SESSION II.
1912.

NEW ZEALAND.

AGRICULTURAL, PASTORAL, STOCK, AND COMMERCE COMMITTEE:

POLLUTION OF WATER BILL

(REPORT ON THE); TOGETHER WITH MINUTES OF EVIDENCE.

(MR. BUCHANAN, CHAIRMAN.)

Report brought up on 31st October, 1912, and ordered to be printed.

ORDERS OF REFERENCE.

Extracts from the Journals of the House of Representatives.

FRIDAY, THE 2ND DAY OF AUGUST, 1912.

Ordered, "That a Committee be appointed, consisting of ten members, to consider all matters pertaining to agricultural and pastoral industry, stock, and commerce, with power to confer and sit together with any similar Committee which may be appointed by the Legislative Council, and to agree to a joint or separate report; the Committee to have power to call for persons, papers, and records, three to be a quorum: the Committee to consist of Mr. J. Bollard, Mr. Buchanan, Hon. Mr. Buddo, Mr. Buick, Mr. Buxton, Mr. Campbell, Mr. Dickie, Mr. Forbes, Mr. Sykes, and the mover."—(Hon. Mr. MASSEY.)

WEDNESDAY, THE 2ND DAY OF OCTOBER, 1912.

Ordered, "That the Water Pollution Bill be referred to the Agricultural, Pastoral, Stock, and Commerce Committee."—(Hon. Mr. MASSEY.)

REPORT.

THE Agricultural, Pastoral, Stock, and Commerce Committee, to whom was referred the above-mentioned Bill, has the honour to report that it has taken evidence both for and against the Bill, and recommends that the Bill be allowed to proceed, with the amendments as shown on the copy of the Bill annexed hereto.

31st October, 1912. W. C. BUCHANAN, Chairman.

MINUTES OF EVIDENCE.

TUESDAY, 8TH OCTOBER, 1912.

The Hon. F. H. D. BELL, Minister of Internal Affairs, examined. (No. 1.)

1. *The Chairman.*] Would you kindly make a statement, on behalf of the Government, regarding the question before the Committee?—Yes, I should like to make a short statement about the whole Bill.

2. *Hon. Mr. Buddo.*] I would suggest that Mr. Bell should tell us briefly the reason why the Bill is introduced, and, secondly, why we should depart from common-law right?—Well, the difficulty which has occurred in respect of the flax-mills is only one instance of difficulties which are anticipated and are threatened in respect of the butter-factories and the cheese-factories and the sawmills. With regard to the last, it is not suggested that the sawmill people should be at liberty to throw sawdust into the river. That is already prevented, as Mr. Buddo knows, by the Fisheries Act. These intimations of complaint of the fouling of streams by the butter-factories and the cheese-factories must have reached the last Government as they have reached the present Government. The position is as was defined in the actions which were recently brought by Mr. Pearce in respect of the flax-mills. Damages—very heavy damages—were claimed in that action. It was shown that the water as it left the flax-mills was very little less usable than as it arrived there, but it was laid down that any diminution in the quality of the water is a trespass under common law—a wrong to the riparian proprietor below. For all the many months in respect of which Mr. Pearce claimed damages—and he claimed substantial damages—and tried to prove them, the Court awarded him only £5, and the judgment shows that the Court found that he had received no substantial injury at all. But this is the law—not the common law, but the equity which follows the law—that where you have established a common-law right, the Court of equity grants an injunction to prevent the continuance of the wrong which has been proved at common law. The reason is this: in the old days, before equity intervened, a man establishing his injury and receiving his damages for the past injury had no right to prevent future injury, and so his remedy was to wait till the future injury had been suffered, and then recover further damages; and so on by a series of actions. The equity rule introduced was, by granting an injunction after and not before the common-law right had been ascertained, to prevent the continuance. However insignificant was the injury, until quite recent times the Court of equity had no right at all to consider that: they granted the injunction as a matter of course when the common-law right was established. The result is that as the law now stands, whether the injury be serious or really minatory to the beneficial use of the land, or whether it be merely trivial, any person below on the stream has the right to an injunction when he has established any diminution in the purity of the water, though he is not really injured, but only because his common-law right has been interfered with, and therefore he can stop the process by which that which is causing him no injury is occasioned. Very well. This question of the flax-mills is of far less importance than the question of the factories; indeed, if the flax-mills were cut out of this Bill the Government would not be broken-hearted. I am not inviting the Committee not to protect the flax-mills, but what I want to make quite clear is that we are not moved by anything more than principle in regard to the flax-mills, and not by the injury that might happen to them, though I am not sure that that is not a serious matter, for this reason: the flax-mills are on low land; it is almost impossible to prevent the ooze from the refuse of the flax-mill getting into the water. And so I think the flax-mills, because they are on the low land, do deserve the protection of this Bill. The Bill does not abolish injunctions. It provides, first of all, that a man shall not have the right to an injunction which he has now as of course. If the injury is such as to render the water unfit for use—not less fit, but unfit—then under the Bill he will get an injunction. If it is rendered less fit but still usable, or if the man has another supply which is just as good for him, then the Court, instead of giving him the injunction, is to continue giving him damages. It may give him so-much per month, or damages from time to time. The action remains open, and he has not to bring another action. We remove the difficulty which caused equity to intervene in the first instance; and then in the last clause of the Bill we provide that if the injury is caused by circumstances which could be prevented according to the usual working of such mills in New Zealand, then the injunction shall issue until the person ceases those methods. I do not think we could have protected the industry with less interference with the common-law right than we have attempted here. We do not propose by the Bill to interfere with the common-law right in any respect; we do propose to interfere with the equitable right of an injunction enforcing the common-law right. If the Committee and Parliament leave the matter as it stands, I have tried to explain what would be the result—that any mischievous person, who is not really injured but alleges he is injured, can stop the operations of some great factory until that factory has adopted some method which will prevent any effluent from getting into the stream; and in many cases that would be impossible, because the factories have been so built as to be on the margin of the stream. If Parliament leaves it so, well, it will not be the fault of the Government. We have tried several methods—that is to say, we have consulted our Law Officers, and no method suggested does not interfere with the injunction. Mr. Salmond's method was to grant the injunction but tie it up so long as the man did so-and-so. That does not seem so right as this, which prevents the injunction unless so-and-so is done. There is no difference in principle, as you see, between the two. No method which does not inter-

fere with the definitive right which every man has to an injunction when he has established any trespass will be of any use. You may leave the matter as it is, but you cannot improve the position except by this method. You must interfere with the right of injunction if you are going to protect the industries at all. I am not expressing any opinion about the policy—that is for the Committee: I am only explaining to the Committee that there is no other method than this of interference with the injunction, if you are going to protect the industries. It may be asked, Why is not this the law in England? First of all, in England the waters are less rapid than they are in New Zealand, except, of course, in swamps where the flax occurs. That is the first reason. The second is this: England is so thickly populated that along the margin of every stream there are not only the landowners, but there are the villages; there are the small places that draw the water. The effluents from the English manufactories were different from ours; they contained chemicals, which were really injurious—I mean, injurious to everything that touched them. In England they said to the owners of the manufactories, "You must prevent anything from your establishments from getting into the water"; and that has been done, at enormous cost to the owners. The industries have managed to prevent any effluent from getting into the water, and it may be that that is what ought to happen here—I do not know: that is for you gentlemen. But that is the difference between New Zealand and England. The manufactories are of a different class. The population which has to be protected is of an entirely different class from ours—I mean, the villager instead of the landowner; the places using the water as against the stock using the water. When such actions were commenced in England some fifty years ago, I think the effect was that a number of the smaller factories were ruined, and stopped; and the larger ones did prevent, by destruction of the waste product, any effluent from getting into the water, and by chemical process rendered the liquid harmless. I am told—and I believe it—that the larger industries in England actually benefited largely by the prevention of their getting rid of the effluent in this manner, because they were driven to make use of the waste product, and this more than paid them for the expense they had been put to through being prevented from discharging anything into the stream. But that could not be so here—at all events, for the present; so it is entirely a question of policy. We say, make these people use all proper methods to prevent injurious effluent going into the water, and give an injunction if they do not do that; but if they do that, give damages—heavy damages if you like—in lieu of an injunction. I think the Court would give very heavy damages and make the man pay a rental for the abuse of the water. The Government, I may say, have no motive in this matter, except to offer Parliament the opportunity which they think the country should have of protection. There is one other point. The whole agitation, so far as my information goes, is from the acclimatization societies. They are already protected against sawdust being put into the water: that is not to be interfered with at all. We are not interfering with the Fisheries Act or the regulations under it. If the acclimatization societies are to govern as against the factories in this matter, it is not the view of the Administration that they should be permitted to do so. If it were genuinely a case of the settler against the manufacturer, well, the settler ought to be considered first. But if the acclimatization societies are using the settler who owns for the purpose of pretending it is a question of settler against manufacturer, then I think the manufacturer ought certainly to be preferred.

3. If we retain clause 3—and it bristles with difficulties—could there not be the right at common law to follow? Could we not give a man that right?—He has his common-law right. His remedy is in damages. He should not be entitled to an injunction unless he has proved that he has been caused actual and irreparable loss and damage that cannot be the subject of compensation.

4. If the whole value of a property would be rendered nil by reason of the pollution of the water, is it not possible for this clause to be read that the man might be compensated for the damage and forced to leave his farm or business?—In that case he would get the full value of his land as damages. His remedy is in damages. Whatever damage he has suffered he will get; if the damage is the loss of the whole of his land, he will get that. But even then, if he is caused such actual and irreparable loss and damage as cannot be the subject of compensation, he gets the injunction.

5. Does it not mean that it will be quite possible for a factory to absorb any property, whether a home, a business, or a farm, without the owner having any other resource than this Act?—No, it could not, because the Court would give him damages. Look at clause 5: "In any action for pollution of water by waste products the Court may, in addition to assessing damages for injury already thereby suffered by the plaintiff from such pollution, either (*a*) assess and ascertain the amount of further sums to be paid thereafter by defendant to plaintiff either annually or at other periods during the subsequent continuance of such pollution until the Court shall otherwise order; or (*b*) direct that in the same action, and notwithstanding that judgment (in other respects final) may have been given in such action, there shall thereafter be assessed and ascertained from time to time," &c. That is to say, the Court can fix a rental which represents the injury; or, if the man does not like that, he can have it from time to time assessed. If he suffers irreparable damage he gets an injunction. If it is not irreparable, then he gets damages—not only for the past, but a continuous rental for the injury for the future. Do you not think that is all that is wanted?

6. Would it not be quite possible under this Bill for any factory-owner to acquire all the property that may be in the way of his work?—Oh, no; how could he? If the owner does not want to sell the land the factory cannot drive him out. The factory would have to pay him. It would have to stop if it was rendering the property useless: that is irreparable damage. If it is not rendering the property useless, it will have to pay the owner the full amount by which his property's usefulness is reduced. The position is that this Bill will lend a good deal of value

to the land below such works. A man will get a substantial addition to the value of his land by showing that he has a flax-mill or something else above him. Those people will have to pay a rental in the future. I ought to have added, Mr. Chairman, that this is not a party question at all. The Government are not pressing it as a Government matter.

7. *The Chairman.*] As I understand, the one case that has been tried in regard to flax-mills is Pearce's?—Yes. He brought, I think, five actions, and he got an injunction.

8. In the case of continuing damages, constituting, as you describe it, a rental, what would be the position in the event of a number of people suffering damage and only one person—as in the case of Mr. Pearce—bringing the action?—He would get his damages, and if the other people did not come along—well, the country would be very much changed. We shall have reformed the inhabitants of this country if one man establishes the right and gets compensation and the other men do not follow him. It will be a very extraordinary thing.

9. *Mr. Buick.*] I understand that this Bill actually copes with the damage complained of by the Minister of Marine? You are not allowed to put any solids in at all?—It does not say so. If you put solids in, it is obvious that section 8 would apply.

10. *The Chairman.*] I understood you to say that you did not consider the damage from the flax-mills so important as the damage done by the dairy factories?—Yes, because they really do not do any injury, but they do reduce, to a certain extent, the fitness of the water; and if you let the thing stand as it is, we have no doubt that an injunction must follow in the case of the dairy factories. The reason why I say the flax-mills are not so important is only because I think the flax-mills might avoid a good deal of the injury that they do to begin with, and, secondly, there are not in the case of the flax-mills so many riparian-right owners below; the works are in the swamps, mostly. Take the whole of the Manawatu: there are very few riparian proprietors below, because the mills are adjacent to bog-water, not clean water. I do not think there is so much action to be feared by the flax-mills as by the butter-factories.

11. *Mr. Sykes.*] You say in connection with sawmills that the matter is already dealt with in the Fisheries Act?—Yes. The provision is that a man might complain of loose timber and stuff of that kind getting in and thereby rendering his water less fit. The sawmill refuse goes in—bark, and so on. It might perhaps be burnt; but in most cases the sawmills are not really doing any injury. They are a long way away; and what gets into these small streams does not do any harm in the world, and no one has ever complained except the acclimatization societies. They cannot get at the mills with regard to sawdust, and so they get at them with regard to bark and rough bits of timber. In the Fisheries Act it is already provided that you cannot put sawdust in. The acclimatization societies think that we are going by this Bill to interfere with the regulations under the Fisheries Act. We are not going to do anything of the kind. We are not going to poison the trout with sawdust, though we may poison them with the effluent.

12. *Mr. Buick.*] Would it not be possible to draft a clause absolutely prohibiting the putting of sawdust into a stream?—Yes; I have no objection to that. I think you had better leave it as it is. I would rather not put in anything about solids. If you do that, some ooze will be held by a chemist to be a solid, and the Judges will say it is solid, and injunctions will issue; and this is not intended. Clause 8 covers the whole thing, I think. Clause 8 is the clause which we hope the Committee will see prevents unnecessary pollution.

13. *The Chairman.*] Do you see any objection to eliminating the word "sawmills"?—No, if you like to strike it out.

14. No sawmiller should possess any right whatever to put an ounce of sawdust in a stream, because he has no difficulty in complying with the law?—Very well. I may state that the Government sawmill pours all its sawdust direct into the stream, and poisons all the trout.

15. In endeavouring to give a reason why we should depart from the common law, would the Committee be justified in taking you to really mean this: that whereas non-compliance with the law injured a great many people in England who were thickly planted along the banks of the streams, here the injury would be to only a small number of people, and therefore is not of so serious a character?—It would injure the stock and not the people here, while in England it injured the people and not the stock.

16. *Mr. Buick.*] It is also made clear in the Bill that unless they have other means of watering their stock, farmers can stop the pollution by an injunction?—Yes.

17. *The Chairman.*] I tap a stream a mile from my place. A flax-mill operates a couple of miles from my place along the stream, above my intake. Would clause 8 not compel me to provide a water-supply, if it were available—a fresh water-supply for my household, regardless of cost?—Yes, except that if the water was rendered wholly unfit for your household use you would get an injunction. If it were rendered only partially unfit and you thought you would need pure water you would have to sink a well. I may say that half the water that comes down the streams in their natural condition is unfit for use. It comes from bush, and is unfit for use unless it has drained through gravel. But, apart from that, if you want pure water this Bill certainly prevents you from complaining of something which has made the water less pure, and may drive you to the expense of getting a fresh water-supply. For all I know that may be part of the damage that the Court would award you. I do not think it would; but if you are so particular that you must have the water of particular purity, well, it is like building a palace: you may be compensated if your house is burnt down, but you cannot have it rebuilt in marble. To the reasonable cost that you would be put by reason of the injury you would be entitled to compensation for damage by the mill which had rendered the injury.

18. But my water-supply serves for such purposes as insurance from fire—a high-pressure system?—Well, you would not be allowed that. That is a luxury. You cannot have marble!

19. Protection from fire is a luxury?—Dirty water will do for that. As I said, this is not a party question. We have a great deal of difficulty with the acclimatization people, and, so far as I know, there is no difficulty with anybody else excepting the people that they stir up.

E. L. BROAD examined. (No. 2.)

1. *The Chairman.*] What are you?—I am a flax-miller at Palmerston. I am vice-president of the New Zealand Flax-millers' Association.

2. Will you make a statement?—Yes. The Bill that has come before the Committee is, I understand, the outcome of a recent case connected with the flax-milling industry in Palmerston North, with reference to the pollution of the Oroua River by certain flax-millers. The Chief Justice, in his lengthy judgment in the case, has mentioned several facts which proved conclusively to his mind that the plaintiff, although he was entitled to his injunction, suffered practically no damage whatever. I will quote, if I may, one or two passages from the judgment to prove what I say. He says, "If the case depended on the putting of fibre in the river it appears to me that even if some slight or nominal damages were recoverable for past action, that what is done now would not entitle the plaintiff to an injunction under this head." And further on he says—this is in reference to the pollution of the river by other means, "It appears that many miles above the part of the river where the first mill sends its refuse into the river there is an outflow from a septic tank belonging to the Feilding Borough. If there were disease-germs in that tank (such as germs of typhoid fever) it would not be safe to use the water in the Oroua River for any purpose, whether for washing dairy utensils or for drinking, unless, at all events, the water had been boiled." He also says, "In my opinion this last quotation correctly summarizes the law. In *Young and Co.* v. *The Bankier Distillery Company* (1893, A.C. 691) the House of Lords held that if pure water is turned into a stream by an upper riparian proprietor that is of a different character from that which usually flows in the stream, that is an actionable wrong, and an interdict or injunction would issue." I take that to mean that if a laundry was working on a river-bank, receiving pure, clean, soft water, and an owner above that laundry came along and sunk an artesian well and got absolutely pure, clean, but hard water, and ran that into the stream, the laundry could get an injunction against the proprietor above to prevent him putting his pure, clean water into the river, because it was of a different character from that which was already in the stream. I will quote now the last part of the Chief Justice's decision: "In my opinion, therefore, the plaintiff is entitled to maintain his actions. The defendants cannot put the effluent from their mills into the river and so pollute it. It may be that a considerable industry may be crippled or destroyed if they cannot continue what they have done, and it may be that the plaintiff's loss or damage will be small, and very small compared with the loss the defendants will suffer by an alteration of their present methods of disposing of their effluents, but I cannot consider such results." That proves conclusively to my mind that the plaintiff suffered no material damage whatever. This matter of river-pollution has already been dealt with in connection with the mining industry. Sections 117, 118, and 119 of the Mining Act, 1908, allow the refuse from alluvial mining to be put into rivers. I have here a short statement of points in favour of the Bill. It is as follows: 1. The Bill is absolutely necessary in New Zealand, because (i) the dairying industry requires it; (ii) the flax business requires it; (iii) local bodies who drain into rivers or take water from rivers, or who discharge by septic tanks, require it. These industries and local bodies represent a huge proportion of the population, and the minority must concede something for the necessities of the majority. 2. The flax business cannot exist if prohibited from using the rivers reasonably, and that industry and the milk industry are too important in New Zealand to be ignored. 3. The principle of the Bill has been dealt with before—that is, under the Mining Act power is given to deposit waste into rivers. Are the flax and milk industries less important than mining? They will exist when mining has gone. It will be pointed out that the law without the Bill is the same as in England, and no River-pollution Bill exists in England. In reference to this—(*a.*) The dairying and flax industries are not, and never will be, known in England. (*b.*) Various Acts have from time to time been passed in England to assist manufactories by modifying the common law. (*c.*) By an Act in England (39 and 40 Vict., c. 75) it is declared that "polluting" shall not include innocuous discolouration, and there are many Acts encroaching on the common-law rights in regard to water. (*d.*) Many establishments in England have obtained the right to turn waste products into rivers by "long user" without interruption. In New Zealand, owing to nearly all the land being under the Land Transfer Act, no such right is possible, no matter how long the undisturbed user. There may be, therefore, not the same necessity or so urgent a reason in England as here for legislation. (*e.*) In America certain pollution is permitted under statute law, it being realized that the necessity to some extent exists. 4. The present law is such that any farmer having land on the banks of the stream may prevent another person taking water or turning something into it, although he suffers no injury. He may even prevent a person turning into the river *pure* water of a different kind to that in the river (see the case referred to by Stout, C.J., in flax-millers' case). A "dog in the manger," or a man who makes a hobby of law, may try this on at any time. 5. The proposed Bill sufficiently protects all persons requiring or using the water (see subclause (*a*) of section 4, and clause 8). I have also a letter from Mr. Hugh Akers, a farmer on the Manawatu River and a flaxowner. He had some water analysed from a creek which passes the Longburn Freezing-works. That analysis proved that the water both above and below the Longburn Freezing-works was quite unfit for either animal or human consumption. The whole of that water goes into the Manawatu River. I will put his letter in. [Document put in.]

3. What is the point of that: was the injury to the water caused by a flax-mill?—No, there was no flax-mill at all on the creek.

4. From what cause was the water deteriorated?—Through rotten vegetable and animal matter.

5. Whence derived?—Above the freezing-works, from rotten vegetable and animal matter—dead carcases which had been left in the creeks, and rotten leaves, and so forth. Below there

the Longburn Freezing-works discharge into the creek and make it a long way worse. The idea seems to have got abroad, sir, that we are asking for something quite new in the Bill. I would point out to the Committee that the milling industry has been going on for twenty-five years now, and we never had any trouble of this sort until a litigious person—who suffered no loss whatever, according to the Chief Justice's decision—takes action against us and tries to cripple an industry such as the flax-milling industry. A few years ago there might have been cause for complaint, but with the passage of time the method of flax-milling has been considerably improved. I am not saying anything with regard to the commercial value of the waste product from the flax-mill; but the methods now adopted in manufacture are such that practically the whole of the solids are kept out of the river. What gets back into the river is the moisture from the flax and the gum, or what we call vegetation—small pieces about the size of your finger-nail, which it would be impossible to catch. The methods adopted in all the mills are these: There is a vegetation-wheel, with spikes on it, revolving slowly, and it catches all the fibre which goes down the drain, and deposits it on a table. The other method is to have a double grating, which necessitates a man being constantly there to catch the leaves and stack them in a heap. I might say that the commercial value of that waste now is £9 a ton. Even if it were nothing, however, the same method would be adopted to save the stuff, as it would be of very great use to the flax-millers for use as ballast in their tram-lines. It has been stated that the river-bed of the Oroua River has risen considerably owing to the flax-refuse being thrown into the river. I can produce evidence to show that the bed of this river has risen higher above the flax-mills than below the mills. That is on record in the case that was heard. If necessary I can produce that evidence. The acclimatization societies, I believe, are bringing evidence against this Bill. I can prove that whitebait—which are, I suppose, the most delicate fish—thrive—in fact, are caught most plentifully every season—below my mills. I have also seen trout of an average weight of from 4 lb. to 5 lb. caught below my mills. I can call evidence in support of what I say from a most ardent fisherman—one who has been in the district for a number of years, and has no interest whatever in the flax-milling industry. Carp also abound in the Manawatu River, and are caught after flood below the flax-mills.

6. *Mr. Buick.*] You mentioned that foul water was proved to come out of the Mangaone Stream, which is above any flax-mills?—Yes.

7. I suppose your idea was to prove that there is foul water going into the Manawatu irrespective of the flax-mills?—Yes.

8. Was it the custom at one time with the flax-mills to put the fibre or the solids into the water?—Yes. A few years ago they used to put not only the short slips into the river, but the tow too. Everything was thrown into the river a few years ago, and there was cause for complaint then.

9. Are you bringing any evidence to show that the mere liquid is not doing any practical damage to the water for drinking purposes for stock?—Yes.

10. *Mr. Buxton.*] You have noticed, I think you said, that the bed of the river has risen quite as much above the mills as below them?—In the recent case at Palmerston it was proved by Mr. Armstrong, the engineer there, that the bed of the Oroua River has risen more at Awahuri, above all the mills, than at Oroua Bridge, which is below.

11. You said that fish were caught below the mills?—Yes.

12. Would you say they were more plentiful below the mills than above?—It does not seem to affect them in any way whatever. My mills are the top mills on the Manawatu River, and fish are caught right up to them: how much further I do not know. They are caught at all the other mills.

13. *Mr. Sykes.*] You say that the waste solids in connection with every flax-mill now in operation are eliminated?—They are all being taken out now.

14. And this has been the practice for some time?—Yes, for some years now—within, I suppose, the last three or four years. Before that everything was thrown into the river.

15. I presume there are trout in the Oroua River?—I have never heard of trout in that river. In the Manawatu there are trout.

16. *The Chairman.*] You said, as to the Mangaone Creek, that analysis proved that the water was unfit for drinking purposes?—Yes.

17. Yet you tell us that despite this and further pollution—or supposed pollution—from flax-refuse lower down, whitebait and other fish flourish?—Yes, we catch them every season.

18. Does not the analysis showing the quality of the water appear to conflict with your statement as to the fish?—No, I think not, because the volume of water that comes down the Manawatu is so enormous when compared with the very small quantity that comes from the creek. The adulteration of the small creek is so infinitesimal that it would not have the slightest effect when it got to the river.

19. Did the cause of action by Pearce not arise as to the Oroua River and not the Manawatu?—Yes.

20. Were any fish caught in the Oroua?—No; I have never heard of fish caught in the Oroua. I was speaking of the Manawatu.

21. Might there not be great damage caused in the Oroua River because of the comparatively small quantity of water, and yet no damage in the Manawatu—as evidenced by the fish—with a great quantity of water?—I cannot answer whether fish have been caught in the Oroua, but I am calling a witness who mills on the Oroua, and will ask him whether he catches whitebait there.

22. You said, I think, that it was impossible to arrest the small bits of flax-gum?—Under the present methods every possible expedient is being used to keep out all the solids.

23. Do you say now that it is impossible under any method?—As far as I know the best methods are being adopted at all the flax-mills for keeping the solids out.

24. Supposing that within the last two days I had visited a flax-mill that arranged its effluent water used under pressure to clean out all the flax-gum scraped off by the strippers, and that means were used at the mill which absolutely prevented any of the smallest gum particles from reaching the creek alongside of which the flax-mill was working, would you believe that possible?—I have not see it, nor have I heard of it.

25. The method was to take this effluent water away in a continuous trough about a foot square and discharge it amongst the vegetation—growing flax, grass, niggerheads, and so forth. All the rubbish, even the finest, was caught in the grass, and the final effluent contained nothing except a little dye. Is any such method used in your flax-mill?—Such a method has just been started, I understand, in—I think it is—Mr. Brown's mill at Waikanae. With a 3 in. pump 180 gallons of water per minute go into a mill. That water has to go out again. If you are going to run that over a flat surface of niggerheads and raupo and stuff, I think it is exceedingly likely that it will eventually be a bed of disease.

26. My question was simply whether the flax-refuse could be arrested?—Under such a method I think it could.

27. Failing growing flax or niggerheads or similar material to act as a trap, would it not be possible to arrange wire netting so as to produce dead water—water distributed over a sufficient area—and compel the settlement of all solids? Would not such a plan as that be equally effective?—I do not think it would be practicable, in the first place. I do not think it possible.

28. Would you credit the statement if you were told that it was being done?—It would all depend on how long such a thing had been done. If it had been done for a week I should say, Yes, it was probably quite correct. If for a year, I could not believe it.

29. Why?—Because, in the first place, such a large volume of water comes down that a man would want an area that was practically unlimited in which to collect this stuff through the wire. Or if you had settling-tanks, with such a large volume of moist matter going through, you would want a tank for every day of the week. You would want acres and acres of land as settling-tanks. You would want more than one a day—one of huge dimensions. You have 180 gallons of water per minute going through a pump.

30. The water is passing away all the time, but leaving its deposit behind. The water goes freely?—But this stuff floats.

31. In a current, yes?—It will float for a week before it will settle.

32. Not in water that is still or comparatively still?—It will float for a considerable time.

WILLIAM WOOD, Merchant, Christchurch, examined. (No. 3.)

Witness: I desire to say that owing to the higher price that is ruling now, the flax-milling industry is extending in Southland just now. There will be some thirty or forty mills working there. The industry is also extending in the outlying districts, such as Gisborne and Auckland. The Manawatu has been the home of the industry, and there is a very much better style of flax-milling there than in any other part of New Zealand, but owing to the increased price the different waste areas are now being taken up. The flax-milling industry, of course, has been developing, and manufacture has improved, and there is not the waste or the trouble from rubbish going into the rivers that there was. As merchants and manufacturers we have got to look for the cultivation of the flax in the future, and all these waste areas. As I say, I should think there will be from thirty to forty more mills in Southland this year than last, and I should think from twenty to thirty more in Auckland. If there is any curtailing of the industry it means an immense loss to the country. Fax-millers are really bringing into use a waste product—a product that can be used for nothing else.

1. *Mr. Buick.*] Do you consider that there are other areas than the Manawatu that are in a like condition—flat areas of low-lying country that would have just the same trouble as the Manawatu?—Certainly I do; but the mills are very much closer on the Manawatu, and the river has probably a slower current than most of the other rivers. The law, however, would affect one part as well as another.

2. *Mr. Buxton.*] You mentioned that the industry is developing in the South Island: what do you think would be the effect on the industry if this Bill did not pass?—There is an injunction which would practically stop the millers from doing their work at all.

3. You consider that if this Bill is not put through it will mean a very considerable set-back to the industry in the South Island?—Yes, a very great loss indeed.

4. *The Chairman.*] You say that there are thirty or forty more mills in Southland to-day than there were last year: were mills in operation on the same flax-fields in Southland before?—Yes; they were shut down owing to the low prices.

5. In other words, the future is likely to be like the past—the number of mills increases as the price increases?—They will operate with high prices, and shut down with low prices.

6. *Mr. Buick.*] Do you consider that an increased cost of production would do something to damage the industry?—If it cost more to produce, and we had the prices of last year, there would be hardly any mills running at all—unless they were absolutely under some contract that they must run—because they made hardly anything last year.

7. You consider that cheap production is the only thing that keeps the industry going—that there is no room for what happened in the Old Country, where the large factories went to great expense to stop the effluent from getting into the waters? You consider there is no room for that in the flax industry at present?—I certainly think there is no room. It depends on the price, of course: that is the main thing.

LOUIS SEIFERT, Flax-miller, examined. (No. 4.)

1. *The Chairman.*] Do you wish to make a statement?—Yes, sir. I have been in the milling business for about twelve years in the Manawatu, and also in the Rangitikei. One point that I particularly want to make is this: I think the idea of a lot of people is that under this Bill we want to do something worse than we have been doing heretofore. As a matter of fact, we are using better methods now for discharging the effluent and the waste into the rivers than were employed years ago. Years ago tow and dust and all the waste fibre went into the river, and a good deal of good fibre too, naturally. Now there is a proper system of wheels and gratings, which have been installed during the last two years. All the mills have not had them put on till practically the last twelve months. So that in the last twelve months the conditions have been much better than they were previously. It seems an extraordinary thing that in the big boom of 1907–11, when there were about seventy-eight mills working in the Manawatu district, there was not one single complaint or one case of typhoid fever or anything of that sort. That was during the time the biggest quantity was turned out—about 17,000 tons was turned out from that district out of about 30,000 tons for the whole of New Zealand. There was a large percentage of solids went into the rivers during those years, and it seems extraordinary that now, when there are practically no solids go in and the conditions have improved, these complaints are heard. In no instance, I think, has a person proved that one beast or one human being has been affected by the water from those rivers in twenty years. I heard the statement made that the vegetation could be kept out of the water successfully. I am not going to say that it is impossible to keep the vegetation out, but what I do say is that the percentage of solids in the vegetation is very small indeed. The vegetation from the flax itself is composed mostly of water when it is condensed. When the flax is stripped there is a certain quantity of vegetation falls from the fibre: some of it is wheeled away, and a small proportion may go into the river; but most of that is composed of water. There would only be about 10 per cent. of it solid. Therefore the proportion of solids going into the river is practically nothing at the present time. I have a river frontage to the Manawatu of three-quarters of a mile. I have stock there—horses, cattle, and sheep—and we have been drinking the water from that river for some twelve years, and we have not had a single case of typhoid or anything else. I want to point out that the discharge from the Oroua River goes into the Manawatu, and the mills that are working on the Manawatu further up would make it nearly as bad as the Oroua water. Although the Oroua Stream is much smaller than the Manawatu, the percentage of mills on the Manawatu is much larger: so one counterbalances the other. With the improved conditions that have obtained during the last twelve months one can hardly understand how it can be suggested that the position is getting worse. It is not likely to get worse, because the flax-areas in the Manawatu are developed practically to their full extent now. It is very unlikely, then, that there will be a larger out-turn; and if the river could stand it for the last twenty years I can hardly see why it cannot now. With regard to keeping all the vegetation out of the water, at Miranui we do keep all the vegetation out. I refer to the big mill between Shannon and Tokomaru. The water from that mill we run into a large dam. The vegetation is caught in this dam. The water oozes over the top of this dam and runs into a drain, then into the Tokomaru Stream, and finally into the Manawatu River. I venture to state that that water is very much worse than any of the water that is running direct from a mill into the Manawatu, for the reason that it is lying there in a putrid state. It is filtered through this rotten vegetation, and when it goes into the river it is as black as your hat. Water going straight from the mill I would not be afraid to drink; there is only the dye from the flax in it. If we employed a system of dams to filter the vegetation from the water it would simply mean that we would be putting the effluent into the river in a putrid state. It has got to get into the river finally, and it would reach the river in a worse state than at the present time. It was merely an accident, I may say, that this case ever came on. The trouble now is that a great number of people realize they can get an injunction against the flax-millers, and if there is any friction a miller is likely to have an injunction taken out against him. The millers are out to improve the position, and want to do everything in their power. If we thought we were doing any harm to any people above or below us, we would use every endeavour to prevent it. The millers want to improve the conditions, and they have improved them; and with the Bill I do not think any one would have any cause for complaint. There are several safeguards in the Bill. One other point: I have noticed any quantity of trout and whitebait on both sides of the mills. I cannot say so much for the Oroua, but I know it very well, and I know that at my brother's and Smith's mill they drank the water from the river for two or three years, and there was no trouble—no case of typhoid; I never heard anything about it at all till after this case came on.

2. *Mr. Sykes.*] You said that during twenty years there were no cases of typhoid connected with the work in the flax-mills. To what cause do you attribute the recent outbreak of typhoid among the flax-mill employees on the west coast of this Island?—I cannot account for it at all, because the conditions are really better now than they ever were. There is more care taken at the mills in regard to pure water.

3. Is artesian water provided for the workers?—At some of the mills it is provided, but not all. No doubt it will be provided from this out. There is no difficulty in providing it by sinking a pipe.

4. Is it reasonable to suppose that the refuse which was placed in the river in such large quantities a few years ago is proving detrimental to that water to-day? Has it all washed away, or is it there in a festering condition?—It has pretty well all washed away. Anything that does not float would go to the bottom. I have never noticed any decaying vegetation in a winter's flood. These floods remove everything, as a rule. In any case the river-water is not fit to drink, apart from the mills altogether. On one occasion I saw above my mill a dead horse in the stream,

and on several occasions have seen two or three sheep. We know that in flood-time there are hundreds of sheep lost there.

5. You said that you have had horses and cattle and sheep depasturing on your property: this is below the mill?—Both above and below.

6. They show no ill effects?—They have done very well indeed—in fact, Mr. Akers, who owns about twelve miles of river frontage, claims that he fattens sheep and stock better on the lower country.

7. These proposed dams for the collection of this gum would be really detrimental to the condition of the river?—I feel confident they would. We all agree that it would only putrefy the water. It would ooze through the vegetation, and anything that is stagnant must be worse than if it is sent straight out to the sea.

8. *Mr. Broad.*] You mill in both the Manawatu and Rangitikei districts?—Yes.

9. When you were milling in the Rangitikei will you tell the Committee what happened when stock were drinking the water?—I was milling on a small stream. There would be only about 200 gallons in the summer-time, and we used to run all the refuse into the stream, and then clear it out periodically. It had about three miles to go to the sea. There was a lot of stock there, and I have frequently seen them drink this water. Yet there was other clean water on the property. The manager of the station said that he had never had any ill effects whatever, and he never even asked us to stop the discharge into the stream. It went away fresh to the sea. It had no time to putrefy.

10. *Mr. Pearce.*] Is it not a fact that until just lately every owner on the Manawatu River was interested in the flax, and almost every owner is now?—No, not all the owners.

11. Practically all?—Some of them must be, because that is where the flax grows.

12. Practically all on one side of the river, and almost all on the other, are interested in flax, are they not?—On the left-hand side of the river going to Wellington there are mostly flax-areas; but on the right-hand side there is a lot of farming-land.

13. Are not those farmers producers of flax, and flax-millers?—Some of them are not producers of flax.

14. With reference to your putting the stuff at the Miranui mill into a dam and running the water through, after it leaves the settling-tank you say that it smells very badly?—My opinion is that if this were done it would be in a much worse condition than if it were run direct into the river.

15. *Mr. Bollard.*] Have you ever heard that cattle died in consequence of drinking the water from the river, or went off in condition?—No, I never heard of it on the Manawatu River.

16. You have heard of an outbreak of typhoid: do you know of your own knowledge, or have the Health Department stated, that it was traceable to drinking the water?—No, I do not think that has been proved at all. There is a septic tank above the mills on the Oroua River, and there are dead carcases in it; and if it was said that the typhoid was attributable to the water, it would not be saying that it was attributable to the flax-refuse. It would more likely be attributable to dead carcases in the tank.

17. *The Chairman.*] Did you hear my statement as to a mill in the Wairarapa getting rid of its rubbish by settling it in the swamp?—Yes, I heard that statement.

18. Supposing the settlers there told you that they had complained bitterly when the flax-mill commenced of damage to the water because rubbish was allowed to go straight into the creek, and that when this filtration plan was adopted the complaints ceased, what would you say?—I could only account for it in this way: that it must have been a very small stream in which the water was practically stagnant, and therefore it was not carrying the small particles of vegetation away rapidly, like a river such as the Oroua or the Manawatu would do. The vegetation must have been banked up along the banks and allowed to putrefy. They may have been putting everything in. It just depends on how much they were putting in. In our case what is put in goes in very evenly, and all the solids are taken out.

19. What would you say to a statement that horses working at a flax-mill actually preferred to go to the trough that was carrying the water away from the mill than to drink from the creek above the mill that had no flax in it? Would you think that likely?—I should not think it likely. I can hardly credit it. I should think they would not like the mill water any worse or better than the other water. But I know they can get a liking for the vegetation.

20. Can you tell the Committee from your experience that the working of a flax-mill does not do any harm to the water?—I would certainly say that on a stream of any size at all it really does not do any harm, provided the vegetation goes in fresh all the time and that the solids are kept out—I mean a stream of any size, subject to floods now and again. I can quite understand that in a small stream if the vegetation were allowed to bank up on the sides and putrefy it would affect it. In the instance that I mentioned it was a small stream, and we sent a man along every few days to clean it out; and the cattle drank, and there was no harm done.

21. Do you know anything of the flax-mills that had an injunction taken out against them?—Yes, I know the mills very well.

22. Are those mills working now?—Yes.

23. How is it that they are working with an injunction out against them?

Mr. Broad: May I interrupt? The injunction has not been issued yet. It is referred to the Chief Justice.

24. *The Chairman.*] Can you answer my question, Mr. Seifert?—I really do not know why the injunction is not taken out, unless the plaintiff has not bothered to take it out. He has the right to get the injunction, I understand, at any time, but probably he is treating them kindly and is not taking it out.

25. You have stated to the Committee, have you not, that the conditions of working at the flax-mills, as far as allowing rubbish to go into the stream is concerned, have been enormously improved?—Yes, I have stated that they have been considerably improved.

26. Is it likely, then, that the injunction is purposely held in suspense, because the threat of an injunction has been effective?—That is possible, although, mind you, these improvements were put in before the injunction was ever applied for. The Marine Department took the matter up because pieces of fibre were going in. They made the flax-millers put in tow-wheels to stop the refuse going into the river.

27. Are you in a position to say that such an enormous quantity of fibre was put into the river that it interfered in same way with the steamers down at the mouth of the Manawatu?—Yes. Probably there were forty or fifty mills, and the small particles of fibre from each mill would amount to a good deal in the aggregate; and the steamers coming up to Foxton would naturally have some difficulty by this stuff interfering with the screw. But there is nothing of that now, because every mill has a tow-wheel to arrest any fibre or solids.

28. If the improvement in arresting rubbish in the flax-mills has been so great as you state to the Committee, is there any real fear of trouble in the future, provided the flax-mills carry on their business as you say they are doing?—You see we are absolutely at the mercy of any person who may find fault with us. It is not a question of whether we are doing them any actual harm. It is a technical breach, and it means that if there is any friction you are likely to have an injunction taken out. We feel that there is no harm being done, and, that being so, why should we have a sword hanging over our head?

29. Would you say that the sword was not necessary, in view of the fact that the Minister of Marine had to enter his protest?—We are quite willing that the Bill should provide that all the fibre and that sort of thing should be kept out; but we say that the fine particles of vegetation it is practically impossible to keep out, or, if it is possible, the water will be in a worse state than it is at present. We say that the Bill is very drastic as far as we are concerned. The safeguards in the Bill for any one likely to be affected are enormous, but we are willing to go to any reasonable length in order that we may have definite lines to work on. We say it is not justice that we should be at the mercy of a person to whom we might be doing no harm. We know there will be trouble if the Bill is not brought in.

30. What about trouble to the other fellow if this Bill is passed?—We say that nobody can be injuriously affected by this Bill. We cannot see how any one can possibly be affected by the system we have in operation now and by the clauses of the Bill. I do not think one person could prove that he would be affected under those clauses.

31. *Mr. Pearce.*] Do you know Mr. Green's mill?—I have not been there since he built.

32. You know that he has a mill?—Yes.

33. If I made the statement that the water from his mill, which runs through my property in a very large drain that has been flooded two or three times, has killed all the watercress and vegetation and fish—in fact, the grass—for two or three feet above the water on each side, would you contradict me?—I could not credit it if he is running his water direct into the drain. If he is running it into a dam first, and it is lying there putrid it might possibly be so.

34. I believe he is running it straight into the drain?—Then I can hardly credit your statement.

35. Supposing the Manawatu kept the water back there for a fortnight, would you think it possible?—Then the stagnant water and the chemicals from the swamp would kill it. I have seen grass killed through water lying on it without there being a flax-mill near.

36. Burke's drain and Poole's drain run parallel with one another; they come out of the same swamps, yet one is full of watercress and wild fowl and fish, while the other has none, although they were both full prior to the mill starting operations. Do you still doubt what I said?—Yes. We know there was never a great deal of vegetation in Burke's drain, because the water there was absolutely black before ever a mill was put on it.

37. *Mr. Buick.*] You say you have made great improvements in regard to retaining the fibre. Have those improvements been made since the action?—A lot of them were made before the action, and there have been further improvements effected since, in this way: there have been gratings added to nearly all the tow-wheels, which makes it doubly certain that all the fibre will be arrested.

38. *The Chairman.*] Are you not a little contradictory? You say that the arrest of the fibre would be an improvement, yet you told us that the arrest of the fibre would mean its decomposition?—You misunderstand me. The fibre that is taken out is taken out by a wheel, and the water and small particles run through. What I claim is that if the vegetation is run into a dam and is allowed to rot—whether there is fibre with it or not—naturally the water oozing through comes out in a very much worse state than if it goes direct into the river. The fibre that we take out is taken out fresh: it has not had time to decompose.

EDWARD PHILLIP LEVIEN examined. (No. 5.)

1. *The Chairman.*] What is your occupation?—I am engaged in flax-milling on the Oroua River.

2. *Mr. Broad.*] Have you read the Pollution of Water Bill?—Yes.

3. What is your opinion about it?—It is absolutely necessary to protect the industry.

4. Why?—Because we could not possibly mill without the water, or without allowing a certain amount of the vegetation to get back into the river.

5. What method are you using now to keep the vegetation and solids out?—I have a couple of grates fixed into the drain. The first one collects the larger stuff, and the second one gets the smaller pieces. So there is only a small proportion of the vegetation going into the river.

6. Have you found this method satisfactory?—Yes, quite satisfactory.

7. Does any of your fibre go into the river at all now?—No, none whatever.

8. Then, what does go into the river from the mill?—A proportion of the vegetation, and, of course, the discoloured water.

9. What do you mean by "vegetation"?—The small pieces that come off the flax—little pieces as big as your finger-nail.

10. Do you use the water for any other purpose than the washing of flax?—Up till lately we had used nothing but the river-water for the cookhouse and for the stock to drink.

11. For how long did you use it?—For the last five years I have used it, and prior to that it was used. I think the mill has been running twenty-five years.

12. Did you ever hear of any trouble at all in the way of sickness or in any other way?—No, I have never known of any. The horses drink nothing else but the river-water.

13. Have you leased the bottom part of your property to anybody?—Yes; Mr. Slack has it.

14. Where does his stock get its water from?—The only water it can get is the Oroua River water.

15. And that is below your mill?—Yes, right below.

16. Below how many flax-mills?—Four or five.

17. His stock is drinking the water that has gone through these mills: does his stock suffer, do you know?—I have never heard of any trouble with it at all—in fact, he gave evidence in the case in Palmerston that he had never suffered any injury through his stock drinking the water.

18. What stock does he run?—Sheep, cattle, and horses.

19. You have never had typhoid or any sickness at your mill?—No.

20. Have you ever noticed any fish in the river?—I believe there has been an occasional trout in the river.

21. Have you seen any fish of any description?—I have seen one or two trout. In fact, we have caught flounders in the river occasionally, and eels are there in thousands. The Oroua River down where we are is not a trout river at all. It is a silty river, and trout cannot live in it in consequence, apart from anything else.

22. *Mr. Buick.*] Is your mill the furthest up on the Oroua?—It is the lowest down the river.

23. It was not at your mill that there was the typhoid fever case?—I have never had a case, to my knowledge.

24. You say you have used the river-water for cooking purposes?—Yes; but since this case came on I learned that the Feilding septic tank emptied into the river, and I have put up tanks for my cookhouse, and we drink that water. I pump the river-water out simply for washing purposes in connection with the cookhouse.

25. You can get artesian water there, can you not, by sinking?—I think some of the farmers have artesian water. They have no trouble, I believe, in getting it.

26. *Mr. Buxton.*] If the law says that you shall not put this by-product into the river, then you say you cannot go on flax-milling?—We shall have to shut up: that is the actual fact. You talk about running this stuff on to swamps, but we have not all got the swamps to run it on to.

27. You say that you are, by your methods now, doing the very best that can be done with it?—We cannot do any more.

28. If the law says that that is not sufficient and you are to do more, it means that you will have to stop flax-milling?—As soon as the injunction is issued we shall have to stop. I am quite satisfied that the effluent going into the river at the present time is not doing the slightest harm to anybody.

29. You do not think it would kill the fish, then?—I am certain it would not kill fish. I have put down an eel-basket and pulled it up the next morning as full of eels as you could get it.

30. Below your mill?—Below and above. There are four or five mills above that again. Tennant's mill is within a mile of mine, and the horses always drink just below the mill—in fact, I have a contractor who is cleaning up a paddock for me; he has got six horses, which are quite strangers to the place; they go there three times a day and drink the water while the mill is running, and there is no ill effect at all.

