combine the local bodies affected to deal with a similar open sewer running down what is known as the Arch Hill Gully, a very offensive state of affairs existing.

Eden Terrace, Arch Hill, Mount Eden, Mount Albert, and a considerable part of the city and a portion of Grey Lynn will be benefited by the construction of a well-built sewer here. The bodies concerned are all anxious that the work should be done. There is some difficulty, however, in combining them under the Health Act so as to provide the funds for the building and upkeep of the work. A legal agreement form is at present being prepared.

Water-supply.—Most of the suburbs, except Devonport and Onehunga, use the city water-supply. A few months ago, however, a new supply was obtained from one of the springs arising near Onehunga. It is in the hands of a body known as the Manukau Water Trust, and is intended to supply Mount Wellington, One-Tree Hill, Mount Roskill, Epsom, and Remuera districts. The position of the spring is more favourable than that supplying Onehunga, and it is better protected. However, careful supervision will be required of the premises on the slopes above the spring, and for this a drainage system for that part of Onehunga is required.

Nightsoil-removal.—Except in Mount Eden, the method employed is of a primitive type, while in the more outlying districts it is absent altogether. An up-to-date service is being introduced in Grey Lynn.

Refuse-disposal.—The larger suburbs have a more or less imperfect system of removal. The outlying districts have suffered in the past in being made the recipients of all the filth from the city and populous suburbs. Thus at Point Chevalier is the general nightsoil depot, the presence of which certainly is against the expansion of the district; in Grey Lynn is the refuse-tip. Another smaller one exists in the Mount Albert district, where the owner of the property feeds his pigs on the matter in the tips. He was prosecuted and convicted for creating a nuisance, but I believe the deposit of refuse continues in a small degree, though evidence is not strong enough yet for purposes of further prosecution. Deposits of fish manure in the suburbs have given me a lot of trouble, more especially in Mount Roskill. The matter is so very offensive that it seems quite impossible to deal with it, however carefully, without creating a nuisance; while in the summer the flies, attracted by the smell, are an annoyance to the whole neighbourhood, and doubtless act as conveyers of disease.

These defects should partly be remedied when the city destructor is built, but not entirely, unless the suburban boroughs unite with the city in order to get their rubbish destroyed also. It is unsatisfactory that this important question should be in the hands of careless contractors and their staffs, who require constant supervision, and are utterly regardless of all sanitary laws.

The Abattoirs.—This properly is a city question, but as it seriously affects so many of the suburbs I deal with it here. The deadlock, caused by the City Council refusing to select any but the sites they know the Government will not sanction, is produced in the interests of certain small butchers, who object to the abattoir being shifted from its present position on account of the distance they would have to bring the meat. There is only one district possible for a permanent abattoir, and that is at Otahuhu or Penrose. This site being on the railway makes the conveyance of meat possible under proper sanitary conditions, instead of by open carts over dusty roads as at present. The railway also makes the site convenient for practically all the butchers in the city and suburbs. The increase of population in the districts between Auckland and Onehunga precludes the driving of cattle across that part of the country—at least, in the near future; and as practically all the cattle for market come from the south the abattoir must be south of this line, and Penrose to Otahuhu are the only places at which drainage can be well dealt with. All the sites chosen by the Council have been north of this line, and, though some might be made in a measure sanitary, they could never be permitted, no matter how well constructed, on account of the driving of cattle and the absence of means of communication except by road. Meanwhile the present slaughter-yard is becoming daily more dangerous, being utterly neglected and very dirty. The meat killed there can scarcely be considered fit for human consumption. The suburban butchers, too, being now shut off from the use of their own premises as slaughter-yards, are in somewhat of a difficulty. It is quite time the matter was settled.

Country Districts.

Boroughs.

Thames Borough underwent a severe ordeal in the typhoid epidemic last winter; but, though a few improvements have been made, nothing in the shape of a far-reaching sanitary reform has been introduced.

The water-supply is good, but drainage is very bad, largely owing to the low-lying parts being at sea-water level, and therefore frequently flooded, and the sewage is not carried away properly.

The nightsoil service was most primitive, and lacked supervision, the contractor doing as he pleased.

There are many ruinous buildings, and the plumbing-work is of a very primitive type.

Rotorua.—While in most directions this town is well forward, the drainage scheme remains incomplete, and so long as this is the case there will be the danger arising from accumulation and soakage of slop-waters.

The water-supply might be improved also, as the present water is somewhat peaty, being from swamp lands. I inspected and reported early in the year on a very satisfactory source from which the supply might be obtained.

Three of the hotels have during the last few months had improved drainage arrangements added, two being provided with septic tanks.

The nightsoil depot has been shifted from the centre of the town to the outskirts.

An isolation ward for infectious disease has been obtained.

Refuse-removal is done systematically by the Health Board's own employees, and so, too, with the nightsoil-removal, much the most satisfactory way of working, both from a financial point and as regards the efficiency of the work. In this other small towns would do well to copy the Rotorua Board.

Tauranga Borough (population, 945).—There has been a good deal of neglect as regards the sanitary arrangements in the past. Being a small town with plenty of space between the houses, the soil porous, the absence of sewers and of refuse-removal is not so serious a matter, except as regards houses in the vicinity of public wells, of which there are two.

Water-supply is chiefly by rainwater-tanks.

The nightsoil service was much neglected, but I am assured my representations on the subject have now been attended to. The Council are also making a crusade against rats.

Waihi Borough (population, 500).—This borough has only recently been created, and it is too early to say whether in sanitary matters this step will lead to improvement. There is urgent need of a good water-supply, a drainage scheme, and an improved nightsoil service with properly constructed receptacles. Typhoid is too common already, and the town is growing rapidly.

Te Aroha Borough (population, 900).—This town might be, from its natural advantages, a very perfect little health resort. Beyond a good water-supply, however, very little has been done. There is no nightsoil service or refuse-removal, and drainage is very imperfect in most parts. Two sewers connect the hotels and sanatorium with the river, which is already beginning to show evidence of pollution. The offer of a subsidy by the Government for the purpose of erecting a septic tank to remedy this was met with a reply that the Council could not afford it, but were "contemplating a nightsoil service." I fear they have become so lost in the contemplation of this hypothetical scheme that they fail to grasp the fact that to be a health resort they must strive to do a little more than a backwoods township as regards sanitary matters.

Cambridge Borough (population, 989).—With a dry bracing climate, a porous soil, and many natural beauties, Cambridge has acquired, with some justification, a reputation as a resort for invalids, especially those with tubercular mischief. A sanatorium is urgently needed, however, as the presence of these unforunates without careful supervision is likely to lead to a spread of the disease. The Council are beginning to wake up to the necessity for living up to their reputation in the direction of improving the sanitary arrangements. A good water-supply is now being installed. It is perhaps too early to demand a drainage scheme, but a nightsoil service is urgent, and I trust the Council will respond to my representation on this subject, as the recent outbreak of diphtheria indicates the need of such an improvement.

Hamilton Borough (population, 1,253).—The growth of this town demands a corresponding advance in sanitary schemes. The Council have in hand a water-supply from the Waikato River, which is to be followed by a drainage system for the thickly populated part of the town, where there is urgent need of it. The question of nightsoil should then be taken in hand, and some means found of disposing of house refuse other than the present system of tipping it over the river-bank, thereby polluting the water and spoiling the beauty of the river-front.

Whangarei Borough (population, 1,429).—A good water-supply has been obtained during the past year, and I understand an improved drainage scheme will follow. The nightsoil service would also stand some reorganization.

The Counties.—Whether it be that their size prevents to some extent the growth of a petty parochial spirit, or that funds are more plentiful, it is certain that these bodies fall in more readily with schemes for sanitary improvement For this reason I should welcome the control by County Councils of Manukau and Eden Counties. The chief fault with these Councils lies in the delay in getting work done owing to their meetings being but once a month.

Eden County has already been dealt with.

Manukau (population, 12,306).—It is absurd to expect the twenty-eight little Road Boards comprising the county to deal adequately with sanitary matters, and I have had a good deal of difficulty in regard to getting their consent to the infectious-disease hospital scheme, or in persuading them that they have any duties in the matter of public health.

Waitemata County (population, 7,000).—This is a difficult district to deal with, being large and ill-supplied with roads, while the distribution of population varies from the thickly populated Northcote district to the desert waste of gumfields. These latter also are a drawback, in that the gum-digging population is generally drawn from the lowest class, and therefore the most insanitary. The Council have taken in hand the question of Sanitary Inspectors; and, as there was no neighbouring county with which it could well be combined for the purpose of supporting a trained man, they have appointed intelligent men, residents in the various centres, who will act in that capacity, and deal with disinfection, and so forth, when called upon. It has been arranged that each should come to town for instruction by the Health Department in his duties. I believe this scheme will answer the present requirements sufficiently.

Hobson County (population, 4,800).—Except in the matter of the drainage of Aratapu, there

have been no dealings in this district. In the one case the Council readily agreed to carry out schemes proposed by Dr. Mason on his visit there.

Rodney, Otamatea, Whangarei, Bay of Islands, Hokianga, Mongonui, and *Whangaroa Counties* do not call for comment. With the exception of Whangarei all are sparsely populated. In Bay of Islands a number of cases of typhoid have been reported, chiefly among Natives.

Coromandel County (population, 4,169).—The township is being supplied with water from a good source in the hills. The nightsoil is removed by contract. Formerly this district was much affected by enteric fever, but no case has been reported this year. There is need of a drainage system, and more supervision in the matter of nightsoil-removal.

Thames County (population, 5,043).—The mining population militates against the sanitary condition of this county, as they are too nomadic to take much heed of such questions as pure water-supply and the proper disposal of filth.

That part of the country adjoining the Thames Borough was in a very bad sanitary condition, being without any nightsoil service, though thickly populated, so that the streams entering the borough were polluted by the filth of these settlements, nightsoil, refuse, and drainage being thrown into them freely. These defects are being in a measure remedied.

Ohinemuri County (population, 5,000).—Here, again, the presence of a number of mining communities makes sanitary matters difficult. In one of them—Karangahake, a very crowded township—the conditions were serious, owing to the lack of nightsoil-removal and the pollution of the river-banks. On my representation the Council have agreed to institute a nightsoil service, which shall be compulsory for the householders in the congested parts. This will shortly be enforced.

Pollution of rivers: A serious question, occurring in many country districts, but especially in Ohinemuri County, is the pollution of the rivers and streams. Here the pollution is partly by sewage and refuse from the various townships on the banks of the Ohinemuri River, but chiefly from the water-overflow, from the stampers, &c., of gold-extracting batteries. There is so much of this that the water is always of a pea-soup consistency, smelling strongly of cyanide. It is quite unfit for human consumption or for cattle, and the settlers lower down suffer in consequence. I do think it would be possible to stop this state of pollution without interfering with the mining industry, but I have been endeavouring to get the local bodies to put a stop to the practise of using these watercourses as sewers for drainage, and as convenient tips for refuse, nightsoil, and such filth.

At Te Aroha, Hamilton, Cambridge, Huntly, and Waiuku I have called attention to the matter, and shall not let it rest at that. Were it possible to have Conservation Boards appointed much good would result. The need for reform in this matter is illustrated by a case I have in hand at present, where the purity of the Waikato River (where it is proposed to obtain the water-supply for Hamilton Borough) is threatened by the drainage from the District Hospital entering a tributary stream. The Hospital Board are taking the matter up, and have appointed an engineer to report on the best remedy.

Of the remaining counties, in three—*Taupo East, Taupo West,* and *Kawhia*—the Counties Act is not yet in force. In the latter two, however, population is increasing rapidly, especially along the railway, and a local sanitary authority will be shortly required. Opotiki, Tauranga, Whakatane, Piako, Waikato, Raglan, and Waipa Counties do not call for special comment. In the latter the one bit of work I called on the Council to do—the completion of the drain at Ngaruawahia—has been carried out satisfactorily. Many portions of these districts remain unvisited, as also does the extreme north; but I have found more than enough urgent work in the more populous districts to occupy the most of my time so far.

Special Measures taken by the Health Department in Auckland District.

Precautions against Bubonic Plague.

(*a.*) *Quarantine Work.*—The adoption of the quarantine regulations has thrown a strain on the limited resources of the Department. A special temporary clerk was appointed to deal with passengers and assist the Port Health Officer in the issue of licenses. Twenty-three medical men were appointed examiners in the Auckland District. Passengers on fourteen vessels arriving in Auckland from Australia have been licensed and examined up to the tenth day after leaving Sydney. In all, 1,223 passengers landing in Auckland have been dealt with, and 2,904 examinations made, exclusive of those arriving from southern ports. Defaulters have as far as possible been hunted up by the police, but generally four or five in each boat managed to evade one or more of the required examinations. Prosecutions have been undertaken in two cases—one for not reporting, and the other for coming ashore without a license. The police have given great assistance in carrying out this work, one constable being especially appointed to visit the addresses of those not reporting and bring them up for examination. Many cases might have been prosecuted had the Department wished.

Cargo-vessels from infected ports have been fumigated also, and deposits collected from the agents in eleven cases in Auckland.

At Kaipara and Hokianga Port Health Officers have been appointed, and vessels from infected ports subjected to fumigation and the crews examined, and arrangements made for collecting of deposits to cover expenses to the Department.

All this has entailed a vast amount of correspondence.

(*b.*) *Precautions on Land.*—Since February last the local bodies in the populous area, and those near seaports have been approached from time to time personally, or by circular, with a view of establishing special measures against the spread of plague.

A campaign against rats has been carried on by most of these bodies, 3d. per head being offered. The city authorities have been destroying from four to five hundred rats per week, and the suburban bodies have also done something in this direction, as have one or two of the county boroughs.

Special Sanitary Inspectors were appointed during March and April to make a general inspection, and see to the removal of refuse and anything likely to encourage rats. In the city four Inspectors were thus engaged. The work done was superficial, being confined merely to rubbish in back yards, but it was at least a step in the right direction. A conference of local bodies has from time to time been convened by the Mayor of Auckland. I have attended their meetings and placed before them the various precautions and sanitary improvements necessary, and, though no very marked reforms have resulted as yet, it is possible that these conferences may, by the discussion and explanation of Auckland's needs, lead to greater consideration being given to sanitation.

Rats from time to time have been obtained and examined, and so far none have shown symptoms of plague; but did time permit a much more thorough search would be desirable.

One case of plague was reported and removed to the isolation ward. A second case was detected only after death. Seven other cases where circumstances seemed suspicious were inquired into, and where possible bacteriological examinations were held. Thus three *post-mortems* have been made, two inquests attended, glands in three cases have been removed and examined, and one spleen obtained from an inquest I was unable to be present at. Mr. Gresham, District Coroner, has given every assistance in investigating cases of sudden death in which there was a possibility of plague being the cause. In none of the seven cases was there any evidence of the cases of illness being other than ordinary. In the two cases of true plague the premises have been specially disinfected, and the sanitary condition of the neighbouring houses improved.

The following matters may be singled out as having been specially investigated and dealt with during the year:—

Outbreak of Typhoid conveyed by Oysters.—The cases were as far as possible visited, the whole condition of the oyster trade inquired into, the wholesale and retail businesses visited, and the means of storing and conveying the oysters. All the oyster-beds in the Manukau Harbour were inspected.

Ptomaine-poisoning Cases.—The chief of these cases was a serious outbreak amongst the guests and servants at the O—— Hotel. Seventeen persons in all were affected, and one case proved fatal. The affair was investigated by Police Inspector Cullen, who gave me most valuable assistance. The cause was traced to whipped cream, which must have been infected by some of the many forms of bacteria causing such attacks. I made a fairly exhaustive bacteriological analysis of some of the milk from the dairy, but failed to detect anything worthy of note.

The other cases investigated were:—

Ptomaine-poisoning from sausages: The case—a boy living in Onehunga—proved fatal. The sausages were traced to a shop in Auckland, which was in a very insanitary condition.

A case at Ngunguru, Whangarei, in which two children and an adult were affected—one adult dying; cause uncertain.

A case at the Thames, where two children took ill and died, was traced to tinned meat, which had been kept till decomposition had set in.

A case at Waihi—an elderly man who died; cause not definite.

Outbreak of Enteric at the Thames.—Investigated and traced to a dairy. Some forty houses in which cases have occurred were visited, a dozen dairies were inspected, and the sanitary conditions of the town as to drainage, water-supply, and nightsoil service were noted.

The following investigations were made into cases of supposed dangerous infectious disease (other than plague):—

Leprosy reported at Ngawa, Bay of Islands, was visited and found to be tubercular.

Small-pox: Two cases reported in the city. All precautions were taken, and the premises specially disinfected; but both cases proved to be aggravated cases of chicken-pox.

Infectious-disease Hospital for Auckland.

This matter is occupying a good deal of time at present. So far, in connection with obtaining the consent of the fifty-two local bodies concerned, 130 telegrams, 68 circulars, 13 special letters have been despatched, and the representatives of twelve local bodies specially interviewed.

Other Matters which have required Special Attention.

Isolation Ward at Rotorua.—The preparation of this building necessitated frequent visits to Rotorua.

Sanitary Inspectors.—The duty of choosing the Inspector for the city was placed on the Department. Thirty-four applications were considered, and five applicants interviewed and subjected to a brief examination.

Three applicants for the position of Inspector for Waitemata County have come to the office for instruction in their duties.

Circulars re combining to obtain the services of an efficient Sanitary Inspector have been sent to nineteen local bodies in Eden County. This matter is still in hand, but the responses so far have not been encouraging. I have interviewed many of the local bodies in the Auckland District on this matter, and the proposed districts have been planned out, but the project is only being taken up.

Sanitary By-laws.

By-laws for the following have been supervised:—

Auckland City.—These are now in process of preparation.

Rotorua.—Many alterations have been suggested.

Mount Wellington.—Special by-laws *re* nightsoil service have been framed.

Arch Hill and Eden Terrace.—The same set of by-laws has been prepared for these two bodies, and is now in force in Eden Terrace, and will be so in Arch Hill early in July.

Cambridge.—A set of by-laws *re* nightsoil has been prepared and submitted to the Council.

Kawhia.

