

Edinburgh and District Water Bill : statement by the trustees.

Contributors

Edinburgh and District Water Trust.
Royal College of Physicians of Edinburgh

Publication/Creation

[Edinburgh] : [publisher not identified], [1871?]

Persistent URL

<https://wellcomecollection.org/works/yzaxtm6p>

Provider

Royal College of Physicians Edinburgh

License and attribution

This material has been provided by This material has been provided by the Royal College of Physicians of Edinburgh. The original may be consulted at the Royal College of Physicians of Edinburgh. where the originals may be consulted.

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

It is respectfully requested that all Ratepayers, whether in favour of the Bill or opposed to it, will carefully read and consider this Statement.

EDINBURGH AND DISTRICT WATER BILL.

STATEMENT BY THE TRUSTEES.

THE Select Committee of the House of Commons having, after a patient hearing of the whole evidence, *unanimously* held the preamble of the Bill to be proven, and the Bill as amended in Committee having passed the Commons, the Trustees hoped that all parties would have accepted the decision as a full and complete justification of the course which they have felt it to be their duty to pursue. So far from that being the case, however, the parties who, in the name of the ratepayers, have fostered the opposition, continue their policy of misrepresentation and advocate a continued opposition in the House of Lords. Had they, in pursuing this object, been content to misrepresent the promoters of the Bill, the Trustees would not have felt themselves called upon at this stage to make any public statement; but when the decision of the Select Committee is assailed as contrary to evidence, and reflections are cast upon the members of that tribunal—whose competency, independence, and freedom from all bias or party feeling are beyond suspicion—the Trustees feel it to be right to review the facts as shortly as possible, and to invite the calm and deliberate consideration of this statement by the citizens of Edinburgh, Leith, and Portobello.

I.—As regards the fairness and deliberation with which the question of the Water Supply has been considered.

The sufferings, especially of the poorer classes of the community, having, for many years previous to 1868, been made the subject of loud and frequent complaints, the corporation of Edinburgh, in June of that year, appointed a special Committee to co-operate with the corporations of Leith and Portobello, in investigating the whole subject. After a full inquiry, the joint Committee of the three Corporations employed Mr J. W. Stewart, C.E., to report on the supply, its distribution, and the source from which a more abundant supply could be obtained. This he did on 13th

August 1868, when he stated his reasons for recommending St. Mary's Loch, the water of which Dr Stevenson Macadam, at the same time, reported to be "of a wholesome character and of excellent quality for general domestic use." On considering these reports, the Joint Committee deemed Mr Stewart's recommendation to be worthy of further investigation, and they asked him to report on the probable cost of the scheme, which he did on 7th October 1868, after which it was resolved to consult Mr Bateman, an engineer of the highest standing and experience. Mr Bateman went carefully into the scheme, and reported that, in his opinion, St Mary's Loch "was a very desirable source of supply," and he estimated the probable cost at £400,000. Thereupon the Joint Committee *unanimously* recommended the three corporations to authorise an application to Parliament during the ensuing session to sanction it. These several reports were submitted to the three Corporations, and were considered by the Town Council of Edinburgh on 27th and 29th October, 1868. On 5th November, 1868, that body resumed consideration of the report, along with a supplementary interim Report by the Committee, dated 3d November, all of which had been printed and circulated; and it was then *unanimously* resolved to approve of the reports; and the Committee were authorised to take such steps as they might consider proper to promote the measure in Parliament during the ensuing session. The requisite plans were accordingly prepared by Mr Stewart, and approved of by Mr Bateman; and a Bill was introduced into Parliament to transfer the undertaking of the Water Company to a public trust, and to authorise the execution of the works shown on the plans.

In 1868 the municipal elections, which usually take place in November, were postponed till December, and the ward meetings, which are generally held in the latter half of October, were, in consequence, held in the latter half of November. The municipal electors who, this year for the first time, were the extended constituency of householders, had thus the fullest opportunity of discussing the measure at these meetings. But in order still further to elicit the opinion of the inhabitants of Edinburgh on the scheme, and to do so more thoroughly than could be accomplished at any general meeting of the citizens, four district meetings were held specially for the consideration of the question; and the result was that the electors in the Calton, Broughton, and Canongate wards, assembled in New Street Church, *by a large majority* approved of the scheme; the ratepayers in the George Square, St Leonards, and Newington wards assembled in Brighton Street Church *by a very large majority* approved of it; the ratepayers of St George's, St Giles', and St Cuthbert's wards assembled in the Corn Exchange *unanimously*

approved of it; and the ratepayers of St Bernard's, St Stephen's, S Luke's, and St Andrew's wards *by a majority* approved of it.

Meanwhile the Water Company, seeing that the Corporations were in earnest, propounded a scheme for bringing in supplies of water—not from the Pentlands, that source being declared by Mr Ramsay, then manager, and Mr Leslie, then engineer of the Company, and by the Directors to be practically exhausted—but from the South Esk or Moorfoot district, which was also recommended by Mr Hawksley, the consulting engineer of the Company.

Another scheme, known as the Tweed or Talla Scheme, was propounded by Mr Coyne about the same time. In these circumstances the Joint Committee deemed it to be their duty to request Mr Stewart and Mr Bateman to examine and report upon the several schemes. Mr Stewart's report, dated 3d February, and Mr Bateman's report, dated 4th February 1869, dealt very fully with the Moorfoot or South Esk Scheme, with the Tweed or Talla Scheme, and with the Heriot district, and both concurred in recommending the St Mary's Loch Scheme as relatively the cheapest and otherwise the best. The reports of these gentlemen were printed and circulated among the members of the Joint Committee, who on 15th February 1869, by a majority of fifteen to three, approved thereof, and agreed to report to the several corporations that in their opinion the St Mary's Loch Scheme is the one which in all circumstances is the best. Thereafter the minute of the Joint Committee, and the several reports, were submitted to the Town Councils of Edinburgh, Leith, and Portobello, and were considered by the Town Council of Edinburgh on 18th February 1869, when, by a majority of twenty-four to five, seven declining to vote, the documents were approved of, and it was resolved to prosecute the Bill then before Parliament. On the same day the Town Council of Leith adopted a similar resolution.

Not content with the publicity given to their proceedings by the publication of these reports, and by the prolonged and frequent discussions which took place in regard to them, especially in the Town Council of Edinburgh, the Joint Committee, on 22d February 1869, issued a statement to the public in name of the three corporations, affording full information in regard to the measure.

At this stage the Examiner upon Standing Orders sustained one of a multitude of technical objections taken by the Water Company to the Parliamentary plans and sections. The Standing Order Committee of the House of Commons allowed it to be got over. The Standing Order Committee of the House of Lords, however, considering that the objection related to St Mary's Loch, which was then supposed to be the exclusive property

of Lord Napier, and that his lordship was in India, refused to allow the Bill to be proceeded with, so far as regarded the St Mary's Loch Scheme, but allowed it to go on so far as the transfer of the undertaking of the Water Company to a public trust was concerned. The result is well known. The Bill was keenly opposed by the Water Company and by certain ratepayers who made common cause with the Company, alleging that large additional supplies were unnecessary. Both in the Commons and in the Lords, however, the necessity for a large addition to the supply was abundantly proved, not only by the evidence of the promoters and the officials of the corporations, but by Sir James Simpson, Dr Alexander Wood, and Dr Moir. Strange disclosures were also made as to the methods which were secretly adopted to restrict the quantity of water allowed to pass into the houses, and under the cross-examination of Mr Ramsay by members of Committee, the hollowness of the reasons assigned on behalf of the Company for the defective supply in the poorer and more densely populated districts was made completely apparent. The bill passed both Houses, and received the royal assent on 26th July 1869, and on 15th May 1870 the undertaking of the Company was transferred to the Trustees appointed under the provisions of the Act. The Lord Provost of Edinburgh and the Provosts of Leith and Portobello being, *ex officiis*, *three, seventeen* being elected by the Town Council of Edinburgh, *four* by the Town Council of Leith, and *one* by the Town Council of Portobello.

