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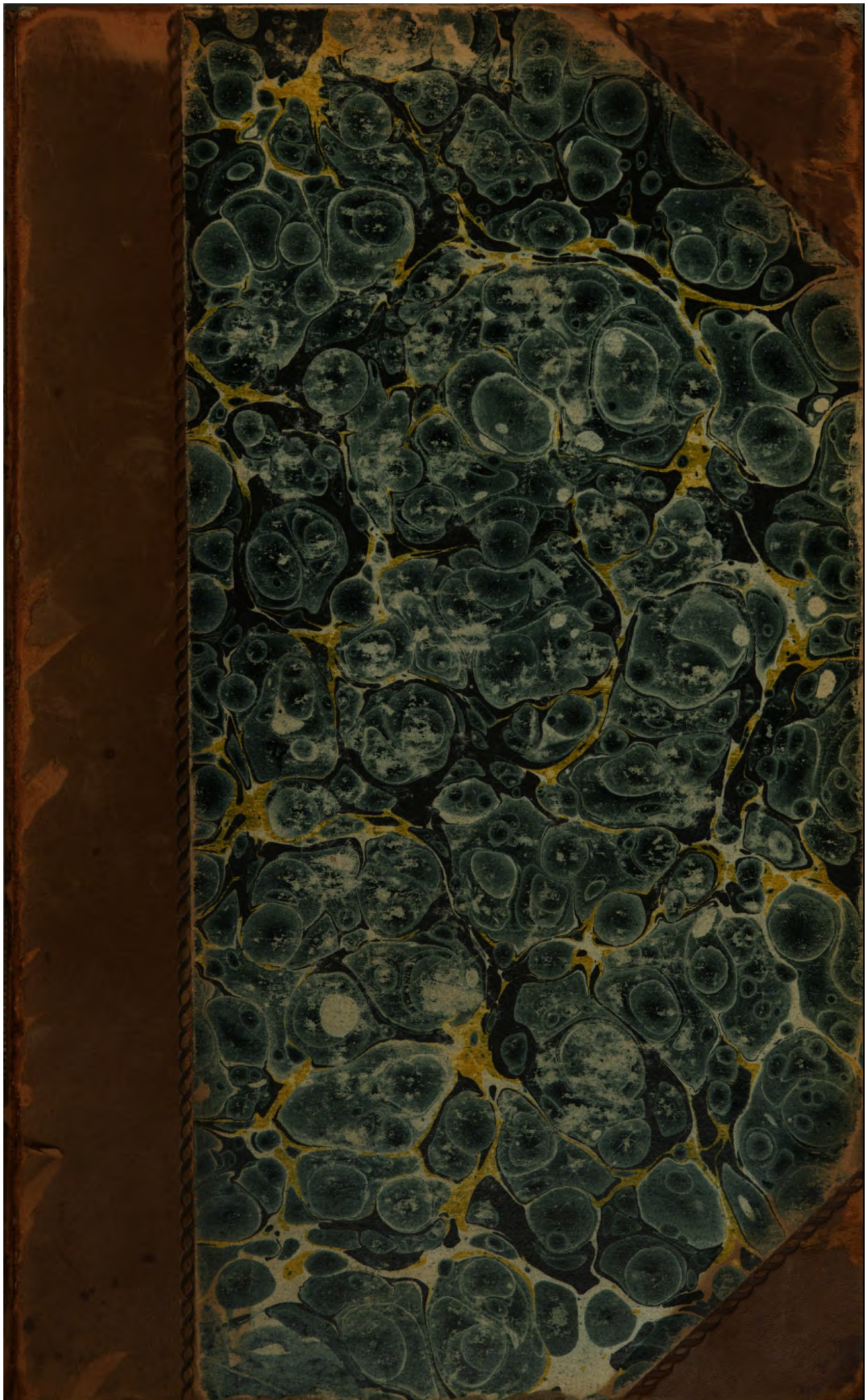
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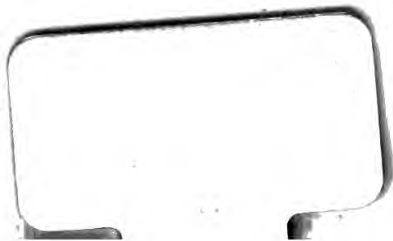
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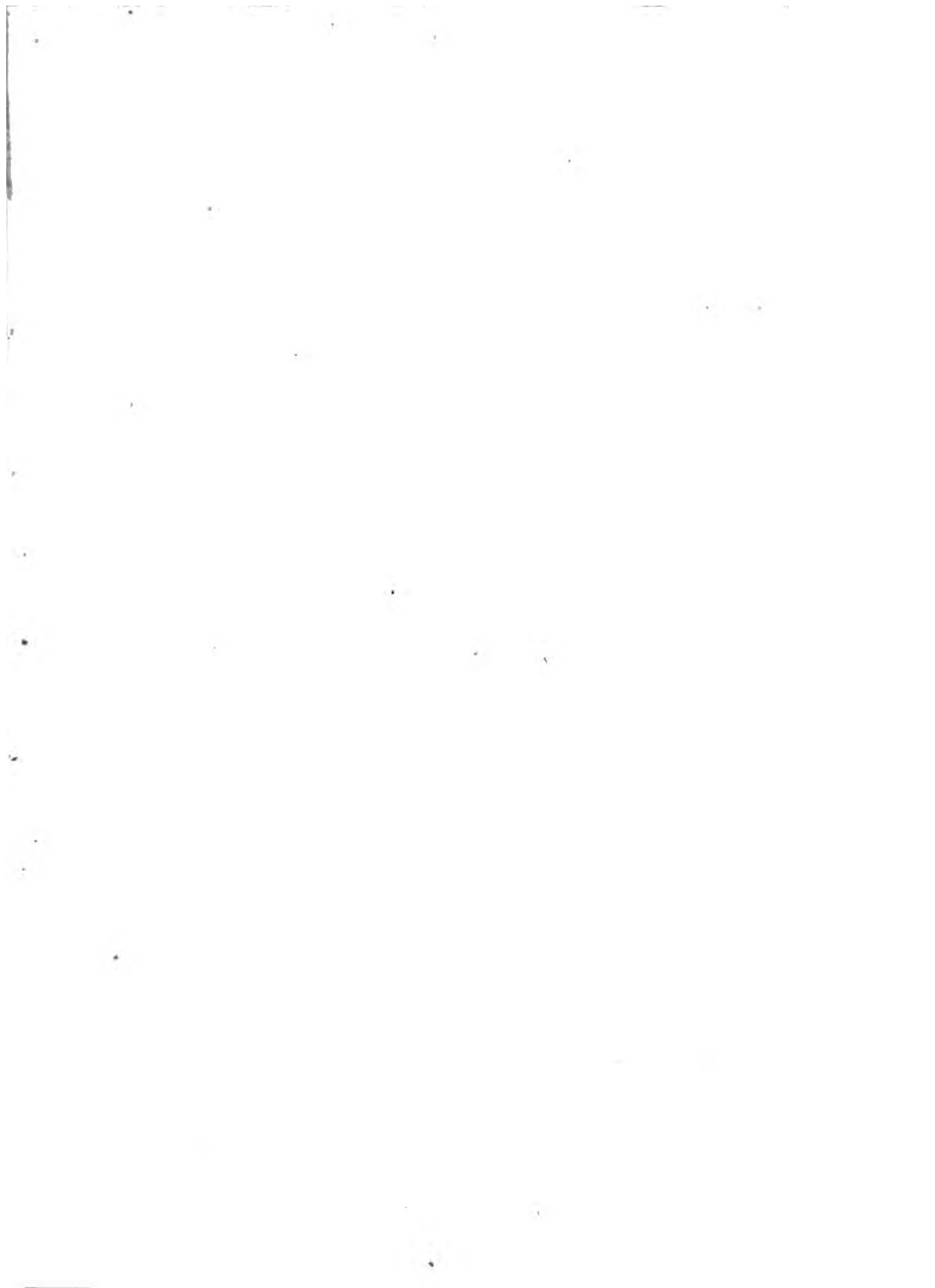


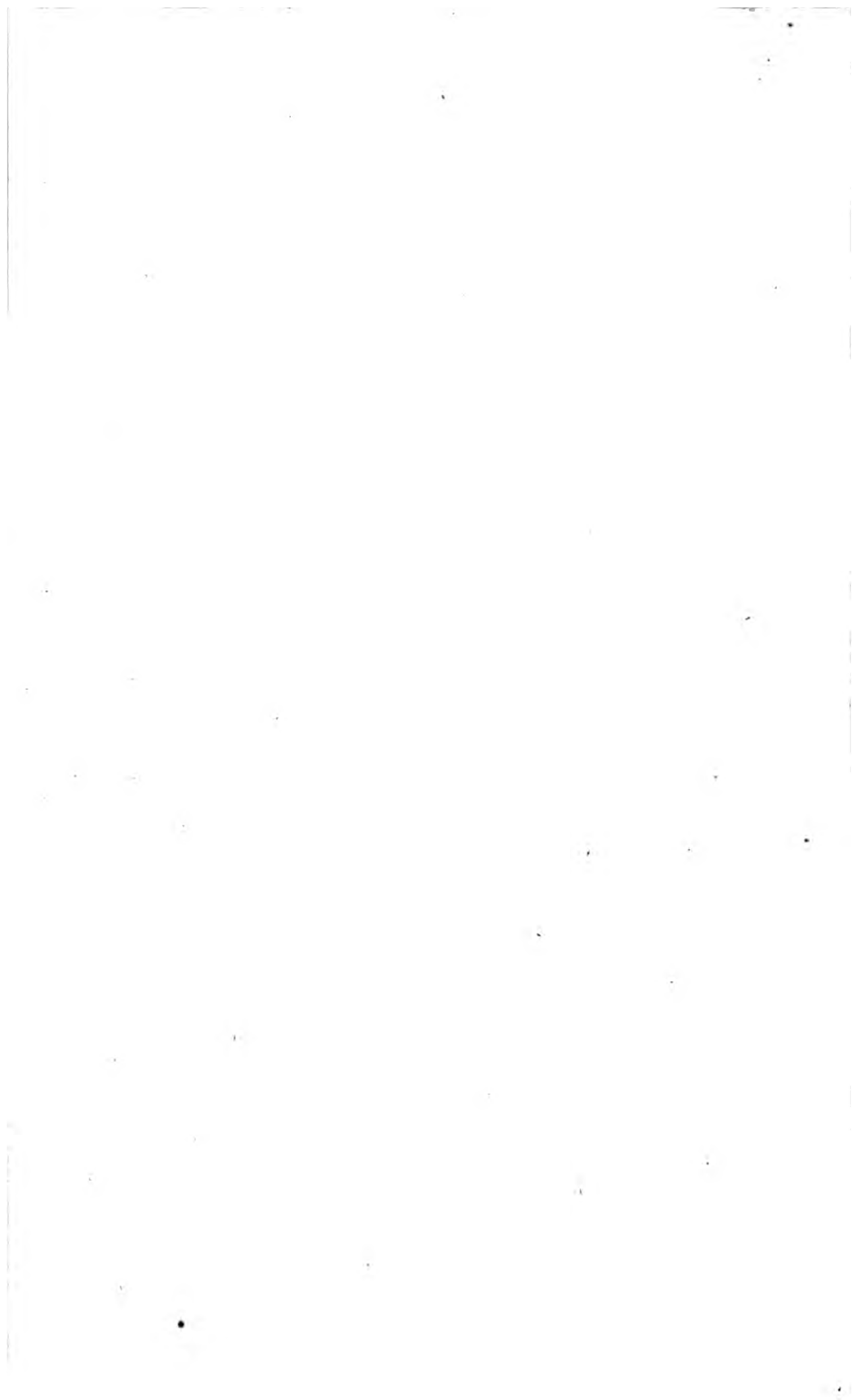
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Gough Adell
Lover.
p. 221.







