

THE  
SEWAGE OF THE METROPOLIS.

---

A Letter

TO THE RIGHT HON.

THE LORD MAYOR,

FROM

W. HOPE,

INCLOSING CORRESPONDENCE WITH

BARON LIEBIG.

---

LONDON:

EDWARD STANFORD, 6, CHARING CROSS. S.W.

1865.

TO THE RIGHT HON.

THE LORD MAYOR,

&c. &c. &c.

60, Threadneedle Street,  
7th June, 1865.

MY LORD,

Your Lordship has upon all occasions evinced such a sincere desire to promote the welfare of the inhabitants of London, and not merely of the City of London, but of the whole Metropolis, that I am well aware that you sanctioned the official opposition of the Corporation to the Metropolis Sewage and Essex Reclamation Bill before the House of Commons, under the most thorough conviction that the Corporation were thereby serving the interests of the whole community, as is indeed proved by the fact that that opposition was withdrawn before the House of Lords, in consequence of the incontrovertible and all-convincing evidence adduced in favour of the scheme before the Commons.

If therefore upon any of the occasions, when in the course of the Sewage Utilisation controversy, I have used any expressions or arguments which

国立公衆衛生院附属図書館

|  |  |
|--|--|
| 受入先  |  |
| 受入日  |  |
| 登録番号   |  |
| 所 在  |  |
| Library, National Institute of Public Health |  |

might seem to reflect slightly upon your Lordship or the Corporation, I trust you will forget them, and look upon them as merely arising from the necessities of a severe and keen Parliamentary contest, which would never have taken place, for your Lordship's opposition never would have been created, but for the intervention of a distinguished foreign chemist. He it was who first began the controversy by an unprovoked onslaught on our scheme, supported by all the powerful literary weapons of offensive warfare at the disposal of one of the most subtle intellects in Europe, but based, as we have proved, by proper legal evidence before Committees of both Houses of Parliament, upon false information, false data, and false deductions.

We had a hard and uphill battle to fight. Baron Liebig condemned us; and who were we who ventured to question his facts and gainsay his opinions? He pronounced our scheme to be "like a soap-bubble glistening with bright colours, but inside hollow and empty." He asserted that "there is not the slightest doubt that every penny expended in that frivolous undertaking would irretrievably be lost. The carrying out of this scheme would not only be a squandering of an enormous amount of money, but before long would also be looked on as a national calamity."

This was violent language, unmeasured assertion, an unqualified judgment — coming from such an authority, and upon his own special subject, or what

he took pleasure in believing to be so, enough to have crushed any ordinary scheme; and there is assuredly no better proof of the thorough and complete soundness of our scheme in all its details, than that it was able to survive such an attack from such a man; and, my Lord, if I resorted to a little sarcasm as the readiest means of diverting the torrent of abuse, as well personal as scientific, which the great German Professor poured out upon us, I must beg you to remember that by the virulence and importance of such an attack, we were driven to bay; and further, that we had more than mere theories and opinions to defend, we had to protect our money engaged in a Parliamentary contest of the most expensive and costly description, to which we little expected to be exposed when we first embarked in a scheme which the Select Committee of the House of Commons has pronounced to be, not a soap bubble, but the "most useful and profitable scheme" for disposing of the sewage, and therefore an incalculable benefit to the whole body of the Rate-payers.

We do not complain of the opposition of your Lordship and the Corporation before the House of Commons; on the contrary, we conceive that you were bound to oppose, on the representations made to you by such a man as Liebig; but we congratulate your Lordship and the Corporation on the moderation and impartial judgment which enabled you to discern truth from fiction, common sense from

crotchets, and after the full and exhaustive enquiry conducted by the House of Commons Committee, led you to withdraw that opposition before the Bill went up to the House of Lords.

What we do complain of and regret is, that a man of Baron Liebig's position should have allowed himself to pronounce such a sweeping and unqualified condemnation of any scheme upon hearsay evidence, and to make such positive statements regarding a question of the highest importance when he was wholly unacquainted with the real sober facts, thereby giving your Lordship and the Corporation a great deal of unnecessary alarm and anxiety, placing you for a time in a false position, and exposing us to a vast amount of unnecessary risk and expense.

