

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.