T. 1028.

SUB-WAYS

PROVED

TO BE ESSENTIAL TO

THE PURITY OF WATER

IN

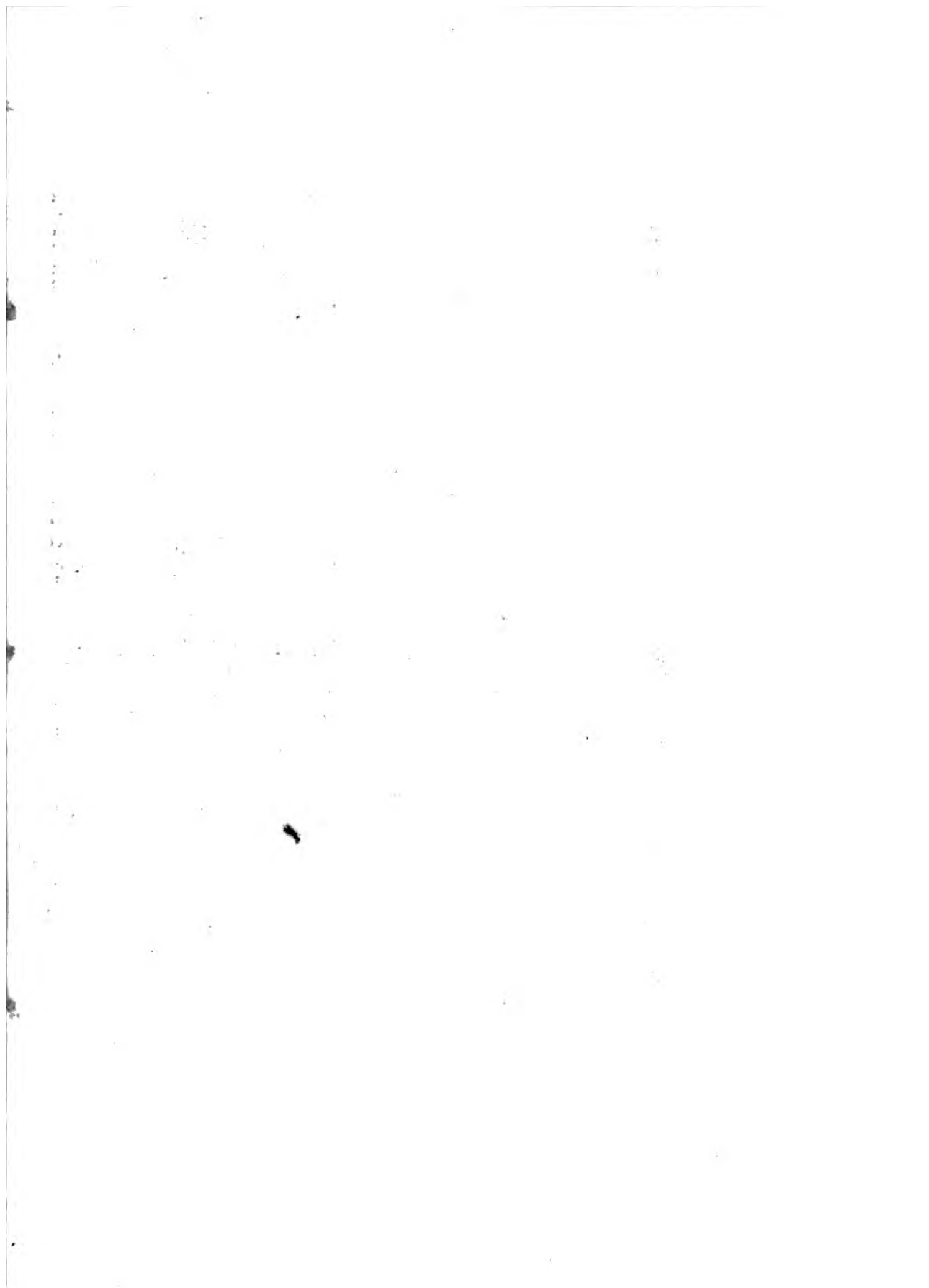
The Metropolis.

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PUBLISHED IN LONDON, 1828.

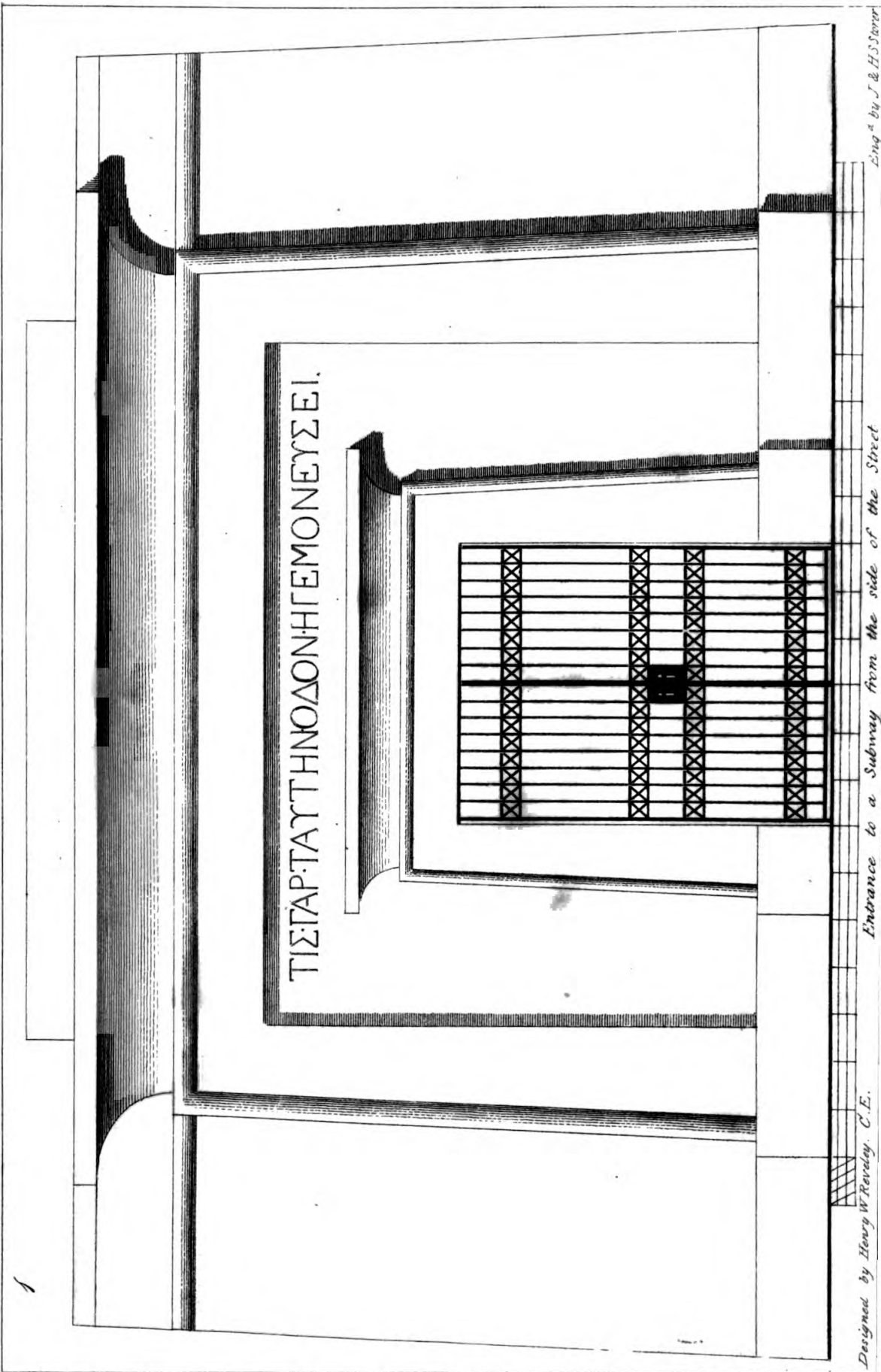


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**S. M'Dowall, Printer, 95, Leadenhall Street.**  
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1



Designed by Henry W. Revely, C.E.

Entrance to a Subway from the side of the Street

Eng^d by J. & H. S. Porter

AN HISTORICAL ACCOUNT
OF
SUB-WAYS
IN THE BRITISH METROPOLIS,

FOR THE FLOW OF

Pure Water and Gas

INTO THE HOUSES OF THE INHABITANTS,

Without disturbing the Pavements:

INCLUDING THE PROJECTS IN 1824 AND 1825.

BY JOHN WILLIAMS,

The Patentee,

CORNHILL, LONDON.

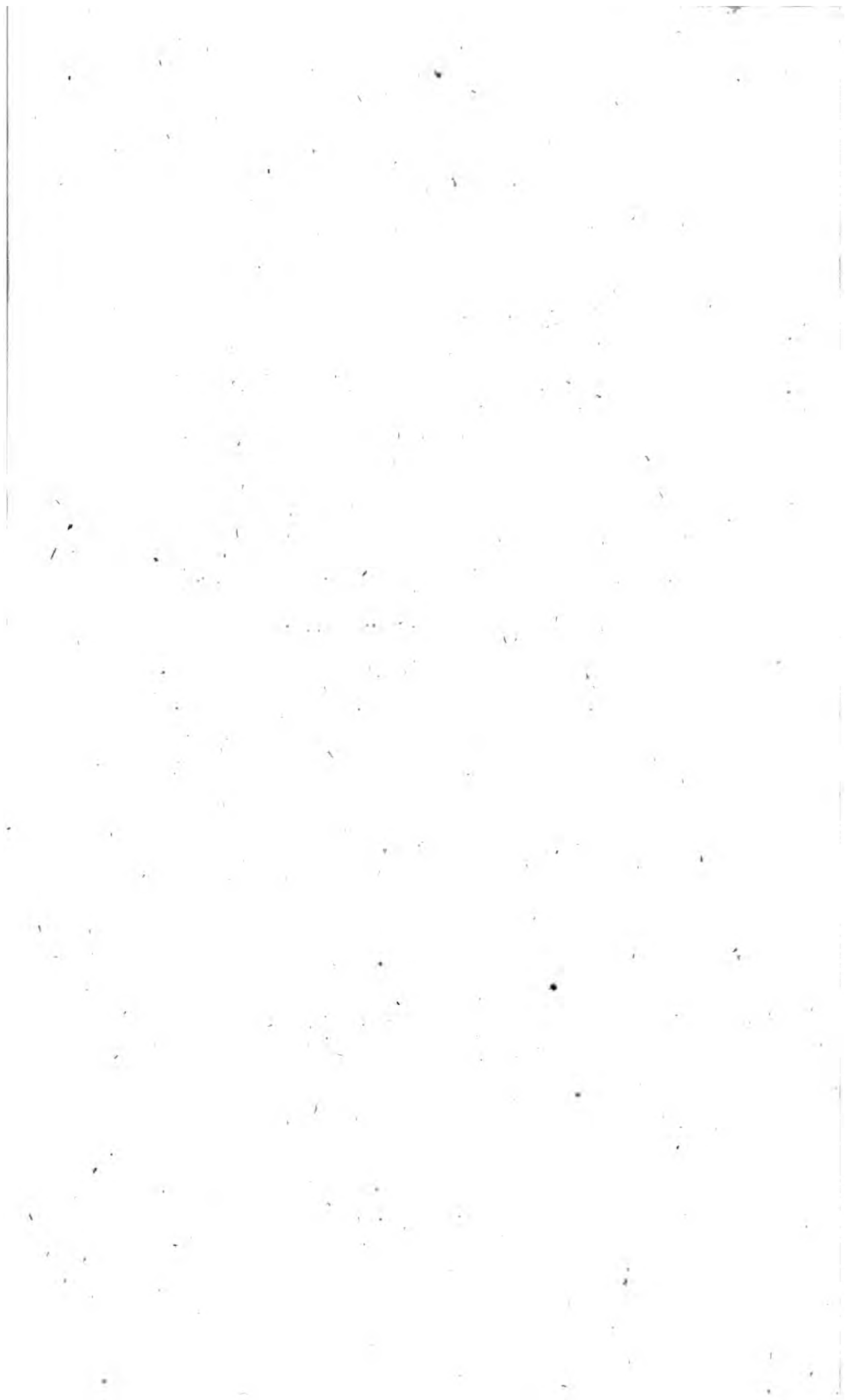
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AND

J. M. RICHARDSON, OPPOSITE THE ROYAL EXCHANGE.

1828.



RESPECTFULLY DEDICATED

TO HIS MOST GRACIOUS MAJESTY

King George the Fourth.

SIRE,

As the Augustus of the age, under whose royal auspices the Metropolis of Britain has received embellishments of such magnitude as to become the admiration of the World—and whose extending views are still raising it to an unexampled eminence—permit one of your loyal Subjects, a humble individual, to lay before Your Majesty, a plan, by which the whole of the splendid improvements already effected—those now in progress—and in contemplation, will be rendered not only complete, but will raise this Metropolis to an elevation of grandeur not attained even by Imperial Rome.

(vi.)

The sanction of Your Majesty is all that is now wanted to confirm that, which the public voice has approved at several General Meetings; and which some of Your Majesty's Ministers recommended to be brought forward. It is quite enough for Your Majesty's Fiat to be issued, for the object to be accomplished, and another monument of national magnificence added to the splendour of Your Majesty's Reign.

With the greatest deference,

I have the honour to be,

SIRE,

Your Majesty's faithful Servant,

JOHN WILLIAMS.

THE object of this Volume being to provide a remedy for the inconvenience the Public suffer from breaking up the Streets, to get to the Sewers, the Water, and the Gas Pipes, and the frequent repairs consequently necessary to the Paving ; as also to suggest various plans for the improvement of each of these public works ; it is respectfully submitted, not as a Work calculated for criticism—not as claiming any merit for classical composition, or literary research—but as a plain tale, by a plain man, amusing himself in a little leisure from his accustomed labours, in search of increased comforts.

Should the community participate in the enjoyment of any one, or all, of these good things, it will extend his delight in proportion to the benefit received. The object is any thing but selfish ; the reflexion on which is highly gratifying, in the retrospect on what he has been enabled to accomplish.

The numerous extracts given in this Work, are as so many faithful witnesses, brought for-

(viii.)

ward to authenticate the points discussed. These documents abundantly prove that it is not the solitary opinion of the Author, but the printed evidence from other writers, which more than substantiates the whole subject.

Errors have unavoidably crept into the Volume, the subject having extended itself in its progress beyond what was originally contemplated:—should a second edition be required, the whole will be corrected, and made complete.

BRITISH SUB-WAYS.

IN introducing this subject to general attention, it is necessary to premise, that British Sub-ways are distinctly different from the Roman : although they approximate in name, they differ in character and purpose ; the former being for the reception of pipes and tubes, through which Water, Gas, and other fluids may flow into buildings, on the sides of the Streets they are constructed under ; and the latter being large aqueducts, to convey all the waters of Rome, pure and foul, of every kind, under that City into the Tiber.

