(No. 150.)



1888.

PARLIAMENT OF TASMANIA.

DRAINAGE OF THE HOSPITAL FOR THE INSANE AT NEW NORFOLK:

REPORT OF THE ENGINEERING INSPECTOR OF THE. CENTRAL BOARD OF HEALTH.

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



REPORT ON THE DRAINAGE OF THE HOSPITAL FOR THE INSANE AT NEW NORFOLK.

To the Honourable the President and Members of the Central Board of Health.

GENTLEMEN.

In consequence of the recurrence of cases of typhoid fever at the Hospital for the Insane, the Official Visitors of that Institution requested the Honourable the Chief Secretary to allow me, as your Engineering Inspector, to make a report upon its drainage.

In accordance with his instructions I have visited the Hospital and examined into the meansadopted to carry off the sewage from the establishment, and the condition, as far as could practically be ascertained, of the various drains. I greatly regret that unavoidable circumstances have prevented me from sending in this Report earlier. As at the time of my visit the recent additions to the building had not been completed, my examination did not extend to them.

1. The existing drains of the Hospital are divided into three groups, each with a separate outfall. A pipe drain, nine inches in diameter, having its outfall at the bank of the Lachlan River, is laid up Grey-street, and takes the drainage from the wards of the private patients on the men's side and from the men's refractory ward and wash-house, workshops, &c. Pipes six inches in diameter, leading into what is said to be an old rubble drain along Burnett-street, with an outlet on the same bank of the Lachlan River, take the drainage from the men's latrines and the woodyard. But the greatest portion of the drainage—that from all the rest of the establishment—is carried by a brick barrel-drain that is laid across the grounds to the angle at the junction of Burnett and George streets, and thence all along Burnett-street to the River Derwent. This drain is about half a mile long, and is about 26 feet deep where it crosses High-street, a spot the level of which is much higher than the site of the Hospital. The sewage carried by this drain is diverted at Montagu-street by an arrangement of pipes leading to the garden of Hall Green, the late Sir Robert Officer's residence, where it is used for irrigation purposes. When not used, or when used, after use, the sewage of this drain is delivered by some 12 inch pipes into the Derwent at the Esplanade opposite the end of Burnett-street.

2. Originally all the drains appear to have been constructed in brick, even the smallest. From time to time these have been repaired and partially renewed with earthenware socket pipes, and in some cases altogether new socket pipe drains have been constructed. As far as could be judged from the openings made, the repairs, renewals, and new drains have been negligently done. For instance, in front of the women's ward a twelve-inch brick drain delivers its sewage into a nine-inch pipe drain; and the old drain under the women's refractory ward is first formed of six-inch pipes, then of bricks, and then of pipes again. The junctions especially seem to be badly constructed. As there is no correct plan of the drainage, it was not practicable to examine many of them, as some time had to be expended in finding them. Those found were usually, in the case of junctions with brick drains, formed by inserting the branch drain nearly at right-angles into the crown of the brick arch; and in the new drains from the men's private wards, the junction of the drain from the bath-room was formed with a right-angled junction pipe into which the branch drain was inserted at a different angle, as shown at A on the plan, as if intended to produce a stoppage or a leakage. 3. Most of the drains opened were fairly clean, as very large quantities of water are used for bathing and washing purposes; but in the part of the main outlet sewer lying within the grounds of the Hospital a deposit was found varying from two to six inches in depth. Not many ventilating pipes from the drains were found, and in some cases a decided want of ventilation was observed.

4. There is a water-closet in the open air passage between the store and storekeeper's office. There are also water-closets connected with the private patients' wards on the women's side. All the other privies are earth-closets fitted with moveable pails, which are periodically emptied, and the contents carted away to the farm. In the chronic wards on the men's side the urinal drains into an open gutter running to a grating outside the latrine yard. The other urinals are more directly connected with the drains. The baths and wash-houses are fairly well fitted up. Only one of the kitchen sinks—that near Humphrey-street, on the women's side—seems to be properly drained.

5. One of the worst features of the establishment is the unpaved and damp condition of the yards, especially the back-yards adjoining Humphrey-street. This is the more to be deprecated as the principal ventilation of the men's refractory wards is derived from the side of the building next the back-yard.

6. Outside the Hospital, and on the far side from it of Humphrey-street, there is an unpaved gutter that takes the drainage from the few houses on that side of the street. As this gutter cannot, from the nature of it, be flushed, and as it is but seldom cleaned, it sometimes gets very offensive. The attention of the road authorities should be called to this.

7. The character and condition of the drains of the Hospital being such as is above described in paragraphs 1 and 2, it is very desirable that they should be reconstructed. In the first place, it is not a good arrangement to have so many outfalls. In the next place, the partial examination that has been made has shown so many defects that it is necessary that every drain should be examined along its whole length, and made homogeneous in character by being altogether constructed of glazed earthenware socket pipes with proper junctions. The cost of this examination and alteration would go far towards that of taking up and again using the pipes as a portion of a new system of drainage.

