

(No. 139.)



1886.

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PARLIAMENT OF TASMANIA.

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## SANITARY CONDITION OF LAUNCESTON:

REPORT TO THE CENTRAL BOARD OF HEALTH, BY ALFRED MAULT,  
ENGINEERING INSPECTOR TO THE BOARD.

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Presented to both Houses of Parliament by His Excellency's Command.

The Secretary, Central Board of Health, to the Worshipful the Mayor of Launceston,  
Chairman of the Local Board of Health.

Central Board of Health Office, Hobart, 28th October, 1886.

SIR,

IN accordance with the following Minute, I have the honour to forward you herewith a Report on the Sanitary Condition of Launceston, which was laid before the Central Board of Health at a meeting this day :—

“Mr. Mault’s Report on the Sanitary Condition of Launceston was laid on the table and adopted : thereupon,

“It was resolved,—

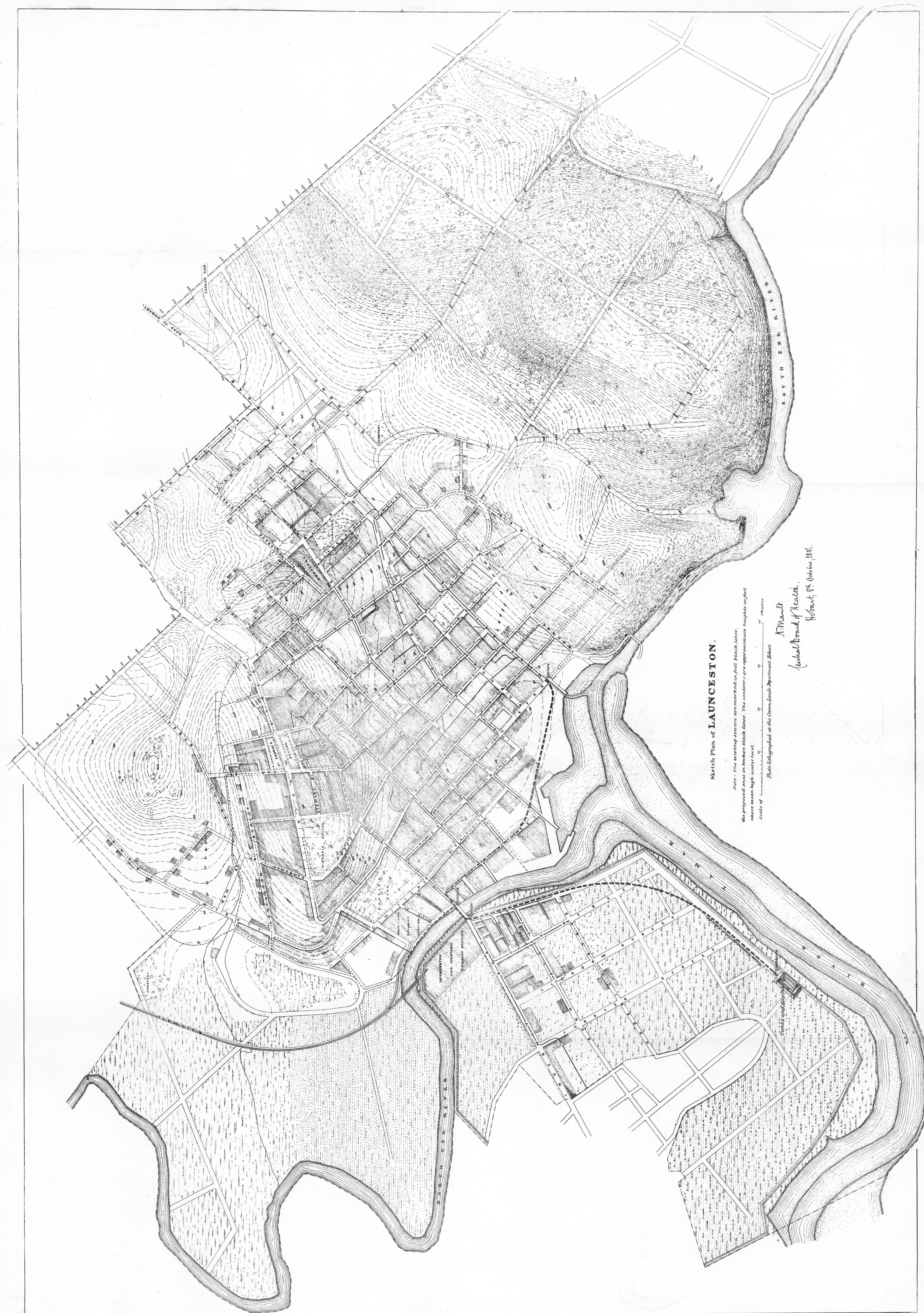
“That copies of the Report be forwarded to the Chairman and Members of the Launceston Local Board of Health for their information, guidance, and assistance.”

I have the honour to be,

Sir,

Your obedient Servant,

W. H. GRAHAM, Secretary.



Sketch Plan of LAUNCESTON.

Note: The existing streets are marked in full black lines. The proposed ones in broken black lines. The contours are approximate heights in feet above mean high water level.