The evidence before the Committees of both Houses of Parliament had proved beyond question that the existing supply was quite insufficient to maintain the constant service which the Water Company were bound to give under heavy penalties, but had never given. Clause 4 of the Act therefore suspended these penalties for five years, from 15th May 1870, thus imposing upon the Trustees the duty of having new supplies introduced previous to 15th May 1875, when penalties for not giving constant service will be exigible.

The first election of Trustees under the Edinburgh and District Water Work's Act took place in August 1869, and on 8th September 1869 a remit was made to the Works Committee to adopt measures to ascertain, as far as possible, (1) to what extent there was unnecessary and preventible waste of water, and how far the present supply could be most equitably and advantageously distributed; and (2) to take steps to ascertain where an additional supply to meet the necessary wants of the communities might best be obtained. Under this remit a series of personal visitations by the Trustees to the Company's reservoirs and to the several districts proposed as sources of supply was arranged, and on 20th October 1869 a full

report of these visits was prepared, printed, and submitted to the Trustees. That report set forth the result of an examination of the Company's reservoirs, and of the following proposed sources of supply :—(1) The south side of the Pentlands ; (2) St Mary's Loch ; (3) The sources of the Tweed ; and (4) The Heriot and Moorfoot districts. In visiting each of the sources of new supply it may be mentioned the Trustees were accompanied by the Engineer who had proposed the scheme applicable to it, and thus they were enabled more satisfactorily to estimate the capabilities and advantages of each of the schemes. The report was approved of by the Trustees on 25th October 1869. Subsequently on 26th November 1869 Mr James M. Gale, resident Engineer of the Glasgow Water Works, was employed, as a neutral Engineer, to advise the Trustees as to the best mode of ascertaining the rainfall in the districts of St Mary's Loch and the Talla, and also of determining the flow of water in the Yarrow and Talla respectively. In carrying out his instructions Mr Gale found it necessary to examine the St Mary's Loch and Tweed schemes respectively, and his reports dated 14th December 1869 and 13th January 1870, embody the results of that examination which he thus summarises :—

“The quality of water from the two sources, would, I believe, be the same if it were possible to treat it in the same manner, but that drawn from artificial reservoirs, subject to considerable fluctuations in level, will always be less pure than that drawn from a natural loch. In quality of water, in the certainty attending estimates, and in cost, the St Mary's Loch Scheme is superior to the Tweed.”

On 10th August 1870, Mr Leslie was appointed Consulting Engineer, and Mr J. W. Stewart was appointed resident Engineer of the Trust, and steps were immediately afterwards taken to ascertain the best means of obtaining an additional supply of water for the inhabitants. Mr Stewart reported on this subject on 19th September 1870, and his report was sent to Mr Leslie, who also reported on 7th October 1870.

Meanwhile, samples of the water of the Talla and St. Mary's Loch having been obtained for the purpose of being submitted to Professor Crum Brown for analysis, he recommended that Dr Frankland, President of the Chemical Society, and one of H.M. Commissioners to inquire into the pollution of rivers, should be employed. The Trustees accordingly requested Dr Frankland to examine St Mary's Loch, the Talla, and Heriot, and to analyse and report on the waters, of which he was asked to collect specimens for himself. His reports, dated 5th, 6th, and 14th October, were duly submitted to the Works, Law, and Finance Committees of the Trust, and were considered along with the reports and estimates of Mr Stewart and Mr

Leslie at various meetings. Ultimately, on 24th October, the joint Committees,—comprising the whole members of the Trust,—in full view of the differences between these engineers, *unanimously* agreed to recommend the Trustees to adopt the St Mary's Loch Scheme, and to authorise the requisite steps to be forthwith taken for going to Parliament in the ensuing session, with a view to obtain additional supplies of water from that source; and farther, they agreed, Convener Field alone dissenting, to recommend to the Trustees to adhere to the Parliamentary plans of 1868, in their general features, excepting minor details. The whole proceedings of the Committees were fully reported to the Trustees on 26th October 1870. and in this report, which was printed and circulated, the Committee referred *seriatim* to the various districts which had been under consideration as available for purposes of town supply. In particular, they referred to (1.) the south side of the Pentlands; (2.) the South Esk or Moorfoot district; (3.) the Heriot district; (4.) the Lyne district; (5.) the Manor district; (6.) the sources of the Tweed; and (7.) the St Mary's Loch district. Under these heads, they summarised the information obtained during the progress of the inquiry since 1868 in regard to the several districts; and it may be stated, that all the figures in the report, so far as referred to the estimates of the cost of the several schemes, and of the quantities of water obtainable from the several districts, as given in the reports of Messrs Stewart and Leslie, were checked and verified by these gentlemen before the report was issued.

Much has been attempted to be made by the ratepayers opposing the present bill, of the fact that the Trustees refused to publish the reports of Mr Stewart and Mr Leslie above referred to. The opponents, however, cannot truthfully allege that the fullest and most accurate information was not given as to the divergence between their Engineers in regard to estimates. What the Trustees did not feel themselves justified in publishing, was those portions of the reports which related to storage and compensation to mill-owners,—matters mainly affecting the Corporation and mill-owners of Selkirk, whose interests were entirely antagonistic to those of the ratepayers of Edinburgh. The report of 26th October 1870 was, on the same day, submitted in print to the Trustees, by whom, with the single exception of Convener Field, it was approved of, and the whole subject was recommitted to the Works Committee, to take such steps as they might consider necessary to promote the St Mary's Loch Scheme in Parliament during the ensuing session. The report appeared in the newspapers on the following day, and was widely circulated previous to the Municipal Elections, and in the various wards of the three towns where the subject was discussed,—in some of them very fully,

—no opposition was offered to the scheme. The requisite plans and sections were accordingly prepared and lodged, and the Bill was deposited in Parliament.

If, however, the three Corporations had disapproved of the St Mary's Loch scheme, the parliamentary notices of which were before the public, it was open to them, in electing the Trustees for the current year, to secure that effect should be given to their views. But they made no important changes in the constitution of the Trust. On the contrary, though, at the meeting for electing Trustees held on 15th November 1870, one member of the Corporation of Edinburgh, who had been a supporter of the Water Company in the contest of 1869, complained that the council and the public had been kept in ignorance by the Trustees of the grounds upon which they were proceeding, and impugned the St Mary's Loch scheme, expressing his preference for the Heriot scheme, and though a vote of confidence in the Trustees of the former year was practically raised by the nomination of eight Trustees in opposition to those proposed by the Lord Provost, the Council, by an overwhelming majority, including many of those who are now actively engaged in opposing the measure, endorsed the policy of the trustees of the former year by electing the persons proposed by his Lordship. The Corporation of Leith did the same thing, by re-electing the Trustees of the former year.