The Ancients, in erecting their Sub-ways, built them on a magnificent scale, as part of them shew at this day. Although they have ceased from their original purpose, the Sub-ways at Rome remain a model of the wisdom of our ancestors in their municipal regulations, and are an object of curiosity and interest to the scientific traveller.

British Sub-ways, then, are a modern invention, being a dry tunnel, immediately under the surface of the Streets, to receive pipes or tubes, to convey Water, Gas, &c. into the houses, without at any time opening the ground, or disturbing the

pavement; they at the same time give access to the Sewers below them, which properly resemble the Cloaca Maxima, or Great Water-way of Imperial Rome, by perpendicular shafts, or by inclined openings in the recesses, or in the body of the Sub-ways.

THE ORIGIN OF BRITISH SUB-WAYS—THEIR
PROGRESS—AND COMPLETION.

By this arrangement the whole subject may be brought into view, and the importance of it fully developed.

Under the consideration of its ORIGIN, will be comprehended—The existence of a *great annoyance* to the Public from the frequent repairs necessary to the Streets of London, which stop the thoroughfares; as well as by taking up the Pavements to get to the Sewers and Pipes under the Streets—the constant recurrence or continuity of this annoyance—and the burthensome expence of it: shewing the necessity of an effectual remedy. *The remedy proposed—By whom and when—The Plan described.*

The PROGRESS OF SUB-WAYS will relate its discovery being announced by a Prospectus at a Public Meeting, called by advertisement at the City of London Tavern, on November 4th, 1822;

and another Public Meeting, called on the 4th of December, 1822:—That the objections then made were very few, and fully answered—That the public voice was in its favour—That it was approved by the scientific, by Architects and Surveyors, and generally by the Building Profession—by some of His Majesty's Ministers, and Members of the House of Commons, who recommended the formation of a Public Company to carry it into effect.

A second Prospectus issued.

The subject referred to a Committee, to report their enquiry into its utility, practicability, and expence.

Two Petitions to Parliament; and a notice in the London Gazette, “ to apply to Parliament for an Act of Incorporation for building Sub-ways.”

Letters to the Secretaries of State, Lord Liverpool, and Mr. Peel; and to the Under Secretaries, Mr. Hobhouse and Mr. Dawson.

Interviews with Davies Gilbert, Esq. M.P., as the leading Mathematician in the House of Commons, and now President of the Royal Academy—with M. A. Taylor, Esq. M. P.—with the Surveyor General of His Majesty's Board of Works—with the Directors of the New River Company, the Grand Junction Company, the

Chelsea Water Works Company, the Incorporated Gas Company, the City of London Gas Company—with the Commissioners of Sewers at Guildhall, and those of Greek Street, Soho—and with the Lord Mayor at the Mansion House.

Another Prospectus issued, and Circulars sent to the Peers and Members of Parliament.

A third Petition to the House of Commons.

A Petition to the Court of Common Council, Guildhall—with an Address to them in Court, when the Petition was referred to the Committee of Improvements—Attendance on that Committee.

A Public Meeting at the City of London Tavern, to receive the Report of the Committee of December, 1822, on the 17th of December, 1823—Alderman Garratt in the Chair; the proceedings at which were adjourned to the 18th of March, 1824, when the Report was approved, and the LONDON SUB-WAY COMPANY unanimously agreed to be formed.—This Resolution not subsequently acted upon—and why suspended at that period.

I now come to the COMPLETION of the Undertaking, which will take into its range a view of several important propositions by ingenious men, highly deserving adoption, which, combined

with Sub-ways, will embrace a magnificent National Work, highly important in producing a *summum bonum* to the inhabitants of this vast City, never possessed by any kingdom in ancient or modern history.

The first thing, then, is to shew the EXISTENCE of a malady, scourge, or plague to which the Metropolis has been subjected, by the impurity of the water supplied for the personal drink and culinary use of its inhabitants.

The next will point out an effectual REMEDY for cleansing the foulest waters; and supplying water at all times, clear as crystal, in the greatest abundance, through

THE SUB-WAYS.

And, finally, that the expence, though great in its formation, will ultimately repay itself, and reduce the public Taxes.

That it must be a Public Work, from its magnitude and importance, under a Royal Commission.

Concluding with a dutiful Address to the King.

THE ORIGIN OF SUB-WAYS.

The Existence of the Nuisance, &c.

It will not require much argument to shew the existence of that which is daily before our eyes. The dirt and filth of London Streets are proverbial, and well expressed in several recent publications on that subject, from a few of which the following extracts are taken, *viz.*

From a Paper read before the Institution of Civil Engineers on the Construction of Carriageway Pavements, by MR. BRYAN DONKIN—London, 1824.

“ The very short period during which the pavements of this great Metropolis remain in a tolerable state of repair, must have attracted the attention of all whom business or pleasure induces to traverse its streets in carriages or on horseback. The holes and inequalities with which every thoroughfare is filled, almost immediately after it has been paved anew, whilst they occasion intolerable jolting, destroy carriages prematurely, and, by making the footing for horses very insecure, render two-wheeled vehicles and horseback extremely dangerous.

“ All are ready enough to detect the immediate cause of the speedy derangement of our pavements, in the immense number of heavy waggons, carts, and drays which constantly crowd the principal streets; few, however, think of looking for causes more remote, which are within the reach of remedy, and which especially deserve attention, as mainly allowing the immediate cause to exert its destructive influence. The subject of pavement, however, is too important to have escaped the notice of Engineers entirely. It has been investigated by some,

and various improvements in the method of paving have been proposed ; but from objections taken either to the nature of the materials used, or the expence to be incurred, none of them have ever been generally adopted.

In most of our streets the pavement lies on a soft and yielding bed ; in several, I have seen it bedded upon the vegetable earth, or natural soil of the place ; and in others, where it has required to be raised to the original level from which it had gradually sunk, I have seen it laid upon sand. This last, however, is generally employed in too small quantity to be of any use ; for sand, though certainly a convenient material for bedding, and supplying a more durable support than earth, is still very far from what is requisite—indeed, is altogether useless, if sparingly employed.

“ But supposing, for argument sake, that the earth upon which a pavement is laid, has been previously well rammed when dry, the stones selected of one size, and carefully bedded; (which would undoubtedly make a better pavement than is generally seen), this is not yet enough ; for the earth being spongy and absorbent, is softened in wet weather, and no longer yields a firm bearing to the stones ; these, constantly exposed to heavy weights, and to blows from carriage-wheels, are put into motion, and churn, or pound the soil beneath, till it becomes a pulpy, semi-fluid mass, easily displaced laterally, *i. e.* from the under-surface of one stone to that of another, or upwards through the crevices between the stones into the street. One stone thus acts as a forcing-pump ; for being depressed itself, the mud is either driven from below it laterally under the neighbouring stones, by which they are raised ; or it is forced up through the crevices to the surface of the pavement.

“ Thus it is that the pavement so soon becomes uneven and full of holes, and at the same time covered with mud, to the great annoyance of passengers generally. Few are aware of the source whence the vast quantities of mud are derived which we see daily taken from the streets ; but the truth is,

the foundations of our pavements are actually carted away, as a nuisance."

From "Considerations on the defective State of the Pavement of the Metropolis, &c." by WILLIAM DEYKES, Gent.—London, 1824.

"The bad state of the pavement of the streets of London has for many years attracted my notice, and more particularly when driving or riding.

"I have been an attentive observer of paviors; and though convinced their operations might have been much better performed, I did not perceive by what means (depending upon their care and attention) the system could be materially improved. The subject has continually forced itself upon my mind; and without knowing wherefore, I have felt a peculiar interest in it. Under such circumstances, the amazing accumulations of mud and dirt which, though often swept up and removed, were still succeeded again and again by equally large quantities, could not fail to excite notice, and the reflection was induced—Where could it possibly come from?

"In every age of the world, and in all climes, the metropolis of empires was a chief object of regard to reigning Sovereigns, and attracted the notice of contemporary States. Ancient History abounds with descriptions of those of Egypt, Carthage, Babylon, &c., and of the various stupendous and surprising works of art which adorned and improved them, many of which have been chiefly instrumental in rendering particular reigns memorable through ages of after-times; nor has Sacred History overlooked the subject, or omitted to mention, with great accuracy of description, the renowned cities and wonderful works of early days.

"The lapse of centuries from a period anterior to the Christian era has not, it may be inferred, been productive of

that great improvement too generally supposed, if we reflect upon the prodigious works which the enterprise of earlier days produced ; and a reflecting mind will readily imagine (not less from those ancient wonders, than from surprising modern inventions) that manifold and great objects may yet be accomplished by a liberal patronage of genius, and a judicious adoption of its emanations.

“ England, the seat of Science, and nurse of Genius, has been foremost among the nations in promoting every object of liberal and enlightened policy, every charitable and philanthropic idea, and every project which by its utility could promote the happiness, comfort, or convenience of its people. Infant States consolidate their Governments, and form their Institutions upon her example ; and nations of far earlier date seek in vain to rival her in approximating towards that perfect system to which the wisdom of succeeding generations will one day attain, and England lead the way.

“ London, the renowned City of the world, and centre of commerce, has largely benefited by the enlightened course she has pursued. Her institutions and establishments (too numerous, and too eminently celebrated, to allow of more than general expression of admiration) are alike the wonder of the Old World, and the objects of emulation to the New.

“ Amongst other objects of high importance, the improvement of the streets of London has been a prominent consideration ; the progressive changes have been marked, and are too generally known to need more than cursory notice. Not more than two or three centuries ago, but few of the streets were paved at all ; and the various histories of London record the arduous journey from Temple Bar to Charing Cross, and the impassable state of Holborn, arising from the defect. At a less remote period, the flag-stone pavement for foot passengers was introduced (how much to general comfort and convenience, every person is competent to judge).

“ More recently the adoption of squared paving stones, instead of the small round ones, called pitching stones, together with the improved mode of paving in parallel lines from curb to curb, has materially improved the streets of London.

“ Still, however, with every improvement hitherto suggested, the pavement of the streets has always been, and to the present day remains, most inconveniently defective, though very great annual expenditure has taken place; nor has any invention hitherto been announced to remedy the acknowledged defect. The names of Telford and M^cAdam stand justly pre-eminent in the science of Road-making; and it is not for me, nor do I intend, to dispute their claim to high consideration and estimation: so far the reverse, that I am free to confess I do not conceive the theories and practice introduced by those gentlemen respectively can be improved upon. But this admission I must confine to apply to roads only. The application to streets of the principle introduced by Mr. M^cAdam is now only in course of trial; and I refrain from expressing any opinion on its efficacy or fallacy. The experience of the public will best determine. But as Mr. M^cAdam himself admits (if I do not greatly mistake) that his theory cannot with advantage be practised upon those narrow and confined streets which are great thoroughfares; and as many of the warmest advocates of the theory, and friends to the practice of *Macadamization* admit, whilst they regret, the increased creation and accumulation of dust and sand, in drawback of the merits of the device; it hence appears that, as applicable to streets, the point of perfection is not yet attained.

“ Leaving Mr. M^cAdam's system in full possession of the roads, and to its action upon the streets of London, according as experience shall teach the public to adopt or reject it, I shall state, under distinct heads, the various faults, defects, and inconveniences of the pavement of the Metropolis, always meaning, in the general term “pavement,” the carriage-way only of the streets.

“ 1st.—The pavement is so continually out of repair, that it baffles the most vigilant superintendence to keep even the greatest thoroughfares in a tolerably good state:—in instance of this, the new and most expensive pavement (equal to any in London) with which the whole of the Strand has recently been repaved, already evidences impairment fully characteristic of the causes to which the general imperfections of pavements are herein attributed.

“ 2dly.—The dust in dry weather is greatly annoying, and highly injurious to goods and furniture, to say nothing of personal feeling and annoyance in having the eyes blinded, and the mouth choked therewith; and no sooner is there a wet day, than the streets become ponds of mud. By the time the accumulation is almost intolerable, the scavenger commences the annoyance of sweeping, and scooping it into his carts, and splashing and bespattering every passer-by, not prudent enough to cross out of his way, and be content to be covered over the ankles with mud, rather than over neck and ears. To this item may also be charged the never-ending scourings, brushings, and cleansings of carriages, by which the superb and highly painted and polished panels are scratched and defaced, and their lustre obscured. As to ladies' and gentlemen's dresses, I leave individual feeling to its own operation.

“ 3dly.—The unevenness to which the surface is liable, and which gives rise to many accidents by passengers and horses falling. From the same cause, carriages and vehicles of every description become shaken, and old, and deteriorated many years earlier than, upon passage over a surface more evenly preserved, they would do; whilst the jolting motion (which the most improved springs cannot obviate), and deafening noise, being also attributable to this cause, further increase the items of the account chargeable to this head of defect and consequent inconvenience.

“ 4thly.—The wide-gaping intersections or interstices between the paving stones. To those who have neithersprained

an ankle, nor filled a shoe with mud, this item will not be intelligible ; but to those who have, I need say no more. By the admirer of the grandest quadruped in nature—the horse—the subject will be appreciated, and felt with a compassionate interest inherent in every generous breast, when convinced (as every person must be, at all qualified to form an opinion) that to this cause, in a very great degree, may be attributed the various injuries to the sinews and tendons of the legs, the fruitful source of all the founderings, firings, and blisterings which that noble animal in its brief existence endures.