8. The following recommendations are therefore made :--The use of the main outfall drain to the Derwent should be discontinued, except for draining the grounds and carriage drives and, where desirable and convenient, rainwater from roofs. All the other drains, whether formed of pipes or bricks, should be taken up, and the trenches they have occupied should, after having been, where necessary, disinfected, be filled up with dry, sound materials. Every drain should be followed up until it was certainly ascertained that no old drains were left in the ground. The new drains should be laid on the lines and of the sizes shown on the accompanying plan, and built of good salt-glazed earthenware socket-pipes properly and evenly bedded and jointed in cement, such of the existing drain pipes as are good being utilized. The sizes marked for the pipes are amply sufficient to provide for any probable future extension of the Hospital.

9. In connection with the outfall, it is suggested that additional land between the Hospital and the Lachlan should be obtained, either by purchase or on lease, for the purpose of sufficiently purifying the sewage by irrigation before it is allowed to enter the river. I understand that this additional land would be very useful to the Hospital. At the outfall there should be two precipitating tanks—one for use while the other was being emptied—of sufficient capacity to hold the solid portion of a week's flow of sewage. When a tank is full of this solid portion of the sewage the sludge should be deodorized, mixed with wood ashes, &c., and carted off for manure. The liquid portion of the sewage should be allowed to flow off over a sufficient area of land—a few acres properly treated would be sufficient—to irrigate it, and the water be carried off by subsoil drains into the river. When the river was in flood these subsoil drains would be charged, but then the overflow of sewage would be innocuous, as it would be mixed with the large volume of flood water.

10. In carrying out this system of drainage, the following directions must be carefully observed :----

No part of any drain is to be laid at a less inclination than that of 1 to 200.

Every manhole must have a small iron grating as an *inlet* of air for ventilating the drains; should this become an *outlet* for air it will show that some stoppage has occurred. Every junction not occurring at a manhole should be followed by an upright pipe coming to

Every junction not occurring at a manhole should be followed by an upright pipe coming to the surface, and covered with a slab so as to admit of inspection, as shown at B on plan. An accurate plan of the drainage must be prepared, and as the work proceeds the position of every junction must be marked thereon, and fixed by two measurements to prominent parts of the buildings, as shown at C on plan.

- Where the upper end of a stack of down-spouts from the roof is more than eight feet from the nearest window, the lower end may communicate with the drain directly, and the spouting serve as a ventilator; in all other cases the down-spouts must be treated as described below in regard to sink and other such crains; but there need not be a ventilated cesspit for each down-spout, as the water from several may be conveyed by properly paved surface drains to one common grid.
- The drains from sinks, baths, cistern overflows, and all other drains from inside the buildings, except water-closet drains, should deliver their drainage either in the open air above a grid or on the open air side of the trap of the grid; from the closed side (the sewer side) of which an air pipe, with perfectly close joints, must be taken to the ridge of the roof, where the opening must be at least eight feet from the nearest chimney, skylight, dormer, or other opening communicating with the interior of the buildings. (See D on plan.) Every water-closet soil-pipe should have from the sewer side of the trap a ventilating pipe
- Every water-closet soil-pipe should have from the sewer side of the trap a ventilating pipe similar to that above described. The pipe from the safety tray should discharge into the open air.
- From the highest inlet of each of the five principal lines of drains shown on the accompanying plan, a similar ventilating pipe should be carried up.
- If these directions be observed no sewer gas can enter into any of the rooms or wards.

11. I would further strongly recommend that the private patients' wards on both sides of the Hospital be fitted with properly constructed self-acting water-closets, and all the other wards with trough water-closets similar to those described in the 50th paragraph of my Report of 1886 on the Drainage of Hobart. These closets would then be altogether under the control of the Hospital attendants, and could, with the urinals, be easily kept clean, and the unpleasant and offensive service of removing pails full of excreta be done away with.

12. Another equally urgent matter is the proper paving and draining of the yards. The back yards and kitchen and wash-house yards ought to be entirely paved with asphalte, and the broad footpaths of the same material made round all quadrangles and buildings. The asphalte should be laid on concrete, and have proper falls and channels leading to the grids. The establishment, especially the parts adjacent to the back yards, would thus be rendered drier and healthier, and all could be kept clean much more easily than at present.

13. I have not prepared an estimate of the cost of the works above proposed, as to do so would require the preparation of a plan of the buildings on an enlarged scale, and the taking of the necessary levels. Much would also depend upon whether the land for irrigation could be obtained on lease or would have to be purchased, and upon how much of the existing material will be available for re-use.

I have the honour to remain, Gentlemen, Your faithful Servant,

A. MAULT, Engineering Inspector-

Hobart, 30th November, 1888.

WILLIAM THOMAS STRUTT, GOVERNMENT PRINTER, TASMANIA.