Scale of 1" = 100' Feet

Photo lithographed at the Ordnance Survey Office

A. Maule

General Board of Health.

February 28, October 1881.

T A S M A N I A.

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R E P O R T

TO THE

CENTRAL BOARD OF HEALTH,

BY

ALFRED MAULT,

Engineering Inspector to the Board,

ON THE

S A N I T A R Y   C O N D I T I O N

OF THE

T O W N   O F   L A U N C E S T O N .



Tasmania:

WILLIAM THOMAS STRUTT, GOVERNMENT PRINTER, HOBART.

1886.



## REPORT ON THE SANITARY CONDITION OF LAUNCESTON.

*To the President and Members of the Central Board of Health,  
Tasmania.*

MR. PRESIDENT AND GENTLEMEN,

1. IN accordance with your instructions, I have made an examination of matters connected with the sanitary condition of Launceston, and have the honour to present to you the following Report thereupon. Object of Report.

2. Launceston contains an area of 3340 acres. Of this area about 1250 acres are occupied by the town proper, and about 300 acres more will probably be so occupied in the near future; about 750 acres are swamp land hardly above high-water level, and upon the greater part of which it would be desirable to prevent the building of dwelling-houses; and about 1040 acres are hilly bush-covered land, none of which is likely to be generally built upon for some time to come, and some so precipitous as to render building impracticable. There are also about 300 acres of water within the town boundary. The conformation of the ground is such that part of the townships of Invermay and of the district of the Road Trust of Breadalbane must be drained through the district of the Launceston Local Board. As these parts are being much built upon they ought to be added to Launceston, so as to be under the control of its sanitary authorities. Area of Town.

3. The population of Launceston is estimated at 14,250, and the number of houses in the town is 3278, giving 4.35 as the average number of inmates in each house, and 11.4 as the average population of each acre of the urban portion of the town. These are by no means unsatisfactory averages; but unfortunately there are many localities where there is much overcrowding, and these localities, as usual in other towns, are in circumstances otherwise unfavourable to health—that is, in Launceston, as elsewhere, where the houses are the smallest, and where the means of ventilation, drainage, and other conditions of living are the worst, there the population is the most crowded. For instance, in the ten-acre block on the Inveresk Swamp, bounded by the Invermay Road, the Esplanade, Gunn-street, and Dry-street, there is crowded a population of 469, or about 47 to the acre, while upon the Windmill Hill a ten-acre block about St. George's Square has a population of 55. Thus, upon an airy hillside about 250 feet above the tide there is less than the eighth of the population to the acre than there is upon a swamp that is actually below the high-water level of many tides every year. Population, number of houses, and ratio of population to area.

4. At the present time the Government is having a survey made of the Town of Launceston for purposes connected with the administration of the Lands Department. I notice, from the reference made to it in the annual report of the Lands Office just presented to Parliament, that it is not intended to make a detailed map of the town showing the buildings, &c.; and I learn, from enquiry at the Launceston Office, that it is not proposed to take any levels so as to contour the town and establish bench-marks. This is much to be regretted; and it would be very desirable that the Local Board of Launceston should memorialise the Government to reconsider its determination, and to take advantage of the occasion to make so complete a plan of the town as would serve for all Plan of the Town.

administrative, legal, sanitary, and police purposes, both local and general. The accompanying sketch plan of the town has been prepared from the best existing maps, supplemented by observation. It must only be taken as a sketch plan, intended to show the general features and arrangement of the town, and equally general suggestions, and not as the definitive basis upon which recommended works are to be constructed. Much of the contouring, especially, has been taken by aneroid observations that it was impracticable to properly check in the time at my disposal.

5. Launceston is supplied, under an Act of Parliament passed in 1877, with water taken from the St. Patrick's River at an intake about 13 miles from the town. The water of the river is of the usual goodness of quality that characterises streams flowing over trap rocks. There is not much probability for the present of its being polluted by sewage above the intake, but still, by occasional inspection, a knowledge of all settlement on the river should be obtained. A channel about three-quarters of a mile long—open, except for about 250 yards of tunnel—carries the water into the head of a rivulet called the Distillery Creek. A great part of this channel was formerly made or lined with wood, and though now the wood has been almost all superseded with stone, a little remains in places, and, as it is more or less decayed, should be removed. A dam across the bed of the Distillery Creek, about  $4\frac{1}{2}$  miles from Launceston, impounds the water at a level of 314 feet above high water. I do not think the water of this rivulet is as good as that of the St. Patrick's River. It flows through swampy land, and there are some farms above the dam which might cause a partial pollution of the water. In dry weather there is but little water in the rivulet except that brought in by the channel from St. Patrick's River, and I think it a pity that this water was not kept distinct. The water is, however, still so good that at present it is not worth while to spend money on alterations. From the dam some water is sent to St. Leonard's by a 9in. main, some runs down the channel of the rivulet to supply mills lower down, and the rest is taken to Launceston by one main of 15in. pipes and one partly of 15in. and partly of 12in. pipes, and delivered into three reservoirs standing 250 feet above high water. It is intended to replace the 12in. portion of the above-mentioned second main with 15in. pipes. The water supply is said to be 2,000,000 gallons a day, but this is probably understated, as the existing 15in. and 12in. mains would, if properly laid, deliver much more than that quantity into the reservoirs.

