

munity and of impoverishment to his family. He leaves a forfeit or fine of 5s. behind him. Whose pocket does it come out of? Out of the family purse! As to the remedy: on the principle that a dog is allowed two bites, a man might be allowed to get drunk twice with impunity, but if he came up a third time there should be an ultimatum. He should be sent to a penal colony or a reformatory. I think there is a great deal to be said for Bailie Shearer's idea of an indeterminate sentence. Those who turn out to be mentally deficient are hopeless. There is another set—those who have their chances; chance after chance. These should be segregated for a considerable period and taught a trade, through the exercise of which they might be made materially to contribute to the support of their wives and families.

Mr. M'CRACKEN, in reply—Mr. President, ladies and gentlemen, when I was asked to read this paper I felt that the time allowed for the introduction was too limited for such a large and many-sided subject, hence in reading it a good deal of the paper has required to be omitted. As religious men and women, what we have to do in social work is to deal with the character of the person. If we can make a new man, then the environment will be made new. Therefore, we must strike at the root of the disease, and that is, the character of a man or woman. With regard to what Mr. Lambie said about my phrase that failure has also to be registered against our moral and religious attempts to recover men, I probably should have said against the methods we are using; but I wanted to impress the matter on your minds when I put it in its nakedness that our religious efforts were failures. If they were successes we should not have large parts of Glasgow as they are at the present time. At a public meeting held in Edinburgh in June, 1891, a resolution was adopted that, "inasmuch as the habitually criminal, vagrant, and inebriate classes are becoming a source of danger and expense to the community, Parliamentary powers are necessary for dealing with them." We are in the very position to-day that that meeting was in in 1891. The pious resolution was passed and nothing more was done.

After what has been said about the results likely to follow the establishment of farm colonies, I want it to be distinctly understood that, as far as I know, there is no colony in Germany—whether it is at Bielefeld or elsewhere—that is really getting thoroughly down to the root of the matter, as is necessary for the redemption of those who enter these colonies. Not 5 per cent. can be shown as reclaimed, and figures have been given to you to show what prevails.

## SOME POINTS IN WATERWORKS ADMINISTRATION.

By Mr. WILLIAM A. TAIT, C.E., Edinburgh.

In addressing so representative a body upon water questions, it seems worth while to devote a few words to the relationship of Parliament to local and other water authorities. It is, or, rather, ought to be, common knowledge that Parliament in recent years, particularly by the 1897 Public Health Act, has done a great deal to simplify the procedure to be followed by a local authority in regard to the taking of wayleaves for water pipes and sewers through private grounds. Neither a greedy landlord nor a stubborn tenant can prevent a local authority from doing its duty to its own people within its own proper district. It must at the same time be kept in view that the law is not now supposed to recognise the right to payment for wayleave, but only for surface or other damages arising directly from the operations connected with the execution of the work.

It is to be hoped that combined authorities, following upon a movement which I had a hand recently in initiating, will sooner or later receive from Parliament the powers which the individual authorities at present possess. This is a matter of great importance, as the present tendency of authorities is to combine for water supply purposes, in order that better and more comprehensive schemes may be carried out and competition among neighbouring authorities obviated.

So far as I am aware, Parliament has not yet given local and water authorities the reasonable facilities

which many of us think they ought to possess in regard to acquiring proper control over the areas which drain to domestic supply reservoirs.

Quite lately, in listening to a paper read to another society, I was, amongst others, able to follow very easily why certain reservoirs were referred to, though, for obvious reasons, names were not then given. They have since been privately communicated to me.

For instance, it was easy enough to know why water from a reservoir supplying a certain populous district was rich in phosphates, as it was common knowledge that it received practically the whole drainage from a much-used cemetery. This cemetery had only been brought into use some time after the passing of the Act of Parliament which authorised the construction of the reservoir for domestic supply purposes. Unfortunately, however, the water works authority had little or no standing when the cemetery came to be formed. It does not appear that the water committee was consulted, but you will no doubt agree with me that no such cemetery should have been started at such a place until the express consent of the water works authority had first been obtained.