31. *Mr. Sykes.*] It has been stated that from 100 to 180 gallons of water per minute is used at one of these mills. That is approximately from 7,000 to 10,000 gallons an hour. How many tons of green flax, approximately, is put through in an hour?—It varies, of course. I should think, from 15 cwt. to a ton.

32. And, approximately, how much of that is refuse and how much dressed flax?—I suppose one-eighth would be solid.

33. And the greater proportion of the refuse you prevent getting into the river?—It is all caught, barring the vegetation and the dyed water.

34. The proportion of vegetation or colouring matter would be infinitesimal when compared with the volume of water?—Yes.

35. *Mr. Pearce.*] With reference to your statement regarding Mr. Slack's stock, is it not a fact that there is plenty of water on the centre of the section without the stock going to the river?—No. There may be a little water there for a day when there is a bit of a flood or a lot of rain—that is all.

36. You made the statement that you keep all fibre out of the river by means of two gratings and a man. Would you believe me if I said that I have stood and watched the man throw six or eight forkfuls over the grating to every one that he threw out?—If you told me that I would tell you that you were telling an untruth.

37. Let me put it in this way: if you put a man there and do not watch him, and expect him to throw the stuff up 6 ft. or 7 ft., have you faith that he will not pop it 6 in. over the grating instead?—You have overlooked the fact that most of these men who are doing this work are on contract, and every particle they save is so much the better for them.

38. *The Chairman.*] Put it in this way: do you agree that it is possible for your man to do that or not? You deny it?—Absolutely. As a matter of fact, my man was brought into Court

at Palmerston and stated that Mr. Pearce was not telling the truth when he made the statement that he has made just now.

39. *Mr. Pearce.*] Will you admit that there are not 300 yards of fibre caught against the bank of the river in front of your mill at the present time?—When I put the mill there some three years ago there was a bank there, and at that time all the rubbish from the mill was simply thrown on to the bank. Certainly there is a good bit of this vegetation and fibre mixed up in that sand. If that is what you want me to admit I will admit it. But I will say on oath that since that case under the Fisheries Act came on and we have had the gratings put in there, that bank has not risen; in fact, it has washed away considerably since that day.

40. Will you make the statement that you have not caused an erosion on my side of pretty nearly half a chain since you have been there, and the ground is still dropping in?—That is a matter on which you want to get an opinion from an expert. It is the position of your bank that causes the erosion. It has nothing to do with my bank at all. The same bank has been there for fifty years. It is simply because this vegetation is on the bank that you think it is causing the erosion. Erosions are taking place in several places up the river where there are no banks at all. It is simply on account of the river's windings that these erosions take place.

41. Would you still stick to that statement if Mr. Laing-Meason says that the conformation of the river is such that it would erode on your side if it were not for the fibre?—Certainly I would.

42. Is it not a fact that you shifted the mill from further up the stream to that particular place?—I shifted it, I think, about four years ago.

43. Was it not your object at that time to shift it to where the water was eroding on that side, so as to get the fibre and stuff shifted with as little labour as possible?—The sole reason why I shifted was this: the bank was giving way where the mill was situated; it was giving way so considerably that my engine was in danger of going into the river, and I was forced to shift to a place where it was not washing away.

44. *The Chairman.*] You deny that the reason was as stated by Mr. Pearce?—He muddled it so that I do not exactly know what he did mean; but what I said is the absolute fact.

45. *Mr. Pearce.*] Is it a general thing for flax-millers to choose a position for a mill where there is a beach, so that all the stuff will be exposed, or do they generally take a place where they get a chance to put it into deep water—that is, where the water is eroding the bank?—I should think they would put a mill in the most suitable position.

46. Could you tell the Committee what width you have between the bars in your grating?—I suppose they would be about a quarter of an inch. I have not measured them. The first one, I should think, would be about a quarter of an inch, and the other about an eighth. The first one was doing the work sufficiently, but to endeavour to meet these troubles we put a second one in, which catches a certain quantity of little bits of vegetation. That is thrown up on the bank and carted away.

47. Do you keep two men for that now?—No; I keep one man for the grating, and he moves the stuff from both grates.

48. What is the size of the trough against this grating?—I suppose it is about 1 ft. wide; perhaps 10 in.

49. About 1 ft. high?—About that.

50. The pump carries from 180 to 300 gallons a minute?—It depends on the size of the pump you are using.

51. I mean your pump?—About that, I think. About 180 gallons, I think.

52. Then if that man leaves for five minutes, the whole of the material will be going over the top of the grating?—No, I do not think it would overflow. It would take possibly about ten minutes.

53. How long is your trough?—6 ft., possibly.

54. The size of the trough is 6 ft. by 1 ft. by 10 in.?—The trough is not the grating. The measurements of the grating itself are about 6 ft. long by about 4 ft. wide and about 2 ft. to 3 ft. high—possibly more than that.

55. The grating consists of bars of iron put down in the front?—Yes, with a floor and sides.

56. Not of bars of iron?—It is a closed-in box, with iron bars to form a grating in the front.

57. The whole of the water has to go through that grating, has it not?—Yes.

58. Prior to going into that box it runs down an incline?—Yes.

59. There are 180 gallons a minute running down, and if your man turns his back for five minutes, is it not plain that the thing will overflow when it is blocked with the fibre coming down?—Have you not got the sense to know that the water is running out the whole time it is coming in?

60. *The Chairman.*] At 180 gallons a minute, the water must run at a good pace?—Yes, at a fair pace. There is not a very big fall, you know.

61. Suppose a settling arrangement of a good many square yards were arranged in which the water would be allowed to drop the fibre to the bottom, would not the effluent that gets into the river be much clearer of fibre than with a rapid stream like that?—No, I do not think so. In fact, I think you get more vegetation into the river in that way than you do with the grating. The vegetation floats with the slightest movement of the water.

62. Do you mean to tell the Committee that if the water was allowed to settle quietly—to drop, not the fibre, but the comminuted vegetation that is scraped off by the scrapers—the water, when it finally escaped into the river, would not be much cleaner?—But you could not possibly do it. Your tank would be full in no time. It would simply rush in and rush out as fast as you put it in. I do not see that you could do it.

63. Supposing your trough was 45 chains long and there was no grating at all, and the water

at the end of that trough was allowed to spread about in a swamp with vegetation of all sorts acting as a sieve; would not the whole of the fine granulated stuff—the gum scraped from the flax—settle to the bottom, and the water finally escape into the creek without any vegetation or fibre at all?—You would want a tremendous extent of country to carry that out, and it would be a very dangerous thing to stack stuff like that on the ground.

64. Would you believe that within the last two days I went carefully over the work of a flax-mill where this was done, saw where the fibre was caught, saw the water below, examined it carefully, and failed to find a trace of any gum or vegetable matter whatever? Could you understand that that was possible?—I do not know how it is worked, I am sure. I could not possibly do it on the Oroua River where we are.

65. How far are you from the river?—The mill is on the banks of the river.

66. Do you mean to tell us that the treatment of the refuse from the mill by the method you describe is sufficient—that is, a 6 ft. trough and a grating of that description?—I have two troughs—one 6 ft. trough, and one down below that again.

67. Very well. After the water passes through the grating, does it go straight into the river?—After it passes the two grates, yes.

68. Do you mean to tell the Committee that that is sufficient to stop the comminuted fibre that is scraped off the flax from getting into the river?—I would tell the Committee that it will keep out all the fibrous matter, but it will not keep the vegetation out. I have said that the dyed water and the vegetation go back into the river, and, in my opinion, it is impossible to keep it out.

69. Where do you get the eels?—Anywhere you like to put a basket down in the river.

70. If the acclimatization societies come to us and give evidence of eels and fish of all descriptions being killed by the effluent from these flax-mills, would you admit the possibility of that?—I deny it, because I do not think it is correct.

71. Is there any trout in the Oroua?—I have seen an occasional one; but, as I explained before, trout cannot live in the Oroua because it is a silting river.

72. *Mr. Buick.*] Do whitebait come there?—I have heard of them coming up, but I have not seen them myself.

The Chairman: I should like to ask Mr. Seifert whether the treatment of refuse from flax described by Mr. Levien comes into the category of improved treatment of the refuse described by Mr. Seifert.

Mr. Seifert. Yes, I should certainly call it improved treatment, because in the old days there was nothing put in to arrest the fibrous matter at all.

73. *The Chairman* (to Mr. Levien.] Do you tell the Committee that this flax fibre and gum, if arrested, would smell and become offensive?—Yes, if it is left stagnant—that is, if it is wet.

74. Would you credit the statement if I made it that within the last two days, when I visited a flax-mill where the rubbish is arrested in the manner that I have described, there was no offensive smell whatever?—I do not know how long they had been carrying the system on.

75. They worked all last summer, and they have been two months at work now?—Could you give me the name of the mill?

76. Longbush, Wairarapa?—I have not heard of it at all. There may be special circumstances there.

77. No, it is just discharging into the swamp. No vegetation gets into the small creek?—It would be impossible for me to do the same thing, because I would have to cross the road with a drain, and I could not do it. In any case I should be very sorry to do the same thing. I think it is detrimental to health.

78. Supposing you had started your flax-mill a sufficient distance from the river to admit of treatment of this sort: could you have done it then?—No, I do not think I could possibly. You must have the river to get your water.

79. Have you not artesian water?—Artesian water is not satisfactory for milling.

80. Have you any well-water?—I do not think we would get well-water where we are.

81. *Mr. Sykes.*] Mr. Pearce made the statement that he has seen the man who is in charge of the *débris* at your mill—this waste flax—throwing the stuff over into the drain which carried it into the river. You stated that a contract was let for the removal of this stuff?—Yes.

82. A contract which would incline the man to cart it away?—To save every fibre.

83. You pay him so-much per ton?—Yes.

84. *Mr. Pearce.*] How long is it since that contract was signed?—We do not get any contracts signed with these men. We just make an arrangement with them that they shall get so-much a ton.

85. *Hon. Mr. Buddo.*] If there is any deleterious matter for stock and fish in the water coming from the mill, where is it more likely to be contained—in the fibre, or in the vegetable matter that is taken off the fibre?—I should say, in the solid fibre. There is very little solid matter in the vegetation: it is nearly all water.

86. Would it not appear to you that the vegetable matter on the outside of the fibre contained the greater degree of acidity?—Possibly it would. I am not an expert in these matters.

87. Have you had any analysis made of the effluent from the mill?—I believe an analysis was made in that recent case.

88. You are not aware of the constituents?—No. An analysis was made, as a matter of fact, by Professor Maclaurin.

89. *The Chairman.*] We have been told that the granulated matter—the vegetation—that comes from a good-sized flax-mill continuously at work would amount to a tremendous quantity in the course of a year; that it would be such a huge mound that it would be impossible to effectually dispose of it. Do you agree that the quantity would be so large?—No; I think the quantity would surprise anybody. I mean that when it was all collected for twelve months it

would not be nearly so much as one would anticipate when he saw it coming from the mill. It dries up to such an extent that there is very little left.

ALEXANDER JAMES TOOGOOD examined. (No. 6.)

1. *The Chairman.*] You are a flax-miller at Longbush, Gladstone, and a business man in the Wairarapa?—Yes.

2. *Mr. Forbes.*] Will you describe briefly the process you adopt at your mill, to which the Chairman has referred?—At the present time we simply run our water out into the swamp. We have been working on that system for about a month. Possibly the water will find its way into the drains later on; it is not doing so at the present time.

3. *Hon. Mr. Buddo.*] What stream will it go into?—The Wangaehu. As I say, the water has not had time to reach the drains, and when it does we know from experience that it will probably have a stronger smell than it has at the present time. We tried the method before, and when the water did get back to the drains it was very bad.

4. *The Chairman.*] I went to the mill, and have described to the Committee what I saw. Then I went to one of the settlers—Mr. Blundell—and what Mr. Blundell stated was that when you commenced at first a lot of the fibre found its way into the creek—I mean the comminuted stuff—and that the water got very black down below, and that complaints were made; but that since then he had heard no complaints and made no complaint himself, because you had altered the treatment and adopted the system, I presume, that I saw when I was there a couple of days ago?—We had a different method of washing altogether then; we had the old hand wash. Now we use a machine, and it is necessary to deal with the water that comes away from the machine. We are running it into the flax, but we know that it must get into the drains ultimately, and I am afraid it will be in a very bad state. Another thing: You said you were there the other day, and that there was no smell from the accumulation. During the last two seasons you were there in the very best month of the year. If you go there perhaps in three or four months' time you will be met with a different odour altogether. There is a house just where the water is running out, and my manager told me the other day that the chances are we shall have to vacate that cottage on account of the smell. With respect to the influence this refuse has on fish, I may say that we also have a mill at Kahautara. Below the mill is recognized to be the best fishing-ground in the Ruamahanga, seeing that His Excellency the Governor has been there twice. Just below and just about the mill the trout are there in millions.

5. You have described to us what you have been doing: will you tell the Committee what you propose in the way of alteration?—I cannot, because we shall have to see what time brings along. It will bring some fresh thoughts, perhaps.

6. You have no plan other than the one you have followed?—No; we are just giving it a trial.

7. Did the settlers down below complain when you commenced?—Yes.

8. Have they been complaining since?—No. They sent a complaint to the acclimatization society—or some one did—and their officer came up and found that the matter was exaggerated, and nothing was done. That is six months ago—probably longer.

9. *Mr. Pearce.*] Does the water, when it is spread over the land below this mill in hot summer weather, kill the finer English grasses?—I could not tell you. We have only tried the method about a month.

10. *The Chairman.*] Would not any water-logged grass be killed by water, without its having any flax in it?—Yes.

11. *Mr. Buick.*] We had a statement that the effluent from a flax-mill killed the grass and weeds in a stream. Have you had any experience of that?—I think possibly it would.

12. Have you had any experience of it yourself?—Indirectly we have. I think probably it would have that effect.

13. *Mr. Sykes.*] Do you know if the trout are in as large numbers now as they were prior to the installation of your flax-mill?—I cannot say.

14. You have not heard the settlers remark on the fact at all?—No. Do you refer to the Gladstone or the Kahautara mill?

15. I am thinking of the Longbush one?—I cannot say whether there was a greater number before or after.

16. *The Chairman.*] With such a quantity of water—right at the lake—could you do any possible damage if you tried?—No. It is a curious fact that the fish do congregate round there. It is known to fishermen.

17. *Hon. Mr. Buddo.*] That is where the water finds its way into the river?—Yes, where the water is the darkest it is recognized to be the best fishing-ground.

WEDNESDAY, 9TH OCTOBER, 1912.

MICHAEL FRANCIS BOURKE examined. (No. 7.)

1. *The Chairman.*] What is your occupation?—I am a flax-miller.

2. *Mr. Broad.*] Where do you mill now?—At Wairoa, and at Waikaka, on the Hauraki Plains.

3. Were you present at the meeting of this Committee yesterday?—Yes.

4. Did you hear what the Chairman said with reference to draining into a swamp?—Yes.

5. Have you ever tried that yourself?—Yes.

6. What has been your experience?—At Wairoa, in the Hawke's Bay District, I have been doing that for the last ten years—that is, draining from the mill back into the swamp through the raupo. I draw the water there from a lake—a lake probably covering about twenty-five acres, which is supplied by water from the swamp. We draw from that lake, and put the water back into the lake again. If we were to deposit the water elsewhere we should soon drain the lake.

7. What condition is the water in?—The water is certainly not of the very best. Being drawn from a swamp and a swampy lake it is not like river-water. We had to convey the water and the stripper-droppings, and so on, for some considerable distance beyond the mill. In the summer-time the stench that used to rise from that heap was pretty solid. But the effect on the fish has been the very opposite to that of which I heard yesterday about their being killed. There are no trout in the lake, but the Maoris go round about the outflow from this flax-mill every evening spearing eels.

8. You were milling some years ago in another part of the country, were you not?—Yes, I was milling on the Manawatu River some seven years ago.

9. Did you adopt any method then for keeping the stuff out of the river?—The by-products of those days were of really no value. The tow we used to burn or dump into the river, and it was easier to dump it into the river because our mill was on the banks of the river. The stripper-droppings were simply carried out into the river with the wash from the stripper. Everything went into the river.

10. What are you doing now: you are not doing that?—No, we are saving the stripper-droppings and the tow. The tow is worth about £11 or £12 a ton, and the stripper-droppings £8 to £9.

11. What method do you adopt for keeping the stuff out of the river?—At one of the mills we have one of those Suttee washing-machines and catcher. Coming from that there is a grating, and there is a man continually at that grating saving these stripper-droppings. That is the only way we have of saving them—trapping them at a grating.

12. Have you ever had any illness?—Not that I am aware of.

13. *Mr. Buick.*] You say that your stripper-droppings are worth from £8 to £9 a ton?—I think the value to-day is about £8 10s. a ton.

14. That is what we call the vegetable-matter, is it not?—We used to let it run out in the heap—short blades of flax.

15. I thought when you said the "droppings" you meant the gum and the vegetable matter?—No; we have not got to the stage of saving that.

16. *The Chairman.*] What distance is your mill from this lake?—About 4 or 5 chains.

17. What do you say is offensive?—The smell in the summer-time from where this is deposited out in the raupo.

18. The smell from the pulp?—Yes.

19. But you have never had any disease from it?—No.

20. Do you think it is at all liable to harbour germs or disease?—I do not think so, because the heap has been there for the last ten years and we have had no sickness.

21. Have you ever heard of the flax-milling industry as an industry being in any way inimical to health?—No, I have not. I think it is just the reverse. When I go to the flax-mill I always get a keen appetite.

22. Do you think the smell is injurious at all?—I should prefer it to the smell around a fellmongery.

23. Supposing you had mills alongside of a stream that was largely used by the settlers down below you, would you feel justified in discharging the pulp—the matter that you put into the lake—into the stream to float away down in the water which your neighbours below you would have to use?—At some of the mills I have been at I do not see that I could help it. For instance, at Waikaka, where I am milling, we are drawing the water from a creek and running it out on to the Government land there. That water is filtering out and finding its way in a zigzag down into the Piako River. I dare say that if I were to go and turn that land up for agricultural purposes there might be a stench for the first year. But if I were to divert that water into the small creek, I should probably be spoiling the creek for anybody who might want to use it. Seeing that I had the facilities for sending the water on to the land and into the Piako River I thought it well to do so; but if that creek were a good big stream I should not hesitate a moment to divert the water into the stream.

24. I referred in my question to an ordinary little stream, of no great volume, that would go down to a low level in the summer-time. Perhaps you have had no experience of them?—No. If I have had a good stream I have put the stuff into the stream. For instance, at Martinborough I put it into the Ruamahanga.

25. Where were you milling at Martinborough?—Next to Martin's, at Otoria, on an Education piece of property on the other side of the river.

26. *Mr. Buick.*] Would your experience warrant you in saying that flax-refuse would kill vegetable matter, such as water-cress?—No, it is more of a fertilizer, I think. We grow very big pumpkins on a vegetation heap at Wairoa.

27. *Mr. Sykes.*] Take the effluent flowing into a drain, we will say?—It will kill if you leave it there long enough. I have seen manuka killed by water lying on it—swamp-water that could not get away.

28. *The Chairman.*] Can you give the Committee any information as to flax-water for stock?—I have not seen them at the water, but I have seen them eating away at the vegetation heap.

29. I mean, drinking this water?—I can only cite my case at Wairoa, where I have had to put this water back into the lake; and the cattle drink that water. That water has been going into the lake for the last ten years, and the only filtration is a bit through the beach.

30. Do you know that the Maoris, when they want a laxative medicine, boil flax-root?—Yes. I have done it myself.

31. Would you think that drinking the water would have any bad effect on stock in that way?—I do not think it would.

32. If any harm were done in this direction, would you not be likely to hear of it?—I should think I would hear of it.

33. You know of no case?—No.

34. *Mr. Baldwin.*] If a flax-mill is properly worked none of the fibre should be allowed to get into a running stream, should it?—I should not think so. An odd strand might get away.

35. But you say that it pays the flax-millers better to put the pulp direct into the stream?—I do not see that they can do anything else with it.

36. Supposing it could be proved conclusively that putting that pulp into the water in considerable quantities renders the water unfit for human consumption—dangerous for human use—would you still say that no method could be arrived at for keeping it out?—I would not go that far; but up to the present there has not been any method brought into use that would keep it out.

37. Have you yourself gone to any pains to keep it out?—I have had no occasion to do so.

38. It is a question in every case as to the quantity of polluted water as compared with the volume of the stream, is it not? If a sufficient number of mills drain into a big river, even the big river will become polluted: is not that so?—I would not say so, because at Foxton, where you have all the mills together in a bunch, there is some of the finest whitebait-fishing.

39. *The Chairman.*] Supposing you have near your mill wire-netting enclosures, quarter-inch mesh, and the mill is of sufficient elevation to discharge the water over the top of the wire netting, and these enclosures are of sufficient size to produce absolutely dead water; as the water with the pulp in it poured into each enclosure, gradually the water would overflow through the meshes, and as the pulp accumulated the discharging water would be always running out from the top. When the pulp had accumulated to a sufficient extent in one enclosure you would divert the pulp-water to another enclosure. The first enclosure would drain dry in a few days, and the stuff be eligible for carting away, if necessary, or you could simply pull down the wire netting and make another enclosure, and so on indefinitely. Thus you would stop all pulp, no matter how fine, in these successive enclosures, and nothing would get into the stream but the dyed water. What would you as a practical miller think of that scheme?—I have never seen it tried. Would not that water, after it had been lying there for a week, get stagnant, and if put into a clear running river poison all the trout?

40. Would not the water minus the pulp be less likely to kill the trout than the water plus the pulp?—You are leaving your water there to get stagnant.

41. No: as the water poured into the enclosure an equivalent overflow would pass out continuously?—It might be worth trying, but I have never seen it worked out.

42. Will you give the Committee your opinion as to how you think that would act?—At Waikaka we have not got any grating or anything of that, but the tussock acts as a sort of filter, like your wire netting. That has been going on for a number of years, but the green water finds its way down to the creek just the same.

43. *Mr. Broad.*] As soon as the water comes away from the mill does the pulp matter sink to the bottom or float?—It floats. That is why you have to leave the tanks till the stuff will sink, and then it is stagnant.

44. *Mr. Buick.*] How long does the pulp take to sink?—I have seen it floating on the stream for miles.

45. *Mr. Baldwin.*] Could not that be prevented by having a finer mesh on top? Could not the enclosure be continued at the top by a finer mesh, so as to confine the pulp in the enclosure? There would then be upward filtration through the fine mesh. That would prevent it, would it not?—It is quite possible.

46. *The Chairman.*] You say that the pulp floats. What you mean by that is that the stream is able to carry it down, and it floats along?—Yes.

47. If you put 20 gallons of your pulp-water as it comes from the mill into a vessel, will you say that in a given time—say, twenty minutes—the pulp would not settle to the bottom?—A proportion of it would sink, but a proportion would still float.

48. What reason have you for thinking so?—It is much lighter than water.

49. I want to know what your observation is?—I can only go by what I have seen on the streams, coming away from the mills. If you run into a lake, you can see the stuff on the surface of the lake—I mean, the leaf of the flax.

50. Would not that be scum?—No.

EDWARD STONE PARKER examined. (No. 8.)

1. *The Chairman.*] What is your occupation?—I have a flax-mill at Blenheim.

2. *Mr. Broad.*] How long have you been flax-milling there?—About eight years.

3. On what river are you milling?—On the banks of the Omaka, just on the borough boundary.

4. Are there any trout in the Omaka River?—Yes; it is supposed to be pretty full.

5. Are there any below the mill?—Yes.

6. Where is the best fishing?—Anglers fish right round the mill—both above and below.

7. Have you had any complaint from the acclimatization society or fishermen about trout or other fish suffering from the effects of the refuse from the flax-mill?—No, I have never heard of it.

8. Do you catch your stripper-slips?—We are doing that this year.

9. What method do you adopt?—We have a grating. We run the water over a grating, and catch the strips on it. We have only just commenced that. We have put in a Suttee washer within the last month.

10. What was your method before you caught the stripper-slips?—Previously they went down the river. You could see them right through the Town of Blenheim—and the pulp, too.

11. *Mr. Baldwin.*] Are these gratings sufficient to stop the whole of the stripper-slips and the fibre from getting into the river?—Practically all, I think. I have not been running this grating long enough yet to know.

12. What length is the grating?—We have only got one, about 6 ft. long. We propose to make a longer one, to get it a bit further out in the stream.

13. You are making it for your own purposes, not for the purpose of helping to purify the water?—We are making it to catch the stripper-slips, because they have a value now.

14. What length of grating do you think would be absolutely effective to catch the whole of the stripper-slips and the fibre?—I think we shall catch them all on the 6 ft. Of course, we are not attempting to catch the vegetation—the pulp.

15. A very small expense would effectively prevent the whole of the waste—excepting pulp—going into the river?—I think so.

16. You have taken no steps whatever to stop what we call the pulp from getting into the river?—None whatever. It is a big stream that we put it into, and ours is the only mill on the stream.

17. You yourself can give us no personal experience as to any effort being made to keep this stuff out of the river?—No; we make no effort at all in the Marlborough District.

18. *Mr. Buick.*] You said that a few years ago the stripper waste was all put into the river: were there any complaints about its injuring the fish?—No, no complaints at all about the fish. We have very good fish there. Of course, the fishermen, when they caught a slip from my stripper, growled, and used to come and ask me to pay for a new rod if they broke one. This effluent does not pollute the water at all. It runs right through the Town of Blenheim. You can stand on the bridge and see the fine stuff floating on the top of the water.

19. *Mr. Sykes.*] The Omaka is a very big volume of water, is it not?—It is a fair-sized stream, and it is very clear water to start with. You could use it for a town supply.

20. *Mr. Buick.*] Is it a tidal river?—Not by the mill. It is lower down.

21. *Mr. Sykes.*] You have made no effort to prevent pulp going into the water, have you?—I have had no reason to. I think I am probably worse situated than any other mill, in that every scrap of my pulp runs right through the borough of Blenheim.

22. There has been no complaint from the residents?—None at all.

23. *Mr. Forbes.*] Is the water of the river used at all for drinking purposes, or anything like that?—Only casually. It is used by all the stock. There are people who go and dip the water out of the river for household use, but they are very few, because practically all round we have spring streams running in, and they can get water just as quickly out of a spring stream.

24. There is no complaint on the score of your spoiling the water-supply at all?—None whatever.

25. *The Chairman.*] Would the Committee be right in assuming that the volume of water in the Omaka is so large that the small quantity you put in would not mean anything much?—Yes, I think they would. The only thing you can ever notice in the stream is that occasionally, where there is a still spot, the pulp collects, and you will sometimes see a bed formed; but there is clear water running over it always.

26. Did you understand the question that I put to the last witness as to the possible arrest of all the pulp by the simple process that I indicated?—I heard that question. You mentioned a quarter-inch mesh. I think you would have a hard job to hold it in a quarter-inch mesh. I think the pulp would run away.

27. Would you be surprised to hear that quarter-inch mesh used in that way has proved effectual?—It would if there was any fibre amongst it at all; but the grating takes most of that out.

28 I refer to the pulp. The meshes immediately got blocked by the pulp?—Yes. I think that most of the pulp would be caught by the method you have explained. I have not seen it tried. I know that Mr. Chaytor, a miller down our way, takes the effluent all away in a stream and runs it on to a swamp-like park, and the water runs away and eventually gets into the river in a dirty colour, but the vegetation is all taken out of it by the time it gets there. I have 7 ft. of fall at my mill, and it sweeps everything clean out.

29. *Mr. Sykes.*] What would be the condition of the water when it eventually did get back into the river after meandering through the swamp?—It would have that green colour, I suppose.

30. Would the water be in a bad condition? Would it remain long in the swamp before it got back again?—I have not had any experience. We have no swamp near us at all.

31. *The Chairman.*] Would the Committee be right in assuming that in your particular circumstances, with plenty of strong-running water, you do not care twopence about any Bill, because you are not afraid of any complaint by any one? Would the Committee be right in assuming that to be your view of it?—I think so. I am not afraid of any complaint from a nuisance point of view.

32. Have the fishermen ever told you that you poison the fish?—No; on the contrary, they seem to think the fish do well on it. The best fishing-ground is close to the mill.

33. So you are not afraid of the fishermen?—No, not from the point of view of the quality of the fish.

ALEXANDER JAMES TOOGOOD recalled. (No. 9.)

1. *The Chairman.*] You heard my question about the wire-netting enclosures. If the first settling-tank was allowed to drain for four or five days, or whatever it might be, and you re-erected the wire netting again at a different place, and so on, you would have a succession of

heaps of dry pulp. Would you give the Committee your opinion as to how you think that would work?—First of all, how much ground would the enclosure take up?

2. I should imagine that about a square chain would be a fair experiment. One can only draw upon one's imagination as to what would be the best?—You must remember that the water would go to the tank in a pulpy state, and by the time it reached the drain might be just as black as if the debris were in it.

3. Do you think that a plan of that sort—comparatively inexpensive—would succeed in arresting the pulp?—I do not know. The meshes might get blocked, and the water run over just the same as now.

4. That would be the very thing required, because as the meshes at the lower level got blocked the water would rise, and would be continually flowing over the top, as the pulp at the bottom rose?—No, the pulp would go with it—it is so light.

5. Assuming that the enclosure was sufficiently large to produce dead-water, would not that mean a settling of the pulp?—I do not see how you are going to create dead-water, because it will get round the outside of the enclosure. Do you mean it to be an enclosure, or simply fenced?

6. It would be enclosed right round, and there would be dead-water within the enclosure; it would be of sufficient area to produce practically dead-water. Would not your pulp settle?—Some of it might, but I think some would still go over.

7. As a matter of fact, does not the pulp in your swamp at the end of your trough settle to such an extent that your channel gets blocked and requires cleaning now and again?—Occasionally, yes; but very little considering the quantity that goes down it.

8. Yet it is not dead-water, because the water is running along all the time; but the pulp settles?—Some of it.

9. Do you think that my plan would be worth trying as a remedy?—I think you would have but a slender chance of a permanent remedy if you relied upon that. I might tell you that the pulp does float; it is very light.

10. It floats in a current?—Almost in dead-water.

11. *Mr. Baldwin.*] Would the effect of the plan suggested to you be increased if you had wire mesh on the top to prevent upward filtration as far as possible?—I am afraid that to allow the water to get out the mesh would have to be so large that you probably would not catch much pulp. Some of the debris would still come out. Probably some would be caught, but not very much. If you had the mesh small enough to catch the debris the water would be blocked.

12. But the water must find its way out?—It might be so blocked that it would not get in.

13. You, I think, will admit that the public health must be paramount even to the flax-milling industry?—It should be equal in importance, anyhow.

14. From a national point of view it should be paramount?—It should be considered first.

15. I think you will agree with me also that the agricultural industry is a large industry and should be paramount to the flax-milling industry?—I do not think it should be paramount.

16. Do you think it a fair thing that flax-millers should take every precaution that the Public Health Department and the Agricultural Department consider right for the purpose of keeping this pulp out of the rivers?—It just depends on what they require. The Department may require something which it is not possible for a flax-miller to carry out and also carry on his industry.

17. *Mr. Buick.*] I understood you to say that the vegetable matter from the flax is lighter than water, and therefore floats on the top?—Yes.

18. It only sinks when it gets saturated with water and becomes of the same weight?—Yes, and when there is sufficient quantity of it. I should like to say that at the present time a flax-miller may be milling on a stream that passes through his property and goes on through his neighbours' properties, who are farmers. It is quite possible under the present condition of things for one farmer down below to take an injunction out which would ultimately mean the flax-miller's ruin. The farmer could complain about the state of the water, and he could make it so warm for the miller that the latter might be ruined. That farmer might have his eye on the flax-miller's property, and might lay some information against the miller and get an injunction which would mean the miller's ruin. He might make it so hot for him that he would have to sell the land. The man desiring the land might not appear, but indirectly he could buy the property. It seems to me that flax-millers on small streams are in that position to-day. The farmer seems to me to have great power in this direction.

19. *Mr. Pearce.*] If the water from a mill was run over an acre of ploughed land, say, for three days or even for a week, and was then turned on to another acre of ploughed land, and the first acre was ploughed again, the water soaking away from that acre of land would be as clean as it was before it went into the mill?—No, it would not. I say unhesitatingly that the water would be infinitely worse after it left the ground than it was before you used it.

20. Supposing the pulp-water was run through a drain and there were blocks of gorse or tea-tree put in in places: if I said that that would stop 3 to 4 tons of pulp a day from a single-stripper mill, after the effluent had run through a grating, would you contradict me?—It might. I do not know.

21. It would be a very cheap thing to dig a ditch 2 or 3 chains long, and while that was being cleaned out run the water into another ditch?—Yes. Of course, some millers are so situated that they cannot spare the ground.

22. *Mr. Broad.*] If Mr. Pearce's suggestion of filtration by gorse in a drain were carried out, the water would be longer in getting back into the stream. Would that water be in as good condition when it got back to the stream as it would be if it were put back immediately into the river?—No, I do not think it would. It would be running over dead matter.

23. It would be more objectionable?—Without doubt.

24. *The Chairman.*] If you adopted a proposal such as I indicated at your mill at Longbush, would not the water get back into the creek straight away, if you had a drain below the enclosure?—The pulp would be retained, and the water would be running over dead matter. At present it runs straight in, and it is much sweeter while it is fresh. Stock will drink it. They would not drink the water under your plan.

25. You had objections from the settlers below you when, at the commencement of your milling operations at Longbush, you allowed all the pulp to go straight away down the stream?—Yes, that is so.

26. Have you had any objections since you changed your method to what it is now?—We have only adopted the present method for about a month. I might say that I had in mind those objections when I mentioned how a farmer below might possibly ruin a man above, because I do not think they were very solid objections.

CHARLES COLLIS, Chairman of Kairanga Dairy Company, examined. (No. 10.)

1. *Mr. Nathan.*] Your company are working a factory with two creameries?—Yes.

2. And the factory drainage goes into an old drain?—Yes.

3. And eventually finds its way into the Manawatu River?—Yes. I may state that we are just above the Longburn Freezing-works.

4. Is that the reason you give why you have received no complaints from the settlers on the Mangaone?—I do not think we have created any trouble. We have never had any complaint. But that would be one reason.

5. At the Fitzherbert Creamery you drain into a small creek?—Yes.

6. And that creek passes through two settlers' land before reaching the river?—Yes.

7. And if they protested they could stop the work of that creamery?—Yes.

8. Although the nuisance really is not great?—No.

9. At the Kairanga Creamery you drain into the road-drain?—Yes.

10. The people facing that road-drain are the suppliers of your company?—Yes.

11. If they were not and were antagonistic to your company they could practically stop your working that creamery?—They could shut us up.

12. Up to the present you have had no trouble at all in the working of your factory or your creameries?—None whatever.

13. If it should happen that you have trouble, would you be willing, on behalf of the industry that you are representing here, to submit to any regulations that the Health Department or the Agricultural Department might frame for the regulation of the drainage of dairy factories?—Yes; in fact, I consider that essential.

14. That is to say, you do not want to shirk your responsibilities; you are prepared to face them?—That is so.

15. But you do not want an injunction granted against you? You are prepared to pay damages if you create injury?—Yes.

16. And you are prepared to mitigate the nuisance, as laid down by the Department?—Yes, the Health Department. I should like to say a word or two here, as Chairman of the Kairanga Dairy Company. I look upon the dairying industry as one of the greatest assets the settlers and the country have, and I do think it would be a step in the wrong direction to attempt to put a stop in the way of the industry. I look upon it as essential, however, that there should be some inspection of these dairies and creameries, and the directors of each of them should submit to the decision of the Health Department, because I do not think the Health Department would ask us to do anything that would be detrimental to the well-being of the farmer and the country.

17. *Mr. Buick.*] You have heard of the judgment that has been given in the Oroua River case?—I have.

18. Do you consider from that judgment that any settler living below you on the Mangaone could stop you from draining into the Mangaone?—I do.

19. You do not think the Health Department would make any objection?—I think they would be rational.

20. *Mr. Sykes.*] You have had no complaints from the settlers below your butter-factory, have you?—No, we have never had a complaint at all. We have been in existence five years.

21. You take every precaution to see that only the polluted water—or discoloured, shall I say?—gets into the stream?—Yes, and I am very particular with our dairymen not to put much of that into the drains. I find that we can get the farmers to take home a very great deal of it.

22. I believe the washings of all butter-factories now are collected in tanks and removed from the premises, and they do not go into the stream at all?—Well, very little. You cannot avoid a little going in, unless you have a septic tank.

23. And a septic tank is of no use—that has been tried?—I do not think it is.

24. *The Chairman.*] The Kairanga Factory discharges its washings into the road-drain?—In one place the creamery does—not the factory.

25. What is the distance from the creamery to the river?—I should think it would be five miles. The drainage from that creamery goes into the road, and travels for about half a mile, and then diverts and goes into the Tanui Swamp.

26. It spreads about in the swamp?—No, there is nothing to spread.

27. Where does the water finally discharge, then?—Into the Manawatu.

28. Is there no smell in the summer-time?—No; I have never heard any one complain.

29. The milk of about how many cows comes into the Kairanga Creamery?—Possibly seven hundred cows.

30. Is there any other means of getting rid of your washings than by that drain?—No, I do not think there is any other means. If you close that you will close the creamery.

31. Do you know of any factory that varies the drain or the channel by which its washings go away?—Yes. I am acquainted with a good many creameries, you know.

32. Would you think it a good plan if there were two channels by which the washings could be taken away, and when one channel had been used for a little while and was getting a bit soapy the other channel could be used?—I scarcely think there is anything in that.

33. Would you be surprised to know that in a factory right in a town that method is used with great success?—Yes, I am rather surprised at it.

34. *Mr. Buick.*] Where your Kairanga Creamery is situated it is all level country?—Yes.

35. And you say that you drain for some chains down a road?—Yes.

36. Is that the Longburn–Campbelltown Road?—The Rongotai–Longburn Road.

37. You said that the drainage goes into a swamp. Does it not really go into the Bunnythorpe–Kairanga Road drain?—No, it goes into what we call the reserve drain that bounds the back of my property, and after a while it goes into the Bunnythorpe–Kairanga drain.

38. It does not drain out on to the swamp—it goes into the Bunnythorpe–Kairanga drain?—Oh, yes, it goes into the main drain.

39. And empties out into the Manawatu?—Yes.

40. *Mr. Baldwin.*] As a matter of fact, this drain runs for several miles through Mr. Pearce's property down in the Tanui?—That is so.

41. He has never made any complaint about that water, has he?—Never, as far as I am aware.

42. As a man keenly interested in the dairying industry, you agree that the welfare of dairy-farmers is of considerable importance?—I do.

43. And you tell us that you think that every precaution that responsible Departments suggest should be taken to keep the water pure?—Yes.

44. *Mr. Sykes.*] Do these creameries of yours exercise the same care with regard to the washings as you do at the main factory?—Yes.

45. The washings are not allowed to go down the drain, are they?—Very little. I am not prepared to say that none goes down, but as small a portion as possible.

46. *The Chairman.*] Do you really fear prosecution on the part of anybody?—No; but a judgment has been given by the Chief Justice against the pollution of streams by flax, and we as dairymen consider that that would apply to us: if there is pollution from the flax, the settlers may say there is pollution from the dairies. As soon as ever that happens we must close up. That is why we are here to-day—to ask you gentlemen to make some provision in your Act; in fact, the Bill that has been drafted we approve of. If you put the matter under the Health Department I do not think a dairyman will find any fault.

HERBERT HUNT, Chairman of the Rongotai Dairy Factory, examined. (No. 11.)

1. *Mr. Nathan.*] You have no creameries working?—No.

2. You have had considerable trouble in the past with the drainage of the factory?—Yes.

3. You tried septic tanks?—Yes.

4. They were a failure?—Yes, a flat failure.

5. They were tried under the direction and supervision of the Health Department?—Yes, at the latter end. At first we went out "on our own"—in fact, the then chairman went to Masterton to see a septic tank that was in operation there, and we practically copied that. That did not act, and then we appealed to the Health Department, and we carried out a few minor instructions that the Health Officer gave us, but it did not act then, and we were told that the necessary bacteria were not present to make it act. Consequently the thing was a failure, after we had spent a lot of money.

6. The drainage of the factory now goes down a small drain and through various settlers' properties?—That is so.

7. The first man's property that it goes through is your own, is it not?—Yes—that is, in open drain.

8. You pipe it down to a certain point, and then take it down in an open drain?—Yes.

9. And then it goes four or five miles before it empties into the main drain?—It goes 199 chains before it empties into the main drain.

10. And how far does it go in the main drain before it reaches the Oroua River?—From the main factory to the Oroua River is about seven or eight miles.

11. If your farm was sold and the person who bought it was antagonistic to the Rongotai Dairy Company he could get an injunction and restrain them from draining in that particular direction?—I believe so.

12. Is there any other way in which they could drain?—Not that I am aware of. The only other possible way in which the Health Department advised us to drain was to put in about four miles of drain to the Oroua River, and we could not attempt that on account of the expense.

13. Before the drainage from the factory goes through the pipes you have a collection of the grease, have you not? It passes through what is called a grease-sump, which has the effect, I understand, of catching the grease?—Yes, it collects a lot of the solid matter, and prevents that from going through the drain.

14. And that solid matter is collected periodically and burnt?—Yes, or buried.

15. Have there been any complaints from settlers below you about this drainage from the factory?—Formerly there were numerous complaints, but, like myself, those making the complaints were nearly all interested in the well-being of the factory. But for that reason I believe we should have been stopped.

16. As one interested largely in the dairying industry, have you any objection whatever to conducting your drainage-works under regulations framed by the Health Department or Stock Department?—No.

17. You appreciate the fact that if you are committing a nuisance you are prepared to pay for the damage? You are prepared to do your best to work the drainage of your factory so as not to be a nuisance to anybody?—Yes, we are doing that at the present time. We are practically working under those conditions at the present time.

18. All that you support this Bill for is that you do not want anybody who may be antagonistic to you to get an injunction against you?—That is so.

19. Have you tried to dispose of the drainage of your factory by means of what might be called a sewerage farm—that is, letting the whole of your drainage go over a certain area of land and soak away?—No, we have not tried that. We have often thought about it, but the nature of our soil has always, we have considered, been against such a remedy being possible.

20. That is, your land is a heavy clay land?—Yes.

21. And the water would never soak away?—No.

22. So that really there is no method of dealing with drainage but the method you are employing?—That is so, so far as we can find.

23. Have you noticed, from the drain going through your property, any ill effects on the stock?—None.

24. They use that water for drinking purposes?—They can use it. They have used it.

25. And you have had no ill effects?—None whatever.

26. *Mr. Sykes.*] Is the drain that you speak of used solely for the purpose of conveying the refuse-water through your paddocks, or is it a drain that is used for the purpose of draining your land?—It is used for the purpose of draining the land as well.

27. Therefore there is other water in it?—Yes, artesian water running into the drain.

28. Yet you are really led to believe that if you farmers were not interested in this factory you would have objection raised occasionally to the smell?—Yes; I have not the least hesitation in saying that if a sheep-farmer bought my farm he would immediately take steps to stop the drainage going through. If the sheep got in, the wool would be rendered practically useless.

29. Is there a noisome smell emanating from the drain during summer-time?—Yes. It is not quite so bad now since we have made every attempt to prevent the solid matter going down; but there is a smell.

30. This is the only available means you have of draining away the refuse-water?—Yes.

31. *Mr. Baldwin.*] You, as a matter of fact, have taken every precaution to prevent this water being rendered unfit for use?—We have attempted to do that.

32. Everything the Public Health Department suggested to you you have attempted to carry out?—As far as I remember, when we had the Public Health Officer there he told us there was only one remedy, and that was that if there was a complete drainage system from the town by which the nightsoil could be put into the tank it might work.

33. Apart from that, you have taken every step that you have been advised to take to render this effluent harmless?—Yes.

34. You think that is a right and proper position to take up with regard to the people into whose water you drain—that they are entitled to ask that you should take every precaution?—Yes.

35. *The Chairman.*] You say that your refuse goes first into a pipe?—Yes.

36. What distance?—44 chains, I think, is the distance of the pipe-line.

37. What sort of piping is it?—They are ordinary glazed drain-pipes.

38. How long have you been using this pipe?—We have been using the present one about four years.

39. Is there much fall?—No, not much.

40. Have you had any trouble through the pipes blocking?—Yes, formerly we did. This is the second pipe drain we have had. The first one we had considerable trouble with, but this being a new pipe drain we have not had so much trouble with it. It has been better constructed, it has not had the same time to block up, and we have endeavoured to prevent the solid matter going into it.

41. Supposing you had several open drains leading away from the factory, and you used them alternately for two or three or four or five days, as the case might be, and at a given distance all these drains converged into the channel that takes your drainage away now: do you think that would be any improvement?—I do not think it could possibly be, situated as we are, for the simple reason that we are right in the town, and the soil is of such a clayey nature. It would depend on how far apart you put those drains. The action of the drainage through those drains would have the effect of undermining, and they would fall in together. Anyhow, we could not provide the land to put in a system of drainage like that. We could not leave them open on account of people and stock falling in.

42. At a factory in Featherston, taking the milk from seven hundred cows, they have two open drains, half a mile long, leading to a creek. These two drains are used alternately, one being allowed to dry and sweeten while the other is in use; and there is no smell that anybody has ever taken notice of. Do you think you could apply such a system as that to your conditions?—No, I do not.

43. Where do you find the greatest amount of nuisance in your one drain—close to the factory, or at what distance?—At the end of the pipe drain.

44. Proceeding along, does the nuisance abate altogether?—Some distance down.

45. What distance?—Perhaps a mile.

46. Then there is no nuisance after that?—Nothing to hurt any one. But in our case a system of drainage like that would be impossible, because the pipe enters a drain that goes through a reclaimed swamp full of timber, and it would be a hard matter to duplicate that drain.

47. On account of there being so much timber?—Yes.

48. You have never tried spreading your washings on the grass?—No.

49. Do you wash all the cans at the factory?—No; there are no cans washed at the factory at all—only the separators and the churns.

50. That is all the washing you have?—Practically.

51. Supposing you were able to spread your washings on the grass by some system of spraying, or something of that sort: with the great evaporation in the summer-time, do you think that would answer?—I do not think it would.

52. Supposing that damages were given against you under the new Bill, how many farmers along this great length that you unfortunately have to carry your washings would be claimants upon you?—About seven or eight, before we get into the main drain.

53. Would there be any complaint on the part of those along the main drain?—I could not say. They would have the same cause, I dare say, but to only a limited extent.

54. *Mr. Buick.*] Does the effluent affect the main drain?—No.

55. Can you see any effect from it in the main drain?—You might find traces of it in the middle of summer when the water is very low.

56. *The Chairman.*] The nuisance is practically within a mile?—Yes.

JAMES BAIN ROBERTSON, Chairman Bunnythorpe Dairy Company, examined. (No. 12.)

1. *Mr. Nathan.*] I understand that you are going to work casein at your factory?—Yes.

2. You had complaints about the drainage of your factory from a certain section of the people up there?—A complaint from one person.