The prospects of this place as a health resort have been reported on, the hot springs visited, and samples sent to Wellington for analysis.

Insanitary Buildings.

Premises in the following places have been inspected and recommended as only fit for pulling down: Auckland City, 6; Parnell, 1; Tauranga, 1; Rotorua, 1.

Water-supplies.

The conditions of water-supply, or proposed source of supply, have been investigated in eleven places, as follows: Thames County, water-race; Thames Borough, supply; Rotorua, projected supply; Cambridge, projected supply—analysis made; Hamilton, projected supply—analysis made; Coromandel, projected supply; Remuera, projected supply; city water-supply analysed, Onehunga water-supply analysed, Manukau Water Trust analysed, Wairoa bakery well analysed. Six supplies have been bacteriologically investigated.

Drainage System.

Special inspection has been made of the drainage of twenty-four districts as, follows: Auckland City, Mount Eden, Huntly, Waitekauri, Thames Borough, Whangarei, Opotiki, Te Aroha, Devonport, Arch Hill, Waihi, Karangahake, Rotorua, Hamilton, Hamilton Hospital, Avondale, Grey Lynn, Eden Terrace, Waikino, Paeroa, Tauranga, Aratapu, Coromandel, Ngaruawahia.

Nightsoil Depots visited and reported on.

Auckland City, Coromandel, Mount Eden, Karangahake, Thames, Rotorua.

Schools inspected.

Ten schools in city and suburbs and thirteen in the country districts have been inspected, and in all the improvements suggested have been or are being carried out.

The following schools have been closed and disinfected owing to epidemics of infectious disease: Newton West (Arch Hill), for scarlet fever; Bayfield (City), for diphtheria; Cambridge, for scarlet fever. Woodhill (Waitemata) was disinfected only.

The various *Chinamen's gardens* around the city have received attention.

Re *City Abattoir:* Six proposed sites have been inspected.

The Quarantine Station at Motuihi has been visited and the requirements reported on.

General Inspection.

The following inspections have been made, exclusive of those visited by Inspector Winstanley alone:—Houses—general inspection, city and suburbs, 37; general inspection, country districts, 44; inspection *re* infectious disease—city, 21; country, 40. In addition 24 hotels, 12 city houses, 13 factories, 5 abattoirs, 10 bakehouses, 7 butchers' shops, 19 stables, and 19 dairies have been visited.

In many of these no recommendations were made, but of those in which alterations were required some seven or eight remained unimproved, while in several others the work has been but half done.

Nuisances.

Defective drains, refuse-heaps, piggeries, and so forth, have been inspected to the number of 19 in the city and suburbs, 20 in the country districts. Of these, six remain unimproved.

Prosecutions *re* nuisances have been undertaken in two places at my request by the local bodies concerned, and in each a conviction was obtained.

The above figures give only the more important places taken in hand, and do not take into account second visits.

One important branch of the sanitary duties of the District Health Officer has as yet received no attention—namely, the adulteration of food, &c. Other matters have hitherto occupied my whole time, but I hope to be able to pay some attention to the question shortly.

Office-work.—The large amount of clerical work, more especially since the quarantine question came into force, has kept me in the office to the extent of greatly interfering with the adequate inspection of the district. The country places have been greatly neglected during the past three months.

Sanitary Inspector Winstanley has put in a large amount of useful work, more especially in connection with investigation into cases of infectious disease. I attach a short summary of his work, which he has carried out with great energy and tact.

Temporary clerks have been engaged—Mr. Anderson in connection with quarantine duties (which he has carried out in a most satisfactory manner)—and more recently Mr. Leplastrier, as office clerk, a position which I hope may shortly become permanent, as his work has greatly relieved me in the office.

Pamphlets *re* tubercle, enteric fever, scarlet fever, and the statistics of the outbreak of small-pox in London have been issued to the various local bodies.

The new office and laboratory were entered into on the 14th May. This has been a great improvement. The original building rapidly became too small for the work, more especially the

amount of bacteriological experiment in connection with the plague cases. The new offices in the old Police Barracks are comfortable and roomy. Cupboards for filing papers have been provided, and the clerical work can now be done more systematically.

Pathological Work.

The new laboratory has been conveniently fitted, and is roomy and well lighted, and were I able to find time much good work might be done here. So far the medical men have not taken much advantage of the opportunity for getting pathological investigations.

The following is a short summary of the work done: Water-supplies analysed, 6; milk-supply, 1; tumours sectioned, 6; urines examined, 9; blood-samples for vidal reaction, 8; throat for diphtheria, 6; sputa for tubercle, 18. One sample vomit was examined chemically and microscopically, 1 of fæces, and 4 of pus. One medico-legal question *re* blood-stain on an instrument was investigated on behalf of the police. One scraping from a wound was examined for tetanus, the bacillus found, and cultures made.

In connection with the Okoroire poisoning case three samples of milk were examined, as was the gelatine with which the pudding in question was made.

In connection with plague the following work was done: From plague-patient V. the gland (*ante-mortem*) and the liver, spleen, kidney, and bubo were investigated; many cultures were made, and a guinea-pig was inoculated and examined after death. From the plague-patient B. the spleen and peritoneal fluid were examined, cultures made, and a guinea-pig successfully inoculated, and subsequently examined. In connection with other cases reported as possibly plague, four spleens have been examined and three guinea-pigs inoculated, two *post-mortems* made, and a portion of an excised gland investigated.

In cases of special interest and importance specimens have been forwarded to Mr. Gilruth for further investigation.

Media have been in part prepared in Auckland, and in part obtained from the Laboratory in Wellington. The apparatus is far from complete yet; what I have is partially borrowed from local practitioners.

In laboratory investigations I am much handicapped by lack of time, and I fear it will be long before any sound research-work can be carried out, as my other duties are so varied, and there is so much need for practical sanitary work in the Auckland District.

SUMMARY OF WORK DONE BY INSPECTOR WINSTANLEY FROM DECEMBER, 1901, TO MAY, 1902.

In December inspected premises *re* 16 cases infectious diseases; inspected 80 houses, &c., *re* sanitary arrangements; served 10 notices *re* sanitary requirements; inspected Coromandel, Hamilton, Rangiriri (*re* Brook's cheese-factory), Thames.

In January inspected premises *re* 15 cases infectious diseases; inspected 226 houses, &c., *re* sanitary arrangements; served 33 notices *re* sanitary requirements; inspected Mercer, Pukekohe, Waihi, Ngaruawahia, Huntly, Hamilton, Tauranga, Paeroa.

In February inspected premises *re* 21 cases infectious diseases; inspected 350 houses *re* sanitary arrangements; served 15 notices *re* sanitary requirements; inspected Whangarei, Ngunguru (*re* poisoning), Waihi (*re* poisoning).

In March inspected premises, &c., *re* 24 cases infectious disease; inspected 200 houses, &c., *re* sanitary arrangements; served 23 notices *re* sanitary requirements; inspected Okoroire (*re* poisoning), Waiwera, Coromandel (*re* pollution of streams).

In April inspected premises *re* 41 cases infectious diseases; inspected 130 houses *re* sanitary arrangements, &c.; served 17 notices *re* sanitary requirements, &c. During this month performed a great deal of clerical work.

In May inspected premises, &c., *re* 32 cases infectious diseases; inspected 330 houses, &c., *re* sanitary arrangements (several ruinous sheds and residences waiting to be condemned); served 18 notices *re* sanitary requirements; inspected Cambridge, Whangarei, and Kamo *re* infectious diseases, &c.; investigated a big consignment of flour from America, which is said to be inferior.

Summary.—Infectious diseases, 149; inspected residences, &c., 1,316; notices served, 116.

Number of residents who have shown improvement out of 1,316 inspections shown on report from December to May, 1902, 1,000.

Number of residents who have shown improvement out of 116 on whom notices *re* sanitary requirements were served, as shown on report, from December to May, 1902, 110.

Number of infectious diseases traced from November to May, 1902, shown on infectious diseases report: Enteric, 182; scarlet fever, 117; diphtheria, 51.

Number of notices served on local bodies *re* disinfection of premises, 237.

R. H. MAKGILL, M.B., C.M., D.Ph., Cant.,
District Health Officer, Auckland.

HEALTH DISTRICT OF HAWKE'S BAY.

Dr. Mason, Chief Health Officer.

SIR,—

The first annual report for the Hawke's Bay Health District cannot be made a very complete one, as I only took up the duties of Acting District Health Officer in the place of Dr. De Lisle on 1st October, 1901; the report therefore deals only with the period of six months from 1st October, 1901, to 31st March, 1902. Also the Act to be administered was a new one, and, the district being entirely strange to me, it took me some time to get acquainted with the district in general and public-health matters in particular. The objects for which an annual report are required are, I presume, to give and record information on the two following points:—

1. The existing state of the sanitation of the district.

2. The measures that have been taken to improve the sanitation, and the measures that are necessary and desirable in the future.

I will therefore divide the main parts of my report into the above two headings.

THE EXISTING STATE OF THE SANITATION OF THE DISTRICT.

The District of Hawke's Bay is sparsely populated, and there are in it all sizes of towns, from the smallest township, to the Borough of Napier with a population of 8,774.

Sanitation can therefore be found in every stage of evolution, from the small township where each man is a law unto himself, has an individual water-supply and nightsoil-removal, household slops and refuse being thrown out on the garden. This is the lowest stage of the evolution of sanitation, as anything less than that cannot be dignified with the name of sanitation, but must be an insanitary state of things. This individual system is sufficient for the sanitary needs of a small township provided the nightsoil and other refuse matters are disposed of with intelligence, so as not to become a nuisance to the inhabitants of the house or the neighbours, until the township reaches a certain size. The next stages in sanitary evolution are the adoption of a common system of collecting nightsoil and house refuse; then some simple drainage scheme is established for removing household slops either by surface-channelling or by closed drains. The next step to be taken is a public water-supply, and the final acme of sanitation is reached with a complete sewerage system and water-carriage of nightsoil and slops. Examples of every stage of sanitary evolution exist in Hawke's Bay except the last, as no town has yet adopted the complete water-carriage system in practice. The most important point that the Health Officer has to decide is whether the town is progressing in sanitation in the required ratio to its progress in increase of population and crowding-together of houses, and also whether for any particular reason, such as the occurrence of typhoid or diphtheria, it is necessary for its sanitary evolution to advance at a quicker rate than it otherwise would do. At the same time, if special facilities exist for a drainage system and a public water-supply, even in a small town the attainment of sanitary perfection should be urged. In relation to this question will first of all describe the existing sanitary arrangement in some of the towns.

Boroughs.

Woodville (population, 926).—Weekly system of removal of nightsoil and house refuse. Wooden sewers and branch drains have been constructed at the cost of about £1,300; the main object for their construction was to carry the water from small creeks that run through the town and to drain the surface-water: this purpose they serve very well. They also receive household slops. A high-pressure water-supply will be completed during the next year.

Dannevirke (population, 2,315).—Weekly system of removal of nightsoil and house refuse. High-pressure water-supply; concrete channelling in the main street has been recently constructed.

Hastings (population, 3,650).—Weekly system of removal of nightsoil and refuse. Water-supply is an individual one from artesian wells. A sewerage scheme at a cost of about £20,000 was constructed about twenty years ago. It receives the household slops of 150 houses, and there are seventy-two water-closets connected.

Napier (population, 8,774).—Weekly removal of nightsoil. House refuse removed daily in business portion of the town, weekly in other portions. Every house is supplied with water from the public high-pressure supply, and almost every house is connected with the sewerage system. Water-carriage of nightsoil is only partial.

Gisborne (population, 2,737).—Weekly system of removal of nightsoil and house refuse. A few premises are drained by pipe drains into the river; no common water-supply or sewerage system has yet been constructed.

Town Districts.

Waipawa (population, 669).—Weekly system of removal of nightsoil. Forty-three houses are connected with a sewerage system, and fifty that can be connected are undrained. No public water-supply.

Ormondville (population, 459).—The houses are scattered, and there is no common system of nightsoil-removal.

Kaikora North (population, 268).—The houses are scattered, and there is no common system of nightsoil-removal.

Taradale (population, 763).—No common system of nightsoil-removal. Drainage for slops by concrete channelling, kept flushed by the discharge of artesian wells. Individual artesian water-supply.

Clyde (population, 623).—Houses are somewhat crowded together, and there is no common system of removal of nightsoil and house refuse.

Waipukurau Village (population, 565).—Weekly system of removal of nightsoil; partial sewerage system. No public water-supply.

Gisborne Suburbs.

Kaiti (population, 700); *Whataupoko* (population, 1,148).—Nightsoil is removed by private contract. In the other small centres of population in Hawke's Bay District there is no common system of sanitation.

The above short description, though not complete, will be sufficient to show that the towns of Hawke's Bay Health District have not, on the whole, been backward in sanitary evolution; and although I cannot speak from a wide experience, yet from what I have seen in England, and from what I have read of in other English-speaking countries and colonies (it is idle to compare English sanitation with that of other nations), I should say that the existing state of sanitation and the

sanitary works that have been undertaken in the district are a great credit to the pioneers in sanitation, and that they would be "equalled by few and surpassed by none" if compared to the sanitation of any other district, especially when it is remembered that the majority of these sanitary works have been accomplished in the natural way of sanitary evolution, and have not been brought about by any system of propulsion or compulsion, which has long been in force in England.

Every one knows the fierce opposition that has to be faced when any sanitary improvement that costs money is proposed. In the first stage of sanitary evolution the communal system of collecting nightsoil is proposed instead of the individual method of disposing of it on the section. Indignation meetings are held to protest against this interference with the rights of the individual, and against the intrusion of the nightsoil-collector on private premises. Similar protests are generally raised when any other sanitary improvements, such as sewerage schemes and public water-supplies, are first proposed. In spite of these protests on the part of objectors to improved sanitation, I think it may be concluded that sanitary progress in the Hawke's Bay District has, on the whole, kept pace with the increase in the population. It is true that there are exceptions, and that mistakes have been made in some of these schemes for drainage which have been constructed in the past; but these mistakes are often simply due to the fact that sanitation has in all countries advanced so rapidly in recent years that what is recognised as right to-day appears an obvious mistake that could have been avoided to-morrow. So much for the general descriptions of the existing sanitary state of the district. Other details will be alluded to below.

The Measures that have been taken to improve the Sanitation of the District and the Measures that are necessary and desirable in the Future.

I must emphasize the fact that in the short period of six months it is undesirable to make any sharp distinction between those measures which have been recommended and have been carried out and those measures which have been recommended, or which it is desirable to recommend, but which have not yet been actually carried out.

House-drain Connections.—All local authorities in whose district there is any sewerage system have been supplied with sketches, and the model by-laws of the Local Government Board in England, showing the recognised way of making house connections by inserting a disconnecting trap between the house-drain and the sewer and ventilation of the house-drain. The importance of applying the water test to all drains before they are approved has been emphasized. Inspector Kershaw has gone to superintend the first installation of any new house-drain according to these by-laws, so as to show practically the method of carrying them out.

Plumbing Specifications.—Inspector Kershaw, late instructor and lecturer in plumbers' work at the Manchester and Bury Municipal Technical School, and examiner at the Wellington Technical School, drew up, at my request, detail drawings and specifications regarding soil, waste, and vent pipes, and the connections to sanitary fittings, including water-closets, lavatories, baths, and urinals. Copies of these specifications have been sent to some of the local authorities, and it is to be hoped that all new sanitary fittings will in future be constructed according to these specifications.

There is no doubt that sufficient attention has not been paid to the details necessary in the proper laying of house-drains and the connection of sanitary fittings by local authorities in the past, as not one of them had adopted the plan recognised by the Local Government Board in England; and I think that it is only fair to assume that, in spite of all the controversies and frequent changes in the details, this is the best system to follow at present. Though the importance of disconnection and ventilation of the house-drains cannot perhaps be exaggerated, another point equally important is the making of watertight joints; unfortunately I have been driven to the conclusion that this error in laying drains has been a frequent occurrence, and that it will continue to be so in future unless every drain is tested by the water test before it is approved.

Boroughs.

Woodville.—The wooden sewers of Woodville have served their purpose well as far as surface-drainage is concerned; as they are not the best adapted for the carriage of slops, it is desirable that any extension of the system and any new connections should be made by pipe drains. Additional ventilating-shafts to ventilate the sewer have been erected.

Dannevirke.—The population of this town is rapidly increasing, and though it has an excellent water-supply, and concrete channelling has been put down in the main street, which on one side receives the slops, and is continually flushed by water (the other side of the street is not benefited owing to the fall of the ground), it is a serious question whether the town is not lagging behindhand in its sanitary evolution through not adopting a drainage scheme. At present no bad effects have been experienced. The town has been free from typhoid and diphtheria in spite of several nuisances existing from the present method of disposal of slops. There is no doubt that it will be only a matter of time before the town suffers owing to the absence of drainage. A drainage scheme has been drawn up and estimates prepared by Mr. Leslie Reynolds, who carried out the water-supply for this town. I believe the main reason why the scheme has not been adopted is that the borough is divided into three wards, and that while these wards exist any drainage scheme that is suitable for the town, irrespective of its division into wards, must be consented to by all three wards, and that though the wards would all help to contribute to the general scheme they would not all equally benefit by it. If the division into wards was abolished the drainage area could be defined, and a special rate struck only over that area. In December, 1901, a poll of the Central Ward decided against a drainage scheme confined to that ward. If the poll had been carried there would still have been the difficulty of carrying out a scheme suitable for the whole borough, but for which the Central Ward would alone have had to

pay for. Whatever is ultimately decided as to the best way of dealing with the matter, it is to be hoped that the drainage question will be settled before long. The drainage scheme proposed for Dannevirke has a good fall from all parts of the town to a suitable site for a septic tank and filter-beds, and the cost will not be excessive compared to the cost of drainage schemes in other towns.