“ The several points of consideration, though stated under separate heads, are intimately connected in cause and effect, and may therefore be treated of collectively.

“ The necessity of frequent repair arises almost wholly from the aptitude of the earth, on becoming saturated with wet, to lose its natural consistency, and become mud ; and consequently that foundation for pavement which ought to be hard and inductile, becomes soft and penetrable. The multitudinous and unceasing passage of immense weights over the surface keeps the stones in constant sway and motion, and propels them downwards into the softened foundation. The surface of the pavement being thus once disorganized, and even a single stone forced below the general surface, each succeeding wheel in its revolving motion jolts into the hole thence formed, and acting with an impelling power from time to time, deepens and enlarges it ; the effect of which is, that the stones in immediate contact, losing on one side that equal support which previously existed, incline to the defective part, and the defective parts existing in many places, hence the ruin spreads, and the streets become such as every day's experience presents to our view.

“ The second head of objection results from the same cause as the preceding. The gravel in the interstices between the stones becoming wet, loses its proper consistency. By the operation of gravitation, and law of motion, as the heavier body

sinks, or is impelled downwards, the lighter body of fluid is thrown upwards, and ejected. Thus the gravel between, and the earth under the stones, are forced upwards in quantity in proportion to the sinking of the stones, and form on the surface of the pavement, mud more or less diluted, according to the quantity of rain which it has imbibed. The gravel in a wet state exudes also by the lateral pressure of one stone against another. To make myself better understood on this point, I may be allowed to amplify. As Fleet-street extends east and west, suppose a team and waggon proceeding westward—the purchase for the feet of the horses will be on that edge of each stone which is towards the west, and the pressure consequently against the stone immediately eastward of that acted upon: the effect will be, that the wet gravel will be pressed upwards from between those stones acted upon, and an interstice or gap formed on the opposite side, which becomes the nuisance noticed under the 4th head of objection. The horses and waggon returning eastward, the same action takes place, but in an opposite direction; and thus each particular stone, instead of being fixed firm and immovable, becomes a rocking stone, and by consequence all its angles are destroyed, the edges become rounded, and the stones unfit for further use but in secondary or minor streets. As this climate is particularly subject to rain, the evils pointed out are constantly in progress, and cannot, under the present imperfect system, be checked, although many thousands of pounds are annually expended in the endeavour. As the correctness of the foregoing explanation may by some persons be doubted, I request the public individually to consider—from what source the (otherwise amazing) quantity of mud which is washed by rain into the sewers, and carted away by the scavengers, arises. Where does it come from? How is it else produced? Are cause and effect confounded, and mistaken the one for the other? Is the mud or the dust the primary nuisance?—in other words, does the dust (in the first instance) result from the mud, or the mud from the dust? The former must certainly be the real state of the case.

“To be convinced of it, let any person reflect how nicely imbosomed, roundly elevated, and plump a new pavement for a short time appears after many loads of gravel have replaced past expenditure ; let him consider what renders fresh gravel always necessary upon relaying pavements ; by which will be induced the further consideration in immediate connection with it—of what becomes of the vast quantities which from time to time are expended.

“The foregoing observations embrace also the considerations connected with the third and fourth heads of objection. The unevenness of the surface of the pavement, and the dangerous openings between the stones, alike result from the causes pointed out ; all the defects are consequent upon each other ; and when once dilapidation commences, speedy impairment and disorganization follow, and are shortly succeeded by total and irretrievable destruction.

“I have refrained from imputing any of the defects in the existing system to the paviors, though an observation or two might be made in that point of view of the subject : but it is nevertheless my confident opinion that no care on their parts could render materially better a system, the results of which have hitherto proved so bad :—there exists a radical defect.”

From a Prospectus of MR. MACARTHY'S
Patent Pavement.—London, 1826.

“The necessity for interposing a hard durable substance between the soil, naturally loose and soft, of public streets and roadways, subject to considerable mercantile and other traffic, must at all times have been apparent ; and hence the origin and use of pitching, or pavement.

“The construction of the street-ways in ancient cities, is totally inapplicable to the streets of modern cities. The

ancient street-ways, once formed, or rather built, might occasionally require repair ; but time would do much to consolidate the original construction ; and even when repair became requisite, the necessary operations would be confined to the surface-covering of the soil.

“If durability had been the only desideratum of a carriage-way pavement, improvement would scarcely advance beyond what has already been done. But progressive civilization has taught the European world, that something more than strength and durability must be effected by the modern Ædile, or Curator of the public ways. And it may not be altogether foreign to the purpose, to observe, that, in the time of the Romans, the construction of the highways was matter of state, the Ædile being a magistrate of high rank, invested with considerable powers ; whereas, amongst the moderns, the street or road surveyor is in little estimation ; has neither rank, station, or precedency ; is too often the mere pavier appointed or employed by the local Board or Trust ; and altogether without authority beyond that of a tradesman executing an order. Hence, probably, the slow improvement in the construction and repair of streets : so that the work were executed cheaply, little selection was made as to the material, and until lately, a very faulty judgment was exercised with relation to method and workmanship.

“It is well, however, that a better spirit is awakened. Road Trusts have abandoned many of their ill-judged methods ; and experiments have been largely tried with reference to the streets of our metropolis. Mr. M^cAdam has discovered, and extensively applied, much that is useful, and worthy of universal adoption as to roads ; yet as to streets and the more public thoroughfares for general traffic in particular situations, it must be admitted that, if his plans have not wholly failed, they have not yet succeeded : still the public owe much to that gentleman, since in broad and open roads, where the line of carriage-traffic is not confined to one or two narrow widths

of ordinary carriages, his method is little objectionable; but where street-ways much frequented are limited in breadth, and not exposed to sun and air, we hazard little in asserting, that Mr. McAdam's plan is utterly inappropriate. In a narrow street, only wide enough to admit of one carriage passing at a time, his plan, executed in his best manner, would not remain conveniently passable six hours of a busy day.

“ Some observations may be necessary to convey to those who have hitherto only cursorily considered the subject, a knowledge of a few of the difficulties attending it.

“ Numerous heavy carriages, carrying from one to six or more tons, pass over the same line, or track, of many of the leading streets, during ten hours every day throughout the year, Sundays excepted. The weight is borne upon wheels, it is true; but all writers of authority agree that these, as at present made, are of a form and inclination calculated to grind and destroy whatever substance they roll over, or which may be opposed to them.

“ The materials composing street-pitching are subjected not only to this pressure, but also to the percussion arising from the tread of heavy draught-horses, shod with massy iron, following one another, each striking the same stone in rapid succession, with a force equal to a ponderous sledge wielded by a powerful arm.

“ Whatsoever time might have effected towards consolidation of the present stone-pitching, and however ingenuity of contrivance may have accomplished the work of time, such pitching becomes loosened, disturbed, and even destroyed, by the operations of the numerous Water and Gas Companies, who yet minister to our habitual wants, whether of necessity or of convenience.

“ Amongst other unavoidable disturbers of the streets are

to be numbered the Commissioners of the Sewers, whose labours are absolutely necessary to cleanliness, and to health, its concomitant.

From " Practical Instructions for the Improvement of the Carriage Pavements of London," by J. C. ROBERTSON, Editor of the *Mechanics Magazine*—1827.

" The defective condition of the carriage-ways of the British metropolis, and of almost all the cities and towns of England, forms a singular exception to that high state of improvement which the public works of this country generally exhibit. It is an evil which every one observes, and feels, and complains of, and which has nevertheless subsisted for a long series of years, without any serious or rational attempt being made to have it remedied. Travelling has made wondrous strides in point of ease and expedition, and this has necessarily been the consequence of much improvement in every thing on which quick and comfortable travelling depends—of improved roads, improved carriages, improved driving, &c. But, as regards the roads, it is those of the *country* alone which have partaken of this improvement; for still, at every town you enter, you find things nearly as they were fifty years ago; the causeways as rugged, ruddy, and merciless to flesh and bones, as they were in the days of our grandsires.

" Mr. McAdam, who has done so much, by the system to which he has given his name, to improve the country roads of England, has been recently employed to relay some of the streets of the metropolis on the same plan; and every thing that could conduce to give the experiment a fair trial—money, time, and facilities of all sorts—have been placed at his command. The experiment, however, may be regarded as a complete failure. The utmost that Macadamization can be said to have effected any where in London, is some gain in point of

smoothness, and a diminution of the noise occasioned by the passage of carriages and waggons—benefits that compensate but poorly for the many serious evils with which it is attended. In all the great thoroughfares that have been relaid on Mr. McAdam's system, such as Westminster and Blackfriars Bridges, Oxford, Bishopsgate, and Coleman Streets, where the traffic is busy and incessant—where carriages of all descriptions are constantly passing to and fro, and in the most zig-zag directions—the *metal*, as it is called, is so rapidly ground to dust, that it is only by a constant supply, at a great expence, of new materials, that the carriage-ways are kept in a passable state; and in all weathers, whether wet or dry, the produce of this perpetual grinding process is alike annoying and injurious to the inhabitants and to passengers. At one time you have to wade your way through pools of mud, at another to buffet it amidst clouds and whirlwinds of dust; clothes, houses (inside and out), furniture, health, and comfort, are all alike sufferers by the nuisance. Every passing creature and thing serves as it were the office of a mud or dust cart, and every adjacent building as a resting place for the flying favours of Macadamization. Nor does the evil stop here; for after all the mud and dust thus carried off, there still remains an abundant residue, which finds its way into the public sewers, supplying them with a sort of food which must ere long (should the system not be abandoned) produce obstructions most injurious to the bodily constitution of this great metropolis, and which can only be removed at great inconvenience and expence.*

“ Streets constantly in want of repair, always mending and never mended—a great increase of expenditure (amounting in some cases, as the writer has been assured, to triple and quadruple that incurred under the old system); inundations of mud in winter, and clouds of dust in summer; persons and property injured; the very *prima viæ* of the city obstructed;—such are the evil consequences of a system, which offers in

* The Macadamization of Bishopsgate Street alone is stated to have occasioned an expence of about £1,500 for clearing the Sewers.

return only a little less noise, and a little more ease to those who ride.

“ All these evils are of course proportionably diminished, according as the traffic is more or less frequent. Nor is it meant to be denied, that in many retired streets and squares Mr. M^cAdam’s system has been and may be adopted with counterbalancing advantages. Wherever, in fact, the traffic is not greater than on most country roads, Macadamization will be found equally beneficial—with this difference only, that the number of persons liable to be annoyed by the vicinity of a dusty or muddy road, is greater in town than in the country.

“ That a system which suits the country well, should fail so completely in town, is only what might have been naturally expected from the great difference between the two. Why were causeways of hard granite ever thought of for towns at all? And why have the blocks of these causeways been made, from time to time, larger and larger? Because, doubtless, of the greater traffic in town than in the country, and of the insufficiency of streets constructed of smaller and less durable materials to withstand the tear and wear which that traffic occasions. What, then, is this attempt to extend the system of Mr. M^cAdam into the hearts of our cities, but a recurrence to that very state of things, which general experience long ago pronounced to be intolerable?

“ The very fact that Mr. M^cAdam’s system is pretended to be equally good for town and country, ought of itself to be decisive of the fallacy of that pretension. It is *impossible* that any system whatever could produce the same results, under circumstances so diametrically opposite.

“ A writer in the *Mechanics Magazine* (Vol. II. p. 216, June 12, 1824), has proposed, as subsidiary to ‘ an improved line of Sub-ways,’ that the ordinary paving should have an ‘ underlayer of large unhewn stone, well bedded in earth ;’ and

this suggestion he enforces with a remark particularly worthy of attention :—‘ It is a matter,’ he says, ‘ of no surprise that ‘ the paving stones sink into hollows without the aid of other ‘ causes than the looseness of the earth on which they are laid ; ‘ it generally consists of broken bricks, the refuse from cinder ‘ hills, and uncementing rubbish of all descriptions ; *the surprise is, that no means have yet been adopted to reach the root ‘ of the evil, by producing a better bedding surface for the ‘ superincumbent paving.’* ”

From “ Hints to Paviers,” by COLONEL
MACERONI—1825.

“ However true it may be, that an observant traveller cannot fail of being struck with admiration at the excellence of the turnpike and other roads throughout this country, he must, at the same time, be very much surprised at the badness of the *carriage pavement*, even of the principal streets of this astonishing metropolis. It is difficult for him to understand how, in a country where every mechanical art is best understood, and actually applied to the most useful purposes—where ingenuity, guided by science, is ever on the research, and ever sure to be rewarded for each fresh improvement—how, in the very capital of such a country, the carriage pavement should be, perhaps, worse than that of any other metropolis in Europe. It is, to be sure, justly boasted that this city enjoys the advantage of commodious and matchless footpaths ; and that the existence and goodness of such footpaths are, in one point of view, of more general convenience and personal comfort than that of a perfect level and easy carriage pavement, inasmuch as the safety and convenience of the thousands who walk, should be preferred to that of the dozens who ride in their carriages. But in a city like this, teeming with life and activity, throughout which so many thousand public conveyances perpetually travel at so rapid a rate, the state of the *carriage pavement* must surely be a matter of very great importance.

“ Previously to pointing out what I conceive to be the most advantageous method of improving the carriage pavement of London, I think it will be expedient to offer a few observations on the nature and construction of such pavements on the Continent as are most remarkable for their excellence and durability.