So unjustifiable did we feel the Baron's conduct to be towards your Lordship and the Corporation, as well as towards ourselves, that, after the Bill had passed the third reading in the House of Commons, we addressed a letter to him, on the 7th of April, appealing to him, in the strongest manner, to come over to this country and appear before the Committee of the House of Lords, in order that we might cross-examine him upon oath as to his reasons for pronouncing so complete and total a condemnation of our scheme, and might show, by his own evidence, that he had no personal knowledge of the localities in question, and was therefore neither qualified nor entitled to express any opinion, far less

capable of giving any legal evidence on the subject. At the same time we offered him a liberal compensation for his loss of time, and opened a door of escape for him, by showing him that he had been misinformed on the facts, and that if he would take the trouble to understand our scheme he would approve it as heartily as all the chemists in this country already had done.

To this letter we received a strange and unsatisfactory answer declining our invitation, but stating that he might come over to this country if invited by "a Committee of the Houses of Parliament." Surely the appeal of those persons whom he had injured, however humble they might be, had a prior claim upon his attention to that which any invitation of any "Committee of the Houses of Parliament" could have possessed?

I then repeated the appeal at greater length, and with greater care, explaining my object in such a manner that it was impossible for any one to misunderstand it. I quoted his violent language, which I have given above, and pointed out to him, first, that he had no right to pronounce such an opinion upon secondhand information; and next, that having done so, he was bound to submit to cross-examination upon oath as to his reasons for coming to that opinion, again opening a door of escape by saying, that he need not be ashamed of confessing his opinion erroneous when based not upon personal observation but upon secondhand information.

To this second appeal I received a more careful answer, in fact, I may say an elaborate answer, but quite as unsatisfactory as the former, and conceived in a spirit of evasion throughout.

Thereupon I wrote, on the 30th April, another letter, reiterating my former arguments, and finally going out of my way to invent an excuse for the discrepancy between my positive facts, as proved by proper legal evidence before the House of Commons, and his theories, endeavouring in this way to make it easier for him to reconcile his scientific dogmas with the facts as they exist, to retract his violent and hasty opinions, and to make that reparation to which we were entitled for the injury we had sustained at his hands.

To this last letter I regret to say I received no reply, therefore, in justice to myself, as he has published the two first letters, I am now bound to publish the whole correspondence (which I have the honour to enclose herewith), in order that the public may see that the great chemist whom they regarded as an oracle, was not prepared to support upon oath his written opinions, and that, on the other hand, we, on our side, had nothing to conceal or to fear; and I think, as I duly warned him, that such is the love of fair play in this country, that however much I may regret it, the result will be greatly to weaken the Baron's reputation for calm judgment, and to make people doubt the soundness of his opinions, even when most correct and most carefully prepared.

Now that the Bill has become an Act of Parliament, and after the division in the House of Lords on the third reading, when we were encouraged by His Royal Highness the Prince of Wales recording his first vote ever given in the House in our favour, and by a majority of no less than 49 to 4, it is no longer of such importance to show the erroneousness of Liebig's views on our scheme; but I nevertheless feel that it is a question of such vital importance to the ratepayers, that they are entitled to the satisfaction of knowing that the only serious opponent of our scheme did not dare to face a cross-examination in the witness box, and I take this mode of giving publicity to the fact, in order that by the same means I may state publicly that upon so decided and uncompromising an opinion of so great an authority, I consider that your Lordship and the Corporation were fully justified in opposing the Bill before the Committee of the House of Commons.

I have the honour to be, my Lord,  
Your Lordship's most obedient  
humble servant,  
W. HOPE.

8th June.

*Postscriptum.*—Since writing the above I have received this morning another letter from Baron Liebig, a copy of which I have also the honour to

enclose to your Lordship herewith. It must be confessed it is rather a tardy acknowledgment of the receipt of my letter of the 30th April, so tardy indeed that I am tempted to believe it is dictated more by the majority of 49 Peers to 4, than by the rules of "courtesy," with which it scarcely seems to comply. It would also have been more satisfactory if the learned Baron had stated more distinctly whether he still held to his Soap Bubble Theory adopted by the 4 Peers forming the Minority; or whether he concurred in the decision of H.R. H. the Prince of Wales and the 49 Peers forming the majority.