Shortly after the Municipal Elections, but before the election of Trustees by the three Corporations, an anonymous correspondent of the *Scotsman*, who signed himself "Physician," took exception to the scheme, in respect of the quality of the water, and predicted the most injurious results from its use. Regarding the statements in these letters as indicative of the kind of objections which were being circulated, the Trustees submitted the letters to Dr Frankland, Dr Alexander Wood, Dr Littlejohn, and Dr Stevenson Macadam, and their reports, which were also printed and publicly circulated, contain the fullest refutation of the Physician's views, which have since been condemned by Professor Maclagan, and certainly found no favour at the hands of the Select Committee of the House of Commons when the author of the letters appeared in his proper person as Dr Charles Wilson, formerly of Kelso.

From the foregoing narrative, it will be seen that whatever objection may be urged against the St Mary's Loch scheme, it cannot be regarded as one adopted hastily, or without due consideration. It has been before the three Corporations since 1868, and the Trustees have promoted it on the advice of Mr Stewart, Mr Gale, and Mr Bateman as engineers, and of Dr Macadam and Dr Frankland as chemists,—the opinions of all those gentlemen having been formed freely and impartially. The scheme has also been thoroughly con-

sidered by Mr Hawkshaw, who is regarded by all conversant with such matters as standing at the very head of his profession, and he, after a personal examination of the district, has expressed his decided preference for the St Mary's Loch scheme over all the others which have been proposed, and his belief that the estimates of Mr Stewart and Mr Bateman are quite sufficient.

II.—*As regards the quality of the Water of St Mary's Loch.*

The three Corporations and the Trustees have always regarded the quality of the water as the primary consideration ; and this is distinctly set forth in the Report of 20th October, 1869, wherein, in defining what should be the character of the future supply, it is stated :—

“First : the supply to be obtained should be pure and wholesome, and otherwise well suited for domestic use.”

In accordance with this view, the very first Report to the three Corporations, dated 24th October 1868, contained Dr Stevenson Macadam's Report on the water of St Mary's Loch, which has been already referred to, and in which the water was stated to be—

“Of a wholesome character, and of excellent quality for domestic use.”

Mr Bateman, in his Report, dated 4th February 1869, said :—

“The quality of the water is so unquestioned that I need say nothing upon that : it is much superior to the water of the South Esk and the Fullarton Burn.”

In September 1869, the Trustees also visited the Loch, and thus reported upon it in October of that year :—

“The Trustees were of opinion, after examining the water in the Loch, as well as that flowing into it, that the quality of the water was, in every respect, highly suitable for town supply.”

Mr Gale, in his Report, dated 13th January 1870, which has been already alluded to, stated that the quality of the water in the Loch was superior to that of the Tweed.

Afterwards, in September 1870, Dr Frankland, who is probably the highest authority in Europe on such a question, was requested to analyse the waters of the several districts, and in reporting upon the waters of St Mary's Loch and the Talla, he said :—

“All the samples are of excellent quality, and are well adapted both for domestic and manufacturing purposes. They are entirely free from all evidence of excremental pollution, and contain a moderate proportion of organic elements, the organic matter being of vegetable origin and innocuous. They are all very soft, and hence well adapted for washing and manufacturing operations, except brewing.”

Again, when requested by the Trustees to give them "a frank and unbiased judgment" on the question raised in the letters of "Physician," he, on 21st Nov. 1870, furnished a careful statement of the grounds on which he "came to the conclusion that the St Mary's Loch scheme was preferable to the Talla or Heriot scheme." Referring in the same Report to the "water fleas," about which so much has been said, he stated—

"I need hardly say that these are perfectly harmless insects. I have rarely found them absent from lake and impounded waters in summer, and they would almost certainly be present in the impounded water of the Talla or the Heriot."

Concluding this Report, he said—

"I can only repeat the opinion to which my analysis and an inspection of the gathering grounds have led me, viz., that, after efficient straining or filtration, the water of St Mary's Loch will, in every respect, be well adapted for the supply of Edinburgh, and will, if so used, *constitute one of the best water supplies in the United Kingdom.*"

These opinions of Dr Macadam and Dr Frankland, it may be observed, were those of men wholly unbiased. Dr Macadam did not know till a month or two afterwards the source from which the the water was taken, or the purpose for which it was proposed to be applied, and Dr Frankland states in his Report of 21st November 1870 that—

"No attempt whatever has been made to influence my judgment in favour of any one of these schemes. I have been left to pursue my investigations in the most free and unfettered manner, and every one with whom I came in contact seemed to be actuated only by the desire to secure for Edinburgh the best available supply, whatever its source might be."

To the same effect were the opinions pronounced by Dr Littlejohn, Dr Alexander Wood, and Dr Macadam in their subsequent reports.

Dr Wood says:—

"The Heriot, the Talla, and St Mary's Loch all afford water of a quality suitable for all the purposes for which it is required in a town. The analysis of the water of St Mary's Loch shows it to contain a sufficient quantity of the salts of lime to remove all fear of the danger suggested in the letter of a "Physician," especially when the copiousness of the supply of these salts from other sources is considered."

Dr LITTLEJOHN says:—

"The water of St Mary's Loch is a very pure, and, in my opinion, a wholesome water. It is remarkably free from organic contamination,—the importance of which in the production of disease, has only been satis-

factorily established of late years; and while on a par in this respect with the Loch Katrine water, it possesses this advantage, that its proportion of saline ingredients is larger, and therefore that it is still less likely to act injuriously on the leaden pipes used in its transmission, or on the cisterns in which it must be stored by the inhabitants. Its waters are not stagnant. They present a large surface to the pure air of a strictly pastoral region, and while several streamlets enter it, the Yarrow leaves it."

Dr MACADAM says—

"As to the water fleas, I may confidently state that they are present in all impounded waters during the warmer months of the year, though during the last summer and autumn they were unusually abundant. I had occasion to examine a large number of waters from different districts, and had no difficulty in observing the presence of the so-called water fleas in many of the samples. Indeed, they are to be found more or less in all still waters, including the less quickly running parts of streams, and any water, whatever be its source or quality stored up in natural or artificial reservoirs, is certain to exhibit evidence of their presence. I have seen them in the water taken from the ponds or reservoirs on the Pentland Hills, and during last summer I found them in the city water drawn from the cisterns in my house in Portobello. These water fleas are found in the best and most wholesome waters, and they are not indicative of any impurity or contamination of the water.

"After mature consideration, therefore, of the quality of the water from St Mary's Loch, the nature of the gathering grounds, and the practical impossibility of cultivating the drainage area falling into the Loch, I am of opinion that a community which can command, even at considerable expense, such a large supply of comparatively soft water, ought to consider itself extremely fortunate, especially when such water is stored naturally in an extensive loch with a pebbly beach."

Upon such evidence, concurring with their own observation, the Trustees had no doubt as to the excellence of the water of St Mary's Loch, and the opinion so formed has been confirmed by the evidence given before the Select Committee of the House of Commons, from which the following extracts are taken.