“ The ancient Roman paved roads, such as the Via Appia, the Sabina, the Flaminian, Emilian, &c. &c., first claim our attention. Of these, there are still tracts of many miles in perfect repair in Southern Italy, especially in the neighbourhood of Rome. A good foundation of gravel, broken limestone, or of basalt, was sometimes applied, where the nature of the soil required it. It is unnecessary to mention the causeways of solid masonry, over which they were at times carried, as such causeways, in certain situations, were as indispensable as they would be at the present day under the same circumstances of locality.

“ The stones composing the pavement of these roads are uniformly of basalt, of a polyangular shape, containing, on an average, about four or five feet surface, and about twelve or fourteen inches in depth or thickness. They are generally more or less slightly pyramidal, and placed with the base or broadest surface uppermost. It is by no means in every instance, as is asserted, that these stones are laid in a bed of mortar; in many situations I have found it to be otherwise. Neither are their edges chipped with any great nicety; the juxta-position is, however, well contrived, and indeed very remarkable; for although they vary *ad infinitum* in shape, angles, and more or less in size, they are fitted together as though each had been expressly cut for its situation.

“ It would appear, that in many places large tracts of these roads have been intentionally destroyed, either for the sake of the materials, or for the purposes of war and devastation; other portions have, in the lapse of ages, disappeared with the gradual changes to which the surface of this earth is subject,

especially in inhabited districts, when barbarism rapidly succeeds civilization, or civilization barbarism. Such portions, however, as have been left to contend with the mere wear and use for which they were constructed some two thousand years ago, are in as good order and preservation as ever.

“ The pavements most similar in construction and solidity to the ancient Roman, are the modern Neapolitan. The stones of these are also of basalt, but in lieu of being polyangular, they are rectangular quadrangles, mostly squares, generally of about four feet surface, and six inches in thickness. The sides are very accurately wrought, as well as the surface, which is left as rough as is consistent with a good level. These stones are laid in a thick bed of the best Puzzolana mortar, and always so arranged, that the lines of junction are never parallel with the line of road,* but cross it diagonally. This pavement excels in evenness and level, is very permanent, but expensive, and liable to become dangerously smooth, which renders it necessary, from time to time, to cut grooves on its surface. The city of Naples being admirably provided with sewers and sub-ways of the most solid construction, the necessity for disturbing the pavement very seldom occurs, so that the expence, though great, is pretty much confined to the first laying.

“ The pavement of modern Rome is also of basalt. The stones are parallelograms of about two cubes in length ; and on being set up endways, they present about ten inches square surface. Although they are accurately cut, and equal in size, they are simply fashioned by a few skilful blows of the hammer. More mortar is used in the construction of these pavements than even in the Neapolitan. I have observed the bed of the

* Opposite the Foundling Hospital may be seen a bit of expensive pavement, the stones of which are most accurately wrought and fitted together; but the lines of junction, being parallel to the line of road, deep furrows have been worn between the stones, in a few weeks after they were so carefully laid. Moreover, having no kind of *condensed* homogeneous foundation, it cannot be expected to retain its level, if subjected to the shocks of heavy carriages.

best Puzzolana mortar, on which they are laid, to be above a foot thick.* Rome being provided with the most extensive and complete sewers and sub-ways of any city in the world, its pavements, or, as they may be called, horizontal walls, have likewise very seldom any occasion to be disturbed.†

“ The next kind of pavements that it may be necessary to mention, are those of Florence, of Sienna, of Milan, and some other cities of Northern Italy. These may, indeed, be assimilated to a kind of stone rail-road, as there are particular tracks allotted for the wheels, and others for the horses. The tracks for the wheels are composed of stones of very large dimensions; they are of marble, lumacular limestone, or of a very hard sand-stone; most of them, particularly at Florence, weighing several tons. They are laid with much precision, in lines of about three feet broad. The spaces for the horses

* When the Roman or Neapolitan pavement is fresh laid, care is taken to cover it a foot deep with earth or rubbish, to protect the mortar, until it is set, from the jars of the carriages. The London paviors, who use no mortar, but lay their stones in loose gravel, nevertheless take especial care to imitate this practice, and carefully protect their loose stones and gravel (from the cold I suppose!) with a stratum of earth or rubbish, which speedily produces pools of mud or clouds of dust. This is not merely ridiculous, but an abominable nuisance.

† At present there are in Rome but few streets which exhibit the ancient polyangular pavement. In most parts of the city it lays at the depth of from eight to twelve feet beneath the present surface. The accumulation over the whole extent of the Forum Tranjanum, which was cleared away by the French in 1813, was, on an average, about twelve feet. That over the Forum Romanum, situated between the Mons Capitolanus and Mons Palatinus, was still greater.

I believe it will be found that the level of most cities has a tendency to gradual rise; as more materials are introduced into them than are ever taken out again. The numerous sackings, burnings, and subversions endured by Rome in the barbarous wars of the lower empire, and the “good old times” that followed, have produced a considerable rise in its level. This has necessarily been greater in the lower parts, between the celebrated seven hills, whose relative elevations have diminished proportionately. Thus the famed Tarpeian rock or precipice, on the south side of the Capitol, has, by the process of subtraction from the top, and addition to the bottom, during more than two thousand years, been reduced to less than forty feet in height.

between these lines are paved with small stones, and are, as well as I can recollect, about four feet wide. In some of the squares, the small pavement predominates ; while the lines of large stone-ways cross it in every necessary direction. Nothing can be more easy or agreeable than this pavement, which is suitable to carriages of every description, without the limitation or confinement of an iron rail-road, but with nearly the same smoothness.

“ Among the causes which appear to me to have contributed to the extraordinary duration of the *ancient* Roman pavements, the geological nature of the surface over which they are constructed, is not the least prominent. With the exception of the Pontine Marshes, and some tracts about Brindisi (Brundisium), Taranto, and Peruggia, nearly the whole of them have been carried over a surface of volcanic tuffo, of greatly compressed Puzzolana, or of calcareous or basaltic rock ; all which furnish the best possible foundation. In countries where chalk, clay, gravel, or sand, are frequent at the surface, as in England, France, Alsace, part of Lombardy, &c., even these Roman pavements, when not kept in repair, have speedily become impracticable for carriages.

“ The size and weight of the stones composing the ancient Roman pavements certainly do, *when once laid on a compressed substratum*, oppose much *vis inertia* to the weights which roll over them, while their polyangular shape prevents any acute, or even right angles, being presented to partial pressure. This polyangular shape, and the excellent juxtaposition of their sides, prevent any continuous line of junction being presented to the course of the wheels, which would so much tend to create ruts, and other irregularities ; moreover, the stones being slightly pyramidal, produces a tendency to conduct the shocks towards the inferior centre of each, or laterally to the superior edges, which are well supported by the surrounding ones.

“ It is necessary also to remark, that the carriages used in Italy, both anciently and at the present time, are what would be deemed in England very light ; besides which, the wheels of the modern Roman and Neapolitan carts are of a larger diameter than any used in England. It would appear that the carts of the ancient Romans were generally two-wheeled, drawn by two or four oxen. Travelling was for the most part performed on horseback, or in litters carried by two mules. Chariots for travelling do not appear to have been used at all much before the close of the Republic. They were both two and four-wheeled, but not made to carry more than two persons, besides the driver. They do not appear to have had any springs; the wheels were very low, and not more than thirty-two or thirty-three inches apart. So that altogether, it may be presumed, they were more calculated to bruise the bones of the riders, than injure the pavements over which they bounced.

“ Such, in a very few words, are the best pavements I have had an opportunity of observing ; and there is reason to believe there are no better existing. It does not, however, follow, because they are good, and perfectly well adapted to their respective purposes and localities, that any of them might be applied with advantage to the streets of London. I think it may be easily shewn, that neither the ancient nor modern Roman, the Tuscan, or Neapolitan, would possess the qualities required for such an application.

“ To pave London after the ancient Roman plan, would, in the first place, be attended with enormous expence, and entirely new stones would be required for the whole undertaking. Stones of so large a surface would also become most dangerous for horses, at any pace faster than a walk,—or when drawing heavy weights,—or upon an acclivity. In London, waggons and carts are in general use, of far greater burthen than any which were anciently or are at present used in Italy. Some of our stages and vans, to a very considerable weight, moreover add great velocity. I shall be told, perhaps, that

in proportion to this horizontal velocity, the vertical gravitation is diminished; but these carriages have very small fore-wheels, upon which the drivers, with extraordinary stupidity, contrive to place the greater part of the load.* Such small wheels, so overloaded, descend with great violence into the least depression of the pavement, and are thrown up (to fall again) by the slightest protuberance.

“ I very much doubt whether, even in point of durability, either the modern Roman or Neapolitan pavements would succeed in London. Considering the friable nature of most descriptions of mortar, I suspect that the repeated shocks of very heavy carriages would pulverize and detach it from the inferior surface of the stones, part of it would work out, and the stones become loose.† A further great objection to any such solid masonry pavements is, the frequent necessity of partially taking it up, to lay gas and water pipes, and to repair our trumpery crumbling brick sewers.‡

“ The foregoing objections will equally apply to the modern Neapolitan pavements. The modern Roman has not the defect of being too smooth, but it has that of homogeneous chemical solidity, which will not admit of its being perpetually displaced for the temporary purposes above mentioned. Moreover, where are we to get a sufficient quantity of such Puzzolana mortar as is employed in Italy, with which the pavement becomes as one rock ?

* The pertinacity with which this custom is followed, is somewhat surprising in this scientific country. What are we to say to the riders too ? We frequently see five or six in front on a stage-coach, without a single person behind, or even inside !

† I have seen portions of ancient Roman road broken up by the passage of heavy artillery. A very few such large stones displaced, will render the road impassable for carriages.

‡ Our sewers are admirably planned and levelled, but the materials and the construction are very deficient of the necessary solidity.

“With regard to the pavements, or, as I have ventured to call them, the stone railways of Florence, Sienna, Milan, &c. &c., the objections to their adaptation to the streets of London must also be obvious enough. Independently of the enormous expence of the materials, such a system could never answer in streets where vehicles of all descriptions, going at every degree of velocity, have occasion to cross, pass, and run abreast of each other, over the entire breadth of the street. Such large stones, whether of granite or limestone, would soon become dangerously smooth, their longitudinal edges would wear, the contiguous stones sink, and ruts continually be formed along them.”

The continual Recurrence of this Annoyance.

This is a regular annual operation; it commences soon after Midsummer, and continues till the funds are spent by the Commissioners of Paving, &c.; and when they have not money enough, they apply to Parliament for more. This will appear from the common observation of every one, as to the fact itself, and by the Act of Parliament in 1823, entitled “An Act for altering and
“amending two Acts, passed in the eleventh and
“thirty-third years of his late Majesty King
“George the Third, for consolidating, extending,
“and rendering more effectual, the Powers granted
“by several Acts of Parliament, for making, en-
“larging, amending, and cleansing the Vaults,
“Drains, and Sewers, within the City of London
“and Liberties thereof; and for paving, cleansing,
“and lighting the Streets, Lanes, Squares, Yards,

“ Courts, Alleys, Passages, and Places, and preventing and removing Obstructions and Annoyances within the same.

“ Whereas an Act was passed in the eleventh year of the reign of his late Majesty King George the Third, intituled, ‘ An Act for consolidating, extending, and rendering more effectual, the powers granted by several Acts of Parliament, for making, enlarging, amending, and cleansing the Vaults, Drains, and Sewers within the City of London and Liberties thereof ; and for paving, cleansing, and lighting the Streets, Lanes, Squares, Yards, Courts, Alleys, Passages, and Places, and preventing and removing Obstructions and Annoyances within the same ;’ and it was thereby enacted, that, for defraying the expence of paving, cleansing, and lighting the streets, lanes, squares, yards, courts, alleys, passages, and places, and preventing annoyances therein, and of making, enlarging, widening, deepening, altering, and removing all or any of the common sewers, public drains, and vaults within the said City and Liberties, one or more rate or rates, assessment or assessments, should, at such time or times as the Commissioners acting in the execution of the said Act, should think fit to order and direct, by writing under their hands and seals, or the hands and seals of any seven or more of them, be made, laid, and assessed in the several Wards of the said City, by the Aldermen or their Deputies, respectively, and the major part of the Common Councilmen of each Ward, upon all and every person or persons who should inhabit, hold, occupy, possess, or enjoy any land, house, shop, warehouse, cellar, vault, or other tenement or hereditament within the said several Wards, and who by the laws then in being, were or should be liable to be rated towards the relief of the poor in the respective parishes where he, she, or they should respectively live or reside, for raising such competent sum or sums of money as the said Commissioners should, from time to time, judge needful, and direct ; so as such rates or assessments did

not in any one year exceed in the whole the sum of one shilling and sixpence in the pound, of the yearly rents of such of the said lands, houses, shops, warehouses, cellars, vaults, or other tenements or hereditaments respectively, as should be situated in any street, lane, square, yard, court, alley, passage, or place, actually begun to be new paved, by virtue and in pursuance of the said Act, or of any former Act of Parliament, AND ONE SHILLING IN THE POUND of the yearly rents of such of the lands, houses, shops, warehouses, cellars, vaults, tenements, or hereditaments respectively, as should not be so situate; such rates respectively to be from time to time ascertained by the rates at which such respective lands, houses, shops, warehouses, cellars, vaults, or other tenements or hereditaments, should be from time to time assessed towards the Land Tax :