Hastings.—There is a good sewerage system, but it is not made sufficient use of. There are about ninety houses on the line of the sewers that might connect, but have not done so. Sufficient extensions of the sewer have not been made as the town has grown, and comparatively few of the houses already connected have water-closets. Certain recommendations with regard to the sanitary fittings in hotels have been sent in, and are being acted upon. The water-supply, as previously mentioned, is an individual one from artesian wells. The absence of a public water-supply gives rise to two difficulties: (1.) The well-water does not rise sufficiently high to fill storage-cisterns for supplying a flush to water-closets, and so it must be raised by rams, windmills, or hand-pumps. As water-closets are gradually substituted for pan closets there will be necessity for constant attention to the filling of storage-cisterns for flushing. (2.) For the purposes of fire-extinction the sewage is dammed back at night. This is objectionable even if no fire occurs; while if a fire does occur the objections are many and obvious, and will become greater as the sewers become more used for sewage. If typhoid fever happened to be present in the town this method of fire-extinction might cause a serious epidemic. The sewer-outfall is three miles from the town into the Ngaruroro River. This river is fast-flowing, and is not used as the source of a water-supply by any one. The previous treatment of the sewage would be preferable, but I have not noticed any nuisance or offensive smell at the outfall, and there are no houses in the immediate neighbourhood.

Napier.—This town has the most complete sewerage system in the district, and practically every house in the borough is connected with the sewer. There are, however, a large proportion of pan closets still in existence, but it has been decided to insist on the substitution of water-closets in all cases within the next two years, and to insist on immediate change where the pan closets are at present for any reason a nuisance. There are numerous bell traps with pits not disconnected from the sewer and unventilated; the pits must, in fact, in many cases act as ventilators to the sewer, and permit the passage of sewer-gas. It has been decided to do away with the bell traps as fast as possible. I have recommended the adoption of a self-cleansing gully-trap with a 6 in. inlet and 4 in. outlet in place of the catch-pits that were being substituted for the bell traps, and which had no water seal. Many of the old drains have been very badly laid, few of the joints have been made with cement, and most of the joints of the old drains are badly leaking. Opportunity is being taken in every case where any alteration or addition to the house connection is being made to test the efficiency of the old drain, and, if necessary, to relay it so that it will stand the water test. As there has been lately a large amount of drainage-work done, and there is likely to be a large amount more to be done in the course of the next two years, an assistant Sanitary Surveyor will probably be engaged. The sewer-outfall is into a tidal river, and, though it would be natural to expect that sewage-sludge would be deposited on the mudbanks and become offensive at low water, there is, as a matter of fact, very little nuisance so caused except at the outfall itself. Owing to certain alterations that are being made by reclaiming land, an extension of the sewer will probably be necessary in the near future, unless other means are adopted for dealing with the matter. The installation of a septic tank and contact-beds has been proposed, and will shortly be seriously considered. Other sanitary measures that will be considered shortly are a refuse destructor, steam disinfector, and the provision of classes for technical instruction in plumbing and drain-laying.

Gisborne.—Although in recent years this town has frequently suffered from typhoid fever and diphtheria, there have been very few cases this year. The importance of providing a drainage scheme and a public water-supply are fully recognised, and at a general poll a loan of £65,000 for these purposes was carried by a large majority. Unfortunately, the town is very unfavourably situated, both as regards drainage and water-supply—for the former the falls are very unfavourable for a simple scheme, and for the latter there is no suitable source near at hand and easily obtainable. The difficulties in the way have been chiefly responsible for the delay in the past of adopting these necessary measures. It has been recently proposed to amalgamate the suburbs of Kaiti and Whataupoko with the borough. Whether this scheme is carried out for all purposes of the amalgamation or not, the places mentioned should certainly all form one health district.

Town Districts.

Waipawa.—The town is well sewered, but there are many houses unconnected with the sewer that should be connected. The sewer-outfall flows on to a broad gravel river-bed, and is often offensive in the summer owing to the effluent becoming confined to one channel, where the ground becomes saturated, and the sewage cannot percolate. I have recommended that the sewage be more evenly distributed over the gravel bed as a first experiment, and if that does not succeed a septic tank should be put up. A public water-supply is under consideration; the source would probably be a well sunk in the river-bed from which the water would be pumped up by a turbine or an oil-engine into a service reservoir on high ground adjoining the town.

Clyde (Wairoa).—As has been mentioned above, the houses here are somewhat crowded, and there was no common system of removal of nightsoil and house refuse. I recommended that they should adopt the double pan system of removal of nightsoil; this has been done, and a suitable site has been found for its disposal. This town is therefore the first one in the district to adopt this system of removal of nightsoil. House refuse is also removed once a week.

Waipukurau Village.—The sanitary measures that are necessary here are very similar to those of the adjoining Town of Waipawa. More houses need to be connected to the sewerage system, and a water-supply should be obtained from the river as recommended in Waipawa.

Havelock Town.—There are several nuisances existing from foul ditches and drains and surface-drains, and some of the houses are dependent for their water-supply on surface-wells, which,

owing to their situation, are very liable to be polluted. For an annual cost of about £30 a simple drainage scheme could be laid down, and an excellent water-supply could be laid on to the town from a neighbouring stream.

Sanitary Inspection.

On the 14th November Mr. Kershaw was appointed Sanitary Inspector for the Hawke's Bay Health District under "The Public Health Act, 1900." A systematic inspection of the district was immediately begun, special attention being given to schools, hotels, boardinghouses, bakehouses, and premises which were directly concerned with providing accommodation or food for the public.

Hotels.—The sanitary condition of the hotels was found, on the whole, to be fairly satisfactory. As a rule, the cubic space in the bedrooms of hotels, and especially of boardinghouses, is deficient. It is true that as they are built of wood there is better natural ventilation than if they were built of brick, but this advantage is largely discounted by the fact that it is the exception to have a fireplace in the bedroom, so that one of the most important means of ventilation is generally absent.

The results revealed by this inspection were not of a very startling nature; no extraordinary degree of filth was discovered, but the general conclusion I have arrived at as the result of personal inspection and Inspector Kershaw's reports is that there is no efficient systematic sanitary inspection carried out by the local authorities. If anything grossly insanitary occurs it is probably remedied through the local inspector or pressure of public opinion. Although section 76 of the Public Health Act expressly states that the local authorities are empowered and directed to cause their district to be inspected and to abate nuisances, the desired results are not obtained. Water-spouts leak and cause dampness under houses, water lies in back yards, stables remain filthy, manure-heaps accumulate close to dwellinghouses, pigsties exist too close to houses, water-tanks are not emptied and cleaned, in towns the by-laws regulating the keeping of poultry are not enforced, &c. In fact, all the small details which go to make a healthy and a cleanly town are not paid sufficient attention to. In small towns the cause is not far to seek, and may, I think, be put down to human nature. It is not a pleasant job for a local inspector to go into his next-door neighbour's or some friend's back yard and find fault with him on these grounds. Even if the local inspector does his duty and reports the matter to the local authority, very often the report is ignored because of the personal relations existing between the person complained of and some members of the local body.

In the districts of all the County Councils, and of most Road Boards, there is not even the excuse of the frailty of human nature, as no attempt was made in these districts to abate nuisances on their own initiative. In these districts, and in the towns, the idea is prevalent that it is the duty of the officers of the Health Department to interfere, even in such small matters as an offensive manure-heap. Rome was not built in a day, and as yet the smaller local bodies and County Councils do not seem to realise that as much responsibility rests on them to insure the sanitary state of their districts as rests on the authorities of a large borough.

I have delayed bringing any pressure to bear until a reasonable plan could be proposed to improve and facilitate the carrying-out of inspection and disinfection after infectious disease. In response to my requests to certain local bodies that Inspectors should be appointed, it is only fair to mention that Wairoa County and Ormondville Town Board have appointed Inspectors, and that Hawke's Bay County made arrangements for their Surveyor and roadmen to inquire into nuisances when reported, and disinfect after infectious disease. I regarded these measures as only temporary, and the only thorough and efficient way to provide adequate and impartial inspection and reliable disinfection is for local authorities to combine together and appoint an inspector under one central authority, or under the Health Department, such inspectors to be paid by contributions in proportion to the population of each local authority. The advantages of such a scheme over the present system are many: (1.) If an adequate salary can be provided a trained and experienced inspector can be obtained. The popular idea is that any one can be an inspector of nuisances, but this idea is erroneous; and, besides, something more than a nuisance inspector is wanted—namely, a man who understands drainage-work, plumbing, and disinfection, from a theoretical as well as from a practical point of view. (2.) Such an inspector would be outside local influences. (3.) A scattered road district, with a few inhabitants, cannot possibly insure any efficient inspection, and occasional inspection is as necessary in country districts as constant inspection is in towns. Provision is made for some such arrangement in the definition of a "local authority" in the Public Health Act. Dr. Valintine has, I believe, already effected such a combination in the Wellington District, and it was from hearing of this combination that I have considered that such a scheme would be eminently suitable for certain portions of this district.

Infectious Diseases.

The following is the summary of infectious diseases reported from 1st October, 1901, to 31st March, 1902:—

Napier.—Scarlet fever, 6; typhoid fever, 58; tuberculosis, 8; diphtheria, 1.

Hawke's Bay District, excluding Napier.—Scarlet fever, 35; typhoid fever, 22; tuberculosis, 22; diphtheria, 11; measles, 13; influenza, 3; blood-poisoning, 1.

Total for Health District.—Scarlet fever, 41; typhoid fever, 80; tuberculosis, 30; diphtheria, 12; measles, 13; influenza, 3; blood-poisoning, 1.

The most important feature in this summary is the number of cases of typhoid fever in Napier. As cases were frequently occurring after 31st March, I have considered that it would be more convenient to make a separate special report which would include all the cases, as judging from past history in Napier there are seldom any cases after the middle or end of May. It may be simply mentioned here that the source of infection could not be traced to either the water-supply

or the milk-supply of the town, as is frequently the case in epidemics of typhoid, but that the epidemic was probably due to defective sanitation, the principal defect being pollution of the subsoil of the flat portion of the town by leaking drains.

HUGH E. FINCH, M.B., D.P.H.,
Acting District Health Officer, Hawke's Bay.

WELLINGTON DISTRICT.

REPORT OF DISTRICT HEALTH OFFICER.

As may be observed in the accompanying map, the Wellington Health District includes the Wellington and Taranaki Provinces, thus forming an area of some square miles, and, according to last year's census, embracing a population of 183,170 persons. In this are no less than 93 local bodies—viz., 20 boroughs, 9 town districts, 21 County Councils, and 43 Road Boards—each of which, be it observed, is a "local authority" under the Public Health Act. The population of these local authorities varies considerably—from the City of Wellington with a population of 43,638 to the Hurford Road Board with a population of 56..

The difficulties in the way of a successful sanitary administration of this district may not at first sight be apparent, but they are, nevertheless, very real. Apart from the difficulties arising from size of the health district, and the time thereby lost in travelling from place to place, it is the duty of the District Health Officer to keep in touch with all these local authorities, many of whom are entirely ignorant of their obligations under the Act. Another great difficulty exists in the distance that some townships lie from their controlling authorities. Since the repeal of the Town Districts Act of 1886 many townships have sprung up, with populations that just fall short of the number requisite to allow their incorporation as boroughs, and which are therefore under the control of the surrounding County Councils. As these County Councils only meet once a month, it is not to be wondered at that the sanitary affairs of the townships in question are not looked after with the same degree of interest that would be the case where all administration was performed by a "local authority" in the strict sense of the word. For instance, the writer has one township in his district that is situated about twenty miles from the place where the controlling authority holds its meetings monthly. In the intervals between the meetings there is usually no responsible officer of that local authority to whom the townspeople can appeal in matters of urgency. In the face of these difficulties, is the sanitary administration of the township likely to be successfully performed, especially as regards the control of infectious disease? For the purposes of sanitation it is a great pity that the Town Districts Act of 1886 has been repealed, for the writer is acquainted with more than one thriving township where that Act is still in force, and where to all appearances it answers admirably.

Again, the great disparity in the sizes of the local authorities has already been mentioned, and an example given of a Road Board with a population of fifty-six. In the event of an infectious disease occurring in the district under that Road Board, the Department would expect the Board to attend to the disinfection of the infected premises—a process that might easily swamp all its available funds. From economical no less than for purposes of sanitary administration it is sincerely to be hoped that a Counties Act will soon be passed which will merge these smaller Road Boards into fair-sized County Councils.

With a view to obviate some of the above-mentioned difficulties, and to become better acquainted with the local authorities with whom he has to work, the writer has personally interviewed the chief Borough and County Councils in his district, and propounded to them a scheme of local sanitary administration that has in the majority of instances obtained their approval. Briefly, it is the appointment of properly qualified sanitary inspectors, whose sole duty it shall be to make themselves acquainted, and keep the District Health Officer informed, on all matters affecting the sanitation of their districts.

Under an interpretation clause in the Public Health Act, local authorities may combine for the purposes of sanitation, and it is on the strength of this clause that the writer has already formed a combined sanitary area. The advantages are obvious, for, in place of those very worthy but shortsighted gentlemen who, besides collecting the dog-tax, licensing vehicles, and attending to fire-escapes, are expected to report monthly to their Councils that the sanitary condition of the town "is excellent," there will be a continuous chain of properly qualified inspectors who will attend to sanitation only, and who therefore will be able to undertake the work of a comparatively large district. Nor will the appointment of such inspectors occasion the local bodies much, if any, additional expense if they be content to combine in the manner suggested. The population included in these sanitary areas would vary from about twelve to eighteen thousand. The sanitary affairs of a district thus constituted could be easily looked after by one ordinarily active man. Moreover, when all such sanitary areas are formed, in the event of a considerable outbreak of infectious disease it will be quite simple to reinforce the Inspector of the infected district with the aid of the Inspectors of the adjoining districts, should the work prove too much for him. The central authority of a sanitary area thus formed would in the majority of instances be a borough, which could combine with the neighbouring town districts, County Councils, and Road Boards. It has been found by experience that the local authorities, though willing to contribute their share towards the Inspector's salary, yet prefer that that official should be entirely under the control of the District Health Officer. This is most fortunate, for it would free the Inspector from those local influences which might handicap him in the due performance of his work.

Such a combination of local authorities would also obviate those difficulties that have arisen in the United Kingdom, where boroughs that have adopted all the requirements of modern sanitation are yet surrounded by insanitary areas over whom the municipal authorities have no control. It

is most important that to a certain extent the larger centres should have some control over the sanitation of the adjoining country districts, on which they so largely depend not only for their food, but often also for their supply of water.

In the above lines the writer has attempted to show some of the difficulties that beset the path of a District Health Officer. To recapitulate, these difficulties would to a great extent be simplified by—(1) The appointment of inspectors in the manner suggested; (2) the abolition of the smaller Road Boards as local authorites under the Act; (3) the reintroduction of the Town Districts Act of 1886 for certain towns that are now under the control of the County Councils.

Local Bodies interviewed.

Wanganui Borough Council, Wanganui County Council, Waitotara County Council (formed into one sanitary area); Feilding Borough Council, Manchester Road Board, Pohangina County Council, Kiwitea County Council; Palmerston Borough Council; Carterton Borough Council, Greytown Borough Council, Pahiatua Borough Council; general meeting of Taranaki local bodies; New Plymouth, Stratford, Eltham; Hutt Borough Council; Rangitikei County Council; Gisborne Borough Council; Auckland Corporation; Wellington (committee of Corporation).

Notifiable Diseases.

During the year which ended on the 31st March, 1902, 397 cases of notifiable diseases were reported in the Wellington Health District, as follows:—

Typhoid	42
Scarlet fever	189
Diphtheria	34
Blood-poisoning	1
Tuberculosis	49
Influenza	16
Measles	66
	397

It may be surmised from this table that many cases of these diseases have not been notified. Though the notification of infectious disease has been compulsory for the past year, yet it was only performed in a very perfunctory manner until the beginning of 1902. For the above reasons next year's statistics will probably show a great increase in the number of cases of infectious diseases reported.

Typhoid.

Of the forty-two cases notified, eight occurred in Wellington and suburbs and fifteen in Wanganui; the rest were scattered throughout the district. Only in one instance could the disease be traced to a common cause—where eight persons were reported as being stricken with the disease after partaking of well-water from a certain hotel. Although only forty-two cases were notified, there is little doubt that more actually occurred. But, with the exception mentioned, the data to hand are not sufficient to show any definite decision to be arrived at as to the actual existing cause of the disease. Unfortunately, typhoid is more or less endemic throughout the Wellington and Taranaki Provinces, and often reveals itself in isolated country houses, where, short of the usual insanitary surroundings, there is nothing to account for the introduction of the specific poison of the disease.

Scarlet Fever.

Of this disease 185 cases were reported during the year, with only two deaths. Of the total cases no less than eighty-one cases occurred in Wellington and suburbs. Though the disease has been prevalent throughout this district for the past nine months, according to the notifications it was only in the last four months of 1901 that the disease assumed epidemic proportions, which have continued more or less up to the time of writing. Fortunately the epidemic throughout has been characterized by its extreme mildness. There is little doubt that the disease has been spread by means of cases of so mild a type that the symptoms have passed unrecognised by the parents or friends of those attacked. In one instance a baker was found engaged at his trade with a typical scarlatiniform throat, the rash manifesting itself the day after he was sent home from work. In other cases children have been found attending school who were actually "peeling" subsequent to a slight attack. In fact, in many instances the disease has only been recognised on the occurrence of this symptom. In another case—in an up-country district—a baker was found engaged at his trade with his wife suffering from scarlet fever in a room immediately adjoining the bakehouse. The baker himself developed the disease two days after being prohibited from carrying on his trade on the infected premises. Of course, some of these offenders might have been prosecuted for a breach of the Public Health Act, but it would have been hard to prove that this carelessness was the result of anything but ignorance; and, again, it seemed unfair to prosecute private persons when the members of the local sanitary authorities were so entirely ignorant of their duties and responsibilities under the Public Health Act.

