

**Facts respecting the drainage of London and the pollution of the Thames /
from the reminiscences of an octogenarian, medical officer, in retirement.**

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FACTS ^H 9

RESPECTING THE

DRAINAGE OF LONDON

AND THE

POLLUTION OF THE THAMES.

FROM THE

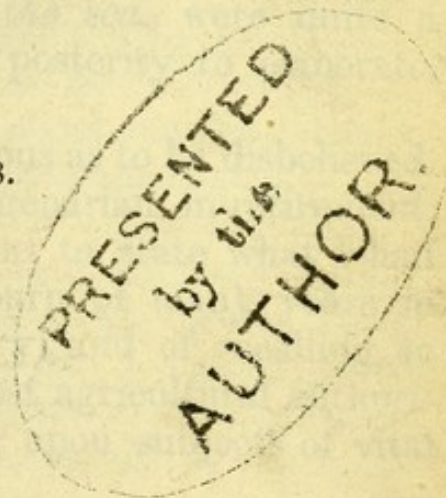
Reminiscences of an Octogenarian, Medical Officer,

IN RETIREMENT.



M. L. Este

FEBRUARY, 1858.



LONDON :

PRINTED BY GEO. BURNS & CO., 1, CAMBRIDGE TERRACE,
EDGWARE ROAD.

FACTS

RESPECTING THE

DRAINAGE OF LONDON

AND THE

POLLUTION OF THE THAMES

FROM THE

ADMINISTRATIONS OF AN OBSCURANT MEDICAL OFFICER

IN RETIREMENT.

FEBRUARY, 1852.

PRESENTED BY THE AUTHOR



LONDON:

PRINTED BY GEO. BURNS & CO., 1, CAMBRIDGE TERRACE,

EDGEWARE ROAD.

PREFACE.

At the end of 1855, there were statements at meetings and in the public press, that between three and four millions sterling had been expended in the purchase and conveyance of Guano from the antipodes to England; and that associations were formed to obtain such manure in abundance. Early in 1856, plans were desired by Government from the Board of Works—plans for the speedy, effectual removal of the drainage of the town and of the pollution from the river, and large intercepting tubular drains were recommended to be formed, at an expense of from five to six millions sterling, to carry off all the sewage and valuable agricultural treasure to waste in the ocean! During the last twenty years increasing nuisances and the safety of the metropolis required speedy removal; *removal*—nothing but *removal*, was then thought of.

Agricultural improvements, and the value of the agricultural treasures, about to be squandered *in the sea*, were quite a secondary consideration, were left for posterity to elaborate, and were then entirely overlooked.

These statements appeared so monstrous as to be disbelieved. Finding they were true, though an Octogenarian, in retirement, I thought it a duty incumbent upon me, to state what I had seen with my own eyes during a sojourn of many years in Italy (the country of my remote ancestry) and of recalling to mind the facts established by the greatest agricultural authorities in England, France, &c., all bearing upon subjects of vital importance now to England.

I resided in Italy, chiefly in the Milanese, from 1792 to the end of 1796, when the French, under the First Buonaparte,

invaded Italy. Had not Italy been disturbed and crushed by the wars and horrors consequent on the French Revolution, I probably should have remained there. During many years, up to 1796, Italy had enjoyed great prosperity and opulence, from an extensive intercourse with England. Every part of Italy, from Venice and the Tyrolean Alps northward down to the Gulf of Tarento, in the sole of the foot of the boot southward, all was English. In those halcyon days, both Leghorn and Naples were quite English cities. The miseries of the finest part of Europe commenced in 1796 with the first invasion, have greatly increased under subsequent re-invasions, until that magnificent country has been reduced to its present deplorable condition.

Whoever depends solely upon such materials as are within himself must be badly provided for in any undertaking. In a learned profession, every man is bound to contribute his portion, however small, to the general stock of knowledge: whoever locks up his talent, inconsiderable as it may be, deserves censure, as an unworthy member of the society to which he belongs.

Diffident in myself, but rich and full of confidence in all the powerful authorities quoted, I shall now venture to assert as FACTS what no ingenious sophistry nor eloquent circumlocutions have hitherto been able to affect.

1st fact.—No guano can be equal to *our own*. Guano of *organic* character is more valuable as a fertilizing agent than any other sort of guano, consequently real British Metropolitan guano may be considered superior to all.

2nd fact.—The millions expended in the purchase and conveyance of an inferior article to England; and further, the millions for tubular drains to carry to waste our valuable treasure are squandered to no purpose, so many millions might as well be cast into the sea.

At the beginning of 1857, the statement that the Board of Works would be powerless for good unless supported by Government, or by the nation generally, gained ground. Statements that although the removal of the sewage for *utilization* to the country might cost millions, yet “such cost “would not be wasted,” as in the first project. *Per contra*, all so expended would be saved, would be employed to great permanent advantage, would be returned in time with profit

to the undertakers : and if a well organised system, founded on fact, were *generally* adopted, under the auspices and sanction of Government, not only would our cities be more effectually drained and purified, but our agriculture would be doubly productive, and this moreover without waste of money.

In 1857, in the Parish Boards of Works, several members asserted, that "Government should not approve of any plan for drainage in which utilization in all ways, in town and country, was not fully comprehended."

Another step in the right direction was the mission of Dr. Southwood Smith and two engineers to Milan, to look after the irrigation and agriculture in Lombardy, alluded to in letter No. 1, of October 15, 1856.