3. Who is not interested in the dairy?—No, he had no stock, as far as I know.

4. You are draining into the Mangaone Stream?—Yes. It eventually goes into the Manawatu River through Jack's Creek.

5. When you had this complaint you consulted the Health Department?—Yes.

6. And they reported there was no nuisance?—The Health Officer examined the water, and told the man there was no nuisance.

7. You did purchase land for £100 to mitigate what nuisance there was as far as possible?—We bought an acre of land so as to safeguard our drains into the main drain, and I suppose the price of the land for farming would have been about £25 or £30. It was no good as a town section, because it was partly flooded with Jack's Creek.

8. It is absolutely impossible for the factory to drain in any other direction than that in which it is draining?—That is the natural channel. It is the only drainage there is there.

9. You are alive to the situation that any person on this Mangaone Stream adjacent to your factory could prevent you from polluting the water by running your drainage into it?—Yes.

10. You have a creamery situated on the Aorangi Road in the Aorangi Settlement?—Yes.

11. The drainage from that creamery goes down a drain through Mr. McFarlane's property?—Yes.

12. Through a private drain?—Yes.

13. Mr. McFarlane is a director of the company?—Yes.

14. If he sold out to some one who did not have the interest of the Bunnythorpe Dairy Company at heart, that person could shut up the creamery by stopping your drainage?—Yes. We have another way by which we could put the drainage into the same creek.

15. It would still have to go into that creek?—Yes.

16. You cannot drain in any other direction than that in which you are draining?—No.

17. So that if anybody did purchase this property you could be stopped there?—Yes. It is different land at Aorangi from Bunnythorpe—it is very porous; and we clean the drain out occasionally by throwing the stuff up on to the land, and it seems to get right.

18. How much of the drain do you clean out?—About 5 chains, I think.

19. And beyond 5 chains from the creamery there is no smell or odour?—Not so far as I know. We have had no complaint from the settlers round there.

20. Speaking as one who is interested in the industry and holding a responsible position in connection with a co-operative factory, you are prepared to carry out any regulations, and would welcome any regulations issued by the Health Department or Stock Department for the supervision of the drainage from the butter-factories?—Yes. We built a new dairy about two years ago, and we sent to the Health Officer at Feilding to come out and make any suggestions, and we followed his idea. We have no open drain at the factory. The drainage goes through a blind creek. The vegetation is growing there, and the Health Officer advised us to leave it to soak through. There is artesian water flowing there, and we have practically no nuisance at all. We have a fat-collector.

21. *The Chairman.*] You have no closed pipe carrying away your washings?—We have a closed pipe leading into this blind creek, about a chain from the factory.

22. Has that been at any time choked?—No, it is all practically new. We have drain-traps and all, according to the Inspector's requirements.

23. How far from the factory is the creek into which you discharge?—About 100 yards.

24. There is nothing running in this drain to the creek in the summer-time except your own washings?—The washings and the artesian water. The artesian overflow is running all night.

25. How far from the factory is the nuisance that was complained of by this one man?—About 300 yards or a quarter of a mile away.

26. How far does this man live from the factory?—He lived there—about a quarter of a mile away.

27. The milk of how many cows is put through the factory?—We put through 3,000 gallons at the main factory. I could not say from how many cows.

JOHN ARTHUR CHEETHAM, Chairman Awahuri Co-operative Dairy Company, examined. (No. 13.)

1. *Mr. Nathan.*] You have had a considerable amount of trouble at your factory with the drainage?—They had trouble some years ago.

2. An injunction against you?—There is an injunction out against us.

3. You drain into a blind creek?—It is not a blind creek. The creek runs, I suppose, for three miles, and then empties into the Tanui Stream.

4. You got over the injunction by providing other water, by means of artesian flows, for the people who complained?—That is so—the two people who were near the factory. We provided artesian flows for them, and for the time that ended the trouble.

5. You have no other means of draining than in this particular direction?—I do not see where we could drain except into that stream. We should be draining uphill if we tried anywhere else.

6. You could not buy a section of 5 or 10 acres of land and run the stuff over that?—I suppose we could buy some land, but it would be a very costly business, and in view of the nature of the land I think it would not act very well.

7. You would possibly create a greater nuisance than now, and to a greater number of people, if you did so?—Unless we carried the drainage a considerable distance away, the nuisance would be felt by the public on the road.

8. You have no objection to meeting any complaints by providing other water for them, by means of artesian or otherwise, if you are polluting their water?—None whatever. I may say that at the present time we are threatened by a man lower down the stream that he will take action against us unless we stop the drainage going down. We are quite prepared to meet him by keeping as much out of the creek as we can, and by finding other water for him.

9. That is to say, you do not want to shirk your responsibilities at all?—No.

10. But if there is an injunction granted against you, the business of your eighty suppliers is stopped?—Yes.

11. You are prepared to pay for damage and provide water and mitigate the nuisance?—Yes.

12. *Mr. Sykes.*] You say you are threatened with Court proceedings by a settler?—A man has threatened that if we do not stop running the drainage from the factory into that stream he will take proceedings against us.

13. He is not a dairyman?—No, he is not interested in the factory.

14. The milk of how many cows comes into your factory?—From twelve hundred to fourteen hundred.

15. All butter?—Yes.

16. No outside creameries?—We have no outside creameries.

17. You say you are threatened with an action if you continue putting your washings into that stream. Have you any other stream than that one into which you could drain?—None whatever.

18. What do you do with your skim-milk?—It is all carted to the suppliers' homes.

19. You have nothing going into this creek except washings?—Just the washings of the floor.

20. How far is the stream from your factory?—We carry the water from the factory in a pipe drain, with concreted joints, across the Rangitikei line, and for perhaps 3 to 5 chains into this stream.

21. How long have you had that drain at work?—As far as I know, since the factory has been in operation.

22. Drains get blocked sometimes: does this one give you any trouble?—We have traps in the drain, and we draw wires through the drain to keep it clean; otherwise it would get stopped up.

23. The nuisance, then, can only be in the creek?—It is in the creek.

24. How far do you find that that nuisance extends along the creek?—It may extend for a matter of about 10 chains from where it discharges.

25. Not farther?—No, so far as I understand.

26. Is there much water in the creek?—During the winter and the spring there is a considerable amount of water. In the summer-time it dries up altogether, except for the overflow from the artesians.

27. And it is then that the trouble arises?—It is in the summer-time when there is no water in the stream that the trouble arises.

28. Supposing you had some cheap system of spreading the water on paddocks attached to the factory, how do you think that would act?—We have no paddocks in connection with the factory. We had to extend our property a little, and we had to pay very dearly for the land, and we should have to pay very dearly for any land that we required for that purpose. Ours is very wet, heavy country, and I am afraid it would cause a lot of trouble unless we carried the effluent a long way from the road.

29. You do not think evaporation would be sufficient?—I do not.

30. There is a factory in Featherston, taking the milk from seven hundred cows, that discharges its washings into a creek half a mile off, not through a pipe, but through two open drains and they use these drains alternately. They are right in the town, and have never had any trouble. Do you think that the smell is largely created in the pipe, through confinement from the air, and is noticeable at the discharge and along the creek?—In the first place, we have to carry the drainage over a public road 2 chains wide. We have no outlet except into this stream, and I do not think we could possibly carry out that system.

31. *Mr. Baldwin.*] You are satisfied with the law as it stands, except with regard to this question of injunction, are you not?—That is so.

32. You think that if you were prepared to pay the damage and satisfy the Court that you had done everything the Health Department or the Stock Department required, you should not be stopped by an injunction?—Quite so.

33. *The Chairman.*] Have you made any inquiry from chemists as to whether or not the fat in the washings, which creates the nuisance, could be neutralized and rendered innocuous in that way?—We have not made any inquiries as to that.

JAMES PROUSE, Chairman of the Levin Co-operative Dairy Society, examined. (No. 14.)

1. *The Chairman.*] Would you like to make a statement?—I desire just to say that I agree with what has been said, and to cite one particular instance. We have a creamery at Linton, and we had a farmer just below the creamery, and he told us that he was going to take action against us—that he was going to have damages and an injunction. We did everything possible. When he thought the time was ripe he approached the County Council, and they sent us notice that if we continued to allow anything to go into the water they would have us fined. So the ratepayers waited upon the County Council and asked them what they meant. The company invited the Health Officer to come up and see. The Health Officer stated that this farmer particularly and other farmers were defiling the water very much more than the factory was, and that the water we put in was doing no harm whatever. What we want is that a community shall be protected against a man like that.

2. *Mr. Nathan.*] You are quite prepared, then, to be governed by regulations laid down by the Health Department or the Stock Department?—Certainly. The Department saved the situation that time for us.

3. You do not want to shirk your responsibilities?—No.

4. You are prepared to pay for any damage that you may create?—Yes.

5. *Mr. Buick.*] From what you say, you look at it that a cantankerous neighbour could use the present law to levy blackmail?—That is the point. Further, we ask that the Health Department and the Agricultural Department, when the settlers have invited them to inspect the spot and pass the proposed buildings and the method of procedure, shall defend the industry.

6. *The Chairman.*] Supposing this complainant who threatened to apply for an injunction did so, and you had the evidence of the Health Officer that you had committed no nuisance, what chance would he have of an injunction?—Well, we made this man good offers; but after that we heard no more about it. He could have helped himself to very good things but he got nothing. The Health Department saved the situation in that instance.

7. Did the evidence of the Health Department silence him?—It certainly did.

8. *Mr. Buick.*] Was that before or after the late lawsuit?—It was before that we were threatened.

9. *The Chairman.*] How do you get rid of your washings?—A considerable amount of water is used for the ammonia-tank, and it is pure water. We run the pure water into the water-races running alongside the factory, and it is not polluted in any way. There is no pollution in the sense of polluting water in a factory. Whatever has any solids in it goes down to the pig-farm, and there is nothing lost.

10. Your washings are carried away by the stream?—The overflow water goes down, but it is only washings, and the silt is valuable for the ground, and it can be cleared out of the drain that it goes down. The feeding-material, which would make a smell, goes down to the pig-farm.

11. But we have had evidence that the washings create a great smell?—That is the washings of the cans.

12. Of the floor?—No, because the floor will be clean.

13. You wash the floor once a day, do you not?—Yes, but you do not expect to have any milk running over your floor. In our case the fairly clean water runs down the water-race, and we have never had any complaint about it. The other water, which has heavy washings, goes down to the pig-farm.

14. Have you read the Bill proposed by the Government?—Yes.

15. Supposing we introduced the Health Department, or some pastoral authority like that, to be the arbiter, do you think that would put you in a safe position?—I certainly think so.

16. *Mr. Sykes.*] I presume that a large quantity of water is used in connection with a butter-factory?—Yes.

17. Especially in relation to the ammonia-tank?—Yes.

18. The little milk that spills on the floor would really only discolour the water when it leaves the factory?—Yes, scarcely that.

FREDERICK JOSEPH NATHAN, Manager Defiance Creameries and Factories, examined. (No. 15.)

Witness: I have a telegram here which I should like to put in: "Regret did not receive letter in time attend to-day. Feel strongly something should be done by Parliament relieve present intolerable position. Grave danger to dairy industry.—LAW, Chairman Shannon Dairy Company." [Telegram put in.] I wish to make a statement regarding this matter before the Committee, because I suppose that we as a dairy company have possibly had ten times as much trouble as any co-operative concern in the district—largely because of the fact that we are a proprietary concern working, in many instances, in direct opposition to a farmers' co-operative butter or cheese factory in the same district; and we have aroused the enmity in some cases of certain people, and they have just made it as hot as it was possible to make it to prevent our carrying our drainage through their properties. I concur with what all the witnesses this morning have stated, that not for one minute do we want to shirk any of our responsibilities; that if we are creating any damage or nuisance we are prepared to pay for it; that we are prepared

to carry out any improvements that may be suggested by the Health Department or the Agricultural Department. Over many years' experience in managing the company we have had to consult the Health Department, and we have always taken their advice. It has always been given to us readily, and they have to a large extent saved us in many instances. What we object to in the present law is that an injunction is the first resource instead of the last. We think it ought to be the very last resource. Why we take such interest in this Bill, and why the matter has been brought so much before the public, is because of the decision given by the Chief Justice recently. The legal position was well known to all of us who had studied dairy matters at all, but the decision seemed to point out to the public how very simple a matter it was to get an injunction. No one knows how serious a matter an injunction can be except those interested in the dairy industry. Now I propose to give you certain instances to show how we have suffered, and that we have done our utmost to get over the trouble. The first instance I propose to quote is the Makino Butter-factory, where we bought an easement to drain through a small farm at the back of the factory, and then we ran the water into the Makino Stream. The Health Department were written to, and we were summoned and we paid a fine. We had nowhere else to run the water, and we hoped for a wet autumn, when there would be no nuisance, and so we went on doing it, and we were fined again. So we approached a farmer there, and he allowed us, for the sum of £1 per month, to build a huge dam; and when I tell you that the residue from this factory would amount to from 2,000 to 3,000 gallons a day, you can see that we would want a very large dam. We used to hold the stuff from the factory in this dam until such time as the creek was in flood. The season afterwards was very dry, and we got into trouble again. Meantime we had approached the Feilding Borough Council to connect us with their system. They were frightened that our effluent would affect their septic tanks, and they refused. When we had this trouble in the dry season I approached them again, and offered to find the money, and the Health Department were good enough to write and point out that it would not affect their septic tanks. We had to find the money—we are going to get it back some day—and then allow ourselves to be rated to the extent of £25 a year, and they put the connection a mile up the street, so that our drainage could go into their septic tanks. We had to find £800. If they had not done that there would have been nothing for us to do but to shut up our factory and go somewhere else. At Bunnythorpe we have had more trouble than anywhere else. We put up a dried-milk factory there and a cheese-factory. A certain amount of the powder is wasted in the cylinders and dissolved in the water, and eventually goes down into the drain. We have been threatened with injunctions there, and we have had to pay pretty dearly to keep them away. We tried a septic tank there. We tried settling-tanks. Then some man came over from Africa. He came accredited from Johannesburg, with letters saying that he had done all sorts of wonderful things. Well, it cost us £90 to find out that his contrivance was no good at all. Altogether we spent £600 or £700 there in tanks, and besides that we are running the overflow of two artesian wells down the creek to endeavour to keep it clean. One man down on the Mangaone Stream eventually complained that it was a nuisance, and I offered, on behalf of my company, to sink him an artesian well to replace the water that we were injuring. He would not take this, and said he wanted money. Eventually we compromised. The amount it cost us was, I think, £175. Then we got the Road Board to straighten the winding stream alongside the road into a straight drain; and we got a settler to agree to the diversion of the water through his property, and instead of a winding stream choked by rubbish we dug a straight drain. By doing that we were able to remove the whole of the water from the roadside, where it was a nuisance. But between the road and the settler who gave us permission to dig this drain there was one person who had three-quarters of an acre of land. Half of it was on the side of a hill; the half in the flat was divided twice by this blind creek. He demanded that we should restore the water to where it had been. He further claimed that we were polluting the water. We offered to buy this three-quarters of an acre for £40 or £50. He would not sell. We offered to buy it at a valuation, we appointing one valuer, he appointing one, and those two appointing another; and we proposed to give him 10 per cent. more than the valuer said the land was worth. We offered to lease it for ten years at 1s. 6d. per week. He would not agree. He sued us for damages. When somebody suggested that he should get an injunction and stop the nuisance, he said No, he was going to get damages out of Nathan every month, and after he had fixed Nathan he was going to fix the Bunnythorpe Co-operative Company. I think it was pretty well proved in the Magistrate's Court that this valuable section cost him £4. He said he wanted it to use for a tannery. I do not know what sort of a nuisance that would be. He got £5 damages for pollution, and he has not sued us any more. But that is our trouble, and that is what we are up against at these particular points.

1. *The Chairman.*] Did he have to pay his costs?—Oh, yes; he lost money over the deal. But we are always up against it. That man can go for an injunction now, and that is the injustice of it. The man lives in Wellington; he does not live there at Bunnythorpe at all, but people write and tell him there is a smell. The reason for his action was this: he owns three-quarters of an acre with a small house on it close to where these Bunnythorpe people are, and he wanted me to give him, I think, £800 for it. I said No, I would buy this piece of land, and he said one piece was no use without the other; yet they are over half a mile apart. What we want is protection against a man standing out like that. It is purely blackmail on a dairy company; and we want that protection. At the cheese-factory at Whakaranga we have bought the drainage rights from the farmer adjoining us. We have to run the water right away into a large disused gravel-pit, and then we get rid of it when the creek is in flood. At the eight or nine creameries that we are working there is no question that we are breaking the law at every one of them, because we are simply putting the refuse from these creameries into the road-drains. We are not doing any injury to anybody, but there is very little doubt in my mind that as the

law stands we can be stopped from doing it. We are not stopped from doing it because those in authority on the local bodies are in many instances dairy-farmers themselves and are interested in the district. We have always received every possible assistance from the Health Department here, and so far as we know all the dairy companies are perfectly willing to work under regulations that will give them security of tenure. It is almost impossible for us to deal with the drainage in any way other than the manner in which the factories are dealing with it. Speaking generally, there is only a fall in one direction, and it is only in that particular direction that we can send the drainage. So far as holding the drainage on land and letting it evaporate is concerned, we had an experience of that at the dam at Makino. I do not think you would like to go within a chain of it, because the smell gets very bad when you have a big collection of the fluid from these butter-factories. I do not think that I have anything further to say. Seeing that some dairy companies are interested in casein and that we are interested in dried milk, I should like to see the interpretation of "waste products" altered somewhat in this way: "'Waste products' means the waste products of any factory dealing with milk or any of the products from milk," and so on. I think these other factories should have the same protection as the butter and cheese factories.

2. You do not think that the Bill applies to them?—I think it is doubtful, and I think it should be made clear. It will cost us at least £8,000 for our dried-milk factory, and we propose to erect a dried-milk factory at Taikoroe this summer that will cost us at least £8,000; and we feel that we should get the same protection for our dried-milk factory as the butter and cheese factories.

3. *Mr. Buick.*] It has been stated that it would be possible to prevent the nuisance by spreading the effluent over a paddock and ploughing the paddock in. Have you any knowledge of that being tried?—At Bunnythorpe, when this trouble was on, the dried-milk factory was burnt down, and we had something like 2,500 gallons of milk, and the farmers refused to take the whey home. We advanced money to a man to buy twelve acres of land and gave him the money to buy pigs. Then we had to pay him £3 a week to take the stuff away. Then the people complained that there was a horrible smell, because it only killed the grass and would not run away. The country was of a clayey formation, and the ground simply would not absorb the stuff. Certainly, in the Manawatu district that method would not be a success.

4. *The Chairman.*] You mentioned the dam at Makino and its filthy state as proof that putting the effluent on the land would not work; but assuming that it was possible to spread it on an ordinary grass paddock, and the quantity was cut down as far as possible consistent with washing the factory once a day, do you think that evaporation could deal with that limited quantity?—I do not think it is practicable.

5. Do you know of anybody who has tried it?—No, the only books I have read on the subject are American literature, and in America they are well ahead of us in dairying matters. Their method is as follows: They take a large field and lay out a section of it in a main line of pipes, and every 3 ft. they lay out section pipes, and these pipes are set half an inch apart. The fluid from the factory is run down the main drain and then taken down into the side drains, which are 12 in. under the ground, so that they can plough it. When they have done one paddock they go to another. It is a very expensive thing. The factories here have not got the necessary ground. I do not know of a single factory in the Manawatu that has got the land available to do as you suggest.

6. I meant that you might cart the stuff—as is done by watering-carts—and spread it on the grass, and thus save the buying of basic slag?—I think we would save half the basic slag. We tried watering the road with this water at Bunnythorpe. I think we have tried every way to get over the trouble. We spread it over the land, and that was a failure. We dammed it up in the hope that the sun would evaporate it, and that was a failure. We told the man when he was carting it away to cut holes in the tanks and spray the road as he went home. Well, they stopped us doing that.

7. *Mr. Buick.*] Have you tried underground pipes?—No, because we have not got the land.

8. *The Chairman.*] What would be the amount that you have had to pay in fines through the interesting experience you have detailed to the Committee?—I do not know.

9. How much better would you be under this Bill?—A very great deal better.

10. You would be fined every week, would you not?—No, certainly not; because the Department would say "Do so-and-so," and I should do it, and then I should be left alone. If they tell me to do a thing I will do it, but I shall not have to pay a lot of lawyers. They are an expensive luxury.

11. Supposing the Health Officer paid you a visit and with the best of intentions led you on the wrong track, as in the case of the Makino dam, that would not absolve you, I am afraid—the lawyers would get at you then?—That may be; but what hangs over our heads now and makes us such easy prey to the man who wants to get at us is the fear of an injunction all the time. If I have not got that fear I can be more independent.

12. *Mr. Baldwin.*] All that I understand you are afraid of is the injunction?—Yes.

13. You have no cause to quarrel with the law except in so far as the Court may restrain you, by injunction, from doing what you are unable to prevent?—We do not want to avoid paying reasonable damage if damage can be proved, but what we do object to is that the first thing a man can apply for, without going for damages, is an injunction.

14. That is your objection to what you imagine is the law. I have drafted here a section, and I would ask you to say, without absolutely committing yourself, whether you think it would meet your position. The section I suggest is this: "In any action relating to the pollution of water by waste products the Court shall, in lieu of granting an injunction, award damages, provided that the defendant shall prove to the satisfaction of the Court that the defendant has

adopted every method calculated to effectually prevent or diminish the pollution. Proof that the defendant has adopted the method, if any, prescribed by the Department of Public Health and the Department of Stock and Agriculture and the Public Works Department shall be conclusive evidence that the defendant has adopted every method calculated to effectually prevent or diminish such pollution." That would meet your point, would it not?—I think so.

Mr. Buick: Do you suggest that as an addition to the present Bill?

Mr. Baldwin: No, I will suggest it later on in lieu of certain provisions in the Bill.

15. *Mr. Baldwin.*] You have had to do with flax-milling, Mr. Nathan?—Unfortunately, yes.

16. You know from your experience that if the tow is discharged in large quantities into a sluggish river it has a tendency to cause obstructions in the river-bed, has it not?—I should think so.

17. And if these obstructions are sufficiently serious they may tend to the erosion of the banks of the river, and also to the flooding of the adjoining low-level land?—I am not an expert in flax-milling or river matters.

JAMES PROUSE further examined. (No. 16.)

Witness: I should like to make a short statement. Some fifteen years ago I was asked by the Timber Conference to write a paper on the conservation of forests, which met with the approval of the whole Conference, and was recommended to the Government. One of those suggestions was that when a bush lay at the back of another man's property the miller who desired to mill that bush should have the right, by paying compensation, to access, in order to bring that timber out. The great question in connection with the dairy industry is the drainage. I think it might be a suggestion to the Committee or to Parliament to make provision for the protection of the industry by inserting clauses to provide for drainage in the cases that have been mentioned by Mr. Hunt and others. The dairy industry is an industry that should be protected and helped. Some gentlemen came to me and said, "We want to put up a creamery." I said, "I stipulate two things—that drainage is provided for, and the site is suitable; and you can do what you like about the rest." In a question of this kind I should say that the proposals should go before the Health Department and the Agricultural Department, and they should say which was the best site in the interests of the industry. But some man, perhaps, will not let us go there. He will say, "I have got the best of the land, and that land is worth £50 to me, but I ask £500 of you people." Should there not be some method whereby the industry should be protected, while no loss was imposed on the individual?

1. *The Chairman.*] Would you make a statement on behalf of the sawmillers as to whether you wish any amendment of the existing law?—I have not looked into that question.

2. You have read the Bill?—Yes, but there is no mention of sawmills in it.

3. Yes; look at clause 2—"waste products"?—I see. With regard to a sawmill, the waste product from a sawmill is generally sawdust. If it is a fair-sized stream the sawdust goes down the river—in flood-time particularly—and mixes with the soil and improves the beaches along the course. If the stream is a small one, the sawdust will fill it up, and in that case it causes an injury. We had a sawmill in a place called Whiteman's Valley, about twenty miles from here, and after we had built the mill we were told that the sawdust must not go into the stream; so we fenced in a little swamp, and we fenced it in with barricades one behind the other, and the water ran into that and went through, and that settled the difficulty. With regard to fish, it made no difference whatever. There were fish in this creek. Sinclair's mill at Wainuiomata ran for years, and the sawdust went into that stream, and I have seen the fishermen 2 or 3 chains below the sawmill dressing the trout they had caught in the stream. But you must not put in rata sawdust; if you do it will kill the trout. If you put sawdust from white-pine or red-pine or matai into a fair-sized stream—say, 6 ft. wide and running 6 in. of water—it will not hurt the fish. If the stream is a little larger than that you can understand that in flood-time it sweeps the sawdust out on either side, and it makes lovely banks and improves the land. If the stream is bigger than that it is lost.

4. *Mr. Sykes.*] Of course, you are aware that sawdust is really dealt with now under the Fisheries Act?—Yes.

5. When this Bill speaks of waste products in regard to sawmills it is really dealing with the bark and odd pieces of wood and one thing and another that might get into the stream?—If the stream were a small one, or if it were a crooked one, the stuff would lie. If you left it to a certain Department to say whether a man was doing injury or not, I think that would settle the question. But if you say that no man shall put sawdust into a stream you are injuring an industry for the sake of, perhaps, half a dozen fish.

6. As a sawmiller have you had any difficulty in connection with this matter, outside of the case you mentioned?—No. At Levin we ran a mill for nearly twenty years. We took all the sawdust out and burnt it.

7. That can be conveniently done, can it not?—It could there, but it could not at all places. All that I as a sawmiller ask is that a case shall be judged upon its merits. If an injury is done, then the miller must pay or give it up.

8. I presume that sawmillers are familiar at present with the Fisheries Act?—Yes; I know that they must not put sawdust into a stream.

9. Therefore in the erection of a mill they take that into account, do they not, and avoid the need for putting sawdust into the stream?—If a sawmill is erected on the bank of a fair-sized river, and putting the sawdust in would not militate against the fish except to a slight extent, why should the miller be penalized in the interests of sport, when perhaps the sport would be worth only £10 to the community? If you say that no sawdust shall go in, a convenient site and the advantage of making a profit for the mill, which means a profit to all the workers, are to a certain extent lost.

10. *The Chairman.*] Is there any difficulty in the mechanical transmission of the sawdust out of the road of the sawmiller, without putting it in any stream at all?—That can be done, but there is no greater danger to a sawmill than sawdust, if it is stacked and gets alight. Every sawmiller has not an open paddock in which to burn it, and the great danger to most bush sawmills is fire. When the sawdust is put into the creek that danger of fire is overcome.

11. Do you know that stock strongly object to drinking sawdust water, especially if it is matai and other timbers strongly impregnated with acid?—That is so.

12. *Mr. Baldwin.*] You heard the clauses I read out to Mr. Nathan: are they satisfactory to you?—Yes, I think so.

THURSDAY, 10TH OCTOBER, 1912.

J. M. MASON examined. (No. 17.)

1. *Mr. Buick.*] What is your opinion about the flax-milling and the dairying industries: do you consider that the effluent they are putting into the rivers is doing any particular harm?—I think so, if the untreated effluent is put directly into any stream.

2. *Mr. Bollard.*] Do you know of any cases where human beings have suffered through drinking the water?—I may save time perhaps by saying that it is quite impossible for any one to contract typhoid from drinking water into which the refuse from a flax-mill has gone. You can no more produce typhoid organisms from flax than you can produce sheep from a paddock. At the same time, it is a well-known fact that cattle have suffered from drinking water into which the refuse from a flax-mill has been put—that is to say, if they have the courage to drink it, which they very often have not.

3. How do you account for their being fond of it, then?—They are not all fond of it. I have seen it produce diarrhœa, both in the human and the lower animal, if there is much of it drunk. But I would take my stand generally on the contention that where some treatment of the by-product can be effected that should always be insisted upon. No trade refuse should be allowed to go straight into a river if it be possible to treat it in any way at all.

4. *The Chairman.*] Will you first recite instances of injury, and prove that the injury arose from drinking flax-water, and then we can talk of the remedy?—But there is no doubt at all; you do not want an actual instance. In the case of the human animal you have only got to drink it. You will find it is loaded with vegetable matter and will produce diarrhœa. As a matter of fact, the old Maoris used flax-root as a laxative.

5. Did they subject it to any preparation by boiling the roots?—They burnt the root, very much the same as they do rhubarb-root now. They made a decoction of it, in many instances.

6. Are you able to tell the Committee that drinking the water running away from a mill in the usual way would have the same effect as the burnt root?—It would depend on the degree of dilution. If there was any considerable quantity it would produce diarrhœa. It produces it in animals and human beings.

7. Have you known of any case of illness on the part of human beings?—I have known cases of diarrhœa occurring in consequence of drinking water that has been polluted with the juice from flax.

8. Have you known of injury to the health of stock?—I have had reports put before me on that matter by men who were in a position to make reliable statements, and they assured me that the stock did suffer from diarrhœa. *A priori*, it is quite evident that if the human animal can be purged with it the other animal can too.

9. Have you known or heard of any death among stock through drinking this water?—No.

10. Have you any suggestion to make as to avoidance of this trouble?—Yes. I think that wherever possible the refuse from the flax-mill should be put upon land and the land subirrigated. The effluent should be allowed to leach through the land, which would practically act as a filter. The effluent would then get back into the river, and would be incapable of doing harm to any animal. By the way, does the word "animal" include "fish" in this Bill?

Mr. Baldwin: I should say it does not.

Witness: That would be the general interpretation, would it not?

11. *The Chairman.*] Do you know the Oroua River?—Yes; I have been up and down its banks several times.

12. Have you any idea of the general conditions—that is, the quantity of water, and the power of that volume of water to take away any quantity of flax-refuse that might be put into it?—I think a considerable amount of data was collected before the Feilding drainage scheme was started. You will probably find it in the old Health departmental files, because the question arose then of the effluent from the septic tank going into the river. I know that calculations were made.

13. Evidence was given by a witness here that in the case of his flax-mill the washing-water from the stripper went along a trough a few feet in length, which had at the end of it two wire traps, one of a larger mesh and another of a smaller mesh, through which the water had to pass, and these were for the purpose of arresting the flax fibre and pulp carried by the water. From this grating the water passed direct into the Oroua River. Knowing the Oroua River, would you think that such a method would be sufficient to prevent pollution of the river to such an extent as would injure the water for drinking purposes by human beings or stock?—The whole thing would turn on the question of proportion. If you allow one to do that, you have only got to multiply the number of instances, and you get a concentrated effluent. As a general rule, I should say that every effluent should be treated more exhaustively than that. That is a wise and a good thing; but if that effluent was made to travel over a bit of ground, by the time it got a few chains it would be almost innocuous.

14. Evidence has been given to us that where that has been done the flax-pulp deposited by this process has undergone putrefaction, and the water flowing over it has become really worse than would have been the case if it had passed out into the river without undergoing any filtration at all?—I should think it would if it were exposed to the air. But in such a case as that the solid part ought to be ploughed in—buried—covered with something. That is quite simple. If you allow it to lie exposed to the air it is bound to putrefy, and certainly it would smell more.

15. As to dairy factories, we have had evidence of a great deal of nuisance being created not by refuse milk or refuse whey, but by the washings of the milk-utensils and the small quantity of solid matter removed by the water. Could you suggest any chemical treatment that would neutralize the grease that creates this nuisance?—There have been many things tried. One firm that I know of spent a lot of money in trying to satisfy the requirements of modern sanitation, and I think their main difficulty was that they had not sufficient land—I mean, there was no want of effort. They did everything possible, and were honestly anxious to do the very best thing. But it does not matter how you precipitate this stuff, you have still got to irrigate a considerable piece of land with it in order to purify it. There seems to be only one way in which you can deal with dairy by-products, and that is by running as much water off as you can, and ploughing in the other and covering it up. It requires a considerable area of land, because the ground soon gets very soddened and sour.

16. How about in the case of clay land?—It would simply run over the top; that method would not do any good at all. None of the organisms that destroy sewage will live in clay.

17. Assuming the possibility of a powerful pump sending this refuse water through a spray nozzle and covering a lot of grass land in that way, do you think evaporation would get rid of it?—If you are going to that expense it would be better to put in a washer like they have at the meat-works, and collect all your solid material, and then put your water on the land.

18. How would you collect the solid?—By solidification—by cooling it down, the same as they do at the meat-works. They put the fumes from the digesters through a washer, and all the solid matter comes down in a sump.

19. Would it be possible to get the very minute solution of milk-refuse precipitated in that way?—I think so. It is only a question of money. This matter is albumen, with the exception of the hairs and the dirt from the cow, and the albumen is being coagulated, and it simply falls down like grease on the top. The only practical difference between the two is that in the case of the washer at the meat-works the fat is volatilized and immediately meets a stream of cold water, which coagulates it and drops it down.

20. *Mr. Nathan.*] If a grease-sump with three or four divisions of fairly large capacity was provided, and beyond the grease some coke filters were provided of at least six divisions, do you not think that that would take out most of the solids that might create a nuisance?—I think so; but the proper way to decide that would be to test the effluent.

21. Supposing that the effluent after that was slightly discoloured, do you think there would be anything in that effluent to cause any injury to stock after the effluent had travelled in a drain or a creek, say, 5 to 10 chains?—I am answering a hypothetical question. I should have to get the effluent and test it.

22. You stated that you had had evidence brought before you that the effluent from a flax-mill scoured the stock. I was wondering if the inquiries that your Department had made in the past had led in the same direction?—The effluent from a dairy factory would not produce scouring; it would probably produce something else.

23. But, to your knowledge, there is nothing that it has produced?—Not in stock; but we do know that unboiled washings from cans produce tuberculosis in pigs. We have overwhelming evidence in favour of that. In the one case you are dealing with the effluent of an animal; in the other it is a purely vegetable thing. The effluent from the flax-mill acts just as rhubarb does. In the other case, although the pollution—I mean the amount of suspended matter—might seem to be a great deal less, its potentialities for harm may be a hundredfold greater, because it may contain any of the organisms which cause ordinary disease.

24. You say that the washings cause tuberculosis in pigs: is it not true that the skim-milk which the farmers themselves use also causes that?—True.

25. When you were in charge of the Health Department, is it not a fact that you found that all dairy factories and dairy companies were anxious to work with the Department, and do all they possibly could to mitigate any nuisance?—Absolutely. I never came across a dairy factory that did not offer the best hand they could to us. Your firm particularly went to very great expense; and when we could not get the money from the central authority to conduct our experiments, you paid for the experiments.

26. *Mr. Baldwin.*] You know the process of arriving at the purity of water by a test as to the oxygen absorbed?—Yes.

Mr. Baldwin: Dr. Maclaurin was, in the Palmerston cases, employed by the flax-millers to analyse certain samples of water taken by the flax-millers in the Oroua River when three mills were running and when the river was in a fairly high condition.

Mr. Broad: Excuse me, but that is not correct.

27. *Mr. Baldwin.*] I will put it in this way: Dr. Maclaurin stated to the Court that he found that where the water reached the first mill it was a bad drinking-water, and where it left the third mill—the last mill—the water was unfit for human consumption—unsuitable for human use. What, then, would be the effect if the number of mills was doubled and the volume of water divided by four?—It would be very much worse.

28. Would the result be a serious one, from the point of view of health?—It is so already, apparently, from the evidence of the doctor, if he says it is absolutely unfit for human use.

29. He says, "unfit for human use;" "unsafe to wash dairy utensils;" "unsafe to use for

butchering." Taking that case of double the number of mills and a quarter the volume of water, would the state be an alarming state?—Yes. The one evil is an alarming one, and should not obtain.

30. Dr. Maclaurin was asked as to the effect upon the milk of drinking highly decomposed water of that sort—decomposed with this vegetable matter. In human practice, have drugs administered to the mother any effect upon the milk?—Yes.

31. In human practice, would the drinking of water in that condition have any effect upon the milk of the mother?—It would have this effect upon her, that she probably would get diarrhœa, and her supply of milk for the youngster would stop. But unless you get a chemical something or a specific organism into the mother you will not influence the child otherwise.

32. The effect of it would certainly be to deteriorate the supply, both in the quantity and the quality of the milk?—I should say so.

33. Supposing milk was left to cool close to water highly decomposed with that vegetable matter, would it have any effect on the milk?—It certainly would. It would taste the milk undoubtedly, because there you get the transmission of a chemical something. A smell, practically, is ponderable—is a something which passes from a heap to one's nose, and if it can pass from the heap to a person's nose it can pass from the heap to the milk.

34. Seeing that the bulk of the damage done by this flax-pulp, as we call it, is on account of the decomposition of the vegetable matter, do you think that some scheme of running the water over a long-enough race of very fine mesh wire netting, and then putting the residual effluent through a charcoal filter of considerable size, would minimize the evil?—You are speaking of the residuum; it would not go through a filter.

35. I am talking of the water; I used the wrong word. After collecting all the vegetation you can in your strainers, if you run the final water through a charcoal filter, do you think that would be effective?—I do not think so. Destruction of sewage is practically all done by putrefactive organisms, and they need suitable food; they cannot live on vegetable matter alone. You would probably find that what would happen would be that your filter would clog up with the vegetable seeds dropping upon it. In a short time you would get the whole thing grown over.

36. But the collection of the bulk of the vegetation would considerably minimize the damage?—Undoubtedly.

37. Does the proper filtration, by modern methods, of the effluent from a septic tank have any effect?—Yes.

38. And the effect would be?—It depends. Typhoid-germs have gone through the whole gamut of a septic tank. But, generally speaking, what the tank does is to produce an effluent which is easily disposed of. If you had typhoid going in at one end, you certainly would not run the effluent into a water-supply. But, provided you have no disease-producing organisms going in at that end, the effluent, generally speaking, is easily disposed of.

39. Is water, with this decomposing vegetable matter in it, a favourable environment for the increase of germs such as typhoid-germs?—No, I should say it was the other way about, because you are getting a very acid medium, and the poor beggars cannot grow in that.

40. You would not be surprised, from what you have heard in your experience, if witnesses here told you that they had lost considerable numbers of stock from drinking this flax-water?—No, provided the solution is fairly concentrated.

41. Supposing a river charged with this water backs up on to the land and leaves pools which are slightly evaporated and then drunk by stock, you would not be a bit surprised at stock absolutely dying from it?—No.

42. *Mr. Broad.*] If any clean river-water is allowed to stagnate on land at flood-time, it will have the same effect—if there is no flax-refuse in it at all?—I think not. Suppose you take clean water from a river and you put it on the land, and you expose it to the sun in a pool——

43. Flood-water?—Flood-water. You put that in a pool. The first thing that happens is that you get a settlement of the inorganic stuff—the stones. It will all depend on how long you keep the water in the pool, but for days or even a week the water ought to remain good. I am assuming that the water was clean when it went in.

44. Flood-water is generally very silty?—But then the silt is really clay and inorganic matter.

45. *The Chairman.*] Are you aware that in Australia thousands of cattle and sheep are watered all the year round from stagnant water?—Yes.

46. And there are no deaths from it?—They do occasionally get diarrhœa towards the end, when it gets a little more concentrated.

47. *Mr. Broad.*] You said just now that you had heard of stock being affected through drinking water that is polluted with flax-refuse. Have you ever heard whether that is young stock or old stock, or whether it is both?—I only know this by reports which I have had, not of my own knowledge. The probabilities are that the young stock, when they get their first drink of it, have not acquired any immunity at all; the older animals have got accustomed to it.

48. Putting young stock on to rich land: would that have any bad effect on the stock?—Undoubtedly.

49. Would it scour them?—Yes; the symptoms would be largely the same.

50. There has been a good deal said about the vegetation-water going into the rivers. Would not the effect of dead carcases of sheep or horses or pigs being put into a river by farmers be to breed typhoid?—The curious thing is that you cannot give typhoid to any of the lower animals, so if they have not got it they cannot give it. The only way in which milk as a general rule carries typhoid to the customer is by reason of the impure water which the dairyman uses to wash his can or to adulterate his milk. The cow itself cannot give it.

51. But dead carcases in a stream would render that water unfit for human consumption?—It depends on the number. Take the Thames, for instance. The sewage of several towns goes

into the Thames, and there are dead carcases, and yet it is drunk. The whole thing is a question of proportion. Unless the farmers along the side of the river are anxious to pollute the stream and throw their stock in, it would be very difficult for them to contaminate to any great extent a river like the Oroua. The flax-miller is putting something in regularly; the farmer only occasionally throws in his dead stock.

52. Are you acquainted with the working of a flax-mill?—Yes, to some extent.

53. Do you know the quantity of water that would go into an ordinary mill in a minute?—I have not got that data with me just now.

54. You suggested a remedy. Are you acquainted with the quantity of water that would be going in and coming out per minute, showing that it would require such a huge area of land to do as you suggest that it would be quite unworkable?—I do not think it would. I know that one flax-miller, where there was an undoubted nuisance, did plough in all his solid stuff, and the nuisance was greatly mitigated.

55. Where was this?—Up near Levin. I think it was at Ohau. It is a good many years ago.

56. When that was done the industry was not what it is now, and was not turning out the quantity?—No; but I do not think that should advantage you, who, I take it, are looking after the interests of the flax-millers, because while his output increases his methods and his means of disposing of these annoying parts of his industry should increase too

57. Supposing that all the fibrous matter was kept out, and the vegetable matter only went in, by what percentage would the pollution, to your mind, be reduced?—Very, very greatly.

58. *Mr. Baldwin.*] You will understand that the questions I put to you dealt only with the pulp; they were based on the assumption that there was no fibre went in?—That is so.

59. *Mr. Broad.*] What I was trying to bring out was that at the time this was done that you mention, both were put in, whereas now the fibrous matter is kept out?—Yes.

60. Mr. Baldwin said that the Oroua River above the top mill was not good drinking-water, and he said that below the third mill the water was unfit for human consumption. Now, I took those samples. They were taken on the edge of the river-bank. Would not the fact of the samples being taken on the edge of the river-bank, where the stuff just pours in, have the effect of showing the pollution to be much more considerable than would be the case if the samples had been taken in the middle of the stream?—Undoubtedly; the stuff would not have had time to mix with the general stream, I take it. The whole question is one of dilution.

61. A farmer below all these flax-mills gave evidence in the Court at Palmerston that he runs his stock below all these mills, and they drink this water and they have suffered no harm whatever. That would bear out what you say. The cattle usually go into the middle of the stream, and they would not suffer any ill effect?—It might mean that they had got immune to it.

62. *Mr. Buick.*] There is no evidence that the effluent from a flax-mill produces anything in the shape of a typhoid-germ, is there?—Not the slightest; it could not.

63. We have heard it stated that the modern septic tank, such as we have at Palmerston and Feilding, does not destroy typhoid-germs?—It does not entirely, but it is undoubtedly one of the most scientific and useful methods of disposing of sewage in a place that is far from the sea-coast.

64. *The Chairman.*] You have no doubt, in the course of your studies and practice, become aware of the general position of English law on the question of river-pollution; and knowing in a general way the condition of the flax industry and the dairy industry, are you of opinion that our local circumstances here call for a special remedy not provided by English law on the same subject?—If the powers contained within the four corners of the Public Health Act were used, you have already got plenty of power to stop all this sort of thing. It seems to me this is a work of supererogation. As the law now stands any industry may be required to take such steps as the officials consider wise for the stopping of any nuisance.

65. The justification for this Bill is to prevent vexatious applications for injunctions?—I do not quite see how it does, but, of course, that is a matter for a lawyer. It seems to me that you are going by this Bill to make it pretty easy for any one to come along and take action, because under clause 8 if a man is not doing all that you think he ought to do the Court can still interfere with him. This provision for an injunction: there is nothing new in that. Waste product: there is nothing new in that. All these waste products are capable of causing a nuisance, and they are all embraced under the term "nuisance" in the Public Health Act. It seems to me that you are adding an unnecessary brick to the edifice.

66. Do you, from your knowledge of the general conditions regarding such matters in New Zealand, think there is any necessity for an amendment of the law?—No. This apparently is giving the plaintiff right of action. He already has that under common law, and the other authorities have the right, if a nuisance is sufficiently grave to cause them to regard it as a menace to health, to stop it.

67. This sketch here [indicated] represents a flax-mill, with three settling-tanks on the surface of the ground. For two or three days, as the case may be, the flax-water, charged with the pulp, pours into this tank, the walls of which are 6 ft. high. The water pours in in a thin stream, to produce absolutely still water, and the pulp settles to the bottom. The pulp accumulates until there is sufficient in that tank, and the stream is changed to tank No. 2, and so on to tank No. 3. You thus get successive heaps of flax-refuse. Would you think, under such circumstances, the water finally getting back into the stream would be quite innocuous?—It would depend on how far the water had to travel through land. It would have to travel through a considerable area, because it would be quite denatured, so to speak.

68. *Mr. Baldwin.*] Do you consider that a body of farmers, whose only water is water polluted as Dr. Maclaurin suggests the Oroua water was polluted, would be taking a vexatious action if they tried to stop that pollution?—I should not think so. It seems to be the only one left for them.

69. *Mr. Tripp.*] Would the effluent from a flax-mill affect fish-life?—Undoubtedly. There again it is a question of concentration. But there is no doubt at all that it has a very injurious effect upon fish.

70. *The Chairman.*] What would you say if evidence were brought before you that eels seem to enjoy the flax-water?—The eel is very much like the maggot: he will thrive under conditions where no other animal seems to get on at all. But for the purposes of my discussion the eel is not a fish.

71. *Mr. Bollard.*] Suppose we had it in evidence that trout were very fond of keeping about the flax-mills and were more plentiful there than elsewhere on the river, and that the fishermen went there to get them?—I should say the fish were very stupid.

72. *Mr. Broad.*] I gave evidence that we catch whitebait plentifully every season below our flax-mills?—You would not catch them above.

73. Yes; there are numbers of flax-mills on the Manawatu River, and the whitebait go right on to the top mill?—They must have gone up the other side.

74. They are on the mill side. We catch them plentifully every season, and the whitebait are perfectly healthy. What have you to say to that?—All I can say is that that particular brand of whitebait must have a different kind of economy from the other, and he has acquired a very bad taste.

Dr. CAHILL examined. (No. 18.)

1. *The Chairman.*] Do you wish to make a statement?—Yes, sir. There can be no question or difference of opinion about this matter. It is a matter of common observation to any man—even the farmers themselves—that all animals require perfectly fresh and pure food and drink. When any vegetable debris or other organic matter gets into water it must undergo fermentation and putrefaction; if the products of putrefaction get into drinking-water the injury it will do very largely depends on the degree of concentration. You, sir, know perfectly well that animals are not allowed to drink lough-water or pool-water, because it injures their health. In recent medical literature attention is called to the fact that cows drinking from stagnant pools are able to convey disease-germs into their blood, and thence through their milk to human beings. Take well-water—ordinary well-water. It may be beautifully clear and crystal in appearance and yet be most injurious, as the result of decomposing animal or vegetable matter getting into it. That is the reason why the medical profession is so much against the use of well-water where there is possibility of surface water getting into it. Water may be polluted from two sources. First, there is the chemical pollution, the result of decomposing animal or vegetable matter. It may be perfectly clear, and give no taste to the water; yet it is most dangerous for people to take; or it may be so tainted as to give an unpleasant flavour to the milk of animals. Then there is pollution of the water from the organisms that grow in it. Everybody must know that if you feed your milk-cattle on mangel-wurzel or turnips, the milk is tainted and the butter is tainted. Cabbage is a proper thing to feed a milk-cow on, as long as you do not give it too much. That is how you are able to get a month's more butter from your cattle at the end of the season. All these are matters of practical farming, and I cannot understand practical men suggesting that dead vegetable matter getting into a stream is going to do no harm. I do not care twopence for the fish, although I am a fisherman.