Other things being alike, it would seem that, if the cemetery had to go on to the drainage area at all, it should have been so placed that its drainage could most easily have been diverted away from the reservoir, and without, if possible, giving rise to complications in regard to the quantity of compensation water which Parliament had previously fixed to be sent down the burn from the reservoir.

Another case might be mentioned where a reservoir (used for the supply of a well-known community) is fed from a drainage area of pretty considerable extent, but which, unfortunately, contains a mill dam with somewhat objectionable feeders. A semaphore signal

is used so that the reservoir keeper may have warning when undesirable stuff is coming down to him. Assuming that the signal is properly and timeously given, and that the waterman happens to be looking in the right direction at the right time, and then acts with promptitude, he may be able to keep the worst of the stuff from getting into the reservoir, and so prevent a very gross pollution of the water there.

This is only one of several cases for giving further powers to a local authority, or perhaps to a combination of authorities.

The officials of Parliament who are most closely connected with private legislation have lately taken a step from which considerable good may result. So far, at any rate, as Scottish Provisional Orders are concerned, a new General Order has been adopted, putting it upon the promoters to show upon a plan to be deposited with the authorities the extent of the drainage area which they propose to tap. The House of Lords has adopted a similar Standing Order.

It is very much to be desired that a drainage area when once shown on a plan deposited with a Government Department should be most jealously protected by the Government authorities in the first instance against any possible encroachment by cemeteries, slaughter-houses, &c., &c. It does not seem unreasonable that the area draining to a domestic supply reservoir should be specially excepted from the operation of any Small Holdings Act. It may, on the whole, be better that the onus of proving a case for an encroachment upon a drainage area should be put upon the would-be invader, and it should only then be left to the water authority concerned to take steps to prevent other people from doing anything which might end in the deterioration of the water from a particular drainage area. It naturally follows that more and

more drainage areas to domestic supply reservoirs should come under the control of local authorities. These authorities might each be empowered to purchase and hold the area, or at least they should be specially empowered to keep the land clear of ordinary cultivation. There is, of course, all the difference in the world between reasonable afforestation of a drainage area and the cultivating of it with the aid of police and other manure.

Among the pioneers of this movement might be mentioned the following in alphabetical order:—

Belfast have purchased 8300 acres, or practically the whole of the catchment area to their Mourne Works. They have also powers to purchase the greater portions of the catchments to their old works at Woodburn and Stonyford, and have already acquired 3657 acres out of a total catchment area of 6937 acres at Woodburn, and 1365 acres out of a total catchment area of 5348 acres at Stonyford.

Since the acquisition of these areas considerable benefit has resulted, as they can now intercept and store a greater proportion of the flood waters than formerly, owing to the better condition of the waters in flood time.

Bradford has purchased over 9000 acres of drainage area.

Edinburgh and District Water Trust have purchased about 6000 acres, or nearly the whole of the area draining to the Talla Reservoir.

Glasgow has made special arrangements to prevent the feuing of land draining to Loch Katrine, &c.

Lanarkshire Middle Ward District Committee has

specially arranged to keep certain fields out of cultivation near certain of its reservoirs which are now comparatively near towns.

Leeds has purchased over 9000 acres, or more than half of the area, draining to the present domestic supply reservoirs.

Liverpool has purchased 10,000 acres, that is the whole of the area, draining to the Rivington Works, and it has also purchased 13,000 acres, or more than half of the area, draining to Lake Vyrnwy.

Manchester has purchased about 7400 acres, being the whole drainage ground to Thirlmere. (Manchester, put last alphabetically, probably deserves the credit of starting the movement.)

So far as I am aware, smaller communities have not taken any steps in the direction of acquiring drainage areas, nor have they made special arrangements to protect these areas from possible pollution.

I am far from recommending that an obligation should be put upon local or water authorities to proceed now with the purchase of all land draining to their domestic supply reservoirs, but I think that the promoters of future Orders for the construction of water works should, before being allowed to spend money upon these new water works, have to satisfy Parliament or some deputed authority not only that the area they propose to tap is a sufficiently clean one, but that they are prepared to come under an obligation to take all reasonable steps to keep it so.

One is quite aware that many water works schemes are carried out under general and not special powers. Such schemes do not come under parliamentary review at all in the ordinary sense. This is not surprising in view of the cost of Scottish Office Provisional

Orders, which are frequently found to be almost as expensive as the procedure by private Bill.