Sewerage  
under plan  
marked "*Sub  
Spe.*"

6. About 30 years ago the Corporation of Launceston adopted a plan, received in a competition established for the purpose, for the sewerage of the town as it then existed. This plan, which has been pretty generally carried out, consisted of culverting the Margaret-street Rivulet as the main outfall drain, and running other outfall drains down Charles-street, St. John-street, George-street, and Tamar-street, with branch drains from the other streets. This scheme of drainage involved the carrying off by the sewers of all the land drainage of the urban area which was formerly taken by the various rivulets running into the Margaret-street Rivulet, as well as the house sewage and street drainage. The Margaret-street sewer is consequently a very large one, the outlet portion being eight feet in diameter, and has a very flat gradient. The invert of the outlet is below high-water level, and is not flapped: the tides consequently ordinarily flow two or three hundred yards up the sewer, and when the rivers are in flood sometimes inundate the low-lying part of the town in the neighbourhood of the crossings of Bathurst-street with York and Elizabeth-streets. Much of the work done under this competition plan is now in need of repair or reconstruction.

7. Since the appointment of the present Town Surveyor, Mr. Fitzherbert, he has extended the drainage system, especially in the direction of the relatively low-lying streets of Galvin Town and Inveresk Swamp, and his sewers appear to be well laid out and constructed. Altogether about  $18\frac{1}{2}$  miles of sewers have been constructed, at a cost of about £40,000, the very large Margaret-street sewer having cost about a third of this sum. These existing sewers are shown by full black lines on the plan. To properly drain the whole urban area, including much that is at present hardly built upon, about 16 miles more of branch sewers will have to be constructed. The medium thick dotted lines on the plan are only intended to suggest their courses sufficiently nearly for estimating their length. They may cost some £15,000 more.

8. The whole of the sewage is discharged into the River Tamar or into the North Esk within half a mile of its junction with the Tamar. The vertical tidal range in the Tamar at Launceston is about 13 feet, and the mean width of the stream varies from about 66 yards at low water of spring tides to 130 at high water. Consequently at low water about 140 acres of mud-banks are exposed to the action of the sun and air within the limits of the town, and an ever increasing quantity lower down the river. Mr. Napier Bell, in his report upon the river, says, "Throughout the greater part of the year the fresh-water flow of both the North and South Esk rivers combined is very insignificant compared

to the tidal flow." And again, "Sailing ships usually sail up the river and are towed out of it, as the prevailing winds blow up the stream." The effects of discharging sewage into a river in such circumstances have naturally followed. Much of the sewage floating up and down with the tide is deposited as slime upon the mud-banks, and the effluvia raised from it in its periodical exposure to sun and air are carried over the town by the prevailing winds. The parts of the town most exposed to this nuisance are those that on account of their low-lying marshy position and condition are already insalubrious. And one of the first and most important steps to be taken is to remedy this condition of things.

9. To rightly understand what this remedying involves there are some facts to be borne in mind. In the first place, the work when undertaken should not only provide for to-day, but should anticipate the requirements of an increased population. In the following estimates it is therefore assumed that the sewage of a population of 20,000 has to be provided for, and that that sewage will amount to the usual average of 45 gallons a head daily, making 900,000 gallons in all. This assumption, when allowance is made for the overflow of clean water from the reservoirs, fairly agrees with the results of the occasional gaugings Mr. Fitzherbert has been good enough to take for me of the present flow through the sewers.

Quantity of sewage.

10. It is also to be noted that the sewage is now delivered into the river in places where it is impracticable, or at least where it would not be permitted, to establish sewage purification and pumping works. The levels of the sewers at these outfalls are also such (being under tidal influence) that it is clearly impossible without pumping to send the sewage upon the land for utilisation and purification. Consequently if the expense of pumping is to be avoided the only practicable plan is to convey the sewage by gravitation to some places where it could be purified or at least clarified by precipitation, and discharged into the river twice a day when the tide permitted. Such a place for the Town proper would be the marsh land on the North Esk opposite the Soap-works; and for the Swamp, the land at the end of Forster and River-streets.

Present outfalls.

11. The construction of tidal discharging precipitation tanks at these places would be a costly undertaking. Provision would have to be made for storing twelve hours' sewage in each set of duplicate tanks, so as to allow for clarification and discharge when the tide served. The main intercepting sewer would have to start from the intersection of York and Margaret streets, where the main sewer is already at about high-water level, and if this intercepting sewer had a fall of one in 1760 it would, on arriving at the tanks, be at a level of about 5 feet above low water at neap tides, and so the effective depth of the tanks could not exceed five feet. This would necessitate the construction of tanks of a large superficial area. A two-feet barrel culvert, with the gradient above indicated, would carry all the sewage of Launceston to the tanks. The tanks for the Swamp side of the town would naturally be much smaller, but the construction of the intercepting sewer would involve the reconstruction of part of the Invermay Road sewer.