“ And whereas an Act was passed in the thirty-third year of the reign of his late Majesty King George the Third, intituled, ‘ An Act to explain, amend, and render more effectual an Act passed in the eleventh year of his present Majesty’s reign, intituled, ‘ An Act for consolidating, extending, and rendering more effectual the powers granted by several Acts of Parliament, for making, enlarging, amending, and cleansing the Vaults, Drains, and Sewers within the City of London and Liberties thereof, and for paving, cleansing, and lighting the Streets, Lanes, Squares, Yards, Courts, Alleys, Passages, and Places, and preventing and removing Obstructions and Annoyances within the same :’

“ And whereas, in consequence of the redemption and sale of the Land Tax, by virtue of the several Acts of Parliament made and passed for that purpose, the rates to be assessed by virtue of the said recited Acts, can no longer be fairly or justly ascertained by the rates at which the said lands, houses, shops, warehouses, cellars, vaults, tenements, and hereditaments are assessed towards the Land Tax, some of the said lands, houses, shops, warehouses, cellars, vaults, tenements, and hereditaments being no longer subject to any assessment

towards the Land Tax, and the rates at which others of them are assessed thereto, having been considerably increased since any assessment was made upon several of the said lands, houses, shops, warehouses, cellars, vaults, tenements, and hereditaments, the Land Tax payable in respect of which has been redeemed or purchased :

“ And whereas it is expedient that the rates to be assessed by virtue of the said recited Acts, for the purposes aforesaid, should be just and equal rates, and that the powers and provisions of said recited Acts should be altered and amended: But as the same cannot be effected without the aid of Parliament;

“ Be it therefore enacted, and it is enacted by The King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons in this present Parliament assembled, and by the authority of the same, that from and after the passing of this Act, the provisions contained in the said recited Acts, and hereinbefore recited, which require that the rate or rates, assessment or assessments, to be laid or assessed upon any lands, houses, shops, warehouses, cellars, vaults, tenements, or hereditaments, shall be ascertained by the rates at which such respective lands, houses, shops, warehouses, cellars, vaults, or other tenements or hereditaments shall be assessed towards the Land Tax, shall be and the same is hereby repealed.

“ And it is further enacted, that from and after the passing of this Act, the restriction contained in the said recited Act of the eleventh year of the reign of his said late Majesty, which prevents rates or assessments being made, which shall in any one year exceed in the whole, the sum of ONE SHILLING IN THE POUND, of the yearly rent of such lands, houses, shops, warehouses, cellars, vaults, tenements, or hereditaments as should not be situate in any street, lane, square, yard, court, alley, passage, or place actually begun to be new paved by virtue and in pursuance of the said recited Acts, or of any former Act of Parliament, shall be, and the same is hereby repealed.

“ And it is further enacted, that from and after the passing of this Act, the rate or rates, assessment or assessments, for defraying the expences of paving, cleansing, and lighting the said streets, lanes, squares, yards, courts, alleys, passages, and places ; and preventing annoyances therein ; and making, enlarging, widening, deepening, altering, and removing all or any of the common Sewers, public Drains, and Vaults within the said City and Liberties, to be made, laid, and imposed by virtue of the said recited Acts and this Act, in the several Wards of the said City, and other places within the limits of the said recited Acts and this Act, shall be just and equal pound rates, and shall be laid according to the respective annual rents or value of all and every the lands, houses, shops, warehouses, cellars, vaults, tenements, and hereditaments respectively authorized to be assessed by the said recited Acts, or either of them ; but subject to the exceptions and provisions in the said recited Acts, or either of them contained, so as such rates and assessments do not in any one year exceed in the whole the sum of ONE SHILLING AND SIXPENCE IN THE POUND, of the respective yearly rents or value of such lands, houses, shops, warehouses, cellars, vaults, tenements, and hereditaments.”

The burthensome Expence of it.

The amount of this charge against the public is not sufficiently known, or not properly attended to when it is. From the official documents of the City of London, in the Chamberlain's brief Statement, published annually by that Corporation, it will be seen that upwards of £26,000 per annum was expended *within the City*, on the average of seven years previous to, and including 1822, for paving only ; and that £10,000 a year more is as regularly expended for the Sewers.

This, it should be observed, was before the late Act of Parliament, just quoted, for raising the Taxes 50 per Cent., that is from 1s. to 1s. 6d. in the pound on the full rent; consequently, if

£26,000 was collected for paving, and
10,000 for sewers

it is 36,000

and 18,000 being 50 per cent. additional

it makes....£54,000 a year, which is regularly spent for these purposes. Now, the City being nearly one-fourth of this extended metropolis, it will appear that £54,000 being

multiplied by 4 produces the immense sum

of.....£216,000 as the total annually collected and expended for keeping up the present wretched condition of the streets of London.

The observation, so frequently made to those who have never been in London, that the streets are paved with gold, appears from these estimates to be not merely an amusing tale to astonish, but that the joke is almost realized, at the expence of the inhabitants, from year to year.

This will be authenticated by the following official Documents, printed for private distribution in 1823.

OFFICIAL DOCUMENTS

*Relative to the Money expended for disturbing the Pavement in the
Streets of London :*

SELECTED BY JOHN WILLIAMS, CORNHILL, LONDON,

Patentee of Sub-ways—1823.

<i>Dr.</i>				<i>Cr.</i>			
1816.	£	s.	d.	1816.	£	s.	d.
To the Produce of the Rates and Assessments chargeable upon the City of London, by virtue of the aforesaid Acts, in full of the Year ending Michaelmas, 1815	21855	18	10½	By Balance overpaid of Account at Michaelmas, 1815.....	10144	19	5½
To Ditto, on Account of the Year ending Michaelmas, 1816	16817	10	4½	By paving, and repairing the Pavement in the several Streets, &c. in the City of London and Liberties	17071	1	6
To three-quarters of a Year's Rent, for the Street Tolls collected on Sundays at the several Turnpikes, which was granted to the City of London by the said Acts, to Michaelmas, 1816.....	911	5	0	By cleansing the Streets, &c. in Ditto.....	6020	1	2
To Fines set on Persons for neglect of duty in cleansing and lighting the Streets, &c., and for causing Obstructions and Annoyances within the same	127	14	0	By lighting Ditto Ditto	8582	0	0
To Compositions for Paving, &c.	837	19	2	By several Artificers employed in the Works directed by the said Acts, viz. Carpenters, Bricklayers, Smiths, Plumbers, &c.	244	16	6
To Cash transferred from Sewer Account	4000	0	0	By Salaries and Gratuities to Officers	1960	10	0
	44550	7	5	By incidental Charges, including Stamps, Stationery, Printing, &c.	1235	2	5
Balance overpaid on } 29th Sept. 1816... }	1586	13	7½	By Expences on Account of new main Sewers...	83	10	0
	£46137	1	0½	By one Year's Interest on Bonds borrowed on the Credit of the Sunday Tolls, due Midsummer, 1816	720	0	0
				By sundry Persons, who, in consequence of having advanced Money on the Credit of the Rates & Assessments, are entitled to Annuities during the Term of their natural Lives	75	0	0
					£46137	1	0½

The above is exclusive of an average of £10,000 per ann. for the Sewers.

<i>Dr.</i>				<i>Cr.</i>			
1817.	£	s.	d.	1817.	£	s.	d.
To Produce of Rates, &c. ending Michaelmas, 1816	22010	13	8	By Balance overpaid Mi- chaelmas, 1816	1586	13	7½
To Ditto on Account of the Year ending Ditto, 1817	13553	19	4½	By paving, &c. the Streets	17382	7	0
To one Year's Rent, &c. to Ditto, 1817	1215	0	0	By cleansing Ditto	4822	13	5
To Fines, &c.	20	5	0	By lighting Ditto	7466	2	4
To Compositions, &c....	2918	19	0	By several Artificers em- ployed	677	12	0
	<u>£39718</u>	<u>17</u>	<u>0½</u>	By Salaries and Gratui- ties to Officers	2023	10	0
				By incidental Charges, including Stamps, Sta- tionery, Printing, &c.	923	1	10
				By Expence on Account of new Sewers	50	0	0
				By one Year's Interest on Bonds, &c.	720	0	0
				By sundry Persons, &c.	50	0	0
					<u>35702</u>	<u>0</u>	<u>2½</u>
				By Balance, Michael- mas, 1817.....	4016	16	9½
					<u>£39718</u>	<u>17</u>	<u>0½</u>

The above is exclusive of an average
of £10,000 per ann. for the Sewers.

1818.	£	s.	d.	1818.	£	s.	d.
Balance in Hand 30th September, 1817.....	4016	16	9½	By paving, &c. the Streets	21988	4	6
To Produce of Rates, &c. ending Michaelmas, 1817	21323	16	2½	By cleansing Ditto	5217	16	4
Received on Account of Ditto, the Year ending Michaelmas, 1818	13488	19	2	By lighting Ditto	7784	19	6
To Rent of the Street Tolls, &c. to Christ- mas, 1818.....	1315	0	0	By Artificers employed in the Works, &c. ...	1191	3	6
To Fines, &c.	95	5	0	By Salaries and Gratui- ties to Officers	2044	0	0
To Compositions, &c. ...	4849	3	0	By incidental Charges, including Stamps, Sta- tionery, Printing, &c.	905	16	10
To Sums received from sundry Persons, for the Purchase of their Contracts for doing the Raker's Work in the several Wards of the City	341	5	0	By Expences on Account of new Sewers	1513	10	0
	<u>£45430</u>	<u>5</u>	<u>2½</u>	By one Year's Interest on Bonds, &c. due at Midsummer, 1818	720	0	0
				By sundry Persons, &c.	50	0	0
					<u>41415</u>	<u>10</u>	<u>8</u>
				Balance, Sept. 1818	4014	14	6½
					<u>£45430</u>	<u>5</u>	<u>2½</u>

The above is exclusive of an average
of £10,000 per ann. for the Sewers.

<i>Dr.</i>			
1819.			
	£	s.	d.
Balance, 30th Sept. 1818	4014	14	6½
To Produce of Rates, &c. ending Michaelmas, 1818	21315	7	11
Received on Account of Ditto, the Year end- ing Michaelmas, 1819..	14618	16	8
To Rent of the Street Tolls, &c. to Christ- mas, 1819.....	1653	15	0
To Fines, &c.	74	16	7
To Compositions, &c....	601	9	0
To Sums received, &c...	1765	0	0
	£44043	19	8½

The above is exclusive of an average
of £10,000 per ann. for the Sewers.

<i>Cr.</i>			
1819.			
	£	s.	d.
By paving, &c. the Streets	24068	10	0
By cleansing Ditto	1725	19	5
By lighting Ditto	7563	0	6
By Artificers employed..	820	9	0
By Salaries and Gratui- ties to Officers	2004	0	0
By incidental Charges, including Stamps, Sta- tionery, Printing, &c.	842	11	11½
Expence of new Sewers	300	0	0
By one Year's Interest on Bonds, &c. due at Midsummer, 1819	720	0	0
By sundry Persons, &c.	50	0	0
	38094	10	10½
Balance, Sept. 29, 1819...	5949	8	9½
	£44043	19	8½

1820.			
	£	s.	d.
Balance to Michaelmas, 1819	5949	8	9½
To Produce of Rates, &c. ending Ditto	19836	16	7
Received on Account of Ditto, ending Micha- elmas, 1820	13376	5	5½
To Rent of the Street Tolls, &c. Ditto	1061	5	0
To Fines, &c.	21	16	6
To Compositions, &c....	2876	4	0
To Sums received, &c...	2120	0	0
	£45241	16	4

The above is exclusive of an average
of £10,000 per ann. for the Sewers.

1820.			
	£	s.	d.
By paving, &c. the Streets	22353	12	6
By cleansing Ditto	2158	1	6
By lighting Ditto	7224	0	0
By sundry Artificers em- ployed	891	10	0
By Salaries and Gratui- ties to Officers	2014	0	0
By incidental Charges, including Stamps, Sta- tionery, and Printing	1003	12	10
Expence of new Sewers	1683	8	0
By one Year's Interest on Bonds, &c.	720	0	0
By sundry Persons, &c.	50	0	0
Transferred to the new Sewers' Account, by Order of the Commis- sioners, 2d May, 1820	2000	0	0
	40098	4	10
Balance, Michaelmas, } 1820	5143	11	6
	£45241	16	4

<i>Dr.</i>				
1821.		£	s.	d.
Balance to Michaelmas, 1820.....	5143	11	6	
To Produce of Rates, &c. ending Ditto	22880	10	9½	
Received on Account of Do., ending Do. 1821..	11743	2	10	
To Rent of the Street Tolls, &c. to Ditto ...	1415	0	0	
To Fines, &c.	12	15	0	
To Compositions, &c....	947	5	0	
To Sums received, &c...	1883	15	0	
	<u>£44026</u>	<u>0</u>	<u>1½</u>	

The above is exclusive of an average of £10,000 per ann. for the Sewers.

