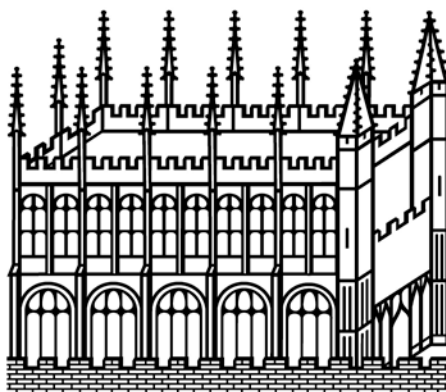




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THE REFORM OF THE SEWERS.

WHERE SHALL WE BATHE?

WHAT SHALL WE DRINK?

OR,

MANURE WASTED AND LAND STARVED.

BY

G. ROCHFORD CLARKE, ESQ., M.A.,

BARRISTER-AT-LAW,

ONE OF HER MAJESTY'S JUSTICES OF THE PEACE FOR THE COUNTY
OF OXFORD.

"Dirt is only a thing in the wrong place."—PALMERSTON.

"Proofs as clear as founts in July."—SHAKSPEARE.

SECOND EDITION. ENLARGED.

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TO THE AGRICULTURAL AND TOWN
POPULATION OF
THE COUNTIES OF OXFORD AND BERKS.

THESE two counties stand so near the fountains of the Thames, most of whose tributaries pass through our farms, gardens, and towns, that it seems as if Alfred the Great, when he divided the counties and the hundreds, appointed Oxfordshire and Berkshire to be the natural guardians of the river-head. Having a residence in the county of Oxford, situated on a fork of the tributary Ray, which I have long endeavoured to keep sweet and clean, whilst passing through my land, I feel I may be excused in thus calling public attention to this duty. As farmers and gardeners, it is our interest to carry every atom of manure to the land; as dwellers in towns and villages, it is our interest to have all the manure collected, removed, and applied, in such a manner as that, whilst cleanliness shall be secured, the increase of food shall be promoted. The shop-keeper and his men are as deeply interested in this as the farmer and his men.

Thus, happily, our mutual interests call upon us to keep every atom of filth out of the streams and rivers, and thereby to add to the substantial prosperity of the country, and to the cheerful enjoyments of bright waters, and to deliver over our noble river, pure and undefiled, to those lower down its stream.

The following pages may bring to light how far we are fulfilling our trust, or how far we are contributing to the melancholy state of the Thames at London. Should I succeed in arousing these two counties to a fixed determination to retrace

every false step, and remedy every existing evil, I am confident there is sufficient intelligence and practical wisdom amongst us to guide us, by the blessing of God, to adopt the best measures for discharging our own duties, and for setting, at the same time, a useful example to the kingdom.

Your faithful servant,

G. ROCHFORD CLARKE.

CHESTERTON LODGE, BICESTER,
20th January, 1860.

SECOND EDITION.

SINCE the publication of the First Edition, several facts confirming my views have been communicated to me, some of which will be found in this Edition. I shall be glad to receive information on this subject.

2, SPRING GARDEN-TERRACE,
24th February, 1860.

LOSS OF BREAD AND MEAT BY THE PEOPLE THROUGH THEIR WASTE OF SEWAGE.

A GREAT principle of our law is, that you should so use your own things, as not to hurt another. But now men cruelly cast their filth into their neighbour's stream. Every British river, from its sources to the sea, is being defiled, subject only to the correction of natural evaporation, fermentation, deposit, water plants, and animalculæ, which an allwise Creator has provided as correctives or palliatives for man's ignorance; but which, at the same time, produce troubles, to rebuke his heedlessness, or arouse him from his sloth. Consider, for instance, THE THAMES! Sewage, containing the valuable manure of houses, farm-yards, and villages, is carried down the brooks towards Oxford. The sewage of Oxford and other places is forwarded towards Reading; the sewage of Reading and its fellow towns towards Windsor; that of Windsor and its imitators towards Hampton Court, Twickenham, Richmond, and the places below; and all these places, with others on the tributary streams, if not prevented, will at last send down their daily accumulating filth, by the great sewer of the once "Silvery Thames," upon London: whilst London collects materials which, if rightly applied, would diminish the price of bread and of meat, and not only wastes them, but proposes to empty them, in one vast flood, as elements of pestilence in the midst of the population still lower down the river.

"O! it is excellent
To have a giant's strength; but it is tyrannous
To use it like a giant."—SHAKSPEARE.

In the hope of seeing this system reversed, I invite my fellow-countrymen to begin at the fountain head. Let the villages be required to keep every atom of filth out of the streams; the towns to keep theirs out of the rivers; and let London consider what would be the best example she could set.

To the gentlemen of England I would say, that the drainage of houses and farm-yards ought not to be allowed to find its way into the ditches, the ponds, or the streams. On the contrary, every spring, pond, and stream, should be regularly

cleansed and protected. Following the multitude, some years ago, I made a drain from my house in Oxfordshire into the Ray; but the very next year I perceived its impropriety, and ordered a mason to make a cesspool in a convenient place in the garden, and direct the sewage thither, so that the rain-water alone should flow down to the stream. This led me to perceive that we have given but little consideration to the best kind of cesspools or their substitutes, and the best and most economical contrivances for emptying them, and distributing their contents. We, in fact, abandoned the old cesspool for the modern sewer, without having made any proper efforts to improve the ancient machinery. What have been the rewards of genius? What are the patents for inventions in this department of industry? This practical view of the subject induced me at last to break silence by addressing the following letter to the Committee of the Royal Agricultural Society of England, which I now publish, together with some extracts from greater authorities, which have since appeared. - I do this in the hope of enlisting the co-operation of many influential persons who are not in the habit of attending to matters that are purely agricultural.

MY LETTER

TO THE SECRETARY OF THE ROYAL AGRICULTURAL SOCIETY
OF ENGLAND.

" Chesterton Lodge, Bicester, Oxon, Dec 21, 1858.

" SIR,—I wish to bring the following observations, on the subject of sewage, under the consideration of the Council of the Royal Agricultural Society. The subject has already attracted their attention; but, considering that the modern plan, of conducting all sewage into brooks and rivers, is causing an enormous loss of manure, and is, at the same time, polluting the waters of all parts of the kingdom at a rapidly increasing rate, it appears to me that the time has come when the subject should be made a more distinct and prominent branch of the Society's operations. The collecting and applying of sewage, suitable for manure, and the preservation of the purity of the water in brooks, rivers, wells, and ponds, may be advantageously treated of in essays, accompanied by experiments, and followed by prizes; and in the following order:—

" 1st. The amount and value of the manure which is lost to the agriculturist through the ill-construction of cesspools, and the difficulty of emptying them.

" 2dly. The amount and value of the manure which is lost to the agriculturist, by the modern plan of conducting the sewage into streams and rivers.

" 3dly. The effect of different kinds of water on the health, growth, fattening, and length of life, of cattle.

" 4thly. The effect of sewage, when introduced into water, on the health, growth, fattening, and length of life, of cattle.

" The following, amongst other prizes, might be offered:—

" 1st. For essays treating of the above subjects generally.

" 2dly. For the best mode of constructing cesspools, both for privies, and as receptacles for sewage from drains, farm-yards, &c., whether of separate houses or of villages; and for intercepting the sewage passing through existing sewers.

" 3dly. For the best contrivances for emptying cesspools and ponds, as regards both liquid and solid matter, with a view to its use for agricultural purposes.

" 4thly. For the best method of disposing of the materials when emptied out, whether in combination with other solid substances, or with water or otherwise.

" 5thly. For the best plan of collecting the sewage of villages and towns, and of delivering the same to the agriculturist on equitable terms, keeping in view the health, convenience, and advantage of all parties; and their mutual co-operation, and their fair rateable contribution towards the labours and expense of the operation.

" I have, &c.,

" G. ROCHFORD CLARKE."

ALDERMAN MECI.

Alderman Mechi called public attention to this subject by a letter, which appeared in the "Times" newspaper on the 7th Nov., 1859, and an editorial article gave deserved prominence to his views. Mr. Mechi made this sensible remark:—

" By a false delicacy and want of knowledge, we have been accustomed to deprecate as indelicate the very mention of our *excreta*, but the stern requirements of a rapidly increasing population imperatively demand of us the only profitable and available means of providing food for the people. Increase of population would, but for our sewer system, bring with it increased means of production. Such has been the case in China, where the commercial value of human excrement has ever been most wisely appreciated and availed of."

BARON LIEBIG.

Baron Liebig, thereupon, addressed a letter to Mr. Mechi, dated Nov. 17, 1859, from which the following are extracts, which, in a scientific manner, show the value of the materials now wasted, and the national interests involved therein:—

" It is my ardent wish that you may succeed in awakening the English people to your own convictions; for in that case the ways and means for setting aside the difficulties which stand in the way of procuring manure from the 'sewerage of towns' will certainly be found, and a future generation will look upon those men who have devoted their energies to the attainment of this end as the greatest benefactors of their country.

" It is true that the diligent tillage of fields, sunshine, and timely rain are the outward conditions, perceptible to all men, of good harvests; but these are perfectly without effect upon the productiveness of the field, unless certain things, not so easy of perception by the senses, are present in the soil, and these are the elements which serve for nourishment, for the production of roots, leaves, and seeds, and which are present in the soil always in very small quantity, in proportion to the mass of the soil itself.

" These elements are taken from the soil in the products of the field—in the corn or in the flesh of the animals nourished by these products, and daily experience shows that even the most fruitful field ceases, after a certain series of harvests, to produce these crops.

" For centuries those elements which are indispensable to the reproduction of the crops have been taken from the soil in those crops, and that, too, without being restored.

" The loss of these elements is brought about by the 'sewerage system of towns.' Of all the elements of the field which, in their products, in the shape of corn and meat, are carried into the cities, and there consumed, nothing, or as good as nothing, returns to the fields. It is clear that if these elements were collected without loss, and every year restored to the fields,

these would then retain the power to furnish every year to the cities the same quantity of corn and meat; and it is equally clear that if the fields do not receive back these elements agriculture must gradually cease.

"Many are of the opinion that corn, meat, and manure are wares, which, like other wares, can be purchased in the market; that with the demand the price may, perhaps, rise; but this will also stimulate the production, and that all turns upon having the means to purchase, and so long as England has coal and iron she can exchange the products of her industry for the corn, meat, and manure which she has not. In this respect I think it would be wise not to be too confident of the future, for the time may, perhaps, come, even in half a century, that not one of those countries upon whose excess England has hitherto drawn, will be able to supply her with corn, and that, too, from the natural law that what is true of the smallest piece of ground is true also of a great country. It ceases to produce corn if the conditions of the reproduction of the corn which has been carried off are not restored to it.