As before mentioned, the apparent increase in the number of scarlet-fever cases is due to the prompt manner in which they are now reported. But at the same time there is little doubt that even now many cases are not reported where no medical man has been in attendance. In coping with the epidemic in the city it has been customary for either the District Health Officer or an Inspector to visit the infected premises as soon as the case has been reported. By this means transportation to the Hospital is generally arranged for, or, failing that, the best means are taken to insure the isolation of the patient. At the same time parents are cautioned against allowing children to attend school from the infected house. A report is filled in stating the sanitary condi-

tion, &c., of the infected house, and particulars as to water and milk supply. (There has been nothing in these reports to give rise to the suspicion that the epidemic may have been spread by the agency of milk, as is so often the case in scarlet-fever outbreaks.) A pamphlet on scarlet fever is also left at the house for the guidance of the occupier. At the same time the local authority is notified, and subsequently required to undertake the necessary disinfection of the infected premises. This is duly performed in some of the larger towns of the district, but it it only when competent inspectors have been appointed in the towns, as mentioned earlier in this report, that the District Health Officer can be expected to exercise some control over infectious disease. As things are at present, although the best has been done that circumstances will permit, it has been almost futile to make the attempt. In country districts the local authorities very often make arrangements with the medical man in attendance to see that the houses are disinfected; but how can a man in a busy practice be expected to see that this very necessary process is properly performed? In conclusion, it may be as well to mention that, owing to the extreme mildness of the disease, it may occur to some to question whether the outbreak is really one of scarlet fever, but rather an epidemic of rubella, or the so-called "fourth disease" which has recently occasioned so much comment in the United Kingdom. Be this as it may, the opinion of the majority of practitioners is practically unanimous that, despite its mildness, it is true scarlet fever.

Since writing the above the following case has been reported showing how the epidemic is spread: Quite recently a girl consulted a practitioner in the city, who diagnosed her case as one of scarlet fever; he therefore communicated with the Hospital authorities, but owing to lack of accommodation they were unable to take the girl in. On leaving the doctor she first went to the Public Library to read the symptoms, &c., of the disease. She was subsequently admitted to the hospital.

Diphtheria.

Thirty-four cases, with ten deaths, have been reported in the district during the past twelve months. As in the case of other infectious disease, many cases must have been unnotified; the statistics are therefore practically valueless.

At the time of writing quite a smart epidemic exists in Wellington, no less than ten cases having been reported in four days. It is by no means unusual for scarlet fever and diphtheria to run concurrently. The disease is practically endemic in Wellington and district, a few isolated cases being reported during every month of last year; but the disease only assumed epidemic proportions about the end of May of this year. From 1st May to date (4th June) no less than eighteen cases have been reported. The weather at the time of the outbreak had been very cold and wet—weather that often has been associated with the outbreak of the disease. As in scarlet fever, there is nothing in the way of faulty drainage or a milk-supply to which to attribute the outbreak of the disease. In fact, almost without exception, the ten houses where the first cases occurred derived their milk-supply from different sources.

There is some definite information, however, as to the manner in which the disease is spread, and that, as is often the case, is by means of unrecognised cases, as the following account will show: Having grounds for suspecting that the disease was spread in this manner, the writer visited the Thorndon School and inspected the scholars, with the result that one child was actually found with diphtheric membrane on the fauces; and of ten swabs taken from suspicious-looking throats, no less than three showed the Klebs-Löffler bacillus on bacteriological examination. It would be as well to mention that two children were found to be attending this school from a house where there had quite lately been two typical cases of diphtheria. Though the throats of the children attending were inflamed, the Klebs-Löffler bacillus could not be found. On this discovery a circular letter was sent warning schoolmasters in the district that all cases of "sore" throat should be regarded as suspicious. By this means several children were prohibited from attending school.

Acting under a similar suspicion, the writer inspected a school in North Taranaki in the early part of last year. Here, again, a child was discovered with diphtheric membrane on the throat; but in that case the existence of the disease was not confirmed by bacteriological examination, although a short time afterwards a sister of the child was overtaken with all the clinical symptoms of typical diphtheria.

In his work on diphtheria, the late Sir R. Thorne Thorne refers to the slight outbreaks of "sore" throat that so often precede a general epidemic of the disease, and also dwells on those cases which do not give the ordinary constitutional symptoms. In many instances it is hard for the lay mind to grasp the fact that a serious disease may exist in a mild form; and the failure of responsible persons to recognise this is often attended with fatal consequences, as the following instance may show: Last year an epidemic of diphtheria broke out in a school in the Wairarapa. The outbreak was a comparatively mild one, and the medical man in attendance had much trouble in getting the local Committee—particularly the Chairman—to regard the matter in a serious light, and prohibit the children from the infected houses attending school. The Chairman likewise wildly advocated his disbelief in "antitoxin," which the doctor in attendance was naturally giving his patients. It was not until the Chairman's youngest child was stricken with a severe form of the disease, from which she nearly died, that the Chairman could be induced to look upon the disease as diphtheria. It may also be interesting to remark that the Chairman is now a firm believer in the virtues of "antitoxin."

In conclusion, it would be as well to insert Sir R. Thorne Thorne's summary on school influences as regards diphtheria: (1.) It brings together those members of the community who are by reason of their age most susceptible to diphtheria. (2.) The children thus brought together are placed, and remain for many hours of the day, in exceptionally close relation to each other. (3.) The closer the aggregation and the greater the hindrance to the free movement of air the greater the risk. (4.) Faulty sanitary conditions of the schoolhouse and its surroundings, and

such other conditions as tend to a condition of general ill health, in so far as they induce sore throat, favour the reception of any imported diphtheria infection. (5.) There are ample grounds for believing that the aggregation of children in elementary schools constitutes one of the conditions under which a form of disease of particular potency for spread and for death may be manufactured. (6.) The practices of kissing and of transferring sweetmeats from mouth to mouth, the joint use of drinking-cups, and the like, must assist in the diffusion of diphtheria among schoolfellows.

Tuberculosis.

As in some other forms of infectious disease, tuberculosis has not long been made a notifiable disease, consequently statistics will not be of much value. Forty-nine cases have been notified in the district, sixteen being from Wellington and suburbs.

In the Registrar-General's return for the Wellington and Taranaki Provinces for the year ending 31st December, 1901, no less than 174 deaths were returned as having occurred from some form of tubercular disease, the proportion of deaths from tubercular to other diseases being as 1 to 9, and of phthisis to other diseases being as 1 to 14. This compares very favourably with the statistics of other countries, yet, in the light of present knowledge, a good deal may surely be accomplished towards lessening the mortality from this scourge.

With regard to the control of tuberculosis in the Wellington District little has been done. Until the State has decided to take charge of those unfortunates who may desire it, the writer is of the opinion that where the medical man in attendance on a case expresses himself as satisfied that all the proper precautions, such as the disinfection of the sputa, &c., are being performed, further action on the part of the Health Officer is unadvisable—or, at any rate, premature. There is rather too much tendency on the part of the public to treat persons suffering from this disease as a species of pariah. Popular hysteria should not allow injustice to be done to many a useful member of the community, who, though a victim to the disease, may yet earn his livelihood honourably to the benefit of his family and the State.

SCHOOL INSPECTION.

The necessity for a form of systematic school inspection, as carried out in Germany and the United States, is undoubtedly necessary in the schools of this colony, and the experience gained by the present prevalence of infectious diseases in the Wellington District has emphasized this fact. Apart from the usual inspection into the general sanitation of a school, the scholars should be periodically subjected to careful medical examination. As previously mentioned in this report, on more than one occasion have children suffering from a mild form of infectious disease been found attending school. Under section 87 of the Education Act a teacher has the power to prevent a child from attending school from premises that he suspects to be infected. The majority of teachers take an intelligent advantage of this section, but it is to be regretted that a small minority do not see the extreme importance not only to themselves, but to the children and the State at large, of exercising all possible precautions to prevent the spread of infectious disease by school-attendance. It may be argued that the teacher is not a medical man, and so forth, but a few intelligent questions put to a child by the schoolmaster may be productive of much good. It was only recently that a schoolmaster informed the writer that he thought it an excellent thing to allow children to attend school from houses infected with scarlet fever, "so that they may get the disease and have done with it." This gentleman was entirely unacquainted with the fact that the longer a child lives free from exposure to the disease the less likely is he or she to contract it when brought into contact with the infection of scarlet fever. Happily it is not often that such ignorance is found on the part of one to whom is intrusted the education of the young. The schoolmaster, however, has a distinct grievance in the fact that the exclusion of scholars or the closure of the school is likely to be attended with pecuniary loss to himself. This is not only unfair to the teacher, but also to the parent; for although no attempt on the part of a teacher to mask infectious disease has ever come to the knowledge of the writer, yet it must be confessed that at times there must be a strong temptation to do so.

Closure of Schools.

Although a good deal of infectious disease has been prevalent in the district, except in two instances there has been no necessity to fall back upon that last resource of the Health Officer—school-closure. In one instance where this course was necessary it was due to the apathy or ignorance of the School Committee; in the other it was rendered necessary by the outbreak of scarlet fever in the schoolmaster's residence, where no proper isolation of the patients could be observed. Closure of schools in country districts is more efficacious in controlling the spread of infectious disease than closure of town schools, for in the latter the children are apt to meet on common playing-grounds. Again, schoolmasters' in a district should be immediately warned of the closure of any school, as some parents are in the habit, when the school is closed, of sending their children to the nearest school available.

Sanitation of Schools.

During visits of inspection to various localities it has been a custom of the writer, when possible, to look into the sanitation of the schools in the neighbourhood. It is not unusual to find the privies inadequate in number, ill-ventilated, and situated over foul excreta-pits. In all cases where these latter abominations have been found, on recommendation to the local Committee they have been promptly abolished. In some instances the water-supply has proved questionable on analysis. In any case it would be as well to supply a Pasteur-Chamberlain filter to each school, and also to do away with the iron drinking-cup that is generally attached to the well or tank. These cups are a fruitful source of transmitting diphtheria. Of course, it is not practicable for each child to bring his own cup, but the thick glass drinking-cups that are used in the schools in the United States might be generally introduced.

The Ventilation of Schools.

This is a subject of much importance, for it is evident that a child cannot thrive, and much less be capable of mental effort, in an atmosphere vitiated with the products of respiration. Any one who has had occasion to visit a class-room during school-hours would not fail to be struck with the offensiveness of the air. It is not too much to say that in the majority of schools insufficent cubic space is provided, and when it is considered that natural ventilation is solely relied on for changing the air in the class-rooms a minimum of 200 cubic feet per scholar should be insisted upon. In some class-rooms known to the writer barely 80 cubic feet are provided.

This briefly outlines some experiences of school sanitation. It is a matter for regret that the writer has been unable to pay more attention to a subject that has such an important bearing on the well-being of the nation. During the year it is to be hoped that the study of sanitation will be introduced into schools, for the earlier its principles are inculcated the more permanent are likely to be the impressions retained. Already the officers of the Education and Health Departments have agreed as to the necessity for some form of instruction, both to teachers and scholars, and only the pressure of work has postponed a definite decision being arrived at between the heads of these Departments as to what form the instruction shall take.

FOOD-SUPPLY.

Visits of inspection have often brought to light some of the insanitary conditions under which food is prepared or stored. These conditions, as may be naturally inferred, are more prevalent in the country districts than in the larger towns, where in many cases by-laws provide as to manner in which certain articles of food are to be stored.

Dairies.—In Wellington fresh by-laws are being framed regulating the conditions under which dairy produce shall be stored. These are very necessary. The most usual faults, however, in connection with dairies in the larger towns are unsatisfactory drainage arrangements and accumulation of refuse about the premises. In one large town, a shed that had received a license as a dairy was also used as a store-room for soiled linen. As dairies are supposed to be under the control of the Agricultural Department, little inspection has been made in country districts, except in those cases where the existense of infectious disease or insanitary conditions were known or suspected.

Fish.—Some loads of fish have been condemned as unfit for human consumption.

Fruit.—A great deal of fruit arrives at the markets in a questionable state. It is sold by auction and sorted afterwards. Very little bad fruit, however, is actually exposed for sale. The practice of Chinamen in ripening bananas in ill-ventilated cupboards by means of artificial heat would not commend itself to the epicure. At the same time, in justice to the Celestial, be it said that the cleanliness of his shop will often compare very favourably with that of the European fruiterer.

Butchers' Shops.—The condition of some of the up-country butchers' shops is little short of revolting. Even the front premises are often in a filthy state, being coated with grease and dust. But the back premises show how the "small goods" are prepared. It is not unusual to find the room where sausages are made also used as a harness-room, the floors of which are generally coated with grease and the walls with cobwebs. The sausage-machine is generally caked with filth, and the brine-tubs often look as if they would be the better for a good scrape. In the towns, however, these conditions do not obtain; but at the same time very great improvements could be made about many of these premises.

Bakers.—Some of the bakehouses in Wellington require to be placed in a thorough state of sanitary repair, and also to conform to the Factories Act with regard to situation and periodical whitewashing. As in the case of some of the up-country butchers' shops, the condition of some bakehouses leaves much to be desired.

OFFENSIVE TRADES.

A good deal of time has been taken up in inspecting some of these trades which are described as offensive in the First Schedule of the Public Health Act. A good deal of unnecessary trouble has been given by those persons who do not recognise that it is impossible to conduct some of the trades mentioned without causing a certain amount of effluvium. If the representations of these people were attended to trade would be driven from the country. Owners of such premises are required to conform to section 72 of the Public Health Act, and in the majority of cases they cheerfully comply with the requirements and suggestions of the Department.

FREEZING-WORKS, ETC.

The drainage of some of these works, is a matter of serious consideration. In many instances the land adjoining them is unsuitable for irrigation, and the only alternative is to allow the drainage —after going through a settling-tank—to run into the nearest river. Of course, a good deal of matter that would be offensive is used up in the "by-products" of the industry, so practically little more than bloodstained water and dilute caustic-soda solution is, at the worst, likely to gain access to the stream.

Many complaints are made about the odour in the neighbourhood of these works when the "digester" is blown off. But at Gisborne and Wanganui the gases generated in the digester are led into the furnace and consumed before "blowing off." By observing that precaution very little nuisance is occasioned.

DRAINAGE OF DAIRY FACTORIES AND CREAMERIES.

This has given rise to considerable correspondence. There is no doubt that the discharge of the washings into a stream often occasions considerable nuisance. But a good deal depends upon the general management of the premises. Experiments are now being made as to the best manner

of disposing of such drainage—experiments that will be watched with a great deal of interest as affecting one of the staple industries of the colony.

Smoke Nuisances.

A few complaints have been made, and with good reason, concerning the nuisance caused by smoke from certain industries in Wellington. There is no doubt that some of the owners are not taking the "best practicable means" to abate the nuisance. But recently some of them have signified their readiness to adopt any suggestion that the Department may make, as much of the nuisance is occasioned by inefficient stoking. A form of mechanical stoker would remedy some of these offences, but in others a "fume-cremator" may be necessary, the description of which is now being awaited by the Department. Among other advantages, it is claimed by the proprietors that this apparatus will effect a great saving in coal.

Match-factory.

A match-factory was inspected where some 120 persons of both sexes are employed. The various processes of the industry were carried out in separate buildings. Only one man is engaged in mixing the explosive material—white phosphorus, chlorate of potash, and gum. He appeared to enjoy good health. A separate dining-room is provided for the females employed, and no food is allowed to be partaken of in the workshops. In the large workroom, where some eighty women are employed, some 1,500 cubic feet of air-space is provided. The ventilating-arrangements of the room are satisfactory. From a glance at the employees it was impossible to imagine that the trade had any deteriorating effect on their health.

General Sanitation of Towns.

During the year every borough and town district and many townships under the control of County Councils have been visited and reported on either by the writer or one of the two Sanitary Inspectors under his control. Inspection revealed varying degrees of insanitation. In some boroughs water and sewage schemes of modern design have been installed; in others extensive works of a similar nature are now in process of completion. For the purposes of this report it will be sufficient to consider the chief sanitary defects found common to those towns visited.

1. *Badly Laid Drains and Connections.*—In some of those towns where a drainage scheme has been in vogue for some years the drains are often found to be ill-laid, and in one instance the work has been scamped in a truly scandalous manner. The sewers are often too large, being laid under the old "combined system" to accommodate both sewage and storm-waters. The consequence of this is that in dry weather the flow in these sewers is very small compared to their size. They therefore become foul, as it is impossible to flush them adequately.

2. *Insufficient Ventilation of Sewers and Drains.*—Though authorities are by no means undivided as to whether or not sewers should be ventilated, the consensus of opinion is distinctly in favour of sewer-ventilation, for it can easily be understood that the better a sewer is ventilated the less chance there is of sewer-air gaining access to a building. It is hardly necessary to dilate upon the danger to the inmates of a dwelling exposed to drain-emanations. It is enough to say that such inhalation materially depreciates the resisting-powers of the body to disease—especially those of an infectious nature. Ventilation of sewers can be effected either by ventilating-grids in the streets, or by running vents up trees, lamps, or poles, or by relying solely on the house-vents. Opinion is divided as to the best means of accomplishing this desirable end.

Ventilation of house-drains: The soil-pipe from a house should be ventilated by continuing the pipe full bore above the roof of the house without any intervening bends, and well away from the windows. The practice of bending these vent-pipes to suit the eave or roof is far too common, as each bend increases the friction of the outgoing air.

3. *The Removal of Rubbish.*—In some towns the removal of rubbish is very properly undertaken by the municipal authorities, but in others it is left to the householder to dispose of it at his own convenience. This means that the refuse is allowed to accumulate until it becomes a nuisance, or it is worth the householder's while to remove it. From a public-health point of view efficient scavenging is just as important as main drainage. In all towns in the district—with the exception of Wellington, which is provided with a destructor—refuse is carted to a section set apart for its reception, and there allowed to accumulate. Occasionally some of the refuse is burnt, if opportunity offers.

4. *The Keeping of Animals.*—In many towns the keeping of swine has been very wisely prohibited; but here, again, fowl-keeping is productive of almost as great a nuisance, especially in hot, moist weather, when the refuse in which the fowls are fed accumulates and putrifies about the yards.

5. *The Flushing of Closets and Sewers direct from the Water-main.*—This is a serious defect, and one that is often found, especially the latter. Many epidemics of typhoid have been attributed to this practice.

6. The other common mistakes of using rain-water pipes as vent-pipes, or allowing the overflow from cisterns to flow direct into the drains, are very commonly met with, as is also the direct discharge of bath and sink wastes into the house-drains.