The decided success of *Mechi* at *Tiptree* in establishing the fact that most abundant crops may be obtained from poor land, inspired further hope. Lastly, in the autumn of 1857, appeared a master work to extinguish all sophistry and circumlocution, carrying conviction in every line of it ; exposing the whole question clearly and intelligibly to common understanding ; and indicating generally the best and most probable termination of a great national importance. (See pamphlet—"Metropolitan and Town Sewage ; their nature, value, and disposal," by A. Sayer, M.D., 1857. Also, an admirable "Address to the Vestry of St. Marylebone," on the same subjects, in the *Marylebone Mercury*, of Saturday, December 26, 1857.)

Both these exhibitions of mental labour and ability should be on every man's table at all interested in the welfare of our towns and country.

Dr. Sayer proclaims this drainage question "*one of the most important ever submitted to the intelligence of man.*" It truly is so, this great work intrusted to you (Board of works), which is to last for ages and generations to come, ought to be carried out *in the best and most liberal spirit.*

This vast undertaking had been properly viewed by the Chief Commissioner, Sir B. Hall, but has never yet been so completely and compendiously handled, as by the author of the pamphlet and address before named.—1st, The preservation and irrigation of the Sewage ; 2nd, The money or *commercial value* of that Sewage : 3rd, The System for the removal and application of that Sewage are the great points with which the mind of Dr. Sayer has been happily employed.

A general, national, well-organized system is warmly advocated ; much incontrovertible evidence and great authorities are given, sanctioning his statements ; and Dr. Sayer, with confidence and propriety—closed his address with the fine injunction from Horace,

“ Siquid novisti rectus istis”, &c.

“ If thou knowest anything more truthful than this, candidly impart it ;
if not, join issue with me.”

The whole assembly did join issue with the Doctor, in long-continued, unanimous applause.

What is wanted ?—and how is this great work to be achieved ? How have other great works been achieved ?—works almost superhuman—by which the prosperity, and glory of England have been demonstrated to an admiring world.

A well-organized system for removal, founded on established facts, and generally supported by the nation and by the Government—seems the great desideratum !—The science and skill of our chemists and engineers, supported by the vast *powers of association* in towns and country, may be confidently looked to for the accomplishment of these objects. Nothing can be done without such combination !—All may be attained (perhaps more easily than is anticipated) by the powers of *general association*.

Let but a well-methodized system for removing the drainage from the cities be invented, and the chief, first difficulty, will be surmounted. Portability is wanted, and conveyancing ; all the rest will follow.

The financial and agricultural advantages can afterwards be attended to.

Should the drainage not be removable in its original *fluidity*—let chemistry be employed to give it consistence—or even solidity—like the *Poudrette* of Paris ; it thus may be spread over the land ; and subsequent irrigation may dissolve, and restore to it much of its original efficacy. In fine,—any plan will be found preferable to the squandering of Millions in Guano from the antipodes—and more Millions upon gigantic tubes from London to the sea, solely for the waste of our valuable manure, and its ejection into the ocean.

M. L. ESTE, F.R.C.S., &

DRAINAGE OF LONDON.

REMARKS

RESPECTFULLY SUBMITTED TO

SIR BENJAMIN HALL, M.P., AND THE METROPOLITAN BOARD
OF WORKS.

October 15, 1856.

No. I.—SEWAGE—MANURE.

It may be said, with Sterne, "These things are better managed in France." Paris and all its adjacents rest upon a peculiar ground of limestone—*Sulphate of Lime*. All the night soil and offal are carefully and ingeniously carried away to Reservoirs beyond the suburbs. The largest *Reservoir*, north-east of Paris, is called the *Pantin*, of enormous dimensions. Into the soil there deposited, large quantities of *broken Limestone* are thrown; Sulphate of Lime is easily affected by heat, and *crumbles down* into powder under fermentation, when combined with the soil. The mixture, de-odorized, is dried into powder, is packed into large casks and cases, is sent even to the remote provinces of France, wherever such manure is desirable, is sold under the name of *Poudrette*, and has ever been a source of *great profit* to those who prepared it. Arthur Young, Coke of Norfolk, Sir John Sinclair, the Agricultural Societies of France and Italy, our own—down to "*Mechi* of *Tiptree* celebrity," could be referred to, were it necessary, in confirmation of these remarks.

In no part of Europe is *Irrigation* so well managed, or *Liquid Manure* more valued, than in Lombardy. Around Milan, Parma, Mantua, Verona, Este, Ferrara, &c., *five crops* of artificial grasses are yielded in the season. The cattle are large; milk and cream are in abundance, and rich. The celebrated Strachino and Parmesan cheeses are produced in an quantity in those pasturages. Around Pavia and the Po fine *rice* and *maize* are in successful cultivation.

While such are the proceedings in France and Italy, how are we employed in England? In contemplating the formation of large tubular drains from London to Sea Reach, at an expense of *Five Millions sterling*, in order that all our agricultural treasures may there be squandered, wasted, and dispersed in the mighty ocean. Moreover, we are sending to the antipodes are purchasing and conveying to England, at an enormous expense of money and of health, the offensive GUANO.

Why, our eminent chemists are shewing in their Lectures and experiments that *Sulphate of Lime is easily produced ARTIFICIALLY*; and the last census tells us, that in London alone there are *two and a half millions* of as *fine Penguins* as any the Pacific can put forward. Why should not we, like our neighbours, turn such resources to the best account?

Some ancient inscriptions, applying to these subjects are respectfully annexed. Over a ducal farm pit, near Ferrara :-

“ O! vile excrementum!
Stercus!—inutile non es!
Tu das alimenta, nutrimentomeo.”

In a large hotel, over the Cabinets a l' anglaise :—

“ Tutto l' arte dell buon cuoco.
Vien finir in questo luogo.”

And the gardens around demonstrated the superiority of the guano.

In an old work on London :—

“ *Urbs sterilis!* fructus agrorum, in *stercora* vertis;
Fertilis ager! in *fruges*, *stercora* vertis,
Tu victum dabis, avido, *vitumque* colono
Debet *stercoribus*, non minus *ILLE*, tuis.”