In answer to a question by the Chairman of Committee, Mr LESLIE stated as follows :—

5218. Do you participate in the feeling which prevails amongst a large portion of the population in Edinburgh as to the injurious effects of water fleas, or the probability of them? I am not a chemist, but it strikes me that it is *very good water, and that there is nothing to be said against it*. I shall be very sorry to have anything much to say against that water, for if that was so, there is scarcely *any hill water whatever that will be considered fit for use*.

Dr LITTLEJOHN—

1558. Have you had plenty of opportunity of seeing St Mary's Loch under all conditions of weather and water?—Yes, I have.

1559. What do you say about this water generally?—*A better water I do not know.*

1560. Have you drank it?—Yes, again and again.

1561. Notwithstanding the fleas?—I have never seen any.

1564. As far as your own personal use of the water is concerned, you have always found it wholesome and palatable?—Yes.

1565. Is it flat to the taste?—No; it is brisk and pleasant to the taste.

When examined as to the effect of soft water in leaden pipes and cisterns, to which his attention had been directed as Medical Officer of Health, he gave the following evidence:—

1575. What do you say, judging from your experience of Glasgow?—I am quite convinced that the St Mary's Loch water can be introduced into Edinburgh with impunity, without danger to the health of the inhabitants.

1576. You mean in consequence of lead poisoning, or any action in the lead?—Yes.

1577. Is there found to be any practical difficulty with the Loch Katrine water in Glasgow?—None.

1578. And that is the softest water that is known?—It is the softest water that I know of.

Dr MACADAM.—During his examination he exhibited and stated the results of an analysis of samples of water collected by him on 17th February 1871, at a time when the water in the Loch was in about the worst condition that it could be in. In regard to it, he said—

1958. On full consideration of the foregoing experimental results, I am decidedly of opinion that the water from St Mary's Loch and district is of excellent quality for town supply. The saline matter is in sufficient and reasonable amount, and the hardness is little, so that the employment of the water will lead to economy in the preparation of all kinds of food, and in cleansing and washing operations. Moreover, the water is thoroughly aerated, containing the full amount of gases, in solution of which oxygen consists of nearly one-third of the whole, indicating that the water is free from any decaying or putrifactive materials. In every respect the water is suitable for all practical applications and use (except in the brewing of ales), and, when boiled, it forms no incrustation in vessels, so that it is safe to use in ordinary steam boilers, and also in the high pressure boilers now so common in households.

1959. In the transmission of the water to the town it may be conveyed through built culverts or iron pipes coated with carbon, and in the distribution throughout the houses it may be stored in leaden cisterns, and be passed through lead pipes without acquiring any poisonous or deleterious property?—Yes; I have experimentally demonstrated that the water can be

so conveyed through lead pipes, and also be stored without acquiring any poisonous or deleterious properties.

1960. Now that is one of the threats that is created, that the water may be injurious by destroying the lead pipes?—It is one of the threats, but it is quite unfounded.

1961. You have tested that?—Yes.

1965. You say, “In conclusion, I would congratulate the citizens of Edinburgh, Leith, and Portobello on the prospect of soon acquiring a large and proper supply of water suitable for town and domestic purposes, collected in a pastoral district where no agricultural pursuits can contaminate the water stored in great natural lochs or reservoirs, where even in stormy weather the water is not tinged with clay, derived from forced embankments, and where it never can become stagnant, but is retained fresh and palatable by a constant stream of water flowing through the loch both in summer and winter?—Yes.

— Cross-examined by Mr Rodwell, one of the Counsel for the rate-payers, opponents.

2070. Do you mean to represent the character of this water to be that only occasionally there is one of these insects here and there?—If you go to St Mary’s Loch with a tumbler, and take a tumbler here and a tumbler there, you will take fifty tumblers before you find a flea.

2071. In the worst season?—Yes.

1072. In the most fertile season for fleas?—Yes.

2079. Do you think it desirable that, in supplying a city like Edinburgh, you should give them a pure water, or that you should give them a water which they believe, although their fears be groundless, is not good?—I believe that a good deal of unnecessary alarm has been created in Edinburgh by means of people circulating absurd stories about the fleas. The St Mary’s Loch is the finest loch we have in the lowlands of Scotland. I do not know why we should have fleas there more than in any other loch in Scotland. There is no accumulation of organic matter. You have nothing to breed these animals. It is one of the finest pastoral districts that we have, and it is perfectly absurd to say that you have fleas in that loch any more than there are in any other loch in Scotland.

Re-examined by Mr Clerk, counsel for the Promoters.

2138. Now, with regard to the animalculæ, you mentioned that you had found them in the Pentland reservoir on the north side?—Yes, in the Torduff reservoir, and also in the Glencorse reservoir on the other side of Pentland. The quality of water in the Heriot district would be subject to this, that it being impounded, and there being no great flow of water through it, you would require to impound the flood water in the winter, and for a considerable part of the summer the whole outflow would be taken into Edinburgh, and the water in the Heriot would become more or less stagnant; whereas in the case of the St Mary’s Loch district, you have

such a body going through it, three or four times the quantity which can ever go through the Heriot reservoir, that you must always have a kind of fresh water passing through the Loch, not only water flowing into Edinburgh, but the quantity to be sent down as compensation.

PROFESSOR MACLAGAN.

2315. To come more directly to the chemical question, have you examined the water of St Mary's Loch?—Yes; I made a general examination, but no detailed analysis.

2316. I believe you have observed the number of springs in the district, and the size of the streams entering into St Mary's Loch?—Yes; I observed the streams and the feeders flowing into the loch.

2317. Are they in such volume as to prevent any probable stagnation of the water in the loch?—I cannot understand how St Mary's Loch should have any stagnation in it, seeing that the Little Yarrow comes in at the top of Loch Lowes, through which a burn comes in at the side; the Meggat comes in at the other side, and the Yarrow goes out at the bottom; and, therefore, I do not see how there can be any stagnation under these circumstances.

2318. Looking at it in a medical point of view, you consider that that is an important matter for consideration?—Yes.

2319. Getting a constant influx of fresh water into a great natural reservoir?—Yes.

2322. Is it in your opinion a pure water, and one well adapted for the consumption of a large town?—That is my belief.

2323. We heard from Dr Stevenson Macadam that it was well adapted, not only for drinking, but for cooking, and washing, and general domestic purposes?—Yes.

2324. Your attention, I believe, like everybody else's, was drawn to the letter of a Physician in Edinburgh?—Yes.

2325. You are aware, therefore, of the objections made in these letters which created a good deal of alarm as to the quality of the water?—Yes.

2326. With regard to that to which a good deal of importance was attached—namely, the small quantity of lime in the water—what do you say as to that?—I know of no facts known to science which substantiate the proposition that the fact of a water being of soft quality interferes with the nutrition of the human body, bones or otherwise.

2329. As a Professor of Medical Jurisprudence, can any objection in your judgment be attached to there being no greater a quantity of lime in the water for domestic consumption than is to be found in the water of St. Mary's Loch?—No.

2357. You were at St Mary's Loch I believe on the 15th of the last month (April 1871)?—Yes.

2358. I believe that you searched for this formidable animal, the water flea?—Yes.

2359. Did you find any?—No.

2360. You made a diligent search, did you not?—We examined all the samples that we took, to see if we could find any.

2372. You do not, as a resident in Edinburgh, entertain any apprehension on the subject of the fleas?—Not the least.

2382. Notwithstanding all that this gentleman ("Physician") says about lime, I believe you entertain a different opinion; you think that the water contains quite a sufficient quantity?—Yes.