This is a matter that requires looking into, and the sooner the better.

It is becoming more troublesome as time goes on to find clean water-sheds that can be tapped at reasonable cost; hence the desirability of ensuring that greater care will be taken by Parliament to see that the question of water supply is treated as a national one. Local and water authorities, particularly the smaller ones, should be encouraged to work together and prevent insufficiently considered expenditure upon small or temporary and independent schemes wherever a combination is likely to be of general good. It must be kept in view that the management and maintenance of a number of small schemes is often more costly than one good combined scheme, also that authorities, who are reasonably able to, and who do, combine, have less chance of having prices of land, &c., required for works raised against them. There are, unfortunately, cases in existence where two or more authorities have pipes side by side in the same road for considerable distances, when a little arrangement among the parties might have very materially lessened the capital cost. It is not infrequently found that really good conjoint boards are formed when each constituent authority makes it a point of honour to delegate its best men to serve on the joint board.

Ratepayers and the consumers must be prepared to pay reasonably in the interest of public health, and it does not seem that the acquisition of drainage areas by local authorities need bring about any large increase in rates. For instance, there is no reason why the cost of land for such a purpose should be paid off in thirty years, and it is common knowledge that Government,

when lately introducing the Housing, Town Planning, &c., Bill, inserted a provision that loans for the purpose of the Act might be repaid during longer than the usual period, provided it did not exceed eighty years, and also made the provision that, as between loans for different periods, the longer duration of the loan should not be taken as a reason for fixing a higher rate of interest. Of course, it will be clearly understood that land in the hands of local authorities will not be so remunerative as in the hands of private landowners, because, if the local authorities let the lands they have obtained for protective purposes, they will do so under restrictive clauses as to manuring, tillage, &c., &c.

The question of the regulation of private piping, which may be required in order to distribute supplies from a water authority's pipe to persons resident outside that authority's compulsory area, is one of very considerable interest, and well worthy of discussion.

It is often only owing to private enterprise that such supplies are provided, and in these cases it is desirable that the authorities should, when practicable, arrange when granting the connections to reserve to themselves the right to give off further connections from the private pipe to parties other than the owners upon reasonable terms. Care should, of course, be taken to avoid the laying of too small a pipe in the first instance.

In this twentieth century it does not seem proper that there should exist privately owned pipes under and along highways, from which connections should be refused to new proprietors or tenants by the way, unless upon almost prohibitive terms, such as the erection of a greenhouse, the supply and fitting in of a kitchen boiler, or the conversion of a stable into a motor house. It does not seem to be in the general interest that there should be numbers of independent private pipes upon

a highway, and in any case money seems to be rather better spent upon one slightly larger pipe than on two very small pipes, and the larger pipe is, of course, the one which the local or water authorities, when their district is extended, will be the more ready to take over. In some instances the Edinburgh and District Water Trust have arranged that when a proprietor is laying a pipe for his own requirements they will contribute an additional sum to the cost so that a bigger pipe may be laid in the first instance, with a view to obviating the necessity for duplicating that pipe for many years to come.

DISCUSSION.

Mr. JOHN FREW (water superintendent, Bathgate)—Mr. President, ladies and gentlemen, I am sure we have listened with much pleasure to Mr. Tait's paper. Anything coming from Mr. Tait must carry great weight with us. We who know him personally as at the head of one of the largest water engineering firms in Scotland know that whatever he says must be beyond the debatable point. I know, from my experience of the firm that he is the head of, that anything they do for us is substantially done, and done according to law, but I must say that it is a little out of place to ask me to criticise a paper on Parliamentary procedure by Mr. Tait, as my experience of Parliamentary procedure is very limited. In fact, I was only once in London in one case, and I was on the other side from Mr. Tait, who won his case and we lost ours. I do not know whether it was due to his ability or to my ignorance. I was glad that he noticed the facility with regard to the acquiring of wayleaves, but, all the same, my experience in a practical water department leads me to say that we are all the better for having a Provisional Order in which you can arrange your own terms with regard to repairs of pipes and for men walking down the pipe tracks, and anything else required can be put in a proper agreement. I agree with him as to the mistake of putting in too small pipes. I think it will be within his remembrance that the district that I have the honour of representing intro-