No. II.

ON THE

PURIFICATION OF LONDON AND OF THE THAMES.

November 20, 1856.

THE subject involves various considerations, each of vast public importance; and the purification cannot be much longer postponed. Those engaged in the question have, hitherto, been at variance. Schemes have been wildly and unconnectedly advanced—approved—rejected—reconsidered, with different results; and plans, not very satisfactory, have been recommended for adoption.

Under such confusion, the Remarks and Statements, in the Circular (No. 1), of October 15th, were respectfully *submitted* to Government—to the chiefs of departments—to individuals in high position and of influence—to invite their attention—to assist them in their deliberations and decisions;—and lastly, the statements of October 15th, were laid before the *master minds*—advisers of the public—the leaders of the press.

The Circular has not been issued in vain. Satisfactory answers have already been received, and such able expositions have been elicited, and have since emanated from the press, as to remove all doubt about the *purification*; while suggestions have been thrown out for hereafter obtaining all the other *great advantages*, involved in a gigantic undertaking. The press, thus far, has done the work clearly and compendiously. Many quotations might be advanced. Two only are selected, embracing the whole matter. They treat it with so much tact and effect, that time and trouble may be spared—entertainment and edification be afforded by their perusal.

1st.—See the *Times* of November 3rd, in reply to Mr. Palk, M.P., of South Devon; also the *Sun* of same date, Monday, November 3rd.

2nd.—The *Morning Advertiser* of Friday, November 7th, expatiates on these points.

The *Times*—“Under a crustaceous coat we wear a tender heart,” says the *Times*—and he shews it in his reply to Mr. Palk—for he enhances the value of Mrs. Palk’s own advocacy,

on one point. The *Times* does not attempt to supersede or in any way to interfere with what Mr. P. "considers" the most *sensible and patriotic course*; and the *Times* thus finishes his reply to Mr. Palk—"We think we are helping him, while saving ourselves!" What truth, good sense, and good feeling are here exhibited! The *Times* states in the reply: "The "undoubtedly valuable matter we now throw into the Thames "at a very moderate estimate is worth *two millions* a year, and "represents a capital of *fifty millions*." Moreover, if the suggestions of the *Times*, as to collecting, deodorising, and as to conversion for portability and practicability can be realized more millions may be saved.

The *Morning Advertiser* of November 7th, at large asserts—"But plan B is not only objectionable on these grounds "The drainage of the *Thames marshes*, is a measure which "might well be comprehended in our drainage *scheme*. I "would improve a considerable amount of property, and re- "move a *source of insalubrity*, whose influence is severely felt "in the metropolis. It would open a *new fund* in aid of the "joint scheme; for the proprietors on both sides of the river "are willing to be taxed for this purpose. But there is yet "another objection which applies not only to plan B, but to the "plan for discharging the sewage at Sea Reach. Both over- "look altogether the possibility of converting the sewage from "an eye-sore, and a source of disease, into a source of *national* "wealth. On this subject, a medical contemporary has the "following excellent remarks in its last impression: 'In no "part of Europe is irrigation so well managed, or liquid "manure more valued, than in Lombardy. Around Milan "Parma, Mantua, Verona, Este, Ferrara, &c., five crops of "artificial grasses are yielded in the season. The cattle are "large; milk and cream in abundance, and rich. The "celebrated Strachnio and Parmesan cheese are produced in "any quantity in those pasturages. Around Pavia and the "Po, fine rice and maize are in successful cultivation.' And "then, referring to this very question of the drainage of Lon- "don, our contemporary thus continues: 'While such are the "proceedings in France and Italy, how are we employed in "England? In contemplating the formation of large tubular "drains from London to Sea Reach, at an expense of *five* "millions sterling, in order that all our agricultural treasure

“ ‘ may there be squandered, wasted, and dispersed in the
 “ ‘ mighty ocean. Moreover, we are sending to the antipodes,
 “ ‘ are purchasing and conveying to England, at an enormous
 “ ‘ expense of money and of health, the offensive guano ; yet
 “ ‘ the last census tells us that in London alone there are two
 “ ‘ and a half millions of as fine *Penguins*, as any the Pacific
 “ ‘ can put forward. Why should not we, like our neighbours,
 “ ‘ turn such resources to the best account ?’ Surely these are
 “ ‘ considerations which ought not to be neglected. We have
 “ ‘ here a certain source of wealth, probably sufficient, in a few
 “ ‘ years, to return any outlay we should have to incur, in per-
 “ ‘ fecting the drainage of London, and thereafter to stand as a
 “ ‘ permanent source of income from which other metropolitan
 “ ‘ burdens, now resting on the shoulders of householders, might
 “ ‘ be met. No doubt the difficulties of arriving at a scheme for
 “ ‘ the drainage which shall embrace *all* the advantages that
 “ ‘ have been suggested from other quarters, appear greater to
 “ ‘ those engaged in considering the matter, than they are to
 “ ‘ the public. But should that circumstance deter the Board
 “ ‘ of Works from making the attempt to include them ? Neces-
 “ ‘ sarily so great a work involves many difficulties. But we
 “ ‘ are now seeking a great national reform. Why not include
 “ ‘ in our scheme, a feature which will be an example to other
 “ ‘ cities and populous towns, and become a permanent source
 “ ‘ of national emolument.”