Tidal discharging tanks.

12. The probable cost of these works would be as follows:—

Cost of tanks and intercepting sewers.

	£	s.	d.
Tanks opposite the Soap Works, small engine-house, &c. ....	12,000	0	0
Intercepting sewer .....	5000	0	0
Land, engine, and appliances.....	1000	0	0
	18,000	0	0
Tanks, &c. on Swamp .....	£5000	0	0
Sewer .....	2500	0	0
Land, engine, &c. ....	500	0	0
	8000	0	0
TOTAL.....	£26,000	0	0

13. In this case I do not think it would be practicable to do more at the tanks than clarify the sewage of the matters it holds in suspension. The matters it holds in solution would render the water of the Tamar unfit for human consumption as drinking water; but as it is not so used, measures that would prevent the deposit of the suspended matters in the sewage on the banks of the river that are uncovered by every receding tide, would for the present be sufficient. Further on reference will be again made to this subject; but, for the present, taking the above for granted, the means of clarification may be considered. If the 900,000 gallons of daily sewage have the average quantity of 45 parts of suspended matter in 100,000 parts, they will contain rather less than two tons of such matter. Rather less than a ton of quicklime a day would be required for precipitating purposes, and nothing else need be used. The addition of a little sulphate of

Clarifying the sewage.

iron or sulphate of alumina might slightly improve the result of the precipitation, but not to any practical extent, and certainly not to any such extent as to justify the increased cost of the process. The above-mentioned three tons of sludge and lime would, if moved daily from the tank, be a wet mass (being mixed with 27 tons of water) of 30 tons, that would have to be left on the land to drain and dry, and be afterwards dealt with as hereinafter described. With the above quantity of lime the supernatant water in the tanks would be clear and colourless, and would have to be discharged as the tide permitted.

Yearly cost  
with tidal  
discharge.

14. The yearly cost of this method of dealing with the sewage would be about as follows:—

	£	s.	d.
Interest on £26,000, cost of works, at 4 per cent.	1040	0	0
Repairs and amortization at 5 per cent. ....	1300	0	0
Lime, 360 tons, at 20s. ....	360	0	0
Wages and engine expenses, &c. ....	1000	0	0
	<u>£3700</u>	<u>0</u>	<u>0</u>

15. This system of dealing with the sewage would be by no means a satisfactory one. The necessity of having two sets of large tanks, two establishments, and two outfalls, one at each side of the river, is very costly and otherwise undesirable. Furthermore, whenever the river is in flood, the tidal discharge would be interfered with, and much inconvenience would be suffered and great damage might be done. Mr. Begent, a well-known Launceston pilot, informs me that for several days together, during great freshets, the tide will not have more than two feet of vertical range, and consequently at such times there could be no effective working of the tanks.

Sewage  
pumping by  
water-power.

16. But to do anything more satisfactory, involves the raising of the sewage by mechanical means. Fortunately, at Launceston this does not imply either any very great preliminary outlay, nor any great continual working cost. The abundant quantity, and the high pressure of the water supply, are now taken advantage of, but in a very wasteful manner. The stone-crushing machinery, for instance, is worked by a turbine that seems to take about 6000 gallons an hour for each horse-power developed. This may be of no great moment as long as there is a superabundance of water, but is nevertheless quite unnecessary, as with a Donaldson waterpower engine, one horse-power could be obtained with the employment of 400 gallons an hour at the Launceston pressure. It is this description of engine that is recommended for the purpose of compressing air in the work about to be described. It is not expensive, requires no special attendance, and would cost but a small sum a day for oiling and cleaning. If the whole of the sewage could be collected at one place and pumped immediately thence, and if at that place all the other work connected with its disposal could be done, direct pumping might be the most economical system to adopt; but as this is not the case at Launceston, the advantage of working by Shone's Ejectors, will be apparent from the following description.

Shone's  
pneumatic  
ejectors.

17. Shone's Pneumatic Ejectors are entirely automatic, and require no attention. An inspection once or twice a year is all that is required. They can be placed anywhere where required under the street level, and nothing more is seen than a manhole cover. They are worked by compressed air supplied by an engine placed in any convenient spot at any distance from the various ejectors to be worked—the cost of air mains being the only cost increased by distance, as loss of power and loss by leakage are found to be practically nothing, and length of air main has the advantage of adding to storage space of compressed air. Each ejector consists of an airtight receiver, into which the sewage flows by gravitation, slowly or rapidly just as it comes. When the receiver is full the compressed air-valve opens automatically, and the sewage is forced through a rising main to the required height in a few seconds. Having done its duty, the compressed air escapes, and the process recommences. This system has been at work for five or six years at Eastbourne, Winchester, Warrington, and other places so successfully that it is now being extensively adopted in the lowlying parts of many other towns—notably at the Houses of Parliament in London. It has this great advantage—the ejectors can be so placed that the sewage can be sent on through the level lowlying tracts of a town through comparatively shallow sewers, laid at steep enough gradients to be self-flushing, and sewers laid at such gradients may be so much smaller than sewers laid at flat gradients, and so much shallower that the difference in their cost compensates for the cost of the ejectors. Thus, at Launceston a 15-inch intercepting sewer, laid at a gradient of 1 in 330, may replace the 2-feet barrel sewer with a gradient of 1 in 1760 as above-mentioned; and the rapidly flowing sewage of the 15-inch pipe will not give off sewer gas, as the sewage in the flat barrel drain would be liable to do.