2466. I dare say you may recollect that, in consequence of the alarm entertained as to the effect of so pure a water as that of Loch Katrine upon lead, the (Glasgow Water) Bill was rejected the first time? Yes, most assuredly.

2467. It was rejected from the very fear which is proposed to be created here?—Certainly.

2468. For how many years has that water been carried into Glasgow?—I think about twelve or fourteen years.

2469. I believe that it was about 1859 that it was brought in?—Yes.

2470. As far as you can tell us, no injurious consequences can be traced to the introduction of pure water from St Mary's Loch into Edinburgh?—No; I am in the habit of telling my students every day, when lecturing upon the subject of lead poisoning, and pointing out to them how complete a revolution of opinion there has been as to that.

2471. As the best evidence of that, we heard from Dr Stevenson Macadam that he had submitted the analysis of these waters to you and to Dr Christison?—Yes.

2472. Did Dr Christison raise any objection as to the propriety of introducing this water into Edinburgh.—*No; he is in favour of it.*

2473. He is now, I believe, President of the Royal Society of Scotland?—Yes, he is.

2494. Do you think that there is any ground for the popular alarm which has been created?—No.

Dr EDWARD FRANKLAND.

3388. Be good enough to take St Mary's Loch water, What class of water is that?—It is good wholesome water, fit for all domestic purposes, and for all manufacturing purposes except brewing—it is not fit for brewing.

3389. It is too soft a water for brewing, I suppose?—It is too soft a water for brewing.

3390. But for domestic purposes is a soft water desirable?—Yes; in my opinion, for domestic purposes, a soft water is very desirable.

3391. Now, you spoke of it just now as a wholesome water, Does that refer to consumption?—Yes, it refers to consumption for drinking.

2392. Now, I gather from seeing your Report that in some of the samples which you either collected or saw, there were present some animalculæ?—There were; what is commonly called the water flea was

present in the Loch at the time of my visit, but the samples which I have recently received from Dr Macadam contained none.

3393. Does it surprise you that these water fleas should be present in the water at one season and not present in the water at another?—Not in the least. I have seen them repeatedly in waters of very good quality. The Manchester water very frequently contains them, delivered in the town, *and that is justly considered one of the best waters in the kingdom.*

3394. An animalcule of the same character is frequently present in all waters, you say?—It is.

3395. Now, is there any great harm in the creature?—None whatever that I know of.

3398. In the event of its being found necessary, there would be no difficulty whatever in getting rid of it by the water being filtered?—There would be no difficulty.

3399. Now, in your opinion, is St Mary's Loch water a fit water to be delivered to Edinburgh for domestic and other purposes?—*It is one of the best waters in Scotland.*

3400. We hear frequently a good deal about soft water acting on lead; could the St Mary's Loch water safely be transmitted through pipes and stored in lead cisterns?—It could. I have made experiments, and have found that although it acts slightly on bright lead, yet it would not affect the water in a cistern.

3401. Well now, do you know the Loch Katrine Water?—Yes I do.

3402. So far as its action upon lead is concerned, is this water as good as that?—I should say roughly speaking that the water of Loch Katrine acts a hundred times more upon lead than the St Mary's Loch water.

3403. And there is no objection to that is there?—No, there is no objection to it practically; it is not found to cause any inconvenience in Glasgow.

Ex-Lord Provost CHAMBERS.

1230. Are you personally acquainted with the water of St Mary's Loch?—Yes, I know it well.

1231. Perhaps you have drunk some of it?—Yes, I have.

1232. Is it really good water?—Yes.

1233. You are a landed proprietor in Peebleshire?—Yes.

1234. And you are often in the neighbourhood of the lake?—Yes.

1235. And you have repeatedly tasted the water?—Yes.

1236. And you tell the Committee the result of your experience?—Yes; I have always found it clear and pleasant to taste. I never found anything offensive about it.

Mr ROBERT MITCHELL, Farmer, Kirkstead, who has resided in the vicinity of the loch for about forty years.

2157. Now, then, according to your experience, is St Mary's Loch water very good for drinking?—Yes, I think so.

2158. And for other purposes also?—And for other purposes also.

2159. And it is used by all the inhabitants upon the margin of the lake?
—Yes, it is.

2160. Did you ever hear any complaints of it?—No.

2161. Not till the last two or three months?—No.

2167. Now, during very heavy floods, do you find the water of St Mary's Loch discoloured at all?—At the foot of some of the burns I have seen it slightly discoloured occasionally.

2168. And after a day or two, what is the result then?—I find it quite pure and clear.

With such evidence before them it is not difficult to understand how the Select Committee of the House of Commons were satisfied with the suitability of the water of St Mary's Loch for town supply, and all the more that the objections to it by Dr Letheby and Mr Voelcker, who were adduced by the opponents to disprove the quality, applied equally to the water of Loch Katrine, the excellence of which was abundantly established previous to its introduction into Glasgow, and is fortunately now too well established to be shaken by any mere theory.

In regard to the other objections to the quality of the water which have been so freely circulated by anonymous newspaper correspondents, and many of which would be ludicrous, were they not calculated as they are evidently designed to excite alarm in the minds of many people, it is only necessary here to say that the Trustees have satisfied themselves by extensive enquiries in the district that these objections are wholly without foundation. And surely it cannot be supposed, even by those who are least inclined to give the Trustees credit for acting under a sense of public duty or of high responsibility, that they would, with any regard to themselves or to their families, seek to introduce a supply of water which they had the slightest reason to believe to be either impure or deleterious.

III. *As regards the quantity of water which should be available for the supply of Edinburgh, Leith, and Portobello.*

Looking to the circumstances of Edinburgh, Leith, and Portobello, the character of the buildings, the habits of the people, and the necessity for a large supply of water for public sanitary purposes, no supply less than fifty gallons per head of the population could be regarded as satisfactory. The authorities in Glasgow have been unable by any process of inspection to reduce the consumption in that city to a lower quantity, irrespective of what is drawn from the Clyde for manufacturing purposes. And both ex-Lord Provost Chambers and Dr Littlejohn, who are intimately acquainted with the requirements especially of the poorer and more densely populated districts of

Edinburgh, urge the necessity for a not less plentiful supply here. Fifty gallons per head of the population is also what both Mr Stewart and Mr Bateman consider it desirable to have for Edinburgh. This quantity is needed to insure a constant supply, especially to the poorer classes, who are crowded in high tenements ; it is needed for the water closets which are being introduced into every house that can receive such conveniences, and which, if not constantly supplied with water, are the fertile sources of disease ; it is needed to flush twice a-day the closes and gutters, which it is now only possible to flush once a-year ; it is needed to remove the offensiveness of the street drains and cesspools arising from a defective water supply ; it is needed to supply the baths which are in every house of moderate rental, and which there is a growing tendency to introduce into the houses of the working-classes ; it is needed to provide an unfailing supply for extinguishing fires and for watering streets ; it is needed for the supply of the shipping and of manufactories and public works, which are essential to the prosperity of the community ; it is needed to secure constant service to all classes of the community and to remove the complaints and heart-burnings which the defective supplies provided by the Water Company from time to time engendered ; it is needed generally to promote habits of cleanliness, which conduce to health, and comfort, and morality.