"In the United States the population increases at a still greater ratio than in other countries, while the corn production upon the land under cultivation has constantly fallen off.

"History teaches that not one of all those countries which have produced corn for other lands have remained corn-markets, and England has contributed her full share towards rendering unproductive the best lands of the United States, which have supplied her with corn, precisely as old Rome robbed Sardinia, Sicily, and the rich lands of the African coast, of their fertility.

"The effect of guano and bones should have taught the farmer the real cause of the exhaustion of his fields; it should have taught him in what a condition of perpetual fertility he might have preserved his fields if the elements of the guano which he has transported in the shape of meat and products of his field into the cities were recovered and brought into a form which would admit of their being restored to his fields every year.

"To an understanding of this, however, the farmer has not yet come; for, as his forefathers believed that the soil of their fields was inexhaustible, so the farmer of the present day believes that the introduction of manures from abroad will have no end. It is much simpler, he thinks, to buy guano and bones than to collect their elements from the sewers of towns; and, if a lack of the former should ever arise, it will then be time enough to think of a resort to the latter. But of all the erroneous opinions of the farmers this is the most dangerous and fatal.

"The prices of bones have become so high in Germany as to forbid their exportation, and if the question should be put to English commerce, whence it furnishes the English farmer with this to him so indispensable manure, the answer would produce astonishment; for this commerce has already so far robbed all the inhabited parts of the earth that the manufacturer of superphosphate can only set his hopes upon the phosphate of lime of the mineral kingdom.

"In relation to guano I have been assured that in twenty to twenty-five years, if the use of guano should increase in even the same proportion as hitherto, there will not remain in South America enough to freight a ship.

"If the common 'sewerage system' is retained, then the imported manures, guano, and bones, make their way into the sewers of the cities, which, like a bottomless pit, have for centuries swallowed up the guano elements of the English fields, and after a series of years the land will find itself precisely in the condition it was in before the importation of guano and bones commenced.

"It becomes us to think whether a nation should not summon up all her intellectual and material resources in order to preserve the fundamental conditions of her welfare.

"It has been maintained that the recovering of the manure-elements out of the sewers of large cities is impracticable. I am not ignorant of the difficulties which stand in its way. They are, indeed, very great; but if the

engineers would come to an understanding with the men of science in relation to the two purposes—the removal of the contents of the sewers and the recovery of their valuable elements for agriculture—I do not doubt that a good result would follow. Intelligence in union with capital represents a power in England which has rendered possible and practicable things of much greater apparent difficulty. I look forward with deep concern to the solution of the sewerage question, for if this question is decided in Great Britain without regard to the wants of agriculture we can scarcely hope for anything better upon the Continent.

“If the British people do not take pains to secure the natural conditions of the permanent fertility of their land—if they allow these conditions, as hitherto, to be squandered—their fields and meadows will at no distant time cease to yield their returns of corn and meat.”

The above remarks of Baron Liebig, on the exhausting effects of crops carried off the land, remind us, that by the common covenants in farm leases, attention has been directed chiefly to hay and straw; and an intelligent and upright farmer, as a matter of course, brings back dung in return for those two things. But we have not in the same way considered, that town or village manure might be brought back in return for corn, cattle, milk, cheese, or other products, carried away; that an active farmer might not only mix all the slops and refuse of his own cesspool with his manure-heap, but might profitably collect the refuse of all the cottages on the estate, when not used by the tenants on their gardens. Had sound practical views been taken on this subject, the use of the refuse of towns and villages might long ago have been more largely introduced, and cleanliness, health, productiveness, and remuneration might have advanced hand in hand, and enabled us to run a more winning race with the foreigner, and the labourer would have had his fair share of the advantages. Landowners would do well to direct the attention of their agents and tenants to this source of productiveness and wealth; and to give orders accordingly. A gentleman by his will in 1842, “devised to A. B., farmer, ninety pounds, to be laid out in horse manure and NIGHT SOIL, within three years from the testator’s death, at the price of those articles at Derby at the time, and to be expended on the farm and lands in the occupation of A. B.” The executors carried this out, and paid the bills.

The Editor of the “Literary Gazette,” Feb. 18, thus condemns this error of the landlords:—“But their shortsightedness has overlooked that which the Chinese, the greatest agriculturists and horticulturists in the world, prize as one of the most valuable producers of animal food. . . . They forget that man carries more off the farm, never to be returned to it, than any other animal, and they have neglected to compel its restoration to the soil.”

THE COTTAGE GARDENER.

The following are extracts from *The Cottage Gardener*,

of November 29 and December 13, 1859, which show, in a practical manner, the value of the materials now wasted :—

“ Mr. R. Moffatt, of Stirling, applied the sewage water of that town to grass land, a light soil and gravelly subsoil, at the rate of forty-five carts to the statute acre. The produce of hay from where the liquid was applied was 56 cwt. per statute acre; whilst from the part to which no liquid was applied, but equal in other respects, 28½ cwt. per acre.

“ ‘ At Craighentinney, near Edinburgh, where this manure is used, there are four cuttings of the grass in the year, and the collective weight of grass was stated at the extraordinary amount of eighty tons the imperial acre.’

“ Mr. B. Webster, of Worcester, at a meeting of the Farmers’ Club in February, 1855, said that he knew that land irrigated with night soil had been trebled in value; and at the same Meeting Mr. Chadwick quoted an instance where, by the use of sewage, no less than ninety tons of cabbages had been grown on a Scotch acre; and he added that there was no instance in which the corn crop had not been increased more than a quarter per acre.

“ But before applying liquid manure to clayey soils they ought to be well drained. On chalky, gravelly, and sandy soils any quantity of liquid manure may be put with good effect, especially for those quickly-growing crops which consume large quantities of food to sustain their rapid growth.

“ Mr. Smith, of Deanston, grew forty-three bushels of *barley* per acre on land manured with sewage, and forty-six bushels on similar land manured with guano and farmyard manure, but the sewage cost only 10s., and the other manures three and four times that sum.

“ Dr. Daubeny, Professor of Agriculture at Oxford, estimates the mixed excrements of a family of four as amounting in the year to 4,745 lbs.; containing 30 lbs. of nitrogen, 10 lbs. of phosphoric acid, and 6 lbs. of potash. In these proportions, and considering that there are 650,000 families in London, then Dr. Daubeny calculates the annual value of their sewage is 635,150*l*.

“ Professor Miller, of King’s College, in his Parliamentary evidence relative to one Thames sewer only, said: ‘ The quantity of potash which passes out of this sewer *per day* averages about a ton weight; and about the same quantity of phosphates of lime and magnesia; and of ammonia nearly two tons.’

The mouth of the pipe which delivers house-sewage—of the employment of which we have the best knowledge—is over a common cinder-sieve of wire: this intercepts all solid bodies, but permanently retains only those which are insoluble. The sewage is raised as required by a lifting-pump from the tank, situated about a hundred yards from the house, and the wind must blow very strongly and directly towards the house before any smell of the sewage can be detected. For within five minutes after the sewage has been poured over the soil, you may stand upon that soil without the slightest smell of the sewage being perceptible. The earths of which all soils are composed are of the number of the most powerful deodorizers. So much is this the fact, that we have known the sewage poured among chrysanthemums, in the bed of a conservatory opening into a dining-room and drawing-room, during the family’s absence, and on their return an hour after they could not detect that the sewage had been employed.

“ House sewage should comprise nothing but the drainage from the water-closets, the kitchen-sink, and the chamber-slops. It may then be applied, without diluting with water, to the soil about the roots of all growing crops, plants, and trees, except to such as are growing in pots. About a pailful to six square yards is a good allowance to cabbages, asparagus-beds, and all such crops. To potted plants, one bucket of sewage to three buckets of water is a good proportion. It is far better to apply it weak and often, than strong and seldom.

“ In winter, when there are no growing crops requiring its application, we

pour the sewage over vacant plots in the kitchen garden ; over the asparagus, sea-kale, and rhubarb-beds ; and among the trees and shrubs in plantations and borders.

"CONCLUSION.—The employment of house-sewage as a fertilizer is a very ancient practice. Columella, writing eighteen hundred years ago, gives full directions for its employment, especially recommending it to be applied to vines and other fruit trees. The workman, he says, should collect and preserve, not only what they make themselves, "but also that which is daily produced in the yard and house."—Columella, ii. 15.

"The practice is no less general than ancient: for in France, Flanders, China, and elsewhere, the sewage is depended upon as the best sustainer of the soil's fertility. Indeed, but for the scrupulous preservation and employment of every household's sewage in China, its soil could not sustain its dense population.

"THE SEWAGE OF EVERY HOUSEHOLD IS MANURE SUFFICIENT FOR THE PRODUCTION OF ALL THE VEGETABLE FOOD IT CONSUMES."

RUGBY AND MANSFIELD.

Until the year 1854 the outfall of the town sewer of Rugby was carried into a stream before the mansion of G. R. Walker, Esq. He was advised that the most beneficial mode of getting rid of the nuisance was by distributing the sewage in pipes over his land. After visiting the farms of Mr. Kennedy and Mr. Telfer, at Ayr, and examining that also of Mr. Mechi, he made an offer, which was accepted by the town, for the whole of the sewerage for twenty years. When visited by the reporter in 1854, between 500 and 600 acres were under irrigation. Seven miles of pipes had been laid down, and five hydrants were kept constantly at work for the distribution by steam power.

The sewerage of Mansfield, in Nottinghamshire, is carried down a stream, and has long been used as manure on land belonging to the Duke of Portland.

Such examples not only show the value of sewage, when properly applied as a manure, but also explain how persons may derive such a pecuniary advantage, from what they might otherwise consider a public nuisance, that, instead of endeavouring to promote a more wholesome state of things, they may become not only reconciled to it, but the advocates of the system, without being aware that they have been unconsciously misled by a supposed self-interest. This may account for the filthy state of many open drains and ditches which we sometimes see by the side of fields and gardens near towns. The owners of the land are glad to have this manure brought, as it were, to their door. But they would probably have got a more productive material by the more liberal policy of undertaking to clean out the privies and cesspools, of which Manchester exhibits a great example.

MANCHESTER.