Comfort and health from purification are certainly the first
 and highest considerations. The metropolis itself can be well
 drained. The condition of the Thames may be improved con-
 siderably, though at high cost. But cost must not be an
 obstacle to health. Comfort and health are not to be measured
 by money. No sum can be too great for such invaluable !
 No money-price can be put ! They must be had, if attainable,
 at any expense of money or labour. Objects of general conse-
 quence require general exertion and combination. Government
 seems well-disposed to take its share in the operations ; for
 the other great agricultural and economical advantages, we
 must look to the powers of association—to Mr. Palk, and his
 chemical and engineering friends, &c., in conjunction with
 government. All may be attained—all may be embraced,
 comprehended, under well organized conjoint operations ! Ye
 annihilators of time and space ! ye who are covering the *terr*’

aqueous globe with steam navigations, and with railroad networks, with electric telegraphs below the oceans, and above them! Ye gas lighters and illuminators of the world! Ye benefactors in a hundred other ways—all English as you are—everywhere sustaining the fame and glory of England. What is there *you* cannot accomplish? Is there any thing in the preceding suggestions to alarm you, after all the nearly superhuman prodigies you have effected? Why? you electrotypers, platers and gilders, you have even made *the sun* its own engraver! Can it be for a moment supposed that *you* are incapable of collecting, deodorising, and converting our British guano to practical and portable purposes,—it is done elsewhere roughly.

This is all that is wanted for the attainment of health and wealth in our own cities; and it no doubt will be accomplished by you, at home, and with great results.

The very moderate estimate of *two millions* in the Thames was the estimate before the Commons many years ago, when the population was less than at present,—the purification of the Thames was the question then.

At present, a civil engineer, of great eminence, tells the government, that about $7\frac{1}{2}$ millions square cubic feet of sewage manure fall into the Thames per day; 6 millions from the north side, $1\frac{1}{2}$ millions from the south side, in London.

A distinguished divine formerly asserted—“The person who quietly, causes two blades of grass to grow, where only one blade grew before, is a greater benefactor than many who make much noise in society.”

May all success attend such patriotism and philanthropy!

No. III.

ON THE

PURIFICATION OF THE METROPOLIS AND OF THE THAMES.

January 20, 1857.

NOTWITHSTANDING serious obstacles, a great change has taken place since the 15th of October, both in the position and in the public opinion of these *National* Questions. In October

attention was directed to *one single point*, viz.,—to the Cleansing of the Metropolis, through large costly Tubular Drains, for conveying the Sewage to the Sea and dispersing it there.

In September, all was confusion ; strange questionable plans were recommended for adoption, which could not be adopted. At several large meetings, since September, there were controversies, criminations, and recriminations, extremely out of time and out of place, and quite irrelevant to the important considerations for first decision, viz.—

1st.—Can the Metropolis be thoroughly cleansed and made healthy ?

2nd.—Can the Thames be equally purified ?

3rd.—Can the other Agricultural and financial considerations (more important than has been supposed,) be realized by simultaneous combinations, and by the powers of general Associations ?

The Government has ever shewn itself anxious to promote these advantages, especially of late, in placing the business in an entirely new and practical position.

During the last three months the press has done excellent service ; the public has been enlightened on the vast and vitally important points, almost entirely overlooked or much under-rated, at special meetings. The course, now taken by Government, surely deserves general approbation. The former commission was restricted to *one point*, the mere *cleansing and draining* of the Metropolis. The new commissions are extensive, in fact, unlimited ; they are enjoined to consider the question in *all* its bearings ; to seek the best information and assistance, wherever they may find it, and the special *injunction is to enquire about the utilization of the Sewage, whether it cannot be deodorized and manufactured, so as to render its discharge into the German Ocean or Sea Reach, not only unnecessary but extravagant and profligate ; and, further to accomplish an immense saving to the Rate-payers and to the country at large.* The ultimate value of the manure saved, should extinguish costs, and add materially to our agricultural prosperity. Local deodorization is adopted in France, and the manufacture of manure has ever been a source of profit and advantage in that country, and both processes have been resorted to, without much expense or annoyance to the inhabi-

tants. If local deodorization and local manufactures can at once, be established in or near our great cities, very little need be expended in Tubular Drains ; great results may be obtained without such large costly outlets, and, indeed, at once. The agricultural classes, however, in most countries, are proverbially slow in admitting of deviation from their old courses. If our agriculturists, in spite of all that has been written, by such high authorities as Arthur Young, Coke of Norfolk, Sir John Sinclair ; and in spite of the great facts recently accomplished, under their immediate inspection, by Mechi, of Tiptree ; if, notwithstanding all, our farming community, should still require delay for further evidence and conviction, the gentlemen on the excellent commission just appointed, are the very persons from whom conviction may be expected. Lord Portman, the much respected of Marylebone, an extensive landowner, a great patron of agriculture, presiding, assisted by the eminent members of the commission announced, have this business confided to them ; placed in such hands, we may now believe the business will be done, and done in the most able and acceptable manner. Should delay be deemed expedient on some points, the great Metropolis itself, may be thoroughly purified in two ways—by drainage and by continual efflux through comparatively short tubes, by West Ham, across part of Essex, to the River Crouch, to the German Ocean, according to the ingenious plans of Sir Morton Peto, &c. The chief sewage of London may be so removed as to quite abstract it from the Thames, and never return to it. The Thames will be rescued from so much pollution ; but let what will be done, such is the great fall to the river, especially to the north side, that the filth from the buildings, wharves, factories, depôts, &c., immediately along, and adjacent to the banks, such filth will find its way, in spite of our efforts, and will, from those banks, drain into the river and pollute it. What between such drainage and the continual efflux of the sewage through the Peto tubes, to the German Ocean, the great Metropolis itself may be effectually and thoroughly cleansed. But how is the river to be dealt with ? In passing from its source through London to the sea, it is everywhere receiving sewage contamination in abundance, at Brentford, Isleworth, Chelsea, Greenwich, Woolwich, Gravesend, Southend, from the Medway, from all the great docks, formed near London, and now forming up to