In the houses of the wealthier classes where cistern accommodation is plentiful, the defective supply has not been so much felt, and many are therefore sceptical as to the great deficiency that exists. The evidence adduced before the Committees of Parliament, however, satisfied them in 1869, as it satisfied the Select Committee of the Commons on the present bill, that an abundant additional supply of water was necessary.

In October 1870, the whole available supply for Edinburgh, Leith, and Portobello, fell to three and a-half millions of gallons per day, amounting, inclusive of the quantity consumed by manufacturers and for all other purposes, to an average of 14 gallons per day to each head of a population of 250,000. But assuming that, by a better husbanding of the water than the Water Company exercised previous to the transference of the undertaking to the Trustees, the average supply to Edinburgh, Leith, and Portobello could be taken at seven millions of gallons per day, that would only yield for all purposes, manufactories, &c. included, 28 gallons per head of the population. To provide 50 gallons per head of the present population, would require a supply of twelve and a-half millions of gallons, —representing an existing deficiency of five and a-half millions of gallons per day. But the population of the district has increased about two per cent. per annum during the last ten years, and as stated by Mr Bateman in his evidence before the Committee (3499)—

There seems no reason why the population should not go on quite as rapidly and with a good supply of water, even more so than now; and if so, the number will be about 300,000 in 1881, and 360,000 in 1891, taking the experience of the past ten years as a guide for the next twenty years.

Applying that principle, the deficiency in 1881 will be eight millions, and in 1891, it will be eleven millions of gallons per day. In other words, assuming that the supply contemplated to be introduced under the present bill is not introduced till 1875, the first instalment of twelve millions of gallons per day proposed to be brought in will be exhausted in fifteen years thereafter, and in anticipation of that event, it will be necessary, probably two years earlier, or within thirteen years from the time when the water is introduced, to make provision for introducing the second instalment.

IV. *As regards the estimated quantity of water obtainable from the several sources of supply that were proposed in the House of Commons, and the cost of introducing it.*

(1.) THE PENTLANDS.

The fact that the Water Company, whose object as a private trading Company was to get water at the lowest possible cost so as to maintain the largest possible dividend, discarded the Pentlands as a source of additional supplies in 1868, and proposed to go to the Moorfoot district, may be accepted as conclusive as to the opinions of the directors, of Mr Ramsay, the then manager of the Company, and of Mr Leslie, its Engineer, by whom, indeed, the Moorfoot scheme was designed. As regards Mr Ramsay, he has never failed on all occasions—at least till he went to London to aid the opposition to the present bill—to declare in his own words that

“The Water of Leith and the North and South Esk were either already appropriated, or in such a state of pollution from paper mills and other manufactures, as to render them totally unfit for domestic use.”

The same thing was announced in the published reports of the Directors of the Company, and was maintained by Mr Leslie, who still consistently adheres to his opinion, and stated to the Select Committee on the present Bill that in his judgment it was unwise to go to the Pentlands for a considerable increase to the supply of Edinburgh.

In his first report to the three corporations, dated 13th August 1868, Mr Stewart reported upon and discarded the Pentlands as a source of supply. It was also reported upon by the Trustees on 8th September 1869 and on 26th October 1870, and they were unanimously of opinion that any water that could be obtained from that source would not be worth the cost which it would entail.

Mr Hawksley, who in 1869 recommended the adoption of the Moorfoot scheme to the Directors of the Water Company when

they were preparing to oppose the St Mary's Loch Scheme, as proposed by the three Corporations, ventured indeed to state to the Select Committee of the House of Commons on the present bill that he could introduce into Edinburgh four millions of gallons per day of good water from the Pentlands at a cost of £100,000 ; but this was contradicted by Mr Bateman and by Mr Leslie, the latter of whom when examined by the Committee said—

5184. Then the 4,000,000 that Mr Hawksley takes would require an available rainfall of 33 inches, which is a great deal more than that district would ever be supposed to yield. I think that a good deal might be done by additional storage at Glencorse. In the first place, you might get as much as would prevent the possibility of the present pipe ever being short of water ; and then possibly you might do more than that ; you might get a place for storage that would hold fully another in that pipe ; but in that case I do not know whether you would not have to fight the millers again. The last time they were in Parliament they got thirty feet additional, and for no reason whatever except that the Company were in some distress.

5185. If you made such alterations in the Glencorse reservoir as to prevent the present supply pipe ever being exhausted, what would that give to the population?—Not any more than the present maximum.

5186. What is the present maximum?—250 feet a minute.

5187. What would that give per head to the population?—That depends upon other quarters ; if the supply was full from other quarters, it would give 7,000,000, which would be equal to about 36 gallons a head for 250,000 people.

When examined by the Chairman as to the alleged waste at Glencorse, he gave the following evidence :—

5196. I see that there is a table handed in to the Committee (by Mr Hawksley) which gives it at nearly four millions and a quarter?—I know nothing of that table ; but I say that I am quite sure it cannot be correct. If you take that table to be correct, it would require 33 inches of water to run off that district, and that is a great deal more than it is ever understood that it gives. We take just now 16 inches, so that if you allow a rainfall of 20 inches, there would be four to come and go upon. If we take 16, that means 17, and, in fact, it is more than all the water that is taken both by the town and for compensation together.

5197. I gather that you disagree with Mr Hawksley's estimate with regard to the 36,000 acres above the 1800 [800] feet contour, and as to the amount that could be obtained from that area?—Yes ; I disagree with him in this respect, that on the north side of the hills there is none of the water that is fit for drinking. It is all mossy water, except the spring water which is appropriated already. There are certain springs on the north side which are not appropriated yet. There are the Maidenwell springs on the borders of Lanarkshire, and they were intended to have been taken in by the last Bill, a pipe was laid, but they were omitted in the Act because they re-

quired a compensation reservoir in the River Mead, and that runs into the Clyde.

When asked by the Committee as to his opinion whether the quantity which Mr Hawksley estimated to be obtainable from the Pentlands could be got.

5199. Do you think you could get one half?—No, I do not think we could get nearly a half.

5200. Do you think you could get one-third?—I really don't like to say without looking over the ground.

So much for Mr Hawksley's evidence in favour of the Pentland scheme, which was intended as a surprise, and met the fate it deserved at the hands of the Committee.

2. THE SOUTH ESK.

The supply obtainable from this source and the cost of bringing it into town are estimated as under,—

	Gallons.	Cost.	Cost per Million Gallons
By Mr Bateman and Mr Hawkshaw,	8,400,000	£243,000	£30,300
By Mr Stewart,	5,409,000	193,000	35,764
By Mr Leslie,	8,934,948	230,000	26,000

From these quantities, however, will have to be deducted what may be appropriated for the supply of Dalkeith and Musselburgh, and in considering this scheme, regard must be had (1) To the provision which Parliament will make for future extension of supply to these towns, if indeed it will allow Edinburgh, Leith, and Portobello to enter a district which has already been otherwise appropriated; and here it may be proper to mention that Mr Bateman stated to the Select Committee that the water which remains would not, in his opinion, be fit for Edinburgh (3475), and (2) to the effect which the further abstraction of water for the supply of Edinburgh from this district may be expected to have on the amenity of Dalkeith Palace and grounds, and other residences, and the opposition which may reasonably be expected from the Duke of Buccleuch and other land-owners, to any scheme for further appropriating the water of the district.