The following is gathered from some of the evidence given before a Committee of the House of Commons, on the "Manchester Corporation Waterworks Bill," May 12, 1858:—

Mr. Heron, the Town Clerk, stated that an Act of Parliament of 1845 gave the Corporation powers to employ nightmen for the purpose of emptying the

privies, and gave the owners of property the right to empty their own privies in the event of the Corporation neglecting to do it after three days' notice. The work was regularly done by the Corporation, upon the average twice in every year. The total quantity removed the preceding year was 95,548 tons, the cost of which was 16,259*l.* 17*s.* 5*d.*; the receipts for nightsoil sold were 9,110*l.* 2*s.* 6*d.*, making the nett expenditure 7,149*l.* 14*s.* 9*d.* The nightsoil sells for one shilling and threepence per ton. He had never heard of any complaints arising from the removal. He considered it a great advantage of the system that it necessitates the providing a small yard at the back of all the houses that are built, and thereby more efficient ventilation is secured than would be attained if the houses were built, as in many densely-populated places, back to back.

The contents of the privies, when removed, are brought to the yard in carts before nine o'clock in the morning, and as quickly as possible taken away by railway into the Lincolnshire, Nottinghamshire, and Yorkshire districts. The cost of carriage, 3*s.* 6*d.* to 7*s.* 6*d.* per ton.

Mr. Hawkesley, civil engineer, stated, I know from experience there is nothing so abominable as the introduction of a water-closet into the house of a poor man; as he has no time to attend to it himself, he cannot keep his children away from playing with it; it is seldom put up right, and never kept in order.

If dry cesspools are properly made, and the ashes of the family, which are deodorizers, are put into them, and the refuse is frequently removed, it is much better than putting water-closets into the house.

Great difficulties are at the present moment being encountered to get an adequate supply of water in the whole of the Lancashire districts and the West Riding of Yorkshire. In most cases, the cost of procuring water in Lancashire is something like 3*l.* per head, and sometimes more.

He knew cases in which, when water-closets were introduced, the consumption of water had risen from twenty gallons per head per diem to two or three times that quantity, and the system had to be abandoned from the absolute exhaustion of the supply. A case of this sort occurred at Hitchin, where the supply had to be reduced to eight hours a-day in consequence of the waste. The same thing took place at Rugby, where it was cut down to two or three hours a-day.

In the city of New York, where immense works were constructed (the Croton Aqueduct Works) for the supply of a population of 1,500,000, they became completely exhausted by the demands of a population of 500,000; and it was specifically stated by the local authorities, who published a pamphlet on the subject, that the exhaustion arose partly from the improper use of hydrants, but mainly from the large quantities of water poured down the water-closets. There the consumption amounted to ninety gallons per head per day, when the local authorities used this strong language:—"We wish to announce to the people of New York that the works are now delivering the last drop of water they are capable of supplying."

It is suggested that the sewerage should be carried out of the town to a distance, and there deodorized. But that which goes into the sewer does not come out of it. When the organic matter which goes into the sewer comes in contact with water, the oxygen contained in the water and the air causes it to assume new forms. It is decomposed into its original elements; it is recomposed into new compounds. As is well known, ammonia is a very fertilizing agent. The matter originally put into the sewers, when going through the putrefactive process, emits ammonia in considerable quantities; but when it has passed through so large a body of water, it is no longer capable of forming ammonia.

MISTAKE OF THE HOUSE OF COMMONS.

Manchester having thus established such a market for such a

commodity, the House of Commons might have considered how best to perfect the system and enlarge the market. They had before them an opportunity for making a great experiment on a great scale, for inquiring and reporting on the fertilizing properties of this dung. But the madness of the sewers forbids the exercise of so much good sense.

If Manchester can remove both its night-soil and ashes at the rate of 100,000 tons a-year, to so great a distance, into Yorkshire, Nottinghamshire, and Lincolnshire, by one railway, at a cost of less than 7,000*l.*, a rule-of-three sum will tell us at how moderate a cost London might manure the poor lands of the surrounding counties; which, with under drainage, when requisite, and such manure, would soon greatly rise in value, and bring to London better customers; and if the land-owners and farmers could awake, at the same moment as the towns, to their own interests, they would be ready enough to assist one another in disposing of their commodities.

THE DRY ASH-PITS OF MANCHESTER.

Since the first edition was published, Mr. Heron, the Town Clerk of Manchester, whose experience on this subject is great, has written to me a valuable paper, from which the following are extracts of great practical utility. I advise practical men to attend to and, if they can, improve upon, this example of Manchester:—

“In the City of Manchester we have upwards of 66,000 houses, of which 51,000 are of the rent of 10*l.* per annum and under. We may say that in effect we have no water-closets; certainly not in any of the smaller class of houses.

“We remove annually about 100,000 tons of night-soil and ashes from upwards of 36,000 ash-pits. It is sent by railway into Yorkshire, Nottinghamshire, and Lincolnshire. The price charged, exclusive of carriage, is about 1*s.* 6*d.* a ton, and the carriage added, which depends on the distance conveyed, fluctuates between 3*s.* 6*d.* and 7*s.* a ton. The whole expenses, which during the past year amounted to 16,130*l.* 19*s.* 7*d.*, were reduced by the receipts for the manure to 6,644*l.* 15*s.* 10*d.*

“In any small town, especially if situated in an agricultural district, the system adopted in Manchester might be made, I do believe, not only to pay all expenses, but to leave an actual profit to the authorities.

“If every house, and especially all smaller houses, instead of having a water-closet, by which the soil is destroyed for agricultural purposes, and made the cause of endless trouble and expense, were compelled to have externally a convenient privy and dry ash-pit (not cesspool), the sanitary condition would be better than if the water-closet, with all its attendant difficulties and inconveniences, were introduced.”

IRELAND.

The ashpit should be tried in Ireland. The night-soil, both solid and liquid, mixed with ashes or peat-charcoal, or with common earth; or even with street-sweepings or scrapings; or with the straw of the farm-yard—would prove a valuable dress-

ing; or carry night-soil direct to the field to be manured; mix it at once with earth from other parts of the field, and leave it covered with earth till wanted. May we soon hear of some experiments, both on the arable land, and on the peat pastures or reclaimed bog. Limestone of various qualities is present in the greater part of Ireland; and of that nature, I suppose, is the sand there called manure-sand, which might not be suited for this mixture.

GLASGOW.

Mr. Bateman, civil engineer, stated to the above-mentioned Committee, "The rivers in Manchester are sweet in comparison with those at Glasgow, where water-closets form the rule instead of the exception." "He had then under his consideration the best method of purifying the Clyde at Glasgow, which in hot weather is almost intolerable." "Though, on the whole, the water-closets at Glasgow are well attended to; yet, when several families have the use of them, they are in a very foul condition, and you cannot go into any house in the town without being cognizant of the smell of gas and water-closets."

GLASGOW has been obliged to go to Loch Katrine for water, to be poured in due time through the water-closets; but it is too genteel to send back any return in the shape of dung to the poor lands: all that goes into the Clyde, which has been converted into a flowing cesspool.

LEICESTER AND CHELTENHAM.

These two towns have tried the plan of sending everything into the sewers and then getting it out again and deodorizing it, hoping to make some sort of manure of it. Mr. Bateman stated that at Leicester there were acres of this material piled up twenty or thirty feet high, as they had not been able to sell it. Mr. Rawlinson attributed this to the price originally demanded having been too high. At Cheltenham he stated there was a sale for the product.

ROYAL AGRICULTURAL SOCIETY.

"On the power of soils to absorb manure." By J. Thomas Way. Journal of the Royal Agricultural Society of England. Vol. XI. A.D. 1850.

Mr. Way records various experiments, which will be found interesting and instructive. He also gives the following quotations, with which Dr. Smith, of Manchester, had furnished him:—

Lord Bacon, in his "Sylva Sylvarum," speaks of a method of obtaining fresh water, which was practised on the coast of Barbary: "Digge a hole in the sea-shore, somewhat above high-water mark, and as deep as low-water mark, which when the tide cometh will be filled with water fresh and potable." He also remembers "to have heard that trial hath been made of salt water passed through earth through ten vessels, one within another, and yet it hath not lost its saltness, or become potable," but when "drayned through twenty vessels hath become fresh."

Dr. Stephen Hales, in a paper read before the Royal Society in 1739, on "Some Attempts to make Sea-water Wholesome," mentions, on the authority of Mr. Boyle Godfrey, that "sea-water being filtered through stone cisterns, the first pint that runs through will be like pure water, having no taste of the salt, but the next pint will be as salt as usual."

STATISTICS FROM DR. PARKIN.

Dr. Parkin, in his recent work, "The Causation and Prevention of

Disease," makes the following calculations; and, though the correctness of all such estimates must be uncertain, yet they seem worthy of notice. He says:—

"The value of sewage water may be calculated in a variety of ways. The alkaline and ammoniacal salts, with the earthy phosphates, contained in the sewer called the King's College Pond, have been analyzed by nearly all our first chemists; and the quantity that passes off daily, as well as the value, ascertained. The total daily value is 54*l.*, and the annual value is 23,360*l.* The quantity and the value of these ingredients is as follows:—

	Quantity. Tons.	Value. £
Ammonia	2	48
Phosphoric acid (in combination with lime and magnesia)	1	3
Potash	1	3
	—	—
Total	4	54

Supposing that the ingredients are in the same proportion in all the other sewers, it has been further calculated that their total value is between 400,000*l.* and 500,000*l.* But then the solid matter has been excluded altogether from the calculation; and, moreover, a large proportion of the ammonia never enters the sewers.

"We must, therefore, take a different calculation. According to Liebig, 100,000 persons would give 24,440 tons of solid and liquid manure, containing about three per cent. of nitrogen, or 738 tons, sufficient to manure 50,000 acres. This, for two and a-half millions, would give 608,800 tons of manure, and 18,450 tons of nitrogen—the quantity required for 1,250,000 acres of wheat land. The value of the 738 tons of nitrogen Liebig sets down at 12,000*l.*, which, for the above population, would give 300,000*l.* annually.

"There will then remain the earthy phosphates, the alkaline and neutral salts, together with the solid or organic matter, the whole of which is useful to plants. I am not aware of any accurate valuation for the whole of these ingredients; but, in Flanders, the *excreta* of a man are valued at 1*l.* 17*s.*, as we are informed by Mr. Chadwick—say 1*l.* 15*s.* for the sake of round numbers. This, for two and a-half millions, would give an annual sum of 4,375,000*l.*

"A few figures will show this to be below the actual value. If we calculate the quantity of urine for a single individual at 500 pounds in the year, this would give for 1,000 inhabitants, 223 tons, which, according to Professor Johnson's valuation, at 10*l.* a-ton—the price of guano—would amount to 2,230*l.* The total value, therefore, of the liquid manure, for a population of 2½ millions, would be 5,575,000*l.* But the following table of Professors Hembstadt and Schübler shows it to be more valuable than guano:—

"TABLE, SHOWING THE RESULTS OF EXPERIMENTS WITH DIFFERENT MANURES.

