

Letters to the Rt. Hon. Lord John Russell ... on the drainage of the Metropolis, state of the Thames, and waste of fertilizing matter / with an appendix, containing statements respecting the impracticability of the plan of the Metropolitan Sewage Company.

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LETTERS

37590/p

TO

THE RT. HON. LORD JOHN RUSSELL, M.P.

ON THE

DRAINAGE

OF THE

METROPOLIS,

STATE OF THE THAMES,

AND

WASTE OF FERTILIZING MATTER;

WITH

AN APPENDIX,

CONTAINING STATEMENTS RESPECTING THE IMPRACTICABILITY
OF THE PLAN OF THE METROPOLITAN SEWAGE COMPANY, &c.

AND A

MAP OF THE PROPOSED WORKS

OF THE

LONDON SEWAGE COMPANY.

London:

PUBLISHED BY W. STRANGE, 21, PATERNOSTER ROW.

1847.

Price, 6d.

LETTERS

THE RT. HON. LORD JOHN RUSSELL M.P.

DRAINAGE

METROPOLIS

STATE OF THE TAMES



WATER OF THE TAMES

AN APPENDIX

CONTAINING STATEMENTS RELATIVE TO THE IMPROVEMENTS
OF THE TAMES AND THE RIVER OF THE GREAT OXFORD

MAP OF THE PROPOSED WORKS

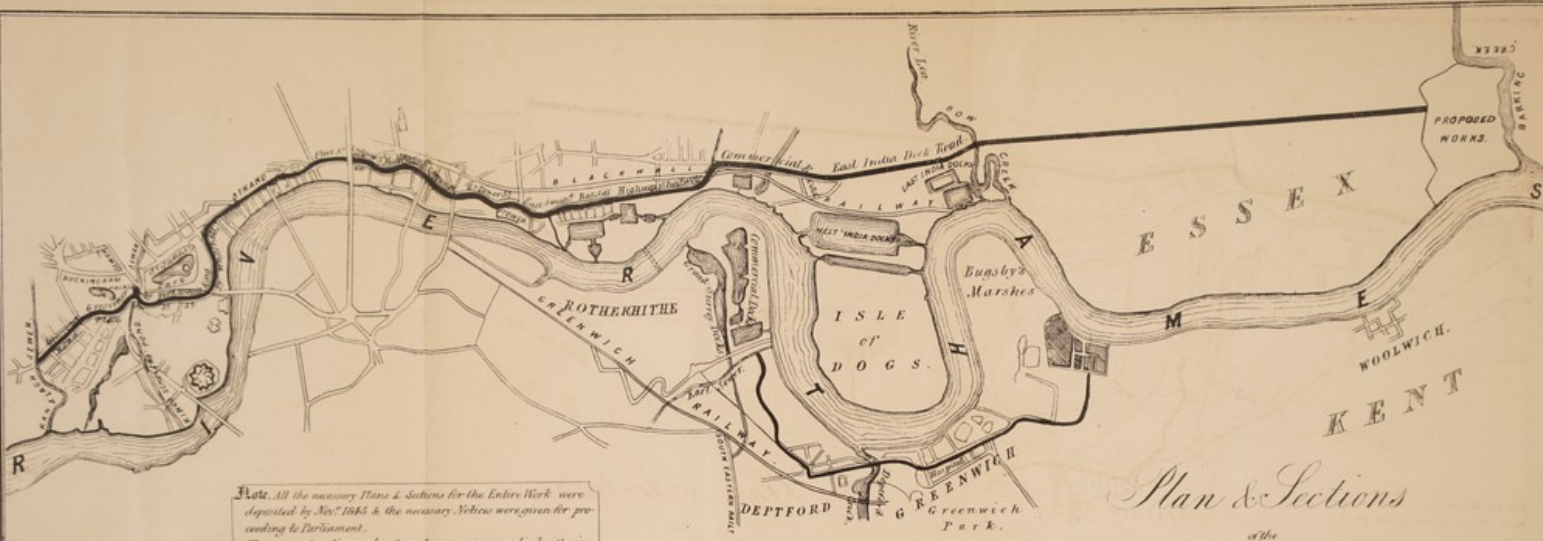
LONDON: NEW AGENT COMPANY.

London

PRINTED BY W. BARNES, ST. MARTIN'S LANE.

1831

PROPOSAL FOR THE CONSTRUCTION OF
A NEW BRIDGE OVER THE RIVER



Note. All the necessary Plans & Sections for the Entire Work were deposited by Nov^r 1865 & the necessary Notices were given for proceeding to Parliament. The same standing orders have been again complied with, in 1866 as far as the South side is concerned, & on the North Side to the Fleet sewer, but the capacity of the proposed Sewer would be sufficient eventually to include the whole drainage of the Strand, Pontiac & Chelsea.

Plan & Sections
of the
London Sewage Company's
PROPOSED SEWERS.

NORTH & SOUTH OF THE THAMES.

Offices 124, Bishopsgate St. Within.

These subterranean Sewers are indicated by Black Lines, and to be firm 2 to 3 feet below these, new existing which will be left undisturbed, their contents being discharged into the proposed New Sewer.