duced a water scheme fourteen or fifteen years ago, and, like other local authorities, were anxious to have it as cheaply as possible, and the engineers were restricted to a certain sum, but in a growing district when you introduce a gravitation water supply the demand for water immediately increases. In one village in my district, where the water was introduced in 1894, the population of 350 is now a population of 2500. A 2-inch pipe was ample to supply them in 1894, and we are now putting in a 9-inch pipe. I think it is cheap economy to restrict the engineers in the beginning of a new scheme, and that they should make provision for future requirements, and I should say that the provision should at least be double the present wants of the district. Mr. Tait will bear me out in saying that in our district we have almost increased by two-thirds. Although I cannot speak about Parliamentary procedure and Provisional Orders with the same freedom as Mr. Tait, I can lay claim to speak about the administration of a water department, as I have had a good deal to do with that in one way or another. I would say that the principal essential that I can see in regard to that is to have a uniformity of pipes, both iron and lead—uniformity of procedure—uniformity of valves, meters, and stopcocks, which simplifies the working very much. I do not believe in carrying on a works department with a mixture of all sorts of fittings and buying in the cheapest market. To have uniformity is to have the work carried on with much greater efficiency and the minimum of work. When you have a correct record of connections kept, monthly readings of meters, register of complaints, and, in fact, a miniature history of your works as they proceed day by day, there is no great difficulty in managing a large water department. I have to thank Mr. Tait for his paper.

County Councillor LAMBIE (Lanarkshire)—Mr. President, ladies and gentlemen, as one who has been as closely associated with Mr. Tait for a great number of years as any one, I am pleased to see him here to-day and to listen to his paper. We in the Middle Ward of Lanarkshire have had a fair experience in connection with water supplies. When the County Council came into existence and became the water authority, we found that in the Middle Ward of Lanarkshire there was a considerable number of water districts that could not be supplied because of the cost. The districts had been formed, but they could not get water within the rate provided for water and drainage by the

Act of Parliament. The Middle Ward acted wisely, I think, when they combined to form one water district, and I think it has proved a thorough success. I would like here to advise a combination of large water districts. I believe that it is better for the districts and cheaper and very much superior to having small independent districts. Even although we have a very large district—perhaps the largest district outside of the Metropolitan Board in London, anywhere in Britain—we have at the same time four pipes of different water authorities running in the same road and going to different districts in Lanarkshire. Just think of it—four pipes going to different parts when one large one would supply the whole. It seems ridiculous, and we in the Lanarkshire Middle Ward have tried—in fact, we have intimated to the different local authorities that we would like to meet and confer as to whether the one could assist the other without any difficulty. What may come out of that meeting it is not for me to say, but I hope it will be beneficial to the whole of the authorities concerned. There is another thing that I think Parliament ought to interfere with, and that is to settle once and for all that when a water district is formed no other authority should have anything to do with it, because it is a serious matter to cut up an existing district and its completed works and arrangements. The money has been borrowed on the faith of the district as a whole, and provision has been made for the district being supplied, and everything has been carried out that is necessary for the supply, and under Parliamentary powers I think it is cruel that other water authorities should want to interfere and come in and take away part of a well-planned and comprehensive district whenever they consider it suitable. I am glad to have an opportunity of stating that fact. There is money being wasted every year because of interference of that kind, and the ratepayers' money is squandered when there is no necessity for it. When the people in the district are being supplied with water, and Parliament has given its sanction, they should be left alone and the district allowed to work out its own salvation, because if that area is interfered with the whole system and arrangements are upset. I think that is one thing that we require to get settled, and settled by Parliament on a basis that no one authority will ever attempt to interfere with the work of another authority in connection with that matter. Then I think that we should have an easier way of getting our districts

supplied with water. It is a very expensive thing when you have to go through the Provisional Order process or by going to Parliament by way of a bill, either one way or the other. I think also that we should get the whole control of the water when we do get it, because it is one of the most important matters that we as a local authority should get a good, wholesome, and pure water supply. There is another thing that we are learning. It is often the case that the first pipes are not large enough, and we find that it is scarcely possible to anticipate the size of the pipe that will be required for a district—growing as Lanarkshire is growing—and I would advise you that two or three extra inches in the diameter of a pipe is well-spent money, because you are ready for anything that comes. I have very great pleasure in thanking Mr. Tait for his paper.