W. H.

À MONSIEUR

M. LE BARON

JUSTUS DE LIEBIG,

PRÉSIDENT DE L'ACADEMIE DES SCIENCES, &c. &c. &c.  
à MUNICH.

*2, Old Palace Yard,  
Westminster,  
7th April, 1865.*

MONSIEUR LE BARON,

Our attention has been called to a short letter which you addressed to Dr. Brady, on the 29th ultimo, and which that gentleman published in the "Star" newspaper, in which you say that you are "preparing a third letter," which will expose "the paltry inside of the glittering bubble" which, in your former letter, you asserted our scheme for the utilisation of the Sewage of the Northern area of the Metropolis to be, contrary to the opinions of the Metropolitan Board of Works, of the Select Committee of the House of Commons, of Captain Galton, H.M. Under Secretary of State for War, and formerly Main Drainage Commissioner, and of the leading Chemists, Engineers and Agriculturists throughout the country.

If this short note was really sent by you to Dr. Brady, we presume all the former letters published under your name must also have been genuine, a



question upon which we have been hitherto unable to come to any decision.

Now, taking for granted that all the letters are really genuine, you have made an uncalled for attack upon us in a matter of business with which you were wholly unconnected, at a moment and in a manner calculated to do us infinite damage, and which has already cost us vast sums of money in Parliamentary expenses; for the City of London have depended wholly upon your support in their opposition to our Bill.

We are willing to believe that you were actuated by the purest motives, and desired only to further your own theories, but one of your strongest arguments was founded upon the fallacious assumption that £28 was the *capital* instead of the *yearly* value of the Craigentenny meadows; and this is surely one of the most fundamental and gigantic mistakes that any man ever laboured under?

Our scheme is not an affair of yesterday, it has been carefully considered and matured, we are confident of the truth of all our statements, and we believe that if you will approach the subject calmly and dispassionately, with a sincere desire to ascertain the truth, we can convince you of the soundness of the scheme in less than an hour. We also know that in less time still we could prove to a Parliamentary Committee the utter fallacy of all the statements that you have hitherto made in any way antagonistic to our scheme.

We believe, in short, that deriving your information as to our scheme from hostile sources, you have taken up entirely erroneous impressions regarding it; that you do not in the least understand what it is that we really propose to do, and that as soon as you do understand it, you will approve our scheme as heartily as all the Chemists in this country already do.

You are aware that our Bill has still to pass through the third reading in the House of Commons, after which it will be again examined by the House of Lords. You cannot be ignorant of the great weight which statements supported by your name carry. You have already confessed to the gigantic mistake of representing the *yearly rental* as the *capital value* of the Craigentenny meadows. You cannot desire that any more such monstrous blunders should be sanctioned by your name, and still less that we should suffer from such misrepresentations without the power of proving their fallacy?

Yet, unless you respond to our former invitation, conveyed to you in Mr. Napier's letter of the 3rd ultimo, and come over to this country to be examined by Parliament, such will inevitably be the result of the line of conduct you propose to follow. We therefore appeal to your honour and sense of justice, to appear before the Committee of the House of Lords, and allow us to cross-examine you.

We are willing, and hereby bind ourselves to bear

the entire expense of your journey, and to add, if you wish it, an honorarium of ten guineas per diem during your absence from Munich; and in order that no one may accuse us of wishing to buy off your opposition, or you of having sold your opinions, we shall send copies of this letter to the newspapers, so that the transaction may be perfectly open and above board.

We think it our duty also to add, that if, contrary to your reputed character and to our expectations, you decline this fair proposal, and refuse to submit yourself to cross-examination upon oath, we shall do our very utmost to destroy your reputation in this country, and that we shall do so with every chance of success.

However, we hope and believe that you will adopt the manly and honourable course that we now urge upon you, in which case, we feel very little doubt that we shall not require to cross-examine you at all, for as soon as you learn what our scheme really is we believe that you will be one of its warmest supporters.

We have the honour to be,

M. le Baron,

With great respect,

Your obedient Servants,

WILLIAM NAPIER,

W. HOPE.

Munich, 12th April, 1865.