Drawn by J. H. Sturges



- Greenwich Road.
- Greenwich St.
- Lower Greenwich Place
- Star Road Row
- Green St.
- York St.
- Breadshop
- R Church St.
- Abbey Road
- King St.
- Whitehall
- CHURCH CROSS
- Strand
- Temple Bar
- Fly St.
- Box Lane St.
- London Wall
- St. Pauls
- Whitings St.
- Budge Row
- Commons St.
- GS Tower St.
- Tower Hill.
- East Southfield
- Parish St. Highway
- Shadwell
- Commercial Rd.
- East India Dock Rd.
- Row Creek.
- Marsh
- PROPOSED WORKS
- Row Creek

LETTERS
TO
THE RIGHT HONORABLE LORD JOHN RUSSELL, M.P.
ON THE SUBJECT OF THE
DRAINAGE
OF
THE METROPOLIS;
STATE OF THE THAMES,
AND THE
WASTE OF FERTILIZING SUBSTANCES.

124, BISHOPSGATE STREET WITHIN,
September 30, 1846.

MY LORD,

The national importance of the subject will justify me in addressing your Lordship, respecting one of the most beneficial privileges of the crown: to enforce proper drainage. The present government stands specially pledged to improve the sanitary condition of the country; and Sir George Grey has stated very truly, that "this was a most important question, and one deeply affecting the physical, moral, and religious welfare of the people."—(*Devonport, July 9.*)

As your Lordship is member for the City of London, there is reason to hope that the present communication will not be without interest; its object being, to effect a vast improvement in the Drainage of the Metropolis.

On the proposed Second reading in the House of Commons, of a bill to authorise an experiment to be made with the contents of two Sewers in Pimlico,* it was opposed by the late government, on the ground, "that it would interfere with the Drainage of the Metropolis, a comprehensive plan for which, was under the attention of government, the accomplishment depending on the retention of the present Sewage of the Metropolis." This

* "By means of a system of pumping-engines and Pipes, analogous to that of the great water companies:" the plan of the Metropolitan Sewage Company. See Appendix, p. 9—13.

plan was farther described, as “one by which all the impurities of the Metropolis would be conveyed down into Essex,”* on the north side; and on the south side, into Kent. This is the Plan of the London Sewage Company.

A Select Committee was subsequently appointed to inquire into all plans which might be submitted to them, and the above mentioned comprehensive one, the only one applicable to the whole of London, was referred to this Committee.

Let it be allowed that Sewer water does possess a certain value—and the question at once occurs, whether the obtaining of that valuable consideration, could not be combined with, and made available for the carrying out of those improvements, which are so much needed in the Metropolis,

Where all egress from the Sewers is daily stopped for many hours by the rising of the tide, the heavier portions frequently forming a deposit in the Sewers;

Where the outfall of low water mark precludes the drainage of the low situations of the Metropolis;

Where the existing Sewers being originally intended to remove only surface water, require to be relieved, and

Where the Thames is made a common Sewer.

Supposing a comprehensive plan for improving the Drainage, and for preserving the fertilising refuse from hundreds of thousands of dwellings to be brought forward. As it would be a new idea, and would be like the commencement of a new era, men’s minds would require to be instructed on the subject. But supposing a plan so fraught with blessing to town and country were proposed for adoption, to which part of the environs would the refuse be most easily, most safely, and most advantageously conveyed?

Let any one be informed of the evidence which was left quite uncontradicted: that Sewer water in its crude or natural state, is not worth carting or fetching half a mile; but that it is very valuable for meadows conveniently placed to receive and to allow it to flow off again, as at Edinburgh and Mansfield; that it is valuable when brought into a less diluted form, capable of being shipped by returning barges and vessels; and that, thirdly, when this precipitated portion is reduced to 1-40th of its bulk, when made into a perfectly dry manure like guano, it would require 1000 vessels of 200 tons each, to take it away.

* House of Commons, May 14, 1846.

Then let a man, so informed, pass from Blackheath over the Surrey Hills, to the highly manured market gardener's grounds at Battersea, Fulham, Isleworth, &c. Afterwards leaving the west with its parks and villas, let him view London on the north, from Hampstead, Highgate and Tottenham, and say whether the proper preservation of the refuse from these parishes, in addition to the solid manure which is daily received from London, would not more than supply all the contiguous lands. The cause of the complaints from the suburbs, and of the formation of a Committee to enforce the removal of nuisances at Tottenham, is simply—that fertilising substances are improperly retained, instead of being applied to agricultural purposes; and it is well known, that the land within seven miles, cannot take half the quantity of solid manure which daily leaves the Metropolis.