2. *Mr. Bollard.*] I know of a case where a cat got into a 400-gallon tank at a dwellinghouse; it was drowned, of course, and the man and his family drank all the water from around that cat without suffering any bad effects. What do you say to that?—If we were to be destroyed by the disease-germs that we take every day we should be decimated. Sometimes your health is maintained above par and you are able to throw off the poison. At other times it is below par, and you are not able to throw them off; then you have to suffer.

3. *Mr. Sykes.*] In your opinion would the effluent which comes from a flax-mill be conducive to typhoid fever?—No, unless there were typhoid-germs in it.

4. How would they be conveyed?—You get careless men who have typhoid, and they are typhoid-carriers. They do not get rid of the disease; they carry it about for years, and they make stools all over the place, which are swept into the water, and you get the germs there. That is one of the ways typhoid is carried. They can be traced. Sometimes an epidemic is brought about by one of those typhoid-carriers. They do not suffer very much, apparently, from it, but in their stools there are the typhoid-germs; and many epidemics brought into a new village or township can be traced to the typhoid-carrier. The stools of men are now analysed both chemically and pathologically.

5. *The Chairman.*] Do you happen to know the Oroua River?—No.

6. You express your belief to the Committee that an undue quantity of flax-pulp—the material stripped off from the leaf by the machinery—poured into a stream of comparatively small dimensions would be injurious to health?—Injurious to the health of men and animals who touched that water.

7. Do you know anything of the action of flax-impregnated water? What is the effect?—I should think it would bring about chronic indigestion and ill health.

8. We have had it in evidence that it produces laxity—acts as a dose of salts?—I do not know the therapeutic effects of flax. I am talking of the general principle of vegetable matters getting into water.

9. In the case of dairy factories, dairy-factory managers, in spite of every precaution they have tried, are threatened with injunctions if they do not stop the smell that arises in the drains or creeks that convey away the washings from these dairy factories. Has anything of that sort come under your notice?—Yes, and I do not think they ought to be allowed to pollute the streams.

10. Could you suggest any method which would help the dairy factories to get over the difficulty?—Yes, sterilization. It is a little expensive.

11. By what method?—By boiling and getting rid of the bodies of animal matter—destroying it.

12. Supposing the washings of a large dairy factory amounted to thousands of gallons per day, would it be practicable to apply the remedy you speak of?—There is one other way of doing it—by irrigation. Plants purify the water which flows through them, and also the exposure to light and sunshine. That is the reason why river-water is fairly good—it flows through the plant-life, and the plants absorb a lot of the animal and vegetable matter; and light and sunshine act as purifiers.

13. If it were practicable to spray or distribute the effluent sufficiently over a big grass paddock, how would that do?—That would be very satisfactory, I think.

14. You think that the plant-life would absorb a great deal of the putrefying matter that now creates the nuisance?—Yes, and the sun would destroy the organisms in it, and the chemical things would not be left in a low form; they would be oxidized and become innocuous.

15. A dairy factory in the Wairarapa District, putting through the milk of 700 cows, uses two drains, each half a mile long, leading into a creek. The washings go for several days into one drain, and for several other days into the other. These drains are close to the Town of Featherston, and I am informed that no complaint has ever been made that any nuisance is caused. Could you explain scientifically if any decomposing products are got rid of by exposure to the sun in these open drains?—A number would be, undoubtedly. Five minutes' exposure to the sun of the germs of consumption would destroy them. Twenty-four hours' exposure to the light of this room would destroy them.

16. I am speaking of the decomposing matter that smells intensely if there is a sufficient quantity of it. Would the action of the atmosphere, under the circumstances I have described, have the effect of making this stuff largely innocuous?—I do not know. That is a matter of experiment. You had better ask Dr. Maclaurin or Mr. Hurley, of the Pathological Department, to make an examination of it.

17. *Mr. Nathan.*] Supposing that a factory had a washing-up from the floor of something like 5,000 gallons a day, would you seriously recommend that they should sterilize all that?—I should seriously suggest that it should be filtered.

18. By what method of filtration?—By means of septic tanks; or you might adopt distillation.

19. Is it not within your knowledge that septic tanks are an absolute failure in connection with butter-factories and cheese-factories?—Yes, if they are not properly looked after.

20. We can point to, at any rate, two factories that put in septic tanks under the supervision of the Health Department, and spared no expense, and those tanks have been in both cases absolute failures?—I do not know anything about them. I know a hotel in the Wellington District that has a septic tank which is an utter disgrace.

21. Where there is such a superabundance of fluids and no solids, septic tanks have never yet been a success?—Then go in for distillation.

22. Can you give us any plan of distillation?—Yes.

23. We shall be very happy to try it?—It would be a little expensive, that is all.

24. Supposing a dairy factory put in a sufficiently large grease-sump, according to the size of the factory, and from there the drainage was run through filter-beds composed of coke. In your opinion would the resultant fluid be harmful to animal life?—That, surely, is purely a question of experiment.

25. I am asking your opinion?—I am not going to give an opinion on a supposititious case. You have to test each filter-bed to see if it is acting properly.

26. That is to say, you have had really very little practical experience of the fluid from a butter or cheese factory?—Or none. But what I say applies to everything of this kind. Any animal or vegetable matter getting into a stream must injure the water.

27. You suggested that the fluid should be distributed over grass lands?—That is one way.

28. Factories have tried that, and they find that if the fluid is taken before filtration and spread on grass land in any quantity, it kills the grass?—You know the answer to that. What do you wash your utensils with?

29. With water?—What is in the water?

30. Nothing?—How do you get the fat out of your utensils? Do you mean to say that you use no caustic soda or anything of that sort?

Mr. Nathan: No, only water and steam.

The Chairman: Do you actually state to this Committee, Mr. Nathan, that washings applied every day to a plot of grass and not allowed to stagnate would actually kill the grass?

Mr. Nathan: No, but I put it to you in this way: A large butter-factory will have from 3,000 to 6,000 gallons a day to dispose of—in many cases on a clay land and in a densely populated district. I say that the suggestion that the land should be irrigated with this fluid is impracticable.

The Chairman: In other words, the quantity is too great for the land to absorb?

Mr. Nathan: Yes.

31. *Mr. Baldwin* (to witness).] The ferment that is set up when this flax-pulp is decomposing in water is harmful to life?—Unquestionably.

32. And if it were increased to a sufficient quantity it would be exceedingly detrimental to stock?—Absolutely.

33. If it were increased to such an extent that it would be unsafe to use the water for human beings, would it be detrimental to stock?—Certainly.

34. What would be the effect of water charged with this fermenting and decomposing matter to an enormous extent upon milk that was stood in the neighbourhood of that water?—It would make it practically unfit for human consumption. On the hills of Kaiwarra, near that boiling-down establishment, the people live on tinned milk rather than purchase the milk from the hills.

35. If the decomposition was sufficiently pronounced you say that it would have a detrimental effect upon stock?—Unquestionably.

36. Would it affect the health of the stock?—Yes, it would affect their growth and their health.

37. Their milking, in the case of cows?—Yes.

38. *Mr. Tripp.*] Can you tell us how sawdust affects fish-life?—I know that it destroys the fish. Sawdust ought to be burnt; so should the refuse from flax-mills.

PERCY EDWARD BALDWIN made a statement and was examined. (No. 19.)

1. *The Chairman.*] What are you?—A solicitor, and incidentally a farmer to a certain extent. I have full experience as to the state of affairs which existed in the Oroua River at the time the actions were instituted by Mr. W. Pearce, joined with the whole of the other farmers for a distance of some six miles of the Oroua River frontage, which actions were taken in the name of Mr. Pearce for convenience. I may make this exception: there was one man named Lucas—a partner, I think, of one of the flax-millers named Tennant—who was not joined in the action. But with that exception the whole of the landowners fronting on the Oroua River for a distance of six miles were forced to take the action which was taken. Now, the Oroua River for a distance of several miles is the only running water available for the watering of several thousand acres of the most fertile land in the Kairanga district. The only other supply is the water which runs through the three large drains—the Manawatu main drain, Burke's drain, and the Sluggish River main drain—all of which drains are vested in various Drainage Boards, and it is a matter of the gravest moment to these farmers that they should have drinkable water, both for themselves and their stock, from the Oroua River. The flax-milling industry has been carried on on the Oroua River, I am informed, for at least twenty years, but never—according to the evidence—by more than two mills at a time until quite recently. At the time the actions were instituted there were four mills upon the Oroua River, and three of those mills were in active operation. Since the deputation and the promise of legislation one other mill has commenced on the bank of the Oroua River, and there are now five mills in active operation discharging practically the whole of their effluent into the Oroua. I do not know if any members of the Committee outside of Mr. Buick are intimately acquainted with the Oroua River, but Mr. Buick will bear me out when I say that the Oroua in summer is a very small body of water indeed in relation to its winter carriage, and the flax-mills are working double shifts in the summer-time. Consequently the evidence as to pollution which was given in the Court does not represent one-tenth part of the pollution which that water is subjected to in summer-time, when it is most necessary for the stock and human beings that are dependent upon it. That being the condition of affairs—the flax-mills increasing in this proportion, and the flax-millers, as the farmers said, refusing to take any steps to effectively keep any part of their waste products from pouring into the river—the farmers combined together to institute proceedings to prevent the flax-millers from wantonly polluting the water. I say at once, on behalf of the people whom I represent, that they are as keenly interested—some of them—in the welfare of the flax-milling industry—I am not talking of pecuniary interest—but they are as keenly ailve to the importance of the flax-milling industry as any other persons in New Zealand. But they must have water, and they felt that nothing was being done to enable them to use the water at all. In short, I want the Committee to understand that these were in no sense vexatious actions; they were actions taken by a large number of persons vitally concerned to have pure water, and only to force the flax-millers to cease flagrant pollution. The dangers in the Oroua River that the landowners saw from this flax effluent were three—firstly, the refuse in the way of fibre and tow escapes into the river to this day in considerable quantities, and forms barriers by collecting silt. It forms barriers, which result in erosion of the banks, and flooding of the land where the banks are low. I have here some photographs which were produced in the case, and I should like to show one instance of the quantity of fibre and tow which collected in a very short time at one of the mills.

2. When?—Within a few months.

3. Since the injunction?—It is exactly the same since the injunction.

4. *Mr. Buick.*] Is that waste of fibre going on still?—Yes. [Photograph produced.] That bank shown there is entirely green fibre. The reason why it was caused is shown by this second photograph [produced], which is a photograph of Jarvis's mill. They had four iron parallel bars across the shoot, and that was the only method Jarvis's mill had adopted up to the time of the injunction.

5. *The Chairman.*] This first photograph is not the Oroua, is it?—Yes; the photograph was taken from a place which makes it look very wide. It was in flood at the time. I was present when the photograph was taken. It is a river with a wide bed up there, but very little water. I was saying that the dangers the landowners saw were, firstly, the formation of these islands by the collection of debris; secondly, that the water was made unsafe for human consumption, unsafe for cleansing purposes, unsafe for butchering purposes, or any other purpose; and, thirdly, that the water had a very detrimental effect upon the stock—the cows and the horses. Now, we had to prove material pollution, and we succeeded. People talk lightly of injunctions, but the costs in that case to the winning side were over £200. It cost £200 for these people to establish their right to pure water.

6. *Mr. Buick.*] Has the injunction yet been applied for?—I was just coming to that. The injunction was granted some time in July. No steps whatever have been taken to have the injunction sealed by the Court or served on these flax-millers, or in any way to have it enforced. The plaintiffs only wanted pure water at as little expense and inconvenience to the flax-millers as was fair and proper, and they are still of the same mind. But Mr. Pearce will tell you that no real steps have been taken to minimize the damage at all, and that the damage is worse now

than it was when the injunction was granted. I was present on three occasions, with Mr. Gerald FitzGerald, the engineer, Mr. Laing-Meason, the engineer, and Mr. Rankin, when we inspected these mills and took photographs for the purposes of the case. Jarvis's mill was not running. The next is Smith and Seifert's mill. There the fibre was being discharged into the river in considerable quantities. The end of the bank shown in this photograph [produced] was continually breaking away, as a sufficient accumulation of the stuff collected.

7. Whereabouts was this photograph taken?—Exactly at Smith and Seifert's mill. You will see there how much narrower the river is. This shows the same bank taken from the top [photograph produced]. All down the river the willows were coated with fibre, and all those sandbanks and bars which had formed, when you dug them, were full of fibre. There were snags in the river which had collected the fibre and were forming regular islands. The result of these islands in cases was the erosion of the banks, as you see in the photograph [produced]. That is below Smith and Seifert's mill again, and is shown more completely in other photographs. We were tempted at these mills to obtain bottles of the effluent—that is to say, the solution of pulp—and it was almost impossible to collect it without the bottle becoming choked with the small portions of fibre and strips. Coming down the stream, the next mill was Tennant's mill, and unquestionably at Tennant's mill the state of affairs was not so bad as at the upper mill. Mr. Tennant very frankly told me and Mr. Pearce, within the last fortnight, that he himself had suffered so much, as a flax-miller, from the two mills above him that if Mr. Pearce had not taken action he would have been forced to do so in his own protection. Very well. We then went down to Mr. Levien's mill, which was in many respects the worst of the lot, as far as we could see. There was a shorter discharge-pipe; there was more material coming away; and the erosion on the opposite bank to Mr. Pearce's is, as can be seen by any one who goes there now, of a very serious nature. To you gentlemen who are farmers, the significance of the erosion will be evident when you know that the banks of all these rivers that we have there are higher up against the river than they are lower down, and as the bank is eroded away into the river so is the bank effectively lowered, with the result that the floods very much more easily break into the land. Mr. Pearce will give you a few instances of loss of stock on his part. I said before that we are not anxious in any way to hamper an industry. I am coming to what we suggest is the maximum that the industries concerned should require. We object entirely to the form of the Bill from the point of view of the farmers' interests. The Bill is framed first of all to take away a right which every one of us has—the right to pure water. It is framed also to take away from us a right which we all have, if we can satisfy the Court that we are suffering material injury from the pollution of water—the right to stop that pollution. It is taking away both those rights. That being the case, one would expect that it would have been compulsory on the persons polluting the water to show that they were taking every reasonable step to obviate the nuisance. The Bill provides, in section 8, that they need only adopt the methods which are usually and properly adopted in New Zealand in an industry of the like nature. That is to say, if the other flax-millers are careless, you are excused by their carelessness. I am suggesting an amending Bill, and perhaps I may explain it. If the law is to be altered at all in favour of these industries: that is to say, if the welfare of these industries is sufficiently important to override the importance of pure water, then we suggest that the method which Mr. Nathan frankly agreed would meet his point of view as a representative of the dairy factories, and which Mr. Prouse agreed, as representing the sawmillers, would meet their point of view, should in fairness also meet the views of the flax-millers. The proposition is this: that in any action which is brought to stop a man polluting the water, the Judge must refuse to give an injunction, and must instead give only damages, as long as the people who are polluting can show that they have taken every reasonable and proper precaution—not the precautions used in their trade, but the precautions that the Government, as represented by the Public Health Department and the Stock Department and the Public Works Department, think are fair. The Government are independent. If the flax-millers will filter their stuff to the satisfaction of the Government, I will undertake, on behalf of the whole of these people, that no more will ever be heard of this injunction. But the Bill makes every farmer whose water is polluted have to prove in a Court of law—prove conclusively—first, that the pollution does him irreparable damage—that is to say, that in no way in the world can that damage be avoided: in no way can it be compensated; and, secondly, he has to prove that he has no other available source of water. Take any person here who is a farmer and has a stream of water, and take somebody polluting that water; you have to show that you have no other available means of water. Why, you are at once met with this, as we were in the flax-mill case: "Oh, put your hand in your pocket and sink an artesian. There you have an available means of water." Consequently, you do not come within the protection of this Bill. They have spoilt the whole of your only real source of water, because artesian water in many cases is quite useless for stock purposes. You have to prove first of all that it is irreparable damage; secondly, you have to prove that you have no other available source of water; and thirdly, you have to prove that the water is unfit for the use of human beings or animals. You have got to prove those three things, although you are the man whose water they are taking away. So much for that part of the Bill. With regard to the assessing of damages for future injury, I have nothing to say about that. It would be, I should think, a difficult matter for a jury to arrive at; but that is not for the Committee and not for myself. One of the greatest dangers that we suffer from the flax-mill industry we could never get an injunction for under this Bill, and that is with respect to this fibre, because we cannot suggest that putting clean fibre or dry fibre in the water renders the water unfit for use by human beings or stock. That only destroys, for effective purposes, the bed of the stream. So that under this Bill flax-millers could put any quantity of dry material, any quantity of fibre, into the river, and under no circumstances could you get an injunction to stop them. I do not think that was contemplated;

probably no one ever thought that that danger would arise; but that is the danger which is arising. Now, I, as a perfect amateur, after speaking to several engineers, including the City Engineer here, would put forward the suggestion that some scheme of this sort might be effective for so minimizing the danger that it would be inappreciable from the farmers' point of view. The suggestion is that the effluent from the flax-mill containing the pulp and any fibre should be run into a semi-circular race, say, a chain long, of fine wire netting. That would collect a great quantity of the material. The water would percolate through that, but underneath that there should be another of these of finer mesh, and underneath that again if necessary one of still finer mesh; and then the water that remained should be conducted down in a race and passed through some form of filter-bed, and discharged into the river. That is not an expensive method; and I again say that if Parliament or the Government will ensure that some method of that sort is tried, I will undertake that this action is not heard of again. It has been suggested to me by the Chairman—and there is no doubt of it—that that would mean the employment of labour, because these wire-netting gratings would have to be kept clean to be effective. But the flax-millers aver that they do now keep one man for the particular purpose of keeping clean the four bars that they have in their small traps. Very well; if he could keep those clean, he could keep these rather long and more elaborate contrivances clean; and if that were done that would meet us. That, I think, is all I have to say on the matter.

8. You said there would be no cause of action against fibre, because it was clean?—No claim for an injunction.

9. But if fibre did what you say it does—blocks the river and causes erosion and flooding—would not that be a cause of damage?—Not for an injunction. The damage there is another result of the pollution of the water. Under clause 4 of the Bill a condition of getting an injunction is that the quality of the water is deteriorated so as to render it unfit for use by persons or animals. We could not say that with dry fibre.

10. Then there is something wrong with the Bill?—We say that too.

11. *Mr. Sykes.*] You say that the trouble arising from these flax-mills has been if anything intensified since the action for injunction?—Yes.

12. It is still going on?—Yes, and there is one additional mill.

13. That intensifies it; but I mean in connection with the mills already operating?—I will not say that the specific mills are putting in more stuff; they are putting in as much, we say. But at the one that I spoke of—Tennant's—they have always really tried to do their best.

14. *Mr. Buxton.*] You state that since the action for the injunction the condition of affairs is worse?—Yes; there is an extra mill.

15. That action was taken in July?—At the end of June or July.

16. And since then no action has been taken by the flax-millers to prevent the condition of things that obtained?—No effective action has been taken. Mr. Levien certainly put out a small wire-netting grating with iron bars at the end, which really is no improvement.

17. *Mr. Forbes.*] I suppose you have an estimate of the quantity of stuff that goes into that river?—I could quote you Mr. Broad's estimate given in the Court, and he is a very capable man on the subject. If it will be of any use to the Committee I will leave a copy of the Judge's notes of all the evidence in Mr. Pearce's case, and if I may I will leave a copy of the evidence in the police prosecutions. The police prosecuted two of these millers for blocking the Oroua River, which is a public drain, and is vested in two Drainage Boards; and they were convicted. Mr. Broad's evidence, roughly, was this: that 7 tons of vegetable matter went into the river for every ton of hemp they made, and they made from 220 to 240 tons a year. So that on his showing each mill is putting in about 4 tons a day. This is his evidence: "The fibre amounts to one-eighth of the flax. There is 7 to 1 of the flax used suspended in the water." He said, therefore, that about 1,750 tons a year—assuming 300 working-days—or 6 tons a day, of vegetation goes into the stream from each mill, and there are now five mills. That is, 30 tons a day, working one shift. If they work two shifts the amount is 60 tons a day.

18. *Mr. Sykes.*] Does it all go into the river—is not a lot of it caught and collected?—No, none of that pulp is collected

19. Are you referring only to the pulp?—Only to the pulp.

20. Not to the fibre?—No. There was an explanation made which I think it is only right to say you would also find in the evidence—that a certain amount of this vegetation remains on the incompletely stripped flax. So that you could reduce those figures by a certain proportion. But here are five mills putting that quantity of vegetation into this small stream every day, and that is with one shift working and one stripper.

21. *Mr. Forbes.*] Does this Bill make the position worse for you than the present law?—It would be quite impossible under the present Bill for any person affected by the Oroua River to get an injunction.

22. Is the present law satisfactory in that way?—The present law is the law which operates throughout—I think I may say, without exception—the whole of the countries that are under English jurisdiction, except that in England it is now criminal to discharge the refuse from any manufactory into a river.

23. In the present case you have an injunction, and it has been treated practically with contempt by the millers?—Treated absolutely with contempt by the millers.

24. Is there no further remedy?—We do not want to harass them; we want to give them a fair run. If the worst comes to the worst, we shall have to ask the Supreme Court to enforce the injunction. But we recognize that in a big industry like that men should get fair-play, and should, after the injunction, have a reasonable time to put their house in order.

25. You do not think they are tackling the thing in a serious way at all?—I am absolutely certain they are not.

26. You think that this Bill will have the effect of allowing them to disregard that injunction?—Yes, undoubtedly. It applies, if you notice, to Mr. Pearce's action. It has been made retrospective to apply to Mr. Pearce's action. We do not object to that if it is the Bill that we suggest. If the millers have to prove that they have taken every reasonable precaution, we do not mind it applying to the past action.

27. *Hon. Mr. Buddo.*] What do you consider is the general damage to the residents on the Oroua River?—The land there that I am particularly concerned with will carry over two thousand dairy cows, and the dairying industry is impossible with the river in its present condition.

28. Have they any other means of obtaining suitable drinking-water for the stock?—None.

29. *Mr. Buick.*] Not even artesian water?—They might by expending money on artesian bores, and as likely as not if you do not strike a good artesian flow you will get a very bad drinking-water; and secondly, the artesians in that district are found to "peter out" in the summer, when they are most necessary.

30. *Hon. Mr. Buddo.*] Are there any complaints in the district with regard to the odour of the river during the hot months of the year?—Yes; the residents say the smell is insufferable.

31. Have you of your own knowledge any information with regard to it affecting the health of the residents?—No.

32. Is there any objection to the odour by individuals?—Enormous objection.

33. The district is generally dissatisfied with the existing conditions?—Yes, so far as the district is not connected with the flax-milling industry, which is a large industry there.

34. Have you any experience with regard to a suitable method for preventing this wastage finding its way into the river?—I suggested that the water should be run over a considerable length of wire-netting fluming, with a finer mesh under that, so that the bulk of the stuff would be caught by one or other of the flumings, and that the final water should be run through a filter. That would satisfy us entirely.

35. You think there would be no damage to stock or disadvantage to the district if the water was filtered before being run into the river?—Effectively filtered, none.

36. Those personally interested in stock in the district do not object to the water, after being filtered, going into the river?—No, so long as it is effectively filtered.

37. *The Chairman.*] What you mean by "filtering" is taking the pulp out?—Taking out the whole of the pulp, or practically the whole; taking every reasonable precaution that the Government Departments advise.

38. *Hon. Mr. Buddo.*] You do not object to the water finding its way into the river after the pulp is taken out?—No; we do not think that would do us sufficient harm.

39. Is the present law sufficient for you to obtain that relief that you think you are entitled to?—Yes. The present law is the law that has obtained for generations in England. At present if you prove pollution you can stop the nuisance, but you must prove material pollution. That is sufficient for us.

40. Would you suggest any alteration in the existing law?—Yes, I have suggested it in this way: "In any action relating to the pollution of water by waste products, as defined by the Bill, the Court shall, in lieu of granting an injunction, award damages, provided that the defendant shall prove to the satisfaction of the Court that the defendant has adopted every method calculated to effectually prevent or diminish such pollution."

41. Is that in lieu of clause 8?—In lieu of every clause in the Bill. "Proof that the defendant has adopted the methods, if any, prescribed by the Department of Public Health, and the Department of Stock and Agriculture, and the Public Works Department, shall be conclusive evidence that the defendant has adopted every method calculated to effectually prevent or diminish such pollution." If regulations are framed and a man can show that he has complied with them, the Court is not able to give an injunction against him—only damage, if any damage is proved.

42. Are you aware of any tests being made with a view to utilizing the pulp?—No, but I should think the millers would probably find, when they had to keep it out of the river, that it was a very useful by-product.

43. *The Chairman.*] With regard to your suggested clause, would not the effect of that clause be to virtually constitute those three Departments you have mentioned a Court of law—judges of the question whether the flax-millers had done all that was possible?—In one respect, and in the same respect as Dr. Mason has pointed out, the Public Health Department is the judge at the present time. I say, Yes, the Department would be constituted judge as to what were reasonable and proper precautions to be taken. The idea is to get an independent body to say what are effectual steps.

44. What is your evidence to the Committee that you are authorized to make the statement on behalf of the people interested that you have done?—The person who was actual plaintiff, who was what is called *dominus litis*, is in the room, and applauded when I made the statement. He is going to give evidence, and he will confirm what I say.

45. What is your knowledge of the detrimental effect on cows and horses of this effluent?—My own practical knowledge is nil, except from having been counsel in the case.

46. Can you give us an explanation of the fact that after £200 has been spent in obtaining an injunction, no further steps have been taken to enforce that injunction, although your evidence is to the effect that if anything the damage is greater than it was before the injunction was applied for?—I can only repeat what I said before: the people I am acting for think that the industry should have a fair run and a fair chance of putting the matter right before any further steps are taken.

47. Is it from your own knowledge that you tell the Committee that a flax-miller lower down than another had intended to get an injunction if Mr. Pearce had not done so?—Mr. Tennant, the flax-miller in question, told me so, not privately, but publicly, with Mr. Pearce, in Palmerston North.

48. Would you feel justified in saying to the Committee that if reasonable precautions had been taken to keep this large quantity of stuff out of the river, no injunction would ever have been applied for?—Absolutely. It was with great reluctance that steps were taken, because the thing was not done lightly. Messrs. Bell, Gully, and Cooper were the solicitors who instituted the proceedings. I was only in as counsel with Mr. Cooper, and the matter was very carefully considered, and it was found that the position was intolerable.

49. As to erosion, do you know the river away up above the flax-mills?—I have only been about a mile and a half above the flax-mills, to the end of a place where a man called Saunders has built a very large retaining-wall; and I know the river at Johnston's place, which is higher still, and I know it at Awahuri Bridge.

50. Are you not aware from your own observation generally in New Zealand that rivers of the class of the Oroua are continually wandering from side to side, and carrying away large areas of valuable soil?—You would see on the lower reaches of the Oroua, if you were there, that that has not been the case there. The Oroua, in its lower reaches, is confined within high definite banks. Higher up, where the shingle has begun to invade, no doubt that does happen; but down below there is no shingle at all; it is a purely silt bottom, and there are high definite banks.

51. What you claim is that erosion has been largely caused by the debris from the flax?—Yes. The evidence given in the police prosecution, which I will leave here, will give you some idea as to the large embankments that have been caused.

The Chairman: Do you wish to ask any questions, Mr. Nathan?

Mr. Nathan: I desire to say that those interested in the dairying industry are quite in accord with those who are fighting for the flax-millers, and are prepared to accept an amendment as suggested by Mr. Baldwin. We are prepared to filter, &c., and if an amendment such as that is inserted in the new Bill, it will suit us as well as the Bill proposed.

52. *Mr. Buick* (to witness).] You have said that the present law is in accord with the law all over the British dominions?—Yes.

53. Is it not a fact that the law has been altered to suit the goldfields?—Oh, no doubt, in New Zealand.

54. It has also been altered to suit the dredging operations in the South Island?—Yes.

55. Also, I believe, with respect to the Murray River in Australia?—For particular purposes, Yes.

56. So it would not necessarily be a breaking of the law to make an alteration to suit these particular industries—it can be done?—Certainly, it can be done.

Dr. MACLAURIN, Dominion Analyst, examined. (No. 20.)

1. *The Chairman.*] Have you seen the Pollution of Water Bill?—No.

2. What we wish to get from you is any information you can give us as to the result of water passing through a flax-mill and carrying more or less dye and pulp from the machines into the river; we also desire your opinion as to injury to health in the case of dairy factories where the washings are put into small streams and create putrefaction and bad smells?—I certainly think that something should be done to regulate the pollution of streams generally, but I do not think it would do to fix any one particular standard for purity of the effluent. I think that the purity of the effluent should depend on a number of circumstances, principally on the size of the stream into which it flows. There were demands made in the Old Country from time to time to fix one definite standard for all waters, and that, to my mind, is very unsatisfactory, because if a large amount of effluent of a certain degree of purity is put into a small stream, the pollution is bad; while if the same quantity is put into a large stream the pollution may not be noticeable at all. I suppose at this stage it would be unnecessary to suggest anything in the way of standards; that would come better, no doubt, if regulations were to be drafted, and standards could be fixed in the regulations, or the whole thing might be left to the Health Department and other Departments to consider. The Health Department, to my mind, is the best one to consider this matter. I do not know that it is necessary to have any other Departments connected with it at all. That Department will naturally see that the water is as pure as it can be under the circumstances. I made some analyses of the water in question in this case, but, unfortunately, the samples were taken in May, and being taken then I do not suppose they represented the water in the summer months at all. But these samples taken in May did not show what I would call serious pollution. They showed pollution, but not serious pollution. The worst of them was considerably purer than what is adopted as standard by several bodies in the Old Country. At the same time, probably these waters would have been very much worse in the summer months. The provisions professed to have been adopted by the flax-millers were not of a satisfactory kind. The grating is much too open, and it would be very easy to improve on that without materially increasing the cost of treatment, I take it. I should think that a fairly fine-meshed grating would be sufficient to keep out everything that would do harm to the water. So far as I am aware of what has been done, there is nothing poisonous in flax; so that you may consider flax as you would any other vegetable fibre—grass, or toitoi, or other vegetable fibre that might get into the stream. Probably it would produce about the same amount of organic solids soluble in water. So there is no material difference in that respect.

3. We had it in evidence this morning that flax-water of a given strength has been proved to have a purgative effect, as in the case of rhubarb. The fact was mentioned, too, that the Maoris use it as a medicine, concentrating the essence of the flax. The statement was also made that cows have suffered from drinking a stagnant solution of the effluent from a flax-mill. What would you say to such statements?—I have no proof that such is the case. There is no proof, so far as I am aware. The chemistry of flax is not very complete, but the chemist who has done most of the work on the subject—Professor Church—affirms that the only medicinal principle in the flax is a non-poisonous bitter principle. It has certain tonic properties.

4. Admittedly the practice of the Maoris was to boil the root and use it as we might use salts?—But this water was from the flax itself, not the root. As I say, flax has certain tonic properties, but they would be very slight in diluted water.

5. You came to your conclusion from the analysis you made, did you?—Only as to the amount of organic matter in this water.

6. Not as to any medicinal effect?—No; it would be impossible to do that from the water.

7. *Mr. Buick.*] We had it stated that you had given evidence in the case in Palmerston that the water below the last mill was absolutely unfit for consumption——

Mr. Baldwin: Unsuitable for human use, I said.

Witness: Yes. The oxygen absorbed in that water was 0·71. In the first it was 0·24—nearly three times as much. I had water from Marton the other day giving nearly 0·5 oxygen absorbed. That is not a good water, but still it is used. The Karori Reservoir here gave 0·34, but that was some time ago, when the water was rather bad. One could not say that that water (below the last mill) would actually do harm to stock; there is not sufficient organic matter in it.

8. *Mr. Sykes.*] What effect would this flax effluent have on fish?—If there was sufficient of it it would no doubt kill fish, because of removing the oxygen, and not, I take it, from any poisonous principle in the flax itself. If there is a very large amount of decaying organic matter in water it removes the oxygen, and consequently the fish cannot live. The amount of organic matter shown in these analyses would not be nearly enough to kill fish.

9. It would have to be very strongly impregnated with this discoloured matter before it would be injurious to fish?—Yes, I think so.

10. *Mr. Forbes.*] Did you take these samples yourself?—No, they were sent to me.

11. You do not know what the state of the river was when they were taken?—No.

12. *The Chairman.*] Did you have any information as to who sent them?—They were sent by the defence—by the flax-millers.

Mr. Baldwin: They were taken by the flax-millers and sent by the flax-millers.

13. *Mr. Forbes.*] The quantity of water flowing would make a tremendous difference to the quality?—Yes.

Mr. Baldwin: Evidence was given by Mr. Armstrong, the engineer, that the river was very high that day. He was present with Mr. Broad when they took the samples.

14. *Mr. Nathan.*] Have you had any connection at all with the sewage from creameries, butter-factories, or cheese-factories?—I had some experience some years ago of the effluents.

15. If the factories put in grease-sumps of sufficient capacity and then run the effluent through coke filters, the resultant fluid would be fairly clean, would it not?—Yes, I should think so.

16. There should be nothing harmful in it for stock?—No, unless you were running it into a very small stream. It depends on the volume of the stream.

17. It naturally depends, too, on the size of the filter: I mean, if we have these things of a reasonable size?—Yes.

18. You have always found, I take it, that the factories are quite willing to work with the Department to carry out any suggested improvements?—I have had no experience on that side of the question.

19. *Mr. Baldwin.*] I will read you, to see if they correctly report what you said, the Judge's notes in this case: "The ferments set up when that water is decomposing"—that is, water containing organic matter—"are harmful to a human subject. If water like No. 5 were decomposing"—that was the water taken below the mill—"it would not be a safe water to use for cleaning dairy utensils"?—None of that river-water up there is.

20. Do you confirm the evidence that you gave?—Yes.

21. "The smell would not do milk any harm." Do you still say that?—Yes.

22. "It would probably turn it if it were sufficiently bad, but would not make it injurious"?—Yes—that is, from pure organic matter.

23. "Milk absorbs a certain amount of taint from decomposition. If some of the germs got into milk it would set up decomposition. I have never heard of the milk of cows drinking water tainted by decomposition of vegetable matter taking on the taint before it left the cow. The water does not directly go into the milk inside a cow. There is a considerable difference of purity between 0·24 and 0·71 water, so far as human consumption is concerned. It"—the 0·71 water—"would be unsuitable water for human use"?—Yes.

24. *Mr. Sykes.*] In reference to sample No. 1, in your opinion, would this water be suitable water to wash milk-cans in?—No, certainly not.

25. *Mr. Forbes.*] You say in the evidence there that the quality of the water a milking-cow has to drink does not affect the quality of the milk supplied: is that what you say?—I said I had no evidence that it did.

26. I thought it went without saying that one of the first requirements for a dairy herd was good water?—Of course, it is an advantage.

27. But it would not affect the quality of the milk if they did not have it?—I should not think so.

28. *The Chairman.*] Seeing that the milk of cows fed on turnips and mangels is well known to be affected as to its flavour, would any such result as that arise from a cow having to drink this tainted water, no other water being available for the cow?—I do not think it necessarily would. Take ensilage, for instance. That is in a sense tainted. It does not affect the milk. There may be some specific taste in flax which may be carried through to the milk. I cannot say.

29. I suppose the truth is that turnips and flax have a subtle flavour that fails to be arrested in passing through the cow?—I assume that that must be so.

30. *Mr. Nathan.*] In your experience do mangels taint the milk?—I cannot say.

FRIDAY, 11TH OCTOBER, 1912.

WILLIAM BRYANT VATER PEARCE examined. (No. 21.)

1. *The Chairman.*] You are a settler in the Manawatu district?—Yes, Oroua Bridge.
2. Would you like to make a statement——
3. *Mr. Baldwin.*] I would suggest that I should question Mr. Pearce on a few points. You were the nominal plaintiff, Mr. Pearce, in the actions which were brought to restrain the flax-millers from polluting the Oroua River?—Yes, I was one of them.
4. The actions were brought by yourself, Mr. Saunders, Mr. Rankin, Mr. Wilde, and Mr. Green: is that so?—Those are the names. Practically the actions were arranged by Mr. Green; I assisted them. The others voluntarily came in to help Mr. Green.
5. At any rate, you were the five people who brought the action?—Yes.
6. Now, as to Mr. Saunders, his property fronts on the Oroua River on the opposite side from you?—Yes, further up.
7. How many acres has he?—Nineteen hundred.
8. And what is the value of that land per acre?—I should say, from £40 to £45 an acre.
9. Immediately below him is Mr. Rankin. How many acres has Mr. Rankin?—About 600 acres.
10. What was his land recently sold for?—£34 an acre.
11. Immediately below Mr. Rankin's is Mr. Wilde's property?—Yes; Mr. Lowe is his manager.
12. How many acres?—Six hundred.
13. Is that land of the same value?—More valuable land.
14. Below him Mr. Wifnosfki comes?—That is the name, I think. He has only about 50 acres, which he purchased at £50 an acre.
15. Was Mr. Wifnosfki a witness for your case with regard to the pollution of the river?—Yes, he offered to stand in. He was a witness.
16. Seeing that you had Mr. Saunders, Mr. Rankin, Mr. Wilde and his manager (Mr. Lowe) interested in the case, you had Mr. Wifnosfki giving evidence for the case Now, immediately below that, who is the next?—Mr. Lucas.
17. And Mr Lucas, what is his position with Mr. Tennant?—They were partners in some of the land.
18. About how many acres?—About 80 acres. There were three of them, I think.
19. Immediately below him again came Mr. Tennant?—Yes.
20. He was also one of the flax-millers?—Yes.
21. His area?—About 203 acres freehold.
22. And immediately below him again?—Mr. Levien.
23. Another of the defendants?—Yes.
24. How many acres?—I could not say for certain. Probably about 150 acres. It is a Native lease.
25. And then there is the town of Oroua Bridge?—Yes.
26. Below the Oroua Bridge there is Native land?—Yes, it is Native land.
27. So that right from Mr. Saunders down to Oroua Bridge every landowner joined in these proceedings either as witnesses or plaintiffs or defendants with respect to the flax-mills?—Yes, but Mr. Lucas.
28. Mr. Lucas was then a partner with one of the flax-millers?—That is so.
29. So that there was about 3,200 acres of land on your side and about 300 to 400 acres belonging to flax-millers?—Yes.
30. Now, what is the character, generally speaking, from a dairying point of view—what is the value of that land to those people?—Well, if it was not for the bad water-supply, it is the best land I know for dairying. There is a good climate. It is better than the Waimate Plains. I have farmed on the Waimate Plains, and this land is better land than the Waimate Plains.
31. And if cut up into small farms how many cows do you think the 3,200 acres would carry?—I know some of it which is carrying a cow to the acre for the greater part of the year.
32. Do you think it would carry pretty nearly a cow to the acre?—Yes, easily.
33. That disposes of the value of the land on one side of the Oroua River. Now we will take the other side of the river immediately below Smith and Seifert's mill. But, first of all, there is Jarvis's mill. That is the highest mill on the Oroua River that you know?—I have never seen it.
34. The evidence is that Jarvis is carrying on on his own freehold land?—I think that is so.
35. Very well; below him comes Smith and Seifert's mill, which is carried on on a piece of the Johnstone Estate which was recently cut up?—Yes.
36. It is a very fine flax-bearing property?—Yes, that is where almost all the flax is got.
37. Immediately below that is Mr. Green's property?—Yes.
38. How many acres?—Perhaps 1,300. He had 1,040 acres, but he has bought some since.
39. And it is worth about?—£25 an acre.
40. Then there is your own property?—Yes.
41. What is the acreage?—2,500 acres.
42. And the value, roughly?—£50,000.
43. Then Pedersen comes next, does he not?—Yes, his is a leasehold.
44. How many acres?—40 or 50 acres.
45. Next, lower down the stream, there is Mr. Morcamb's?—I have a small piece.
46. Then comes Mr. Morcamb?—Yes.
47. How many acres has Mr. Morcamb got?—About 200.
48. Worth?—It would carry a beast to the acre.
49. Worth about £40 an acre?—Yes.

50. And then, finally, there is the property of Mr. Purden?—Yes.

51. Every one of these landowners on that side either joined in as plaintiffs or witnesses for the case on the side of the plaintiff?—All but Morcamb. He has taken possession since.

52. Now, it is suggested, Mr. Pearce, that you were vexatious in the matter. Whom did you instruct to bring these actions?—Mr. Green gave the instructions.

53. Who were the solicitors?—Bell, Gully, and Cooper.

54. A branch of the firm of Bell, Gully, and Myers?—Yes.

55. One of the recognized chief firms of solicitors in New Zealand?—Yes.

56. Do you remember the month in which the people signed the agreement to take these proceedings?—It was a good while before midsummer.

57. Was it in October, 1911?—Yes, I think so. I would not like to say definitely. Mr. Cooper also acted, I think, as solicitor for some of the flax-millers.

58. Do you know which of them?—I know he acts for Tennant and Levien. I have seen Jarvis in his office.

59. You went to the solicitor who is also the solicitor for two of the flax-millers?—I suppose that is so. He was instructed by Mr. Green.

60. Were the proceedings commenced in June, 1912?—Yes.

61. Have you taken any steps to interfere with the mills under the injunction?—No.

Mr. Bollard: I must take exception to this evidence. What we want to know is, is this water polluted, and if so to what extent. The Oroua River is not the only place there are flax-mills in New Zealand, and this is a general question. I would like to hear some evidence as to the pollution of the water. It is not a question of the number of cows. Are they affected by drinking this water, and are the people affected by drinking the water and using it for domestic purposes?

Mr. Baldwin: I am endeavouring to prove that it was not a vexatious action. It was a very serious matter, and the action was not viciously commenced.

62. *Mr. Baldwin.*] Taking all this large area of country, what is the only available source of running water?—The two rivers. As far as my property, almost all the other parties have only the one river, the Oroua. There are only three of us who can get to the Manawatu.

63. The rest are confined to the Oroua River?—Yes.

64. How long have the four mills been operating on the Oroua River, roughly?—Three of them have been going at times, not continuously. They have changed hands, and have stopped at times and then gone on again. There are now five in all. Sometimes they run out of flax, and sometimes the management runs out of money. They have never been going like they are going at the present time.

65. *The Chairman.*] How many years have you been there?—I have been there twelve years, and I believe they were milling there twelve years before that. I know they have been almost continuously going ever since.

66. For about twenty years?—Yes, probably.

67. *Mr. Baldwin.*] How many mills were working intermittently?—Not more than three. There are now five.

68. When you brought this action how many were working constantly?—Three of them were working constantly.

69. You brought the action against four mills?—Yes, there were four mills working.

70. Had the pollution greatly increased that year?—Yes.

71. Had the pollution become very serious indeed by that time?—There is no doubt about that.

72. Now I will ask you, generally, what was the effect of the polluted water on your stock. Since the four mills have been working, what was the effect of the polluted water on your stock, roughly?—Stock that were continuously on the river would not look at it. As to to any strange stock brought on to the place, it was very injurious—of course, sometimes more so than at others.

73. Did it affect more particularly any particular section of the stock, the young stock, or the weaker stock?—It was deadly on any young stock, weaners of any kind, sheep or cattle.

74. Have you lost any stock to which you can put the deaths down to this polluted water?—Yes, both directly and indirectly.

75. Do you know other persons who have lost stock in the immediate vicinity from the drinking of this water?—Yes, Mr. Morcamb.

76. That is Mr. Morcamb of Morcamb and Purden?—Yes, they have about 200 acres.

77. Have you noticed any difference when you shifted stock? They have been dying, and you have then shifted them to other water. Have you noticed any difference?—Oh, yes.

78. What is the difference?—When not gone too far they recover immediately.

79. You have a piece of property which is about all flax?—Yes, on the Manawatu.

80. Is it possible to establish a dairy factory at Oroua Bridge?—You mean on the river? The river was formely nothing like the state it was in last summer. You could not then manipulate milk within 10 or 20 chains of the river for the smell from it.

81. You anticipate it will be serious this year, because there are more mills?—Yes.

82. Now, with regard to the use of the water for butchering, do you know whether the butcher uses the water?—He may, but he would not get any one to buy the beef.

83. He does not use the water?—No.

84. *Hon. Mr. Buddo.*] I just want to put a few leading questions. Do you carry your young stock on this land?—No; I tried to rear some stud Shorthorn cattle, but it was a complete failure.

85. A portion of your stock would be raised on the farm?—No.

86. They are all purchased cattle?—This season, thinking the mills would be stopped, I purchased six hundred or seven hundred yearlings of a good class, principally store cattle.

87. How long would you have them on the farm before you would dispose of them?—With regard to these cattle, I do not intend to dispose of them until they are four years old.

88. What is your usual system? You have just informed the Committee that most of your stock is purchased, and, I assume, fattened on the land. How long would you keep such stock on this land?—A great deal of the land is not broken in, and I have no stock on that land. The first piece of land I got was fattening land. Since then I have been breaking in low bush country. There is young grass suitable for young stock, and there is native grass as well. It would be an ideal place for rearing young stock if it was not for the water; so I bought young stock, assuming that the mills would be stopped.

89. How long would you keep stock on the land adjoining the Oroua River, where they would have to water at the river?—They are not compelled to water at the river. In wet weather there is plenty of water in the drains. It is only in the dry season that they have to water at the river.

90. How long do you usually keep stock adjoining the Oroua River in the summer-time?—I have never taken it on myself to fence the stock in against the river; but if there is any stock close to the river and there is the slightest thing wrong with them, they go under at once.

91. During the months when the water is at its lowest, how do you notice that there is something going wrong with the stock? Do they stand about alone, and appear out of condition?—They start to scour, and they are gone almost at once.

92. They die almost at once?—Yes. I can give you one case. I had a team working on a part of the farm where there was good water. They were running at the homestead before, and did not touch the river; but quite unknown to me one of the mares was left on some land away from the river where some work was being done. This mare was brought in after being away three weeks. She then drank at the river, and was very bad. I had to get a veterinary surgeon, and it cost me a fiver. He stated it was blood-poisoning, and we gave the mare medical treatment for a day or two. We thought she was getting better, but she went lame in her hindquarters, and eventually fell into the river. I lost her.

93. Do you make a habit, Mr. Pearce, of drafting out stock you find to be suffering from this cause, and which are out of condition, and taking them elsewhere?—Yes, I take them over to my Te Wheka place, above the mills.