GENTLEMEN,

I beg to acknowledge the receipt of your letters of the 3rd March and 7th April.

I refrain from replying to those portions of the latter which are personally invective towards myself, and which apparently seek to intimidate me from expressing my honest and truthful convictions. I have no wish to injure the interests of any party or parties concerned in the question, and have approached the subject free from all bias, and with the sole wish to give my humble aid in the solution of a question which is far above all private or personal considerations, and which vitally concerns the interest of the nation at large.

I beg you, therefore, to believe that in the advice I have given and the views I have expressed, my object has been to assist yourself and others in coming to a right decision, and if these intentions and wishes on my part have been misinterpreted by you, I can only regret it. *All your calculations are founded on an incomplete knowledge of the nature of the Craigentenny meadows, and on that erroneous theory that you can grow Italian rye-grass in pure sea sand to which the nutriment is supplied in solution; and if I show that you throw away your money in doing so, I am—as it is my intention to be—your benefactor and not your enemy.*

With respect to your appeal to me to repair to



England, I beg to say, that I might possibly have accepted an invitation from a Committee of the Houses of Parliament, to appear before them and to give my evidence on the question at issue, but I must decline to appear as the partisan or supporter of any particular scheme, for I cannot allow myself to be drawn within the vortex of party strife on a question of great public interest and utility.

With respect to the threat contained in your letter, of your intention to do your utmost to destroy my reputation in England, I leave it to the public, before whom this correspondence will be placed, to judge how far passion and intimidation are to prevail against honesty and truth. A scientific reputation which could be so easily destroyed, would not be worth defending.

I have the honour to be,

Your obedient Servant,

JUSTUS LIEBIG.

MESSRS. NAPIER and HOPE,  
London.

À MONSIEUR

M. LE BARON

JUSTUS DE LIEBIG,

PRÉSIDENT DE L'ACADEMIE DES SCIENCES, &c. &c. &c.,  
à MUNICH.

2, Old Palace Yard,  
Westminster,  
18th April, 1865.

MONSIEUR LE BARON,

ON my return to town last night I found your letter of the 12th waiting for me, and in Mr. Napier's absence I hasten to reply to it.

I am sorry to find that you have entirely misunderstood the nature of the invitation to come over to this country, which we have addressed to you; for you say, "I must decline to appear as the partisan or supporter of any particular scheme," that we "apparently seek to intimidate you from expressing your honest and truthful conviction," and that you leave it to the public "to judge how far passion and intimidation are to prevail against honesty and truth."

The notion of intimidating you from expressing your honest convictions, derived from personal and positive knowledge, never for one moment entered our heads, nor do I think, after carefully reading over our letter of the 7th inst., that any such con-

struction can properly and fairly be put upon it, for though written hurriedly, it yet points out very clearly that what we desire is, that you should not lend the weight of your name to the authoritative enunciation of statements *as facts*, of which you have no personal knowledge, and only derive from second-hand information, or deduct by inference, and which we know to be in direct opposition to the facts as they exist; as for example, your statements that the Craigentenny sands are *not sands*, and your inference that £28 per annum per acre is the *capital* and not the *annual* value of those sands.

It is very true that such statements, unsupported by any legal evidence, would not be received, or even listened to by any Court of Law or Parliamentary Committee, but they nevertheless pass as facts with the public, and are believed by every one not specially acquainted with the subject, that is to say by at least nine persons out of every ten, and therefore, despite their utter fallacy, they do us infinite damage.

We have consequently appealed to you to come over to this country and allow us to cross-examine you upon oath, before a Committee of the House of Lords, in order that if you still persist in such statements, we may first show by cross-examination of yourself, that you have no personal knowledge of the subject, and secondly, by leading proper legal evidence, prove the truth of our statements and the fallacy of yours—though this we *have in fact already proved* before the Committee of the House of Commons.

Yet in spite of this, and in the face of the most positive, direct, and unimpeachable evidence, you reiterate, in the letter to which I am now doing myself the honour to reply, your assertion that we are ignorant of the nature of Craigentenny sands! It is true, you add, “and if I show that you throw away your money . . . I am your benefactor and not your enemy.” This I freely grant, and I never supposed that you were intentionally our personal enemy, as indeed why should you be? But, M. le Baron, *assertion* is not *proof*, and you do not “show” us that we are throwing away our money, you only *assert* it.