After having viewed London from the South, the West, and the North, let a man next pass beyond the Lea on the Eastern side—

Here is a lower level towards which all the refuse may flow by a small additional inclination in the Sewer, which would, on each side of the river, convey it;—

Here are fifty miles of open meadow land, remaining almost in an uncultivated state, a disgrace to a country which has the example of Holland before it;—

Here is close at hand (in Kent), the lime which is required to deposit that portion which may not be used for irrigation;—

Here are passing thousands of empty barges and vessels, well adapted to convey the manure in a moist state;—

Here, remote from all valuable property, could the precipitated portions be converted into a perfectly dry manure, ready for shipment to the West Indies, &c.;—

Here, with the ebbing tide, can the surplus water be daily discharged into the Thames, after the more valuable portions shall have been extracted.

Mr. Cuthbert W. Johnson, looking at the question merely as regarding the best application of liquid manure, has pointed out Essex and Kent as the proper part to which the Metropolitan Sewage should be conveyed. This recommendation is from the Author of the Prize Essay on Liquid Manure.

Mr. Rennie, looking at the question merely in an engineering point of view, has pointed out Essex and Kent.

Mr. Dean, in his evidence before the Health of Town

Commissioners, proposed a plan to convey the Sewage into the same locality.

Mr. Thomas Cubitt gives the same recommendation in his " suggestions" to relieve the Thames from its present pollution ;

And surely there is no other part of the environs to which the refuse could be so *easily*, so *safely*, and so *advantageously* conveyed.

That which the locality in question is so evidently designed for—that which these able men have desired to see accomplished, Mr. Wicksteed has made practicable by his plan of creating a lower outfall at a distance from London, by which means, sufficient fall or inclination is given for an eight and a twelve feet Sewer to carry off the required quantity of Drainage from two millions of inhabitants.

In this lower outfall or reservoir, fifty feet under ground, the whole would be disinfected by lime and then pumped up.

The utmost estimate for the works required to remove all the refuse from the Metropolis, is £1,300,000, and the proposed works will be sufficiently large to insure a constant and rapid flow for more than double the amount of refuse. The enactment of compulsory measures to remove refuse—the many complaints which exist—the vast increase in house Drainage, and in the construction of new Sewers, clearly prove that any Comprehensive Plan should provide for an increased Drainage ; not merely for the 95 millions of tons at present flowing into the Thames, but for 250 millions of tons which should leave the Metropolis annually.

Not a single refutation of Mr. Wicksteed's report has appeared, nor has there been any attempt to raise a doubt respecting the undertaking ; but the Select Committee has not afforded to the country the advantage of proof in regard to a subject of the most vital importance, respecting which the previous government had expressed itself so favourably. Every requirement of standing orders was complied with, and the Bill was printed and presented, in order that the whole plan of the LONDON SEWAGE COMPANY might be fully known and inquired into ; and the names of several of the most competent men in England were handed in to give evidence in support, and in explanation of the proposed enterprise, but the Committee did not examine them.

After having given evidence on the 18th June, Mr. Wicksteed himself again attended on the 22nd, to state additional facts respecting the strata through which the Sewer would pass, but he was not examined, although others were heard two or three different times. At the subsequent meetings, Mr. Wicksteed's assistant, Mr. Radford attended. He has been engaged in a vast number of very extensive works, a list of which was handed to the Committee, and his evidence tendered; but he was not examined.

The names of six other gentlemen were handed in and their evidence tendered. There are probably not any men in the country more competent to speak on the feasibility of the plan proposed for adoption by the London Sewage Company; but the Committee did not examine them.*

The country is entitled to all the proof which can be afforded in reference to this vast contemplated improvement. Responsible Contractors are ready to undertake the work, and give security for its proper and safe execution. And as the Committee have left unexamined, Gentlemen so competent to give information on the subject; the foregoing statement appears due to your Lordship as Head of Her Majesty's Government, and also as Member for the City of London.

I have the honor to be,

Your Lordship's

Most obedient humble servant.

J. J. MOREWOOD.

124, Bishopsgate Street, Within, Oct. 13; 1846.

MY LORD,

We beg to thank your Lordship for the acknowledgment of the receipt of a communication respecting the "Drainage of the Metropolis." There are, however, other important considerations connected with the subject, and we request to be allowed to make the following additional remarks.

1st.—The government has already passed an Act of Parliament to compel the removal of Refuse likely to produce contagion. The corrupted atmosphere which is found in

* The names were given to Lord John Russell, in the original Letter.

the dwellings of the poor, excites and induces malignant diseases, which are now but too likely to be increased, and aggravated in their character, by insufficiency and badness of food.

Lime and air are universally allowed to possess the most powerful, neutralizing, and disinfecting properties; and the construction of a subterraneous Sewer, capable of removing more than double the present amount of Sewage, and emptying itself in distant marshes, where, fifty feet underground, the whole is to be mixed with lime previous to being pumped up, may fairly be termed,

The Grand Desideratum, required by a government anxious to avert the danger, which in a sanitary point of view, threatens the Metropolis.

2nd.—The state of the River Thames, and of the supply of Water derived from Wells, deserves some consideration.

Our large consumers being unable to use river water taken from between the bridges, had recourse to digging deep wells, and after expending very large sums of money in search of a sufficient supply, it is now becoming but too certain, that they will be compelled to be dependent on Water Companies, the great demand upon the well water having drained the London Chalk Basin to the extent of 50 feet during the last 20 years. The water in Messrs. Combe's brewery, which was 70 feet from the surface, 20 years ago, is now 120 feet.