94. What is the effect?—It is beneficial if they are not gone too far.

95. *Mr. Buick.*] At what time of the year do you have the greatest number of deaths among your young stock?—Well, so far as the purebred cattle are concerned, it is going on continuously. There is no difference whether they are twelve months old or have never been taken from their mothers.

96. *Mr. Sykes.*] I understand you claim that there is great erosion in the banks of the river because of the accumulation of debris, flax-leaves, &c., on the other side of the river?—Yes, that was one of the causes of the action, and affected two of the settlers particularly. They have to bank the water back. One settler could not keep the water back, although his land has been banked for years. I think it has cost him as much as £250 to keep 1 chain up.

97. This gentleman had a difficulty with the erosion of his land before the flax-mills started, did he not?—Oh, no.

98. Since the flax-mills started he has had to make these special banks?—Yes.

99. Has the value of the land been affected by this erosion?—Well, to the outside public it may not appear to be of much importance, but it is a serious matter to the farmer or owner.

100. Are floods more frequent?—I do not think they are more frequent now than they were six or seven years ago.

101. They are not more frequent now than they were before the mills started?—We had a very severe one last summer.

102. Were you in occupation of your present farm before the flax-mills started operations?—I had a leasehold further down the river.

103. I just wish to ask you whether your stock throve at that particular time? Were you in occupation of the land before the flax-mills started?—Well, the bulk of the land was then in its native state, and I was not paying anything for a great deal of it. I was running cattle on Native land, and on the Hon. Mr. Johnston's land.

104. The land is thoroughly drained now?—In the summer-time. Of course, it floods at times.

105. I presume the stock could drink this drain-water equally as well as they could the river-water?—The land is intersected by swampy creeks, and there is a great deal of low land. Some of it would not be dry enough to get at once a week.

106. *Mr. Bollard.*] Since the flax-mills have been working on the river what is the average number of stock on your farm?—At times the number is about one hundred and fifty horses, five thousand or six thousand sheep, and seven hundred or eight hundred head of cattle. From time to time I am always drafting off and on to the place.

107. Can you give us any idea of the average number of cows?—I cannot tell you. As soon as the flood was over in the river last summer there was 800 acres quite out of grass, and the place could not hold the stock.

108. Can you tell us how many head of stock you have lost through drinking the water?—That is the reason I can get no compensation: I cannot prove that the stock have been drinking the water. The cattle die, but, of course, I do not see them drinking the water. Strange cattle drink the water, but cattle that have been on the place some time do not drink the water if they can help it.

109. Can you tell us how many you have lost through the water?—During the last three months I have skinned fifty or over in one draft. Other settlers have lost stock. Mr. Morcamb

has taken up his place recently, and has put on strange cattle. He has only been there a month or two. He will tell you what he has lost. He has been more unfortunate than I have. Some of the cattle he has lost are some cattle which I sold to him; but they were not running near the river. They came from my Te Wheka property.

110. You are quite sure there is no epidemic among the cattle?—Certainly there is nothing but blood-poisoning.

111. Have you had within the last two or three years any disease amongst your cattle?—No, none amongst my stock.

112. What is the class of cattle on your farm?—Young stock.

113. You state it is principally young stock?—I had some breeding-stock, but some of the calves died on their mothers before they had been weaned, and I lost on the cows. Some of the cows I took away.

114. You told us that you bought lately about seven hundred head of young cattle. Why did you purchase these when they were dying so badly? Why did you not purchase some other class of stock?—I had reason to believe that these flax-mills would be stopped from putting the stuff into the river. The cattle were the class of cattle which showed the most profit. Even though I have lost fifty, and the others do well from now onwards, I will do better than if I had bought older cattle.

115. With regard to the action which you and your neighbours brought respecting the pollution of the water, was not the judgment of the Court to the effect that it was not a question as to whether the water was polluted so that it injured stock, but that the water was less pure below these mills than above them; and that, according to law, the Judge had no alternative but to give the judgment he did. Is not that a fact?—Yes.

116. The judgment was that the water was less pure below these mills than above them?—Yes.

117. And that he had no alternative but to grant an injunction on that account?—Yes. He gave his judgment on the analysis of the water, not on our evidence. He ignored our evidence.

118. He did not give his judgment on the fact that the water was so bad below the flax-mills that it injured cattle or other young stock?—I should say that the judgment was given on the state of the water at that time of the year when the sample was taken. The sample was taken after a flood. It was the most lenient judgment he could possibly give on the evidence.

Mr. Baldwin: What is suggested by Mr. Bollard is quite correct. The Judge did not find that it killed any cattle at all, but found that there had been pollution of the water in some respects.

119. *Mr. Nathan.*] Before coming down to the Manawatu, Mr. Pearce, you were a dairy-farmer in Taranaki?—Yes.

120. You were farming adjacent to the Riverdale Cheese-factory?—Yes, right across the road.

121. It is the largest cheese-factory under one roof in the world, is it not?—Yes.

122. And the water that passes the cheese-factory went through your property?—Yes.

123. Did you ever find any injury to your stock in drinking that water?—No.

124. Your stock used to drink that water?—Yes.

125. *The Chairman.*] You say that so-many of the settlers joined you in this action for an injunction, and we were told yesterday that it had cost so-much. Did these others join with you in the expenses?—Yes, they signed an agreement. I joined Mr. Green, and the others came in.

126. It was a joint affair in all respects?—Yes, the agreement was put in in the Court. It was drawn up by Mr. Cooper

127. You have enumerated so many settlers, their acreages and values. Are all these people dairying, or only some of them?—Only some of them—only the smaller settlers.

128. What proportion of the land would you say?—A very small proportion of the land. They would be about half the settlers. The three largest settlers are not dairying.

129. Is that a true picture of Mr. Levien's mill [showing photograph]? Does that represent his mill?—No; that is Mr. Jarvis's mill.

130. Is that mill at work now?—Yes, I believe so. I have never seen the mill.

131. Do you know Mr. Levien's mill?—Yes.

132. Is it farther away from the river than Mr. Jarvis's?—No, it is quite close on the river.

133. Is that mill at work now?—Yes.

134. Can you say of your own knowledge that the effluent from the mill is discharged as directly into the Oroua as was described by Mr. Levien in the case of his mill?—I had the information given to me by Mr. Low on Saturday. He said that both mills were still putting it in the river. They claim the right to put it in. Two of them claim the right to put tow into the river.

135. Can you tell the Committee what artesian water is available on the properties you have described?—I had artesians in one paddock, and I found that I lost several big bullocks with bad pizzles. That is a drawback to the whole district. The water, particularly the artesian, is very bad.

136. It is bad from the artesians?—Yes. The land is saturated. The land is very porous. You can drive 75 ft. or 80 ft. and then you strike gravel; and further down, at 120 ft., you strike gravel, and even there the water you get is bad. The water percolates through the land. You can smell the water that comes up. If you let the sun on it it soon becomes stinking, and the pipes will not stand it: they fall to pieces.

137. To what do you attribute the corrosion and falling-to-pieces of the pipes?—Iron in the water.

138. Not to the flax?—That is away from the question of the mills altogether.

139. Is the Committee to understand, then, that quite apart from the flax, the water obtained by artesian wells is unhealthy for stock?—I do not say that iron water is unhealthy. I do not think the stock suffer in that respect, except with bad pizzles.

140. Have you had a veterinary surgeon's opinion as to what is the cause of this pizzle trouble?—I think I know more than enough about it myself. I think there is no doubt about the cause.

141. Do you know what was known as the Oroua Downs Station before it was cut up?—I have known it this last twelve years. I have had stock grazing on a part of it for a time.

142. Did you know anything about it, say, five-and-twenty years ago?—No, except from hearsay.

143. Would you be surprised if you were told that they found it necessary to sell their Shorthorn and Polled Angus calves off the cows—wean them off the cows, and sell them straight away—because they could not rear them owing to the influence of this iron water, or some other influence, that was fatal to them in that district? Would you be surprised to be told that?—No, not the slightest; but I would not put it down to the iron. I should put it down possibly to bad management—not to the iron water.

144. Summed up, are you of opinion that, quite apart from the flax trouble, there was considerable trouble amongst stock from other causes?—You are referring to the other side of the river?

145. I am referring to the district generally?—There is a great difference in the district generally. The Oroua Downs land will carry——

146. I am speaking of this class of land in the neighbourhood of the Oroua River. Are you aware, quite apart from fat stock, that there has been trouble for years from either iron in the water or some other causes?—I should say there have been numerous cases. There may have been bad management of the stock, or bad management of the land.

147. I must keep you to the question?—Yes, there has been trouble; but I say there have been a number of causes.

148. Apart from mismanagement?—Well, I cannot say that the land was well managed.

149. You have told us about pizzle trouble: do you suggest to the Committee that that is caused by mismanagement? Do you suggest that, with your knowledge of stock, this does not arise from a cause peculiar to certain districts?—I should say it would. The principal cause is the iron in the water, I should say.

150. With regard to the stock you have lost, could you get a certificate from a veterinary surgeon that, in his opinion, that stock was lost through flax-pollution of the water?—I think so.

151. Who was the veterinary surgeon you consulted?—Mr. Scott. I think he is a veterinary surgeon as well as a chemist. He has also been to Mr. Morcamb's to attend to his stock.

152. Did the evidence of your losses of stock come before the Supreme Court when the injunction case was tried?—We did not bring that up to any extent, but we did give evidence to that effect. We did not know till a day or two before that the case was coming on.

153. Would the Committee be justified in assuming that your evidence went to show that you had lost hundreds of pounds' worth of stock through bad water caused by flax-pollution?—Yes, certainly.

154. You gave evidence that you had lost stock to a considerable amount owing to this cause?—Yes.

155. And you got £5 damages on the Supreme Court case?—Yes, £5 against each mill.

156. Did you expect more than £5 damages?—Certainly, I did. I expected ten times that amount.

157. And did you not bring evidence to show your losses before the Court?—A great part of the loss was caused through the grass being destroyed in the paddocks. In some places the native grass had grown up again in place of the old English grasses. It was a very hard thing to prove.

158. Were you paid compensation at any time in the Taranaki District for losses of hoggets?—I had a case on in the District Court, and allowed the defendants to confess judgment and to pay £10 each. I lost one hundred and fifty sheep one night.

159. What was the cause of the loss?—I turned eight hundred hoggets into a paddock on the river, and they drank the river-water, and next morning about one hundred and fifty of them were dead. Every one of them had a black patch on the neck or brisket.

160. What was the cause of that?—Blood-poisoning.

161. Had flax anything to do with that?—Yes, the river was in a fearful state.

162. What amount did you claim as damages in the Supreme Court case?—£500, or something like that. £250 from each mill, I think. I would not be certain.

163. *Mr. Baldwin.*] You claimed £250 for damage by the erosion, loss of stock, and the loss of your grass?—Yes.

164. But only pressed your case for an injunction?—Yes, that is right.

Mr. Baldwin: I am putting in the evidence in the Supreme Court case, which will show the position.

165. *Mr. Buick.*] I should like to clear up one little matter. You say that you lost stock through drinking artesian water?—That is because I had no other water at that time.

166. Do I understand you to say that you get to gravel some 80 ft. below the surface?—One of the pipes is driven down 76 ft. and the other 80 ft.

167. Do I understand you to say that the water on the gravel below is pregnated by water from the surface?—No; I would not say so with regard to that paddock. I was referring to the artesian water in general.

168. Do you not know that all artesian water in that particular district is impregnated with iron?—Yes, I should say it is. When I came to the district a stranger, that was the only thing

I thought that there was to complain about on the Manawatu—the artesian water. If you had water there like there is on the Waimate it would make a difference of 25 per cent. in the value of the land.

Mr. Baldwin: With the permission of the Committee I would like to put in the evidence I mentioned previously, the evidence taken in the Supreme Court case. This is the Judge's notes on the case [put in]. I would also like to send you a draft copy of a Bill which I suggest would meet our difficulties. I will get it properly typed, and send it to you. And if Mr. Morcamb can give evidence, that is all we will trouble the Committee with.

169. *Mr. Sykes.*] You say that your stock which you lost and which had access to the Oroua River died of blood-poisoning?—Yes. Mr. Morcamb has also lost some of his cows, and others have lost stock through the same cause.

170. Through drinking the water out of the Oroua River?—Yes, when the river is not in flood.

LEONARD OWEN HOWARD TRIPP, President of the Associated Acclimatization Societies of New Zealand, examined. (No. 22.)

1. *The Chairman.*] Your profession, Mr. Tripp?—Solicitor.

2. Will you make a statement to the Committee?—I would like to make a short statement. I may say that I am president of the Associated Acclimatization Societies of New Zealand, and I am chairman of the Wellington Society. My council has considered this Bill, and they have asked me to come here and make a short statement. I may say that on our council we have business men and we also have farmers. One farmer attended this meeting from Eketahuna. They have asked me to point out to you that they consider that any alteration of the law in the direction of allowing the pollution of river-water is dangerous from a public health point of view. In a young country like New Zealand you have always got to consider that it is going to have a large population, and that you will want a pure-water supply in the future. This is a matter, I admit, for the Public Health Department, so I will not say anything more about it. Coming to the Bill, I would point out that, according to clause 4, if a farmer has two streams running through his property, each of which contains a sufficient supply of suitable water, no injunction can be obtained through the pollution of one of the streams. That is to say that one stream may become at some time or other a sewer; and the question may arise, and will arise probably, that when that farmer wants to cut up his property he may find it is almost impossible to do so, because he has not got a sufficient pure water-supply for each section. The next point I am asked to call your attention to is the fact that, according to clause 4, you cannot get an injunction unless you can show that the water is unfit for the use of human beings or animals, and also that he has not got a sufficient supply of good water available. Take water that is coming down from, say, a flax-mill or a sawmill: that water may not be in such a condition as to be absolutely undrinkable. The Court would then hold that that water is not unfit for human beings or for animals; and, therefore, in that case you cannot get an injunction though the water is polluted. Now, say some industry starts on the banks of that stream, and pure water is required. This water is not unfit for human beings or animals, but it may be unfit for the use of this particular industry; and, therefore, I am asked to point out that that industry should be considered. Now, we thought at our meeting that the dairy people might fall in if this Act was passed. That is to say, a dairy factory might start, and a sawmill might start up above, and pollute the water; and yet, because it is not unfit for human beings and animals, the dairy factory could not get an injunction. Mr. Nathan pointed out to me that if necessary a dairy factory need not use water from the river in such a case, but that artesian-well water could be used. In reply to that I am told by an engineer—and I am also told so by a practical dairyman—that you cannot be certain that there will not be some pollution of the so-called artesian water. It depends entirely on the condition of the soil whether the water cannot percolate from the stream to the water-supply for the dairy factory, and also, of course, as to where the so-called artesian water comes from. I am just mentioning this point to show the danger there is in trying to deal with this question. There is another point: in several districts in New Zealand, and in one that I am particularly well acquainted with, water-races are used by people for the supply of water for their stock, and in many cases for drinking-water also. Now, what is to prevent, say, a sawmill throwing this refuse into the stream, and partially polluting that water? It may be that it is not unfit, mind you, for human beings and for animals, but still it is not good water to drink, and not what one would call wholesome water. That would apply to a great extent to Canterbury, or places where they use water from water-races for drinking purposes. Now I would like to say a few words with regard to the fish in our streams. I would like to point out, first of all, that the fact of having fish in our streams encourages many town men, who are working hard in town, to go out into the country for week ends and for holidays to fish and to keep them in health. That is an important consideration, because I am glad to say there are a great many fishermen in the towns. Then, again, the fish-supply should be considered as a food-supply. To-day the fish from the rivers is only a small food-supply, but still it is a food-supply; and you, gentlemen, should take that into consideration. Furthermore, with the means of delivery being improved in the future, the fish from our rivers will be a very large and important food-supply. In the South the Government have gone to considerable expense in connection with the quinnat salmon, and you all know what the quinnat salmon means to Canada. It means there is an important industry started there, and we hope in the future that something similar will be started here. I mention these facts because, of course, it will be stated that fish must give way to industries. My point is that I ask you to consider the fish as an industry, and it is an industry which should become a very important one. I say, cannot provision be made so that any industry can be carried on near a stream and allow no pollution?

If so, make the necessary provisions. If not, then I admit that you must consider which is the more important to the country—the industries which pollute the streams to the detriment of the fish, or the fish. Now, the industries which affect the fish are the flax-mills and the sawmills, and our main trouble is the sawmills. Cannot some method be devised to stop the refuse from the flax-mills getting into the streams? That, I admit, is a matter for experts. With regard to the sawmills, it is now illegal to put sawdust on the bank of a river or into the stream, or anywhere where it can get into the stream; and, I take it, it is not quite clear, if this Bill is passed, that the law will not be entirely altered. If the effect of the Bill is as I read it, the law will be altered, and the only way you can stop the sawdust getting into the stream will be to apply for an injunction; and, as I pointed out before, the sawdust does not in all cases render the water actually unfit for human beings and animals, and so you will never be able to get an injunction. I know from my own experience—I have fished a great deal in the rivers about here—that actually below the sawmill itself you will find few fish. It may be that you will find a few fish in water polluted by sawdust, but what experience tells is that if a large body of sawdust gets into a stream and a flood comes, it gets to the gills of the fish and smothers them; and, furthermore, certain portions of the sawdust are, I am informed, poisonous. Now take the rivers here about Wellington. At the headwaters of these rivers are sawmills: take the Hutt River, for instance. If you allow sawdust to get into these rivers you will find that right down to the mouth they will become one mass of sawdust; and that will decay, and will become a menace to the public. As regards the damage to fish from allowing the refuse from flax-mills and sawdust to pollute a stream, it depends entirely on the volume of the stream and the amount of refuse that goes into the stream. If a large amount of refuse goes into a small stream, when it starts to decompose it will kill the fish. It is true you will occasionally find fish near a flax-mill. I know you do so in the Ruamahanga. The Ruamahanga River is a river with a large body of water. We say it is unnecessary to alter the law at all; but we suggest that if you find it is necessary, then set up a Commission to decide what rivers in New Zealand are to be polluted and what not.

3. *Mr. Buick.*] Do you know of any instance where refuse from any sawmill has destroyed fish?—Only what has been reported to me.

4. Do you think a sluggish river is not a good fishing-ground, a river like the Oroua, for instance?—Some sluggish rivers are. If it is muddy the fish are not very nice to eat.

5. Would you be surprised to hear that we have had evidence to the effect that the Oroua River, where all this pollution has been going on, is teeming with whitebait?—I would be surprised if there is a large body of refuse going down.

6. In the Oroua there is not a great volume of water, but it is very sluggish?—I think you will find that below the mills there are considerably less fish than above.

7. You would be surprised if you heard it said that there were more?—Yes, more trout, certainly.

8. You spoke about dairy factories being in the greatest danger. Do you think the managers of dairy factories know really what is affecting them, because we have had evidence very much in the opposite direction?—I do not think the dairy factories affect the trout.

9. But you said that flax would affect the dairy factories?—What I suggested was that if there was a certain amount of pollution allowed, and it got into the water that the dairy factories had to use, it might affect them.

10. Would you be surprised to hear that the amending Bill brought down is very much favoured by owners and managers of dairy factories?—Mr. Nathan told me he is supporting it.

11. *Mr. Sykes.*] In connection with water-races, of course, you know that every water-race is at present polluted?—No, not every water-race.

12. Well, stock in large numbers drink the water, and consequently all water-races are polluted?—Yes, in that way; but I know several water-races in Canterbury from which the settlers drink regularly.

13. Then they are drinking polluted water?—Yes, in some cases.

14. I believe it is the intention of this Bill not to interfere with the Fisheries Act?—Is that so?

15. We have expert advice on that point?—Probably it is going to be altered then. Our main trouble is sawdust—there is no doubt about that.

16. And you say that in your experience the waste water from dairy factories has no injurious effect on the fish?—No, it has never been reported to me.

17. *Mr. Bollard.*] Do you know of your own knowledge of any trout being injured from the pollution of rivers by flax-mills?—Not from my own knowledge—only what has been reported to me by our Ranger and other fishermen.

18. Do you know from your own knowledge that trout like dirty polluted water in preference to clean water?—I do not know. It does not follow that the trout are healthy.

19. Do you know that they do better in dirty water than in clean water?—No.

20. Then you have got a lot to learn about trout?—Yes, I admit that.

21. It is a strange fact that we have had it in evidence here that fishermen make a bee-line for a flax-mill near a river in order to get good trout—they go just below the mill and get plenty of them?—I have not heard of it myself. From what has been told me it depends entirely on the amount of refuse that goes into the river, when it starts to decompose, and the volume of water in the stream, as to whether or not fish will be found near the effluent of the mill.

22. It depends whether there are any chemicals in the water that are injurious to the fish. If there are it is a different matter. Do you know of any chemical in connection with the manufacture of flax that is injurious to trout or any other animals?—No, I do not know of any.

ALEXANDER JOHN RUTHERFURD examined. (No. 23.)

1. *The Chairman.*] What are you?—I am a vice-president of the Wellington Acclimatization Society.

2. Do you wish to make a statement to the Committee?—No, I have no wish to take up the time of the Committee by making any statement. I have made a study of the pollution of waters as far as I have had opportunity, and any information I can give to the Committee that would be useful I should be most happy to supply.

3. *Mr. Buick.*] Do you know of any instance where the putting of flax-refuse into a stream has damaged the fishing-qualities of that stream?—Yes. I have had a good deal to do with flax. Away back in the "seventies" I was engaged in dealing with flax-mills in Otago. There is no question as to the damage done to water by the effluent from a flax-mill. It is a question of concentration. In the case of a small stream, if the whole of the water in that stream is put through a flax-mill and turned back into the stream by a ditch, for a long distance below that stream becomes an abomination of desolation. The stock will not drink it; they refuse to do so. Horses sniff and turn up their noses at it. It is a question of the extent of the dilution by water of the effluent. The effluent itself is noxious. The evidence given before the Committee will show that the butt and root of the flax contains a fairly strong bitter laxative. I have used it in camp, and it has acted as a purgative. There is no doubt that the extract of the root of the flax has very much the same effect as bitter aloes, and it is used by the Maoris as a laxative. The question before the Committee really is the amount of concentration of this effluent and the pulp and fibre in it. If there is a large body of water and considerable fall in the stream, well, the effect is comparativley small; but if there is a small body of water into which the effluent is flowing and little fall, it becomes concentrated and beastly for miles below the place where the stream is flowing, and the stock will not look at it. The water is dead, and there is little life in it. I am instancing a small stream at Alfredton. When that mill is running half time the stream is passable, but when it is running full time it becomes black, and absolutely unfit for fish-life or for use for stock.

4. *Mr. Sykes.*] Is it not a fact that water flowing through a flax swamp, even if unpolluted by flax-mill effluent, is almost unfit for human use?—Practically an extract from the peaty soil. There are different classes of discoloration. The peaty streams in the mountains in the South Island, where the water flows from the peat, are dark. The discoloration is not similar to the colour caused by flax effluent; it is a different thing, and not so unwholesome. Stock drink the water freely.

5. It is really unfit for human use?—Unless boiled, I would not like to drink it. There is one point that I do not think came out before the Committee in connection with dairy-factory effluent. I think something might be done by cultivating nature's scavengers in the rivers. The eels, bullies, crayfish, and inanga use up to a large extent the animal matter flowing from the dairy factories, and the more they can be encouraged about the place where the effluent comes out the better.

6. *Mr. Buick.*] What are those fish you mentioned?—The eel, the koura or crayfish, bullies, larvæ of insects, and the little water-beetles, &c.—all that class of life will act as scavengers.

7. *Mr. Sykes.*] Of course, naturally they will make their way there?—Yes, and the more they are encouraged the better for the river.

8. *The Chairman.*] You have had to do with flax-mills?—Yes.

9. Do you know of any instances of damage to stock in cases where they have been compelled to drink the water from flax-mills in the absence of any other?—No, I do not. I have not come across any such instance. I know that the water is often so bad that they will not touch it.

10. Can you assure the Committee that of your own personal knowledge you have seen stock absolutely refuse to drink the water?—Absolutely refuse; the water becomes stale-smelling, black, and disgusting as the vegetable matter decomposes.

11. Apparently it would be like soup?—Yes, beastly.

12. Do you think that would kill trout?—Oh, yes; they would not go near it; they would try to escape from it.

13. What about eels?—They do not like it. I have taken some trouble over this matter. I have explored for eels and koura in these places, and I found a few small ones, but not large ones. I am talking about the concentrated essence, where the whole of the water is diverted through the mill and goes back into the stream again.

14. A large quantity of refuse to a small quantity of water?—Yes, a concentrated essence.

15. You have been a long time in New Zealand?—Yes, about fifty years.

16. Speaking broadly, do you see any necessity for this Bill?—No. I look upon it as a mistake to provide for specific instances by general legislation. There is no doubt that this case that has occurred at Oroua has been brought before the Government, and they have brought in a general Bill to provide for this special case at Oroua.

17. Have you had any opportunity of visiting the Manawatu district?—Yes, I fished in the Oroua River a good many years ago.

18. You know nothing of the conditions now?—No.

19. And you know nothing of stock actually poisoned?—No, I have not come across an instance of it.

GILBERT LAING-MEASON examined. (No. 24.)

1. *The Chairman.*] What are you?—I am a civil engineer practising in Wellington, and a member of the Institute of Civil Engineers, England.

2. The Committee has been informed, Mr. Laing-Meason, that in the course of your professional duties you have been brought in contact with the flax industry in its relation to rivers and so on. Could you give the Committee any information?—I certainly have not had very much

experience in regard to flax, and I can only speak on the point from the point of view as an engineer. I have seen the Waipipi Creek, on the Opaki Plain, near Masterton, when there was a flax-mill on it. It was certainly a very small creek, but the water was exceedingly foul, dark, and smelling, and we diverted the water-races, as you may know, so that the water of the creek could not get into them. That is the only instance I know of. I was called in in connection with this case at Oroua, but I only saw the river when it was in flood. I was told that when the river dropped low it became very foul, and my opinion was that the effluent that was finding its way into the river then would be very deleterious, and I should not use any water of that sort for any purpose of water-supply. It seems to me, if I may be allowed to give the opinion, that the matter should be treated in this way: that any tendency to restrict the law about polluting rivers should not be relaxed in the least in this country. For instance, in the Old Country the rules are most stringent, and no water can be admitted into a river, creek, or stream unless it undergoes analysis by the officers of the Board. What appears to me to be the right thing to do would be that, instead of depositing this water into the river practically foul, that it should be lifted, if you cannot get it in by gravitation, and put into a pond for treatment, and the only way to treat it would be to consult a professional chemist. That is the only way I can assist the Committee from the point of view of a hydraulic engineer.

3. Take this sketch I have here: assuming one point to be a flax-mill and the water rose 10 ft. or 12 ft. and discharged into a wire-netted enclosure, the mesh of the wire netting being one-eighth of an inch, the effluent charged with pulp and discharged into that enclosure of a nature which would produce absolutely dead water, would not the pulp settle in the bottom, allowing the clear water to flow straight away and be carried away even by a small stream without much pollution?—Do you mean settle on to the wire netting or on the bottom?

4. On the bottom of the wire netting?—Would it not intercept all the fibre?

5. The fibre would not be allowed away at all—there are plenty of means of stopping the fibre; it is the pulp that is carried down-stream. It is estimated that there are 150 tons put into the Oroua per day by the fifty-odd mills. Would not some such plan as that enable the pulp to be arrested in the case of a flax-mill, where they have not the water to carry it away?—It is quite possible that it may do, and if I had time I could work out some scheme for doing it; but my point is that it should be dealt with outside the stream.

6. In three or four days, as was found by experience, the effluent runs into reservoir No. 1, and when a certain quantity of the refuse has settled there the effluent is diverted into reservoir No. 2, and so on. Having filled the three, you simply shift your wire netting and repeat the process, and you pile up heaps in that way and get rid of all your refuse?—Yes.

7. The water would probably carry away certain of the flax-dye but no solid matter at all?—It merely bears out what I say, that I think the effluent should be treated in some manner before it is admitted into the stream. Personally, I think it is nonsense to say that the effluent is not harmful, because I have seen it in a bottle decomposing and fermenting in a very short time. It will blow the cork out of the bottle, and that is not good for man or beast, or anything else. The only point I am making is that the effluent should be carried away and treated before it gets into the river, and the question of the treatment should be left to an expert chemist.

8. The trouble, as far as a chemist is concerned, is the enormous quantity preventing the possibility of dealing with it chemically?—Well, of course, we know that sewerage is dealt with in many ways. You have deposition and chemical treatment, septic tanks and filters, and there are no doubt means which could be devised to treat such a case as this.

9. Can you from your engineering knowledge give any information of what is done in connection with noxious manufactures at Home to prevent the pollution of streams?—No. They are all treated. I have never had anything to do with it personally, but I know the treatment is that they are secured in tanks and dealt with in various ways according to the nature of the manufacture. Some are dealt with chemically and some by deposition.

10. *Mr. Sykes.*] If the effluent from a septic tank was allowed access to a river, would it be possible to use the water for town supply?—It depends entirely on the septic tank and on the point from where you are going to use the water for town water-supply. There is a great deal of evidence in engineering books showing that water purifies itself in a comparatively short time if it is treated. For instance, I have known myself of water being treated in a septic tank, and after passing through percolation filters the water below was much purer; it contained more oxygen, and the oxygen improved the water below. It depends a great deal on the size of the river and one consideration and another. For instance, we know that at Home there are really huge areas of land which have been secured for water-supply purposes, and in one instance no less than a population of sixty thousand people is on land treated by mechanical filters.

11. We are led to believe that typhoid bacteria are not affected by that process of treating the water in septic tanks, and that it may float down the river and be harmful?—Yes, certainly. A septic tank will not kill all sorts of bacteria, but it is a great help in the treatment of filtering. It depends altogether on the conditions, the amount of pollution, and so on.

DAVID CUDDIE examined. (No. 25.)

1. *The Chairman.*] Have you, as the Government officer in charge of the Dairying Department, been brought in contact with the trouble arising from the effluent from dairy factories?—To a very limited extent, Mr. Chairman. The dairy factories, as a general rule, seem to have suitable arrangements.

2. *Mr. Buick.*] We have had a good deal of evidence in regard to the effect it has on stock. Have you had any experience of whether flax-mill effluent has a detrimental effect on stock?—No; we do not come in contact with that end of it.

3. *Mr. Sykes.*] Of course, the supervision of the dairy factories comes under your control?—Yes.

4. Do you find that anything which the Health authorities suggest the factories are quite willing to adopt in connection with mitigating any nuisance which may arise in connection with waste water from the factories?—As a general rule, we find no difficulty in getting the dairy factories to carry out suggestions we may make in connection with drainage or sanitary arrangements. They seem only too pleased to carry out any suggestions.

5. *Mr. Nathan.*] Before a cheese-factory can start work it has to apply for a certificate from your office?—Yes.

6. And when the officers inspect a factory it is usual for them to see that proper provisions are made for drainage?—Yes, that is one of the main points.

7. The reason that we are trying to get this Bill through for dairy factories is the fact that at times there are some people who threaten the factories with an injunction, and may stop the industry?—Yes.

8. Do you ever find the dairy factories averse to carrying out any suggestions of the Department for the proper drainage of the factories?—No, I cannot say we have.

9. You have found them at all times amenable to reason in that respect?—Yes, that is so.

10. And has your Department at any time had any complaint from settlers that the drainage from a butter-factory is doing the stock any harm?—No. We have had complaints from people who objected to the dairy-factory drainage passing their dwelling, but that was probably due to the fact that the drain was not properly looked after.

11. And provided the dairy factory puts in a sump of proper proportions and then runs the effluent over it there should be no difficulty?—That would intercept the great bulk of the solids. I should just like to mention this point, that I think in regard to this Bill the definition of "waste products" is a little too wide. I think if it went through in its present form and became law it might be a great disadvantage to some of the dairy companies.

12. *The Chairman.*] Will you explain?—Clause 2 reads, "'Waste products' means the waste products of any butter-factory, cheese-factory, flax-mill, or sawmill, and includes refuse and chemicals." That is too wide, to my way of thinking. I do not think that refuse should be allowed to pass into any stream if there are any means by which it could be stopped.

13. Well, the presence of that word in the interpretation does not mean that refuse should be allowed to pass; it merely means that this Bill deals with refuse?—Yes, I follow you.

14. It does not mean anything else than the items that are designated there. If I have a factory dealing with sheep-skins, or something like that, the Bill does not touch that?—No.

15. It touches only what are mentioned in the Bill?—Yes, I see.

16. Now, we have had in evidence, Mr. Cuddie, what happens at a factory which is unfortunately distant some eight miles or thereabouts, following the only method by which they can get their effluent or the washings of the factory to the nearest stream?—Yes.

17. And the factory people admitted that a stink arose from the washings that are carried along this drain?—Yes.

18. Well, we need not dwell upon the importance of dairy factories, but we want some means by which that cause of complaint can be got over either chemically or mechanically or in some other way. In the course of your duties those things have come before you?—They have frequently.

19. Well, we want help from you as the head of the Dairy Department?—Well, as a general rule, the drainage from dairy factories is discharged into a running stream where it is said to do no harm at all, and we always recommend that to be done where it is possible; but where there is no such outlet it is a very difficult matter to deal with dairy-factory drainage. It becomes very foul and stagnates. The only way to modify it seems to be by filtration, and a very good plan is to build two tanks, 10 ft. long, 6 ft. wide, and 4 ft. deep, fill the tanks with coke, and place the bottom of one over the top of the other, and allow the drainage to filter through. I believe that is a very effective method. That coke can be removed when it blocks up, and can be burned. A fresh supply of coke is put into the tanks, and that will run for a fairly long time with a moderate-sized factory.

20. In what factory is that plan carried out to the best advantage, in your opinion?—We have not been successful in inducing them to adopt it, although we have been recommending it; but it is unusual for factories to have much trouble with the drainage.

21. *Mr. Nathan.*] We adopt that method to a larger extent at Bunnythorpe. We have nine concrete tanks there, and they are all filled with coke?—I did not know that.

22. *The Chairman.*] And you think that by that means, Mr. Cuddie, all cause of complaint, even in the case of a factory eight miles distant from a stream, would cease?—I think it would be greatly reduced. I do not think you are going to get rid of the complaint entirely. There is such a large body of water to handle from a dairy factory that it is difficult to treat it satisfactorily and purify it so that it would not give rise to any complaint.

23. Do you know the proprietory factory at Featherston?—Yes.

24. I was speaking to the manager, and he described his practice to be two open drains from the factory half a mile long, discharging into a stream that passed through Featherston. He uses one of the two drains for a while only. As soon as it begins to give the usual indications he then turns the effluent into the other drain; and, although that is close to the Town of Featherston, as you know, there have been no complaints?—No. I have been to Featherston and seen the place, and there seems to be no trouble in connection with that system. During my visit to Denmark some years ago I came across a very good system to get rid of the drainage. The sewerage was run on to a piece of land about 6 acres in area, but the situation of the factory, of course, happened to be suitable. The land sloped right away from the dairy factory. The drainage was carried first of all into a tank to settle or get rid of the solids as much as possible, and the overflow ran into a channel at the head of this piece of land. Down through the centre

of the land other channels were cut, and at stated periods they made an alteration and allowed the water to run down one channel for a few days, and then changed it to another channel for a few days. By that means they were able to cultivate that land, and they got a lot of grass from it and also crops.

25. In other words, sewerage irrigation?—Yes, but that would only apply where you had a natural and graded fall.

26. You can offer no suggestion by which the greasy solids could be neutralized chemically?—The volume of liquid to deal with is so large that it would be impossible to handle it in that way. About 90 per cent. of the drainage from a dairy factory is clean water. There is a little fat, a little milk, and other solids.

27. Take a cheese-factory, the routine is this: the milk comes in the morning, and the previous day's whey is carried away in the cans, and there are only the vats and the floor at the factory to be washed?—Yes.

28. That is all the effluent there is?—Yes, and it is not harmful so long as you can get it all away and do not allow it to accumulate.

29. Have you read the Bill, Mr. Cuddie?—I have.

30. Do you think there is any necessity for the Bill as far as the dairy industry is concerned?—I hardly think there is, because we are having very little trouble in regard to dairy-factory drainage at the present time.

31. We have had a large amount of evidence, and the kernel of it is a fear that some cantankerous person will apply for an injunction and create trouble. Have you any information which would help us as to whether or not that fear is likely to be justified by action in the direction of an injunction?—Well, I admit this: that the Bill would, if passed in its present form, be very helpful to some dairy factories who are at present having a difficulty with their drainage; but, on the other hand, the dairy factories are probably liable to suffer some loss through other industries providing the Bill goes through. If the pollution of water is allowed to the extent that one would be led to understand it is from the Bill, it might prove a very serious matter for the dairy factories.

32. In the Manawatu district, a district which is well known to be highly suitable for dairying and contains valuable land, such evidence has been brought before the Committee showing that the pollution of water from flax-mills especially is such that grave difficulties are likely to arise through want of pure water for use by the dairy factories?—Yes.

33. Has anything of that kind come to your knowledge?—No. As a general rule the factories draw their supply of water from wells. There are cases where they have to depend upon streams, and are unable to get a sufficient supply from a well.

34. *Mr. Buick.*] But the water from a stagnant stream would not be fit for dairy factory use?—No, it would not be except for running over a condenser. But if for general use in a factory it would be quite unsuitable. It is imperative to have pure water.

35. The ordinary sluggish-stream water would not be fit for dairy factory use?—No.

36. Without any pollution?—No, it would not be suitable.

37. *The Chairman.*] Have cases come within your knowledge where artesian water is evidently drawn from an old swamp, and is so impregnated with iron and other mineral matter associated with iron as to make the water unsuitable for dairying purposes?—Yes, quite frequently that has come under my notice, where there has been too much mineral matter in the water to use it for boilers or washing out. It corrodes the tinware and metal parts of the machinery.

38. And it might in such a case be that the best the dairy factory could do would be to use the best system of water at hand?—Yes, perhaps the nearest stream.

39. *Mr. Nathan.*] With all due deference to Mr. Cuddie, I think the dairy companies themselves are better able to express an opinion as to the requirements of the Bill or otherwise. The complaints that might reach the dairy companies would not reach Mr. Cuddie's Department. They would, I think, reach the Health Department before reaching the Dairy Department. We have eight or ten men down here representing the whole of the dairy factories, cheese-factories, and butter-factories. Kimbolton and practically every one of those companies can be stopped by way of injunction. The position of the Cheltenham Factory is this: Mr. Bruce is the chairman, and he owns the land immediately below. If somebody buys Bruce out—and he is to be bought out in a few years—Cheltenham can be stopped, because the water flows through Bruce's land, and they have no other drainage whatever. We were stopped at Makino, and we had to find £800 for the Feilding Borough Council for drainage, and if not we would have had to throw our £6,000 factory away. The people refused us drainage. Take Bunnythrope: Mr. Wilcox is entitled to stop us there. He said he was going to but did not, and when asked why he did not he said it would pay him better to get damages from them every month; and yet the man does not live there. Take Awahuri: there is an injunction out against them?—The drainage is very bad there.

40. *Mr. Buick.*] As a dairy expert, you have travelled round a good deal?—Yes, all over the various districts.

41. Have you seen any scheme by which it was practicable to take away all the deleterious matter from dairy factories?—It is a difficult matter to deal with. I have not seen any scheme that would give you just ideal conditions. It can be modified a good deal.

42. *Mr. Sykes.*] And having travelled throughout all the dairying districts of the world, have you seen anything outside the ordinary drainage methods?—No. We have tried septic tanks, but they have been a failure.

43. What system obtains in Denmark?—They handle it by sewerage system.

44. And how about England?—There is not much dairying on the factory system done there.

45. Are there no factories in England?—There are some factories, but they are mostly con-

nected with the town sewerage. Some protection may be needed, and no doubt is needed, with reference to the cases Mr. Nathan mentioned; but those are not typical cases of dairy factories throughout New Zealand. My opinion is that there is an element of danger in that Bill as it stands to-day to the majority of the dairy factories. If some modification is not made in regard to the discharge of refuse into the rivers and streams by other industries, dairying is likely to suffer.

Mr. Buick: The only one allowed in this Bill is flax.

46. *The Chairman.*] In England, Mr. Cuddie, the law there is just the same as it is here—in other words, English law is our law?—Yes.

47. And despite that law being in force in England, we know what England is as a manufacturing country?—Yes.

48. We want to put the dairy factories in the position of being able to say, "Go ahead, we defy you; there is nothing here against which the Supreme Court would grant an injunction," to the person who is inclined to proceed?—Yes. I candidly admit that dairy-factory drainage is not troublesome where you can get an outlet for it.

49. We do not want to say to the Rongotea man, "You are only a cipher in the whole business—we cannot take any account of you, because you are the only one who is so far distant as eight miles from a stream"?—No. I am quite willing to admit candidly that this Bill would benefit a few of the dairy people, but while benefiting them, in some cases it may prove detrimental, in that it opens the door to other industries coming in and polluting the streams and water-supplies.

50. At the same time can you tell us that as far as the dairy industry is concerned its circumstances are such that it stands out on a different footing to any of the thousand-and-one industries which in England do not or have not required a special Bill like this to protect them?—Of course the conditions are totally different.

51. Will you explain how?—I take it that at Home, where large industries are at work, they have a very large capital, and they are able to go to perhaps an enormous expense in treating their drainage. Of course, in New Zealand the companies are small, and if they were called upon to provide similar facilities for handling drainage as they have in England it would mean shutting up the concerns. They would not be able to afford it.

52. *Mr. Sykes.*] Are you familiar with the law in Denmark with regard to water-pollution?—No, I am not. Of course, it is a country where there are very few streams indeed.

53. *Mr. Buxton.*] They treat the land with the waste, and use it in the shape of manure?—Yes.

54. *The Chairman.*] That is the ideal remedy, if it were practicable to enrich the land by what is going to waste?—Yes. I saw that system in vogue at quite a number of places, and it was apparently quite a success.

55. *Mr. Buxton.*] You have stated, and I think fairly emphatically, that if this Bill becomes law it will probably do the dairying industry considerable damage. You are of that opinion?—Yes, sir, I am.

56. You can see the possibility of the Bill damaging the industry?—Yes, defeating the ends it is sought to gain.

57. Take, for instance, freezing-works: they have to provide their drainage now, and are not allowed to put it into a stream?—Yes.

58. Take meat-boiling-down works and manure-works: those industries would be allowed to pollute the stream under the Bill?—These works are not included in the Bill.

59. *Mr. Buick.*] You know that the law now as it stands gives power to apply for an injunction if there is any deleterious matter put into a river?—Yes, I understand so.

60. You do not know of any way whereby it is possible to work a dairy factory without putting a certain amount of matter into a stream?—No.

61. In this special case before us the farmers sought the sum of £500 for damages going on for some time, and they got £5 damages; but they had the right to apply for an injunction?—Yes. I admit that an injunction is a very severe method of taking action.

62. *The Chairman.*] Well, there is another point: you say that the question applies more to the Health Department?—Well, yes, the question of sewerage, of course, does; but we have to do with the sanitary arrangement in connection with dairy factories, which includes drainage.

63. Take these Manawatu people who are between polluted water by flax and inferior water from the artesian wells: the cheese comes down for your inspection, and do you not come in then if damage arises from the use of impure water?—It would be very difficult to ascertain where it came from.

64. Your duty would be to take some marks off that cheese, would it not, and your further duty would be to go to the factory and find out how it has come about?—Oh, yes, that is our duty. We do attend to those things.

65. Then it is plain that bad water would put you on the *qui vive* straight away?—Yes, that is one of the first things we look at if there is a chance of the supply being contaminated.

66. *Mr. Buick.*] In your experience have you been able to filter artesian water with iron in it to make it suitable for dairy factories?—I do not know if it has been tried.

67. *Mr. Nathan.*] It has been used. We have a system of filtering. The manager of one of our factories was anxious to compete at the Palmerston Show, and we sent all the water down to Bunnythorpe to be filtered and to take all the iron out, but that, of course, was only a small quantity. We may use 7,000 gallons of water per day, but only a small portion of that would be for butter, the rest would be for cleaning?—Yes.

68. Those filters would never deal with the quantity of water required for a butter-factory or cheese-factory?—I should think not.

TUESDAY, 15TH OCTOBER, 1912.

TOM PURDON, Farmer, of Rangiotu, examined. (No. 26.)

1. *The Chairman.*] Would you like to make a statement?—Yes, sir. I am bounded by the Oroua River, the Manawatu River, and Burke's drain, and the water in the river there and in the drain is polluted to such an extent that it will poison cattle. I have had to fence it off. Before it was fenced off I had a good deal of trouble, but since the rivers have been fenced off I have had no trouble. The trouble has been attributed to the water. I lost three cows last season, and I have lost one this season, from drinking the water. Burke's drain runs into the river; there is a mile of it; and as the river rises the water backs up and keeps the polluted water back, and it soaks the poisonous matter out of this vegetation. I do not say for a minute that the water coming direct from the mill would poison cattle. I was working at Seifert's mill for six years, and I drove a team there. I used to send the horses down to this river in front of the shoot to drink the water, and it never affected them. The reason for that was that the water did not stop long enough on the vegetation to soak out the poisonous matter. Another thing was that the vegetation, as we all know, floats. It is not until it sinks or gets washed up in a back-wash and becomes stagnant that it becomes poisonous. It is the length of time the vegetation is in the water that causes the damage. If the vegetation were kept out I do not think the discoloured water would hurt cattle. I never had a Government Veterinary Surgeon to these cows of mine, but I got advice from Mr. Scott, a veterinary chemist in Palmerston. The cows died, and I did not know what was the matter with them. So I opened the second one. It died with the same symptoms as the first one. Mr. Scott could not come down, so I got a brother-in-law of mine, who had been in the dairying industry for twenty or twenty-five years, and we opened the beast and we found that the second stomach was inflamed so much as to indicate poisoning, and it was poisoned. I took a part of the stomach to Mr. Scott, and he said that the cow was poisoned with a fluid and not with a solid. I asked him if he could make out what was the cause of it. He said he had looked over my pasture and could see no weed or anything of that sort, and asked if I had any dirty barrels of any sort. I told him no, only the skim-milk barrel that I fed the pigs from. The only thing I could suggest to Mr. Scott was the Oroua River, because you may remember that last year up till about October it was very low—it was not more than about 4 ft. across. You could get across in any place with the water only up to your knees. The only thing I could think of was this water, so I fenced the Oroua River off, and I have had no more trouble. This year, about a month ago, I had a cow die on the bank of Burke's drain. Mr. Pearce was coming along, and I said to him that I was going to have some more trouble with my cows, and asked if he knew the cause of it. He said "You come with me." We went up Burke's drain a bit, and he said, "You take a bottle of that water and see if that is what is doing it." I took a bottle of that water to Mr. Scott, and Mr. Scott said it would kill anything. So I fenced the drain off, and I have had no trouble since. There are two neighbours and Mr. Pearce and myself on this block, which is just a point in the river. There is one other thing I desire to say. I think the millers can keep this stuff out of the river without much trouble. They could keep it all out without any trouble.