In the smaller towns where no drainage scheme is in vogue, in addition to some of the defects above mentioned the chief are:—

1. *The Existence of Cesspools.*—The majority of these abominations are unlined, so that the contents are liable to pollute the water in the adjoining wells. In a community that is dependent upon wells for its water-supply the existence of cesspools is a constant menace to the health of

the inhabitants, as they have often been the cause of a smart epidemic of typhoid fever. Apart from this, their periodical emptying occasions considerable nuisance.

2. *The Removal of Nightsoil* is very ill attended to in many of the smaller towns. It is often left to the contractor to remove the receptacles (which generally lack uniformity and are leaky) when he thinks fit; or in those towns where he is supposed to get his dues from the householder he will generally refrain from removing the nightsoil from the houses of those persons who are in his debt.

3. *Tank-water.*—Persons who rely on tanks for their water-supply very seldom take the trouble to get them cleaned. They would be surprised to see the interior of a tank that had received the washings from the roof for a few months.

Wellington.

Of the four chief cities of the colony and their suburbs Wellington has the lowest death-rate, that for 1901 being only 10·29 per 1,000. The infantile death-rate is also proportionately low, only 7·95 deaths being recorded to every 100 births.

During the past year 27 deaths occurred from specific or zymotic disease, 9 being in children under five years, and the remainder in persons over that age: viz.,—

	Under Five Years.	Five Years and over.
Influenza	4	10
Whooping-cough	1	0
Diphtheria	4	3
Typhoid fever	0	5
	9	18
	27	

It is interesting to note that no deaths are recorded from scarlet fever.

Seventy-two deaths were reported from tuberculous diseases in the city and suburbs. Of these, 55 were from phthisis, two being in children under five years of age; therefore 1 death in every 7 was from some form of tuberculous disease, and 1 death in every 9·2 from consumption of the lungs. This rate is too high, and does not compare favourably with the death-rates from tuberculous diseases recorded in the other chief cities of the colony.

The Sanitation of Wellington.

The sanitary condition of the city is fair, though many houses are yet to be connected with the drainage system. The drainage-connections are on the whole well made, but now and then examples of careless plumbing are found. The Corporation by-laws are very complete, and if they were observed in their entirety the sanitation of the city should be absolutely assured.

Removal of Refuse.—The manner in which this is at present carried out is far from satisfactory. Though a daily system for its removal has been adopted in certain parts of the city, in other portions it is only removed once a week. In many instances the receptacles provided are too small for the purpose, and the scavenger refuses to take more than is actually in the pail.

Removal of Stable Manure.—This is most unsatisfactory. Many owners of stables would get rid of this manure regularly, but it is extremely difficult to find a place handy to the city for its disposal. It would be imagined that there would be a great demand for a manure of such agricultural value, but such is not the case. The Corporation should consider the advisability of acquiring the right to deposit the manure on some of the sandhills.

The Destructor.—In connection with the removal of rubbish it may be as well to mention the writer's experience as to the capabilities of the destructor, concerning which there are many conflicting reports. On reliable information it has been ascertained that some seventy loads are put through daily, Saturdays and Sundays excepted—viz., from Corporation carts, 37 loads; from private carts, 20; fruit, 10; fish, ½: total, 67½ loads. The fruit from the auction marts, however, is not taken to the destructor. This destructor is a four-celled "Fryer," and was erected about fourteen years ago. It certainly appears to do its work well up to a certain point, but the addition of another couple of cells would be of great advantage to the city.

Infectious-diseases Hospital.—At the time of writing seventeen cases of scarlet fever and four cases of diphtheria are in the Hospital, and five more are convalescing at the Plague Hospital.

About the middle of last year the necessity for increased accommodation for infectious cases was emphasized by the epidemic of scarlet fever, and the following letter was addressed to His Worship the Mayor:—

Department of Public Health (Head Office),
Wellington, 31st October, 1901.

Sir,—

I have the honour to draw the attention of your Council to the following matters concerning the sanitary welfare of the city, particularly with regard to the present want of accommodation for cases of infectious disease.

On the 18th instant, four days before the arrival of the s.s. "Gothic," the Department was notified that scarlet fever had broken out among the passengers of that ship. Accordingly, arrangements were made by Dr. Ewart for the reception of those infected at the Hospital. Information was also received that the Isolation Hospital at Berhampore was available, in case it might be considered necessary to isolate more cases than the Hospital authorities were able to accommodate. In making the necessary arrangements it was discovered that the Berhampore Hospital was not connected with the telephone.

On arrival of the "Gothic" I was informed by the Hospital steward that it was impossible to accommodate the three cases of scarlet fever from that vessel, as some cases of that disease had recently been admitted to the infectious ward from H.M.S. "Ringarooma." The cases and contacts were accordingly sent to Berhampore in a cab. It is true that the Corporation ambulance-car was in waiting at the wharf, but the vehicle did not look safe, and is altogether unfit for the purpose for which it is intended.

That afternoon I gathered from Dr. Ewart that for the last six months the resources of the Hospital had been sorely tried to accommodate infectious cases from the city and suburbs, and were accommodation provided thirty beds could have been kept occupied during the last six months.

The present accommodation for infectious diseases at the Hospital consists of a building 30 ft. by 24 ft. This ward, which is separated from the main block, is about 18 ft. high, but for the purposes of ventilation can scarcely be reckoned higher than 14 ft.; so that, allowing 2,000 cubic feet of air-space as the minimum for each patient, there is accommodation for barely six patients. This ward is divided off with wooden partitions for separation of the sexes. There is no accommodation for the nurses on duty, who have either to sleep in one of the cubicles in the ward itself, or in the kitchen adjoining the ward.

In the main Hospital building are the usual small isolation-rooms which are necessary for the reception of those cases of infectious disease which periodically crop out among the inmates; but these rooms can scarcely be regarded as affording accommodation for the general public.

I have therefore endeavoured to show that at the Hospital there is accommodation for barely six persons; that poor provisions are made for the separation of the sexes; that only one kind of infectious disease can be treated at a time; and that there is no proper accommodation for the nurses on duty.

At the Berhampore Hospital are two wards, each containing some 6,000 cubic feet of air-space, or accommodation for six persons. Authorities on the subject agree that the minimum allowance of accommodation for the treatment of infectious disease should be one bed for every 1,000 of the population. In Wellington and suburbs, with a population of 55,000, there are at the most only fourteen beds available for the treatment of such cases.

I would therefore respectfully suggest to your Council the desirability of providing not less than thirty beds for the treatment of infectious cases. As accommodation for six persons has already been provided at the Berhampore Hospital, this would entail the erection of a building for the reception of twenty-four cases.

The adjoining Borough Councils should unite with your Council in providing a hospital for the treatment of infectious diseases. The expenses of such an institution might be apportioned on a basis of population ("The Public Health Act, 1900," section 38, subsection 8). I would also suggest that your Council approach the Hospital Board in this matter. If some satisfactory arrangements could be made with that Board it might result in the erection of an infectious-diseases hospital worthy of the city and suburbs, and the question of administration might be greatly simplified.

It is almost unnecessary to point out that it is impossible to cope successfully with certain forms of infectious disease without proper hospital accommodation. Preparations for the treatment of infectious disease should be made in non-epidemic times, as under the influence of the panic, often caused by the immediate presence of a dangerous infectious disease, an authority is liable to erect buildings of an unsuitable description, and in unsuitable places, and often at inordinate cost.

There is another matter to which it is my duty to call the attention of your Council. At the present time the only means available for the disinfection of infected things are: (1) An alformant lamp, which is very suitable for the disinfection of houses, but is of little value for the disinfection of bedding, clothes, &c.; (2) the obsolete "dry-heat infector" at the Hospital, which is practically valueless as a disinfector. It is very necessary that a modern steam disinfector should be provided. Here, again, it may be possible to come to some arrangement with the Hospital authorities, who, I understand, contemplate erecting a modern apparatus. At present, however, there is no place in the city where the process of disinfecting infected things can be carried on.

I have, &c.,

T. H. A. Valintine,

His Worship the Mayor, Wellington. District Health Officer.

The Hospital authorities now intend to erect another ward for the accommodation of infectious cases. When this is accomplished there will be in the city—on Dr. Ewart's estimate—accommodation for twenty-six cases of infectious disease, but this would not be sufficient. Although in the letter to the Mayor thirty beds were asked for, the usual allowance for an infectious hospital is one bed for every 1,000 of the population. In the meantime the diphtheria cases are treated in the small isolation wards.

Nothing at present has been done about a proper ambulance; the present vehicle is nothing short of a disgrace to the city.

Plague Precautions.

Owing to the recrudesence of plague in Sydney during the early part of the year, additional precautions had to be taken to insure the sanitation of the city, and the department is very grateful to the Mayor of Wellington for setting an example that was subsequently followed by the authorities in the larger cities of the colony. Six additional inspectors were appointed to make a house-to-house inspection throughout the city. The reports of these inspectors were handed in to the City Engineer every night, and carts were despatched to remove the accumulations of rubbish, &c., reported on. A premium of 3d. per head for rats was also advertised.

The reports of these inspectors showed that the sanitation of the city was better than had been anticipated, although many faults in the drainage connections were brought to light.

Insanitary Buildings.

During the year a number of insanitary buildings have been condemned and others placed in a state of sanitary repair. The drainage arrangements of many stables have been altered so as to comply with the city by-laws. A good many insanitary buildings still exist, however, particularly in the narrow lanes off Tory Street. Some of these small houses, though insanitary in their surroundings, are cleanly kept. The housing of the poor is always a difficult problem, but has hardly reached the acute stage in this city, though it must not by any means be lost sight of. In this matter we should profit by the experience of the London County Council, and not embark on a wholesale demolition of insanitary houses without first ascertaining if better accommodation could be readily obtained for those evicted.

Sanitation of the Suburbs.

The sanitation of the suburbs is not satisfactory. In the more thickly populated portions of the Melrose Borough a service for the removal of nightsoil has been instituted, but very little, if anything, has been done with regard to the removal of rubbish. The attention of the Department has been called to the existence of several nuisances in this borough, particularly at Mitchelltown, and the polution of the Island Bay Creek. The condition of some swamps adjoining the borough boundary has also been the subject of some correspondence.

In the Onslow Borough no measures have been taken with regard to the removal of nightsoil. This is only necessary in the neighbourhood of Wadestown and Kaiwarra. During the past year many nuisances have been reported from both these portions of this suburb.

Karori: Nuisances have been reported in this suburb. The Borough Council should lose no time in instituting a service for the removal of nightsoil.

In connection with these suburbs it is to be hoped that, in the interests of sanitation, the "Greater Wellington" scheme will obtain the approval of the ratepayers.

Lower Hutt: This borough is about to institute a better system for the removal of nightsoil.

Petone: No nuisances have been reported during the year from the neighbourhood of Petone. The Borough Council are about to install a public water-supply.

WANGANUI.

A "combined" system of drainage has been installed in Wanganui for some years past. It works fairly well, but naturally in dry weather the sewers tend to become very foul, with no storm-waters to flush them. The house connections are very well laid, under the inspection of the borough engineer. A good many complaints have been made during the year concerning the emanations from the ventilating-grids in the streets, and additional shafts have been advocated to reduce the nuisance.

As in other towns, the removal of refuse is most unsatisfactory. Unfortunately, scavenging is not undertaken by the Council—with the usual results. The condition of the depot where rubbish is deposited deservedly occasions considerable criticism. A regular removal of rubbish and the erection of a modern destructor are very necessary to complete the sanitation of this prosperous town. A few unsanitary buildings have been condemned in this town during the year.

Unfortunately, fifteen cases of typhoid have been reported in Wanganui for the year ending 31st March, 1901. No common cause, however, could be assigned for the disease. As in the case of other New Zealand towns, the disease is endemic, and is specially liable to break out in the low-lying parts of the town during the fall of the year.

Inspector Kendall, who has been appointed by this Department for the Wanganui-Waitotara "combined area," is now stationed at Wanganui. Mr. Kendall is an able and energetic officer; and has been instructed to take special observations with regard to all cases of typhoid reported.

PALMERSTON.

The sanitary condition of Palmerston is not good; in fact, in that part of the town between the Square and the Railway-station, which is not connected with the drainage scheme, it is very bad. This portion is honeycombed with cesspools. In other parts of the town a good many houses could be connected with the present system of sewers.

The house-drains are badly ventilated.

Refuse is removed by a contractor, who is not obliged to remove more than 6 cubic feet at a time.

I understand that the Corporation intend to extend their drainage scheme so as to allow the insanitary portion of the town—just mentioned—to connect therewith. This is very necessary.

During the months of February and March an outbreak occurred that presented all the symptoms of true dysentery. Fourteen cases were reported, with four deaths. Dr. Wilson kindly gave the following description of the disease. It was characterized by the sudden onset of diarrhœa and vomiting associated with severe griping pains in the abdomen. Within twenty-four hours the stools became tinged with blood—in some cases the hemorrhage from the bowels being very severe; the extremities were cold, and the patient soon assumed that "pinched" appearance which is characteristic of true dysentery. Those cases that terminated fatally died within twenty-four hours of the onset of the disease. In some cases the diarrhœa and vomiting ceased as suddenly as it had commenced; but in the majority the disease ran into a chronic course, gradually lapsing into ordinary chronic diarrhœa of an intractable nature. Insanitary conditions were found about all the houses where these cases occurred.

FEILDING.

Unfortunately this town has no system of sewerage, therefore its sanitary condition is not good, but not nearly so bad as has been currently reported. A proposal for water-supply and drainage is shortly to be submitted to the ratepayers.

MARTON.

The sanitary condition of this borough is fair on taking into consideration that it has no system of sewerage. A septic tank has been installed at one of the hotels.

The borough is provided with a water-supply, but the water is of poor quality, containing too much vegetable matter.

HAWERA.

This borough has lately had installed an excellent water-supply and drainage scheme. A good many houses are yet to be connected with the sewers.

STRATFORD.

An excellent water-supply and sewage scheme, with the septic-tank system, is in process of installation in this enterprising borough.

NEW PLYMOUTH.

The ratepayers of this borough have lately adopted the proposal submitted them by their Council for a thoroughly modern system of drainage in conjunction with septic tanks. The borough has been provided for some time with an excellent water-supply.

PAHIATUA.

On taking into consideration that no drainage scheme exists in this borough the sanitary condition is not so bad. The Borough Council should certainly submit to the ratepayers a scheme for the introduction of good water into the town. The water from many of the wells in Pahiatua is unfit for human consumption.

MASTERTON.

This borough has lately been provided with a modern system of water-supply and drainage. The septic tanks appear to be working well.

CARTERTON.

A poll of the ratepayers has lately decided on a public water-supply. The inhabitants are to be congratulated on this decision, for many of the wells from which the inhabitants derive their water-supply are by no means above suspicion.

GREYTOWN.

This is an undrained town, and the water in some of the wells is doubtful. Some cesspools have been abolished, and septic tanks substituted. There are still some cesspools to be filled in. With these exceptions the sanitary condition of the town is fair.

ELTHAM.

The sanitary condition of this newly formed borough is considerably better than it was a year ago. The Borough Council are about to submit a water and sewerage scheme to the ratepayers.

Besides the abovementioned towns, the following places have been visited and reported on: Tikorangi, Waitara, Toko, Tariki, Waverley, Waitotara, Aramoho, Pipiriki, Mangaweka, Taihape, Ohingaiti, Hunterville, Pohangina, Kimbolton, Longburn, Levin, Otaki, Johnsonville, Pigeon Bush, Featherston, Kaiwaiwai, Martinborough, Eketahuna, Mangatainoka, Ballance. Outside the Wellington Health District—Gisborne, Auckland, Dannevirke, Waipukurau. In addition, the following places have been visited by Inspector Kendall: Inglewood, Hawera, Midhirst, Opunake, Patea, Manaia, Foxton, Normanby.

It may be added that, although many matters relating to the sanitation of the district have, owing to want of time, barely been inquired into, yet the results of the work of the past year show that a considerable proportion of the public take a lively interest in matters relating to the public health. This augurs well for the future. The writer cannot allow this report to conclude without expressing his hearty appreciation of the services rendered by Sanitary Inspectors Kendall and Schauer, nor without expressing his thanks to Mr. Horneman and his staff for their hearty co-operation in face of a stress of work that has sometimes been severe.

T. H. A. Valintine, D.Ph. M.R.C.S., L.R.C.P. Lond.

MARLBOROUGH DISTRICT.

Report of Acting District Health Officer.

Blenheim, 20th June, 1902.

Although a Health Officer had been appointed by the Borough Council in 1900, very little was done, and very little interest was taken in matters pertaining to the public health. In July, 1901, an epidemic of enteric fever alarmed the public, and Dr. Mason, Chief Health Officer for the colony, was asked to visit Blenheim, and to make a report on the sanitary condition of the town. In a lengthy report Dr. Mason very conclusively proved that the town's condition as to sanitation was far from good, and he made recommendations with a view to improvements. The report was adopted by the Council, and Dr. Mason was thanked for his services.

In August I was appointed Acting District Health Officer for Marlborough, and it became my duty to see that the wishes of the Chief Health Officer were complied with. I was instructed not to hurry the persons concerned unduly, but to keep their attention directed towards the necessary work.

With the exception of the filling-up of Collie's Hollow and Lock-up Creek, and of the adoption of the sealed-pan system of removing of nightsoil, all the work ordered had been executed. The filling-up of the above places is a big undertaking, but the Council are only waiting for a report from the Public Health Department as to the best scheme to adopt with regard to the sealed-pan system. The Council are awaiting the visit of an expert from Auckland.

I have also to report the following matters:—

1. *Vaccination* is practically a dead-letter throughout the district.

2. *Infectious Diseases.*—During the months of October and November epidemics of measles, scarlatina, and influenza broke out. The Notification Act was ignored, but, as far as I could ascertain, there were no fatal cases. Since then an occasional case has occurred, and three cases of enteric fever have been reported. One case of enteric occurred at Havelock, with fatal results. Mr. Middleton, Sanitary Inspector, visited Havelock and reported. His report was sent on to the local authority, with the request that the recommendations be carried out. Under the instructions of the Chief Health Officer, I have from time to time examined passengers holding licenses from quarantined ships. On 20th May the s.s. "Nambucca," from Sydney, was inspected and fumigated at the Wairau bar.