the Thames Haven Dock short of Southend, and moreover from the shipping. A forest of masts extends, more or less densely, all the way from London Bridge to the Nore, which, in fact, is becoming the commencement of the Port of London; Gravesend has been hitherto so considered. The Nore bank, with Southend on one side, with Sheerness and the Medway on the other, separates the two great entrances to the Thames which entrances run together, join a short way westward of the Nore, into one broad mouth of the river, and also of the Port of London, resembling the broad bowl of a funnel. At the rapid rate of which we are living and progressing, Southend will shortly become the N. E. suburb of London; the Medway, the S. E. boundary of the Port of London. The well organized Fenchurch Street Railway, all open without tunnels, now conveys from Fenchurch Street to Southend most agreeably, in about one hour and 40 minutes. Since its opening, Barking, Raynham, Purfleet, and Grays, have increased surprisingly. At Tilbury, a North Gravesend is arising, as happened at North Woolwich. The Tilbury Rail has its Steam Ferries and its offices at the Town, Terrace, and Rosherville Piers, at each, and has moreover, the Terrace Gardens in its occupation; besides this, the Tilbury Rail has the Thames Haven Pier as one of its appendages, from thence Steamers proceed (except at low water) in nearly a straight course to Margate; the shortest, pleasant way of reaching Margate. The Thames Haven Dock is forming under the auspices and prospects of the Tilbury Railway. The Railway conveys from Tilbury to Southend in about 40 minutes. The accommodations at the Southend Terminus are admirable. At Southend the general answer to all questions concerning the Railway, is, it will be the making of Southend and the adjacents.

Under such circumstances, how are we to act—to deal with the river—with the port of London; as it is, and as it shortly will become, between London Bridge and the Nore?

The river may be greatly improved, but cannot be as completely corrected as the Metropolis. The river is now so polluted as to be horribly offensive at times, to all near it and upon it. Is it to be further contaminated by all the filth of London thrown into it at one of its most interesting parts? Not one drop of further pollution should be permitted; if possible, all filth should be abstracted, should everywhere, as

much as possible, be taken from, not cast into the Thames in any part. But what is to be done with the sewage from all the docks? from all the shipping between London and the Nore? and with some other drainage not to be prevented? Much, however, may be accomplished, notwithstanding the obstacles above mentioned. Fortunately, common water (in large quantities) is a great deodoriser of itself: so is earth. We must look to previous general deodorising, especially of liquids, before liquid sewage be allowed to run into the river. When previously deodorised, the river will carry away large quantities, and not be much deteriorated—not very appreciably the worse. Simple deodorising, together with simple process, for manufacturing the denser materials into fertilizing manure, as adopted successfully abroad, are the two processes necessary here for effectually cleansing our cities; for improving, as far as may be, our rivers. Sooner or later both these processes will be discovered and zealously followed. Should our public, prepared by former authorities, by the Mechia Demonstration, be now ready to receive, and ripe to adopt the communications of the new commission; the advantage may be at once pursued, and great savings effected immediately in unnecessary tubes and importation of guano. With the public convinced, and appreciating the results, associations will everywhere be formed, and the vast powers of association will be brought to bear upon these national importances (as has happened upon other occasions); improvements will rapidly follow in simplifying and rendering both processes of easy attainment for general use. If, unfortunately, the judgment of the public should not yet be matured and fixed, the Metropolis must be cleansed; the main drainage must all be sent through tubes by the shortest way, across Essex, to the German Ocean. The plan of Sir Morton Peto has one great recommendation: the main drainage of London will be conveyed away from the river; the Thames will be purified, and will no longer be charged with the filth of the Metropolis.

A few other considerations, as to the future may, perhaps be not wholly unworthy of notice. We are everywhere increasing the number and size of our ships, of our clippers and steamers in the Thames, the Clyde, Tyne, &c., &c. We are contending with the Americans—with brother Jonathan, who shall build the largest and the swiftest. Increased traffic will

Australia, China, Japan, &c., is before us. With such increase in traffic, and in shipping, there must follow corresponding increase in the contamination and in the disturbance of the river, which should drive us to double diligence in preventing and relieving the offensiveness. The river may be improved for navigation and for neighbouring habitations, though it cannot be completely cleansed, either for the river fisheries or for the particular use of man, externally or internally. The purest water should be furnished him, for both his baths and his beverages ; as also the purest air, because his skin, like his lungs, has two functions to perform. The skin serves as an inlet and an outlet in his quiet healthy state ; noxious vapours are constantly passing off unobserved ; under exercise the insensible transpiration is increased into visible perspiration ; and through his whole surface of skin an absorption of oxygen and other vapours is constantly going on. In pure air and pure water, man takes in health through his skin. In impure air and sewage manure—in marsh miasmata—disease, not health, is admitted through the outward pores as through the lungs. Endosmose and exosmose are, through life, always going on, both when we sleep and when we wake, whether we are ill or whether we will not ; hence the importance of pure air and of pure water to man—the purest are required.