2. Would you mind suggesting how?—At the present time each miller has a man to catch this vegetation, as was stated here, and that vegetation is worth £7 or £8 a ton—I mean the stripper-droppings. I contend that if that scaly matter were gold the millers would catch it; they would not lose a grain of it. The way to catch it that I would suggest would be this: in the first place, the mill is close to the river-bank. They have not got room enough to work a shoot to stop that matter going into the river, and in the short distance it would overflow. I would suggest that they take it on an angle to give them more room, and if the water will come out of a 3 in. pipe it will go out of a 12 in. shoot, and with the grating they could catch most of the stuff, and with a gauze and a Y-shaped trough they could catch the remainder, because if the trough was deep enough the vegetation would rise and screen itself. The millers may say that that would overflow while they were cleaning it out. Well, they could make another trap and shut that one off while the man was cleaning it out, running the water through this other one. I do not see why that remedy should not work. My idea is that the quicker the water is in the river again the less poison there is in it. There is one mill I know that is going to put a 6 in. pipe into the river. I think that if the trough were made big enough it would catch it, just the same as it would with from 180 to 300 gallons a minute. There is at the present time more vegetation on my place and some willows down there than I should like to carry.

3. *Mr. Buick.*] What mill is it that is emptying into Burke's drain?—Green's, I think it is. When the river rises sometimes that water is kept back eight or ten days and cannot get out, and you get that poisonous water for two or three days afterwards, perhaps.

4. *Mr. Sykes.*] Since fencing off the drain you have not had the experience with your stock that you had last summer?—I had three die last summer.

5. Then you fenced off the drain?—No, I fenced off the Oroua River then.

6. You presume, then, that it is the stagnant water in summer-time that does the mischief?—Yes, and the backwash. This vegetation floats, and the wind from the opposite direction will send it over to the shore and on to the lee side. If you have the running stream, and it is running properly, you do not stand such a chance of getting the vegetation; it is when the river is low and the wind high that you get it all. And it ferments then; it is perfectly black on the bottom of the river.

7. *Mr. Buxton.*] You say that the millers can very easily keep the solids out of the river: we already have it in evidence that they are keeping the fibre out?—They are not keeping it out; it is coming down at the present time. What we say is that if the millers are allowed to put a certain portion in they will take permission to put more in.

8. Would you think that any other water, if allowed to lie on the grass for a week or so and become stagnant, would have a like effect upon the cattle?—No, I should not say so. It will kill the grass if it is left there long enough, say a fortnight or three weeks. The grass will rot.

9. I mean simply flood-water, that has not been contaminated by any mills, but has come over the surface and gathered a fair amount of vegetation and then been allowed to stand?—The grass would rot.

10. Would it kill your cows?—I have not tested it.

11. You think that the water that has come over your land from the river, after being contaminated, has killed your cows?—It did not come over the bank. They went down and drank it out of the river.

12. You are quite satisfied that that was the cause of the death of the cows?—I have no other proof of it.

13. *The Chairman.*] You did not get a veterinary surgeon to examine these dead cows and ascertain definitely what it was that killed them?—No, only Mr. Scott, the veterinary chemist. He was the handiest man that I could get.

14. Why do you call him a "veterinary chemist"?—He has it over his door that he is a veterinary chemist.

15. He lives at Palmerston North?—Yes.

16. You have had a good deal to do with flax-mills—have you?—Yes. I was six years at one place.

17. Supposing you filled a barrel with the water, just as it comes from the mill laden with the pulp from the strippers, and left that water standing in the barrel, how long would it take before the pulp settled, do you think?—That I could not say. Some of it settles and some does not. I do not know whether some parts would settle. The reddish part of it settles and the greenish part seems to float.

18. What makes you think that some of it would not settle?—Because you see some of it floating, and you can see the other on the bottom of the river.

19. When you noticed it floating was it in a current or in still water?—It was in both.

20. You said that flax-millers could keep their refuse out of the water if they would only try. If opportunity were given of still water that carried this pulp, in your opinion would the pulp settle at the bottom?—It would in time. It gets water-logged, and it sinks down.

21. Is not the pulp green and moist when the flax is put through the strippers?—Yes.

22. Do you not think it would settle straight away if it had an opportunity in still water?—That would get heavier with water than it was without water.

23. How long were these cows of yours bad before they died?—From one milking to another—from, say, half past 5 in the evening till half past 5 in the morning—in fact, one of them died in between that.

24. Did you notice anything the matter with the cow before?—I did. The first one that died looked for all the world like a cow whose milk was pinching it. You would just think that the cow was very anxious to get milked.

25. How long had they calved?—They both calved in August and died in September.

26. There was no chance of its being milk-fever?—No, the symptoms were different altogether.

27. Did they scour?—Not that I know of. No, they did not, but their bowels were open.

28. They did not last long after you saw them ill?—No. There was one that we saved. She had come off the Oroua River. She got half-way from the Oroua to the Manawatu and then she dropped. My neighbour and I had her up on her breast-bone for about four hours, and she was frothing at the mouth and kicking—in fact, she blew up a bit. I put some gin in a drench and drenched her, and we got her right.

29. *Mr. Buick.*] Did they appear to be weak in the loins?—No. It just seemed as if it was a sharp pain.

30. Inclined to stagger?—No, no staggering at all.

31. *The Chairman.*] You never saw anything the matter with your cows once you fenced them off from the stagnant water?—I never had any trouble after that.

GERALD FITZGERALD, Civil Engineer, Wellington, examined. (No. 27.)

1. *The Chairman.*] Would you like to make a statement?—I think I could give the bulk of my evidence more shortly by making a statement. The first observation I desire to make is with regard to the Bill itself. It seems to contemplate that in some circumstances an injunction is possible, but if you take clauses 3 and 4 and invert them it seems to show that no injunction can possibly be obtained, for this reason: under clause 4, before you can get an injunction, you must prove first that the water is unfit for use, and, secondly, that you have no other water-supply. But reverting to clause 3, you will find that you cannot get an injunction at all under any circumstances if the injury can be compensated by money. So you have first got to prove that the water is unfit for use; secondly, that you have no other water; and, thirdly, that your injury is beyond compensation by money. Well, sir, there is no injury we know of that the Compensation Court has ever been called upon to deal with in which money has not been held to be a sufficient compensation. A man will be told in case of total deprivation that money is sufficient compensation. The Compensation Court has held over and over again, not that a sufficient sum of money at ordinary rates of interest producing the income lost is the amount to be paid, but that a sufficient sum of money for the man to take away with him and reinstate himself in some other part of the country is all that he can be paid; and that has been the basis of compensation in very large and important cases. So that total deprivation itself, which is the worst thing you can possibly do to a man, does not entitle him to an injunction under this Bill.

I contend, therefore, that it is impossible to obtain an injunction. The next point I take is clause 6. That deals with the qualified injunction, and the qualification there is that the Court may if it likes, but always acting under the provisions of the Bill, give a qualified injunction relating to certain periods of the year. Of course, that is quite outside the point here, because we are dealing with the question of polluting, and the degree of pollution means amount of dilution of a poisonous effluent, and that has nothing to do with the time of year—it has only to do with the quantity of water in the river; and the quantity of water is sometimes lowest in the winter and sometimes lowest in the summer; at all events, there is no period of the year at which you could say that the water could reasonably be said to be lowest or highest, and therefore a period of the year, if included in an injunction, would be entirely misleading as to the result. It has been given recently in evidence, for instance, that last spring was one of the driest seasons known; as a matter of fact, for six weeks I was using the spray during the spring in my garden. Clause 8 contains another provision which I think is a trap—no doubt provided without that object in view; but it seems to me not to afford any relief. The polluters are only asked to adopt methods—that is, if they are challenged by an injunction—that are in use in New Zealand. That would bind us for all time to any crude methods that may be in vogue now; we could not ask them to go beyond anything that had previously been done in New Zealand. At least, the precautions required ought to be those known to experts in the business.

2. Or subsequently discovered?—Or subsequent discoveries. You see it shuts off all subsequent discoveries. It makes the Bill a reactionary one, instead of one marking progression. That is all I have to say about the Bill. I come to the position now in which I am principally interested myself as the manager of trusts lending money. This is an attack upon our securities, and it is a particularly insidious attack, because, as it appears to me, it will affect the value of properties on which we are either asked to lend money or have already lent money. If we are asked to lend money on properties that seem to us to be affected by the provisions of this Bill, we, of course, can protect ourselves by refusing the loan, and that is what we shall have to do. A dairy-farmer coming to us now for a loan will, if this Bill is in force, be closely questioned as to what possibility of pollution there may be, and if it is found that he is subject already to pollution he will not get his money. If there was any chance of pollution we should probably not approve the security. But this is the particular vice in that clause: it gives the man a right to compensation by damages, and he gets the damages—the mortgagee does not. The mortgagee's security is depreciated, and the mortgagor takes away the money, whether the compensation is sufficient or not. So the mortgagee has absolutely no redress at all. There is this further view with regard to the damage done to a farmer: he is met with one very great difficulty. As the law stands at present, and as is well understood in all the British dominions where it is in force, an injunction is comparatively easy to obtain. You have only got to prove pollution, and there is an end of the matter. But this is quite different: you have got to prove damages. It is very difficult indeed to prove that damage, especially at the initial stage when the full damage has not occurred. It is prospective damage; and although the Bill makes provision for postponing finality in the matter so that the question of damages may be brought up from time to time, that does not help the farmer if he has to proceed against more than one person. If there are a dozen polluters his actions will have to be severable. It is possible to imagine that each one would escape by suggesting that it was some one of the other eleven. It has been seen here that where an action for assault in Wellington reached the Court, there were two persons involved; there was not the slightest doubt that one of them broke a man's jaw, but they both got off by each suggesting that it was the other. It is not possible to prove what damage each is doing, and that will be one of the defences raised. The difficulties that I am enumerating now are those that will appeal to us as lenders of money. We realize the hopeless position a man will be in, and realize our own hopeless position in consequence. There is one further matter of some importance. The British law makes underground streams of exactly the same and no more importance than above-ground streams, as long as they can be defined as streams at all. The consequence is that this question of pollution will apply to underground streams—even to drinking-wells. They can all be polluted. I have myself known several instances of the connection between those wells being immediately seen. There is another distinction which the Bill has omitted—I do not know why. It makes no difference between solids and fluids, and that is a very important matter indeed, because even if it were contended that it is difficult to entrap fluids, it cannot in this stage of knowledge be said that it is at all difficult to entrap solids. Solids can be deposited by sedimentation or coagulation. There is no difficulty about that; but there may be some further difficulty about fluids. The objection is that the solids, if allowed to be deposited upon the bed of a river, would poison the whole of the bed. They would begin by poisoning it at the point of entry, and as the solids are removed by floods to further down the course of the river—to the extent of a great many miles, according to the velocity of the water—they will succeed in depositing upon the bed of the river the solids which are fermentable. Those solids all contain albuminoids, whether of sawdust or of flax-refuse or of almost any vegetable matter. They only require a certain temperature to make them soluble, and the acids are liberated; in point of fact, they become poisonous, and if you were to drink them they would kill you. Almost any vegetable matter in a state of ferment is unfit for the human stomach. The only fermented things that I know of as being consumed are the fermented maize, which is consumed by the Maoris. The most common solids are sawdust, flax-pulp, fæcal matters, and brewers' wastes. They are all very poisonous when fermented. I should like to mention what is the practice in other countries. In England the rivers are under the control of Commissioners. It is the duty of those Commissioners to determine the degree of pollution that may be admitted to the channel, and they form regulations with that object in view. That has proved an extremely satisfactory way of dealing with the matter, because they can deal with wealthy corporations which a dairy-farmer would be

absolutely unable to attack for want of means. If a corporation or an individual manufacturer or a set of manufacturers wish to use a stream for the purpose of their waste, they have to get the permission of these Commissioners before they are allowed to do it, and then they are told how much they may put in, if any at all, and what degree of dilution is necessary, because that is the main question. In winter you could put the whole of the wastes of an industry into the stream, and it would not make any difference if it were all fluid; it would all disappear. But in summer when the stream was low very much less could be put in. And that is what these Commissioners have mainly to deal with. I think the main principle upon which they act is that the community are better served by the total loss of a trade if that trade cannot be conducted without menace to public life. And of course it is an axiom that the streams of a country should not be polluted to the detriment of the public. There is a further advantage that they have in dealing with these matters: they deal with them as experts, and if such a matter were to go to the Court after having been handled by the Commissioners it would probably be very easy for the Court to settle it; but it is not nearly so easy for a Court to undertake to settle such a matter in the conflict of expert opinion. It is much easier for the Commissioners to send a case cut and dried to the Court. If they have settled it, probably the Court will see that their reasons are good. There is another remedy—an altogether different one—which I suggest is well worth consideration, and that is as to whether a slight enlargement of Lord Cairns's Act would not have met this case entirely. That is more strictly in accord with the apparent object of this Bill. Lord Cairns's Act at present, I believe, deals only with trespass, and it allows a person who is trespassed against to be paid damages if the nature of the trespass is such as in the opinion of the Court it would be unreasonable to ask the trespasser to remove—a very large or lofty building trespassing perhaps an inch or two, say. In that case they would probably give damages and allow the building to remain. If an extension of that Act were adopted here, so that the Court would have absolutely free jurisdiction to deal with the matter, it would be ever so much better than the hampering clauses I have commented on. There, I contend, the Court is not free.

3. *Mr. Buick.*] Is that an English law?—It is a British law—I think it is in force here. It only applies to trespass; it does not apply to a general invasion of private rights such as this Bill set up; this is quite new.

4. *The Chairman.*] Does that finish what you wished to give the Committee in the way of statement?—That is all I have prepared.

5. *Mr. Buxton.*] What is your opinion as to the present position of the flax-millers: do you say that if things remain as they are they cannot possibly go on and risk injunctions?—They cannot do that: it would be dangerous to defy the Court. An injunction is absolutely prohibitive, unless you mend your ways.

6. You mean to say that there must be some amendment of the present condition of affairs?—I think it would be very desirable, because at present there is no authority dealing with rivers. It throws the whole onus of the test on to the private rights of the two parties.

7. Your contention is that something is needed, but this Bill is not the right thing?—I should have no objection whatever to something, because if the degree of pollution were made such that it would not injure anybody, as a lender of money I could not find fault with it. As long, for instance, as a man's stock could freely water at a stream, I would not suppose that a man's property was deteriorated in any way whatever.

8. But if this Bill was passed as it stands you consider that it would very considerably affect it?—Most certainly. We should have to conduct our business on somewhat different lines.

9. Of course, you have no idea how many farmers would be affected?—I should think every dairy-farmer would be affected now or his future position would be in jeopardy. He would have no redress, as far as I can see, against a polluter.

10. You, as a lender, would feel that under this Bill you would have to be very much more careful indeed—you would have probably to reduce your lending limit?—Yes; we should lose a number of clients.

11. That means that, in your opinion, there would be a considerable reduction in the value of all the land that might be affected?—Yes, no doubt. A reduction in value is a particular menace to mortgagees, because they have no redress under the Bill.

12. Your trouble there would be that the money that is already lent on land——?—Would be in jeopardy.

13. *Mr. Field.*] Have you had experience of the effect of flax pollution of streams?—Yes; I was a flax-miller myself once—not for long. I lost all my money in the trade, and then I stopped.

14. What effect does flax-refuse have on small, still-running streams if it is allowed to pour out from the mill without any filtration?—It would certainly make them poisonous in time.

15. Do you know whether it would have any effect on the fish in the streams or on the vegetation along the streams?—If it were very poisonous the fish would not live there. I have known fish killed from that cause, and many others—sawdust, for instance. As a general rule, if fish will not live in water, that shows that it is so depleted of its oxygen that it is not fit for consumption.

16. You say that water badly polluted by flax-refuse which has fermented would be dangerous to the health of human beings?—Yes.

17. It would naturally follow that it would be dangerous to the health of stock also?—It is rotten. The doctrine that is now being accepted in the United States is that stock require as good water as human beings.

18. You have experienced the stench arising from this polluted water, have you not?—Yes.

19. It has a bad smell?—Yes, it smells, and it is very dark.

20. What do you say as to the effect on milk in the near vicinity of a slow-running drain or stream that is badly polluted by flax-refuse?—I have always understood from dairy-farmers—

though I have had no personal experience—that milk is very readily tainted by any smells in its vicinity.

21. You are aware probably, from your experience as a controller of the lending of money, that farmers unfortunately have to borrow, as a rule, up to the full limit—that is, two-thirds or three-fifths of the value of their property—and possibly have to get a little on a second mortgage as well?—In nine cases out of ten they want more money than we can let them have, and they have to get the rest from somebody else.

22. Would not the passing of this Bill have the effect of reducing their borrowing-powers—they could not get nearly so much money?—It appears to me to be so. In my case it would certainly have that effect.

23. With respect to claims for damages, you see the effect on the mortgagee, and you say that the owner would get the damages if they were available. Can you see any means whereby a farmer would get any damages from a flax-miller who was unable to pay? Supposing the flax-miller was practically in a bankrupt state, what would be the remedy?—He would have practically no remedy.

24. And could not stop the pollution of his stream?—No.

25. He must submit to the pollution and get nothing in return?—That would be the effect.

26. Assuming a stream to be badly polluted by flax-refuse, does the pollution extend any distance where the soil is permeable? Does it extend any distance from the drain, do you think?—Yes; in some soils it would extend literally in any direction in which water flows from the channel of the river. The ground-water is frequently supplied from the bed of the river itself. In that case the whole of the ground-water would be polluted.

27. Flax-mills are generally on ground that is not much above sea-level, are they not?—That is so; at the same time it is to the advantage of the miller to get a current.

28. You said something concerning the pollution of water lower down in the ground itself. Do I understand that this refuse would pollute well-water some distance down in the ground?—Yes; it would pollute well-water as far as the polluted water is capable of penetrating—that is, down to the first hardpan. Beyond that the water is classed as artesian.

29. It would not affect artesian water, but would it affect water that is sometimes called artesian?—It would affect the latter, but it would not affect true artesian, because that is from a considerable distance down.

30. Would one flax-mill pouring this refuse into a stream high up the stream be likely to affect the water drunk from wells at a mill lower down the stream?—Yes.

31. So that one flax-miller might be doing damage to another, or even to himself?—Yes. I do not contend that such pollution as this is pollution that is actually bearing pathogenic germs, because those germs are not capable of being spontaneously generated. On the other hand, it is an excellent field for the culture of those germs if they should happen to get in from any other source, and the general source of pollution is human excrement. Sooner or later that gets into polluted streams, and then there is very great mischief.

32. Have you any method to suggest whereby the flax-millers could filter their refuse, so that by taking proper precautions—involving the expenditure of money, no doubt—they could reduce the evil to a minimum?—Yes. I have not the slightest doubt they would have to filter the lighter portions that float, because those are wax. It is erroneous to call them gum. They are wax, and the consequence is they are extremely hard to dissolve. In most cases they are practically insoluble. That would have to be screened.

33. That is injurious also?—It generally bears with it an inside skin which is fermentable, but there is an inside part which is not soluble except chemically. That would have to be screened, and it could be screened quite easily. The rest would settle. The solids can be deposited either by precipitation or by coagulation—all of them. The fluid could then, I think—some of it, at all events—be admitted to the channel. It could all be admitted in times of flood.

34. *The Chairman.*] Can you tell the Committee from your own observation that this wax portion of the pulp would not settle, say, in a perfectly still pond of a chain square?—I doubt if it would settle.

35. It has been suggested that if the mill-water was passed through under the strippers, and deprived of the fibre by ordinary screening methods, the pulp portion then poured into an enclosure, wire-netted, with small mesh, the enclosure being, say, a chain square, and there was perfectly still water, the pulp would settle in the bottom and the water would flow out on all sides and find its way into a drain, and go back into the stream and so be carried away?—That is quite practicable.

36. Then when enclosure No. 1 was sufficiently charged, you could go on to enclosure No. 2, and so on indefinitely, making successive enclosures in which to deposit the solid matter?—That is quite practicable; but that would not be required under the Bill as it stands at present. No man could be obliged to adopt those remedies because they are not in vogue in New Zealand.

37. What the Committee would like to know is, whether, in your opinion, the lighter portion would settle under conditions like that?—It might not settle in a pond where it was capable of being floated, but if it were liberated on any land it would settle down as a solid on the land, and the water would leave it. I have seen flax so deposited. The fluid has left it. It has been simply dumpted in a heap like sawdust. The pulp has remained and the fluid gone. I should like to add one thing that I forgot. These by-products are of great value. I have not the smallest doubt that the pulp is of great value if a method of treating it could be discovered. It must contain all the nitrogenous element of the leaf, and that is valuable as manure if the compound can be discovered which will make it agreeable to the vegetation for which it is used—either lime or a phosphate. I have seen linoleum made of it. I have seen paint made of it.

38. *Mr. Buick.*] I suppose you know also that a patent was taken out and a company floated to make it into a cattle-food?—No, I did not know that; but cattle would eat it when it was fresh. I have seen another process in which the whole of the leaf is dissolved, except the fibre. It absolutely disappears, and the fibre stands out as a sheet of white felt.

39. That was a German process, was it not?—No; it was invented by a New-Zealander who is in England now with the object of patenting it.

40. *Mr. Sykes.*] That process would be an expensive one, I presume?—He said it was very cheap: it would bring the flax into successful competition with cotton. I did not know enough about it to be able to test that, and he refused to accept the conditions I proposed to him in order to have it tested here.

41. When you were engaged in the flax-milling industry, did you adopt any means whereby this refuse could be collected?—No. We could not sell our tow, so we threw it into the river; and we could not make any use of the pulp, so we threw that in too.

42. With the knowledge that you were polluting the stream?—Yes; we were not prevented. There was no other mill working on the stream. It was a large stream, the Ruamahanga. There is such a very large volume of water there that you could not say there was any result within an appreciable distance, but close to the mill there was a little backwater in which there was a result. I have seen pumpkins growing on this refuse in the most satisfactory fashion. It satisfied me that it must be full of nitrogenous matter which only wants a suitable compound to make it valuable for plant-life.

43. You do not know of any experiments that have been made in that direction?—No, not as to manures.

44. *Mr. Field.*] Could you give the Committee any idea of what the expense would be to a flax-miller of taking the precautions you suggest for the purpose of purifying the stuff that comes from the mill—that is, stopping the solids—the wax and the green vegetation—and purifying the water to such an extent that it would not do very much harm to the farmer down below?—At first sight I would suppose that it would be only a little more than the carting away of the accumulations of pulp. This pulp will settle wherever you drop it.

45. But the question is the purifying of the liquid charged with the solid matters?—The liquid has not got any solid matter. If you were to deposit a stream of the stuff on the floor of this room, probably very little of the pulp would get out of that door. It would settle here and remain on the floor, but the fluid would run away.

46. It is mainly the cost of settling?—Yes.

47. That cost would not be very severe, would it?—I have seen this stuff deposited on the bank of a river. It did not even run into the river. It remained there.

48. You do not think it would be a serious tax on the flax-miller if he were asked to take what you regard as ordinary precautions?—I do not think it would, and I think he ought to be obliged to do it.

49. *The Chairman.*] You speak of carting. If the flax-mill is on level ground, a difficulty might be encountered in getting the water charged with the pulp on to any particular settling-spot. Would there be any practical difficulty in raising, by an ordinary pump, the pulp-water up to a tank, say, 6 ft. above ground-level, and then taking your flume straight away to successive settling-spots, thus doing away with the expense of cartage entirely, the water being the conveyor?—That would be quite practicable. It would involve a little capital expenditure, perhaps. Probably an easier way would be to commence the whole of your washing-operations at a higher level. That would mean pumping up your washing-water to a higher level, from which it would all be done by gravitation then. It would mean a little capital expenditure. The present practice is to liberate the water on the floor of the mill at a low level.

50. I witnessed the operations of a sugar-beet mill in America where 300 tons per day were carried away from the sheds in which the beet was stored, and delivered by machinery up to the top story of the sugar-mill, and the beets cleaned and washed, and the only manual labour engaged in the transport was two men, who were sitting quietly tumbling the beets into the stream?—That could be done.

51. Would you consider, then, that under similar circumstances the flax-refuse could be as easily handled?—I have no doubt about that.

52. You mentioned a point of great importance—namely, the Commissioners at Home. Would you explain to the Committee their exact status, seeing that, as we understand it in England, the Court is the final resort?—I think the Commissioners are appointed by statute, and they relieve the Government of the whole of the obligation to deal with such matters as these.

53. *Mr. Buick.*] They decide what is pollution and what is not pollution?—They decide the degree of pollution that the river is capable of carrying.

54. *The Chairman.*] There appears to me to be a conflict between what you said in the opening of your evidence—namely, that an injunction could be got in England if there was any alteration of the water-supply by pollution and what you now state that the Commissioners fix the permissible degree of pollution?—I do not know the full extent of their powers.

55. Can you indicate any source from which the Committee could get this?—No. My information is derived from the reports of those Commissioners appearing in the engineering journals from time to time.

56. In evidence given by the petitioners they express themselves as perfectly willing to accept the dictum of the Health Department as to what the flax-miller is to do to prevent the present unsatisfactory state of affairs. Could we here institute some body, such as you describe the Commissioners to be, that would be able at any time to give evidence to the Court as to what is possible under the particular circumstances of each case?—I should think that the officers of the Health Department would be quite capable of doing the work, and they could do it in safety if

their powers were defined by statute. It would be a difficult duty to ask them to perform now as long as they are Government servants purely under the control of a Department. If they got into conflict with the member for the district in each case, they would require some further protection.

57. Do you happen to know personally the condition of the Manawatu and Oroua Rivers in recent years as to the flax pollution?—Yes. I was engaged in the case at Palmerston North in which certain riparian owners tried to prevent pollution, and they ultimately succeeded in getting an injunction. But the case was an extremely unsatisfactory one in that evidence was required dealing mainly with the period at which the river was extremely low, and evidence of that character was a good deal by means of photographs taken when the river was in half-flood, and apparently there were miles of water. The photographs showed an enormous quantity of water in the river which any sensible man could see could not be affected by the effluents that were then escaping; and there was a great dearth of evidence as to what happened when the stream was low. The chemical tests did unquestionably show pollution even in a tolerably high state of the water, so you can imagine that in a low state of the water the pollution would be quite intolerable. As a matter of fact direct evidence of that kind was not presented to the Court. I myself had no opportunity to deal with it, because I was not asked to view the river until a few days before the trial, when the river was in fresh; but I did ascertain that the bed of the river was laden with tow deposited, with light sand on top of it, and that it was putrid. I took some up a good distance below the mill—about a mile below the lowest.

58. Submerged tow?—Submerged tow and pulp had been entrapped by the water and buried in the silt, and it was rotting on the bed of the river.

59. Would you consider it possible that evidence could be given of parts of the Manawatu River channel having silted up with sand and fibre from a depth of 7 ft. or 8 ft. almost to the surface?—I have not the slightest doubt that it could be proved that at certain places where the tow had been allowed to accumulate and it was held down by silt the bed of the stream had been raised. I am not prepared to say how high—about 3 ft. or 4 ft., I should say, in the Oroua, for instance, would certainly be a possibility.

60. Will you state what your opinion is as to the duty incumbent on the Government of the country to prevent interference with an important water-channel like the Manawatu to such an extent as you indicate by this silting up, quite apart from health or other damage? Ought not the Government to have taken steps long ago, from points of view other than health, to stop this silting up?—That is a very wide question. In the absence of a local authority to deal with the conservation of these particular rivers, I know the Government are proverbially slow to interfere. I do not quite know why they should interfere. If the farmers immediately interested, who are subject to flooding, choose to submit to it, I do not know why the Government need relieve them. There is no menace to health in that. In some parts of the world these risen river-beds have reached extraordinary dimensions. In the south and east of Japan the railways go underneath the river-beds because the latter have already got to such a height that it is almost impracticable to bridge them, in view of the gradients involved. Occasionally these rivers break their banks, and wholesale destruction ensues. That is the tendency with what you have mentioned.

61. *Mr. Pearce.*] Can you tell us as a flax-miller whether it would be detrimental to the colour of the flax to pass it from the patent catcher a distance of 6 ft. or 8 ft. before the water is applied to it?—If the flax had not time to become dry or appreciably drier in the interval before the stream of water fell upon it, it would still perserve the moisture, and it might travel.

62. In this case it is travelling fast on a chain. All the pulp is falling on a dry floor. It then goes into the patent washer, and 5 tons per day are collected off that floor, at the expense of the wages of one man, who also collects the stripper-droppings. Would the expenditure of that sum of money injure the industry?—Probably not; but I have never been able to see any reason why labour should be needed at all for it. If the mill were suitably equipped it would run away without any interference at all.

63. *The Chairman.*] The Committee would be very glad, Mr. Fitzgerald, if you could indicate where we could put our hands on the information that you referred to?—I will see if I can get you the information.

ALEXANDER FRANCIS HADFIELD, Farmer, examined. (No. 28.)

1. *The Chairman.*] Your address, Mr. Hadfield?—Waikanae

2. *Mr. Field.*] Your mother is the owner of a property at Waikanae, which is watered by a small stream on which there is a flax-mill?—She is the life tenant, and she has asked me to represent her in this matter.

3. The property is in the vicinity of the flax-mill?—Yes, within two or three hundred yards.

4. The flax-mill is on the stream which flows through the property?—Yes.

5. What sort of a stream is it?—It is a fresh mountain stream. It comes across from the mountains there, and runs past the mill into a drain which has been constructed to receive it and take it on to Mr. Campion's place.

6. How large is the stream?—It would be on an average from about 2 ft. 6 in. to 3 ft. in width; and it would vary from bank-high in winter-time to about 6 in. or 7 in. in the summer.

7. A mere dribble in the summer?—That is so.

8. Has it got any appreciable fall to the sea?—Yes, but it is a good way to the sea.

9. How far is it from the flax-mill to the sea?—The stream runs in a direct line westward, and then it goes through Mr. Campion's and Mr. Field's properties. I suppose, by the stream, from the flax-mill it would be very nearly four miles to the sea.

10. How does it affect your mother's property—the putting of the flax-refuse into this stream?—Well, it affects it very seriously, because it entirely pollutes that stream. The stream

in the summer months is really a foul spot: it is stinking. And with regard to stock drinking at it, they will not touch it at any price at all.

11. They will not touch it at all?—No.

12. A bad smell arises from it?—Yes. I was fencing there in the beginning of 1911 for about three months, putting up a mile or so of fencing, and it was so stinking, the smell was so overpowering, that the three of us who were working there were constantly affected with diarrhœa and sickness.

13. What is the stench like? Is it like rotting animal stench?—It is just a rotting stench, a stinking stench. Of course, it is greater when the stream is low, and in the hot summer months.

14. Will you tell the Committee what effect it has on the bed of the stream?—On the bed of the stream there is a slimy yellowish deposit right round the bed, and this has been collecting and collecting for years, ever since the flax-mill was started; and it has absolutely fouled the water now. Even fresh water coming through would be fouled through running over the polluted bed.

15. Does it have the effect of killing fish or vegetation?—Yes. As a boy I used to go bobbing for eels in that stream, but now all fish seem to have absolutely disappeared. There are no signs of eels or fish of any kind.

16. No signs of eels even?—No.

17. Does it have the effect of killing vegetation also?—Yes, the watercress has disappeared. It seems to absolutely kill the vegetable life as well as the animal life.

18. Have you any knowledge that the pollution of the stream also pollutes the land in the vicinity of the stream?—Yes. The fencing we were working on ran parallel with the drain for some distance, and every time we took out a shovelful of earth the smell was so sickening that, as I have stated before, it made us sick. There were three of us, and it affected us all.

19. Is your mother's property wholly dependent on that mountain stream for fresh water?—Absolutely. If my mother subdivides, as she proposes to do for dairying purposes, it would absolutely ruin the property.

20. Have you seen the stock drinking the water?—When we were fencing there I often saw sheep come down to have a drink at the watering-places, and they would just smell the water and go away without drinking. At that time all the watercourses were dried up, and there was no other water except this stream-water, which they would not touch.

21. Has it any appreciable effect on the health of the stock?—Well, I could not say that positively, except to this extent, that the mortality of sheep in that particular paddock was very, very heavy indeed. We turned out 221, and we got in 175. That was for a period of about six months.

22. Have you read this Bill?—Yes.

23. Can you say from your opinion that the Bill will very seriously prejudice the farming industry?—I should certainly say so.

24. Do you know anything of the steps which have been taken by the mill close to your mother's property to prevent this evil?—I can only speak generally. At first the flax-miller used to run in everything holus-bolus, but latterly he has boarded in the place, and it is now only the vegetable pulp that comes out.

25. And with these precautions is the evil very much mitigated?—I think the evil will steadily grow worse, because this vegetable matter is being accumulated inside this boarded enclosure, and as it grows older and decays the evil will get worse.

26. As a farmer, have you any idea what effect this water would have on dairy cows?—Well, I have heard that turnips taint milk, and I should say if turnips taint milk this stuff would absolutely poison it.

27. You do not think they would drink the water at all?—No.

28. *The Chairman.*] Have any of the settlers concerned taken any steps to prevent the mill from polluting the stream in this manner under the old Act?—There have been no steps taken so far as I am aware.

29. There have been no steps taken to obtain an injunction to stop the pollution of the stream?—I think it has been discussed at times, but nothing has been done up to the present.

30. This has been going on for years?—Yes, I should think a few years.

31. Is there a large collection of fibre in the bottom of the stream?—It is only a small stream, and what seems to have collected chiefly is the pulp. It is formed into a yellowish brown slime running round the water-bed.

32. And there is really no great force of water in the stream even in wet weather to wash it out?—There is a very fair fall to the sea. In the mile run through our place I should think it is probably 30 ft.*

33. *Mr. Sykes.*] You say the mortality among sheep which depastured in the paddock through which this stream runs was very heavy?—Very heavy indeed.

34. Was that during the summer months?—The last mortality we noticed was from crutching-time, when we turned out the sheep, till we got them in, about the beginning of last month.

35. Of course, they might have died from other causes? The pasture may have been insufficient, for instance?—Yes, of course, it is a question for discussion to arrive at what the cause of death really was. But still the death-rate was extraordinarily heavy.

36. You are aware of the fact that during the winter sheep practically drink no water?—There is generally sufficient moisture on the ground, but, of course, this particular ground was soaked to a fair area with refuse from this drain.

37. Were the sheep hoggets or fully grown sheep?—They were mostly hoggets. They were hoggets and breeding-ewes.

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* *30 ft.*, I stated in my evidence, but I think Mr. Campion, who said 15 ft. to 20 ft., was nearer correct.—A.F.H.

38. Breeding-ewes of your own breeding?—Excepting the oldest sheep, which were bought sheep. There were very few of them.

39. With regard to this vegetable matter of which you spoke, which has been collecting at the flax-mill for some time, has not the flax-miller taken any steps to remove that collection of deposit?—Well, as I explained, I am only speaking generally. In the first place, I know this flax-miller ran the stuff in holus-bolus. Afterwards he boarded it in, and now it is just a percolation. I say that will increase the evil, because that vegetable matter is collecting there and decaying, perhaps, for a number of years.

40. He does not periodically remove that vegetable matter from the enclosure, but allows it to decompose?—I would not go into any details, but I presume he does catch it in his race, perhaps by a hook.

41. I presume there will be a vast mass of vegetable matter in this enclosure?—Yes, there is a great mass of vegetable matter, mud, water, and dead trees and shrubs which have been killed.

42. *Mr. Buick.*] I think you have stated in your evidence that those working at a certain fence had diarrhœa and other ailments?—That is so.

43. Is that purely from the smell—not through drinking the water?—No, we used to take our billy of cold tea out with us when we were working on this fence. We never touched this water: it was too strong altogether.

44. *Mr. Buxton.*] You say that although the sheep go down and look at the water, you have never seen them drink it?—That is so, I have not seen them touch it.

45. Do you think they did drink it?—That was in the very driest part of the year, when the water was pretty low in the stream, and it is quite possible that when the water was diluted by freshes or floods that they might have drunk it.

46. You stated that the mortality among the sheep in that paddock was very heavy?—Yes, that is so.

47. And yet they did not drink the water?—They did not at that particular time. I have not seen them drinking it.

48. What has been your experience for many years as regards the mortality of sheep in this particular paddock—is it heavier than in other paddocks?—I have only been there about three years

49. That has been your experience for three years?—That is so.

50. Is it more low-lying than the other paddocks?—It is certainly low-lying.

51. Swampy land?—It ranges from low sandhills to swampy drained flax-land.

52. The mill has been in operation all the time you have been there?—During that three years, certainly.

53. *The Chairman.*] With regard to this paddock where you had the excessive mortality, was there any chance of the sheep drinking any other water than this polluted water in summer-time?—In summer-time we found that every drain on the place except this mile drain was dried up absolutely, excepting some swamp water in a small lagoon, out of which there is a drain running down to the coast; but I have never in my experience known cattle or sheep drink that swamp-water. The other water, coming down from the mill through the mile drain, was the best water on the place, and the only suitable drinking-water.

54. And it carried the mill-refuse?—Yes.

55. So that practically stock had no other water to drink except this mill-water?—That is so, except along the upper part of the property there are several small tricklets of water in various places; but the flax grows up very close, and the sheep would have great difficulty in finding their way up to these tricklets; and that was the only other good drinking-water.

56. You said something about a boarded race. Will you describe that to the Committee. What was its purpose?—I think the boarded enclosure was to prevent the larger refuse from flowing in. Of course, it did not prevent the pulp from flowing in, but it prevented fibrous matter of any length that could be hooked from flowing in. I think it was hooked first with a drag, and then being boarded round, it is just a matter of percolating through the cracks in the boards and the swamp land.

57. And the pulp still flows down with no check at all?—No, there is no check at all.

58. Working out the figures you gave us as to the loss of sheep, it means 20 per cent.?—Yes.

59. Had you plenty of grass?—Yes, any amount of grass.

60. Do you know what your losses were in the other paddocks?—In one of the other paddocks, felled bush land, we turned out 261 breeding-ewes and we got in 259.

61. What about hoggets?—We never paddock hoggets there, except perhaps a few stray ones. These would be breeding-ewes from about two-tooth to six-tooth in that particular paddock.

62. Any loss?—Only a loss of two in that paddock.

63. Was it not a mistake to have your hoggets where the conditions were not the best that you could obtain for them, and to have you ewes in the paddock where this flax trouble did not appear?—We considered that when we turned out the ewes. The ewes were worth from 16s. to 17s. each, while the hoggets were worth only about 8s., and we considered it the better policy to put the best ewes on the good lambing country, where we could attend to them properly, than to put the hoggets on the best land.

64. *Mr. Field.*] There is flax, of course, growing on your mother's property?—Yes, certainly.

65. And you derive income from the sale of the flax?—Yes, my mother does.

66. You are then to some extent dependent upon the flax industry?—Yes.

67. You do not want to do any harm to the industry?—No.

68. Have you noticed in the slime in the paddocks the little red worm you find in filthy watercourses?—No.

G. ALLPORT, Secretary for Marine, examined. (No. 29.)

1. *The Chairman.*] Would you like to make a statement, Mr. Allport?—The only statement I have to make is with regard to the effect that the deposits from these mills into the rivers has upon the fish, and the silting-up through this cause of the mouths of the rivers which are harbours. The main objection which we have taken to the deposits is the tow going down the rivers and stopping when it comes into the still water where the waters of the river meet the tide, and there forming banks caused by the sand and silt drifting upon this material. This forms a solid bank, which impedes the navigation of the river. Then there is the effect it has upon the fishermen, because this material gets in their nets and clogs them, and prevents the fishermen carrying on their industry in a proper way. We took steps to prevent this by requiring the mills to put in gratings to catch the tow as it went out from the mill into the river. This was done in a good many cases with very good effect; but we find that still some of the material goes out into the river and flows down and forms these banks. Then we find that the green material from the flax has a bad effect upon the fish. I am not able to say that the fish die from it, but our experience is that they forsake that part of the river in which this stuff accumulates, and consequently are not caught there to any extent. These are the only grounds upon which the Department has raised an objection to the deposit of this material in the rivers. We have not looked at it from the point of view of its effect upon stock, or anything of that sort.

2. *Mr. Buick.*] What river were you alluding to when you stated the tow affects navigation by raising up banks of silt in the river?—That applies to all tidal rivers.

3. Does that refer to the Manawatu?—The Manawatu and other similar rivers. The Manawatu is the principal one.

4. That was some years ago?—Yes, some years ago. It has not been so bad since we have done our best to keep these gratings I have mentioned maintained in order to catch the tow going down.

5. What reason have you to think that it is deleterious to fish?—The fish leave that part of the river: that is our reason for thinking that it is deleterious to them: they do not stop in it. The river becomes almost bare of fish where they were formely found in large numbers.

6. Would you be surprised if we told you that we have had evidence to the effect that fish really crowd to these places?—Yes, I should be. That is not my experience.

7. *Mr. Sykes.*] Are there a number of fishermen dependent upon their trade in the particular rivers you mention?—Yes, that is so in most of the rivers. In the Manawatu there are a good many dependent for their living upon their fishing at the mouth of the river.

8. You speak of fish in general terms?—I am speaking mostly of sea-fish when I speak of these fishermen near the mouths of the rivers.

9. *Mr. Buxton.*] It is sea-fish that you specially refer to? We have had trout mentioned as being affected by it, and all kinds of fish?—Yes, the green matter is more damaging, I think, to the trout than to the sea-fish, because the material that acts upon them is dissipated pretty well by the time it gets down.

10. With regard to the banking-up that you speak of, is that caused by the tow or the other sediment?—It is caused a good deal by the tow. It is caused chiefly by the tow.

11. They are taking that out now?—So long as it is kept out it is all right. The other matter would not be serious. I do not think the other matter would affect the navigation.

12. *The Chairman.*] Would it be correct to say that the channel-buoys put there for navigation purposes are interfered with in time of flood by masses of tow, which gets entangled upon them, and the force of the water in flood-time pressing against them?—Yes, to a certain extent, but we have never found it has had any serious effect upon the buoys.

13. Can you give us any definite particulars as to interference with navigation caused by the silting process you have described? Were the steamers stuck?—Steamers have stuck upon such banks that were formed.

14. From this cause?—Yes, from that cause.

15. *Mr. Field.*] I have heard that in the Manawatu the boats have had their propellers at times stopped by the tow going down?—Yes, that has happened, but not very often; not to my knowledge, at any rate.

16. *Mr. Buick.*] Not of recent years?—No, I have not heard of it of recent years.

ALEXANDER CAMPION, Farmer, examined. (No. 30.)

1. *The Chairman.*] Your address, Mr. Campion?—Waikanae.

2. *Mr. Field.*] You are a farmer at Waikanae?—Yes.

3. You are the next-door neighbour of Mr. Hadfield, who gave evidence just now?—Yes.

4. With regard to this stream which is polluted by the flax-refuse, does that stream intersect your property?—It runs through it.

5. Are you a grower of flax on your property?—Yes.

6. Have you a flax swamp?—Yes.

7. Do you sell your flax to this mill?—Yes.

8. You are therefore interested in the industry, and it would be a serious matter to you if that mill were to close down?—Yes.

9. A considerable portion of your living is derived from the sale of flax?—Yes.

10. You do not want to do any harm to the flax industry?—Not at all.

11. Coming to this stream, was it orginally a pure stream, as it comes from the hills?—Yes.

12. Is the mill close to the stream?—I should say it is about 100 yards from the stream.

13. What are the conditions of the mill with respect to the prevention of the flax-refuse from getting into the stream?—I think the flax-miller has done something towards it. He has put an

embankment round it—it is a very strong one—and since he has done that it has not been nearly so bad.

14. It is not, however, entirely effective?—It is not nearly so bad since he has done that. But, of course, it has been wet weather. We have not had a dry season since that has been done.

15. In dry seasons what effect has the emptying of this refuse into this particular stream upon the stock?—The stock will not drink the water.

16. What is the appearance of the water? What does it look like?—It is very dirty. It is the gum, I think, or the waste or wax, whatever you like to call it, that accumulates in the bottom. You would think it was alive in the bottom of the stream.

17. Does it make the water slimy?—Yes, it makes it slimy, and the stench is terrible.

18. The stench is terrible?—Yes.

19. So far as stock are concerned, what can you tell the Committee about the drinking of water?—I had to take the stock out of the paddock. They would not drink the water.

20. Do you refer to all kinds of stock?—I had only horses in that paddock in the dry season.

21. Did the stock go down and smell at it, and then go away without drinking?—Yes, they would smell and go away. I could not make out what was up, and then I found that they would not drink the water, so I shifted them out of the paddock.

22. Are you largely dependent upon this stream for the water for your stock?—In that particular paddock that is the only water I have got.

23. Do you know anything of the effect of the flax-refuse in the stream on the fish and on the vegetation?—It kills them all.

24. Does it kill the eels?—Yes. The first time I cleaned the drain the mill had not been running for a few months. It was simply full of eels. Now, since the mill has been running, there is not an eel.

25. That is, of course, a very small stream in the summer?—Only a small stream. I should say it has only about 6 in. of water in it.

26. Has it got much fall to the sea?—I should not think so.

27. How far is it from the mill to the sea?—Anywhere from four to six miles.

28. And what is the fall in that distance?—From 15 ft. to 20 ft.

29. There is not much chance of the stream itself washing the impurities away?—It cannot wash it away.

30. Is the stream polluted for some distance down?—Yes, all the way down.

31. And stench arising from it?—Yes.

32. Do you think the emptying of the refuse from the mill into a stream such as yours would have the effect of choking the stream to any appreciable extent? Does it accumulate on the bottom of the stream?—Of course it does. We have to keep cleaning it out, and we have to keep cleaning the drains out.

33. Suppose, Mr. Campion, that you wanted to finance on your property, to borrow up to the fullest possible extent on it: do you think it would affect your borrowing-capacity, this stream?—I should think it would.

34. In other words, it would depreciate the value of your property?—Yes.

35. Have you any knowledge of stock suffering in any way from it?—I do not know. All I know is that my horses would not drink the water, and I simply shifted them out of the paddock. I have never lost any stock through it.

36. *Mr. Buick.*] You are a dairy-farmer, are you not?—No.

37. Is that the only water-supply you have?—On that particular end of the place. I have got water about a mile and a half away.

38. Do you think it would be possible for the mill to be carried on profitably without using that stream?—They could not carry on the mill without using that stream.

39. They could not carry on the mill without polluting the stream?—Oh, certainly, they could carry on the mill without polluting the stream if they took precautions and kept everything out of it.

40. What way do you think they could deal with the material?—Either cart it away or shoot it away with water. It has not been nearly so bad since the embankment has been put up. But that will get bad later on: there will be so much of it accumulated, it will get rotten, and perhaps be worse than ever. There should be some way of working the mill without accumulating this stuff.

41. Has there ever been an attempt made amongst the neighbours to stop the pollution going into the river by way of injunction or in some other way?—Never, to my knowledge.