	Quantity in proportion to seed		
No manure	3 times.		
Herbage, grass, leaves, &c.	5	"	
Cow dung	7	"	
Pigeon's dung (guano is nearly the same)	9	"	
Horse dung	10	"	
Human urine	12	"	
Sheep's dung	12	"	
Human manure, or bullock's blood	14	"	

"It also gives the largest proportion of gluten, when applied to wheat crops, as shown by the next table:—

	Gluten.	Starch.	Bran, &c.
" Human urine	35.1	39.3	25.6
Bullock's blood	34.2	41.3	25.5
Night soil	33.1	41.4	25.5
Horse dung	13.7	61.6	24.7 "

Dr. Parkin then takes Professor Playfair's calculation, that a pound of urine will yield a pound of wheat, which would give 2,200,000 additional quarters of corn, and finally arrives at a total estimate for the liquid and solid manure of 8,365,500*l.*, which London wastes every year!

THE REGISTRAR-GENERAL'S DISEASE.

The Registrar-General, amongst his many diseases, terrifies us with NIGHT-SOIL FEVER. I shall therefore now add some curious facts about this.

First, let me record, that water-closets are not yet fifty years old; and a friend of mine, an eminent physician, told me, that, some years after their introduction, Sir Herbert Taylor, in the course of a conversation, used this remarkable expression:—"England has never prospered since they turned the water-closets into the Thames." So soon did thoughtful and observing men foresee whither we are hurrying. But even then, they had cesspools; and only the surface-water passed off by small drains into the sewer.

Water-closets introduced the sewers. In 1800 the City of London had only 7 miles of sewers; it has now 49 miles. In 1830 the sewer system was commenced in Liverpool, and 53 miles had been made in 1847; but in 1858 they had increased to 201 miles. Leeds began in 1850, and has now 40 miles of sewers. The metropolis now rejoices in 1,500 miles. The system has been increasing in activity since 1848, when Acts of Parliament were passed; which set in motion Boards of Works, and Boards of Health, with more valour than discretion. And now they terrify us with NIGHT-SOIL FEVER.

I before alluded to the strong opinions held and acted on by some physicians, of the beneficial effects of the fumes of night-soil in certain disorders; and stated that I had myself received similar information from a nightman. I now add some authorities.

THE EDINBURGH REVIEW,

Remarking on Dr. Guy's account of the freedom of nightmen from fever:—

"The lay-stall, or scavenger's-yard, is a huge collection of street-sweepings, refuse of markets, night-soil, and dust of houses, but is not allowed to remain in a fermenting and indiscriminate mass. Almost as soon as it is deposited, men, women, and boys, sift and sort the heap; bones, glass, linen, and woollen rags, old iron, and other metals are set aside, and the coals and great cinders are extracted by the 'hill-men.'

"Yet Dr. Guy says of these workers,—'They are, with a very few exceptions, a healthy-looking, ruddy-complexioned race. One or two boys whom I saw at work, would have been excellent models for the artist.'

"The score or so of master-scavengers who were brought together on more than one occasion by the trial already alluded to (an indictment for nuisance against a lay-stall keeper) as the origin of these inquiries, *are the healthiest set of men I have ever seen.* I do not think, whether in town or country,

such a body of men could be brought together, except by selection; and it is not going too far to assert of them, that if the comparison were limited to the inhabitants of London, or our large towns, no score of selected tradesmen could be found to match the same number of scavengers brought casually together."

"Whilst the bricklayer's labourer suffers from fever a ratio of thirty-five-and-a-half per cent, and the brickmaker twenty-one per cent., the scavenger experiences only eight per cent. of illness from the same cause."

"Sir Anthony Carlisle tells us, that out of fifty men employed in the sewers in his time, only three had fever. Thakrah declares, that out of eighteen examined by his assistant, only two had even slight disorders, and they informed him that appetite was increased by the effluvia; and finally, Dr. Guy tells us, that out of thirty-four nightmen examined by him, only one had an attack of fever, and he only through being out of work for three weeks; he suffered, in short, *from change of air*, and perhaps want of food. Dr. Guy says, that a gentleman who accompanied him in one of his inspections over a scavenger's-yard, informed him that, 'he perfectly well recollects thirty years ago, when he was a lad, seeing as many as twelve patients directed by the faculty of that day to *walk round the shoots* for the night-soil on his father's premises; and he appealed for confirmation of this statement to his brother, who said that he had seen scores of patients industriously inhaling this curious dose of physic!'"

THE SATURDAY REVIEW.

In a series of articles on "The Philosophy of Stinks," in which the reviewer states many facts to show that disagreeable smells are not necessarily pernicious, the following bear upon our present subject:—

"Mr. Grainger, in his Report, 1848-9, to the Board of Health, says:—'Next in order to overcrowding, as to the extent to which it prevails, and the evil results produced, is, according to my experience, what may be called the "privy atmosphere." Persons habitually exposed to such an atmosphere are thereby predisposed, in an especial degree, to fever and other sickness.' If this were true, it would be difficult to explain how the scavengers of London and nightmen of Paris were almost the only classes which escaped the cholera in 1832. If it were true, the evidence of Mr. Rose, the night-soil contractor, who employed 118 men to empty ashpits by day and cesspools by night, would be not a little paradoxical, since, out of these 118, only four had cholera, and the attacks in their cases were due to other causes. He adds, that the occupation of nightmen is so healthy that about fifty who go out to brickmaking or harvestwork in summer are so much reduced in health that it takes some months on their return to recover their good looks."

With regard to this night-soil fever, I will suggest some matter for inquiry, in order to ascertain whether it is not rather SEWER-FEVER. Take a close pit or cesspool, from which no current of air can come upwards, and ascertain what gases will ascend from night-soil. Probably only such gases as are lighter than common air. These, including ammonia, are not the pestilential gases. The sulphuretted hydrogen 1.1912, phosphoretted hydrogen 1.185, and carbonic acid gas are heavier than common air, and without some moving power will not ascend. But take a water-closet connected with a sewer; or

let there be a drain from the cesspool or pit into the sewer, and let a current of air come upwards from that drain; ascertain what current will be sufficiently strong to force upwards the sulphuretted hydrogen, and other heavy gases to be diffused through the house. Ascertain what current of air will in the same way lift the sulphuretted hydrogen from the sewers, or from the surface of the river, or the mud-banks into the midst of the town. The occupiers of small houses will probably be much safer and sweeter with a small yard and a privy in it, than with a second-rate water-closet inside the house! Water-closets have a tendency to diminish yards and open-air; and in small houses, the danger of a defect in the traps and pipes is probably a greater evil than a close ash-pit or cesspool, regularly cleaned out. Speculative builders will be glad to get rid of the yard and privy, so as to be able to build the houses back to back, with a would-be water-closet in the midst. Yards and privies are great advantages for small houses. But if any man thinks fit to have a water-closet, let him honestly provide his own cesspool, and empty it; and not make it an excuse for polluting the stream, or troubling the public to provide him with a sewer. And let him bear in mind, that the close cesspool requires the least quantity of water; but the drain requires the most to wash away obstructions and keep it clean.

THE LITERARY GAZETTE.

The last number of the "Literary Gazette," Feb. 18, contains a powerful article in favour of keeping the manure out of the sewers, and carrying it on to the land. The Editor at the same time contributes the following practical and valuable information:—

"In China, France, Flanders, Belgium, and all over the Continent, night-soil is carefully collected for agricultural purposes. We ourselves know that the National Guaranteed Manure Company, Limited, which has extensive works near the city of Carlisle, most profitably employs the night-soil of the large factories there in the manufacture of what is admitted to be a very valuable manure.

"This Company manufactures peat charcoal, which deodorizes in the most effectual manner the night-soil. Their *modus operandi* is this. They have long troughs which have a few inches deep of peat charcoal thrown into them. They are then run under the seats to the closets, and are removed when full, and replaced by others. The contents are then carted to the factory in a perfectly inodorous state, and manufactured into a valuable manure by the addition of other fertilisers. So powerful is this mixture of peat charcoal and night-soil, that we have seen a whole horse covered over with a light coating of it and in less than ten days the whole animal, bones and all, was reduced to powder, and entirely free from odour."

The "Civil Service Gazette," Feb. 18, also deals effectively with this subject, dwelling philosophically on the combinations and reproductions of matter.

Let me emphatically call the attention of Ireland, to the peat charcoal of the bog mingled with the nightsoil of the town, as a mine of wealth, and a cheap recipe for cleanliness. This also shows us how prisons, barracks, hospitals, factories, schools, colleges, camps,—yea palaces— may be dealt with.

MISCELLANEOUS AND HEARSAY INFORMATION.

HAY and straw are sent up to London in exchange for soot. In some cases ashes used to be thrown into the cesspools, which made a valuable compost, and all was removed together for manure, until the ashes became a valuable article for separate export. Market gardeners in the neighbourhoods of Sandy, Biggleswade, and St. Neots send up large quantities of garden produce to London, and receive back large supplies of manure, which they use in spade husbandry; and some have boasted that this manure enables them to take three crops in the year off the same ground. There is a Company that exports from London large quantities of blood from the slaughter-houses, and reduces it to a convenient state for being applied to the land.

A clergyman informs me, that a farmer in a Somersetshire parish collected the night-soil of the village, mixed it with earth, and then kept it till wanted. The effect was astonishing, and the yield of crops most remunerating. One year he mixed lime with the night-soil, which was agriculturally a chemical mistake. For the ammonia of the night-soil mixed with the carbonic acid of the lime, and formed carbonate of ammonia, commonly known as volatile smelling-salts, which escaped from the dung as gas; and the herb was deprived of the thing it wanted. My clerical friend, being a bit of a chemist, explained to the farmer his error; and recommended as an experiment, that the alabaster rock, or gypsum on the shore of the Bristol channel, should be reduced to powder, and mixed with the night-soil. This was done; the gypsum, sulphate of lime, gave off its sulphuric acid to the ammonia generated in the night-soil, and formed sulphate of ammonia; which was not a volatile salt, but remained in the dung; affording a rich dressing for the land, and yielded abundant crops.