18. The arrangement proposed for Launceston may be thus described:—The clarifying tanks should be placed on the Swamp, as shown on the plan, at about the position of the smaller tanks above mentioned. As the clarified sewage would be discharged at all states of the tide, the tanks need only be capable of containing the quantity of sewage that will be delivered during the time that is required for proper precipitation—this is about three hours. So that, if provision be made for six hours' sewage, to allow for varying quantities at different parts of the day, the tanks will be amply large enough. The engine-house for compressing air, &c. should be on this ground, and air mains taken thence to the various ejectors. One of these ejectors would raise the sludge from the tanks (a service for which it is well adapted) and deliver it upon the land, and thus save much hand labour, and would also discharge the clarified water into the Tamar when the state of the tide did not permit of its outflow by gravitation, or would distribute it for irrigation purposes as hereafter suggested.

Works at  
outfall.

19. The sewage would be taken to the above described tanks by the following arrangements:—At the intersection of Margaret and Patterson-streets, two 400 gallon ejectors would raise the sewage of the Margaret-street sewer into a 15-inch intercepting drain, that, starting there with a depth of about 3 feet would run as shown on plan, with a gradient of 1 in 330, to the Tamar-street end of the bridge, where it would be deep enough to have intercepted the Charles-street, St. John-street, George-street, and Tamar-street sewers, without much work of reconstruction of any of those sewers. At each of the above-mentioned sewers, including especially the Margaret-street sewer, there would be penstock chambers with overflows for storm water into the existing outfalls. At the Tamar-street end of the bridge, two 600-gallon ejectors would raise the sewage so that it might be delivered by a 9-inch main laid across the bridge into an 18-inch intercepting sewer, beginning at the Invermay side of the bridge. At this spot another 600-gallon ejector would raise the sewage of the Swamp district into the same intercepting sewer. This 18-inch sewer, beginning with a depth of 3 feet, and with a gradient of 1 in 330, would have a depth of about 19 feet at the tanks, where two more 600-gallon ejectors would lift the sewage into the lime-mixing chambers, whence it would flow into the tanks.

Ejectors and  
intercepting  
sewers.

20. The Donaldson water pressure engine is nearly automatic in its action, stopping when the desired compression of air is attained in the storage vessels, and working at its utmost speed when the consumption of air is greatest. One or two visits a day for oiling are all the attention it requires. As all the lifts of the above-mentioned ejectors are comparatively small, a ten-horse power engine would be quite sufficient.

Engine power.

21. As Shone's system has not been adopted in the colonies, it is difficult to give an exact estimate of its cost. At Eastbourne, with an ordinary outflow of 2,600,000 gallons, and a maximum of 4,000,000 gallons a day of sewage, steam power had to be used, and the total cost, "including ejectors, inspecting chambers, manholes, air and sewage mains, compressors and boilers in duplicate, engine-house, boiler and receiver house, two cottages for engineer and stoker, including land, engineering, law and other expenses, amounted in the aggregate to £8500." At Launceston, with an ordinary outflow of about one third the above ordinary, and a maximum of about half the above maximum outflow, and with no necessity for much of the more expensive parts of the above detailed works, it would be safe to estimate an outlay of..... £6000 0 0

Estimate of  
cost.

This would certainly be double the rateable cost in England.

A tank 200 feet by 20 feet by 10 feet would hold six hours' sewage, and made in duplicate would cost about .....

The above described intercepting sewers, about ..... 4500 0 0

Engine-house, land, appliances, &c. .... 5500 0 0

..... 1000 0 0

TOTAL..... £17,000 0 0

22. The yearly cost of working this system would, as far as hand labour is concerned, be less than that of the tidal discharge system, as much might be saved by the application of machinery, and there would be but one establishment instead of two. The following is an estimate of the total yearly cost:—

Yearly cost.

	£	s.	d.
Interest on £17,000 at 4 per cent. ....	680	0	0
Repairs and amortization, at 5 per cent.....	850	0	0
Lime for precipitation, 360 tons at 20s. ....	360	0	0
Wages and engine expenses .....	600	0	0

TOTAL..... £2490 0 0

being £1210 a year less than by the tidal discharge process.

Could sewage  
be tidally  
discharged  
without pre-  
cipitation?

23. It may be thought that some part of this yearly cost might be saved by an adaptation of the sewage lifting process above described to a system of tidal discharge. Mr. Begent's observations of the tide at Launceston show that as a rule the duration of ebb is about two hours longer than that of flow. This is borne out by a series of observations in the possession of the Marine Board, taken at George Town by a Mr. Korff in 1854. No doubt this difference of duration allows for the escape of the immense volume of fresh water that must be brought down by the South Esk with its drainage area of over 2,000,000 acres, and by the North Esk with its drainage area of over 200,000 acres. Careful observations might show that, on account of this superior duration and volume of outflow, sewage discharged at a certain time during the ebb might be carried so far down the Tamar as not to be returned quite up to the town by the succeeding tide. But the tides are so uncertain, depending so much on wind and weather outside, that no efficient system could be based upon them, and no assurance could be given that the injurious deposit from the sewage now occurring would not very frequently take place. And even if such assurance could be given, no great saving could be effected, as the expense of precipitation would be counterbalanced by the increased cost of the much larger storage tanks that would be needed.