The difficulty which besets the question of Drainage, may be gathered from two public acts of the present Lord Mayor. During the late summer, the Water Companies were urged to afford an extra supply, to wash all refuse out of the Sewers into the Thames. A month later, a Court of Conservancy at Greenwich, found true bills against persons who did convey refuse into the Thames.

Mr. Thomas Cubitt, in his "suggestions," states very truly, that we act unfairly towards Water Companies, by forcing all refuse into the stream, from which our houses are again immediately supplied with water; seven out of the nine London Water Companies taking their supply from the Thames. Formerly the City was supplied by the London Bridge Water Works, and west of Temple Bar, there were the York Buildings Water Works. Both these establishments had to be relinquished in conse-

quence of the polluted state of the river, and now the powerful pumping machinery at Broken Wharf, and a large main pipe, from the Thames into Cheapside, cannot be used *even for watering the streets*, in consequence of the badness of the river water; and improving house Drainage is daily increasing the evil.

By the diversion of the contents of all the Sewers of the Metropolis, an immediate improvement will be afforded in the Thames, and in the course of a few years, good water would be within reach of the inhabitants.

3rd.—One of the earliest commands given to man was, that refuse should be carried a-field, and there put under-ground.—The fertility which would be caused thereby, would naturally attract attention, and induce that preservation and application to agricultural purposes, which has been continued among the Chinese, and which Liebig and others have taught us to adopt in Europe. There is, no doubt, a beneficent arrangement of Providence (agreeing with the ancient command alluded to,) and therefore the withholding from the land its due, may be naturally expected to act most injuriously, both on the land, and also on the water and air, which improperly receive that which should fertilize the soil. The inhabitants of towns, now so largely exceed the rural population, that the extravagant *waste* which exists on the part of the former, must bring *want* as its natural consequence. English farmers depending upon foreign manure, will not be able to compete with rivals, whose fertilizing substances are economised by every neighbouring town; and beyond this, an increased cultivation of the soil is required by the recent failure of the crops, and an additional quantity of manure must be provided for this purpose.

The lowest estimated value of the Sewage Manure of the Metropolis is £600,000 per annum; the loss consequently, since the last general war, is 18 million pounds worth of fertilizing substance. No wonder we have had to exhaust the deposit of centuries in the Atlantic, and that hundreds of ships are now searching for Guano in the Pacific, whilst the Sperm Fishery there is left to other nations. 25,000 miles are traversed to fetch manure by ships, which cost the country at least 3 millions, whilst for less than half that amount, a Guano field, more valuable than Ichaboe, may be permanently secured to our agriculturists.

Looking, therefore, at the proposed work merely in respect

*to the supply of Manure, the existing and the prospective circumstances of the country, may be said to demand the adoption of a plan at once so simple and so comprehensive for its preservation.**

I have the honor to be,
Your Lordship's
Most obedient humble servant,
J. J. MOREWOOD.

Downing Street,
17th October, 1846.

SIR,

I am desired by Lord John Russell, to acknowledge the receipt of your Letter of the 13th inst., on the subject of the state of the Thames, and of the waste of fertilizing matter.

I am Sir,
Your obedt. Servant,
R. W. GREY.

Downing Street,
20th November, 1846.

SIR,

In reply to your Letter of yesterday, I am desired by Lord John Russell to inform you, that he has no objection to your publishing the letters you addressed to him on the 30th September and 13th October.

I am Sir,
Your obedt. Servant,
R. W. GREY.

* By giving sufficient fall or inclination to the Sewer which will accomplish these objects, the size required will not be larger than that of some already existing Sewers. As five or six miles of the intended Sewer will be constructed before the works reach the City, the execution of this portion will afford easily available proof of the correctness of the statement of experienced and responsible contractors, who have offered to give ample security for the proper execution of these works with perfect safety to the roads and streets under which they will pass, at a depth of from 40 to 80 feet.

APPENDIX.

- 1.—*Statements showing the agricultural and commercial impracticability of the plan proposed by the Metropolitan Sewage Company, for the removal of Sewer Water from Pimlico to Hounslow.*—Page 9—14.
- 2.—*Statements respecting the Sewage Chymical Manure Company's plan, for preparing Manure in Westminster.*—Page 14.
- 3.—*The Plan of the London Sewage Company, which is perfectly original, and the operation of which does not interfere with any other.*—Page 14—15.