You assert that our scheme is “a soap bubble, “glistening with bright colours, but inside hollow “and empty.” Such an assertion by itself would not perhaps carry much weight, as it would be taken for a poetical exaggeration, much as if you had quoted the lines—

“A bubble bright as ever *hope*  
Blew from fancy or from soap,”

without, of course, meaning them to be taken in their strictly literal sense; but you continue—“There “is not the slightest doubt that every penny expended in that frivolous undertaking would irretrievably be lost. The carrying out of this scheme “would not only be a squandering of an enormous “amount of money, but before long would also be “looked on as a national calamity.”

You then write two long letters, founded upon erroneous data, in support of your opinion.

Now, we say, first, that no man has a right to

pronounce such a sweeping denunciation of any scheme upon second-hand information; and, secondly, that, having done so, he is bound to come forward and substantiate or attempt to substantiate his opinions by giving personal evidence, and to allow the parties, of whose scheme he has pronounced so utter and total a condemnation, to cross-examine him. Therefore it is that we have made an appeal to you to come over to this country, and I now beg to repeat that appeal in the most emphatic manner. We ask you to come, not to become "a partisan or supporter of any particular scheme," as you appear to fancy, and which you properly decline to do; still less do we wish to prevent you, by intimidation, "from expressing your honest and truthful conviction:" but simply to repeat upon oath, before a Committee of the House of Lords, the opinion that you have already pronounced in writing in such unqualified and unmeasured terms, and so to give us the opportunity of cross-examining you upon oath as to your reasons for coming to that opinion.

I may mention that it is impossible, for many reasons, for any Parliamentary Committee to convey to you the invitation, as you would have wished; first, there is no Committee of either House constituted at the present moment, as the Committee of the House of Commons have done their work and made their report, and the Committee of the House of Lords is not yet appointed; secondly, when the latter is appointed, we shall wish to proceed to business as soon as possible, and there would

therefore be no time for you to receive an invitation from them; and thirdly, it is altogether contrary to the usages and rules of both Houses of Parliament that a Committee on a private Bill should protract the enquiry and therefore the expense, by inviting witnesses from abroad; but we give you the desired opportunity of giving your evidence on the subject, and while we urgently appeal to you in fairness and justice to appear before the Committee of the House of Lords, we at the same time invite you (and I trust with courtesy) to come to this country to see and hear for yourself, instead of trusting to the eyes and ears of others, and to do so, upon a footing which will be as little inconvenient as possible.

At the same time I feel bound to repeat the word of warning contained in our last letter, and which I am sorry to see you interpreted as a threat, viz. that "if you decline our fair proposal and refuse to submit yourself to cross-examination upon oath, we shall do our very utmost to destroy your reputation in this country, and that we shall do so with every chance of success."

It is no flattery to say that your opinion carries greater weight than that of any other man alive on such a question as the present, and for this reason we cannot pass over your opposition in silence. Were the matter a mere scientific discussion, we should not care to put any pressure upon you, and we should abstain most carefully from every expression that could cause you annoyance; but it is a matter of business in which we have expended a

very large sum of money, and we must protect our own interests. If, therefore, you still lend the weight of your name to statements destructive of our scheme and at variance with the facts, and refuse to give us a fair chance of either converting you, (not from your own chemical theories, but from your erroneous views as to the Craigentenny sands, and as to the operations proposed by our scheme), or of proving from your own evidence in cross-examination that your opinions upon our scheme are founded upon hearsay evidence, and are therefore valueless, then I say that we must in self-defence do our very utmost to destroy that reputation which induces people to accept, without question, *as facts*, statements which are wholly devoid of any foundation, and I think it only right to add that such is the love of fair play in this country, that we shall make the attempt with every chance of success.