A landowner tells me, he had boxes made for his cottagers, into which he recommended them to throw earth as occasion might require, as a deodorizer, and when full, to empty the box in the cottage garden; but he says they considered it too much trouble. We must try even easier plans, and empty the places for the profit of the dung.

Mr. Dodd, of the City Wharf, Hoxton, informs me that he has collected and exported as much as four hundred tons from cesspools in a week, into Kent, Essex, Hertfordshire, and Buckinghamshire. His charges per ton were two shillings for the article as put on board the barges, eightpence for freight, and sixpence for tonnage. Amongst the crops for which it was used he mentioned hops, onions, and celery. He sometimes exported it unmixed, and sometimes mixed with other dung, as the parties required it. Mixed with the street sweepings it becomes deodorized. When nothing else is admitted into a cesspool used by healthy persons fed with unadulterated food, and regularly emptied, there is little smell and not offensive. But a place occupied by persons of bad habits and adulterated food, and into which other things are admitted, he described differently. He told me some remarkable facts, illustrating the differences. He said the smell of the Thames was more offensive than what he had first described, and that he could detect a smell from it, which, whether rightly or wrongly, he attributed to the coats of the intestines being affected by adulterated and pernicious food. He considers that the benefit of this manure continues in the land for the crops of more than three years; a much longer period than guano. He described to me the simple manner in which this manure is collected and removed for agricultural

purposes in some houses in Paris. He also described to me the manner in which, in Belgium, the farmers steep clean straw in this pure manure in a liquid state, carrying the steeped straw in carts to the field; and there women follow the plough, and lay in this steeped straw in the furrows, to be covered over at the return of the plough. All these matters deserve the consideration of town and country.

I may add that this statement, as to smell, I heard also made by a witness on his oath at a trial at Hertford; who described the smell of unmixed night-soil as pleasant when compared with a river, into which an ignorant Board of Health (query of disease), had turned the cesspools of a country town.

"Very rich natural meadow contains on one square foot, 1,000 plants; irrigated meadow, 1,798 ditto."—LIEBIG.

"The deposits of a garrison of 8,000 men in the fortress of Rastadt, in the Grand Duchy of Baden, was sold in one year for 8,155 florins. The Commune of Oligghrem consumed the greater proportion, and in the course of a few years they converted the most sandy, unproductive soil into flourishing corn-fields."—LIEBIG.

Let us inform ourselves of all the various methods of other countries, such as France, Belgium, Tuscany, and China, where this kind of dung is used. Instead of investigating such things, and informing us about them, our travellers generally content themselves with turning up their noses and remarking,—“I perceive a smell!” The result is a very superficial state of mind, puffed up with the sublime idea,—“WE turn all such things into the river or the sea.” A public Commission to investigate and make the subject fully known and understood, would be worthy of this kingdom; for this notion of throwing all into the river or the sea, seems like the deranged contrivance of Bedlam. Combined action on the part of such countries as aim at improving agriculture by the use of this manure might result in the enlightenment of us all. We might assist them with improved machinery, without forcing them to adopt water-closets and sewers; and they might reward us by showing us a way of escape from our false position. I shall be obliged to any one that will give me a detailed statement of the methods of collecting, removing, and applying this kind of dung in any country; the advantages and disadvantages of such methods; and any suggested improvements; all which I will endeavour to communicate to the public.

SUGGESTIONS.

IF those persons that have the ear of the town population would point out that this subject involves the price and supply of bread, vegetables, and meat, there might be more united action between town and country in the application of remedies for the present waste of manure. The first thing is skilfully to collect and save it; the second is skilfully to remove it; and the third is skilfully to apply it. The public have been misled by men with only one idea—that it could be and should be got rid of and forgotten. But it is one of those great realities of life that cannot be disposed of in such a short way.

By a united effort of the Horticultural and Agricultural Societies in the united kingdom, acting in concert with the town population, a large amount of dung might be rapidly intercepted and removed, as it used to be, without getting into the common sewers, and might be applied, as heretofore, to productive purposes; and a wiser view of the subject might be taken by the nation at large.

The Agricultural Societies and town population in Ireland should assist. That country abounds with small farms, generally having no provision for the collection of manure, except the hollow ground before the cottage door. A wiser, but simple and inexpensive method for collecting and distributing manure, both solid and liquid, would be to them a great boon. They should be encouraged to export dung from the towns. In August I have smelt the Liffey at Dublin as offensive as the Thames at London.

The public require to be reminded that those common sewers that flow into a stream or river, were primarily intended to carry off the rain-water, and to cast in filth was a nuisance. But other things have gradually, through want of watchfulness, found their way thither; first, by a stealthy and fraudulent, then by an open and ignorant, and now by a violent and destructive perversion of the use of the sewers. But now that we perceive the evil that has thereby been done, let us endeavour, not only to prevent the increase of the evil, but to retrace our steps.

Let every attempt to cast filth into streams and rivers be promptly and stoutly resisted by actions, presentments, and indictments; and not only may all that is useful find its way to the land, but manufacturers, brewers, and tradesmen may

discover that they are now wasting materials which are convertible into valuable products ; in the same way that a saving of fuel has resulted, from manufacturers and others being compelled to consume their own smoke. It is not creditable to us, as a manufacturing and mercantile people, that our manufacturers should cause a nuisance by their refuse; or that our seamen should cast the refuse or filth from their vessels into our ports and rivers. Gas-works are already restricted from polluting the sewers; and every trade and manufacture ought to have its own contrivances for disposing of its refuse. All such matters are capable of being arranged and improved. Some Boards of Health that would have turned the streams near their towns into open, uncleansed, and pestilential cesspools, if they had not been arrested by actions and indictments against them, have discovered better methods for disposing of their commodities. A mill-owner used to let the water in which his wool was washed run to waste ; but now he converts the grease in the water into a coarse soap, as I am told, by soda, and a small quantity of sulphuric acid ; presses it, and sends it to a soap-maker, and derives a revenue therefrom. A work on the uses of refuse would be valuable. " Gather up the fragments that remain, that nothing be lost."

We have, however, unfortunately to contend with the evil example which the metropolis has been allowed to set. To this, therefore, I would direct special attention, as the monster grievance.

The common law would treat the pollution of streams as a nuisance ; but Parliament has recently legalized that nuisance. The years 1847 and 1848 form a melancholy period in the history of British rivers. That which the common sense of our law had forbidden, because at the bar of reason it is a crime, then became a Parliamentary virtue, and an ordained necessity. Acts were passed giving power to Commissioners in the metropolis to empty all its filth into the Thames. They had, indeed, other powers, great and valuable, given to them for better purposes, and for providing better remedies for the existing inconveniences ; but to pollute the Thames seemed to them the easiest thing to do ; and, therefore, being empowered thereunto, they did it ; whereupon the Thames suddenly changed colour. But, as if that was not bad enough, by the Towns Improvement Clauses Act, 1847, intended to be gradually applied to the whole kingdom, the Common Law right of having our cesspools, or ash-pits emptied, and the dung carted away for use, according to ancient practice, was to be taken away wherever that Act should come into operation ; and, instead of substituting any improvement, all the rivers of this realm were put in jeopardy, for it was enacted by sect. 36:—

" No house or building within the limits of the Special Act shall be

built upon a lower level than will allow of the drainage of the wash and refuse of such house or building into some sewer belonging to the Commissioners, either then existing, or marked out upon the map hereinbefore directed to be made by them, OR INTO THE SEA, OR SOME PUBLIC RIVER INTO WHICH THE COMMISSIONERS ARE EMPOWERED TO EMPTY THEIR SEWERS."

Fortunately that Act of Parliament was only to be enforced in such towns as should subsequently be directed. Perhaps we may retrace our steps before that time shall fully arrive. Already London has been startled from its dreams, by beholding the death-flow of the Thames; and in 1858 the Metropolis Management Act was passed, enacting that, as far as practicable, the sewage of the metropolis should be prevented from passing into the River Thames, WITHIN THE METROPOLIS. But here again, by those last words, London is empowered to cleanse itself, by throwing its filth down upon its neighbours around the metropolis. I cannot think the nation understands to what it has consented in giving such Parliamentary powers to London—powers by which the metropolis can at once waste its valuable manure, and, at the same time, corrupt other parts of the Thames, or poison other populations, and set the worst example!

This Parliamentary power to pollute rivers and streams is new and unheard of, and should be immediately repealed and taken away. No man or body of men should be allowed to do it. Such sewers as are polluted should not be allowed to empty themselves into rivers or streams. The Commissioners should be prohibited from creating or continuing that or any other nuisance; and they should be directed and required to carry on all their operations with a view to save and promote the proper application, to agriculture and horticulture, of all matters suited for manure; and, as far as practicable, to keep out of the common sewers all matters except water; and when that cannot be effectually done, at all events to keep out of the common sewers all matters injurious to sewage as manure; and to retrace their false steps as rapidly and effectually as possible.

Already in London, every house or lot of houses, has what is called a dust-hole; and a class of men, called dustmen, regularly empty it; and the article has its merchantable value, being used in the manufacture of bricks. The dustman's day sometimes causes a little smell, but we reconcile ourselves by the thought we are thus kept clean. Yet, if once this article were to be turned into the common sewer, all the world would think that was the best and only proper place for it; and possibly on some hot day some one will smell a dustman's cart, and then, instead of proposing that it should have a cover, or an impervious curtain or cloth thrown over it, will propose that the removal of dust be abolished. Again, the streets of London are regularly swept; and thousands of tons of the sweepings are yearly carted away, and exported for manure; that which is swept

from a paved street is the most valuable, as having the smallest quantity of earth in proportion to the dung. Shall we also turn that commodity into the Thames? When I first came to my present London house, there was a cesspool under the stable, which was from time to time emptied by a class of men called nightmen. It was rarely that inconvenience was experienced—it was done at night between twelve o'clock and four in the morning. I followed the fashion; made no attempt at improvement, but filled it up and made drains into the public sewer, and sent its contents forward into the Thames! which, I suppose, entitles me to the praise of the many indolent and thoughtless; but to the condemnation of the active and prudent few. All this I might now be compellable to do, if I built a new house; and the authorities have unfairly compelled the owners of old houses to do so.