Subsoil  
drainage.

24. The saving of cost effected by Shone's ejectors, when used as proposed, is not the only great advantage to be gained by their adoption. One of the chief benefits accruing from town drainage is the drying of the subsoil resulting from the making of comparatively deep drains in damp localities. Some parts of Launceston are in need of being thus dried. The lower portions of York, Elizabeth, Bathurst, and Margaret streets are so nearly at ordinary tide level, that an extraordinary rise inundates them, and thus this damp locality, that so especially needs deep drains to dry it, cannot have them at present deeper than about 3 feet,—a depth quite insufficient to effect much good. But by keeping the ejectors proposed to be placed at the intersection of Margaret and Patterson streets at a greater depth than required for the present sewer, all this district might be drained to any desired depth, say 8 feet, and thus thoroughly dried. The new deep drain to effect this might be laid at any future convenient time, and in the meantime the ejectors would work efficiently. In like manner the drainage of the lower parts between Cimitiere-street and the North Esk River might be facilitated by lowering the ejectors at the end of Tamar-street.

The Swamp.

25. The necessity for drying the subsoil is still more urgent at the Inveresk Swamp. Mr. Fitzherbert, the Town Surveyor, has recently made a report on the drainage of this part of Launceston, from which it appears that it has an area of about 378 acres laid out in streets and building allotments, with reserves of about 70 acres for show purposes, &c. The buildings are at present chiefly confined to 65 acres, fronting the Esplanade and Invermay Road. The natural surface of the marsh is just below high-water level, and there are  $3\frac{1}{2}$  miles of open ditches. The overcrowding of buildings on parts of this land has already been illustrated, and the example of the block mentioned in § 3 is being followed on other blocks. Mr. Fitzherbert says, "The soil of the Swamp is saturated with moisture to such an extent that in almost any part holes sunk not two feet deep are soon filled with water, consequently the soil is rendered cold and unwholesome as a site for dwelling-houses." He estimates that it would cost £38,100 to properly make and sewer the streets, and drain the land, besides other collateral expenditure for police purposes; and continues: "After all this outlay, it does not appear that the healthiness of the Swamp would be increased in any very great measure." He therefore recommends the carrying out of the suggestion made by the Mayor of Launceston, that powers be obtained by the Municipal Council for repurchasing the Swamp—except the 65 acres occupied by buildings—and thus to prevent any further occupation of it for human habitation. It is certainly much to be regretted that the Government ever sold this land for building purposes without any regard as to its suitability, or any provision for its sanitation, and the Council, that now finds itself saddled with the cost of the works that ought to have been done before the land was sold, appears to have a great claim for consideration. Mr. Fitzherbert concludes: "There is no doubt that these lands could be purchased for not one-half the sum required to improve the locality when built on. This land might then be leased for market gardens, or farmed out, or dealt with in any of the numerous ways that suggest themselves, so as to return a fair revenue. Further than this, it will be necessary at a not very remote period to arrange means for the proper disposal of the sewage of the town, so that as clear and pure an effluent as possible only shall be discharged into the river, instead of the present rough and ready method. To do this, land will be required, which it is desirable should be isolated as much as possible from the town. By the Council buying the larger portion of the Swamp area a suitable site would be available."

26. In these last sentences Mr. Fitzherbert has anticipated part of my proposals. But before considering them it may be noted that the provision of ejectors at the tanks, at the depth mentioned at the end of § 19 of this Report, was specially made with a view of

effecting the subsoil drainage of the swamp, and thus the healthiness of that part of it that is occupied by dwelling houses would be greatly improved. If any difficult or expensive work should be encountered in the putting in of so deep a sewer in such a locality, a larger sewer with a flatter gradient might be substituted; or, the ejectors might be placed anywhere in its course where its depth was thought sufficient for subsoil drainage purposes, and the sewage forced through mains for the rest of the way. This course is one that is frequently adopted, and would not add much, if at all, to the cost.

27. If the Mayor's suggestion be adopted, it should be made to include the part of the Swamp (149 acres) beyond Box's hill, as well as that with which he more immediately deals. The ejectors would permit the subsoil drainage of the whole of this area to be effected, and thus render it suitable for irrigation by the effluent sewage after precipitation. The capacity of the land for production would be thus greatly increased, especially after the addition of the precipitated material from the tanks, and the effluent water would be purified as well as clarified before its discharge into the river. The previous clarification by precipitation would take away all liability of nuisance arising from the irrigation, and at the same time it would obviate the necessity of incessantly applying the sewage whether required by the land or not, as its immediate discharge into the Tamar would cause no deposit upon the banks. The land thus bought and treated ought to produce a substantial revenue. Purification  
by irrigation.