42. In other words, you would rather put up with the pollution of the river than lose the mill. Which would you rather lose, the stream or the mill?—I would rather lose the mill than lose the water

43. You have lost the water practically now, but you have still got the mill?—Yes, that is so.

44. *The Chairman.*] Can you tell the Committee positively from your actual knowledge that you could not scrape up an eel in this creek in spite of the flax?—No, I never saw one.

45. Have you looked for them?—Yes; as I have said, when I cleaned the drain before you could chuck them out by the dozen.

46. And do you say that the watercress is killed out too?—Yes.

47. When you shifted the horses out of that paddock, what did you do with the paddock?—I let sheep in on it. They would have to do without water, or else drink it.

48. Did you ever notice them drinking it?—No.

49. Well, you know, in a dry summer sheep want a drink do they not?—Oh, yes, but sheep will live without a drink.

50. But will sheep do well in a dry summer without water?—No, they do better with it.

51. Did you watch them to see that they did not drink it?—No, I did not.

52. So you could not be positive whether they drank it or not?—I could not.

53. What about cattle?—I have had no cattle in the paddock. The horses were valuable horses, and I took them out. I thought the sheep could take their chance.

54. What did you say to the owner of the flax-mill? Did you do anything?—I told him he would have to do something. He tried and did the best he could. It has never been so bad since the embankment was put up, but we have not had a dry season since then. I think the water is all right as it is now, but if we get a dry season it will be bad.

55. *Mr. Buick.*] You say you never saw your sheep drinking that water?—No.

56. Had they any other source of water?—No.

57. They would have to either drink that or go without water?—Yes.

58. *Mr. Field.*] The object of this Bill is to substitute a claim for damages in place of the present right of applying for an injunction?—Yes.

59. That means to say that you must submit to the pollution in most cases, as it is entirely dependent on a claim for damages. What does the farmer want—pure water or the right to damages?—Pure water. We do not want damages.

60. But supposing this Bill passes, and the pollution of this stream and other streams is allowed, what steps would the farmer take to prevent the pollution of the stream: would he destroy his flax and close down the mill, or what steps would he take?—He would destroy his flax.

61. His idea would be to close the mill rather than let the pollution continue?—At least, that would be my idea.

GEORGE WATSON, Farm-manager, examined. (No. 31.)

1. *The Chairman.*] Your address?—Waikanae.

2. Would you prefer to make a statement?—I have not very much to say as to what the damage that flax-mill pollution would do to a river, but I do know a little bit about what it would do to a small stream of a similar nature to the one referred to by Mr. Campion. As an instance of what happened about twelve years ago, a residence was built on this particular creek, about 56 ft. away from it. The creek was then a pure fresh-water stream. In fact, the reason the house was put there was for the purpose of using the water for household purposes. It was used for a long time for cooking purposes, and drinking as well. About seven years ago the flax-mill was shifted from Waikanae to where it is at present, and it is using this stream. Now, in the summer-time in a dry summer the stock will not drink that water from that creek if they can get water anywhere else. Of course, I am not one of those who say that the stock would not drink it, because I think in a dry season they will drink anything. But still, at the same time they will not drink it, and as to the stench from it I can assure you it is not a bed of roses that you smell. As to the water itself and the action it has on the stream, there is no vegetation such as watercress or grass, or anything else. This gummy matter, whatever you like to style it, seems to destroy everything.

3. *Mr. Field.*] When the pollution was at its worst, where were the stock getting their water from?—At that time in that paddock they would have to go about half a mile over the hill and get it out of a lake further down. The stream runs into that lake, and I believe in time it will pollute the lake, which is at present a fine fresh-water lake.

4. Have the cattle in the same paddock now an opportunity of going to this lake?—No; it is now subdivided.

5. And the pollution of the water at the time you speak of would prevent the stock getting water for drinking?—Yes, and that is the only water they will have to rely upon now.

6. This property which you are managing, how is it served for water purposes?—Well, that particular section is, of course, watered by this particular stream.

7. Is this stream the main source of supply for the whole property?—Yes, the whole property.

8. Is it true that at the southern end of the property there is a pure unpolluted stream?—Yes.

9. This Bill provides that you shall not have a right to an injunction if you have pure water either on your property or adjacent to your property. Would this pure-water stream at the southern end of the property be of any use at all?—No. It would mean taking the stock three miles night and morning. It would be a difficult matter to know when they want a drink.

10. It would be hardly worth while bringing the stock up and down all the time?—No; that is exactly what would have to be done.

11. Do you live on the banks of this stream now?—No. I lived in this particular residence about twelve years, and this last season I have had to shift my wife and family away, and take them to Waikanae, away from the place altogether, because at night and morning I can assure you it is very unpleasant. Furthermore, I may add that there is a portion of this property which is maintained by the Horowhenua County Council through an agreement with the various owners, and their employees have to go and clean this drain out every year during the dry season. Well, I cannot say that it actually makes them sick, but they do use very strong language, I can assure you.

12. Can you tell the Committee without reservation that in a dry summer a house on the bank of a stream polluted as this is is quite unfit to live in?—It is absolutely unfit to live in, and I would decline to live in that house again in the summer-time, or allow my wife and family or any one else to go in there.

13. Do you know whether it killed all the fish in the stream?—I could not say. I do not know anything about that. I know there were fish in the stream, but whether there are any now I do not know.

14. Did you notice in the bottom of the stream among the slime any little red worms?—Millions of them. You can see them there when the water is low. There is a slimy mass. You

will see millions of these worms there. In fact, I pointed them out to you yourself one day when going along.

15. Did you say you had used this water for domestic purposes when you went there?—Yes.

16. And that it is quite unfit for such purposes when polluted?—Absolutely no use at all of any description.

17. At one time you used it for cooking?—Yes, and for drinking also.

18. Can you tell the Committee that undoubtedly the pollution of this stream would have the effect of depreciating the value of that property?—Yes, I am sure it would. You know very well that if you have a polluted stream or a pure fresh-water stream it must add to the value of the property or depreciate it, as the case may be.

19. As manager of this place, supposing the Bill passes, and this pollution continues, would you advise that flax should be supplied to the mill from the property? Would you be willing to sell the flax to the mill?—No, I would certainly not. I would advise them to grub it out, or sell it elsewhere. I would not support the mill polluting that property.

20. If the water is kept pure it is very much to the interest of the farmers in that district to support the mill?—Most decidedly so.

21. *The Chairman.*] You did not notice any deaths among the stock from the drinking of this water?—No, I did not. I did not because in this particular paddock there was a supply of fresh water at the lake, into which this stream flows at its lower end. The highest portion of the lake is fresh.

22. Have you remonstrated with the flax-miller?—Yes, we have.

23. Has he done anything?—No. I understand he put in some kind of protective works—what it was I do not know. I understand he did do something. Certainly it has been kept cleaner since; but still, it can be better even than it is now.

24. Can you suggest anything to the Committee by which this nuisance could be done away with, and still allow the flax-mill to go on producing wealth from the flax?—I cannot suggest anything. It is a matter I have never taken any interest in. I could not suggest anything at all.

25. *Mr. Sykes.*] Does your property supply flax to the mill?—It does.

26. And the flax-mill is dependent for the supply of flax from you and your neighbours?—It gets the flax from various places.

27. Then the remedy is in your own hands?—No. He takes flax from Paekakariki, twelve or fourteen miles away.

GERALD TOLHURST, Farmer, examined. (No. 32.)

1. *The Chairman.*] Your present address, Mr. Tolhurst?—I am at present residing at Otaki.

2. Would you prefer to make a statement?—I think so. I have not read this Pollution of Water Bill, but I understand it has been brought on because Mr. Pearce won his case against the flax-millers some months ago, in which Mr. Pearce by his action apparently has raised an alarm. I was on the Oroua River with Mr. Pearce for many years, and I was one of the members of the Drainage Board there, and we were continually contending against the flax-millers for putting their waste products into the river, mainly on account of the tow raising the bed of the river. Well, on one occasion we brought an action against the flax-millers, but our chief expert witnesses did not give the evidence that we expected, because they saw the river only in flood-time, and they said that they could not see that the bed of the river was raised. The evidence was true so far as it went; but if they had gone on ordinary days when the river was low, they would have seen that the tow collected on the bed in the river, and quickly raised the bed of the river. That is one of the points I wish to mention, the tow from the mills raising the bed of the river. Another point that I know of is that waste water from a flax-mill that used to empty into the main drain, which was one under our control, always killed the watercress and other green stuff. There is generally watercress, grass, and green stuff growing in a drain, but in this case we never had to clean it for vegetation: we only had to attend to the slips of soil which came down into the main drain. This proved to us that this waste water from the mill was of a poisonous nature, as it affected vegetation in this way. This Pollution of Water Bill, for all I know, may affect us in many other ways. It may be the means of giving further permission to people who now are polluting our streams. It may give them further facilities to pollute the streams than they now have. Now, we have dairy factories in our district that are polluting the water, and men who are discharging waste water from their households into the stream; then there is the refuse from the sawmills: it all goes into the river. All of that could be prevented by a little expense. It is preventable. I understand that the waste products from the mills could be prevented from polluting the streams in a cheap way through filtration. The mills should not be given further concessions, but steps should be taken to see what can be done in the way of filtration. There should be some simple means of allowing them to filtrate their water instead of allowing them to dump it wholly into the river, and if you pass this Bill you will give them further facilities to do so. The mills have been doing this work for years, and in the old days there was a great deal more flax tow put into the rivers than there is to-day. There is possibly not so much of it now, so that the question of raising the bed of the river may not be so important as it was in the days I am speaking of. But the green vegetation is still being poured in. Of course, as I am not an engineer, I do not know the exact cost of filtration-beds; but simple filtration-beds would I think greatly solve the difficulty. It can be done I am sure, and cheaply.

3. *Mr. Sykes.*] Is that in reference to flax-mill refuse?—Yes, flax-refuse in particular.

4. *The Chairman.*] You have suggested filtration. Can you give the Committee any details as to what sort of filtration-beds you would suggest?—Well, in an ordinary cow-yard we filtrate through stones. Of course, there is a very large discharge from these mills, and the material would have to be more systematically dealt with in large quantities. The flax-mills are now an

established industry, and surely there should be some means by which the flax-miller can take his waste and filtrate it, and carry the solid refuse out into the paddock.

5. You have no details that you could give us?—No, I have no details as to filtration-beds that I could suggest offhand. But one of us could make filtration-beds that would prevent refuse from becoming a nuisance to our neighbours. As to these streams and rivers, we have all sorts of things going on. We have all sorts of articles being discharged into the stream, such as dairy-factory waste, slaughtering waste, household waste, and nightsoil; and here you will have an Act of Parliament permitting it. That is how I feel. This Act of permission may give us greater difficulties in protecting our waters against pollution, because we cannot take action for injunction against people who are doing this, because by Act of Parliament they are to be permitted to do so.

6. *Mr. Buxton.*] Your opinion is, then, that things are bad now, and if the Bill goes through they will be worse?—That is so. From what I understand of the Bill it facilitates this sort of thing.

7. Gives greater facilities for polluting the water?—Yes.

8. *The Chairman.*] Can you tell us anything from your own observations as to stock drinking this polluted water?—I have only observed, in the old days, when this water was from the main drain, the stock did not care about the water. But that is only in a general sort of way. I cannot give any particular instance, such as taking my horse up and trying it.

9. Do you know whether it kills fish?—No, I cannot say as to that either. I have never been a fisherman, and I have never observed anything of the kind.

10. Can you tell us anything about the dairy factories?—I can tell you that the dairy factories in our district are so strong in the summer-time that you cannot pass them without holding your nose.

11. Are they on the bank of a stream?—They are on the banks of a little stream.

12. Do you think that that nuisance could be stopped?—I do not know about it being entirely stopped, but I should think a great deal could be done by more sanitary methods. I do not know what the cost would be, but there must be a means of dealing with the filth.

13. *Mr. Field.*] From your knowledge of the methods of flax-millers now, has any serious attempt been made to filtrate the water and refuse that flows from the mill, or in any other way to abate this nuisance?—No. My experience goes back four or five years ago. In those days they made no attempt at all to properly deal with the refuse. They had the most primitive methods in those days. They had just an arrangement of two sticks to keep the solid matter back. I do not know whether they have improved their methods since.

14. You have read the Bill?—I have read some of it.

15. It has the effect of substituting damages for an injunction?—Yes.

16. Do you think that would suit the farmers?—Of course it would not. We cannot afford to take Supreme Court cases, which would then possibly go on to the higher Courts and to the Privy Council.

17. Have you had any experience of actions for damages where a number of experts have been called in to give evidence?—Luckily not.

18. At any rate, it is quite certain that the farmer wants pure water: he does not want damages?—That is so.

19. *Mr. Pearce.*] You made a statement that the flax-millers were not now putting so much of their tow into the river as formerly. Do you know that of your own knowledge?—No. I only gather that that is so because the tow is now of some value.

20. Take the mills above your old place, for instance, and considering they would have to convey the stuff by tram for a considerable distance, and then cart it round the paddocks; and considering the expense they would be put to in treating and drying the stuff, and for paddock-room, &c., do you not think it would not be profitable for them in that case to make use of it, and that it would pay them better to throw it into the river?—I would not be surprised, considering the distance they would have to cart the tow. I never realized that the tow was not worth the carting.

21. You state that the primitive attempts made to deal with this refuse was to put in two bars?—Two sticks.

22. Would you be surprised to know that at the present time the largest mill has only two bars of iron, with a spout 12 in. wide at the bottom and 16 in. at the top, to deal with this refuse, and that there are three spaces you could put your hand through?—No, I would not be surprised.

Mr. J. ROBERTSON, M.P., examined. (No. 33.)

1. *The Chairman.*] Would you like to make a statement to the Committee, Mr. Robertson?—Yes, sir. I wish particularly to refer to the flax-mills on the Manawatu and the Oroua Rivers, which are the two districts principally under discussion. I do not know whether you have had any evidence in regard to the exact quantities of waste which goes into those rivers; but I may say at any rate there are thirty strippers at work on the banks of the Manawatu River, and you may allow for each stripper about 20 cwt. to 25 cwt. of finished fibre per day. At a low estimate there is 8 tons of green leaf to 1 ton of fibre, which gives about 280 tons altogether of green leaf being milled. Now, seven-eighths of that is waste in some form or other, or by-product. It would be a safe estimate to say that one-half of the 8 tons goes away in the form of green waste vegetation, and that the balance is accounted for by manufactured fibre and tow and by evaporation. So into the Manawatu River I should say at present there is about 120 tons of green vegetable waste going every day, and into the Oroua River from 24 to 30 tons a day. With regard to tow, I heard what Mr. Pearce had to say. I think in regard to tow that the pollution that comes from that at the present time is very much minimized. Tow does pay for itself, I

think, in spite of what was said. At a mill like Smith and Seifert's, on the Oroua River, it will pay to take the tow out on the trucks. But there is a tow "waste" at every mill, which comes from the scutching, and it is unfortunately a practice at a great number of mills to allow that to accumulate in large heaps on the river-bank, until it assumes somewhat large dimensions; and if it is not toppled into the river in the meantime, at any rate the first flood that comes along usually takes it there. And that is a very bad cause of pollution. One may see it, on the Manawatu River particularly, in very large heaps, and I think that that is a form of pollution which is entirely preventable with some care. As to the question of paddock-room making the tow unpayable, I do not think it can, because the tow is produced after the fibre is bleached and is produced in the scutching. With regard to stripper-slips, of course, there has been evidence from the mills to the effect that the stripper-slips are valuable, and that prevents this going to waste. At the same time there are the short leaves—they get away in the wash; and if specific means are not taken to prevent this refuse getting into the river, and very efficient means, there is no doubt that there is a great deal of this that will go to the river. I cannot speak authoritatively with regard to the effect of this flax-refuse upon fish, or on stock drinking the water. But there is this about it at any rate, that at many mills—putting aside this question of typhoid which is occupying a great deal of attention at present here—where men drink the water even where it is comparatively pure, having just the green vegetation in it, among these men diarrhœa is very, very frequent, and they ascribe it to that fact. And I should say if it has that effect on human beings it must have the same detrimental effect upon stock. I do not think there is any more information I can give you. It was principally in regard to the quantities of flax waste which goes into the Manawatu and Oroua Rivers that I wished to address the Committee.

2. You say that you can state without question that diarrhœa is bad, and has resulted in some cases from drinking the water straight from the mill?—Yes, the water with the green pulp in it. All I can say is that the men are subject to this diarrhœa frequently, and that they ascribe it to that cause. I cannot speak as a medical expert, but this is so.

3. You have, of course, read the Bill?—Yes.

4. Taking the present state of the law as you know it to be, and taking what you know of the circumstances of these industries which are brought in question by the Bill, are you of opinion that a Bill such as this is required at the present moment?—Well, I do not think this question would have arisen had proper care been exercised by those who are responsible for the pollution of the river. I believe if they had taken reasonable care the matter would not have been brought up. In the case of streams such as that we have had mentioned at Waikanae, with a particularly small water-volume, there, of course, it may always be serious; but, so far as rivers are concerned, if care had been exercised I do not think my friend Mr. Pearce would ever have raised this question and brought this about. Looking at the Bill I think there is a great danger in it. A Bill like this, where the means of relief is by damages, is not at all satisfactory. There is the difficulty of proving damage, or who to prove it against, and this makes it a very, very difficult proposition for the farmer; and I am inclined to think that any relaxation of the present restrictions in regard to pollution may have the effect of causing a miller, or whoever is concerned, dairy-factory proprietor, or any one of that sort, to still further pollute the rivers. They may be enabled to go on polluting the water when by reasonable precautions it could be prevented. Such a relaxation as is suggested in this Bill may have the effect of making the state of affairs worse than they are now. My experience is that while a certain amount of pollution goes on people will put up with a certain amount of it within reason when an industry is involved, but by a relaxation to this extent it may become more damaging to those who suffer from it than otherwise it would be.

5. Would you, as a member of Parliament, feel called upon to go very closely into the special causes that would be put forward for a Bill of this sort, modifying or altering provisions which have lasted for a very long period in regard to this question?—I should think that before Parliament would pass a Bill of this kind they would have to be satisfied in the fullest possible manner that this pollution was absolutely unpreventable; and if it was unpreventable it would then have to face the position of either sacrificing the industry or allowing the pollution of the water. But before raising that question I think Parliament should be quite satisfied that this pollution is unavoidable and unpreventable. If it is preventable by any reasonable means I think that Parliament should say that this should be done. I should say that I know from my own personal experience in the Old Country the state of many of the streams there, and I think it would be a bad thing for this country if the same state of affairs was allowed here.

6. Are any of the flax-millers conducting their mills in such a way as the farmers would approve? Have they any way of filtration, for instance? Does not the Miranui Mill do something in this direction?—That is the big mill at Shannon. I know the mill. There was evidence given in regard to that mill. Their evidence was to this effect, that they had put in some sort of a filtration-bed, whatever that means, but that the water that flows from that is really much more polluted. They say that the water is more polluted after it flows from that filtration-bed. By keeping vegetation there, of course, it rots.

7. Then there is not a proper filtration-bed at any of the mills?—No; at the best the green pulp comes down, but nothing but the pulp, and where you have a large volume of water that is not so serious.

Mr. C. J. REAKES, D.V.Sc., M.R.C.V.S., Director, Live-stock and Meat Division, Department of Agriculture, examined. (No. 34.)

1. *The Chairman.*] Will you give us a statement, Mr. Reakes?—Whatever you think best.

2. You no doubt have a good acquaintance with the subject-matter that is before the Committee, and you have heard some of the evidence. You might give us a short statement on the points we have to decide upon. In the case of flax the trouble is the pollution of water and

danger to stock; then there is the waste water from the dairy factories becoming a nuisance and polluting the streams. One of the principal questions before us is the danger to the dairy industry through pollution of the water from flax-mills, &c. Conflicting evidence has been given as to its effect upon stock that have been drinking the water, and also as to its effect upon fish. You might give us your views on these different subjects?—Well, first of all, I think perhaps I had better just refer to dairy-factory drainage. As regards the drainage from a dairy factory which would be put directly into a stream in a perfectly fresh state, I do not think it is likely to do any harm in the way of river-pollution. Dairy-factory drainage consists very largely of water. There is only a small amount of solid matter in it. It becomes a nuisance when it is allowed to stand and putrefactive changes take place. That is what one of the witnesses referred to this morning when he mentioned a bad smell from one of the dairy factories in his neighbourhood. I would like also to refer to sawdust going into a stream. There has been a great deal stated at times about the injury that is done to trout on account of that, and I am of opinion that it is very detrimental to trout in the streams. It acts probably mechanically, by lodging about the gills—the gill-rays—of the fish, and interfering with the proper oxidization of the blood, a process that really corresponds to breathing with us. Now, as regards flax-refuse, that is a matter which I think will have to be considered very carefully and very seriously. There is an enormous quantity of it which has to be got rid of every day in an ordinary flax-mill, and to put the whole of that quantity, day after day, into a running stream is calculated to produce considerable pollution of the water. Naturally, of course, the extent of pollution depends upon the volume of water that is in the river, and also the force of the current in it. In a river like the Manawatu, for instance, in its lower reaches, it would probably not cause any serious pollution from the point of view of detrimentally affecting the health of the stock which were drinking the water, so long as they were drinking it from the main current itself. But in a river of smaller volume, or in a river which is running over a bed which is liable to leave deposits in places, or in a river where there are liable to be some backwaters occurring, then trouble may very well happen, because the flax-refuse would after getting into the water gradually undergo decomposition, and be more liable to sink to the bottom, and become a sediment there; and such collections of decomposing material would be more likely to occur in backwaters of that sort, being carried in probably by eddies, and so on. On the other hand, stock drinking from that river would probably find backwaters like that the most handy places for getting at the water. The injury to stock would occur through the poisonous material which is produced as a result of the process of decomposition that goes on. The perfectly fresh flax-refuse is not detrimental to their health, if taken in small quantities. We ourselves often see cattle picking away at growing flax, and when this is perfectly fresh, and not taken in too large quantity, it would do no harm. As a matter of fact it has been frequently suggested that the stuff should be used as a food for stock. But after it undergoes decomposition it becomes dangerous as a result of the poisonous materials which are produced from the process of decomposition; and then, of course, that brings us back again to what I was saying in the first place—it depends largely upon the volume of water in which it happens to be lying to what extent the danger exists to stock: the smaller the stream the greater the danger. I can quite realize how one of the witnesses I heard this morning noticed that their stock appeared not to care to drink the water when it was badly polluted as the result of decomposition of flax-refuse. Probably they exhibited a sort of natural selection, which one often does see in the lower animals, which leads them to avoid food or water which is liable to be dangerous to them; and, to put the thing in a nutshell, I think that the putting of this large quantity of flax-refuse in running water is a source of more or less danger to the health of stock drinking the water. It does not necessarily follow that this flax-refuse will kill them. It may simply cause a certain amount of disturbance of their digestive organs, a certain amount of indigestion, perhaps a little scouring, or put them into a condition of more or less ill health; and, at any rate, affect their monetary value and affect their general usefulness. There is one other point I would like to bring out, and that is that it has been stated that this flax-refuse might be profitably utilized for manurial purposes. Mr. Aston, the Agricultural Chemist to the Government, has made one or two analyses of this refuse, and in connection with one of them he says, "This would make a good fertilizer if well rotted and easily obtainable." I would also like to quote his analysis of another sample, which, so far as its chemical constituents are concerned, ought to make a useful sort of fertilizer. He states as follows: "Waste product in flax-manufacture: This consisted principally of fleshy portions of the leaf of phormium with a little short fibre, the whole in a fine state of subdivision. An analysis of the constituents following was requested and supplied: Water, 69·9 per cent.; organic matter, 26·6 per cent.; ash, 3·5 per cent.; phosphoric acid (P_2O_5), 0·249 per cent.; sulphuric acid (SO_3), 0·137 per cent.; chlorine (C_1), 0·082 per cent.; lime (CaO), 0·540 per cent; potash (K_2O), 0·753 per cent.; soda (Na_2O), 0·371 per cent. Calculated on the percentage of the ash the two chief fertilizers stand as follows: Phosphoric acid (P_2O_5), 7·11 per cent.; potash, (K_2O), 21·51 per cent. Of course, there are practical difficulties in the way of handling the stuff in great volume. These are my views generally, and if you would like to ask me any questions I shall be pleased to answer them.

3. *Mr. Buick.*] Does your experience lead you to believe that the refuse from the flax-mills when it is fresh would do no harm if taken in small quantities?—No. It would have no effect of that sort. If taken in great quantity it might set up serious indigestion or something of that kind. Of course, there will always be small strips of fibre bound to accumulate in the stomach.

4. Does that refer also to growing flax?—Yes. There is one point I might have mentioned, and that is that flax contains a bitter principle, the exact medicinal character of which has never been determined. It is a bitter, and if taken in any quantity flax tends to have a laxative effect on animals; and I think it is quite possible that this bitter that is in the flax is something similar to aloes, which is used as a purgative for horses and other animals. Flax belongs to the same

family as the aloe. This bitter principle has been determined by Professor Church, who has made a chemical investigation into the properties of flax; but after making it he simply says it is not his business to talk of its medicinal effects, and he says no more about it. Most of the bitter stuff is at the butt of the flax-stem.

5. Have you any knowledge of a company formed in Hawke's Bay and Manawatu to utilize this refuse as a cattle-food?—I heard that such a company was being talked about, but I did not know very much about the details of it. I simply heard that there was such a company being formed.

6. It has not been a success?—No, not to my knowledge.

7. You did not hear anything as to the cause of failure?—No, I did not.

8. *The Chairman.*] Can you assure the Committee, Mr. Reakes, that under certain circumstances which you have described—namely, the concentration of a considerable amount of the decomposing juice from the flax-refuse—that a poison is developed sufficiently strong to injure the health of animals, and in some cases cause their death?—Yes; the poison that is elaborated is the same class of poison that is produced when any organic matter is undergoing decomposition, just in the same way as you get the poisons which are commonly termed ptomaine produced in decomposing meat, for instance. It is simply the result of the splitting-up by bacterial action of the material into its various chemical elements, and if taken into the system in sufficient quantity that would cause ill health, and if in larger quantities it might cause death.

9. Can you account for what I assume to be a fact—namely, that the decomposition of leaves and decaying timber, and so forth, in a block of bush does not produce these poisons and discharge them into the streams that flow through the bush? In other words, that any person having a drink in a bush stream never fears any poison from decomposition of wood and vegetable matter?—Well, that is explained through two causes. One is that the process of decomposition goes on in the open, and many of the materials that are produced simply go away in the air in the form of gases; and in the second place, anything that remains on the ground as a result of the decomposition of the leaves and other vegetable matter does not necessarily find its way into the water. It is only just what happens to be carried along on the surface to the water, and consequently you do not get the accumulation of it in the stream that you do under these circumstances where you have got a large quantity of stuff being poured in day after day.

10. Peat, for instance? You know what is meant by peat: Peat-water is brown, dark in colour, but it does not produce any bad effects from the drinking of it?—Yes, well, the same thing applies to peat that you apply to ensilage, for instance. The changes which produce peat or which produce ensilage are brought about by a chemical process. The changes which produce the decomposition of vegetable matter which is discharged into water, or of animal matter which happens to get into water, are brought about by the agency of bacteria. That is the explanation. Just in the same way that ptomaines in meat are formed by bacteria. A good deal of the poison produced is produced by the micro-organisms themselves. It is given off from them, as it were.

11. Just as alcohol is the product of a chemical change from the sugar in the fruit?—Yes; but that is produced by the fermentation set up by the fermentative processes, which are micro-organisms in one form.

12. Have you had any opportunity of witnessing the state of the Manawatu and Oroua Rivers in recent years from the deposits of flax-refuse from the mills?—No, I have not.

13. What would you say in regard to the possibilities of injuring the dairy industry from the fouling of water by flax-mills?—Well, if a dairy factory is getting its water-supply from a stream which is contaminated by flax-mill refuse having been put into it higher up, it could quite well have a very detrimental effect on the quality of the butter produced.

14. *Mr. Buick.*] If that water is used?—Yes, if that water is used in the actual manufacture of butter.

15. *The Chairman.*] Would you think it likely that ordinary well-water, not artesian water, would be affected by continuous percolation of foul water from the surface?—It might be affected if the well were in soil of a sufficiently porous character, so as to allow water to percolate through it fairly easily. I do not consider the danger would be so great as in the case, we will say, of typhoid contamination; but it is not an impossibility provided the well were sufficiently near the watercourse where the contamination existed. But if it were any distance away I do not think the risk would be very great.

16. Taking artesian water, would it be impossible for contamination to enter in here?—It would be extremely unlikely.

17. The distance would be against it?—Yes, the risk would be reduced to a minimum.

18. Take a case of this sort: we have had in evidence a dairy factory some eight miles from running water, unable to get this refuse away except by a long course of little streams and drains, and so forth. The effluent had to travel eight miles. Can you suggest anything by which the difficulty of keeping the drains clean in such a case could be overcome?—Well, it would be rather a difficult thing to do unless the dairy factory happened to be situated on land which had a deep shingle subsoil. Of course, you do not often get that sort of land in dairying districts. It is usually heavier and richer land. But if you have a deep shingle subsoil, and you dig a large enough pit, and put your drainage in it—or you might have two pits and put the drainage into each alternatively—you would, I think, be likely to satisfactorily get rid of the drainage. As an instance of that I may say that we have at our laboratory at Wallaceville a shingle-bed, and the whole of the laboratory drainage, including everything except antiseptics, goes into a septic tank—not a very large one—which discharges into a pit dug in the shingle, a pit about 6 ft. square. That has been at work now for six or seven years, and everything gets away as well now as it did in the beginning. Naturally, of course, a dairy factory would have a very much greater volume of drainage to deal with, but that is an instance of how it could be got rid of under suitable soil

conditions. But where you have not got these soil conditions it is certainly a very difficult thing to get rid of, and if it was a retentive clay soil it would be quite impossible to do so by subsoil absorption.

19. Do you know of any case where the effluent has been rendered innocuous by ploughing patch after patch—irrigating this effluent, in fact?—I have not met with any such case in connection with dairy factories, but, of course, it is done in some cases in connection with slaughter-house drainage, which could become even more objectionable than dairy-factory drainage.

20. Waingawa?—The place I have in my mind more particularly is Pakipaki.

21. Have they got rid of their effluent at Waingawa successfully?—Yes, we have never had any trouble with it there.

22. It has occurred to me that in the case of the dairy factory about which I have been speaking, with eight miles of drainage, a tilting-tank might be of very great use. By a tilting-tank I mean a tank that would periodically, when full, discharge its contents with a big rush, sufficient to carry everything before it, and making a stream sufficient to carry everything away?—Of course, you would have to have some place to discharge it into. You would have to discharge it into a drain of some kind.

23. Undoubtedly?—That would undoubtedly be of some assistance; but if your dairy factory had a sufficiently plentiful water-supply, you would still further improve matters by a stream of pure water running into your factory-drain all the time, so as to increase the volume that was going down. I have, however, not gone into these matters very much, because it is my friend Mr. Cuddie who deals with dairy factories. But I think it is quite possible that some cheap material could be found which could be placed in the drain, or have running into the drain, which would have the effect of even still more minimizing the possible trouble that might result from it.

24. Some chemicals?—Yes, some simple chemicals. Dairy-factory drainage is usually of an acid nature, and if you had some alkaline element, like carbonate of soda, for instance, it might possibly prevent it from becoming a nuisance when it gets into the stream. I do not think you could do anything profitably or conveniently which would prevent an accumulation of dairy-factory drainage from becoming detrimental. Unless you get it away as fast as you produce it it would not be much use.

25. *Mr. Buick.*] In your experience as a veterinary surgeon, do you think that the fact of the dairy cows drinking from a polluted stream with either flax or dairy refuse would affect their milk either in quality or quantity?—Well, it might, providing the pollution were sufficient to upset the cow's health in any way.

26. It would affect the taste of their milk?—Whether it would affect the taste of the milk would depend entirely on the character of the contamination. But, speaking as a general principle, of course, it is very bad for a milking-cow to drink polluted water. There are so many varieties of pollution that one cannot well lay down any definite result as to what would happen with polluted water generally. But, of course, it is a bad thing for them, both on account of their health and the quality and quantity of the milk.

27. *Mr. Sykes.*] In your opinion will decomposing flax-mill refuse tend towards engendering typhoid bacteria?—No. It has nothing to do with typhoid fever. You can never get typhoid fever occurring as a result of flax-mill refuse.

WEDNESDAY, 16TH OCTOBER, 1912.

JOHN PEARCE MORCOMBE, Farmer, Rangiotu, examined. (No. 35.)

1. *The Chairman.*] Would you like to make a statement?—Yes, sir. I have about two miles of river frontage altogether, on the Oroua River. Just lately I had six cows die—about a month ago, I suppose. One or two I saw just before they died, and that was all. With the last one I got the Government Veterinary Surgeon down.

2. What name?—Plimmer. He looked at it, and said it was poisoned, he thought. It was two or three days after the cow died before he could come. He said it had been poisoned, but would not exactly say what kind of poison it was. There were pools of water where the river had flowed, and this flax-refuse would get in and settle, and the cattle would drink it. So I changed them from the Oroua River, and put them over the other side, and since then I have had no more trouble. Another thing: when they were on the Oroua River they were continually scouring. Directly I changed them over to the other side they stopped scouring. We put them back the other day, and they started to scour again. I used to live alongside the river in summer-time, and I found it impossible to bathe in the river or to use the water for any purpose whatever. I have seen fish in the river in the winter—trout—but have never seen them there in the summer when the mills have been working. I was down here last week, and when I went back I was walking along the Manawatu River, and I could still see flax and stuff going in from the mills. I spoke to one or two millers about it before I came down, and they said, "The best thing you can do is to fence off the river." They admit themselves that this water is poisonous if it lies in pools. They said, "Clean those holes out yourself, and put artesian wells down." I do not see why I should be forced to do that.

3. *Mr. Sykes.*] You say you have had six cows die recently?—Yes.

4. Were you dairying last year?—Yes, on the same land.

5. And had you the same experience last year?—No, I never had that experience before.

6. Is the nuisance more accentuated this year than last year?—It will be, because another one or two mills are being started on the Oroua River, and if they put two or three strippers in each mill it means a greatly increased output of this refuse; and if they work sixteen hours a day it makes it worse still.

7. You say that in walking along the bank of the Oroua the other day you saw flax floating in the stream?—Yes, flax and fibre; and in the Manawatu.

8. Was it in an undressed condition?—It seemed to be the tails. It had gone through the stripper, no doubt.

9. It was more than the ordinary pulp?—Yes. The pulp is always going down. In the centre of the river I do not think the pulp would hurt at all; it is when it washes over and gets in the pools that it does the damage.

10. You infer, then, that the flax-millers are not even now taking the necessary precautions to collect their refuse?—No, they are not. I was very much surprised to see it in the Manawatu. Just at the back of the willows there was a heap of flax and stuff.

11. *Mr. J. Bollard.*] What is the width of the Oroua River?—I suppose the water would not be more than about 30 ft.

12. And the depth?—I suppose it would take it all its time to go 3 ft. right through, and about 2 ft. in the summer-time. I have walked across in the summer-time with watertight boots on without getting wet.

13. How do you account for the cattle drinking from these pools that are supposed to be poisonous?—Very often there is quicksand further out in the river, especially where they have been drinking, and they would rather drink from the pools than go out in the quicksand.

14. They can get to the middle of the water if they want to?—In places they can, but not in all.

15. We have had it in evidence here that trout like to be below a mill where they get the vegetation to feed on—that fishermen get more fish there than anywhere else on the river. How do you account for that?—If they get it just below the mill it does not hurt, because the stuff has not had time to ferment. It is almost pure water, I suppose, just below the mill. But in the Oroua River I have never seen any trout when the mills have been working.

16. Did you ever see any dead trout in the river?—No.

17. *Mr. Field.*] Is there any stench arising from this polluted water?—Yes, in the summer-time.

18. Is it a bad smell?—It is a bad smell.

19. Supposing there was a small stream badly polluted by flax-refuse, would it be fit to live alongside of?—I should not think so.

20. You have seen the Bill?—Yes. I do not think it is a fair thing for a dairyman, because what chance would he have to go into the Supreme Court for the sake of one or two cows?

21. Speaking for dairymen generally, you are satisfied that they are not prepared to accept damages without having the right to an injunction? This takes away the right of injunction?—You have to go to the Supreme Court to prove the damage.

22. Is that satisfactory to dairymen?—No, it is not. A cow is valued perhaps at £6 or £8, and it might cost you £200 to get that amount in damages.

23. The fact that you have not seen dead trout—is that explainable in this way, that the moment the trout find the water polluted they clear out to pure water?—Yes.

24. *Mr. Pearce.*] Are not the quicksands much worse directly after the river has subsided than when there has been a spell of dry weather?—Yes.

25. And it is impossible then for the cattle to get water?—Yes. They can go right down on to the beach in summer-time, but they cannot after a flood.

26. *The Chairman.*] Where the settlers front on to the Oroua River, is the river frontage not fenced at all?—No.

27. How are cattle prevented from straying away then?—Occasionally they cross the river, but it is not very often.

28. Speaking generally, have the settlers in that locality any water available except the Oroua?—Yes, we get it by sinking artesians; but when you lease a property fronting on the river you lease it with the right of using the water.

29. When the Veterinary Surgeon visited these cows of yours that died, why could he not come to a conclusion as to what had poisoned them—were they too far decomposed?—Yes. He was away in Taihape, and we had to wait to get him.

30. How did he conclude that the cows had been poisoned, if their condition was such as you state?—I told him how they were lying, and that they died pretty suddenly. I saw one just kicking its last, and I told him how it was, and he examined it and said, "I think it is a case of poisoning." We went down there to look at a drain, and he said he thought the river was all right; but it had come up that morning. Mr. Scott, the veterinary chemist, reckoned the cow had died from eating cleanings, but Mr. Plimmer would not listen to that. He said it was a case of poison.

31. Do you know of any other case where cows were supposed to have been poisoned?—I was speaking to Mr. Plimmer, and he said there were some cases at, I think, Moutoa, but he did not tell me exactly. I asked if there were flax-mills working there, and he said Yes, and the flax was going into the drains, and they were dying very suddenly; he would not say they were dying from it, but he gave me to understand they died from drinking bad water.

32. Are you satisfied yourself that your cows died from flax poisoning?—I am in my own mind. It might have been poisoning brought on by drinking flax-water.

33. Are your cows getting water in any other way now than they were at the time these died?—They are drinking now out of a drain. In the summer-time all the grass on the Manawatu is practically bare, yet on the Oroua River side you see the grass up high. The cattle mostly stay where the water is—on the Manawatu side.

34. Do you mean to say that the grass grows long because it is too far for the cows to travel to water?—Yes.

35. What distance?—I suppose, about a mile.

36. Do you mean to tell the Committee that the distance these cows had to travel was the cause of this overgrowth of grass?—Yes. I do not say they could not eat the grass on the other side as well as on the Manawatu side. No doubt it is on account of their getting better water on the Manawatu side.

37. In the winter-time, when cows do not want water, is the position the same?—No; they will go backwards and forwards then.

38. And the grass is no longer in one place than in another?—No, not at present.

39. What, in your opinion, should the flax-millers do to prevent what you complain of?—They say we should prevent it ourselves—we should put artesians in and fence the river off.

W. B. V. PEARCE further examined. (No. 36.)

1. *The Chairman.*] I understand you wish to show us some photographs?—Yes, some photographs of the Oroua River, taken on Sunday last. [Photographs produced and explained.] With regard to the methods followed at the flax-mills, I desire to say that Mr. Tennant, after the flax leaves the patent catcher, does not apply the water for a distance of probably 10 ft. Then it goes into the patent washer and is washed. The pulp, gum, and stripper-slips have nearly all been shaken off on the travelling chain, only the marketable flax being washed. The refuse is run down a new drain, and the accumulation, after a month's working, would not take a man more than half a day to throw out. Mr. Tennant says it should be thrown out every Saturday after the water is let out, but the drain has been backed with flood-water. The material caught from this mill is stated to be 5 cubic yards a day, and he is the flax-miller that we did not expect to get an injunction against. He was doing better before than any of the others. The water from this mill is run through a swamp, and does not go back into the river again for three or four miles; it goes into a public drain. The drain shows no ill effects whatever. With respect to Mr. Broad's and Mr. Jarvis's mills, they have put them practically under one roof so as not to contaminate one another's water. They are putting everything into the chutes, and instead of putting the chute, as before, right out into the river, they are carrying it down the bank of the river to prevent erosion by dropping all the stuff in under the bank. The only means they have of stopping anything is three lengths of ½ in. pipe. These are practically put together in the bottom of the fluming—which is a foot wide—and run up at an angle and spread at the top. There would be four spaces, and at the bottom the three were practically together. At the end of the chute after that one of the mills had two upright bars. That would make three spaces of 4 in. each in the bottom and 5 in. each at the top. I could put my fist through. The other mill had three bars, making four spaces, of 3 in. each. With reference to stripper-slips, any that they had caught they had put over the banks to stop erosion of the artificial bank, or on the natural bank. Quantities they would cart out in a dray and dump down, and the cattle were running over it. They were not making any commercial use of it, or only a fractional part of it. There may have been a small quantity of stripper-slips at Smith and Seifert's, but I do not think they would be picked up; they were lying in the long grass. I had never been to Jarvis's mill prior to this. One great loss to the settlers there arises from the leakage of water through the river-bed having been raised. The artificial banks there are many years old. The bed has risen so that the pressure against the artificial banks is causing an ooze all down over the paddocks, and rushes are growing where it ought to be the driest land in the paddocks.

2. *Mr. Buick.*] Who owns the land?—It has been Lockwood. The millers themselves own some of it for drying-paddocks. I might say that at this bank of Green's there is a stream of water bigger than my leg coming through and coming down over my land. I shall have to provide for it later on.

3. *The Chairman.*] Is that a new stream?—It is coming under the embankment.

4. *Mr. Sykes.*] You are of opinion that the methods now adopted by Mr. Tennant are satisfactory?—There would have been no case brought if they had been half as good. But when we brought the case there were only three or four mills. How many mills there are to be I do not know. Every time they cut the flax they take the toitoi, &c., out, and every time the crop is twice as big.

5. It will not matter how the mills multiply, provided the conditions are good, will it?—I would not like to say if there are 5,000 gallons of liquid a minute put in in the summer-time. I think the greatest cause of our trouble now is the two- or three-years old pulp that is lying buried. If that were once washed out I think it would be all right. If they only put the juice in next summer I think it will be bad, in view of the multiplication of the mills. If we get two or three big floods and wash the river out, I think it will be all right.

6. You say there are no ill effects apparent in the drain which conveys this waste water from Tennant's mill away to the river?—I was never more surprised than when I put my arm down in it and took it up. There was only a sour smell. But, of course, we have had cold weather all the time.

7. Perhaps in that time the process of fermentation had not taken place?—There was no fermentation. I believe stock would have eaten it.

8. *Mr. J. Bollard.*] You think that the flax-mills can be managed in such a way as not to be a nuisance to the owners of property?—I am positive about that. In Taranaki the dairy-farmers and flax-mills are practically side by side, and there is no trouble. They all put the flax-mills close to the sea, and put the refuse into the sea direct. The dairy factories are always above them. In this case it is cheaper to take the flax to Foxton and make it than to do it on the ground. They are contaminating one another's water. The mills are going up the river further and further to get water—in fact, Mr. Tennant had threatened them with an injunction prior to my taking action, and has done so since, because he is the lowest on the river. He told me so himself on Sunday.

9. Are you prepared to swear that these flax-mills being on the river has been the cause of your losing so many cattle?—Yes, I am positive.

10. How do you know?—I know from over twenty years' experience.

11. Did you have any veterinary surgeon there to examine them when they were ill?—I have not passed as a veterinary surgeon, but I have often been called out as one. I was rearing stud stock for the shows when I was fifteen years old.

12. You have not got any diploma, have you?—No.

13. *The Chairman.*] You have read the Bill that is before the Committee?—Yes.

14. If that Bill were made law, would you have more power to prevent these flax-millers from putting so much refuse in the river as they have been doing in the past?—There are lots of ways of looking at the question. It depends on whether there is a possibility of bringing bribery in. That has been the case with our witnesses, I am sorry to say, both in this case and in the case before. I think the Bill does not give us power enough, but I think it is far better than the old system, anyhow.

15. You are aware, are you not, that the fault found with the existing law is that it gives too much power to a man to put a stop to any mill—to get an injunction against any mill that is doing damage?—I think it is the other way round—that it does not give half enough power.

16. You know that you have power to put an injunction into force if you choose to apply to the Court to do so?—I did not feel satisfied that I had without the others helping me or my helping them. I would not try it, anyhow.

17. Do you mean to say that you got that injunction and that you felt yourself unable to go any further with it?—If you knew the class of men that are round flax-mills, and you had property there that was valuable, I think you would do the same. I have insured my house since, and I never insured it before.

18. Did you not give it in evidence, or hear it given, that the reason why that injunction was not given effect to was because of consideration for the flax industry—a reluctance to stop the flax industry?—Yes. Well, in Mr. Tennant's case it was.

19. But, speaking generally—as to the flax-mills generally—you had an injunction, and you did not put it into force because, as you told us here, you were reluctant to put a stop to an important industry?—Yes, I am very reluctant to do it. It brings a lot of money into our district. It would almost ruin some of my smaller neighbours.

20. If the Bill that was suggested by Mr. Baldwin was put into force, do you mean to say that that Bill would give more power than the injunction you now have in your hand if you choose to enforce it?—Yes, I think so.

21. In what way?—If the men appointed to go there were firm, they would get things done. On the other hand, we could not stop the millers; if we went to Court they would all swear they were keeping the stuff out. They all told you here that they have improved their methods, but they have not done it. We cannot watch them night and day. Why, I had trouble to get the photographer near the mill. We went there on Sunday.

22. Are the Committee, then, to understand that one of the reasons for not putting the injunction into force was the fear of disturbance?—That, and to give them a chance to improve matters. Mr. Tennant has done what he could. He is putting none back. He has cut off the water after using it.

23. Do you mean to tell the Committee deliberately that Mr. Baldwin's Bill, if made law, would give you more power by injunction or damages than the law that we have at present?—Certainly. I think the evidence of the experts would be worth double our evidence, and ours would be in direct contradiction of the flax-millers' evidence. Whatever we said, they would say the opposite.

24. *Mr. Field.*] You say that Mr. Tennant is the only miller who is endeavouring to take reasonable precautions to prevent the nuisance?—The only one.

25. You say also that this drain of Mr. Tennant's, in which his partially filtered refuse was running, caused no nuisance—it was not foul-smelling?—There was no smell in it whatever. The water had a slight brown colour where it was standing still.

26. Had the outpourings of the mill been partially filtered before they reached that drain?—No, just run through the drain.

27. But prior to getting into the water at all, the stripped leaves were cleaned of their vegetation and so forth?—Yes, of the stripper-slips and everything. Five tons a day of this was taken out.