1.—THE plan which is proposed in the Appendix of the Report of the Health of Towns Commission, for the distribution of Sewer Water over the Land, by means of Pumping Engines, Main and Service Pipes, and Hose, was clearly one, which contemplated the application to be annually, "in three separate portions." As the Sewer Water has to be daily removed, it would therefore be necessary to have "reservoirs," capacious enough to store the quantity which would accumulate during the intervals; during a severe winter, when the Land would certainly derive no benefit from it; and during a very wet season, when the Land could no more absorb it, than a sponge already filled with water, would absorb an additional quantity. *Reservoirs* are consequently a very distinct and necessary part of the plan, which the Metropolitan Sewage Manure Company adopted, and were fully acknowledged to be so, by claiming in their Bill, power to purchase Land in different situations for this purpose. (Clause 18, question 1190 in Minutes). This plan of distribution was recommended for three years, but when the construction of Reservoirs to the West of London was not allowed by Parliament, the Engineer in chief to the Company declared that Sewer Water would be advantageously applied to the Land all the year round, (117, 1201,) and the plan of the Company was completely changed. The Steam Engine is to work night and day, to accomplish daily distributions over the Land, which is to be so covered with Main and Service Pipes, as to allow a Hose of sufficient length to water every part, through a $\frac{3}{8}$ of an inch, or a one inch orifice.

In reference to so continuous an application of Sewer Water, it has to be remarked, that the experiments made by Mr. Dickinson, are considered by the Committee to be most conclusive, and his words are—"There are days when there has been a good shower of rain; you would not use it then; days when you have a dense atmosphere; you would not use it then. Land kept occasionally watered, never becomes in a dry state." This is dictated by the experience of Mr. Dickinson, who only uses 5 to 15 tons of Liquid to an acre of Grass Land; whereas, the Metropolitan Company proposed at first 80 tons, and afterwards, their arrangements con-

template the application of 100 tons on Arable, and 500 tons on Meadow Land. The latter is $5\frac{1}{2}$ inches, in addition to the 19 or 22 inches of rain which annually falls near London. Now, no fact is more notorious in Europe, than the humidity of our climate, and hence the high estimation in which proper Drainage is held.

Mr. Jolly, who was brought forward to speak in favor of Sewer Water, admitted that all Land "should certainly be drained before any application of this water was extended on a large scale." If the Land be not specially prepared for the distribution, the fertilizing properties contained in the Sewer Water cannot be equally received, nor can the excess of water run off. The expense at Mansfield is given at 30*l.* an acre, but there was no evidence to show that any Drainage was contemplated on the land proposed to be irrigated by the Company, nor was any notice taken of the extra expense to be incurred for the necessary Drainage and preparation of the Land, in addition to the 6*l.* 5*s.* (at 3*d.*, or at 4*d.*) the 8*l.* 6*s.* 8*d.* per acre expected for the Ton of Manure, which is contained in the 500 tons of King Scholars Pond Sewer Water. Where is the excess of water to run?

According to Mr. Parkes, only 91 tons of water drain through an acre, during the six summer months, although the quantity of rain which falls is equal to 2000 tons a year. If the Sewer Water fouls or corrupts any stream or well, there is a fine of 300*l.* to be paid, (Clause 37.) If the whole quantity is to remain on the Land, then surely the accumulated ground heat will be seriously diminished, and there will be excluded the genial and fertilizing influence of the atmosphere, as it is established by the extraordinary effect of fallowing.

Perfect putrefaction is necessary to destroy the seeds of weeds, but there was no question asked, whether the Sewer Water used on arable land, would not cover it with the seed of weeds and grass washed into the Sewers, nor was there any inquiry respecting weeds on land kept in so moist a state.

The Hose which is to be dragged over a ten acre field to water every part of it, is to measure 110 yards; or according to the plan of the Engineer in chief, to 320 yards to water a 40 acre field. This will weigh about 3500 pounds, which a man is expected to move to every part of the 40 acres, from one centre, and without injury to the growing crops.

When the land is already too wet, the Sewer Water will be most diluted with rain, and in dry hot weather, its thickness is likely to interfere with its distribution.

The Metropolitan Company promised to Manure the ground, "delivering it on the Land," and the example of Mansfield and Edinburgh was given as a proof of efficacy; and at the same time was named the success of Mr. Harvey of Glasgow, of Mr. Thompson of Clitheroe, and of Mr. Dickinson; and "the cheapness of the application adopted by them." Removing a less diluted Liquid by Steam power already on the premises for other objects, and a Horse dealer charging himself no cartage, are unquestionably "cheap," as is the running of Sewer Water over a natural declivity towards the meadows at Edinburgh. It is impossible to understand how these modes of application can be compared with that which is directly opposite; viz. forcing 500 tons of Sewer Water up hill, to convey a Ton of Manure; and how Liquid Manure of which

5 to 15 tons an acre are sufficient on grass, can be compared with Sewer Water, of which 500 tons are to be given. The difference is as great as between a precious, and a base metal. To say that the greater is equal to the less, is absurd.

At Edinburgh, all the Sewage is used. (171.) It is probably from 30,000 Inhabitants; and the quantity of Meadow Land fertilized, is not 200 acres.

At Maybole in Ayresshire, where the Sewage must ever have flowed over Meadows which are irrigated by it, there are 6200 Inhabitants, and the quantity of Meadow Land fertilized, is 12 acres.

Three and a half Millions of Tons of Sewage are due to about 36,000 Inhabitants, which according to the Metropolitan Sewage Company's plan, are to be applied to 35,000 acres; which directly, or indirectly, are to pay for being covered with Pipes, whilst the example of Edinburgh and Maybole establish the quantity of acres at, from 72 to 250 acres, instead of 35,000 acres.