28. The adoption of ejectors would also render it possible at any future time to thorough-drain the swamps between the Railway and the North Esk River, and thus increase the salubrity of the town. Until this be done the building of dwelling-houses on these swamps should be prohibited. The necessity that exists for improving the sanitary condition of all the low-lying parts of the town is clearly shown by a return Dr. Thompson has been kind enough to furnish me, setting forth the localities that furnish the fever cases that are admitted to the Hospital. In the first half of the current year 58 fever patients were admitted, of whom 41 came from the low-lying parts of Launceston on both sides of the river. Of these, 20 seem to have resided in the block at the corner of the Esplanade and Invermay road, referred to in § 3, forming nearly five per cent. of its population. These figures only refer to the Hospital cases; how many others were attended at home there are no returns to show. Doubtless they were very numerous, as nearly all the medical men of Launceston in their replies to the questions asked by the Sewerage Committee of Launceston in 1883, pointed out these localities as the principal seat of the disease. Glebe Swamp.

29. The consideration of this part of the subject may be concluded by the following extract from the Report of the Highways and Drainage Committee of the Borough of Eastbourne, written after four years' experience of the Shone system:—"We have every reason to be satisfied with the works already executed on this system, which is undoubtedly based on scientific principles, easy of application in practice. Our experience warrants us in stating that in low-lying and flat areas good self-cleansing drains and sewers can be readily obtained by the adoption of the Shone system of drainage. Once established in a town or district it can be extended as the place grows. The works here afford an illustration of this. The air-pipes are laid under the streets, and we have never had the least trouble with them, and the observations taken from time to time show that the loss by friction and leakage is practically *nil*. The ejectors and the automatic gear are strong and simple in construction, and they work in their chambers under the streets noiselessly and innocuously, and need little or no repair or personal attendance." Experience at  
Eastbourne.

30. As before mentioned in § 6, the existing drainage system provides for carrying off all land and storm water, as well as sewage, consequently storm overflows have to be provided along the proposed intercepting sewer. In all future work the separation of sewage from land drainage should be effected as far as practicable. Water-closets.

31. As regards house sanitation, the Local Board of Health and its officers are paying a great deal of attention to it, as is well shown by the last half-yearly report. As the sewerage system is extended the number of houses provided with proper water-closet accommodation is increasing. A cheap form of closet is recommended, and a model of it, with a waste-preventing cistern, is on view at the Waterworks yard, so that the public may see at how small an outlay the requirements of the Local Board may be carried out. In reference to this model it would be desirable to let it include a simple arrangement to ventilate the soil-pipe. Nightsoil  
removal.

32. There is a contract in force for removal of and dealing with nightsoil. It is taken to one or other of two depositing places provided—one at the Sandhills on the Hobart Road, in the district of the Breadalbane Road Trust; and the other near the new Racecourse, in the township of Invermay. Trenches are dug about 3 feet deep, and Scavenging  
and dust  
removal.

every night's collection covered with the soil taken out. The expense of this removal is borne from the general rates, no special charge being made.

Back yards.

33. The scavenging of the streets is fairly well done by day labour. In the centre of the town dust boxes, provided by the occupants of the houses, are daily emptied. This arrangement should be extended to the whole town as soon as practicable.

34. One of the worst features of the town is the defective surface drainage and pavement of the back yards. In the low-lying districts already referred to, much has been done by the Board in the way of causing the ground to be filled up to the level of the adjoining streets. But in these cases the shallowness of the sewers renders the drainage imperfect. The remedy for this has been alluded to in § 24. Nearly everywhere—as well in the play-grounds of the public schools as in the yards of private houses—surface formation and proper levelling, so that the water falling thereon may flow away, are unattended to; and still more so any attempt to render the surface impermeable by paving or asphaltting. The result is not only a great deal of discomfort and dirt, but also an unhealthiness arising from the emanations from stagnant puddles and moist surfaces that cannot be kept properly clean. This is receiving attention.

Cemeteries.

35. The condition of the cemeteries is pretty fully set forth in the half-yearly report of the Local Board. With one exception, they are not suitably placed. The Scotch Cemetery in High-street should either be properly drained or closed. It drains naturally down the steep hillside, where there is a little rivulet that in rainy weather mingles its waters with those of the overflow from the Lord-street Reservoirs, and thus forms part of the water supply of a few houses in Hampton Vale. In respect of all the cemeteries, some regulation should be made to fix a minimum depth of burial.

Abattoir.

36. The condition of the public abattoir, and the management within its walls, leaves but little to be desired. It is well ordered and cleanly kept. I would only suggest that a screen be fixed between the slaughter pens and the pens of the cattle waiting to be slaughtered. But the method adopted by the contractor who removes the offal for disposing of it at his depositing place, was, when I saw it on the 31st of July, simply horrible. The depositing place adjoins that already referred to on the Sandhills, and consists of two small paddocks in a little hollow on the ridge dividing the Launceston drainage basin from that of the Punch Bowl Rivulet. The lower part of these paddocks forms a pool in wet weather which is the source of a little stream flowing into the Punch Bowl Rivulet. Ever since the beginning of February the offal had been simply tipped out of the carts on to the surface to be devoured by pigs, about a hundred of which were kept. The bones and matter the pigs could not eat had been removed two or three times and buried in the adjoining paddock. The greater part of the surface was consequently saturated with putrid animal matter, giving out a horrible stench. If this arrangement be continued into the hot weather, the nuisance to people passing along the Hobart Road will be intolerable. And it is not pleasant to think that the flesh of pigs nourished on such food is sold for human consumption. In any future contract for the removal of the offal from the abattoir, some provision should be made as to controlling the methods of its disposal.