3. THE HERIOT.

The supply obtainable, and the cost of introducing it are estimated as under,—

	Gallons.	Cost.	Cost per Million Gallons.
By Mr Stewart,	9,000,000	£380,000	£38,700
By Mr Bateman,	9,000,000	306,000*	34,000
By Mr Leslie,	9,825,876	260,000	26,360

* Independent of compensation to the proprietor of the Borthwickhall estate.

This district is the natural source of supply for the rapidly increasing town of Galashiels, which is at present very inadequately provided with water. Besides, the flood waters of the Heriot are necessary for scouring the bed of the river Gala, which during a large portion of the year is in a very offensive condition. Any attempt, therefore, to abstract the waters of the Heriot would, there is good reason to believe, be strenuously and successfully resisted by the people of Galashiels.

4. ST MARY'S LOCH.

The supply obtainable and the cost of introducing it, are estimated as under.

	Gallons.	Cost.	Cost per Million Gallons.
By Mr Stewart, 1st instalment of	12,000,000	£457,000	£38,000
By Mr Bateman, do.	12,000,000	473,000	39,416
By Messrs Stewart and Bateman, } 2d Instalment,	12,000,000	140,000	11,667

Upon the subject of Estimates, Mr Bateman gave the following evidence before the Select Committee of the House of Commons :—

3490. Now what do you say about the estimate that has been spoken to by Mr Stewart, in your judgment is that estimate sufficient for the execution of the works?—Yes, I may mention that my estimate was totally independent of Mr Stewart's, I not knowing even what the Parliamentary estimate was at the time. It comes to £472,000, at very full prices.

3497. So that basing your estimate or your opinion upon the actual result of similar or more expensive works at Loch Katrine without going into further details, have you any doubt that Mr Stewart's estimate is ample for the execution of the works?—My opinion is that Mr Stewart's estimate is quite sufficient.

The plans, sections, and estimates have also been carefully examined by Mr Hawkshaw, whose eminence and experience no one will question. Mr Hawkshaw visited St Mary's Loch and went over the whole line of the proposed works, and in regard to the estimates he said,—

3752. Have you examined the estimates?—I have gone carefully into them.

3753. Do you consider the price is sufficient?—Quite sufficient.

The estimates of the cost of the St Mary's Loch Scheme given above, have been carefully made with reference to the works shown on the plans and sections. The estimate by Mr Leslie in his report to the Trustees,—which, as he states in his evidence (5108), was “rather hurriedly got up,”—was offered as a mere approximation, and he stated to the Select Committee that he had not gone into the

plans now before Parliament, nor had he made any estimate with respect to them. It is further to be observed that no serious attempt was made in Committee to break down the estimates of Mr Stewart and Mr Bateman, confirmed as they were by Mr Hawkshaw.

V.—*The Grounds upon which the St Mary's Loch Scheme is to be preferred.*

The policy of the Water Company during its existence was essentially a hand-to-mouth policy. Their supplies were obtained from time to time in small quantities, which scarcely sufficed to meet the demand for the present, and made no provision for the future. Complaints were thus constant, for the demand was always in advance of the supply. Besides, it was a costly policy. In bringing in the seven millions of gallons which constitutes the present supply, no less a sum than £470,000 has been expended, showing an average cost per million gallons of £67,000. It must be assumed, that having the selection of the best portions of the Pentlands, the Water Company and their advisers would adopt those which entailed the least cost relative to the quantity of water obtainable; and yet Mr Hawksley expects people to believe that four millions of gallons per day can now be obtained from that district at greatly less than one-half of the cost which it has hitherto been found necessary to expend in obtaining a similar quantity under much more favourable circumstances.

But the experience of the past affords little encouragement to adhere to what has been well termed the "dribble" or hand-to-mouth system. It is costly in itself and unsatisfactory in its results. And if the wisdom of a larger and more liberal policy needed illustration, it is to be found in the cases of Glasgow and of Dublin. In the former city the proposal to introduce a supply from Loch Katrine raised an opposition which succeeded in defeating the exertions of the promoters on two occasions. With a wise persistence, however, they persevered, notwithstanding the obloquy and misrepresentation with which they were assailed, and the storm of opposition excited by the fears of impure water, lead poisoning, and heavy taxation, which the opponents of the scheme succeeded in creating there to a greater extent than they have happily succeeded here. Ultimately the bill was passed, and ere long no class of persons were more thankful that it was so than those who had been defeated in their short-sighted opposition. All classes of the community luxuriated in the enjoyment of an abundant supply of the best water; trade and manufactures received a fresh impulse, and the domestic water-rate, which commenced at 1s. 4d. per pound, has been reduced to 8d., with

the prospect of still further progressive reduction. There is no reason why Edinburgh should not profit by the example and experience of Glasgow ; and it is idle to say that the St Mary's Loch scheme is one for posterity. A glance at the facts will establish the fallacy of such a statement. It has already been shown that if 50 gallons per head is to be provided, there is at present a deficiency of five and a half millions of gallons per day, and that the deficiency, according to the present rate of increase in population, which may be assumed at 2 per cent. per annum, will, ere an additional supply can be introduced, say four years hence, be six and a half millions of gallons per day. To bring in, therefore, either the water of the South Esk or the water of the Heriot, would be to provide for the wants of the community for only seven years longer, *i.e.*, till 1882. In other words, whether the South Esk or the Heriot were first taken, it would then be exhausted, and it would be necessary to go to the other district to obtain an extension of supply. That is to say, making allowance for the three or four years which might be required to carry a bill, and to execute the requisite works, the trustees would again require to be in Parliament in eight or nine years hence, exposed too in all probability to the risks incident to a contest with powerful opponents fighting for an important and legitimate object. And what would be the financial results of such a policy as compared with the proposal of the Trustees to bring in twelve millions of gallons per day from St Mary's Loch at a cost of even £500,000, with an additional supply of other twelve millions of gallons per day when required, at a farther cost of £140,000 ? Let Mr Bateman's evidence on this point, and on the general superiority of the St Mary's Loch Scheme answer the question.

3508. Now, in your judgment, would it be in any sense an economical administration of public funds to contemplate only the 12,000,000 gallons for the 20 years ?—In my opinion, it would be a most impolitic and very bad economy on behalf of the city. Now, I will draw the attention of the Committee to the difference between the two schemes. The construction of works where you have to impound water by embankments and artificial reservoirs from first to last cannot take less than about five years. If you take the Heriot, which is at present unappropriated, and that supplies 9,000,000 gallons of water, you could not complete those works in less than five years from the time of their commencement. At the end of about eleven or twelve years from the present time the 9,000,000 gallons would be exhausted, but inasmuch as any scheme of that character would require five years to complete it, you must commence the outlay upon the second scheme, which, if the South Esk had been unappropriated, would have been the South Esk, so that you must within the next twelve years, have incurred the whole expense of the South Esk and the Heriot. In doing

that, you would have incurred a cost of £550,000 according to the estimate of 1869, and if the estimate upon careful consideration were to be as much increased as the St Mary's Loch had been, the cost would not be less than £630,000, and that must be incurred within the next eleven or twelve years, whereas £450,000 would be about the cost of the St Mary's Loch scheme. You get 12,000,000 gallons, nearly enough for twenty years, and all the outlay you have to incur for that period, in fact quite enough, is what I have stated, because 11,000,000 gallons is the whole deficiency twenty years hence, therefore not only as respects the nature of the works, the character of the district, the quality of the water itself, and the cost, it is in every respect the cheapest and most desirable scheme.