Again, according to the evidence, the quantity of Liquid and Solid Fertilizing Matter passing into the Thames, from King's Scholars Pond Sewer, is (Professor Miller's Evidence), 23,360 $\frac{1}{2}$.

The whole drainage is 6 millions of tons, of which the Metropolitan Company propose to take 3 $\frac{1}{2}$ millions, which therefore may be assumed to be worth - - - £13,628

For this amount of value, as avowed, the Company will charge at 3*d.* per ton, which was spoken of as the lowest price (410) - - - - - £43,750

The price of 4*d.* a ton was also spoken of, which would be a charge of - - - - - £58,333

One of the Engineers, who gave evidence in support of the scheme before the health of Town's Commission, states, that the cost of pumping and conveying Sewer Water for 5 miles is 2 $\frac{1}{2}$ *d.* per ton, and this evidence is now reprinted in the first report of the Metropolitan Company, (page 28.)* Taking then 5*d.* for 11 miles, the sum to be paid, will be - - - - - £72,916

No explanation is given respecting this extraordinary discrepancy, nor is any reason assigned for assuming that substances which can be bought at one amount, become worth four or five times as much, by being encumbered with 500 times their weight of water. £13 worth of Guano would be applied to the Land for 30*s.* or 40*s.* instead of £30 to £60.

This estimated value of £13,628 rests on the supposition that the whole of the valuable properties will be retained by the land on which it flows. That portion which is held in solution, is esteemed as the most valuable by the Metropolitan Company; (522); and at Edinburgh, six experiments with Sewer Water in its crude or natural state, quite established the very important fact, that the land has but little affinity for this portion. The third specimen actually gained in strength, abstracting manure from the soil, and after passing over 2 miles of meadows, 82 grains in solution were only reduced to 72 grains, when the

* The cost of transmitting Water to a distance of 5 miles, and to a height of 200 feet, including wear and tear of Pumping, Machinery, Fuel, Labour, Interest of Capital invested in Pipes, Reservoirs, Engines, &c., amounts to about 2 $\frac{1}{2}$ *d.* per ton. Evidence of T. Hawsley, esq.

Sewer Water finally passed over a sharp sand into the sea. 8-9ths of the portion held in solution were consequently lost, and only 1-9th retained by the land. On the other hand, that portion which is naturally suspended in the Sewer Water, consisted of 244 grains, the whole of which (except $2\frac{1}{2}$ grains) were absorbed, and one would have supposed that the land was fertilised, and that a perfectly new top soil of 12 inches and more, had been formed by the $241\frac{1}{2}$ grains, rather than by the 10 grains which were spread over two miles of meadows, particularly as a part of them did not retain a single grain of dissolved matter. The land has, at any rate, so little affinity for this latter portion, that if left on it, the first heavy rain will probably wash it away, and it is consequently very uncertain whether the whole of the £13,628 worth will be received by the Farmer.*

Again, the Company expects that a large quantity of land will be turned into meadows. The increased stock of cattle would at once furnish all the liquid manure required. Mr. Harvey has clearly proved this fact at Glasgow, and therefore the use of London Sewer Water would be superseded, so soon as the meadows were formed, and stocked with cattle. The pipes with which the land requires to be covered, to distribute Sewer Water with a 50 feet pressure, will be, of course, of little value for applying the Liquid from cattle, unless every farmer is to have steam power on his premises; and the Pipes would have to be disposed of at the Farmer's offer for them, or taken away; and in either case a new and more distant market for the Sewer water would have to be sought, the Pipes being subject to fresh removal at any time.

Mr. R. Baker's farm-yard is well placed for conveying liquid Manure through Pipes to Meadow Land. He laid down Iron Pipes. The first severe winter burst those that were most exposed, and he has never found it worth his while to replace them, or to take up those which remained in the ground.

With respect to Market Gardeners using Sewer Water, it has to be remarked, that only two were brought forward to give evidence, Mr. James Norris and Mr. Joseph Knight. The former, when asked, whether he would fetch it half a mile, replied that "he could make solid Manure go farther," (746,) and the latter admitted that he had never used Sewer Water, "although he lives pretty close to a Sewer." Market Gardeners are, in fact, obliged to have stable Manure for forcing the growth of vegetables, and after it is cold, have it at hand, for generally fertilising their ground.

It has been stated, that Sewer Water will be used to mix with Farm-yard Manure, and that Farmers will store it, to cart it on the land. The valuable properties contained in a ton of Sewer Water, are certainly not worth more than $1\frac{1}{4}d.$ The conveyance, (*by so expensive a process as Steam Engine, Pipes, &c.*) will increase the cost to $3d.$ or $4d.$ or $5d.$, and cartage is proved to cost $6d.$ to $1s.$ a load, for such distance as a Farmer commonly removes his Manure—consequently by storing and carting the Sewer Water, a Manure worth $1\frac{1}{4}d.$ would cost $1s.$ or more. The proportion of $1\frac{1}{4}d.$ to $1s.$, is as 1 to 9.6. At this rate, that which is said to be worth £13,628 would cost £130,828, when spread over a certain number of acres! Beyond this, the cost of reservoirs to store a three months' supply of the Sewage of the Metropolis, will exceed

* See page 14—N. B.