<i>Cr.</i>				
1821.		£	s.	d.
By paving, &c. the Streets	21285	9	6	
By cleansing Ditto	508	0	0	
By lighting Ditto	10418	0	6	
By sundry Artificers employed	405	17	6	
By Salaries and Gratuities to Officers.....	2013	10	0	
By incidental Charges, including Stamps, Stationery, and Printing	860	0	4	
By Expence on Account of new Sewers	1535	16	6	
By one Year's Interest on Bonds, &c.	720	0	0	
By sundry Persons, &c. Transferred to the Sewer Account, 3d Oct. 1820	2000	0	0	
	<u>39796</u>	<u>14</u>	<u>4</u>	
Balance, Michaelmas, 1821	4229	5	9½	
	<u>£44026</u>	<u>0</u>	<u>1½</u>	

1822.		£	s.	d.
Balance to Michaelmas, 1821	4229	5	9½	
To Produce of Rates, &c. ending Michaelmas, 1821	19138	14	1½	
Received on Account of Ditto, ending Michaelmas, 1822	11844	12	1½	
To Rent of the Street Tolls, &c. Ditto	1515	0	0	
To Fines, &c.	88	15	0	
To Compositions, &c....	472	12	0	
To Sums received, &c...	431	5	0	
Received of the Society of the Middle Temple, Arrears of Consolidated Rate, due at Michaelmas, 1815	81	18	0	
To Produce of the Sale of Horses and Carts, Breese, Ashes, &c...	501	7	1½	
	<u>£38303</u>	<u>9</u>	<u>2</u>	

The above is exclusive of an average of £10,000 per ann. for the Sewers.

1822.		£	s.	d.
By paving, &c. the Streets	19718	5	0	
By cleansing Ditto	1188	8	6	
By lighting Ditto	8346	13	6	
By sundry Artificers employed	413	10	6	
By Salaries and Gratuities to Officers	2099	0	0	
By incidental Charges, including Stamps, Stationery, and Printing	775	3	10½	
Expence of new Sewers	537	12	6	
By one Year's Interest on Bonds, &c.	720	10	0	
By sundry Persons, &c.	50	0	0	
	<u>33849</u>	<u>3</u>	<u>10½</u>	
Balance, Michaelmas, 1822	4454	5	3½	
	<u>£38303</u>	<u>9</u>	<u>2</u>	

Abstract from the foregoing Seven Years, of so much as relates to the Nuisance of opening the Pavements in the Streets of the City of London, which the Sub-Ways will prevent.

	1816.			1817.			1818.			1819.			1820.			1821.			1822.				
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.		
Paving, and repairing the Pavement in the several Streets, &c. in the City of London & Liberties thereof	17	0	7	17	3	8	21	9	8	24	0	6	22	5	3	21	2	8	5	19	7	18	
Cleansing the several Streets, &c. in Ditto	6	0	2	4	8	2	5	2	1	6	1	7	2	1	5	2	1	6	5	0	8	3	6
Several Artificers employed in the Works, directed by the said Acts, viz. Carpenters, Bricklayers, Smiths, Plumbers, &c. &c.	2	4	4	6	7	7	12	0	1	1	3	6	8	2	0	3	9	0	4	0	5	1	7
Salaries and Gratuities to Officers	1	9	6	2	0	3	10	0	2	0	4	0	2	0	0	2	0	0	2	0	3	0	0
	2	6	2	2	4	9	0	6	2	5	3	0	4	4	2	8	6	1	8	1	8	8	4

1816. ... 25296 9 2
 1817. ... 24906 2 5
 1818. ... 30441 4 4
 1819. ... 28618 18 5
 1820. ... 27417 4 0
 1821. ... 24212 17 0
 1822. ... 23419 4 0

7) 184310 19 4 in the last 7 years.

26330 2 9 Average per annum.

From the foregoing evidence of respectable witnesses, as to the existence of the annoyance in the Streets of London, upon the present plan of proceeding by the constituted authorities, those witnesses having studied the subject, and published their opinions at their own cost and charge, it must be admitted as a fact well established and confirmed.

The natural result of these universal complaints produces this conclusion—that an effectual remedy having been loudly called for, it has become absolutely necessary, not merely as a curiosity, but for actual use, for the public benefit to produce one.

This remedy was originally sought for in a cursory manner, in the year 1817; but it was finally matured in 1822, as the following facts prove. The public attention having been called to this subject, and the mischief still continuing in all its force, not only unabated, but actually increased, the publications, from which these large extracts are taken, successively appeared.

In the year 1817, Mr. Michael Angelo Taylor, the Member for Durham, obtained an Act of Parliament for removing obstacles and nuisances from the Streets of the Metropolis, and regulating the paving and lighting of the same. This was one step towards the improvement wanted;

and it was of importance in clearing the pavement of wheelbarrows, impediments, and interruptions in the public way; it also prevented projections from shop-doors and windows, by which the public had been long annoyed : it has therefore become a highly useful Act for the purposes intended, in the existing state of the streets.

This Street Act, or, as it is called, Mr. Taylor's Act, led to the following Letters, in August and September, 1817.

*Copy of a Letter from MR. JOHN WILLIAMS, of Cornhill,
London, to M. A. TAYLOR, Esq. M. P.
dated August 27th, 1817.*

SIR,

As the labours of the Committee of the House of Commons, on the Act for improving the Paving of the Metropolis, of which you had the honour to be the Chairman, are likely to produce considerable benefit to the public, I take the liberty, with much deference, to offer to your notice, in furtherance of that object, an idea which I humbly trust is capable of rendering the views of the House, in addition to the Act of Parliament enacted last Session upon that subject, thoroughly complete. It is, in my mind, perfectly attainable, to prevent the Pavement, when once laid according to my views, from ever being disturbed for any

purpose whatever. As the simplicity of the plan, when explained, may create a question of its originality, although it has never been adopted, or indeed thought of, I therefore at once submit the idea to you, Sir, as the promoter of the new Act, in order that I may not be disappointed, either in the loss to the public of an object so important, or of any remuneration I may be entitled to receive.

I have the honour to remain

Your obedient Servant,

(Signed) JOHN WILLIAMS.

*Answer of M. A. TAYLOR, Esq. M.P. to the above Letter,
dated August 30th, 1817.*

Scarborough.

SIR,

I had the favour of your letter yesterday, and I lose no time in answering it. I have great hopes that the Bill introduced into Parliament, will be most beneficial. As to any other advantages that talent and ingenuity may suggest, I can offer no opinion on them, unless I am acquainted with the particulars.

I have the pleasure to be, SIR,

Your faithful Servant,

(Signed) M. A. TAYLOR.

To Mr. John Williams, Cornhill.

SIR,

I am greatly indebted to you for the promptitude of your attention to my communication of the 27th ult. Having taken the liberty to trouble you with my ideas upon paving streets universally, so as to remedy the nuisance of opening them, either for water or gas pipes, or indeed for any purpose whatever, after they are once laid according to my plan ; I am now to state that the simplicity of the object is so naked, that beyond the assertion of its practicability, I think you will agree with me, that thus early it would be highly indiscreet to disclose the means by which it may be effected ; or indeed do more than suggest the thought, and reserve the disclosure of it, until it is decided, if the thing is practicable, that it shall be adopted.

I therefore most respectfully solicit the favour of your advice as to what measures I should adopt to bring the subject forward for general usefulness : whether I should, in the first instance, write to the Directors of the Water and Gas Companies, and to the principals of the numerous parishes ; or, should it be of sufficient importance, to wait for Parliament to legislate that it shall be carried into effect ?

In soliciting this favour of you, Sir, I commit myself to you in confidence, without consulting

one person on the prudence of the act, or the knowledge of the project being known to any, which I have in a great measure been induced to conceal for the reason here stated.

I have the honour to remain, SIR,

Your obedient Servant,

(Signed) JOHN WILLIAMS.

September 2d, 1817.

To M. A. Taylor, Esq. M.P.

Scarborough.

It will appear, therefore, that as early as the month of August, 1817, the first glance of the thought was suggested for forming Sub-ways; but, from want of sufficient attention to the subject at that moment, the matter rested until the year 1822, when the London Bridge Water Works having been declared a nuisance by Act of Parliament, and the whole of the Works destroyed, the customers of that dissolved Body were assigned to the New River Company by the same Act, on certain conditions. The streets of the City were rapidly torn up, to remove the Pipes of the old Company, and lay down new ones for the New River Water; so that the entire City appeared to be preparing for a siege, and nothing but submission to the evil was allowed to the universal lamentation of the People.

At this moment, when Cornhill was laid open, and the dirt piled six feet high on both sides of the streets, the subject revived in the mind of, and the remedy presented itself to, the author and compiler of this volume, who, in October, 1822, took out a Patent "for a Method to prevent the FREQUENT REMOVAL of the PAVEMENT and CARRIAGE PATHS, for laying down and taking up Pipes, and for other purposes, in Streets, Roads, and Public Ways.

To effect this object, I construct SUB-WAYS and PASSAGES :—they may be of various descriptions, as to capacity, form, situation, and materials.

In constructing these SUB-WAYS, I propose to open the ground to the required depth, say of ten feet; lay a course of bricks, stones, or iron, nearly level, or rather curved on the ground, five feet wide, with Drains to go into the Sewers; raise a wall on each side five feet high, and arch it over, so as to leave the height, in the centre of it, seven and a half feet clear; leave openings of nine inches in each upright wall, at the distance of every twenty feet, three feet from the base; from these openings carry tunnels to the sides of the streets; and at the end of the tunnels, fix gratings or doors, to be opened from the inside; leave similar openings in the top of the arch, at the distance of every hundred feet, for the admission of light and air; and doorways, five feet high,

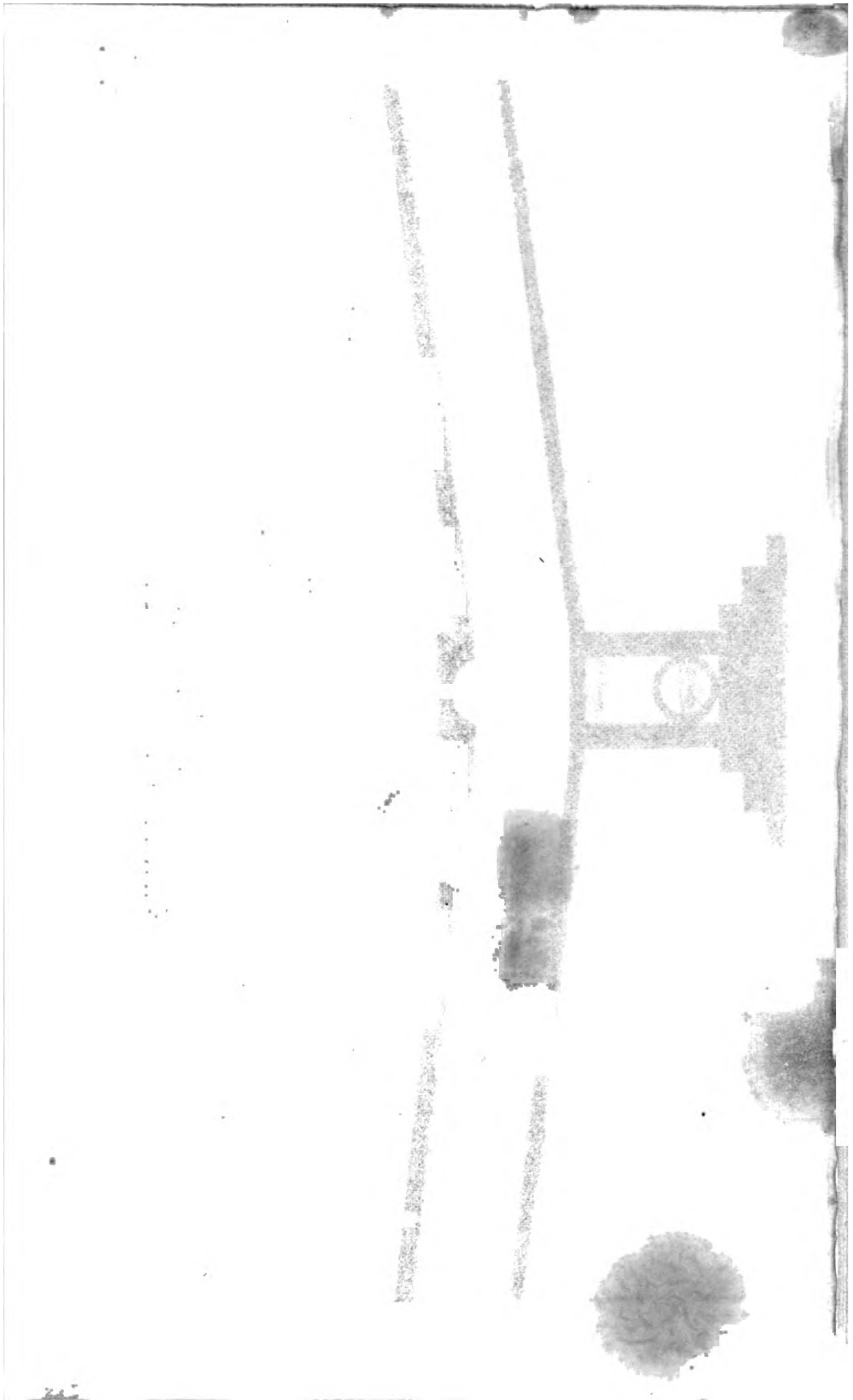
and three feet wide, in each side wall where these openings are made.

These SUB-WAYS may be entered at the sides by doors and passages, wherever required, from the houses and buildings in the streets and roads, in the same manner as into cellars that are under the streets; and the main pipes for every purpose may be placed therein, on iron cradles, or otherwise; and the service pipes, for the supply of the Public, through the tunnels, or openings, in the side walls.