Up to a very recent period the privies and cesspools of the metropolis were all cleansed in the same way, by nightmen. I am informed that in St. Margaret's, Westminster, in 1854, the numbers emptied and cleansed were 282 privies and 1,015 cesspools; in 1855,—366 privies and 353 cesspools. Similar returns might be obtained from all London, and would show how very recent a thing it is to have turned this mass of dung into the Thames. I do not find that any well-organized plan was ever adopted for the cleansing of the privies and cesspools of the metropolis. The old carts, old ways, and old carelessness worked their way; till first the great turned their water-closets into the Thames, and now the whole population is being driven by violence to follow that example.

When some old cesspools were opened at Westminster, and the contents carelessly pumped out, so as seriously to affect the health of several persons, though a great outcry was made, yet it did not rouse men to attempt any improvement. No prize was offered to call forth inventive genius, but London opened its sewers, and turned more filth into the Thames; and now, perceiving that it is about to poison thousands by a river, instead of half-a-dozen by a cesspool, it is trying to escape from one sewer by plunging into another, and to purify this part of the Thames by polluting that part which is below.

All operations of cleansing must have their several inconveniences. Even the making of a hotbed has its inconvenience, and yet its heat produces the most luscious fruits. The fixed cesspool has its inconveniences, the sewer, when converted into a flowing cesspool, has its inconveniences; but the system which saves and applies the refuse for useful purposes is productive, and preserves bright rivers and streams to gladden the land; that which casts it into rivers or the sea is destructive, and in its result destroys one of the enjoyments of this world.

Dr. Letheby, the Officer for Health of the City of London,

says that "the iron in the clay from the town shores of the Thames fixed the sulphuretted hydrogen in the summer, turned the river black, and was *the salvation of our lives!*" Suppose such a theory correct, and then let the sulphuretted hydrogen abound in the river in such quantities, or under such circumstances, as not to come in contact with such iron—then Dr. Letheby hands us over to death. In the hot weeks ending 9th, 16th, and 23d July, 1859, the deaths in London were 128, 300, and 435 over the average; the Registrar-General attributes it to his own theory; but **PERHAPS** it was from putting all our dung, solid and liquid, into the sewers instead of on to the land. At all events, the water-closets and Boards of Health have placed London on the edge of a deadly-looking ditch. They now throw into the sewers other things to deodorize; but malaria does not necessarily smell. People complain of the smells of healthy FLORENCE, but not of unhealthy ROME.

Let us then try, even in London, if something cannot be done. For instance, the Commissioners or Boards of Works have power to make many public conveniences. Why should they not be contrived so as to save the manure, to keep clean the sewer, and to be experimental in the best direction? One part might be on wheels, or otherwise removable every night. It would be easy to find a man to cleanse them, and a market for their contents. Similar contrivances for the seamen and workmen about the river and docks would be an easy experiment. Such simple methods might at a small cost, greatly diminish the evil, and open our eyes towards great results.

Thoughtless London is about to be perplexed with at least four plans for collecting, removing, and applying these things.

The first is that by which these things are first washed into a sewer, and then, when the fall of the ground permits, allowed to overflow the land, by pipes, drains, and ditches. Or where there is no sufficient fall, it is pumped up, and then distributed by means of pipes. Alderman Mechi is the able and zealous advocate of this plan, and has introduced it at his Tiptree Farm—and he says successfully and profitably. The advantage of this plan, if it were applied to the sewerage of large towns, would be, that it would fit into the system of sewers, as of late years introduced. The objections are, it would involve a vast outlay; Mr. Mechi estimates for the sewerage of London a capital of 2,000,000*l.*; it is a highly artificial system, perpetuating the sewers; a large body of intrusive water must be moved, a large proportion of the fertilizing properties of the original materials are lost; and the experiments already made on a comparatively small scale, have not been so convincing as to lead to the supposition that farmers are as yet prepared to adopt it. Since the publication of my first edition, I have had

the pleasure of hearing Mr. Mechi deliver a very interesting lecture on the subject at the London Farmers' Club, and a discussion thereupon; and I have availed myself of the information derived therefrom, and would by no means discourage further experiments.

The second plan is that of deodorizing the sewage; and collecting the solid matter resulting from precipitation or evaporation in a dry state. The advantage of this plan is, that it also fits itself into this modern system of sewers; and a material is produced capable of being easily handled, removed and applied. The objections are, that the same large proportion of the fertilizing properties of the original materials is lost, and the things used to deodorize produce a totally different kind of manure. I would as much as possible avoid saying anything to depreciate the value of the article, and would rather encourage experiments. The town of Leicester, however, has tried this plan; but it has, as I am informed, large accumulations on hand.

The third plan is that which I advocate in this publication—namely, to collect, remove, and apply every atom of refuse that we can, without allowing it ever to get into the sewers; and at all events to get all the manure as quickly as possible out of them before it reach the rivers or streams. This was done in all the kingdom till very lately, and is still done in the greatest part of the Queen's dominions, of Europe, and the world: and should I happily turn back on the land any filth on its way to the sewer and the stream, let the doers of such work understand, I have reaped my reward. The advantages are, that all the fertilizing properties of the materials are best preserved; a much less bulk has to be moved—and where water is excluded the quantity is comparatively small; and the rivers are rescued from despair. The objections are, it is a plan as old as Adam; it is too straightforward and simple; it does not sufficiently inflate the mind with the grand idea of a network of sewers, carrying rivers of slops, all floating in dismal pomp towards one point, and then radiating back again through another network of pipes, diffusing a luscious beverage over millions of thirsty acres, till lost in the haze of a distant uncertainty, and the mist of contractors' bills. Instead of the Roman grand but barren idea of Cloaca Maxima, it is the homely but fruitful adage, "Many a little makes a mickle."

The fourth plan is that favourite but melancholy operation of Boards of Health and Boards of Works, by which all filth is thrown into the sewers, to find its way into the rivers or the sea. This system has, I trust, already received a check. For on the 8th of February, 1860, at the Thames Police Court, the Board of Works applied for an order, that drains should be made from some privies to the sewers. But the magistrate, Mr.

Yardley, said :—" The greater the population, the more necessary it was that the Thames should not receive any more of the filth of the metropolis. The Thames had been fearfully polluted ; and instead of a healthy, pleasant stream, had been converted into a great, filthy, and offensive ditch. He made an order for water supply to the seven tenements, that they should be effectually repaired, cleansed, and whitewashed, the cesspools to be emptied and cleansed."

We made a similar order in petty sessions, in the summer of 1859, with respect to some houses in one part of Bicester, with the addition that the contents of the cesspools should go on to the land ; and that the drains should carry only the rain-water from the premises into the public sewer ; none of which was to be allowed to enter the cesspool, and nothing from the cesspool was to go into the sewer.

Let such examples be followed and improved, and a change for the better will be rapidly effected.

Happily for us, we claim not to be an infallible people, pledged to follow out bad principles to their worst results ; but common, vulgar Englishmen, that think it very foolish to throw away good money after bad. We may, therefore, repent, and reform even the sewers. When London shall have spent a few more millions on its hobby, it may find it worse than useless, and abandon it to its fate. By that time the contractors will have made all the sewers ; and, finding no more work to be done in that direction, will be ready to reopen old cesspools ; or construct some new ones better contrived ; or ashpits, tubs, or boxes ; things which the inventors will, by that time, have prepared, and expect to be also well paid for ; and they will all agree, that it will be easier for London to empty a million of such small things than to find its way through the underground labyrinth, or know what to do when it arrives at the far end.

People have at present but one idea, namely, a large, unmanageable sewer, to be made at the cost of millions, into which the most valuable commodities may be cast away, put out of sight, and would be forgotten, if they did not start again into terrible life in the river's bed. This great sewer is intended, not merely to convey away the filth, but to carry away all the rainwater of this district, which ought to run pure into the Thames. Two things which ought to be kept distinct are confounded together—pure water and the contents of cesspools. We first create an evil, and then, instead of retracing our steps, we expend millions to create another and greater evil ; whereas the very interest of the money might pave the Thames in some selected places of deposit, and deepen it in others ; remove those mud banks that the steamboats or the tide set floating from one part of the river to settle in another, and

might sweep the mud into carts or barges as regularly as the streets are swept, and more cheaply, and place it on the low lands, or elsewhere; and might intercept the most valuable dung before it reached the common sewer; or might collect the sewage before it reached the Thames, and convert it into manure, and deliver it to our farms and gardens at a tempting price. As was well said, in the Editorial Article above mentioned, "Our great drainage system, after all, will be but an elaborate machinery for the conveyance of sewage to some place or other; and why, therefore, should not the material be delivered at a market where it would become actually productive? This is a question which it may be hard to answer, but which, at any rate, ought not to be put out of sight."

It is no answer to say that a Sewage Manure Company has failed. It is not reasonable to expect the farmer to come up to London, sink an enormous capital in order to unravel the entangled net of the London sewers, and extract the residue of what was once valuable from those other ingredients which ought never to be allowed to mix with the manure. London itself ought to pay for its own mistakes, and to remove its own filth at its own cost, without creating any nuisance elsewhere; and all that it can reasonably require of the kingdom at large is, that if it will convert the material into manure, and deliver the same to the farmer at a tempting price, the kingdom at large will contribute to the cost. London has so mismanaged its sewers, and so destroyed its own market, as to have no right to expect to make the manufacture immediately answer as a speculation. But the kingdom as a whole would be immediate gainers, and such an application of manure would, in a national point of view, be remunerative. The whole nation might be induced to contribute for the purpose of applying all the manure of the towns, for all the lands in the kingdom, upon equitable terms; the result being a benefit common to all.

That this manure, when properly collected, has its value and is merchantable is evident from the fact that it always found a ready market, although no effort was made by persons in authority to promote the sale or extend the market; but all was unreasonably left to the haphazard of nightmen of the smallest means, and without any improved appliances. Nevertheless, Mr. Ludford, a respectable nightman in Westminster, tells me that he always found full employment to the extent of his small capital, and, notwithstanding he was under the disadvantage of not having any place of deposit of his own, he readily disposed of it to the market gardeners round London; and persons sent their carts, amongst other places, from beyond Romford, for a supply. His father has been always in the business, and is near eighty years of age.