With respect to the river fisheries, an old boatman (*abnormis pisciens*) lately questioned thereon, gave the following answers, expressively in his own seafaring *vernacular* : “ Fisheries ! why bless your honour, there beant none now, the river’s poisoned, quite poisoned ; worserer and worserer an’ that, them there huge ships, them there great ugly smokers, as you sees always at it, by day and by night ; them it is as poisons us all, fish and all ; they kicks up such a clatter all along, and such a *dust in the water* ; them there it is as does the harm, as frightens the fish, and drives them into the sea.” A worthy alderman of Gravesend lately stated important facts. He had known Gravesend from his infancy ; he had property there ; among other, in houses and in the baths. Gravesend had been more prosperous, at times, than it is at present ; it had suffered already much from the foulness of the river, and would be ruined if the filth of London were to be discharged near it. When a boy, he had pleasure in watching the salmon leaping from the river, disporting in

the air, taking their air bath just as he was about to take his water bath. No such thing now; no Thames salmon to be seen or heard of. No more delicious smelts, formerly abundant, are found in the river. However, notwithstanding all obstacles, present and expected, the river may be rendered *inoffensive*; may be deprived of its several obnoxious effluvia, by sweetening the liquid drainage, and by fertilizing the denser, and taking all the denser away from the river for the land. "*No manure is comparable to the organic.*" Powerful associations, for these purposes, should everywhere be formed. Associations, highly conservative both of river and of land, should be formed at Gravesend, at Woolwich, at Greenwich, in co-operation with the new commission; also westward of London, as at Chelsea, at Brentford (there purification is much wanted), at Windsor, Clewer also. Such associations must and will arise, sooner or later, as the community may be enlightened and determined. Such associations will act with vigour when they begin to discover the prosperity that must follow their exertions,—"*for vast are the powers and results of association,*" and

" Truth will prevail
Though it creeps like a snail."

May not mischief be prevented by stopping large ships from going further up than Thames Haven Dock or Gravesend? With railways now open all along on each side the river, and also with swift light water carriage, great facilities are given to passengers and traffic. Large ships would slip in and out and save the pains and time of passage up and down the river.

No. IV.

ON

THE DRAINAGE OF LONDON.

September 8, 1857.

THE Report of the Referees on the Purification of the Metropolis and of the River, presented by Sir Benjamin Hall to Parliament, just before the closing of the session, gives the deliberations of eminent engineers on these important subjects. They evidently have considered the subjects in all their bear-

ings on public interest, though they confine their present recommendation to one, to the first, and most important of all, viz., to *the cleansing of the Metropolis and the River*. Quite alive to the value of the manure and its fertilizing powers, they leave all questions of *utilization*, and of the modes of applying it for future general study, and occupy themselves just now solely with what is *most pressing and of the greatest consequence*.

They recommend two great Drains from London to Sea Reach: a northern Drain through Essex, by Barking, Raynham, Purfleet, Grays, Stamford, to Sea Reach, east of Thames Haven; a southern Drain through Kent, by Greenwich, Woolwich, Erith, Greenhithe, Gravesend, Milton, to Sea Reach, north of Cliff, through the marshes, opposite the northern Drain. Both Drains to be large, to afford a constant, continuous, free passage, by day and night, to all the filth, to the sea.

The northern drain (the largest) calculated to carry off, at a rough computation, about five-sevenths of the sewage: the southern, adapted to the flowing of two-sevenths of it; and in consideration of the rapid increase, both of population and of impurities, to be shortly expected in our Babylon, the able Engineers have recommended that the Drains should be of larger dimensions than necessary for the removal of merely the present filth.

Now, to the inhabitants of London, provided the sewage be removed, it matters little whether the removal be to the Sea, or Sea Reach, or to the German Ocean, through the River through in Essex. Common water, especially in large quantity, deodorizes to a small extent; sea water, with its salts, with its chlorine, its bromine, its iodine, &c., is a powerful deodoriser.

In Sea Reach, beyond the Hope, the water is sea water except at near low water, near the end of the outflowing tide. The tide commonly runs up five hours—runs down seven hours. And the currents of the tide appear to have been considered, for favouring the outflows of filth thrown in at Sea Reach. At the east end of Gravesend Reach, the out tide sets towards the Kentish side, sweeps round beyond Milton, passes up the Hope to the Essex coast, with considerable force sweeps in front of Thames Haven, where there is always water; the tide then seems to leave the Essex flats, Canvey Island, Leigh, Southend, and to rush strongly towards Sheerness and the

Nore—so strongly as to make great encroachments all along the Kentish coast, exposed to the unbroken fury of northern and eastern Levanters.

Supposing low water passed, and the tide rising—the Drains emptying themselves, opposing the tide—with as much chance of stopping it as Dame Partington had with her mop in trying to keep out the Atlantic at Sidmouth. Agitation is caused by the opposition; the filth is well shaken, is largely diluted, deodorised, and amalgamated with sea water, which becomes more and more salt, more and more truly marine and disinfecting, as it rises gradually but forcibly from low to high water mark. The diluted, deodorised filth is carried upwards in so large combination with sea-water as not to be long discoverable, lost in the diluting vehicle, and amalgamated with it. At what rate does the tide travel? Is it four miles per hour? Will the filth be discernible to the eye even (certainly not to the nose), beyond Gravesend Reach. The tide rises commonly five hours, runs down seven hours; carries all before it—comparitively but little filth returns, and that little corrected. Let London *consume her smoke* and be *well drained*—comfort and health will be enhanced—such contamination being fatal to both.

The MEDWAY.—In ascending the Medway from Sheerness an offensive effluvium occasionally assails the passenger, in progress towards Chatham: not so towards the sea—the tide run very strongly each way. The outward current, the “Fresh from the Medway,” in sailors’ language, is dark coloured, runs a long way beyond the Nore, toward Whitstable and Herne Bay, mixes with and loses itself in the ocean. The Fresh is visible, but not otherwise discernible, a long way; even in sultry, calm weather, there are not bad smells. To look down upon the Medway at low water, from the heights above Chatham and Gillingham, and even from the old Dover Road, is not a pleasant sight.

Sheerness, from the windings of the River, seems near. The dark morasses on each side, great sources of Miasmata, are exposed to view—the mere sight produces an agueish shaking and sensation, as in the Paladi Pontini, or at the Pontine Marshes, of former days. Of late years, on the appearance of serious sickness in the Medway, our large ships have been

generally sent to sea, to anchorage, three or four miles in the offing; and this removal has been speedily effective. This judicious removal should be speedy in cases of scarlatina, diarrhoea with low fever, typhus, &c., in accordance with professional experience and advice.