28. The leaf, stripped of the vegetation, went into the washing-tank as practically pure fibre?—Into a drum, yes.

29. I suppose there was some refuse?—Yes. The photograph shows the little that had collected in the drain.

30. You do not suggest that flax-refuse in any quantity does not create a stench in hot weather, particularly if it is allowed to accumulate in drains?—I say it does. In this case it had been there a month in cold weather, and had not started to ferment.

31. Did you in your previous evidence give the Committee a description of the stench which arises from a badly polluted drain?—The smell from the river itself last summer was such that we had our doors and windows barricaded against it, and if the wind had not changed we should have had to shift from the house. That was five or six months prior to the case being brought.

32. You state positively that a dwellinghouse situated within 50 ft. or 100 ft. of a badly polluted drain is unfit to live in in hot weather?—Certainly. I have heard a dairy-factory manager complain that it was not safe to cart his stuff across a bridge from one factory to another.

33. *Mr. Sykes.*] You said that you were afraid to go near the mill on Sunday?—I was not. The photographer was.

34. Are we to draw the inference that you were afraid of the flax-mill owner, or the flax-mill men, or the smell of the flax—which was it?—It was the men if anything. You get some pretty threats in a public bar in town if you happen to meet some of them there.

35. Do you mean to say that the flax-mill workers resent the action you have taken in regard to the proper methods to be adopted?—Not lately, but when the case first came on they did. Now most of the men are with us.

36. Then, really there was no reason to fear going near these mills, if the men are now in sympathy with you?—It was the photographer. He refused to go.

37. The men recognize now that you are doing something to better their condition as well as your own?—The more intelligent do—and when they are sober.

38. You say that Mr. Tennant is the only miller taking precautions. You mean the only miller on the Oroua River?—Yes, that is what I was speaking about.

39. *Mr. J. Bollard.*] With regard to the stock that you lost—what percentage of your stock, approximately, have you lost since this flax became such a nuisance?—I could not tell you the percentage.

40. Supposing that you had a hundred cows, and had good land and pure water: what percentage do you think you would lose in the year?—It all depends on circumstances. Sometimes you might go through a year with a lot of young cows and lose none.

41. I mean in the ordinary way?—With good cattle, probably 5 per cent. If you buy cheap rubbish, 10 per cent.

42. Do you not think that 10 per cent. would be a very reasonable proportion to lose?—Yes, I think 10 per cent. depreciation and 10 per cent. loss would probably be about it with most men who are milking cows.

BERNARD CRACROFT ASTON, Government Agricultural Chemist, examined. (No. 37.)

1. *The Chairman.*] Can you give us any statement that would be of information to the Committee as to the chemical aspect of what we are discussing—flax-refuse—and the result of decomposition in the way of developing a poisonous element dangerous to the health of stock and human beings?—No, I cannot say anything as to the poisons in or derived from flax, but I can say something as to the manurial value of flax-refuse, and so point to a way of utilizing the waste product. I have prepared a few notes, which are as follows: Flax-refuse is the fleshy portion of the leaf of *Phormium tenax*, with some short fibre. The refuse accumulates as a waste product in process of producing the fibre known as New Zealand flax. Dr. Purchas, of Auckland, in 1868 (Trans. N.Z. Inst., Vol. i, p. 69) stated that the refuse made "most excellent food for cattle." Certainly the well-chewed ends of flax-plants are evidence that stock to some extent find the leaf palatable, but I am unaware that any exact experiments have been carried out to show its food-value. Sir James Hector ("*Phormium tenax* as a Fibrous Plant," 1889) mentions that if cattle have access to a field of flax which has been cut, they will destroy the plants altogether by drawing out the young leaves to chew the butts, of which they are very fond. The same writer suggests that if the sodium-sulphite process be used to obtain the fibre, the rejected portions of the leaves could easily be converted into papermakers' pulp. Professor A. H. Church (now Sir Arthur) some forty years ago (Trans. N.Z. Inst., Vol. vi, 1873) conducted a research of the chemical composition of the *Phormium* leaf, and suggested that the ash of the refuse would make a lye to be used for the partial cleansing of the fibre. Seeking for a substitute for stable manure, a difficult substance to obtain in this country, where there is so little stall feeding of stock, some years ago I suggested to Mr. J. D. Ritchie the advisability of experimenting with New Zealand flax-refuse, a complete analysis of which is given in my annual report for 1900 (see pp. 135–6, New Zealand Department of Agriculture Annual Report, 1900), and a partial one in my 1904 report (p. 137). Experiments were accordingly carried out at the Weraroa (Levin) and Ruakura (Hamilton) and Moumahaki (Waverley) Experimental Farms. On a clay soil resting on gravel at Levin potatoes were planted on the 5th October, and on the 6th November 2·19 in. of rain fell in fourteen hours. In these trials, 5 tons of Up-to-Date sets, sown with no other fertilizer than flax-waste at the rate of 30 and 20 tons per acre, came away fully a week in advance of crops fertilized with artificials only, the former maintaining their growth right through the season. The 20-ton-dressed plot gave a crop of good quality, but not equal to that given by 2 cwt. superphosphate; the 30-ton-dressed plot was very much better, being quite equal to the best of the artificially dressed plots (1907 report, p. 320). The Overseer, Mr. Drysdale, remarked that thousands of tons of this valuable refuse, which could be made profitable use of, were lying about unutilized at the various mills. At Ruakura, on a sandy soil, 20 tons of flax-waste, without any other fertilizer, gave an increase of 2 tons 7 cwt. potatoes over the unmanured plot—a profit of £6 19s. per acre, due to the waste, after allowing 2s. 6d. per ton for cartage. The waste was valued at 2s. 6d. per ton (see Journal of Dept. Agric., Vol. i, No. 4, pp. 275–6), this being the actual cost of carting and distributing. The following are the actual results:—

	20 tons Refuse.	10 tons Refuse, 2 cwt. Bonedust, 2 cwt. Basic Slag.
Cost of manure	£2 10s.	£2 0s. 6d.
Yield per plot	1 ton	19 cwt.
Yield per acre	10 tons	9 tons 10 cwt.
Increase over unmanured, per acre	2 tons 7¼ cwt.	1 ton 17¼ cwt.
Value of increase at £4 per ton	£9 9s.	£7 9s.
Profit per acre, due to manure	£6 19s.	£5 8s. 6d.

Probably the profit would have been much greater had 30 tons instead of 20 tons been used. An experiment was also made at the Moumahaki Farm by Mr. Gillanders on a crop of mangels, with the following results (see 1907 report, p. 309):—

——	2½ cwt. Superphosphate, 28 cwt. Flax-waste.	56 cwt. Waste.
Cost per acre	£1 6s. 6d.	£1 8s.
Yield per acre (roots)	79 tons 4½ cwt.	15 tons 8¾ cwt.
Yield per acre (tops)	9 tons 7¼ cwt.	4 tons 10 cwt.
Increase over unmanured, per acre	70 tons 11½ cwt.	7 tons 6 cwt.
Cost per ton of increase	4½d.	3s. 10d.

As was to be expected, the flax-refuse by itself did not show up very favourably with this crop, but when combined with superphosphate, 2½ cwt. per acre, the treatment produced 70 tons of mangels at a cost of 4½d. per ton for fertilizer, and took second place in a trial with twenty-two different mixtures of artificial fertilizers, 5 cwt. of basic slag per acre taking first place and producing a crop at 4d. per ton. Comparing flax-refuse with stable manure, it may be said that while containing similar amounts of water and phosphoric acid, the refuse contains larger amounts of potash and nitrogen. It has, moreover, one very great advantage over stable manure inasmuch as it does not contain any weed-seeds, a fact which will appeal to the farmer.

2. *Mr. Buick.*] This flax-refuse is useful as a manure without any further treatment than its own fermentation?—That is to say, if it is allowed to ferment in heaps. I think there is scope for experiment in ascertaining whether it would be useful as a cattle-food as it comes direct from the mill and without allowing it to ferment. It might be possible to treat it in some way and make an artificial cattle-food of it.

3. Have you heard anything about the attempt that was made in the Manawatu?—No, I could not get any information about that.

4. *Mr. Sykes.*] You only view this flax-mill waste as a manure in its raw state, as it were?—Yes, where it can be got at the price of cartage, or a little more, perhaps. It may be profitably utilized where there is not much carting to be done.

5. It can only be utilized by those farmers who are adjacent to flax-mills?—Yes; treated in the same way as stable manure.

6. Has any information come to you that farmers are utilizing it?—No, although I have recommended it for some years. It is really too much trouble to the farmers to use it. It has only been tried at three different State farms.

7. *Mr. J. Bollard.*] Do you know anything about the science and practice of agriculture?—Yes, a little.

8. Do you believe that statement about the experiments on the State farms?—Yes; Mr. Gillanders is a particularly good man.

9. He put down the cost of getting this flax-waste at 2s. 6d. a ton?—That was at Ruakura.

10. How far is the flax-mill from Ruakura?—It would be comparatively near, I should think.

11. Do you know where it is?—No. The roads are good all over that district, and when the teams are not doing any work I suppose they can be profitably utilized in doing that.

12. *Mr. Field.*] You know nothing of the internal economy of a flax-mill—as to what would be the cost of saving this refuse?—No.

13. Have you had occasion to examine a drain or stream polluted with flax-refuse?—No.

14. *The Chairman.*] Do you know whether, in the case of the experiments that you have quoted to us, 2s. 6d. a ton included the cost of distribution on the land, by drill or some other method?—I am afraid I cannot answer that. I took the figures exactly as they stood in the report. I do not see how you could drill flax-waste.

15. You could drill it only if you had it sufficiently dry and fine enough?—But it must be applied in a moist state. It must be put in by hand.

16. Have you any idea of the distance between the flax-heap and the farm?—No. I took this statement from the annual report as correct.

17. Assuming that the flax-mill was close by the paddock to which the refuse was to be applied, at what would you estimate the cost of loading that stuff into the dray and carting it into the paddock and distributing it, by shovel out of the dray, or by any other practical means, at per acre?—I cannot make any other estimate than the cost that the Farm Manager states—2s. 6d. a ton.

18. Do you not think it practically impossible to have carted it for any distance, much less distributed? Do you not think the 2s. 6d. per ton stated is practically impossible, in view of the present cost of labour, horse-flesh, and what not?—I suppose that if the teams were doing nothing it would be cheaper to employ them than to let them stand in the stable.

19. Have you ever known, or have you been told, that stock with an ordinary supply of grass would touch green flax?—I have seen green flax eaten where there is plenty of grass growing alongside it.

20. When you saw the flax did you see the cattle feeding?—No.

21. Would not this be possible: that in the previous winter the cattle, hard up for feed, took to flax, and the evidence of the cattle having fed on flax would be plain in the summer when there was plenty of grass?—Yes, that is so.

22. You could not suggest any method of reducing the huge bulk of 30 tons, or 20 tons, or whatever it might be, that would be requisite to produce the same effect as, say, 4 cwt. or 5 cwt. of concentrated manure? You could not suggest any method by which that difficulty could be got over?—No, no more than you can concentrate stable manure. There might be a combination. You might possibly put it into a hydraulic press and squeeze the pulp so as to get an almost dry product, and then the effluent would be liquid, and you could let that flow away to a septic tank and get rid of it in that way, without its going into the river at all.

23. Are you not aware that the scanty application made by farmers generally of stable or other manure of a similar character is because of the heavy cost of labour, and that it does not pay to shift these bulky manures?—I think it is due more to the difficulty of getting the bulky manures.

24. Are you not aware that on farm after farm you will see the ordinary stable and other manures that are carefully looked after in the Old Country comparatively neglected here, and from the cause I have stated—the cost of applying them?—I take that to be more from ignorance of the beneficial results that would follow from applying them.

25. Could you suggest any means by which it could be conclusively tested what the result is of stagnant flax-water fermenting and producing poisons injurious to the health of stock and human beings?—You wish to find out what takes place when the effluent from the mills is allowed to remain in water and to ferment: that could be worked out. Such a research would be expensive, and it would take a long time. It would require considerable thought to work out different methods.

26. You have no data available of any experiments that would be of information to us?—No.

27. It has been suggested to us that poisons similar in character to ptomaines are produced in the process of fermentation?—That is quite possible, but ptomaines are usually the product of decomposition of animal matter.

28. The dairy factories are supposed to be in danger of having an injunction taken out against them because of the foul drainage from these factories. The washings of milk-cans and so forth containing milk and other solids go into the drains and cause a nuisance. Could you help the Committee by suggesting any plan by which the application of chemicals would reduce this fat to something innocuous?—Surely the amount of milk-fat going into a river is very small The curd and the milk-sugar could be got rid of by a small septic tank.

29. We have it in evidence that septic tanks have been tried under several sets of circumstances, supervised by the Health Department, and that these septic tanks failed to act?—That is the only remedy that I can suggest.

W. H. FIELD, Barrister and Solicitor, Wellington, examined. (No. 38.)

1. *The Chairman.*] Do you wish to make a statement?—Yes, sir. I own a farm property at Waikanae of about 2,000 acres. It is out near the beach, and has about two miles and a half of sea frontage. The main water-supply of my farm consists of a stream running from one end to the other, and finally emptying out into the sea on my property. I should think it intersects my property for something like three miles and a half, and in two places it widens out into lakes. This stream originally is a mountain-stream of pure water coming from the hills. Just after it reaches the flat a flax-mill has been built upon it, close to the bank, and it is the effect of the refuse from that flax-mill on the water of which we complain. I am a grower of flax. I not only preserve it, but I actually plant it, because as long as I can get 7s. 6d. a ton for it, it is more profitable for me to grow it than to fatten stock; and as I have been accustomed to get something like 7s. 6d. for it, I have been in the habit of growing flax. I also breed dairy stock, and I am in addition the largest owner in a sawmill; so I cannot be said to be "up against" any of the industries dealt with by this Bill—in fact, it is particularly to my interest that the flax industry should be encouraged and should flourish in my district. I have had for a number of years past to put up with the effluent from this particular mill running through the stream; and as questions were asked yesterday of farmers who also farm land on this particular stream as to whether any protest had been made, I have in the meantime had copies made of letters appearing in my letter-book that have from time to time been addressed by myself to the flax-miller, and with the consent of the Committee I will read one or two of those letters. On the 20th March, 1910, I wrote to the flax-miller: "For weeks past Watson"—that is my farm-manager—"has been vainly endeavouring to get you to abate the serious nuisance caused by allowing your flax-refuse to drain into Mile Drain and then into Diagonal Drain and the Ngarara Stream. I pointed out to you the results to me when you allowed the same nuisance some years ago, and I am much surprised at your repeating it, to say nothing of your continuing it week after week with a full knowledge of the injury you were doing me. If you do not put an end to the annoyance at once you will compel me most reluctantly to take action against you." On the 7th November, 1910, I wrote: "Be assured that you do not let any more of that vile flax-refuse get into the drains. It is a serious matter, polluting as it does practically the whole of my water-supply system. Looking at the mill from the train the other day it looked to me that your precautions at that time were not nearly sufficient." Then, a few days later, on the 10th November, 1910: "I was very much relieved to have your assurance that the steps taken by you to prevent pollution of watercourses were proving so effective. You will, I am sure, understand my anxiety in the matter." Then, on the 5th December, 1910, I wrote: "A fortnight or so ago Watson told me that he thought there was still some flax-refuse coming down the drain, and from the appearance of the water it seemed to be so. Possibly it was the balance of an earlier accumulation. I just write to remind you to watch it very carefully, as it is, of course, in the summer months that the great damage can be done." Then on the 8th December, 1910: "I have to thank you for your letter of yesterday enclosing cheque for £31 13s. 9d. for 84½ tons of green

flax cut in November. I am glad of your renewed assurances that there will be no pollution of the Mile Drain." And last year, on the 3rd April, 1911: "You must stop that flax-refuse nuisance at once, even if you have to cart the stuff direct from the mill to a distance. The position is too serious for me to allow it to continue. The stream is in a filthy, stinking condition all the way to the sea—*i.e.*, from one end of my property to the other—and the water is quite unfit for stock to drink. The nuisance has already resulted in very serious loss to me. I cannot put cattle on my Kukutauaki land at all. Campion is, I believe, also complaining, but he has one clean stream to fall back on. A writ must issue if you cannot advise me by return mail that the nuisance will be put an end to immediately and permanently." Then I find a letter written on the 24th September of this year—before I had any knowledge of this Bill: "I trust that you will be able to take thoroughly effective measures to prevent water-pollution this summer. The matter you will recognize is a very serious one to me." There were numbers of other letters written on the same subject to keep this miller in check, and they had the effect of doing so. Although I suffered severely from the nuisance, I was prepared to put up with a good deal rather than take action, and I did not want to see the flax-mill close down. If, however, we are thrown back simply on an action for damages without having any right to stop the nuisance, then, as far as I can see, the result must be that those of us who supply this mill with flax—and the miller is dependent very largely on his neighbours for his flax—we must cease supplying the flax, even if we have to destroy it. The chances are that, if it paid us to do so, we should rail it to some distant miller further up the line. That, of course, we should be reluctant to do. It may seem that an action for damages is as good a thing as a right to an injunction, but I should not have put up with this nuisance if I had not felt that I could insist at any time on my water-supply being left in a pure condition. It was the knowledge that I had that power, which the law of England has allowed for centuries, that prevented my taking unpleasant action against this particular flax-miller, who is a friend of mine, and a neighbour, and I have no possible reason for doing him any harm if I can possibly help it. This stream I referred to is a small stream. I have no personal knowledge of flax pollution of rivers and large streams. Mine is a stream of which, I suppose, the Kaiwarra Stream would easily make six. In the summer-time it is merely a dribble, and it has a fall from the flax-mill to the sea, a distance of five miles, of probably 15 ft. or 20 ft. The result is that the drain or stream is choked up to a very large extent. At every excrescence and throughout the whole bed of it there is a mass of grey slime of a stinking nature. There are no fish whatever: all fish have died or disappeared. The watercress and all other water-weeds also die, and the stench is abominable. When I first experienced it I could not believe that it came from vegetable refuse, because it was so like the stench arising from rotting animals. It had a worse effect on the stream than would have been the case if there had been the decaying carcases of animals, because of the slime. A rotting animal-carcase will rather improve the condition of the weeds growing in the water; this, however, kills them. On my farm, which is a place I take a good deal of pride in, my house is built within about 40 ft. of the stream. It is built in a bend of the stream, and in dry summers the house has been practically unfit to live in—in fact, on one occasion my farm-manager and his wife announced their intention of leaving; they could not put up with it any longer. And this is at a time when I have the power to keep the miller in check. Under this Bill I shall have no power at all; all I shall be able to do will be to sue him for damages, because, whether intentionally or not, the Bill provides that there shall be hereafter no injunction for pollution whatever: you are forced to rely entirely on an action for damages. I do not know whether that is intended, but that is the effect of the Bill as was described by Mr. Gerald FitzGerald yesterday. It seems to me that the flax-miller should show conclusively that he is doing the best that can possibly be done, even with the expenditure of a considerable sum of money, for the purpose of putting an end to this nuisance. My experience is that he is not taking anything like effective measures, and this Bill will have the effect of encouraging him to pursue slipshod methods rather than induce him to adopt scientific and up-to-date means of getting rid of his refuse. Now, speaking as a man who has had occasion to finance, I can say unhesitatingly that if I were forced to borrow up to the full limit which a lender will advance on farm property—if I were to seek to borrow on the security of my property, polluted as it has been more than once, and as it would permanently be if this Bill were passed into law, I simply could not finance upon it, and it might result in my losing the property altogether. This Bill would have the effect of reducing very largely the value of the property. I have constructed a road from my house to the sea alongside this creek. This house forms the summer home of my wife and family. The children at holiday-time go up there and spend their holiday for about a couple of months. If this nuisance were allowed to continue the house would be unfit for them to live in, and the road alongside the stream would be unfit to use as a road. You can understand, therefore, that the position is a somewhat serious one to me. With regard to the killing of fish, I think it is worth while to mention the fact that there is a considerable whitebait industry on that part of the coast. This stream of mine joins a large spring river, the two forming a large outlet to the sea, and providing a favourite whitebait-fishing ground. If water-pollution were allowed, particularly if the other stream were to be polluted—if, under this Bill, somebody were induced to put up a flax-mill—which is unlikely at present—or a dairy factory on the other stream, and so pollute that stream, then the whitebait industry in that particular place would have to cease altogether. I can say absolutely that the flax-refuse would have the effect of either killing or driving out all the matured whitebait, which, of course, furnish the supply of young fish. With respect to the damage to stock I cannot speak positively of my own personal knowledge. I am quite satisfied, however, from the stench which arises from the polluted water and from its appearance that the water is utterly unfit for stock to drink. This particular stream was originally a stream which was fit for human consumption; as it came from the hills it was almost absolutely pure. It did suffer some little pollution and discoloration by

draining through a number of swamps; but it was fit even in dry weather for cooking and drinking purposes. Since the mill has been upon the stream it has been impossible to use it for either of such purposes. The result to my stock is likely to be more severe in future than it has been in the past, because I have further subdivided my property, and in more than one paddock the stock have only this particular water to drink. Up till quite recently they had the lake to go to in addition to the stream. It is probably within the knowledge of the Committee that a number of farmers—it has occurred up my coast—have been put to considerable expense and have borrowed money and rated themselves very heavily in order to bring pure water on to their properties. If this Bill is passed these very watercourses may be rendered practically useless to them at any time. Perhaps some members of the Committee have had experience as to the value of an action for damages. I will give one of my experiences. Some time ago a wealthy association of hotel-owners in this city proceeded to excavate under my house in Wellington Terrace. They were an association of persons of great influence, and I was advised to suffer the damage and look to them for compensation rather than take any Court proceedings for an injunction. I decided, however, to apply for an injunction against them, and succeeded in getting one. The ultimate result was that my injunction was allowed to stand. I had some two years of worry over the matter. I won all along the line, and eventually I got damages. The total cost to the persons I was fighting ran into some thousands of pounds, and the net result to me was that my property was wrecked, and although I got my law cheap—practising as I do as a solicitor—I was out of pocket £250. And that would be the result in many of these cases. I have not a word to say against the flax-miller. Of course, when you are fighting an influential and wealthy association like the Flax-millers' Association they naturally are prepared to spend money in order to defeat you; and I am satisfied that an action for damages by me would be met with all kinds of expert evidence, and members of the Committee know exactly what expert evidence is. I would suggest to the Committee that possibly they might visit Waikanae—say, on Saturday—for the purpose of having an ocular demonstration of the average means which are being used by flax-millers to prevent the pollution of streams, and they could also see the small stream running through my property, on which I am almost entirely dependent for my water-supply. I am sure they would be impressed if they had the time on a Saturday, or any other day, to come up there and see for themselves. With regard to the provision in the Bill that makes an injunction impossible—although in any case an injunction is impossible under the Bill, I say—in the event of a person having other water on the farm or adjacent, it is true that I have a stream which is at present unpolluted on the southern end of my farm, but it is something like two miles away, and you would have to drive stock that distance daily, which, of course, would be an impossibility. If the pollution were to continue, my two lakes, which are fairly pure at the present time, would also suffer pollution. The Chairman has handed to me a Bill that has been prepared by Mr. Baldwin, which I assume it is suggested to substitute for this Bill. So far as I have been able to peruse Mr. Baldwin's Bill, I should say that the one provision in it whereby flax-millers are forced to take every effective method that is devisable for the purpose of preventing the nuisance would be some protection for the ordinary farmer, whether dairy-farmer or otherwise. I am not aware whether the Committee are seriously considering the new Bill or not. If I were to cut up a portion of my property, as I am very likely to do, and as Mr. Hadfield, my neighbour, intends to do, for dairying purposes—because the land up there has been proved to be fit for dairying owing to recent methods of dealing with it—the part of the property which I should cut up would certainly be dependent entirely on this stream for its water. I am not aware whether it would be possible to obtain artesian water there, but the experiments that have been tried up to the present have been failures. I have thought of trying the experiment more than once, but hitherto I have not thought it wise to incur the expense, for my property is already well watered, so long as there is no pollution.

2. You have read the Bill suggested by Mr. Baldwin?—I have just read it through. I will not say that I have grasped every point in it.

3. You have heard a lot of evidence showing the enormous quantity of stuff that has been poured into the Oroua and the Manawatu Rivers for some years past, and is apparently still being poured into the streams. Are you of opinion that Mr. Baldwin's Bill would be effective in protecting the settlers there and the dairy factories, who are dependent upon reasonably pure water for turning out thoroughly sound products?—I would not like to give a very definite opinion. If it is possible—and with my imperfect knowledge of the subject I think it is possible—to purify the effluent from flax-mills—I know nothing about the effluent from the dairy factories—then I say the Bill makes the necessary provision, because it provides that they must use effective methods, and if they use effective methods then the water will remain pure, or comparatively pure. Speaking for myself and other farmers, I am sure we do not mind a certain amount of pollution. If flax-millers cannot take away all the polluting matter and allow only a small portion of it to reach the water, so that the streams will be fit for stock to drink from, we shall be satisfied.

4. The three bodies mentioned in Mr. Baldwin's Bill—the Health Department and the other two Departments—are to specify the steps that shall be taken; failing those steps an injunction is obtainable, is it not?—Yes.

5. And if, despite these steps being taken by the flax-millers, injury is still suffered by any person, damages will still lie against the miller?—Yes, that is so, as I read the Bill. The present law, of course, is that a man is entitled to an injunction and damages. He has both—not one or the other.

6. Is not that the case with regard to that Bill?—That is the case as I read Mr. Baldwin's Bill: if a man suffers damage, even though the miller carries out the regulations of these three Departments for preventing nuisance, he is entitled to compensation for the damage.

7. Speaking from the point of view not of one interest alone, but broadly from the public point of view, and knowing as you do a good deal of the circumstances of the case, do you think the suggested Bill is better than the Government Bill?—Yes, I do, although I should not like to express a very definite opinion, for I have not carefully considered it. The Government Bill, I think, is a monstrous Bill. If certain flax-millers are suffering an injustice and find themselves faced with a Supreme Court injunction obtained by Mr. Pearce, that certainly is not a reason for passing a sweeping measure of this kind, which is likely to do very great evil and injury to people situated otherwise than Mr. Pearce. I know that in my case—and I am only one out of a number—very serious results indeed are likely to follow the passing of such a sweeping measure as this. I say that some fairer way ought to be found out of the difficulty between Mr. Pearce and the flax-millers, without attacking the whole farming industry as this Bill may. We must not consider things as they are at present. We have got to consider the whole of the streams of the Dominion, and what the development of industries may be in future in this country. If a Bill like this passes and prescriptive rights are obtained under it, we may be in a very bad mess indeed, and it will hit back, in many cases, against the people whom the Bill is intended to help —the flax-millers, for instance. I should certainly refuse to supply a single blade of flax to this particular mill if I found that the effects arising from the Bill were such as I think they will be. And similarly you have it in evidence that the pollution of water by the dairy factories is likely to injure factories lower down. However, I am not here to-day to speak of dairy factories; but I do speak with some authority on the flax-refuse question. Men like myself who have bought property with a pure stream running through it, on the faith of the common law of England, and in the belief that that law will continue as it is, naturally expect that that water shall be allowed to remain pure. The farmer is not accountable for the nuisance. The flax-miller brings it upon him; therefore let the flax-miller take it away. This Bill does not say that the miller shall take proper steps to prevent the nuisance; it says "Create the nuisance as much as you like, and you farmers go for your damages if you can get them."

8. Do you think that a small farmer bringing an action against a flax-miller would be met by an association of flax-millers—and we are told there are fifty-odd different flax-mills—do you think he would be met by all the weight and money and influence of the association in defending the action for an injunction or damages?—I think it would be more than probable, because they are naturally banded together for their joint protection.

9. Have the flax-millers an association now?—Yes. They know that a judgment—as in Mr. Pearce's case—delivered in one part of the country becomes the law with regard to the whole country, and therefore it is their business to protect their industry in every possible way. I should be very much surprised if there was not a fighting fund provided by the association for the purpose of combating action such as this.

C. K. WILSON, M.P., examined. (No. 39.)

1. *The Chairman.*] Will you repeat to the Committee what you told me as to the silting-up of the Manawatu River within your own experience?—What I told you, as showing the evil effects of the flax, in the Manawatu River particularly, was that where some years ago it was impossible to cross the river owing to the depth of the water, I crossed it recently on the silt that had deposited in the river. It has raised the bed of the river to such a height that I could cross on foot. I was fishing at the time. It was all silted up, and the loose fibre and the waste had brought about that condition.

2. *Mr. Sykes.*] Are you not aware of the fact that the beds of a good many of the rivers in New Zealand are being raised, though there are no flax-mills on the banks?—I am only speaking of this particular case. I am satisfied that this was caused by the waste flax from the flax-mills. The loose tow sank as I walked over it.

3. *Mr. Pearce.*] Are you aware that thirty years ago the tide used to come many miles further up?—No, I could not speak as to that.

TUESDAY, 22ND OCTOBER, 1912.

DR. VALINTINE, Chief Health Officer, examined. (No. 40.)

1. *The Chairman.*] You know what the business of the Committee is, doctor; will you kindly give us your view of the whole matter as it affects the flax-mills and the dairy factories?—Acting under your instructions, sir, I have perused the evidence taken with regard to the above Bill, and have the honour to submit the following matters for the consideration of your Committee. In the first place I would respectfully submit that the natural surface watercourses of this country should be regarded as potential sources of water-supply for the purposes of human consumption, and that, far from granting facilities for the pollution of our watercourses, every reasonable precaution should be taken to maintain their potability. In making this statement I am prompted by the fact that many towns and villages in this country which in the first place were conveniently situated as regards potential sources of public water-supply have been prevented from making such provisions on account of the pollution of the streams in their immediate neighbourhood. This has necessitated the authorities looking for a water-supply from a more remote and, therefore, less polluted source, but the expense involved has deterred many a town and hamlet from the undertaking. If this is the case when the population of the country is little more than a million, what will be the position when the country embraces a population three or four times its present size? Surely we ought to look ahead. Nevertheless, I am bound to admit that the interests of our industries must be considered. It would be idle to imagine that all trade and

public wastes can be kept from our rivers, but the means of polluting them should not be made too easy, and the pollution (if allowed) should only be to such an extent that it might be possible to repurify the water if required for public purposes. Certainly no wastes of a solid nature should be admitted to our streams. This applies especially to sawdust, flax-fibre, and sewage. Apart from its mechanical effect on the streams, it is well known that sawdust will remain a long time in water before it rots or undergoes other processes of disintegration. Its fatal effects on fish are well known. I regret that I am unable to speak as authoritatively on flax-wastes, but having some knowledge of the Oroua, I am confident that the daily discharge into that river of some 24 to 30 tons of flax-waste (as stated by Mr. Robertson, M.P.) must, under certain conditions of the river, bring about a collection of fermenting heaps or pools that would be inimical to animals drinking the water therefrom. Again, it is well known that flax is possessed of certain medicinal properties. It belongs to the same natural order (*Liliaceae*) as aloes, which is well known as a purgative; and though I have no knowledge that the drinking of water impregnated with this plant has caused illness among stock, I cannot imagine that such potions if taken repeatedly would be for their benefit. On this occasion I need not refer to pollution by sewage. Butter and cheese factory wastes: With one or two notable exceptions, there has been little difficulty with regard to the disposal of these wastes. For the most part these factories are situated near running water, and I cannot think that under these conditions fresh wastes, if admitted to a stream of reasonable size and velocity, can be inimical to animal or plant life, and in animal life I include fish. But in those few instances where dairy factories are situated on sites remote from running water, the difficulties of disposing of their wastes are many and serious. I know of one factory in particular where exhaustive experiments have been made to deal with its wastes, but unfortunately with little result. There is little doubt that the disposal of these wastes is still a matter of experiment. A system of settling-tank and filters in conjunction with intermittent irrigation is the best means of disposing of these wastes; but as we are principally concerned with these wastes in relation to rivers, I need say no more just now, except to reiterate what I have already stated, to the effect that I can see no objection to the effluents being admitted to streams of reasonable size. A great deal has been said as to the difficulty of disposing of flax-fibre other than by discharging it into rivers. I think I am right in saying that the discovery of many of the valuable by-products of industries has been stimulated by injunctions restraining the disposal of crude wastes. It would certainly appear from the evidence submitted to this Committee that it is quite possible that flax-millers may be able to make a useful and remunerative by-product of the fibre now cast into the streams, which may remain undiscovered if the present practice is allowed to continue. I may say here that I agree with those witnesses who have stated that no amount of decomposing matter, whether flax or dairy waste or sewage, can breed typhoid. The organism must be present to produce the disease, which does not arise *de novo*. Nor do I consider that the wastes referred to are likely to harbour the germ if once introduced. Nevertheless, it is somewhat significant that typhoid cases are constantly being reported from the neighbourhood of flax-mills, which cannot be easily accounted for. I may possibly be pardoned for saying that I do not like the Bill. It makes too easy the pollution of our rivers. To obtain an injunction it must first be proved that the water is unfit for use. This is often very difficult. The Department is often confronted with the same difficulty with regard to the condemnation of houses. We know that a certain house is unfit for human habitation, but it is mighty hard to prove our point, and, unfortunately, a fell disease among the occupants does not always come along to support us. The same may be said of a suspected water-supply: it is difficult to prove that it is unfit for use. It seems to me that for actions of the sort big guns are needed, and I mean by "big guns" local authorities or Commissioners. Then, again, the plaintiff has also to prove that he has not a sufficient supply of unpolluted water upon or immediately near his property. Now, I do not profess to know anything about law, but this strikes me as particularly hard if plaintiff has, until the establishment of an industry, been satisfied with the water for his cattle. One witness has stated that damages will be to the benefit of the mortgagor, but to the detriment of the mortgagee. Quite so. I think that the collection of damages will become a thriving industry on the banks of the Oroua and Manawatu, as already has been the experience of another witness who comes from that neighbourhood. Nor do I like clause 6. The weather here is so variable that it is difficult to forecast what the flow of a river will be at certain times of the year. And least of all do I like clause 8. Is it right that the methods to minimize pollution are to be limited to those that are "usually and properly adopted in New Zealand"? Who is to set the standard? And even if it is a fairly good one, is it to remain at that? We gain more knowledge of disposal of such wastes every year. A few years ago crude sewage was discharged into the streams of the United Kingdom, but since the Rivers Pollution Commission insisted on a purification of the effluents the water has so improved—especially in the Thames—that trout have been found in the lower reaches where they had never been seen before. No, I do not like the Bill. What is wanted: We want to protect our streams and rivers, but in so doing we do not want to unduly hamper our industries. I am of opinion that sections 63 to 67 of the Public Health Act provide what is needed. It may be thought by this Committee, however, that some other legal provisions are necessary. There is much to be said in favour of admitting to rivers effluents only of a certain standard. Such standardization should be considered under the following headings, and be proportionate to—(1) The possibility of the water ever being required for public purposes—a public water-supply; (2) the locality and nature of the industry; (3) the volume, velocity, and general nature of the stream. It may be argued that it would not be wise to leave this responsibility in the hands of one Department. The bulk of the work could well be done by the District Health Officers with the assistance they now receive from the Government Analyst and Government Bacteriologist and Public Works Engineer when needed. Larger questions of this nature might, however, be submitted to a Board

composed of the Chief Engineer of the Public Works Department, the Chief Health Officer, the Government Analyst, and the Government Veterinarian; and I recommend accordingly. It might be advisable to ensure that factories from which waste products must be discharged into streams or rivers are only erected on sites approved by the Department or the Board.

2. *Hon. Mr. Buddo.*] Will you explain in what way section 66 of the Public Health Act could be utilized for a settlement of the difficulty?—The sections are Nos. 63 to 67. Section 67 provides for the prevention of the pollution of streams that are to be part of a public water-supply. Sections 65, 66, and 67, I submit with all respect, would meet the case. This is section 65: "In any case where, on the report of the District Health Officer, the Governor thinks it expedient in the interests of the public health so to do, by notice in the *Gazette*, place any specified watercourse, stream, or lake, or any specified portion thereof, under the sole control of any one specified local authority, notwithstanding that it may not be within the district of such local authority or on land belonging to such local authority, and every such notice shall, until revoked by the Governor, have full effect." Then section 66 reads: "Subject to the provisions of the last preceding section, the local authority shall, for all the purposes of this Act, be deemed to have control of all watercourses, streams, and lakes within its district." Section 67: "The local authority having the control of any watercourse, stream, or lake may from time to time, as it thinks fit, and shall, whenever the District Health Officer so recommends, make by-laws to enforce the cleansing and prevent the polluting or defiling of such watercourse, stream, or lake." Under those sections it would have been possible to put the stream in question under the control of, say, the Manawatu County Council, and the District Health Officer could have made recommendations with regard to the purification of the Manawatu and Oroua Rivers, insisting on refuse being kept out, and so forth.

3. *Mr. Forbes.*] Do you consider that those sections cover the ground that is taken up by this Bill?—I do not say they cover the whole ground, but I think they provide all that is required.

4. Is there any particular point in this Bill that is not covered in those sections?—What you want to do, I take it, is to maintain the purity of the rivers as far as possible, but you do not want to interfere more than is unavoidable with the trades and industries of the country. Those sections, I maintain, provide for that.

5. You said there was not much objection to the dairy factories discharging their waste into streams: do you mean their waste after it has been dealt with by filtration, or something like that?—Yes, after it has been filtered.

6. You do not mean the waste direct from the factories?—No. When dairy factories or cheese-factories are situated near running water, a very simple inexpensive means of filtration will render the effluent fit for admission to the stream.

7. It is necessary to have some filtration before the stuff is allowed to go into the stream?—Oh, yes.

8. *Mr. J. Bollard.*] With regard to the pollution of water, do you consider it is all a question of degree?—It is all a question of degree. It depends entirely on the velocity and volume and nature of the river. Take, for example, that very River Oroua. I know it very well. On Good Friday of 1895 I crossed that river, and the water was only up to my horse's hocks. On Easter Monday of 1895 I was nearly drowned in that river, and the whole of Feilding was under water; the water in the main street of Feilding was up to my horse's hocks. At that time the river would have taken all the refuse of the Manawatu; it very nearly took Feilding.

9. It would take a good deal of pollution to affect the Manawatu, would it not?—It would take a great deal.

10. In the judgment given in the Oroua case the Judge stated, I think, that if a man had an industry on a stream, and that stream was purer above his factory or mill than it was below, no matter what degree of pollution there was, it was contrary to English law, and an injunction must be granted on that ground. If that be the present law, how do you propose to deal under the Public Health Act with any stream that is less pure below a factory than above it?—As I said just now, I do not know anything about law, but I hope I know something about common-sense, and it seems to me that we must treat every case pretty well on its merits. It would be absurd to insist on the same standard for effluent to be admitted to the Manawatu as to a small slow-running stream. We must standardize our effluents. For example, we insist upon the drainage into our rivers from public septic tanks and so forth being of a certain standard, but in times of flood we allow the authorities controlling septic tanks to open them in order to dispose of their sludge.

11. *The Chairman.*] In evidence before the Committee complaint was made of town sewage entering the Oroua River higher up than where these flax-mills are discharging their waste?—Yes.

12. That came up in connection with the reported cases of typhoid fever; and we had evidence from medical men that the typhoid germ could pass, and did pass, through septic tanks without losing its vitality?—Yes, that is so; the possibility exists.

13. What would you say to evidence that was put before the Committee of cattle absolutely refusing to drink water in which there was a lot of the pulp from the flax-mills—water which, flowing sluggishly along, contained a lot of fermented matter?—I should certainly think that was true. Animals are very selective—horses especially—about where they drink. They are not likely to drink water that is subjected to active fermentation. They have not acquired the taste.

14. It was further stated that the difference in the condition of cattle was very marked as between the time when they were obliged to drink this water, there being no other, and when they were shifted where they got clean water?—I do not know much about cattle, but I can quite imagine that they would be liable to illness or discomfort if they had to drink water undergoing fermentation.

15. This is a section of the English Act as it stands: "Every person who puts or causes to be put or to fall, or knowingly permits to be put or to fall, or to be carried into, any stream,

so as, either singly or in combination with other similar acts of the same or any other person, to interfere with its due flow, or to pollute its waters, the solid refuse of any manufactory, manufacturing process, or quarry, or any rubbish or cinders, or any other waste, or any putrid solid matter, shall be deemed to have committed an offence against this Act." That is the English law, and the method of carrying that law into effect is by a combination between what is called the Local Government Board and the sanitary authority?—Yes; that would be the same position, practically, as our central Public Health Department and our local authority.

16. Would you consider it advisable, as head of the Health Department, and would you consider it fair to all interests concerned, if this section of the English law were put on our statute-book, the enforcement of the law being left to the Health Department and the local body?—I certainly think so, in regard to solid wastes; but, in my opinion, that is covered by the sections in the Public Health Act that I referred to, plus the regulations and by-laws that you can make under the Act.

17. Can you suggest anything to the Committee which, in conjunction with a provision as regards solid matter, would cause the prevention of wanton injury to an industry by a spiteful person taking out an injunction, although no damage was being done?—In the first place, you said just now that where there is no law existing on the subject in this country English law applies. I maintain that that law does exist in this country on this question, and that law, if enforced properly, would be sufficient, with certain additions which I have indicated. I consider that the sections that I refer to, with the regulations and the by-laws that can be drawn up, would be sufficient. It might be well to make them more explicit, perhaps, setting forth the conditions under which a new industry could be started, stipulating that the site must be approved by the Department and the business conducted under conditions that are approved by the Health authorities.

18. *Mr. Buick.*] That simply gives the Health Officer the powers of a Commissioner?—Yes. Or if it be the opinion of the Committee that you are vesting too much power in the hands of the Department that I have the honour to control, vest it in a Board composed of, say, the Chief Engineer of Public Works, the Chief Health Officer, the Government Analyst, the Government Bacteriologist, and possibly the Chief Veterinarian.

19. We have a suggestion that it should be the Health Department and the Stock Department?—Yes, that would be quite sufficient. As it is now the Public Health Department has the advantage, in matters of this description, of being able to get the opinion of the Government Analyst, the Government Bacteriologist—who is an officer of the Department—the Chief Engineer of Public Works or one of the Public Works Engineers. We have already got the necessary machinery. I maintain that this Oroua business could have been handed over to the Oroua and Manawatu County Councils respectively; those rivers could have been gazetted, on the recommendation of the Public Health Officer, as under those public bodies, and the District Health Officer could by recommendation make such regulations under the Public Health Act, and those local authorities could make such by-laws as would deal absolutely with this case. I maintain that we have the power and are prepared to act on it.

20. *Mr. Buxton.*] Do you not think that if this Bill is put through it will give those who want to manufacture on various streams in New Zealand opportunities to pollute the streams to an extent that would be injurious to the country generally?—I do. I feel very strongly on the point. I think this Bill might be called the "Pollution of Rivers Made Easy Bill." As I said in my opening remarks, what we want to do is to maintain as far as possible the purity of our streams without unduly hampering industries. It can be done, and it ought to be done. I maintain that this Bill would put such power into the hands of the flax-millers and others that they could pollute the streams as they liked.

21. *Mr. J. Bollard.*] You stated that pollution was dangerous to the life of trout?—Yes. I was going on hearsay, mind you. I have had no personal experience.

22. We have had it in evidence before the Committee that fishermen find more trout just immediately below a flax-mill than anywhere else in the river?—Trout are fond of vegetation.

23. *Mr. Buxton.*] You said that a typhoid germ could pass through a septic tank: I presume you would be absolutely opposed to any system of drainage of a town into a river, even through a septic tank?—Oh, no; we could not stop it. It is very much better to run the risk of having a typhoid germ in a river than having a typhoid germ under your house, as might be the case if you had cesspools. There cannot be a hard-and-fast rule.

24. Your contention is that under existing laws you have ample power to meet all the conditions that obtain in New Zealand?—That is what I maintain.

25. *Mr. Buick.*] In the case that has already happened you could not prevent Mr. Pearce or anybody else applying for an injunction, as the law stands now?—No, but we could show that these people had taken reasonable means to prevent any nuisance being caused.

26. *Mr. J. Bollard.*] That would be no good, in view of the law?—Not according to the English law, but I maintain that our law is subsequent to that.

27. *Mr. Buick.*] But there is nothing in our law to prevent a man getting an injunction?—Then why should you not add a clause to section 67 of the Public Health Act to the effect that no injunction should be given effect to if in the opinion of the District Health Officer reasonable and practical means are being taken to prevent a nuisance being caused? That is all you want.

28. *The Chairman.*] It has been suggested that to guard against vindictive proceedings to get an injunction, instead of an injunction being obtainable a plaintiff should be restricted to damages, concurrently with the forbidding of any solid refuse being put into the rivers. What would you think of an alteration providing that damages only could be claimed where the law was effective in preventing solids going into the river?—I do not know. I think that to make it damages only would be rather dangerous. I think it would render blackmailing possible.

Under those conditions a man could cart any quantity of stuff to a stream and put it in, and say, "Well, I am willing to pay for it."

29. In the Public Health Act, section 20, you have damages not exceeding £50, and continuing damages for every day during which the mill or the factory insisted upon pouring solid matter into the river. Solid matter is thus absolutely stopped: a man could not go on in the face of damages like that?—No.

30. Then the damages would only be for any remaining injury after all solid matter was stopped?—Yes.

31. I am supposing that we do not touch the Public Health Act at all, leaving to you sewage and all such things as are more particularly applicable to the Health Department. This is a separate Act, referring only to dairy factories and flax-mills?—I beg to differ from you. I think it affects very vitally the public health of the Dominion.

32. You would still have the Public Health Act, with the addition of this Act?—Pollution of rivers can be done by other means than sewage—for instance, chemicals. Later on there will be complications from industries where chemicals are employed, which have such a devastating effect on the vegetation of the rivers of the Old Country.

33. *Mr. Buick.*] We have had it in evidence that a septic tank has no effect on the effluent from a dairy factory—that the germ that acts in a septic tank is not bred in the effluent of a dairy factory; it requires town sewage to breed that microbe?—It has certainly an effect. In the course of a life of attempting to do something I have naturally made some very bad mistakes, and one of my most grievous mistakes was when I attempted to deal with a factory's waste by means of a septic tank. I succeeded in making one of the most abominable stinks I have ever smelt. I am referring to one at Eltham, in Taranaki. Dairy-factory effluent is quite hopeless in that way. As far as I know you can only deal with it by settling-tanks, filtration, and then broad irrigation; but it is very hard to deal with. As far as I can make out there is no known way. It is all in the experimental stage.

34. *The Chairman.*] We have had evidence that in the case of one factory, drainage was effected by means of a drain and small stream combined, running for eight miles with very little fall before it finally discharged into a stream that was sufficiently strong to carry the stuff away. The land round the factory was very stiff and retentive and non-absorbent, and they had great difficulty in keeping their outfall drain in a sanitary condition. Could you suggest anything to help in such a case as that?—I believe that in the factory you refer to there are about nine different coke filters. Mr. Cuddie might be in a position to advise you on this matter; but I know that even in Denmark, which is pretty up to date, they cannot suggest anything more than irrigation. It has been a tremendous problem; but, fortunately, most of our factories are near running water. That shows the necessity for a Department being consulted with regard to the situation of factories. We now never allow a factory to be established away from running water.

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