Mr. Duckett, of Dockhead, Bermondsey, keeps 150 cows,

and exports dung to various parts of the kingdom, where there is water carriage, and by railway as far as the cost of carriage will admit. It was his practice to mix the contents of privies, cesspools, and other ingredients, with the horse dung and cow dung which he exported. In this way he has been in the habit of exporting from five to six hundred tons of dung a-week; about one-fourth part of which used to be the contents of privies and cesspools. He still mixes and exports manure as heretofore, but considers the country has been deprived of the most valuable ingredient; of which he can now mix but comparatively a small quantity, since it has been turned into the Thames. He mentioned to me the names of many extensive farmers who were his customers, and I hope some of them will give the public the benefit of a report of their experience. He sells his manure at from three to five shillings a ton. But the railway charges are one penny per ton per mile. He employs forty-three men in this work, most of whom have been twenty years in his service, and some more than thirty. Not one of them was affected by cholera, when it visited London. I walked through his cow-house, and admired his cows; passed into the yard adjoining, where his men were engaged in mixing the dung; and many a farmer might well go there and take a lesson. An active and intelligent farmer might see at once how easily he might contract for cleansing his market town, and profitably apply the proceeds without inconvenience to any one. I mounted one of the waggons used in the night-work—close and well-constructed; I stood and walked in the yard, asking many questions, and my attention was not once attracted to the smell.

In addition to this, we have the fact that a Corporation at Manchester exported, in the year 1857-1858, no less than 94,548 tons from privies, sold for 9,110*l.* 2*s.* 6*d.* And the Manchester, Sheffield, and Lincolnshire Railway Company, by carrying it, has proved how readily railway companies would provide suitable carriages, and meet the demands of the public, provided a profitable market were established. The Emperor Napoleon, in his recent agricultural and commercial manifesto, has intimated that to increase the facilities for the carriage of manure by railway, thereby promoting such traffic, will be one of the objects of his Government; so that we may be assisted by the skill and ingenuity of France in a vigorous attempt to hand the manure of the towns over to the land;—and then we may need pruning-hooks instead of swords.

Far be it from me to say that dung does not smell; every farm-yard smells; but I am not aware that the smell of a properly-kept farm-yard is injurious to health. The collecting, removing, or spreading of the different kinds of dung does not affect the health of those employed therein; and many instances

are recorded where that class of persons have escaped epidemics, when others have suffered. If Parliament had made regulations respecting the mode of operation, the height of walls, the covering-in of buildings, or even specifying places where the trade should or should not be carried on, that might have been reasonable : but are we, as a mercantile and agricultural people, to abolish the trade?—to annihilate one branch of mercantile and agricultural operations? Farewell to England's health if her rivers become decoctions of dung, and worse things than dung. As to the smell on occasional emptyings, that might be a reason for scolding the servants for not having managed better, and for expressing a hope that the thing would be better done next time. Some people get in a rage with the sweep when he wakes them up at five in the morning. Why do they not pour water down the chimney and wash the soot into the Thames? There are grown babies that would jump at such a bright idea. We may be thankful that Solomon has given us this proverb if we can only apply it:—

“Where no oxen are the crib is clean ; but much increase is by the labour of the ox.”

In other words, by squandering rivers of waters through your closets you clean them into your rivers ; the crib is indeed clean, but you defile the waters and famish the land !

Having thus alluded to the question of health and smells, it may be useful to contrast ROME with FLORENCE in this respect.

ROME has a celebrated sewer, Cloaca Maxima ; and if there were the seven mistakes as well as the seven wonders of the world this might perhaps be found to be one. ROME stands on a higher level than the river ; the drainage is good ; she empties her privies into the sewers, and through the sewers into the river ; wastes the manure instead of applying it to agriculture. She has abundance of water and plenty of fountains. Dr. Parkin sums up thus : “ROME being, as is well known, the very hotbed of fever, at least of intermittent fever, and in its worst and severest form.” “In the Campagna of ROME also—a term almost synonymous with desert—malaria prevails to as great an extent, and in the same intensity, as in the immediate vicinity of the Pontine Marshes, which are thirty miles distant.”

FLORENCE, on the contrary, has a poor soil around it, and wisely uses the contents of its privies as manure. The cess-pools are *beneath the houses*—the approaches badly contrived ; no traps ; the smell, of course, spreads in the houses ; and to strangers it is often very disagreeable. Their system may admit of much improvement. “But,” says Dr. Parkin, “what is still more remarkable, FLORENCE is entirely free from the endemic of Italy—intermittent fever ; while it is not only the healthiest

city in Italy, but as much so, perhaps, as any other in Europe. It has also been very slightly visited by epidemic cholera." The late Dr. James Johnson, who was for turning all filth into the river, wrote thus:—"The City of FLORENCE, then, like too many of its neighbours, is a city of filth, where *not a single wave of air* is unimpregnated with the most disgusting, if not pestiferous, effluvia that imagination can conceive." "Why is this infernal box of Pandora, compared with which assafoetida is incense, gradually collected in the cellar, and annually disgorged in carts, instead of being daily carried subterraneously into the Arno?"!! Such is the madness of the sewers. No thought of improvement can enter the Doctor's mind, but it is brim full of this one idea, which pollutes the waters, wastes the manure, and starves the land. It is as if a doctor, visiting a patient, and seeing a barrow full of dung standing at the door, instead of saying immediately, "Wheel that away, and dig it into the garden, or plough it into the land," should say, in a frenzy, "Throw that barrowful of muck into the well." Which would be best, to throw such dung, or such doctors, into the Arno?

Is the water-closet such an absolute necessity, and so free from its own imperfections, as to justify us in forcing all people to adopt it? No doubt, if you contrast a water-closet in perfect order with a badly-constructed and neglected privy, the water-closet has many advantages. But if you contrast a well-constructed and well-managed privy, regularly cleansed, having a cesspool from which there is no current of air upwards, with a water-closet connected by a drain with the common sewer, and a current of air finding its way upwards into the house, the privy has the advantage. Water-closets involve great expense and trouble—look at your plumber's bills and water-rates. Then whenever the frost seals up the valves and water-pipes, nothing will move; or if the water is at last set running, the place is drowned. Then when the thaw comes the burst pipes are immediately let loose. If the cistern is at the top of the house the contents sometimes come down through the ceiling. A long hard frost would make many people abuse water-closets.

But grant that a water-closet in good order is a luxury; why should we actually compel the people to submit to such an artificial system; to pay this tax; to make this waste; to poison these rivers; when the people did not want it; but only wished the cesspools to be better contrived, and more frequently and skilfully cleansed? Why should they be prohibited from reopening their cesspools if they think fit? Why should we say, You shall not be even allowed a choice? The water-closet should never have been permitted to be more than an auxiliary; and those that thought fit to indulge in the luxury should have been compelled to find out the way to dispose of the contents,

without intruding on the common sewer; as the owner of the privy was required to do. Had such a policy been pursued, men of understanding and independence would have sought out the best contrivances, and their wealth would have amply rewarded the inventors—the produce might have found its way long before this to their farms and gardens, and returned its rent into their own pockets. They would have seen that it was a great mistake to allow the waste water-pipe from the cistern, or the rain water-pipe from the roof of the house or yard, to pass into or through the cesspool, thereby filling the cesspool with an unmanageable quantity of water, and diluting the contents to an extent almost past recovery. They would have directed their attention to find out the way to keep a closet sweet with the least amount of water. The subject would not have been first left in the hands of the poor and despised without capital, power, or intelligence; to be suddenly transferred into the hands of engineers, plumbers, water companies, and contractors and their inspectors. Then the simple and useful, which might have been done, and which in most cases may now be done, for thousands, would not have been to-day superseded by the destructive, at the cost of millions. I see no reason why some experiment should not be at once tried in the midst of the next building speculation, or even in some of the present districts. Several moderate-sized and well-constructed cesspools, from which all useless waste of water is excluded, are far more manageable and less expensive than those gigantic sewers, in which, by the quantity of useless water which is introduced, we first create a difficulty, which afterwards we can only partially overcome by great labour and cost.

Look again and again at the millions upon millions which your sewers have cost you! All unproductive! Nay, all destructive!—the deformed and barren offspring of water-closets!

We are entering on an era of better farmers and wiser landlords, and, may we not add, more prudent towns; to be rewarded with higher rents for the landlord, greater profits for the farmer, and more abundance for the town population. Great progress in agriculture has been made of late years; but, nevertheless, we are still in the rear of that supply which the population requires. From 1700 to 1764 we exported annually from 100,000 to 950,000 quarters of corn; and, from that period to 1784, our exports very nearly balanced our imports. Now, we import twelve millions of quarters annually. Besides this large importation of food, we must bear in mind that between four and five millions of the people have emigrated during a comparatively brief period of our history. And that the population of Ireland had greatly decreased in the ten years that elapsed before the last census. A great

part of the kingdom has been already underdrained ; the work is still going on, let us press it forward. If it is true that only one-sixteenth part of our stiff clays are underdrained, much, indeed, remains to be done. By this the land is made ready to receive a larger supply of manure, and yield a heavier crop. The great deodorizing power of the common soil of the fields has been of late demonstrated by experiment. Let any amount of the most strong smelling manure be but thoroughly ploughed in, and you may pass over the field and find all is sweet. Instead of turning up our noses with disdain, let us clap our hands when we see the draining pipes in the fields, and the plough rapidly turning in the manure. By care in collecting, care in removing, care in applying, that which is now terrifying us as a poison will produce wholesome food for blooming cheeks.

The poor lands of the Downs, round some of our choice watering-places, might be enriched by the very material that is now wasted in the ocean, and often makes the once sweet beach offensive. One watering-place has lately removed a sewer, but instead of turning the contents on to the fields, has carried it into the sea a little further off. Who are the people? are they poets, tourists, or philosophers, that can endure with patience the thought, that sewers are now turned into our show waterfalls, whilst the hills above are barren and bare?

Bathers, fishermen, artists, water drinkers, tourists, may soon wonder what corrupts the water; but, as Mr. Mechi suggests, they may have too much false delicacy to speak about it, or, from want of knowledge, may not perceive it, or find out the cause. London itself may be obliged to ask, Where did this water come from? Why, from those rivers which you, O London, have taught the kingdom to poison! But why do not the water companies filter it? What! filter all those rivers of water with which you, O London, wash your water-closets and your streets; flush your sewers; and of which you are so wasteful, that in this wet, rheumatic climate, you will not suffer the ground to be dry one hour, but send your watercarts to waste this water, even whilst it rains! What! filter that Thames which, after every town from Oxford downwards, every jail, hospital, and barrack, every village, home, and yard, has polluted it, you are going to divert at Teddington, or some other place, to run it through your water-closets and sewers, and by another channel deliver, at the cost of millions, doubly poisoned, on the population below, perhaps to flow back upon you in judgment. What! filter all this? Why filter it? how filter it? and what sort of drink will it be when filtered? Drink, therefore, O London! You that are too delicate to bear the thought of emptying a cesspool and manuring the land, drink the cup of your own mixing, and grow pale!