One information was laid for a breach of the Notification Act. The offender was a dairyman, but for want of evidence the case was dismissed.

3. *Sanitary Conditions.*—The Inspector of Nuisances is an energetic man, and, acting on his reports to me, I have frequently had occasion to visit houses, back yards, drains, wells, &c., complained of as nuisances, and to have the defects remedied. I find the owners or tenants anxious to assist in any reasonable way.

4. *Teachers for South Africa.*—Two ladies were examined. One was passed, the other rejected.

5. *Returned Troopers.*—Eight were examined by myself, acting as a Medical Board.

6. *Contingents.*—Forty men were examined for the Eighth and Ninth Contingents, and twenty-five for the Tenth Contingent.

7. *Special Reports.*—Special reports were sent to the Chief Health Officer on the outbreak of enteric fever and on the proposed site for the abattoirs.

8. Picton has been visited twice, Dr. Claridge very kindly assisting me on each occasion.

W. Anderson, M.B. and C.M.,
Acting District Health Officer.

OTAGO AND SOUTHLAND DISTRICT.

Report of District Health Officer.

Department of Public Health,
Dunedin, 6th June, 1902.

Sir,—

I have now the honour of sending you a report on the sanitary work in my district during the period ending 31st March, 1902. It comprises practically the months of September to March, with a few items during the month of August, in which I received my appointment, but during which the work was little, partly because I was winding up my practice, partly because the details of my work had to be mastered and brought into working-order. This report therefore comprises only seven months' work.

I have, &c.,
Frank Ogston, M.D.,
District Health Officer for the Otago-Southland District.

Dr. Malcolm Mason, Chief Health Officer, Wellington.

Report for the Otago-Southland District on the Work done during the Year ending 31st March, 1902.

On my appointment as Health Officer for the District of Otago-Southland, in the beginning of August, 1901, I had necessarily a good deal to do in mastering the details of the work I was expected to undertake, and in bringing it in line with that of Health Officers in other parts of the colony. The laws relating to public health, with the varied duties these imposed not only on me, but also on the public bodies throughout the district, further engaged my attention for a time. Having to some extent made myself familiar with these, I proceeded to bring myself into relation with the different authorities within my district, and to acquaint them regarding the nature of our responsibilities the one towards the other. This I to a great part accomplished by personal intercourse, having visited and examined most of the townships of Otago and Southland, and establishing relations with Mayors, County Councillors, and County Clerks, &c., of each place to which I came. I had arranged to visit the remaining parts of my district before the close of the working-year, but was prevented from seeing a few of the less important places by the necessity of supervising and getting into working-order the system of quarantine which had been imposed on all ships arriving from Australian ports.

Places visited.

I have personally visited and made myself more or less thoroughly familiar with the following townships: Abbotsford, Alexandra, Arrowtown, Bluff, Clinton, Colac, Dipton, Dunkeld, Fortrose, Frankton, Gore, Green Island, Invercargill, Lawrence, Lumsden, Makerewa, Orepuki, Otautau, Palmerston South, Port Chalmers, Portobello, Riverton, Roxburgh, Waitati, Waitahuna, Waitahuna Gully, Wyndham; while my Inspectors have made inspection of Balclutha, Balfour, Kaitangata, Limehills, Mandeville, Mataura, Milton, Mount Cargill, Nightcaps, Owaka, Riversdale, Romahapa, Skipper's, Waikaka, Winton, &c.

While travelling to and from these places, sometimes by rail, sometimes by coach or buggy, I have taken occasion to examine smaller settlements and buildings on the way, and to gain information from residents in the country as to the condition of the rural districts generally. I have thus acquired a fair working knowledge of the sanitary state of my district, of which I shall be enabled to make further use when time and quarantine regulations permit me to visit the different localities at more leisure during the course of next year.

Many of our country townships have from local circumstances, such as inconvenience of access, proximity to rivers, and so on, been placed in situations not altogether favourable to their healthiness, the river-flats being swampy or liable to floods, with frequently too slight fall to the river to allow of their own drainage being easily removed, when by the increasing growth of the township a common scheme of drainage was rendered necessary. On the other hand, their little elevation above the river prevented its being utilised to provide a water-supply, essential to a service of sewage-removal, or for leading into the town water for drinking and culinary purposes in cases where the river-water was pure enough for such.

Thus, in the case of several country townships, I have been requested to advise on or to approve of schemes for water-supply and for the disposal of their drainage. Among these I may

mention drainage schemes for Port Chalmers, Wyndham, Gore, Otautau, Lumsden, Arrowtown, Queenstown, Invercargill, Dunedin; water-supplies to Alexandra, Roxburgh, and Dunedin, where the methods at present existing required improvement, or where schemes required initiating *de novo*.

Sewage disposal has also engaged my attention, and in the several cases I have been consulted I have endeavoured to impress on local authorities the necessity of care in its removal, as well as in that of its disposal. In several country townships the pan system has been, or is being introduced, and in these I have emphasized the necessity of using small covered pans, so that the amount contained in them may be small, necessitating frequent removal. In giving advice regarding sewage-removal by water carriage I have impressed on local authorities the fact that, although they may in the meantime be permitted to use rivers, either tidal or authorised sludge-channels, they must provide for the possibility of having to purify the sewage by filter-beds or other means, and that they must so construct their discharging-sewer that some such purification may be adapted at or near its termination.

Food-supplies and their Storage and Treatment.

During my inspection of the different townships and country districts I have made a special point of examining the shops in which provisions were sold, but with perhaps a more critical eye those of butchers and fish-salesmen, and have found much in these requiring amendment. In over fifty I have ordered improvements where gross uncleanliness was noticed. But I consider the whole subject of meat-storage requires looking into, and am now engaged in studying it with a view to making a full report to the Department later.

As a rule, I may now mention slaughter-yards, butchers' shops, dairies, dairy factories, piggeries, &c., as not kept in a manner that is necessary from a public-health point of view. Many of the dairy factories, for instance, have piggeries attached, and in most cases they are kept in a very filthy condition. I have personally visited some of these, and my Inspectors have seen several more; but with only two, I think, we were entirely satisfied. We have found that many of the farms, either supplying milk to the dairy factories or directly to customers in towns, are not kept in a cleanly manner, the farmer being either too poor to erect proper outbuildings for his cattle and for treatment of the milk, or negligent in keeping them clean and in good repair. An examination of the cowsheds in one district of Dunedin resulted in the condemnation of more than half of them, either from structural defect, insufficient accommodation, or too close proximity to dwellings and other buildings. And during a round of inspection Inspector Gunn made to the dairies in the country immediately surrounding Dunedin, and supplying it, he found them generally much requiring cleaning.

Slaughter-yards.

Many of the existing slaughter-yards suffer from want of efficient water-supply, and are consequently dirtily kept. But I understand they are now engaging the attention of the Stock Department, under whose supervision they come. I have visited several of these with Mr Gilruth and other of the officials of that Department, advising with them as to means for their improvement, and my Inspectors have been looking around to see that what has been ordered is being carried out.

Dilapidated and Insanitary Houses.

In Dunedin and some of the townships visited a goodly number of houses were found, from old age chiefly, to have become so dilapidated that pulling down was the only remedy. I have consequently had over forty of these removed, and have a number more in view.

Schools.

During my rounds I have, by request chiefly, looked at several of the schools in the towns and in the country districts, and found that in several the cubic space was not sufficient for the average number of pupils, and that in the majority of cases the closet accommodation was in a bad condition, mostly from the pans generally employed being too infrequently cleaned.

Stables.

In most of the stables and stable-yards I visited the construction of the buildings was defective, and the stalls could not be properly cleansed and kept clean owing to the want of impervious paving and to the lack of drainage at the front of the stalls, while in many the manure was not being often enough removed. In twelve cases I have noted the immediate removal of enormously overgrown manure-heaps was ordered.

Poultry-keeping.

In many of the houses, in Dunedin and its suburbs especially, the keeping of fowls in small improperly kept runs has caused a nuisance to the neighbourhood. These have been looked to, and in several instances ordered to be discontinued.

Rubbish-tips.

The places on which town and house rubbish is being deposited have received considerable attention not only in Dunedin, but also in several of the country townships, and I have had to devote some time occasionally to looking after these to make sure that they were being carefully attended to, and that they did not cause a nuisance to the locality.

Nightsoil-removal.

My attention having been in many instances drawn to the careless way in which nightsoil-removal has been conducted, I have had to write to local authorities calling on them to exercise a closer supervision over their contractors. I have also had on several occasions to find fault with the state of the places at which the nightsoil was being deposited.

The nightsoil-depot at Tomahawk, about which Dr. Mason was consulted, and which formed the subject of litigation, is now being carefully kept, and has not been the cause of any complaint of late, as it is being treated with greater precautions than formerly. The ground available is now almost exhausted, and a new place will have to be found, or a new system adopted.

Defects in House-drainage.

I have noted fifth-two cases in which house-drains were defective, and which I have seen personally, ordering their repair or replacement by a better system, and Inspector Donaldson has reported to me that he has caused eighty houses to be connected with the sewers.

Over three hundred nuisances of a miscellaneous nature have been seen to by myself and Inspectors in town and country, and Inspector Donaldson has inspected over two thousand premises, to some of which he has called my attention, and requested assistance in effecting improvements. Inspectors Cameron and Gunn have also been active in the same direction in their districts.

Complaints having been made to me that our theatre was being neglected, I, after examining it, interviewed the manager and requested that a more efficient means be adopted for keeping it clean in future. The state of some other of our public halls has received attention, having been much needed.

Railway-carriages and Meat-vans.

The imperfect way in which the railway-vans for the carriage of fish were being cleansed at Port Chalmers attracted my notice, and I wrote you asking you to call the attention of the Railway Department to it, with the result that it is now being looked after, water for the purpose having been obtained from the town's supply, and being used to wash out the vans. I examined the meat-vans at the Bluff on one occasion, and found the same reason to complain of neglect.

In travelling around I have observed that the closets at some of the railway-stations are badly looked after, and allowed to get into a filthy mess. I have spoken to some of the Stationmasters about this, and have thus effected a little improvement; but I consider a more general supervision is necessary. I have also had complaints about the uncleanliness of some of the closets in the railway-carriages, which require more careful supervision, especially those of the second-class carriages.

Public Baths.

The City Council having decided that public baths in a central part of the city were desirable, I was asked to examine that at Pelichet Bay, and reported that, from the fact that it was in a position where the sea-water had to be retained at high tide by a lock, and that it received the drainage of a portion of the town, it was unfit for use, and might be dangerous to those bathing in it. It has in consequence been pulled down, and is no longer in use.

A substitute being desirable, it was suggested that the enclosed baths known as "Morgan's Baths," fed with water from the bay which had passed through the boilers of the adjacent cement-works, should be bought for public use. I was requested to examine and report on their fitness. On doing so, and perusing the analysis of the water which had been made by Mr. Kidston Hunter, I was satisfied that they might with safety be used, and that their water was free from any dangerous element. The scheme of taking over these baths was thrown out by a majority of the City Council when it was brought before them.

Manufactories possibly specially Dangerous to Health.

At the request of the Chief Health Officer, I made a special examination of several of the factories in which processes involving a greater amount of danger to the workers than usual might occur.

Of cement-works, the only one in my district is the Milburn Lime and Cement Works, near Pelichet Bay. Here I found that ventilation was free, all the sheds being practically open, and the danger from lime-dust minimised to the utmost degree.

In the wax-vesta manufactory at Caversham all possible precautions were taken to protect workers. Since then new works have been erected, with all possible provision for ventilation, and attention to the safety of the employees.

Pollution of the Kaikorai Stream.

The condition of the stream which flows through the Kaikorai Valley, and on which many factories are situated, has engaged much of my attention, as it was being subjected to considerable pollution from these. I found, however, that its pollution was to some degree unavoidable unless a main drain was laid down along the whole course of the valley, some four or five miles in length, and provision were made for the purification of the effluent at its lowest point, no easy matter from the slightness of the fall in the valley; and that, further, a sufficient water-supply were brought along the valley to take the place of the stream, the water of which, though not clean, was good enough for the use of many of the works. This would be necessitated by the fact that several of the factories had water-rights which would be interefered with by the construction of a sewer to carry away the water they had to depend upon. This question was therefore left in abeyance till the scheme for providing a more abundant supply of water to the city and suburbs,

much required, has been carried to completion, which will be in a short time, as it is now in progress. It was left to stand over, too, for the reason that a Drainage Board has recently been formed embracing Dunedin and its suburbs, whose duty it will be to provide drainage for the district in question, and who will thus have to tackle this difficult matter. Meanwhile the stream is being closely watched, and the amount of pollution diminished as much as possible, several of the works, which are the chief culprits, having been ordered to adopt means to purify their effluent as much as may be.

Inspection of Meat, &c., intended for Human Consumption.

In this department much has been done since the establishment of our public abattoirs, and a close watch is being kept on the importers and sellers of meat, fish, and fruit.

Mr. Snowball's reports to his Department (Agriculture) will show how much good work he is doing in the way of meat-inspection.

City Inspector Donaldson has examined 111 carcases of beef, 480 sheep, 36 calves, and 3,025 pigs; and, acting along with us, he has seized and destroyed five pigs and 181 hams and rolls of bacon out of the 1,544 which have been examined.

Inspector Gunn condemned a lot of hams and bacon at Port Chalmers, the owner paying all expenses.

Two separate consignments of fruit were pounced upon, ordered to be picked, and the decayed fruit destroyed. This amounted to 123 cases of oranges and 25 cases of lemons, all far gone in decay.

On two occasions freezing-works, where a large amount of fish, &c., supplying Dunedin and the surrounding country is stored, were visited; the first visit resulting in the seizure and destruction of 6½ tons of provisions, principally fish, far gone in decomposition, and at the second in about 2½ tons being simlarly treated. The owner of the works was prosecuted and fined, with expenses, and the works shut up till they had undergone a thorough renovating and cleansing, to my satisfaction.

In this connection it may be mentioned that seventy-nine dairies for the sale of milk in the city have been inspected and licensed, and that over fifteen of the suburban dairy farms have been visited, and generally found not to be properly kept clean. This state of matters was ordered to be amended, and that the farms and surroundings be better seen to in the future.

Lead Contamination in Beer.

In the beginning of this year Dr. Truby King consulted me in reference to a case which he had treated in Seacliff Asylum, presenting most of the symptoms of lead-poisoning, and requesting me to follow up the case by making an examination of the beer sold at the hotel this man was in the habit of frequenting. Inspector Gunn therefore visited the hotel, and took a sample of the beer which had stood in the beer-tap all night, and sent it to Professor Black, who pronounced that it was contaminated with lead.

Following this up, Inspector Gunn visited the hotels which did an early-morning trade in beer; and, as his visits were at an hour when he got the first draw-off, he was enabled to have fair samples of the beer as supplied to workmen on their way to work in the morning. In nearly every case these were found by Professor Black to contain lead in more or less quantity, its source being, as I have stated in my report on the matter, the leaden pipe which leads the beer from the cask in the cellar to the tap at the bar.

I am further following up this, and meantime it is being attended to by the trade, with a view to find a better method of drawing the beer. I did not judge this a subject for a prosecution, as the thing had been the result of inadvertance, not of negligence or design, but have thought it better to let the trade devise a remedy, which they are both willing and anxious to do for their own sakes. This will probably be in the direction of finding a substitute for the leaden pipes. So far as I have been able to learn, the man in question has been the only victim, and it was the excessive amount he drank which led to the result by which he was injured.

A prosecution having been undertaken by the local authority for the selling of jam which was proved to be adulterated with fruit substances other than that which it professed to contain, we had some samples taken from various places, but these were certified by Professor Black to be genuine articles, with no adulteration of any kind.

Sanatoria for Consumptives.

As instructed, I kept my eyes open while travelling through my district to find out if it contained any place or places suitable for the retention of patients suffering from consumption, and for their treatment and cure. Two places only struck me as meeting requirements. On one of these, the Beaumont Valley, I have fully reported; and on the other, Tapanui, though much has been learned regarding it, I have not been able to visit it to make a special examination, and I have not ventured to recommend it on imperfect information. The former of these combines most of the necessary requirements; but the latter has this in its favour: that it is more reachable, having the railway within a short mile.

Both our quarantine stations were examined, and are now in working-order, ready for any emergency.

My Inspectors have been attending to the disinfection of premises where that has been required from the occurrence of infectious disease, and on two instances I had to see to the disinfection of articles which came here from Tasmania to the paper-works.

Infectious Diseases.

During the past year my district has been comparatively free from infectious diseases.

We have passed through an epidemic of *measles*, or *German measles*, for no distinction appears to have been made between them by the doctors who notified them, which was frequent and well spread when notification was regularly begun. The epidemic was at its height in and around Dunedin about the end of October or the beginning of November, and spread southwards, arriving at Invercargill and the surrounding country, and throughout my district generally, about a month later. In October 140 cases were notified; in November, 171; and in December, 64; while in January they had fallen to 21, and in February to 15—nearly all in the country places, working southward—till in March they were practically only notified in the Invercargill district, 29 in number. The number of deaths in Dunedin, from which 440 cases were notified, was 6, or 1·36 per cent.

Scarlet Fever.—During the progress of the measles epidemic a few cases of scarlet fever were notified; almost without exception I visited these, but on no occasion could I find any contact with a previous case of scarlet fever, while in many I did find contact with cases of measles of an undeniable type, so I was forced to the conclusion that we had to do with German measles of the form which approaches the scarlet-fever rash. In all these cases, however, I directed precautions to be taken as if we had really to do with scarlet fever, and there has been no spread of that disease in this district.

Diphtheria.—An epidemic of diphtheria occurred in the southern part of my district, beginning at Lumsden, apparently arising from a filthy lagoon at the back of the two principal hotels, in one of which it broke out, and spreading by direct contact throughout Southland, to terminate in the end of October. Thirty-two cases thus occurred, generally of a mild type, ending in recovery, except in two instances—one the first attacked; and the other, at Riversdale, from the utter negligence of the patient to take the least care of himself.