£2,000,000, and Farmers would all require Liquid Manure carts or water-tight waggons, if the Sewage is to be mixed largely with Farm-yard Manure.

Dr. Bostock and others have proved that Sewer Water, if kept for a time, loses the efficacy which it possessed when it left the Sewer.

According to the expectation of the Company's Engineer in chief, "every Farmer of every acre of land in the extent of 11 miles will put on each acre in his occupation 300 tons of London Sewage Water annually," (question 230). The other Engineer spoke of 100 tons an acre, (406), and stated that in his estimate he had arranged for $3\frac{1}{2}$ millions of tons to be distributed over 35,000 acres. Using the same manure to the soil year after year, Professor Johnson has shown to be impracticable. To raise crops annually, a heavier dressing is also required, and it would be necessary to cover at least 70,000 acres with pipes, in order to water 35,000 alternately. This would consequently almost double the expense which the Company in question has calculated on. But assuming the Metropolitan Company's views and estimates to be correct, then we have £120,000 for taking away and distributing $3\frac{1}{2}$ millions of tons of Sewer Water; which gives £8,500,000 for the extent of Drainage arranged for at a cost of £1,300,000, by the plan alluded to in the letters to Lord John Russell, proof of which was offered to the Select Committee.*

The plan of the Metropolitan Company rests on the supposition that there is little or no solid deposit in Sewers, that "Sewer Water" has only to be pumped away. Mr. Samuel Mills, Mr. Roe, Mr. Kelsey, and many others have given evidence, "that there is a deposit accumulating to obstruction and overflowing the Houses," and Sir James Graham's Bill, proposed to compel the proper flushing and cleansing out of Sewers, (clause 128). Beyond this, it must be remembered, that greater facility to remove heavier matter is required. This must be evident to any one who is aware of the prevalence of Sewers stopped up by solid deposit, and of cesspools which are scarcely ever emptied, as in Marylebone, in all the Suburbs, and in the neighbourhoods like Long Acre.

Compulsory enactments are required to remove solid refuse, and were 20 miles round London covered with Sewer Water, it would not only make necessary, immense works in the *Metropolis* to effect a *country* distribution over the land, but it would also involve us in a serious difficulty in respect to the removal of the solid Manure, with which the environs are at present supplied—but there was no evidence to show what was to become of it.

That the proposed plan of distributing Sewer Water in its natural state would aggravate the evil of defective Drainage from which London suffers, is well known to every one acquainted with the Foul Burn question at Edinburgh, where the Town Council have repeatedly endeavoured to get rid of the nuisance; and any one aware of the nauseousness of the effluvia which existed in the dwellings of the Cholera patients in 1832, will naturally view with alarm, since that infectious disease, the conveying of the refuse from houses, in the natural state, over the surrounding land.

* To guard the Reader against his taking it for granted that £8,500,000 would accomplish the Metropolitan Company's plan, for the "application of the Sewage Manure of the Metropolis to agricultural purposes," it may be well to add, that it can be most clearly proved, that double the amount named, would not be sufficient for the required Works, Mains, Pipes, Engines, &c.

At a Sanatory Meeting in St. James's Square, August 9, 1846, which was attended by a number of Noblemen and Gentlemen, it was stated by Mr. Gunter, that the Sewerage and Drainage was very bad at Fulham, Walham Green, &c. Instead of appropriating that refuse which is on the spot, the Metropolitan Company propose to supply Sewer Water from Pimlico, for the land surrounding Fulham, Walham Green, &c.

The inapplicability of the whole plan, and its expensiveness are likely to be proved before any attempt will be made, to put it into execution. The Company has already discovered that the very Act which was sought, and granted, is inadequate; that they require "an Amendment Act," and compulsory powers, and an increased capital.

N. B.—By the London Sewage Company's plan of precipitating the Fertilizing properties contained in Sewer Water, instead of losing all except 10 grains of that portion held in solution, there will be preserved 75 grains, and all the matter merely suspended; together 1 part in 466, taking no account of the sand from roads.

2.—*Six Months* after the plan of the London Sewage Company, to convey all the refuse into *distant Marshes*, and there precipitate the valuable portion, was published, a Gentleman brought forward a suggestion, to collect and precipitate it at *different stations in town*. The price at which the Manure is to sell, is stated to be £4 per ton, and in the Prospectus, "half the price of Guano which is selling at £7 to £10." Whereas the London Sewage Company's plan will confer the advantages in Drainage which no other can accomplish, and will at the same time supply the Manure at the place for shipment at £2, or supply it in that moist state, which will probably be found most useful, at 4s. a ton.