But rather let us mend our ways. Let us, both town and country, put our hand to this plough, and not look back till the poet can once more call our noble river, from its bright springs till it reaches its chalk ocean bed, "the silvery Thames."

"Flow not, thou faulty sewer,
But ere thou reach the sea,
We trust some lusty hewer
Will break the neck of thee."

The neck of the sewer might be broken in the marsh lands, before ever it can reach the Thames. There London, whose sole affair this is, might be required to purchase, if needs be, thousands of acres, and there deal with the contents of this London hobby-horse; but not be allowed to create any nuisance. There let them make their pits, their reservoirs, their drying-grounds, their filter-beds, their sluices, their dams, their floodgates, their engines, their pumps: all the contrivances, good or bad, that inventive genius can suggest. Let London pay for the inventions, the experiments, the failures, and the success. What are a few thousands, or hundreds of thousands, well spent, compared with many millions wasted. But until success is certain and well-established, do not go on poisoning the Thames more and more every day, lest we all become sick whilst the contractors are working their way. Withdraw from the Thames without delay all the filth that can be withdrawn, whether in London or in the country: carry it off to the land, and promptly plough or dig it in. By that means we shall at once diminish the evil at this end of the sewer; and the mischief, labour, and expense at the other; and give a more wholesome and practical turn to the public mind. But no place should be allowed to turn into the river a mere filtered stream; that highest point to which an enthusiastic deodorizer has hitherto attained, when he talks of "the pellucid and innocuous residuum of a deodorized cesspool." No. Let that pellucid stream itself pass not through a mere filter-bed, that stops the solid matter, but leaves all the soluble in suspension; but let it pass through the ground of the field, on which the green herb is grown, and which is more than such a filter-bed, and takes even the soluble matter into combination with its own parts.

The placing of privies over rivers and streams should be prevented. As many as possible of those already built should be removed; and intercept the deposits of the rest.

Each of our Universities is situated on a river, which ought to be purer than any other rivers, if the Cam is to be considered an emblem of the purity of the mathematics which is the glory of the one, and if the Thames or Isis is to figure forth the purity of the theology which is the boast of the other.

But my own University, Cambridge, unless things have improved, is a great culprit in this matter, as the Cam can testify. Yet the Colleges on its banks might provide a few long, narrow barges, with sides to flap down as a cover when full, or to be covered when full with the sifted ashes of the College; to be put in the right place, which any gyp could point out; and at least one spare barge to take the place of a full one, and be off to the fens or elsewhere. If nothing better can be thought of, and my College, St. John's, will lead the way, I will give fifty pounds towards it. I make the same offer to the Inner Temple. The offers are made in the hope of stirring up active citizens to do something of the sort in the docks and ports of London, Liverpool, Bristol, Hull, Glasgow, &c. Why should there not be such accommodation near the wharfs? How easily could the barges carry off their cargoes by sea or canal, without any removal! The thing can be done, almost in a week, if the right men will put down their experimental hundreds. The truth must be told—we have too lightly esteemed, and too carelessly dismissed, the humble friendly nightman, and now their noble corps must be welcomed back with a shout, and the sooner this is done the better.

The Almighty and Allwise, when he was providing for the well-being of the vast multitude of the Israelites, gave them plain instructions on this subject (Deut. xxiii. 13). And, though those instructions were specially intended for a particular time and place, yet two things may be deduced therefrom. First, that regulations respecting dung are proper concerns for the ruler and the people, man, woman, and child, to consider and understand. Secondly, that the ground of the field is the convenient and suitable place of deposit. We might also infer therefrom the deodorizing powers of the earth. Similar directions were given as to slaying beasts and fowls fit for food taken in hunting:—"He shall even pour out the blood thereof, and cover it with dust." (Lev. xvii. 13.) Also in slaying certain firstlings of the flock:—"Only thou shalt not eat the blood thereof: thou shall pour it on the ground as water." (Deut. xv. 23.) One of the gates of Jerusalem was called the Dung Gate.

We may learn similar lessons from our Saviour's parables. In one, illustrative of his own wisdom and goodness, he spared the barren fig-tree for another year: "Till," saith the Lord, "I shall dig about it and dung it, and if it bear fruit well, and if not, then after that thou shalt cut it down." (Luke xiii. 8, 9.) In another parable he teaches, that salt may be in a fit condition for the land or for the dunghill, or become unfit for either. (Luke xiv. 35.)

On the other hand, to make the river a place of deposit, and turn the water-courses into running cesspools, destroys for ever

those delightful pictures, in which brooks and rivers appear as sources of refreshment and delight, and polluted waters are treated as an evil and a curse:—

THE BLESSING.

“He shall drink of the brook in the way; therefore shall he lift up the head.”—Ps. cx. 7.

“The words of a man’s mouth are as deep waters, and the well-spring of wisdom as a flowing brook.”—Prov. xviii. 4.

“But let judgment run down as waters, and righteousness as a mighty stream.”—Amos v. 24.

THE CURSE.

“And the streams thereof shall be turned into pitch.”—Isa. xxxiv. 9.

The waters of Zion are brilliant and sweet,
They flow from the throne of the Holy One’s seat,
The God of all glory has made the decree;
Those waters are healing, and precious, and free.
The proud and the slothful stand still on the brink;
The poor and the lowly stoop down, and they drink.
The wayfaring man, as he wanders along,
Refreshed with their sweetness breaks forth into song.
The weak and the dying remember the hour,
They quaffed and rejoiced in their life-giving power.
Then woe to the man, or the woman, or child,
By whom those pure waters shall e’er be defiled.

Other Scriptures might be mentioned, but these are enough to correct the judgment of some that fancy this subject is not of general concern, or suited for general discussion.

The fear lest such passages should be no longer appreciated by the people may cause the minister of the Gospel to cleanse and improve the watercourse, as it passes by his house or glebe; the charitable may study the best way to collect, remove, and profitably apply manure, but not destroy it, or pollute the waters.

The women of England, whose assistance in this perplexity of sewers we so greatly need, should be persuaded to perform the part of the help-meet in this, as they do in every good work. They really must help us. Many things will be perceived by them, that will escape the men. Discretion even in the cleansing of the house and the yard may be a woman’s office, and she may well consider how her servants may best bestow their work. The subject need not be banished from the household talk. It is a family matter which concerns father, mother, and children. Girls are not so ignorant as some people seem to suppose. I do not speak of girls that know not a geranium from a crocus: I speak of those that once had their pet plants, and some had spades and gardens; and read horticultural books and learnt the use of manure; and made their plants thereby to flourish, which many a young man does not know how to do.

My mother makes my father's bed,
 And smooths the pillow for his head,
 And guards his sweet repose ;
 And there's a thing that I may know,
 To make my plants and flowers to grow,
 And pluck for him my rose.

I thought the poets had not sung,
 Of such a useful thing as dung ;
 But better days are now,—
 Since damsels midst their fruits and flowers,
 To charm the dullness of the hours,
 To mix the soils know how.

My ground is sweet, though many things,
 A maiden's hand, if skilful, brings,
 That some might fancy naught ;
 But when the sky has lent its shower,
 Such buds will burst around my bower—
 No better could be bought.

Then laugh, you rude, unskilful boys ;
 And break your heads with bats and toys,
 But do not touch my plant ;
 You cannot handle as you ought
 These things you stupidly call nought—
 You know, you boys, you can't !

A country gentleman tells me, that he travelled on the Continent ; and in his family was a Swiss maid. When they reached a certain part of Switzerland they perceived a smell, which was the temporary result of manuring the land, and which they condemned as disagreeable. But the countenance of the Swiss maid suddenly brightened up as she exclaimed, "Ah, the riches of my country !" Sensible woman, true patriot ; one for a hardy honest man to choose as his help-meet, and love her to the end.

Give me that hand—a freeborn yeoman cries,
 Give me that heart so constant and so warm.
 I read thee patriot by those glist'ning eyes,
 That gaze so fondly on our mountains' form,
 Prepared to brave the winter and the storm ;
 To keep the herd well fed, the cottage clean ;
 To save the dung, its manners to REFORM—
 Our field shall not be bare, nor cattle lean—
 'Twixt us :—no foe but death shall ever come between.

On the other hand, Mrs. — said to me, "I have got your pamphlet, but have not read it yet, for Mrs. — took it away ; saying it was just the thing for her husband. But what is it?" "Why," said I, "you are throwing away all these things into the water." "Well," said she, "where else would you put them? surely not upon the land!" I stared; then added, "But where are the girls to bathe?" "Oh," she said, "I never bathe." I mention this to show what must be the ideas of some excellent women ; and how absolutely necessary it is to

explain the subject to them; or instead of helping us, they will hold us fast in the sewer:—

I never bathe. As I grow old,
I find the water grows more cold.
And now 'tis filled so full of dirt,
I think 'twould do less good than hurt.
The sight and smell of such a river,
Would make a Naiad scream and shiver.
The fish themselves have given up
Their bathing in this filthy cup.
So cast the dung along the stream;
But on the land,—pray never dream.
And keep the ground both clean and sweet;
The thing I hate is muddy feet.

Some careless daughters may think these things concern them not; yet let them know, that unless this sewer's tide be turned, the time will come when they may sigh, and say, "Where can I bathe?"

The maiden finds no more the crystal flood,
Where erst her mother cooled her youthful blood;
But strange mysterious waters meet her scan,
Unfriendly deed of rude uncourteous man:
She dares not taste, nor bathe her snowy limb,
But sighs, and turns her from the streamlet's brim.
The wave disowns the Azure name it bore,
And falls discoloured on Britannia's shore.
No lovers tread her beach with clasped hands,
No maidens dance their ringlets on her sands,
Unless they find some wild, untrodden spot,
Where merchant princes and their wives are not;
But where the shepherd's dog bathes clean and sweet,
And young Princesses envy him his treat.

The tender-hearted will remember how the wayfaring man drinks of the brook in the way: shall it be for life or for death? Her first-born may drink of the same brook!

I know not by what means the public are to be properly aroused from their deadening sleep without great freedom of speech; and many women will be sensible enough to perceive that a foul murder is being perpetrated, by this plunging of the body politic into the sewer; and, like Emilia, their heart will be full, and as she would not refrain from speaking, neither will they.

"'Twill out, 'twill out! I hold my speech, Sir? No;
No, I will speak as liberal as the air.
Let heaven, and men, and devils—let them all,
All, all, cry shame against me, yet I'll speak."

SHAKESPEARE.