3509. What do you say about it as respects the character of its collecting ground?—It is very much superior to anything either at South Esk or the Heriot. The very plan which is exhibited there—the elevation of the country—shows that. There you have mountains forming the margin of the St Mary's Loch basin, rising from 1,700 to 2,700 feet high. A large tract of ground within the basin is 1,600, 1,700, 1,800, and 2,000 feet high. There is nothing of the sort in the drainage-ground of the Heriot and South Esk, except a little bit of 2,000 feet in this corner.

3510. Irrespective of any other consideration, the higher the land the less likely to come under cultivation?—Much depends upon the geological character of the soil. The silurian district gives water of very pure character. I do not know whether there is any plough cultivation in the country, and the water comes down very rapidly. In the silurian district the water runs off the ground very quickly. In the Loch Katrine works we had so little water that we were actually obliged to carry water down shafts and into the tunnel, to lubricate the holes which we had to drill to blast the rock. There was not enough water in the shafts to lubricate the drill holes.

The views thus enunciated by Mr Bateman, are confirmed by Mr Hawkshaw, who gave effect to a similar policy when he was appointed royal and sole commissioner to decide which of the various projects for supplying the city of Dublin with water should be adopted. That gentleman has also considered the several schemes which have been proposed for Edinburgh, and he thus stated to the Select Committee his opinion of the St Mary's Loch scheme.

3740. What is your opinion of the plan?—My opinion of the plan generally is that it is extremely simple, and that as an engineering work it presents no difficulties more than very ordinary difficulties, and I believe it would afford a very good supply of water to the City of Edinburgh.

3741. And there is no risk of danger of any kind?—None that I can see. It is extremely free from risk.

3748. Have you compared with the St Mary's Loch, the Heriot, and Moorfoot schemes?—Yes.

3749. Having regard to the cost and the mode of obtaining a supply which should you say was best for the interests of Edinburgh?—My comparisons were made before a considerable part of the district was supplied by Parliament, and my opinion was that it was very much better that Edinburgh should go to the St Mary's Loch scheme, but even although part has been taken away by other schemes, I consider it beyond all question the best for the supply of Edinburgh.

3750. Should you consider it an important question in the comparison that the Moorfoot and Heriot schemes would require the construction of large reservoirs?—Yes; I consider it a very important element in the enquiry. Of course there are cases in which towns and cities cannot be supplied without the construction of large reservoirs, and where that is the case, you must face the difficulties and take the risk; but where you can get a case of this kind without the necessity of constructing a large reservoir, that, of course is the best scheme, because, although engineers undertake to make those large embankments, and ought to be able to make them safe, yet we know that very serious accidents have arisen from them, and that would decide the question to my mind; even supposing there were no other considerations, and even supposing the St Mary Loch scheme was considerably the more expensive, I should, if I were advising the City of Edinburgh, advise them to take this scheme without embankments.

3751. I believe that when you gave your recommendations with respect to the works for the City of Dublin, you took the most expensive of all the plans?—Yes, I did; for reasons which appeared to be quite sufficient to me at the time, I selected the most expensive of eight or ten schemes that were brought before me, and the works have been carried out; and I do not believe that any person has quarrelled with my decision since.

3767. *Cross Examined by Mr RODWELL:* Suppose you take the South Esk scheme for the supply of Edinburgh, that is 8,000,000 a day?—I have said that if you take them both the St Mary's Loch would be the best.

3768. But supposing you take the South Esk—that would be in round numbers 8,000,000 a day—what would that cost to bring to Edinburgh?—For South Esk or Moorfoot district, which is given to me as producing 8,400,000 gallons, the estimate is £243,000.

3769. That is the estimate you calculate upon as compared with the St Mary's Loch?—St Mary's Loch would be £480,000, but the South Esk Scheme would have the disadvantage of having large reservoirs.

3780. *Re-examined by Mr CALVERT:* As far as you have observed is it the case that that place in Musselburgh is the only place for a supply?—I dealt with the question as I have stated before. I was not informed that any power had been given to Musselburgh for dealing with the districts. I was only of opinion that it was better to take the St Mary's Loch scheme than that scheme, and I have since incidentally heard that a portion of the water has been appropriated to Musselburgh; but it did not appear to me to be very material, for if no water had been appropriated to Musselburgh I should have been still of opinion that the St Mary's Loch scheme was the best.

VI. *The rates which will be necessary to meet the cost of the St Mary's Loch Scheme.*

A statement of the Estimated Revenue and Expenditure of the Trust for the year to 15th May 1871, and of the probable Revenue and Expenditure for the six years up to 15th May 1877, prepared by Mr Cameron, Treasurer of the Trust, and by Mr Adam, City Accountant, was put in evidence before the Select Committee of the House of Commons, and sworn to by both of these gentlemen. From that statement, and the explanations given by Mr Cameron, confirmed by Mr Adam, it appears that the following rates will suffice:—

For the three years from 1871-2 to 1873-4 a domestic rate of 8d per pound on house rents above £6; of 4s. on each house below that rental; and of 3d. per pound on the rental of all shops, not exceeding in the case of any shop a rental of £150.

For 1874-5 a domestic rate of 10d. per pound on rents above £6 each, and of 5s on each house below that rent, and a shop rate as above.

For 1875-6 and 1876-7 a domestic rate of 1s per pound on house rents above £5, of 5s. on each house below that rent, and a shop rate as above, with a public water rate of 1d per pound on the assessable rental of all lands and heritages.

By the year 1875-76 the new water supply is expected to be introduced, all the expenditure connected with the works will have been made, and there is no reason to doubt that thereafter the rate stated for that year will not only not be exceeded, but that it will ere long be reduced, as has been done in Glasgow.

This financial statement proceeds on a moderate estimate of the increase of the rental of the three towns, and of the revenue to be derived from the sale of water to manufacturers and shippers, and on a fair and liberal provision for the annual cost of maintenance and management, including Interest and the Water Annuities; and it shows that, in the sixth year (1876-7), with the above rates, the probable Surplus Revenue is £9,155, which would meet a contribution of even £7,200 to the Sinking Fund (which, however, will not, under the Bill, come into operation till 1878-9) and leave a surplus of £1,955, equivalent to $\frac{1}{2}$ d per pound on the house rental.

In conclusion, the Trustees hope that this lengthened statement,—in which they have been careful to give nothing but facts which have been proved in evidence,—will be fairly and candidly considered by all who are desirous to form a just conclusion for themselves on the important question which now awaits the decision of the House

of Lords. The legislature has imposed upon the Trustees the duty not only of administering the present water supply of Edinburgh, Leith and Portobello, but also of providing for the future wants of the three growing communities, and they have endeavoured to discharge that duty to the best of their judgment, under the advice of professional men of the highest eminence in their several departments. They feel assured that after the present Bill shall have become law, it will ere long be admitted even by its present opponents to be a good and beneficial measure, and they appeal with confidence to the Committee of the House of Lords for a confirmation of the unanimous decision of the Select Committee of the House of Commons.

WILLIAM LAW, *Lord Provost of Edinburgh.*

JAMES WATT, *Provost of Leith.*

THOMAS WOOD, *Provost of Portobello.*