Much will remain for future consideration, in a sanitary view, respecting our guano—its utilization; respecting both a pure and contaminated atmosphere and also water. A great neglected truth is daily obtruding itself upon public attention. The elements are assailing us insiduously and vigorously, in constant though concealed warfare—especially the air.

“ Quam multas, aër, animas, demisit in orcum,

“ Pestifer; ac Letho, res hominesque dedit.”

An old Italian remark not to be forgotten.

No. V.

THE CHOLERA.

October 1, 1857.

WHAT has happened with the “*Mutiny in India*” is actually taking place with another Indian curse in London—with a Vena Sahib here—in the shape of “*Cholera*,” likely to be more destructive to human life than the monsters in the East. Years before the mutiny burst out in India, admonitions and representations were sent from different quarters by officers of great “merit and experience” for the prevention and suppression of such mischief. The warnings to the authorities remained unnoticed, until the late explosions required sudden energy and action. So in London; during the last visitation of Cholera, all the Medical Authorities—Civil, Naval, and Military, submitted the result of their best studies and experience for the removal and prevention of the evil. Action was solicited; the evil subsided, and instead of action, *discussion* as since followed. *Vox et preterea nihil*. From the last Report of the Referees, engineers of eminence, a plan and the adoption of the plan were expected. Not so: the Report seems to have opened ground for still further *circumlocution* and all parties seem as much at variance as ever.

In the *Sunday Times* of September 27, in an article headed “Metropolitan Board of Works,” cause is shewn for the inac-

tivity and delay, viz. :—" To carry out the main drainage and the other necessary improvements in London would cost something like £12,000,000 sterling. This, of course, could not be paid for by the present ratepayers, but should be carried over *sixty* or even *one hundred years*; as the object is '*to purify London for all time*,' posterity should help to pay for an advantage so largely beneficial." By a Government guarantee, the money could be had at $3\frac{1}{2}$ or 4 per cent. Unless the Government lend their aid, the Metropolitan Board of Works will be powerless for good.

Next to the suppression of the Mutiny in India, the suppression of the Cholera in London should occupy our thoughts. The sooner the sanitary measures are adopted, the more effective and the less expensive will they be found.

No. VI.

ROSHERVILLE, KENT ;

ITS HEALTH, BATHS, AND RECREATIONS.

IN the palmy days of Rome, when arts and arms were in the ascendant, with Virgil, Horace, and Mæcenas immortalizing their age, the Roman Emperors had been contending which could contribute most to the comforts, the improvement, and to the recreations of the people. Vast amphitheatres for Olympic games were erected, warm swimming baths of vast extent, of *pure water*, were opened *on the lowest terms and gratuitously*, on great occasions, as after victories &c., to the people. *Rural excursions* were not suppressed, but were encouraged at that period on holy days, to charming situations, (such as *Baja* and *Cuma*), where the heavens were telling the glory, and the firmament showing the handiworks in full effulgence. Virgil on his first visit to *Baja*, under enchantment and lofty aspiration from the scenery he surveyed, exclaimed,—

" Nullus in orbe locus Bajis proluet amœnis."

" This ! this is the spot to live and die in." The remarks of Virgil are as applicable to our *British Baja Rosherville* as to the *Baja* of Italy. With a clear atmosphere and shining sun, when properly lighted up, the panorama at Rosherville surpasses the Italian in many respects. *Baja* and *Cuma* are remarkable, especially to a poet, for amenity, beauty, and tran-

quillity. From the heights of Rosherville, besides the landscapes varied on every side, spreading unbounded beauty to the roving eye—a vast expanse of water, from Purfleet to the Nore, is thrown open to view. A moving panorama of incessant interest, of light, of life, of industry, enterprise, progress, wealth, and of extending civilization, strikes the mind with awe; we are filled with admiration at the sublimities we survey, and with gratitude for the bounties we behold in profusion, all created for our use. We are led “*from nature up to nature's God;*” while our loftier sentiments are so excited, our *godly energies* in sympathy with the mind, are continually improved by the external physical agencies, invigorating and ever acting upon us.

1st—The *pure air*. 2nd—the *pure water* from land springs. 3rd—the dry warm *chalky soil*, are all favourable to *organic life*, as is demonstrated by the *strong, luxuriant vegetation*, and also by the beautiful race of children and inhabitants at *Northfleet, Southfleet, Cobham, Shorncliffe*, and other select spots in the charming county of *Kent*. Valuable papers and essays on all these important subjects, on *baths*, on *athletic exercises*, on the *ruins of Rome*, and on the *recreations of the Romans*, appeared in the proceedings of a *Society* formed in London for their promotion *forty years* ago, under the warm patronage of their *R. H. the Dukes of Kent* and of *Sussex*, and of the men of science of that period,—viz., *Dr. Bayley, Vaughan, Pemberton, Maton, Este, Fothergill, Sir John Sinclair*,—his son, the present Baronet, and many others. That Society though greatly supported, *drooped in 1812* and lay *dormant* for several years. The last Peninsular War then raged violently, engrossed public attention; the Prince Regent, *V. P. R. George the IV.*, was called upon to send every man, and every shilling he could spare, in 1812, to Lisbon,—to Wellington's Army then in the Lines of *Torres Vedras*. *V. P. R.* then sent all his *Guards*, all his *Life-Guards, Blues*, and all he could spare in every department, to the Peninsula. The most active members of the Society were sent away, one on a medical charge of the *Household Cavalry Brigade* to Spain, the others on special services elsewhere; and it was not until some years *after the wars ended*, in 1816, that *Societies* for the revival of *Baths* and of *Lavatories*, were re-announced. *Mr. William Cotton* of the Bank of England, the philanthropist, re-