Mr. MURRAY (Renfrewshire)—Mr. President, ladies and gentlemen, unfortunately I was unable to hear the beginning of the paper, but I know pretty well the gist of the whole subject. Mr. Frew, in my opinion, has glossed over a good many of the troubles experienced by local authorities and County Councils. My experience, and probably Mr. Tait's, and every water engineer is, that compensation which requires to be given off to proprietors and millowners makes a great number of water supplies almost prohibitive. (Hear, hear.) I know in my own experience that we had to abandon most suitable sites for reservoirs. As you are aware, the statutory rule is that one-third of the water area has to be given over for water compensation. Take a village with a population of 1600 or 2000, every sanitarian, engineer, or town-clerk here knows perfectly well that the money requires to be borrowed for thirty or thirty-five years, and to borrow that money and put on a rate to cover the cost of a reservoir, including the amount of water to be given off for compensation, would make it beyond the statutory rating power. The cost of borrowed money, capital and interest, are well understood by all local authorities. Practically speaking, it amounts to 5½ per cent. In some of the small villages the rate for the water supply, after paying wayleave, compensation, surface damage, &c., would run it up to 3s. or 3s. 6d. per £. Mr. Tait knows as well as any man in Scotland that it is only folly to put in large pipes in every case. In fact, you cannot go beyond the power of rating. If a poor hamlet requires a supply, the local authority

are compelled to supply it at a certain price. They have no alternative. I quite agree with Mr. Tait that pipes are never put in large enough. In my own experience I had to put in two additional pipes, a 6-inch and then a 12-inch, but we must not forget that local authorities cannot overburden a small community, no matter how willing the County Council are to meet the future requirements. I do not consider it is fair that the present community should be asked to pay for the future. I am of opinion that this money should be borrowed for at least fifty years, so that the percentage would be reduced to permit of a suitable installation and allow the future population to pay their proportion. So far as the borrowing powers are concerned, I think this important body, representing local authorities, might have something to say, and perhaps the Association could influence members of Parliament and others connected with borrowing powers in Scotland to increase the number of years or give it at a lower rate of interest. If this was done it would mean a great boon to the community. There are many other things that I might mention, but these are the points that occur to me. I am sure this Association could go a long way to assist local authorities and small communities on the lines indicated. The last speaker mentioned that there should be amalgamation of water supplies, and I agree with him, but it is not practicable in every case. For instance, if a hamlet, which is situated seven or ten miles away from a densely populated place, is to be supplied and pipes laid between the two places, including meeting all claims by farmers and land proprietors, why it would put this little village beyond the possibility of getting a water supply at all. I am bound to say that land proprietors in the West of Scotland have met County Councils and committees in a very liberal way with regard to ground and wayleave. I have to express my great pleasure in hearing Mr. Tait's paper.

Mr. FREW—My remarks applied to a scheme costing fully £100,000, and not to these 2½d. village schemes at all.

Mr. JAMES I. LITTLE (Kilsyth)—Mr. President, ladies and gentlemen, there is one point that has been omitted as to the cause of some water schemes not being adopted, and that is the want of confidence in the cost given by the engineer as being the actual cost of the scheme. An engineer gives a probable cost, and this is reasonable considering the supply to be got, and the scheme is adopted; but as the work proceeds it is found that the estimated cost