To be laid under such a necessity would, however, cause me very great pain, and I therefore hope most sincerely, that, understanding as you now cannot fail to do the nature of our invitation, and why it is that we appeal to you to come to this country, you will at once accept our proposal, when, as we said in our letter of the 7th inst., I make no doubt that on informing yourself personally of the facts in connection with our scheme, you will become one of its warmest supporters. And surely, M. le Baron, you, who have had the courage before now to own your opinions mistaken when they were founded upon personal observation, need not hesitate to confess

your opinion on our scheme erroneous when it is founded upon second-hand information, which we shall prove to you to be false.

In order to put you to as little unnecessary inconvenience as possible, we would let you know by telegraph when your presence in London would be required; and awaiting your answer in the full confidence that it will be in the affirmative,

I have the honour to remain,

M. le Baron,

With great respect,

Your obedient servant,

W. HOPE.

*Munich, April, 1865.*

SIR,

I HAVE to acknowledge the receipt of your letter of the 18th of April, to which I reply a few words, that you may be in a position to judge how far my coming over to England would favour the execution of your scheme.

It cannot have escaped you that during the last twenty-five years I have strenuously endeavoured to draw attention to the source of our existence, to show that the art of Agriculture does not consist only in making the earth produce, but also in rendering its productiveness permanent, and that of the various means for doing so there is only a single one which can be safely relied on to secure the perpetual fertility of our fields, viz. The utilisation of the Sewage of Towns.

You will understand, therefore, when lately the application of Sewage of the largest town in the world became a question of public interest, why I lent my aid to solve a question, on the decision of which, in my opinion, the future welfare of more than one nation depended.

It is not necessary to assert that my opposition to your scheme had no personal motive. The reasons why I was against it are obvious. Your

scheme seemed to me the worst way of utilising the Sewage of the Metropolis, its execution the greatest hindrance for assisting the wants of the farmers, and its failure the death-blow for the future application of Sewage, "not even for grass crops," the farmers would then say, is the London Sewage worth anything!

As to facts on which my opinion is founded, *they are your own*, brought forward in your evidence before the Committee of the House of Commons, and those I found in the description of the Edinburgh meadows, published in the Report of the Main Drainage Commissioners, and I submit it will be difficult for you to point out a single statement of mine on the nature of the Maplin Sands or on that of the London Sewage, wholly devoid, as you say, of any foundation. All I know in regard to these matters is taken from your own writings, or from Official documents.

If, as stated in your letter, the truth of your statement and the fallacy of mine have already been proved before the House of Commons, there can be no further necessity for my evidence.

As to "assertions" made by me without "proof," I beg to say, that it is Science that has here to decide, and if my opinions are called into doubt, let therefore a Committee of Scientific men, the ablest which England can produce, be appointed to visit the localities in question, and report on the nature of their respective soils. This course would



be, I imagine, satisfactory to yourself, and be considered conclusive. I, for my part, am quite willing to abide by such Committee's decision. This would lead to a more practical result than if I were to be examined before the House of Lords. Besides no cross-examination, as you seem to suppose, would extract from me any evidence to show that Italian rye-grass can be produced in pure sea sand manured with sewage water, for do what you will, Science after all can only pronounce a judgment in harmony with the laws of Nature. So long as you dispute the very basis of my arguments, it would be useless for me to prolong the discussion or to enter further into the merits of your plan.

Consequently my presence in England at a considerable sacrifice to myself would not be of any practical utility or advantage to you.

If, on the other hand, you recognise the truth of a theory not invented by me, but founded on Science, then I should be most ready, even at a personal sacrifice, to give you every assistance in my power; I must beg you, therefore, to accept this statement as a final reply to the "threat" reiterated in your letter in the shape of a "Warning" that you will do your utmost to destroy my reputation, if I should decline your invitation to repair to England.

Labouring, as I have done, so long in the development of Science, and especially in its application to Agriculture, I shall still faithfully and

energetically support and defend those opinions which are founded on the immutable Laws of Nature.

In the metaphor you alluded to it certainly was not my intention to indulge in a poetical strain, though I cannot but confess in the scheme proposed it does seem to me as if

"Hope told a (too) flattering tale."

I have the honour to be, Sir,

with much respect,

your obedient servant,

(Signed)

JUSTUS LIEBIG.



À MONSIEUR

M. LE BARON

JUSTUS DE LIEBIG,

PRÉSIDENT DE L'ACADEMIE DES SCIENCES, &c. &c. &c.,  
MUNICH.