appeared in good earnest, with all his influence and his powerful associates,—the Bank of England, all the great City Corporations, our *Merchant Princes*,—collectively and individually, were pouring in enormous subscriptions for the formation of *Model Baths* in London, and for the extension of similar establishments all over the United Kingdom. *H.R.H. the Duke of Kent*, in his enthusiasm for the *first Society*, when the remarks *on the Ruins of Rome, and on the Recreations of the Romans*, were first submitted to him, loudly proclaimed in the Senate and out of it,—“ he saw no reason why the Citizens “ of England, should not be indulged quite as extensively as “ the Citizens of Rome, in their *salutary recreations and enjoy- “ ments*, and that he would use what influence he might possess, in the encouragement of such sources of health and “ happiness.” Extraordinary large subscriptions, from all quarters, were occasionally announced,—neither last, nor least, *Her Most Gracious Majesty*,—reigning in the hearts of her subjects,—inheriting the spirit and intelligence of her Royal Parent,—foreseeing the blessings likely to result to the most humble of her subjects, from the *realization* of the *parental* ideas,—full of filial piety and philanthropy, threw open her purse and her patronage, most liberally on the revival of the Societies, at their outset, and further exhibited her bounty and benevolence in large donations on *all subsequent occasions*, towards the accomplishment of the great boon.

The great success of the paternal plans, now brought to maturity and general adoption, not only in England but through Europe and in America, under her royal auspices and through her active intervention, must prove a constant source of gratification to Her Most Gracious Majesty. The Emperor *Louis Napoleon* has lately directed that *warm baths* and *lavatories*, with all the English mechanism, may be introduced in the *Cité Ouvriere*, or *New Lodging House*, for the benefit of the industrial classes in France. The *Clifton Baths, near Rosherville*, are of handsome erection and commodious, but nothing but the PUREST WATER *should be admitted for the use of man*, either *externally* or *internally*. The water of the Company, near *Windmill Hill*, like most of the springs in Kent is very pure ; *deep wells* and *spring waters*, are everywhere desirable for health and comfort. Thames sewage manure is scarcely fit for flushing the intended large tubular drains for the purification of London !

February 1, 1858.

Formerly A. Young's journey to the south of France was for purposes similar to the present mission of Messrs. Dr. Southwood Smith, Austin, and Way, to Milan, to look into the agriculture and irrigation in Lombardy.

All around London, at Messrs. Gunters, Kew, Gunnersbury, Richmond, Slough, Hounslow, Windsor; and to the eastward beyond Bermondsey, around Messrs. Cormacks, at Greenwich, New Cross, Lewisham, the grounds, in high cultivation, are harming to the surveyor. Bordering upon the well organised Tilbury Railway, where all is open, without tunnels, the increase of the towns, as also of market gardening, since the new railway, is very striking. Thanks to Sir Morton Peto & Co., vast cargoes of market gardening are now rapidly conveyed by rail to the London markets.

So around Paris, market gardening is in the ascendant, between Montmartre and St. Denis, around Ecouen, Sommailiva has added to his wealth by converting common land into garden culture. Formerly a great distiller of perfumes, the celebrated Fargeon, who supplied Europe in his day, had extensive lands in floriculture. The answer to all enquiries as to how such abundance and success are obtained is everywhere nearly the same. At home, they tell you, "Manure, town manure, and moisture—plenty of both." At Paris, our gay neighbours reply, "Du fumier, du fumier, et ensuite du fumier c'est là le grand secret! Mais, monsieur, il vous en faut, du votre!" You must take their own. Quite characteristic is their answer. Will not our British Metropolitan guano do equally as well? Some years ago a scheme was mentioned at Paris for forming a dépôt on the Channel of guano, for the supply of England. At the same period, announcements appeared of artificial manure in the south and west of England. The French scheme dropped.*

* Might not large dépôts be formed, both east and west of London, on remote spots upon the banks of the river, say near Barking or Raynham Creeks, or Plumstead, eastward; and beyond Battersea and Cremorne, to the west? With conveyances by land or by water, with the tubes constantly carrying the sewage to these dépôts to be there prepared for agricultural use. With other outlets—north and south, London could soon be cleansed. When the mania for antipodean guano was raging, an ingenious advertisement announced guano in any quantity on due notice, on moderate terms, at a private depot, somewhere near Chester.

Louis Napoleon, ever anxious for improving his country, has in contemplation a great undertaking, which will add materially to his fame, if successful. The cultivation of *les landes* south of Bordeaux, now unproductive: to the north of Bordeaux, all the Touraine by Angouleme, between the Loire and the Garonne, is called the *Jardin de la France*, from its fertility. *Les landes* to the south are all in desolation. With abundance of good materials, this large tract of bad country, arid and sandy, may be made productive. The French manure, *le poudrette*, will not do at all in this case. Nothing would answer the purpose so well as our British metropolitan guano. Could not we assist Louis Napoleon materially in his truly patriotic project, by supplying him with cargo after cargo of those agricultural treasures we wished at great cost to throw into the ocean? Such cargoes shipped from this country to Bayonne would be of great value. A leviathan load would there be a prize.

In Lombardy abundant irrigation after manure was the system. The ecclesiastical establishments, chiefly Carthusians, had obtained a monopoly of the waters—had long possessed the sluices and aqueducts commanding the irrigation, north and east of Milan. These establishments suffered much during the wars. Dr. S. Smith and his companions will find Lombardy in a very different state from what it had been in 1796, and previously, in the days of Arthur Young.

NOTE.—The state of Italy before and after 1796 will be shown in the “Reminiscences.”