is but a fraction of the actual cost. The local authority grumble, but the work has to be gone on with, and the money cost paid, together with extra fees to the engineer; therefore the local authority, in considering a scheme, have a fear to enter upon it in case the cost in the end requires a ruinous assessment to meet it. If engineers were paid on the basis of the contract, accepted offers, many extras, and unforeseen difficulties which add a few thousands to the cost would not so often occur. Under-estimated schemes also often cause the supply to be unsatisfactory, as necessary work is often omitted to keep down the cost, with the result that there is a continual outlay for years in the endeavour to perfect an unsatisfactory supply. In speaking thus I have such a water supply in my mind, but I refer specially to the feeling often found in a small town with reference to engineers' reports on water supply schemes. Schemes are so common in which the actual cost exceeds the estimated cost to such an extent that, when considering a probable cost, the double is expected. Engineers should include in their primary report the cost of overcoming obstacles which they expect to find; in fact, local authorities should insist on engineers examining the site of the reservoir far more minutely than is often done before a scheme is adopted. I have in my mind such a scheme, the cost of which was double that of the estimated price, with the result that the ratepayer has to pay the piper, and they accuse the local authority with having deceived them in respect to the water supply. If engineers were more careful in their primary reports they would gain the confidence of the public, and much unnecessary money which is expended on water supplies would be saved, and schemes which they recommend would more readily be adopted.

Mr. TAIT, in reply—Mr. President, ladies and gentlemen, I am perhaps more accustomed to be lectured than to lecture. The gentleman who has just sat down has given a good indication of how an engineer is treated when the money that he thinks is reasonably required is asked for. The paper as a whole, small and insignificant as it is, seems to have met with a favourable reception, and I am much obliged to you. Mr. Frew raised some points, and I agree with him as to what he says about having uniformity of procedure among authorities and about keeping a correct record of everything that is done, where pipes are and where connections are, so that there may be no trouble whatever

if anything gives way. Mr. Lambie dealt with several subjects, but with great modesty he refrained from making any reference to an Act of Parliament known as the Public Health Amendment Act of 1891. It was an Act which the Lanarkshire County Council themselves saw through Parliament. It enables authorities to put a rate of 3d. per £ upon people whether they get a supply of water or not. It was only by the enterprise of the Lanarkshire County Council that the Act passed through Parliament as a public Act. Once it became a public Act it has been applied very usefully indeed. Several water schemes which could not possibly have been completed without it have been carried out through the operation of that Act. Another gentleman spoke about Mr. Frew glossing over a number of troubles and seemed to object to compensation water being given. It is ordinary practice that you have to pay for what you get. You cannot go and take water without providing compensation in some form, either in money or in water. Another gentleman went a stage further, and said that the amount of compensation prohibited a supply of water to a hamlet seven or nine miles away. I did not suggest that there should be such an amount of compensation, but I did suggest that a better supply would frequently be got when the local authorities were combined, as there is no doubt that combined authorities could have far better results with one good man giving a good deal of time as superintendent than if little places simply employed a local blacksmith or carter, at a possible remuneration of 25s. at New Year time, in respect of which he was expected to look properly after the works. I do not know whether I can say anything further except to thank you for the kind way you have received my paper. (Applause.)

### DISCUSSION ON WHAT ARE THE MOST ADVANTAGEOUS ARRANGEMENTS TO BE MADE BY LOCAL AUTHORITIES FOR THE ISOLATION OF CASES OF LUNG TUBERCULOSIS.

By Dr. THOS. F. S. CAVERHILL, Edinburgh.

The PRESIDENT—Ladies and gentlemen, unfortunately Dr. Caverhill, who was to have opened the discussion on this subject, is unable to be here, but Dr. Cullen, convener of the Public Health Committee of Edinburgh, has kindly consented to read Dr. Caverhill's paper, and I now call upon him to do so.

Dr. G. MATHESON CULLEN—Mr. President, ladies and gentlemen, before I begin to read Dr. Caverhill's paper, I would like to direct your attention to the photographs which have been sent by Dr. Caverhill, and which have been hung on the wall. What he wants to show is the benefit of having sanatoria in a hill district, and not in the form of one large building, but in colonies of huts or chalets. There is here also a photograph showing how one can make a sanatorium at home. A gentleman in Roxburgh, after being at a sanatorium, could not sleep in his own house, and he constructed this small hut in his garden, where he has been sleeping for the last three or four years.

MR. PRESIDENT AND GENTLEMEN,—

I feel highly honoured by the request of your Council to open this discussion.

Since the issue of the circular on the administrative control of pulmonary phthisis by the Local Government Board of 10th March, 1906, the attitude of the local authorities has largely been one of expectancy, mainly due to the serious financial obligations likely to be incurred.