---

2, Old Palace Yard,

Westminster,

30th April, 1865.

MONSIEUR LE BARON,

Last night I received with great pleasure your answer to my last letter.

I am well aware that for a quarter of a century you have, as you say, unceasingly advocated the use of town sewage, and it is this very fact coupled with the great reputation which you have acquired in this country in all kindred subjects, that makes me so anxious to disabuse your mind, if possible, of those erroneous impressions as to the nature of our scheme for the London sewage, which have been so carefully imparted to you, or, if I fail in this, then to induce you to come over to this country in order that I may disabuse the minds of the public as to the value of your opinion of

our scheme, by showing that in this instance your opinion is valueless, because it is founded upon erroneous data which you have acquired from others and not by personal observation, and for which therefore you are in no way responsible.

Nothing can be fairer than your proposal to submit the points in dispute to a Committee of scientific men and to abide by their decision, and were there the slightest occasion for any further enquiry I would at once arrange with you the nomination of a Committee, but we are already supported in our statements as to the Craigentenny and Maplin Sands, by the three men in all England the most competent and fitted to pronounce an opinion, namely, Professor Anderson, Professor Voelcker, and Professor Way. These three gentlemen, an Englishman, a Scotchman, and a German, represent three different schools of chemistry, and they fully and entirely and cordially endorse everything that we have stated with regard to those two localities. Indeed, there is no room for doubt. It is just as notorious a fact that the Craigentenny "Sea Meadows" or "Figgate Whins" are composed of the purest seasand, as it is that the cliffs of Dover are made of chalk, and this we have already *proved*, by proper legal evidence given on oath, to the entire satisfaction of the Committee of the House of Commons, as also the second fact that grass grows in this pure sea sand by the application of sewage water and *nothing else*.

I therefore cannot understand how you can doubt or deny these two statements.

You have probably been told that we were a pair of ignorant schemers, regardless of science and her teaching, reckless as to the future, and only desirous to make a little money by the concoction of a Company. You have therefore, as it appears to me, taken for granted that we had no profound knowledge of the subject, that we were unsupported by any scientific men of eminence, and that our statements were not worthy of serious attention or consideration. It is for this reason that I have written in such strong terms, challenging you to repeat upon oath that comparison of our scheme to a "soap bubble, glistening with bright colours, but inside hollow and empty," which you have already made in writing, because it appeared to me that such a challenge was the only way to induce you seriously to consider our statements, and soberly to examine the basis upon which your opinion of our project was founded, in order that you might realise the fact that you were condemning it upon *hearsay evidence*, and not upon positive and personal knowledge; and I am delighted to see by the altered tone of your last letter, that you are beginning to doubt whether after all you have not been deceived, and induced to pronounce an opinion contrary to the facts.

On the other hand, I do not desire for one

moment to call in question the truth of your chemical theories. Having been educated at the University of Cambridge, I have the greatest veneration for Science, and for those men who devote their lives to fathoming the mysteries of Nature by her aid. Accordingly, when I find a patent and unassailable *fact* opposed by a scientific *theory*, I do not at once say the theory must be wrong; on the contrary, I assume that it also is true, and I endeavour to smooth over the discrepancy, and to reconcile theory with fact, science with nature.

Do not let us, therefore, dispute the truth of our respective statements, neither your theories, nor my facts.

You state that grass will not grow in pure sea sand, if nourished only by "sewer water." I point to a case where grass *does* grow in the purest seasand, nourished by nothing but "town sewage."

You state as a reason, for the impossibility of growing grass in pure seasand, by the application of sewage alone, that sewage does not contain all the elements necessary for bringing a land plant to maturity, and that a coating of clay must be spread over the sand to produce the desired effect.

Now, if you assure me that no land plant can come to maturity in a pure sea-sand, to which the nutriment is applied "only in solution," I am bound to believe you, and neither wish, nor am

under any necessity to deny it. Sewage contains matter in *suspension* as well as in *solution*, and therefore I am led to conjecture that it must contain the small amount of clay washed from the streets, which you consider to be essential to vegetable life.