Since then we have had isolated cases in places remote from each other, all of a mild type, with no deaths, apparently due, so far as I could learn, to dirty gutters or general surroundings of a localised nature. Of the five cases in Dunedin, for instance, in one — that of a baby three months old, which died—the surroundings of the house were in a most filthy state. I had called attention to these premises some time before, but they had been allowed to relapse into an unsatisfactory condition, which I have now properly remedied.

One or two of the cases were notified as possibly diphtheria, turning out to be aphthous throat; but I have encouraged the notification of these as tending to let us have early notice of what might require active interference, and which gives us notice of a locality requiring looking after.

This disease gave for the whole district three deaths, or 7·3 per cent. of the cases notified.

Enteric Fever.—We have been very free from this disease, but the return is rather imperfect perhaps. I have been able to hear of only seven cases, four of which were in Dunedin, one in the Clutha County, at an isolated farmhouse, and the other two in Southland. In all the cause was pretty well traceable to defective drainage, though, except in a case at Riverton, not to any previous occurring case. The fever which happened at Winton was traced to water from a dirty lagoon.

Tuberculosis.—We are not having satisfactory returns of this, only 149 having been sent in from the district, of which sixty-nine were from Dunedin and the immediate surrounding country, including Dr. Stephenson's hospital, while we have from Dunedin Registration District forty-eight deaths. It is thus no use to try to estimate the percentage of deaths, as the returns have been too imperfect.

Influenza.—A few cases have been notified—fifteen in number; with one exception, all in Dunedin or its immediate neighbourhood. But it is doubtful if these were of the true type of epidemic influenza, from which this district has been free for some time apparently.

Blood-poisoning has been noted in four instances, but of no definite type, and it has only occurred sporadically.

Leprosy.—One case of this was notified at Murphy's Flat, and on investigation it proved to be a true instance of anæsthetic leprosy. As the man, a Chinaman, lived alone in a remote part of the country, and as the form of the disease from which he was suffering is held by authorities not to be contagious, or only so in a very advanced stage, he was left in his place, with strict directions for his isolation, which are now being carried out satisfactorily, by late accounts.

I may mention that the case agreed in every respect with cases I have seen in Norway in the Leper House in Bergen, and that from the photographs taken by Dr. Mason on his visit with me the case was pronounced to be true leprosy by my brother, Professor Ogston, of Aberdeen University, who has studied the subject in Norway and elsewhere.

I cannot at this time enter into a detailed account of the examination I made of the places visited within my district, as these visits were necessarily too hurried, and were more in the way of entering into relations with the various Councillors and local authorities than a close inspection; but during the currency of the present year I shall hope to make my visits more thorough, so that they may form the bases of full reports, which I may be able to send you from time to time, to form a catalogue of each, by which the district may be accurately known.

We have had no bacteriological work during the year, except in the case of some of the surface material at the nightsoil depot at Tomahawk, which was examined to find out if any fecal remains were left. Cocci and a very thin bacillus were found.

I have had to make a microscopic examination of a mutton-chop, in which I found a cheesy gland, which was full of tubercle bacilli, on staining and examining a smear under the immersion lens 1,200.

EPIDEMIC of MEASLES in the OTAGO-SOUTHLAND DISTRICT during 1902.

Localities.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	Total.
Dunedin City	45	27	10	3	...	3	88
Hill boroughs—							
Mornington	32	15	...	...	...	...	47
Roslyn	8	16	5	...	...	...	29
Maori Hill	4	15	1	...	...	...	20
Flat boroughs—							
Caversham	9	19	9	2	1	4	44
South Dunedin...	6	34	11	1	...	...	52
St. Kilda	6	15	2	...	...	...	23
Northern boroughs—							
North-east Valley	4	8	3	...	...	...	15
West Harbour	2	3	8	...	...	...	13
Peninsula	2	...	...	...	...	...	2
	118	152	49	6	1	7	333
Counties, going north from Dunedin—							
Waikouaiti	12	1	5	...	...	...	18
Waihemo	...	1	...	...	...	...	1
Counties, going south from Dunedin—							
Taieri	1	4	7	...	...	...	12
Bruce	1	...	...	12	1	1	15
Clutha	...	...	...	...	...	...	...
Tuapeka	...	2	...	1	...	...	3
Vincent	...	...	...	...	...	...	...
Maniototo	...	7	...	...	1	...	8
Lake	...	...	...	...	...	...	...
Southland	6	6	...	4	14	72	102
	138	173	61	23	17	80	492

NOTE.—The arrow shows the direction the epidemic took.

[To face page 61

Four specimens of water were sent in, one of them from a tap connected with a well supplying Ross and Glendining's factory in Roslyn. The water showed, under a low power, numerous very minute crustacea of the lobster species, about the size of a cross-section of a large pin. The other three specimens were ordinary town water from various places. They were found to contain a good deal of clay, and plenty of the same minute crayfish and shell-fish like extremely small periwinkles. As I thought these might interest Professor Benham, and that he might be able to give me a reason for their appearance, I went to see him, but unfortunately he was away from home for a time.

We have made examinations of rats several times, but have observed none with any disease of any kind about them. One of the lots we examined was from one of the Union Steamship Company's steamers which had come from Melbourne, and was about to be docked for general repairs. The rat crusade has been vigorously prosecuted, both in this neighbourhood—some fifteen hundred to two thousand having fallen victims—and in Invercargill and the Bluff, where eight hundred to a thousand have been caught.

As the new law-courts are not yet ready for occupation, we have still to wait for our office. They are to be formally opened about the end of this month, so we may get entry to our office in the beginning of July. I shall be glad of this, as our work is hampered to some degree from want of room and shelves, &c., for papers and suchlike.

In concluding this summary, I have to express my satisfaction with Inspector Gunn. He has shown zeal, intelligence, and tact in the work he has had to perform. His work, too, has been of a high order, far surpassing that to be expected from the class of man which his small salary might be expected to attract to the position. Indeed, he has had to do, and has done, especially since the initiation of quarantine, work which should only be demanded from a first-class clerk. The quarantine regulations have given him so much work of a clerical nature, which the usual type of sanitary inspector would have been incapable of, that he deserves either to have his salary raised or to have a bonus for his extra duties. I should be glad if you could see your way to this.

Inspector Cameron appears to be full of zeal, but would be better with more supervision than I have been able to give him since quarantine has tied me so much to Dunedin. When this is over I shall perhaps ask to have him transferred for a time to this centre, where I can train him and have control of him; but till that is over he would be of little use to me, as he has not the aptitude for clerical office-work which at present forms so much of Mr. Gunn's duty.

I am inclined to think that, instead of an Inspector, the work would be better done by a doctor, who would work under me, with a small retaining salary, and should act as referee in sanitary matters for the local authorities, who have their own Inspectors. As the doctor could do private practice as well, the cost might be not more—it might even be less—than by the present system. But, of course, it is for you to judge of this matter.

FRANK OGSTON, M.D.,
District Health Officer for the Otago-Southland District.

REPORT OF DR. POMARE, HEALTH OFFICER TO THE MAORIS, TO THE CHIEF HEALTH OFFICER.

I have the honour to submit the following general report of my work since my appointment as Health Officer to the Maoris. The detailed sanitary inspection of the villages which I have visited you have: it is the report of the general condition of the Maoris and their attitude towards the new Health Bill that I will now endeavour to present to you.

It was with a heart full of fear and trembling that my mission was undertaken. Fear and trembling, did I say? Yes, for the deeply rooted superstition of ages—the strongholds of tohungaism, the binding laws of tapu, the habits and practices of centuries, the mistrust of the pakeha—these were the Goliaths in the way of sanitary progress amongst the Maoris. For what did all this mean? It meant the dissolution of time-honoured customs, the tearing-down of ancestral habits and teachings, the alteration of Maori thought and idea; in fact, a complete change in their socialistic, communistic, and private life. It meant more; it meant the gentle persuasion, the authority not of force, but of clear convictions of the evils of the present system of half-European and half-Maori ways of living, and the benefits of a better, more sanitary, higher, and nobler way of life. Yes; it meant the introduction of things entirely new and foreign to the Maori mind and life. Who can change the customs of a nation in a day? No; not in a month, nor a year, nor a generation could they be changed, for progress is a plant growing. But the change must come; it will come; it has come. The Maori will yet bloom with the fairest of the Anglo-Saxon; and why not? And yet can we make men clean by Act of Parliament?

Who cares to have a stranger poking around his back door, condemning his favourite nooks, the ash-heaps resulting from his laziness, the hundred and one things which sanitarians know are detrimental to the public health? Who cares to have his habits disturbed, the pet meeting-house of his ancestors pulled down? And yet it was because of the utter hopelessness of his sanitary condition, the thorough knowledge that unless the flagrant infractions of Hygeia's laws were quickly stopped the Maori would surely disappear with the moa, that gave me courage and hope to fight the cobwebbed customs of the past and to introduce the new.

You can imagine my complete surprise and joy when upon my first lectures I found that the Maori mind was not altogether unteachable; in fact, he was anxious and willing to better his condition. In many places I was welcomed with song and dance and speech. We will listen to the words of some of the most noted chiefs:—

"My heart is made light at last. Our ancestors adopted Christianity, but their lands went from under their gaze: it was death. We signed the Treaty of Waitangi, but went to war: it was death. We sent members to Parliament: it was the same thing. We have been gradually disappearing with our lands. At last, at last, there is life!

"Come—welcome! thrice welcome! Come to teach, come to advise, come to show your nation the ways of life (health), the good ways of the pakeha and other nations of the world whom you have seen. Come, our hearts are made glad, our hearts are made light, our wailings shall cease. The light of life dawneth—we bid you welcome. Come upon the wings of knowledge. Come and teach us. Give us the ways of life; warn us from the ways of death. Give us to drink of the same cup of life as the pakeha; hide nothing from us, that we may live and bless thee.

"Come, the descendant of Maui. Come and fish for us the great fish of life (health), like your illustrious ancestor who fished up this land. Come and see the place of the people who are no more. Come and see these remnants who are so few of days. Come, teach, that our tears may cease to flow."

I might go on using inverted commas for the next forty pages, but this is sufficient to show the sentiments, the attitude of not only the few I have quoted, but of the vast majority. It is the truth when I say that all along, as far as I have gone, I have met with kind receptions, attentive and appreciative audiences, willing hearts with willing hands. Yea, have I not seen the smoke of the proverbial whare circulating heavenward as an offering to the God of Health, as the landmark, for the parting of the ways of the old and the new!

And yet with all these encouraging welcomes you must not imagine that the work has been smooth all the way, for we have had many difficulties to contend with—many seeming obstacles to overcome— more of which anon; but the willingness of the majority overbalances the predjudices and the doggedness of the rest. But we expect all these things. They must meet us on our onward march to health and progress.

My method of disseminating the knowledge of the laws of health is simple. I notify the chief of my intention to pay his village a visit. He calls the people together for me in the evening, while during the day I go round with him, or the member for the Native Council, but principally with the Village Committee, and inspect the kaingas. Sometimes, where practicable, I speak at some Maori *hui* or meeting, thus getting a chance with the masses as well as the individuals. I speak on the five great causes of the Maoris' decay—viz., the home, clothes, foods, sterility, and disease.

In the old days the Maori lived upon the hills. He did this for various reasons, principally for protection. During the day he left the hills and worked on the cultivations in the valleys. Now war has ceased he fears no human foes, and so has left the high altitudes, and with the descent to the valleys he has descended to his death. The Maoris were numerous in those bygone days, because they lived upon the hills, where the pure air could always bless with the vital spark of pure blood, where the tears of Rangi (Heaven) could wash away the filth and dirt into the lower levels. But now the daily exercise of climbing the hills is no more. The Maori lives where the eels are handy and his cultivations close by, where the damp swampy atmosphere prevails—the air impure, and disease-germs reap a harvest in the deaths through consumption, pneumonia, typhoid fever, and other maladies of the noblest among aboriginal races.

The Homes.

I am glad to state—and I do so in all good conscience—that the Maoris are generally willing to improve their style of buildings, and, in fact, so much so that at Mohaka and Te Reureu, and numerous other places, the Maoris have gone to the bush, and with their own hands have cut enough timber to build decent European cottages.

The allowing of pigs, dogs, and poultry to roam at large in and around pas, I have no doubt, is responsible for many deaths. Pigs from of old have always been a dirty, filthy race. I have only come across two cases of hydatids among the Maoris, yet I believe it is much more prevalent than one would imagine, knowing the number of dogs the Natives keep. So fences have been readily built around homes, and pas and sties are kept at least 40 yards away from the homes.

We find the Maori awakening. He is in a transitional stage, though very slow in parts. Yet his sanitary chrysalis is gradually developing, and I am sure that within the near future we shall see the entire Maori population living in properly constructed, ventilated, and hygienic dwellings, and the old raupo whare become but a dream of the night of his insanitariness. Everywhere the Maori is eager to have his European house, with the comforts; and in places they are creditable, even when compared with the best. In some localities, where the Natives are very poor, we have been lenient, and have only made them ventilate their whares and put up bedsteads, for the custom of simply lying on the bare ground and huddling together is pregnant with many evils. We aim at the moon, perhaps we may hit a tree.

The lack of funds to carry out some of the reforms, especially in the drainage and water-supply systems of pas, has been a great drawback, but we have done much, as far as it was possible, without means. I hope the poor Maoris will have some consideration in the next estimates in the way of funds for the putting-up of much-needed things, and unless we have some consideration we shall be very much handicapped. This last year found us with absolutely no funds to do anything with, and still we have made reforms where we could, and an encouragement in the ways of right living would be very highly appreciated. Money spent in water-supplies for Maori kaingas will be money spent profitably, for I am sure it would mean the saving of fully a third of the lives which are annually sacrificed through bad water-supplies. The Government has supplied tanks, which I am certain have been the means of saving many lives. As we all know, the wells and water-supplies in a Maori kainga are not always the best, and in two or three instances, in the Taranaki and Wairarapa districts, we have traced typhoid directly to the water, and, thanks to our quick and timely intervention, only one death occurred, where many perhaps would have been sacrificed had there been no interference.

Doctors for Indigent Natives.

In this connection I may state that much need is felt throughout for properly qualified men to advise indigent Maori patients. In parts the doctors' fees are so high that the Maoris cannot

afford to pay for a doctor, and what is the result? They either do nothing, or sneak off to a tohunga, which is the only alternative. I am glad that the Department has now taken the matter in hand, and I am certain that the appointment of good medical men throughout the colony for Maoris will prove well worth the expense the State is put to.

Drains.

We have been successful in many instances in persuading the Maori of the benefits of drains, with what results the future census will enlighten us.

Closets.

A much-needed adjunct to Maori homes and pas has had its share of lectures; though reluctant in some instances to put up these necessary houses of convenience, yet after receiving proper explanations the Maoris have coincided, and shown their willingness by constructing them.

Kautas.

These Maori kitchens, or *kautas*, as they are called, I have condemned wholesale. I have found them veritable death-traps. It is strange, and yet true, that many of the Maoris who live in elegant pakeha homes have these miserable *kautas* at the back.

Let us visit one of these whares. We enter the place where the Maori loves to pass away his time in the evenings in the society of his wife, children, and friends, and to enjoy the fire—*mahana* (warmth), the Maoris' great god. We stoop as we enter (the door is not made high), and find ourselves in a place anything but inviting—perhaps all kitchens are that way if we but knew—ignorance, after all, is bliss. Not only our noses, but our eyes, in more ways than one, testify to the fact that surely this is not a place for human beings to live in. There the poor housewife plies her wearied lungs in trying to fan into flame the carbonaceous gases which are making our eyes weep tears—yes, tears, dear housewife, for thee and thine, for death lurks within the very walls of thy realm—in fact, within the very atmosphere you are daily, hourly, breathing in; but at last lung-capacity prevails, and we have a light. We see in one corner a flax mat, a roll of blankets, and perhaps a bed (not a bedstead) on the bare ground. Our kitchen has no floor. Mother Earth does homage by caressing the bootless foot of the housewife as she plies to and fro getting the *manuhiri* (strangers) their evening meal; for with all our faults here is one of our redeeming qualities, our cause of poverty, our cause of praise, and—Aroha, thou monster!—our cause of decay. Liberal to a fault—yea, liberal to our death! Let us follow our benefactress. She goes to the potato-heap, and soon returns with a basket of potatoes, which are peeled, the skins being thrown outside for the pigs and poultry—like all the other refuse. Soon she opens a wooden cupboard, generally made from some old dry-goods box. Ye Goddess of Health! what a smell; and no wonder, for this is made the receptacle for anything and everything eatable that is not eaten. It has a cheesy smell without the cheese. It is redolent of putrefaction, obnoxious, teeming with bacteria, covered with a blooming forest of mould and full of death. Here we are—the meal is ready. We may eat with knives and forks; we may not. No discredit so long as the hands are clean. What is that chilly sensation stealing up and down our spines? Ah, we find our kitchen at least is well ventilated, for there are many cracks and crannies in its walls, especially between the posts through which the air may find ingress. Though good to have ventilation, yet it can stand the application of the universal law of temperance. When ventilation becomes a direct draught, then it is detrimental.

We soon find that our *kauta* has been gradually filled with neighbours from across the way. There is Hare, the lazy man, and his wife, who smokes. The baby has to come: it might die if left at home. There is the gossip of our village just dropped in to see how things are; in fact, the small and great are there, and the house is full of smoke. Every one smokes, or nearly every one does: smoking is nearly universal with the Maori. "Lend us your pipe," is a common phrase. Some have deep coughs, some are asthmatic, some on the verge of tuberculosis—some have it, and some will have it. Listen to that cough, and see that nice, sweet-looking girl with the pinched face and glistening eyes. She has consumption—and watch, she expectorates beneath the mat, and what a high old carnival those germs are having, soon to pluck away some unsuspecting flower of the race—so young, so fair; but, alas! through ignorance, to go before her threescore and ten years.