Offensive trades.

37. There are some offensive trades carried on in Launceston, and their condition has occupied the attention of the Local Board. Even if it be proved that such trades are not positively injurious to the public health—that is, supposing they are only “offensive,” and not “noxious”—it is still very desirable that they should be removed from populous neighbourhoods. The Local Government Board at home, in its General Order of the 13th March, 1880, defines *noxious* as “productive of injury,” and *offensive* as “causing anger, disgusting, displeasing, disagreeable, noisome, causing pain,” and nuisances arising from both kinds of trades are dealt with. As the Central Board is in communication with Government as to generally dealing with the regulation and localising of offensive trades, it is not necessary to dwell on the subject here. But there is one thing in connection with offensive trades that should be borne in mind, and it is this: that those outside the town boundary may be almost as prejudicial to the public health as those within it. There are almost invariably very offensive by-products at such establishments that must be got rid of, and it must be looked to that this is done inoffensively. For example, if this were not done, the soap-works on the North Esk in the Township of Invermay might, by discharges into that river, practically render ineffective everything the Local Board of Launceston might do to purify the Tamar and cleanse the banks left uncovered at low water.

Public Buildings and Hospital.

38. I visited most of the public buildings of the town, and found well ordered and well kept establishments. Dr. Thompson was good enough to take me over the hospital, at which the drainage, water-closet, and some other arrangements had not been satis-

factory. As works of amelioration are now in progress, it will be better to wait for their completion before expressing a definite opinion. The building is certainly well designed for its purpose, and admirably administered. But on principle I think it a mistake that the water supply at such an institution should be paid for by meter, especially in a town with so superabundant a supply. Urinals should certainly have a continual flow through them, and no necessity for saving money should prevent this in a hospital, particularly when there is no necessity for saving water. There are some "air closets" fitted at the hospital of a kind that work well when well attended to; but, as a general rule, I would not recommend any special appliances such as these, or grease collectors connected with sinks, in any public establishment. The drains ought to be so well laid and ventilated as to render them unnecessary.

39. During the inspection of the town some lodging-houses were visited. It would be desirable that their licensing and inspection were under the control of the Local Board, as at present no care seems to be exercised in regard to these matters. At what is said to be the best conducted common lodging-house in the town there are four rooms in which there are 17 beds; but which are licensed for 32 beds. One of the rooms had a floor area of 146 feet, and a cubical capacity of 1314 feet. This was licensed for lodging 8 persons, allowing but 168 cubic feet to each person, and 18 square feet of floor. Four single beds were crowded into this room. The keeper said that no instructions were ever given him as to cleansing and whitewashing. Lodging-houses.

40. Tenements let in rooms should also be brought under the lodging-house clauses of the Police Act, and transferred to the inspection of the Local Board. There is such a tenement in Bathurst-street, where 16 rooms are let out in one, two, and three-room lodgings and occupied by 20 people. The whole place was in an unclean condition. Tenements let in rooms.

41. In conclusion, I have to acknowledge with hearty thanks the assistance I obtained from His Worship the Mayor of Launceston, the Town Clerk, the Town Surveyor, the Sanitary Officer, and all the other officers of the Corporation, and the unvarying courtesy with which I have been treated. The Corporation of Launceston, before the Public Health Act was passed, paid great and evident regard to the sanitary condition of the town; and since that Act constituted them its Local Board of Health, it cheerfully accepted the addition of responsibility, and has administered the further powers for good conferred upon it with a heartiness and a wisdom which prove how useful the Act is when properly and intelligently carried out. How thoroughly this has been done was shown by the half-yearly Report you recently received, and will be still more so by the perusal of the papers attached to this Report. They are copies of the forms of notice issued under the following sections of the Public Health Act:—

Sections 107 to 113, as to houses unfit for habitation, overcrowded, etc.;

Sections 117, 118, 119, 127, 137, 147, 148, as to house drainage, etc.;

Sections 102, 124, 127, 128, 129, as to earth and water-closets, etc.;

Section 121, as to cleansing, etc. of ditches, etc.;

Sections 130 to 136, as to keeping of swine and cattle;

Section 138, as to the removal of manure;

all of which are appended, as they may be useful as forms to guide other Local Boards. Launceston has a well known reputation for energy and progressiveness, and its Local Board quite justifies it; and it well deserves the warm praise of one who has had a large experience of Local Boards and their proceedings, and who has the honour to remain,

Your faithful Servant,

A. MAULT.

*Central Board of Health, Tasmania.  
Hobart, 8th October, 1886.*