The objection to works in town, is the enormous expense of the sites required; the improbability of obtaining them so near the mouths of the Sewers as to secure the refuse from the most crowded parts of the Metropolis; the nuisance which Steam Engines, Reservoirs, &c., would cause, and also the increase to the already immense traffic on the River, and half-a-mile inland, between Greenwich and Chelsea. Conveying 200,000 to 300,000 tons of Manure, all the Lime to precipitate it, and the fuel to dry it, would increase the traffic to a large extent.

3.—The idea of the preservation of the refuse of the Metropolis occurred to the writer in June 1845, when observing the waste of Fertilizing matter from one of our markets. After having visited the large manufacturing towns in Lancashire and Yorkshire, without being able to find any practicable plan which could be adopted in London, early in October, the necessary surveys for accomplishing the objects contemplated, were commenced, on each side of the Thames. The plans were duly lodged by the 30th of November, the Parliamentary notices were affixed on 80 parish doors, and published in the Gazette and County Newspapers, for three succeeding weeks; the Engineers report, and the details of the plan with a lithographic sketch, were sent to every Member of Parliament, and were altogether circulated to the extent of many thousands, and the whole particulars of the scheme were published in nearly 100 Newspapers and Periodicals; the

The drainage from the district extending from Temple Bar to Chelsea Hospital is 1,798,000 cubic feet of 24 hours or 18,311,000 tons a year of this quantity 44871 " " " " 456,980 " " " is proposed to be taken by the Chemical Manure Company & for this 1/40 part, their plan will require works covering an acre

Government were repeatedly informed of the progress made; and early in February, the Bill of the London Sewage Company was printed and presented to Parliament. The proposed enterprise has therefore now been twelve months before the Government and the country, without any one coming forward to question its practicability and the correctness of the estimates.

The necessary steps have again been taken for applying to Parliament for powers to construct a Trunk Sewer to remove all the refuse from the *South Side*, and from the City and Eastern districts on the *North Side*, commencing at the Fleet Sewer, the Drainage from the latter district being about 40 millions of tons; but the 12-foot Sewer, with sufficient fall, will be adapted to include eventually all the Drainage from the Strand, Pimlico, and Chelsea. The most careful examination has quite established the fact, that this work can be completed, respectively, for less than £200,000 and £600,000. But assuming even these sums as cost, and the lowest produce, which repeated analyses (by such chemical means as will be resorted to) have established, it is found that the dry Manure, like Guano, and containing 10 per cent. more fertilizing properties than Guano selling at £8, will cost the Company £2 per ton, after the payment of all expences and 10 per cent. profit. In a moist state, adapted for removal by returning barges and vessels, the price would be 4s. per ton, and in its crude or natural state, it can be put on board at 1d. per ton, and then easily removed to such land as is adapted and conveniently placed for the application of Sewer Water in its natural state. The only evidence of removal of Sewer Water from a town, which was brought before the Select Committee was by barge, (269) and probably a very large portion of the London Sewer Water will be used in these two forms; but a Company must always be at the mercy of the seasons and buyers, unless its plans comprehend the conversion into a solid and universally valuable Manure.

The distrust which has been excited by the enormous Railway Speculations of the two last years, has operated unfavourably on the successful progress of every new undertaking, however sound and beneficial in its character; and it has been found impossible to procure the necessary subscription required to obtain the Company's Bill in the ensuing Session of Parliament.

The more the measure is investigated and becomes known, the more clearly will appear the important benefits it is fitted to confer on the Metropolis, and on the Country at large; and it may, therefore, be confidently expected that the Inhabitants of the Metropolis will eventually afford due support to the enterprise in question, which will convert the most active cause of disease, into a source of reproductive wealth, giving a new and profitable employment, and vastly increasing our supply of Food.

The arrangements proposed by the London Sewage Company for improving the Drainage of the Metropolis, are as perfect as if this object were the only one contemplated. The present Sewers are *Reservoirs* instead of being *Drains*, so soon as the tide rises, by which means all egress is prevented for many hours each day; and the channels for the removal of all the refuse of the Metropolis are as inadequate for this end, as Old Fish Street Hill would be for the traffic of 1847, or the arches of Old London Bridge for the increased navigation of the river.

The Subterranean Sewer to be constructed, will pass under streets

and roads running nearly parallel with the river; it will be constructed by boring or tunnelling, without interfering with any private or public property, excepting the necessary reservoirs, at a considerable distance from Inhabitants; it will communicate by shafts with the underside of the existing Sewers, so that all the refuse of the Metropolis may be removed, under ground, without any nauseous exposure, into marshes down the river, where an outfall will be created and constantly preserved, sufficiently low to ensure a continuous and rapid flow for more than double the Sewage now discharged into the Thames, which, both by deposit and exhalation, produces most injurious effects on the surrounding atmosphere.

The prevailing conviction that something must be done to improve the *Sanatory condition* of the Metropolis, should induce a proper examination of the enterprise, in order to give it the support it deserves.

Beyond this inducement, the increasing necessity to fertilize our soil at a cheap rate;

And the polluted state of the Thames, urge the subject with additional force, and we shall be inexcusable, if a remedy so comprehensive and so efficient be not adopted, without farther loss of time.

124, Bishopsgate-street Within, London,

January 8, 1847.