But I gather from your letters to the Lord Mayor, that you have never had an opportunity of conducting any experiments with genuine English town sewage, and have been obliged to content yourself with an "artificial sewer water," compounded, I presume, according to the analyses published by various persons.

Now these analyses have generally been made with some special view, and have generally been of "sewer water" in the strictest sense, that is to say of some sewer which contained only *house* sewage and no *street* sewage. Such samples naturally would contain no clay, and do not represent a fair sample of "town sewage."

Trying thus to reconcile your chemical theory with my own positive fact, I imagine that you must have been led to commit a slight *practical* mistake in your *scientific* experiments, for which again you are clearly in no way responsible. Seeing a number of analyses of "sewer water" all more or less agreeing with one another, you naturally took these as fair samples of "town sewage," and thus in compounding the "artificial sewer water" accidentally omitted an important element.

At least this seems to me to be not only a possible, but also a highly probable explanation of the discrepancy between your theory founded on scientific research, and my fact derived from practical experience.

As regards your other views expressed in your letters to the Lord Mayor, they are 1st, that we do not contemplate a wide enough distribution of the sewage; and 2ndly, that we should be wrong in applying sewage by itself to perhaps any crop.

Your first objection is one of an engineering character, and therefore I may be excused if I disagree with you, however on this also you have been misinformed. We do not wish to lay down any dogmatic rules to the farmers. We tell them, and we tell the public, what has been done in other places, and that with a certain dressing, a certain return may be assuredly calculated on, this is after all only what you say yourself. We say 3000 tons an acre per annum of "sewage," you say about 2400 tons of "sewer water." There is no very great difference here. But you then go on to say, that by giving smaller doses over a greater extent of country, a greater profit may be obtained. Here we dissent. The question is, as I have said, an engineering one. We do not dispute that you might be able to increase the *gross produce*, but we say that it would not pay, because the wider distribution would increase the *cost* in a still greater ratio than the *produce*.

Your second objection is a chemical one, and I bow to your chemical knowledge at once, and I have very little doubt that in the course of a few years, by your assistance, we may be enabled to increase the realisable value of sewage in a far greater degree than by the cost of the chemical substances which you would advise should be mixed with it. The *modus operandi* to be adopted in mixing these ingredients with the sewage might require consideration, but it is a mechanical question of no very great difficulty. However we say this, that to obtain a very brilliant result from the application of sewage, it is not the least necessary; that any increase of such nature would come as an extra profit; and that we should not be justified in asking public support for our scheme upon such expectations alone.

I trust and expect that you will, after this further explanation, see through the misrepresentations that have been made to you in respect of our scheme, and will admit that we propose to do nothing in any way contrary to the "Laws of Nature," and that we have no sort of objection to improving the scheme as far as possible under your chemical advice, always reserving our right to form independent opinions on engineering points, or questions of a purely practical nature.

But if we are still to be adversaries, then I beg to repeat more urgently than ever our appeal to

you to come over and appear before the House of Lords.

Begging for a reply at your earliest possible convenience.

I have the honour to remain,

M. le Baron,

With great respect,

Your obedient servant,

W. HOPE.

---

*Reichenhall,*

*5th June, 1865.*

SIR,

I had hoped and intended to have closed our correspondence by my last letter, but courtesy requires that I should acknowledge the receipt of your letter of the 30th April.

I have fully and unreservedly conveyed to you my opinions on your scheme for the utilisation of the London sewage. I have done so after full consideration of the subject, and with no other wish or object in view but that of assisting you and others in forming a correct judgment as to the difficulties

and most efficacious means of carrying out this important undertaking.

Having now, as I consider, exhausted the subject, I am unwilling to continue further discussion, which can lead to no practical good; for to judge from the tenor of your last letter, I fear that, however inclined to accept the opinions I have expressed as founded on science, you are of those who

“Convinced against their will,

“Entertain the same opinion still.”

It only remains therefore for me to express my earnest and sincere wishes that under the guidance of the eminent Professors to whom you have alluded, the great and important work of utilising the sewage of the metropolis may be carried out in the manner most conducive to the public good and the interest of all parties concerned.

I have the honour to be,

SIR,

Your obedient Servant,

(Signed)

J. LIEBIG.

W. HOPE, Esq.,

London.