The above picture, though a little exaggerated perhaps, gives a good idea of these *kautas*, and the same would hold true for the small whares. I am glad, however, that several of the Councils have made spitting about in houses a finable offence. I once condemned a *kauta*, and the lady of the *kauta* was highly indignant; when I started on the microbic life, she simply laughed and poohpoohed the idea of any one dying with such things. At last I did not know how to convince her of the necessity of building anew, and as I said, "How old is this *kauta?*" "Eighteen years," she replied. Now, the *kauta* (as nearly all *kautas* are) was without a floor. "How many times has the *kauta* been scrubbed?" I asked. "Scrubbed!" she screamed; "why, no one thinks of scrubbing a floorless house." "Well," I said, "what would you think of a pakeha whose house stood eighteen years and was never washed?" That was enough. I got a kitchen properly floored, and a chimney added to her home.

The overcrowding of these chimneyless and floorless dwellings is in a very great degree responsible for the great mortality in young children, and the lung-complaints, asthma, consumption, and allied troubles of the older ones.

The Maori is learning to live separately, and when he does his salvation is sure; but until that is done his doom is sealed.

Clothes.

It is needless for me to go into this subject, for we all know the many faults which we commonly see in the way of most Maori clothing. Far better had it been if the Maoris had never donned the highly coloured proverbial pakeha blanket. It is not the European clothing, but it is the ignorance concerning the laws of wearing English clothing which does the mischief; and yet so civilised have some Native ladies become, I have actually come across a floating kidney, consequent on wearing the stylish waist-squeezer—the corset. These more personal hygienic matters have not been overlooked in our Maori work.

Foods.

A thorough knowledge of the gastronomical world is much needed among the Maoris. His food is very simple at present, and, though rotten corn, rotten potato, and shark have been decried by the advanced part of our community, I sometimes think that perhaps the Englishman's gamy cheese and his too gamy pheasant would run a very close second to the corn and the shark. However, the Maori Councils have not been asleep, and as a result of some of the health lectures some of the Councils have passed resolutions concerning the prohibition of eating putrid foods. This result, perhaps, has been due more to the circulars which were sent out concerning the eating of diseased meats (which circulars met with a good hearty reception) than anything else, though foods have had their share in my lectures.

Sterility.

It is alarming to know that so many Maori women are childless. The principal cause of this is easily traced to the bad home, hygiene, smoking, neglect, bad clothing, irregular meals, bad nourishment, exposure, manual labour, too early marriages, and other causes. We can only remedy this evil when the Maori has advanced to a higher plane. Perhaps the Legislature could help by fixing the marriageable age at not earlier than seventeen. However, this is a debatable question, and I wish not to enter into any controversies.

Harmful Maori Customs.

The recent by-laws of the Maori Councils have been a great help in suppressing the evils of tangis, huis, and tohungas drinking and smoking. Tangis have been limited, especially in cases of infectious diseases; and in this connection permit me to add that, in order to carry this out perfectly, all deaths occurring among the Maoris ought to be certified by duly qualified medical men. The non-registration of Maori deaths blinds us to all the causes of his decay. Death-certificates will have a wide and far-reaching effect: it will make the deceiving tohunga tremble, the money-seeking *toi-ora* think twice before he practises upon the unsuspecting and simple Maori mind; and, further, it will give us a thorough knowledge of the diseases which are sweeping away the race, and thus enable us to carry on a more perfect warfare in preventing the spread of epidemics and infectious diseases.

All the declared infectious diseases ought to be notifiable among the Maoris as well as the pakehas.

Tohungas.

Tohungaism is in its death-throes; and though it may be compared with the feline of nine lives, yet it is surely dying out.

The strong arm of the law is the only potent medicine that can cure this cancerous malady. A few doses of the lock-up will soon have the desired effect. It is wonderful how superstitious even the most enlightened are. Who has not seen a delicate silk-attired lady of fashion sigh her wishes over her left shoulder at the inconstant moon? Who does not dream of bad luck when there are thirteen at a table? Who has not heard of the mariners refusing to go to sea on a Friday? And who has not seen an old shoe cast at the happy wedded pair? And if these things can happen in the far advanced, we can surely excuse some of the peculiarities of the Maori, who has barely emerged from the dark night of superstition into this blazing sun of civilisation. However, I do not by any means excuse the acts of tohungas. The immersion of the sick in cold rivers, I am glad to say, has been stopped by the Councils; not that a bath, even a cold one, is altogether detrimental, but that the attending risks in exposure, &c., are so enormous, and the result so disastrous, that it has been deemed wise to stop all such treatment.

Alcoholism.

One almost hesitates to give an opinion after the great koreros concerning this bane of civilisation, and yet I am but doing my duty in saying what is the truth. Contrary to many, I am of the opinion—and I speak guardedly after being all around the colony—that drunkenness is practically at lowtide with the Maoris. I know some of my worthy friends will differ from me; but, nevertheless, I know that in towns and small country places where there used to be scores of drunkards you never find any now, or hardly ever. In fact, in several places I have visited the publican said to me, "What has happened to the Maoris? They drop in once in a while, but it will only be for a glass. You never find a Maori drunk now; and I respect them more for it."

It is true in one or two places in Taranaki they have been bad, but that has been more for bravado than anything else. Wrong Te Whiti-ism has been to blame—I say wrong Te Whiti-ism because I have heard from Te Whiti's own lips that he did not approve of strong drink. However, the formation of the Native Village Committees under the Council have at least been the best thing that could have happened, as the Committees are empowered to suppress the abuse of liquors in the pas.

SMOKING.

The prohibition of under-aged children from smoking will do a world of good among Maori communities. I am only sorry that it has been limited to the children. All child-bearing women ought to be prohibited from smoking also, for I am sure this is one of the great causes not only of sterility among Maori women, but also of the death of Maori children.

When a child is shut in a room with half a dozen people smoking tobacco, its own mother half-poisoned with nicotine, the room with every possible avenue of ventilation closed, and, added to this, a fire in the middle of the whare, no wonder the infant mortality is great.

Again, I am glad to state that in some districts smoking is prohibited in the meeting-houses.

DISEASES.

Chief among the diseases I have encountered stands the dread white plague, phthisis, the exact ratio of which to other diseases cannot be correctly estimated till death-certificates are required by law. One is not surprised when we behold the abuse the poor bodies are subjected to through ignorance of sanitary and hygienic laws; the wonder is that there are not more who die of this disease. The Maori is generally looked down upon as an individual with weak lungs, but I am sure if pakehas were exposed in the same way as Maoris they would disappear just as fast, and perhaps a little faster. Put the Maori in good healthy surroundings and he will thrive.

Bronchitis is very common. Pneumonia carries off not a few. Typhoid is responsible for many deaths, due principally to bad shallow wells, low positions of kaingas, and lack of drains, and the non-isolation of cases. Menstrual cases are not uncommon. I have come across one case of leprosy, three cases of cancer, three exophthalmic goitres, and two simple goitres, many specific affections, several epileptics (mostly young girls), numerous skin-affections, principally *hakihaki*, common itch, and eczema, ichthyosis, and herpes zoster (a case of each); but the most common diseases of all are the lung and skin diseases.

Number of pas visited and inspected in the North, South, and Chatham Islands, 124; number of health lectures given, 106; number of indigent persons examined and prescribed for in the North, South, and Chatham Islands, including Rotorua Camp, 356; number of operations performed, 10; number of patients sent to hospitals, 9.

In conclusion, I may state that there has been a thorough awakening. Many comfortable homes have been erected within the past year. Whole villages have been cleaned. In view of the plague, circulars were sent to all the Councils urging the necessity of burning up all rubbish and destroying the plague-carrying rodents. A hearty response has been met with everywhere, even among the most conservative; but with these Councils in motion, with the eagerness to advance, the Native work has increased till I feel that one man cannot do justice to himself or to the whole Maori population, and so I urge that several competent Inspectors—say, four in number—with salaries of £150 each, be appointed to carry on the inspection of Maori kaingas, in conjunction with the Village Committees, these men to be entirely under the control of the Department; and, further, that all matters touching the health of the Maori be under the control of the Public Health Department, so that there should not be any friction, and that the gradual introduction of the public-health laws can be made, till we shall have one law for the pakehas and the Maoris. And so we may hope that these reforms will soon be the commencement of that most desired condition of which Gibbon dreamed, Macaulay prophesied, and the Grand Old Man (Sir George Grey) hoped, longed, and worked for: when Maori and pakeha will stand side by side in the commercial, social, and political realms, firmly united—when

"Our Maori blood shall still flow on
In a new-coming race,
That when the old is dead and gone
We may yet find its trace
In nobler types of humankind,
With traits wherein there blend
The white man's more prosaic mind,
The poet Maori trend."

APPENDIX C.

REPORT OF PATHOLOGIST.

SIR,—

I have the honour to report on the work conducted by me for the Department during the past year. Four hundred and thirty-one different specimens have been forwarded to the laboratory for pathological and bacteriological examination.

SPUTA.

Of these, ninety-eight have been specimens of sputa for the detection of the presence of tubercle bacilli. The great majority being in all probability from cases which presented doubtful clinical symptoms, it is not surprising that in fifty-seven of these, after the most careful examination of numbers of slides prepared from each sample, no tubercle bacilli could be demonstrated. In several instances experiments on guinea-pigs were conducted when deemed advisable, but in each case the previous microscopical examination was confirmed. As is well known, when tubercle bacilli are present in sputum the examination necessitates commonly much less trouble for the conscientious microscopist than in cases where, after a great expenditure of time and care, the conclusion is ultimately reached that the sputum is free. The record of these examinations speaks itself of the amount of labour entailed.

DIPHTHERIA.

Swabs from the throats of thirty-five suspicious cases have been submitted for examination. In each case the microscopical examination has been supplemented by the inoculation of gela-

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 precrural 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

cultures of plague, they having the peculiar glistening appearance, being of extremely sticky consistency, and morphologically showing all the peculiarities of bacilli grown on artificial media. An attempt was then made to ascertain if this were simply a bacillus with very feeble virulence, and a guinea-pig was inoculated with a fresh sub-culture, *plus* a sub-culture of diphtheria bacillus recently isolated. As a result death ensued in slightly over five days, the body showing *post mortem* all the characteristic lesions of a guinea-pig dead of the disease after that lapse of time—*i.e.*, enormously enlarged gland above the seat of inoculation, swollen and mottled spleen, but lungs and pleura healthy. This last series of experiments is, I venture to submit, of some importance. The patient was affected with a simple bubo, and was isolated on the clinical features of the case, at most as a case of *pestis minor*. Before the above experiments had been completed the patient had completely recovered, and had been discharged. The value of clinical evidence and the possibility of an incorrect conclusion being arrived at through the failure of experimental proof by ordinary methods are thus amply demonstrated.

Rats.

During the past few months, consequent on the recrudescence of bubonic plague in Australia and the few cases in New Zealand, thanks principally to the officials of the Wellington Corporation, 150 rats, chiefly from various parts of the City of Wellington, have been carefully examined *post mortem* at the laboratory. These rats had been killed by various means—such as dogs, poison, &c.—and naturally a number were too far advanced in putrefaction for satisfactory results to be obtained on examination. Nevertheless, all have been subjected to very careful *post-mortem* examination, in every case portions of the spleen and external lymphatic glands being submitted to the microscopical test. In all instances where the slightest suspicion existed after the microscopical examination—and these were numerous—further tests were made by the inoculation of various culture-media, and in several instances these were further supplemented by experiments on rats and guinea-pigs. It is pleasing to be able to report that in no instance did we succeed in demonstrating that a single plague-infected rat had been found in the City of Wellington or its vicinity.

In spite of that fact, in virtue of my previous experience in regard to the examination of rodents for this disease, I do not consider it proof that the disease has not been present amongst the rats of this or other centres where similar examinations have been made with like results. Animals afflicted with any disease are prone to separate themselves from their fellows and seek seclusion, and it is unlikely that a rat affected with plague, unless in the earlier stages, would readily partake of poisoned bait or feel so inquisitive as to enter a trap. Hence the above negative results should not induce any municipality to relax their efforts in the destruction of these four-footed plague-carriers.

For the information of those who are interested in the investigation of this disease in the lower animal, I would point out that, although enlarged skeletal lymphatic glands and enlarged spleen are nearly always found in plague, and are always to be regarded with grave suspicion, these abnormal conditions may occur without any apparent cause. My observations led me to the conclusion that the nature of the food, particularly decaying animal food, materially affects the size of the rat's spleen. Enlarged lymphatic glands are often more difficult to explain, but the frequency with which rats fight amongst themselves, and so receive wounds and contusions, may to a certain extent be responsible. In any case, the enlargement of these organs in practically normal rats is a point of some importance.

Besides the number of rats examined, two dead cats were received for examination as to the presence of the bacilli of plague, with negative results.

Experiments with Dr. Danysz's Rat-microbe.

In the *Annales de l'Institut Pasteur* of April, 1900, Dr. Danysz described fully a bacillus which he had isolated from field-mice during an epidemic amongst those animals. The bacillus bore a great resemblance to the *B. coli*, and even at the beginning was slightly pathogenic for the grey rat. But for mice even he found the microbe soon lost its virulence on passing from animal to animal under ordinary circumstances.

By an ingenious innovation in the methods of cultivation he was so able to augment the virulence as to make it strongly pathogenic, first for grey, then for black, then for white rats, to such an extent that they succumbed in from five to twelve days after ingestion of cultures mixed with bread or grain.

Following his successes experimentally in the laboratory, Dr. Danysz continued his researches by mixing bait with his cultures and distributing it in such a manner that rats living under normal conditions would partake of it.

Samples of cultures were sent to different parts of France and elsewhere, and several hundreds of reports were received of the results. These reports showed that in the half of the cases a complete disappearance of rats in the affected buildings, &c., was effected. In 20 per cent. the results seemed completely negative, and in the remaining 30 there was reported a veritable diminution of the rodents in the localities treated. In some rare cases the extension of the epidemic from the locality treated to a certain number of neighbouring localities was observed.

When in Paris last year I had the pleasure of meeting Dr. Danysz, and he courteously discussed the whole question with me, explained his methods of procedure in the preparation and distribution of the cultures, and provided me with specimens for the purposes of experiment here. Unfortunately, four months elapsed between the time I received these specimens and the date on which, after my return to the colony, I was able to commence experiments. They had been forwarded here with all care, however, and preserved under the best conditions, as recommended by Dr. Danysz.

Experiments.

A large number of various kinds of rats, black, brown, and what were apparently crosses, were experimentally fed by saturating food such as bread in dilute and even in pure cultures. Many died, the time elapsing being from two to twenty-eight days after feeding; but, though from two to four were as a rule fed at each experiment, each rat being in a separate hutch, there was no uniformity in the results.

For example, four rats were fed with the same doses of the same culture. Two were found dead on the seventh day, but microscopical examination failed to demonstrate the presence of the bacillus, and culture-media inoculated from the system and blood remained sterile; while the remaining two both survived till the twenty-seventh day, with similar results *post-mortem*. Yet on the same day that these were fed experimentally a number of portions of bread saturated with the same culture were placed in various parts of the outbuilding where mice and rats had been frequently seen; and a few days later they disappeared, so far as could be observed, although no dead animals could be found. Whether the rats and mice died, or were only sick and migrated, cannot be stated, though the latter is probably the correct conclusion, for later a reappearance of the rodents occurred, and further attempts did not have the same results. Again two animals were fed: one remained alive for weeks; the other died on the fifth day, with general symptoms of illness, the bacilli being isolated from the blood and spleen.

Rats, however, are very unsatisfactory animals with which to experiment. Even in health they remain bunched in a corner of the hutch, and very frequently die without apparent cause if confined. Feeding even on the bodies of dead rats I did not find give satisfactory results, and contact experiments always gave negative results. Common mice I found even more unsatisfactory, death generally resulting in a few days from confinement. I waited several months for the arrival of the white mice I had ordered when in London, but through some misunderstanding there they only arrived a few weeks ago.

Two large experiments were tried in meat-works. Quantities of bouillon culture prepared direct from the original cultures were sprinkled over portions of meat, bread, &c., the baits being left in likely places. During the night this food was all eaten by the numerous rats infesting the buildings. As a result, however, no diminution in the number of rats was observed, and there was no indication of any epidemic having occurred.

So far as my experiments here are concerned, the indications are that as a means of extermination this method is not satisfactory. It must be admitted, however, that the delay necessitated before experiments could be conducted, the transmission of the original cultures, &c., militated greatly against satisfactory results being obtained, hence deductions are not very reliable.

General Specimens.

Fifteen samples of urine for various examinations were received. The suspected conditions were tuberculosis, tube-casts, pyo-nephritis, &c. The remainder of the materials submitted was of many varieties, such as suspected gonorrhœal discharges, vomit, fecal discharges, discharges from wounds, expectorations (one of which contained typical actinomyces nodules), a large filter, and, lastly, what was termed a sanitary coffin. On all these specimens special reports have been submitted to you, but none are of such importance as to be dealt with in detail here.

In conclusion, I wish to add a word of recognition of the aid I have received from my assistant, Mr. G. H. Barker, F.R.M.S. Much of the preliminary work in examinations has naturally fallen to him, and in addition he has had to prepare for distribution to different officers and others quantities of media, such as agar, gelatine, and particularly serum, the preparation of which requires particular care and patience.

The Chief Health Officer. J. A. Gilruth, M.R.C.V.S., Pathologist.

APPENDIX D.

ANALYSES BY THE COLONIAL LABORATORY FOR THE PUBLIC HEALTH DEPARTMENT.

Sir,— Colonial Laboratory, Wellington, 28th June, 1902.

I have the honour to report on the analyses made in this laboratory for the Department of Public Health from the 15th November, 1901 (the date of my appointment as Analyst to the Department), to the 31st March, 1902. The nature and number of these analyses are shown in the following table:—

Nature of Samples.	Number of Samples.
Potable waters	14
Mineral water	1
Urine	1
Beach-shingle for sewage contamination	3
"Preservaline"	1
Bread	1
Total	21

Of the potable waters, eleven were of good or fair quality for household purposes, two were of inferior quality, and one very impure.

I have, &c.,
J. S. Maclaurin, D. Sc., F.C.S.,
Analyst to the Department of Public Health.

The Chief Health Officer, Department of Public Health, Wellington.

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