These SUB-WAYS may also be formed double, or another parallel to the first—one for Water, and the other for Gas Pipes—and in any number that may be required, with or without doors, communicating into each or either of the other SUB-WAYS.

From these SUB-WAYS and PASSAGES access may be had into the Sewers and Drains, or Springs and Wells of Water; and for almost every purpose for which the Pavement and Carriage Paths in Streets, Roads, and Public Ways, have hitherto been opened.”

“Thine was the work, Almighty Father;
“The thought, the gift, was Thine!”



for which streets
streets,
been open

2

Section of a Subway comprising a Sewer within itself.

Entrance
Subway



Arched passage
on an
Inclined Plane

Foot way

Carriage way

Foot way



Inclined Plane leading to the Subway

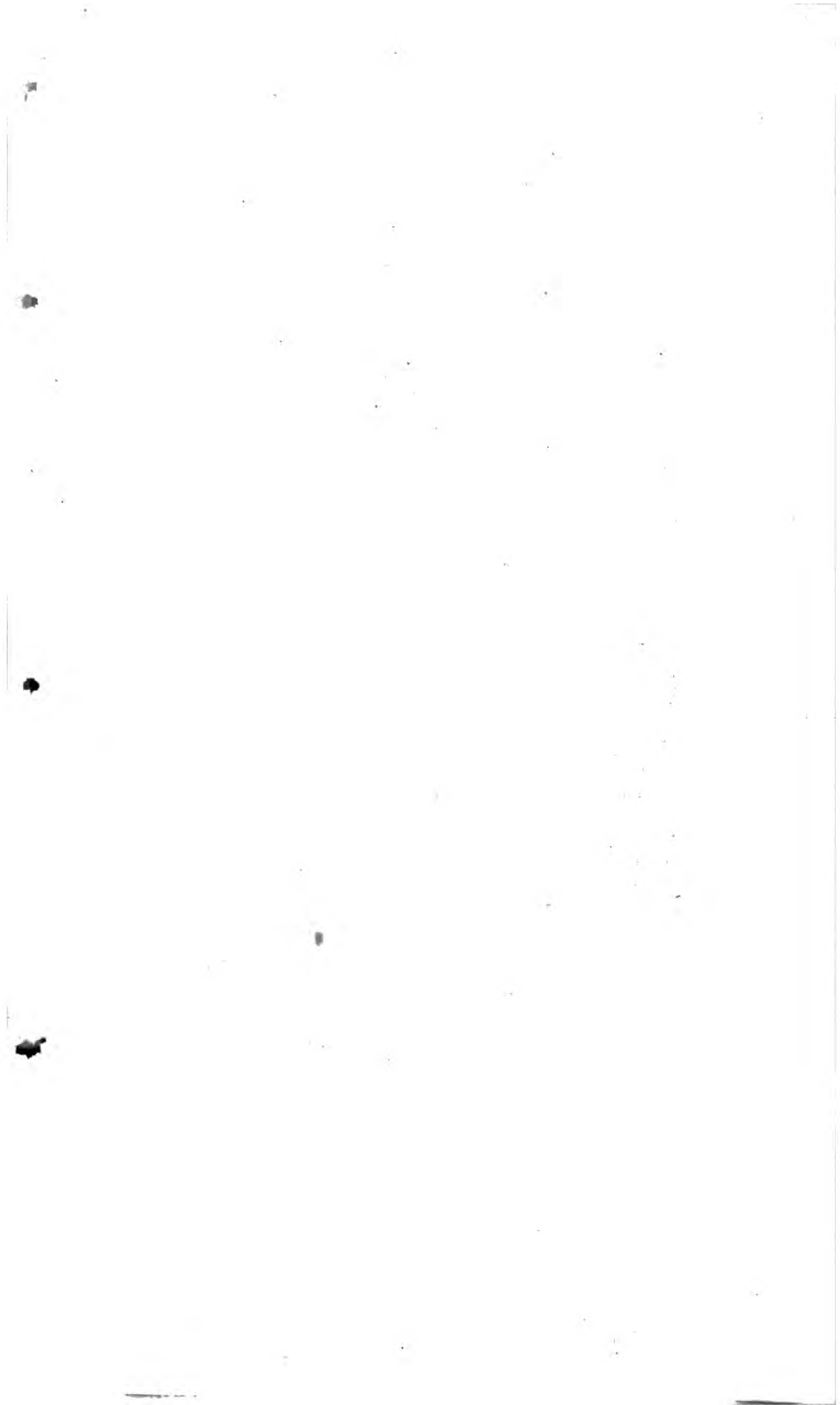
Subway

Filling up



Sewer





THE PROGRESS OF SUB-WAYS.

On the 26th of October, 1822, and the following days, advertisements appeared in the daily Papers, announcing a Public Meeting at the City of London Tavern, on Monday, the 4th of November next, at twelve for one o'clock, to take into consideration the disgraceful state of the Streets for some time past; and to enter into resolutions for the immediate adoption of a permanent remedy, which remedy will particularly interest all the Proprietors of Water and Gas Shares.

The Prospectus of the Plan may be obtained of Chapman Barber, Esq. No. 44, Chancery Lane; and of Mr. Humphries, No. 10, Old Broad Street, City.

PROSPECTUS.

In all Cities and large Towns, the frequent opening of the Streets and Roads, for the Water and Gas Companies, as well as for the Sewers and Drains, has for many years become a lamentable and dangerous nuisance; and as this Patent promises much towards abating, if not preventing it altogether, it is desirable to obtain the benefit for the Public, with the least possible delay. As it must necessarily be undertaken upon a large and extensive scale, to be generally useful, and by the authority of Parliament, it is proposed to raise

£100,000, in transferrable Shares of £100 each, for the CITY OF LONDON PATENT SUB-WAY COMPANY.

This Capital to be employed in constructing the Sub-ways and Passages, as soon as leave can be obtained by an Act of Parliament.

THE CITY OF LONDON PATENT SUB-WAY COMPANY propose to receive into their Sub-ways the respective Pipes of the several Companies now in existence, and those that may be created in future, for the flow of any material, at the same price per annum it has hitherto cost each Company for laying down and taking up the Pipes, upon the average of the last seven years.

They also propose to give access to the Work-people of the Commissioners of Sewers, into and through their Sub-ways, for the formation and repairs of the Sewers and Drains, and other purposes, upon receiving the same sum per annum which they have hitherto expended for opening, shoring, and closing the Streets, Roads, and public Ways, upon the average of the last seven years.

This Company engage to preserve the Highways and Pavements of the Streets, Roads, and public Paths, in the most perfect condition, after they are once properly laid down to their satisfaction, upon receiving the same annual amount

that has hitherto been expended for that purpose, upon the average of the last seven years.

The advantages the Public will derive by the establishment of this Company, must be sufficiently obvious to every one who has observed the state of the Streets, in the City of London, for the last few years—Ludgate Hill, Wallbrook, &c. in particular. The same nuisances will continually occur, however it may be stated to the contrary, and probably increase, as new Companies are formed, without the intervention of such an effectual remedy as this, which the Public will enjoy without any additional expence.

The Water and Gas Companies will also have a ready and comfortable access to their Pipes, which will not be bedded in earth, but lie dry and sound, without pressure or injury, at no additional expence: the Pipes also will not be required of the same substance in future, but of a slighter and cheaper make, particularly for Gas, which, being a thin subtile fluid, of a very light weight, may be conveyed through the Sub-ways, in Pipes of any other, and much cheaper materials, than it is at present.

Access may also be had into these Sub-ways, to ascertain whether the Mains, both of Water and Gas, are properly supplied at the required time; and facilities thus afforded for various

improvements for extinguishing Fires, and other objects connected with Gas and Water. These Sub-ways will also be in a state of preparation for any new Company, for any purpose, who would otherwise require the Streets and Roads to be opened.

The Commissioners of Sewers will have the same superintendence, controul, and authority, for the regulation of their valuable concerns, without being subject to the nuisance in common, or the delay that usually takes place in preparing for, carrying on, and completing their works.

The Paving Committee will be especially relieved from never-ending and troublesome applications for leave to take up and lay down the Pavements, and from the numerous complaints they are continually subject to respecting them; these complaints they will always be hearing, without the security and remedy this Company affords: in fact, the Streets, Roads, and public Paths, will become regular, firm, and beautiful, like Terraces, without expence to the Public, or comparative injury to any one. This Company will combine the interests of all the several Gas and Water Companies, and Commissioners connected with the Sewers, Pavements, and Roads, by establishing this important Work, which will make the Pipes and Sewers permanently complete, in connection and union with these Sub-ways.

This national object, for it is no less, will give active and immediate employment to a considerable number of mechanics and workmen, during the construction of these Patent Subways ; and promises a fair prospect of profit for the capital that shall be engaged in this useful undertaking. It will also especially meet the views of the Legislature, and of His Majesty's Government, who are very desirous of promoting public Works at this juncture of stagnation among the labouring classes of society ; as will be seen by the following Advertisement, now appearing in the public Papers.

EXCHEQUER BILL LOAN OFFICE.

South Sea House, August 6, 1822.

WHEREAS an Act was passed in the present Session of Parliament, Cap. 86, " To amend two Acts of His late Majesty, " for authorizing the issue of Exchequer Bills, and the advance " of money for carrying on public Works and Fisheries, and " the employment of the Poor, and to authorize a farther issue " of Exchequer Bills, for the purposes of the said Acts :"—

NOTICE IS HEREBY GIVEN, that all applications for Loans under the said Acts, by any Body or Bodies Politic or Corporate, or ANY PERSONS engaged in, or DESIROUS OF CARRYING ON ANY WORKS OF A PUBLIC NATURE, or for the Encouragement of the Fisheries, or the Support of any Collieries or Mines, or any Trustees of Roads, Railways, or Drainages, or ANY persons proposing to undertake any Embankment from the Sea

in Great Britain, specifying the amount required, the purposes to which the same is to be applied, and the security proposed, are to be addressed, sealed up, to WILLIAM HOLDEN, Esq. Secretary to the Commissioners constituted by the said Acts, at their Office, as above.

*Extract from the MORNING HERALD of the
5th of November, 1822.*

IMPROVEMENT OF THE STREETS.

Yesterday a meeting was held at the City of London Tavern, for the purpose of canvassing the merits of a project to prevent the frequent removal of the Pavement and Carriage Paths, for laying down and taking up the pipes, and for other purposes. To effect this object, subterraneous ways or passages were proposed to be constructed; and for the completion of these, to create public establishments, under the authority of Parliament.

The meeting was by no means numerously attended.

A short discussion took place amongst the leading persons present, when it was agreed that the matter was too important to allow any steps to be taken in a meeting so inadequately attended. It was judged advisable, however, that the nature of the plan should be stated publicly, in order to

its being properly understood before another meeting was convened.

Mr. John Williams, of Cornhill, then proceeded to state the great inconvenience arising to the Public, in this crowded Metropolis, from the frequent breaking up of the Pavements, for Gas and Water Pipes, and to make repairs. The inconvenience, and the enormous expence the public have sustained from this source, must be sufficiently known to all ; and for such an inconvenience some remedy was desirable. In Ludgate Hill and Wallbrook particularly, the inconvenience was felt, and was likely to be so, as new Gas and Water Companies were forming. He had long turned his attention to the subject ; and it appeared to him that if Sub-ways and Passages, to be conducted through the Streets, underneath the Pavement, were constructed, it would remedy the inconvenience so justly complained of. For such a plan he had obtained a Patent.

In making the Sub-ways, it was proposed to open the ground at the required depth, perhaps of ten feet ; to lay a course of bricks, stones, or iron, on the ground, five feet, with drains to go into the sewers ; upon this course he would raise a wall on each side, five feet high, and arch it over, so as to leave the height, in the centre of the passage, seven feet and a half clear. He would leave openings at the distance of every twenty feet,

to convey the pipes to the houses, and also openings at the top of the arch, to admit light and air, and door-ways, five feet high, in each side-wall, where the openings for light were made. This was the outline of the Sub-ways, which might be entered at the sides, by doors and passages, from the buildings in the streets, in the same manner as cellars under the streets. In these Sub-ways the main pipes for every purpose might be placed on iron cradles, or otherwise, and the service pipes conducted from the mains, through the openings in the side-walls, to the respective houses. From these Sub-ways and Passages access may be had to the sewers, drains, springs, and wells of water, &c., and for every purpose for which streets, roads, &c. were so constantly broken up, and obstructed. In wide streets, these passages might be formed double, or parallel ones made—one for water, and the other for gas pipes, as might be found convenient. To carry this plan into execution, it was proposed to raise a fund, in transferrable shares of £100 each; and, as soon as leave can be obtained by an Act of Parliament, the capital which would be found necessary, should be employed in constructing the Sub-ways and Passages.

The shareholders should be incorporated in a Company, to be called THE CITY OF LONDON PATENT SUB-WAY COMPANY, which would receive into their Sub-ways the Pipes belonging

to the Companies now in existence, or that might be created, at the same price *per annum* as it had hitherto cost each Company for laying down and taking up the pipes, upon the average of the last seven years. Access would be given to the work-people of the Commissioners of Sewers into the Sub-ways, for the formation and reparation of the sewers and drains, &c. upon receiving the same sum *per annum* which had hitherto been expended for opening, shoring, and closing the streets, for the last seven years. The Company would engage to preserve the high-ways, pavements, &c., in the most perfect condition, after they had been once properly laid down, upon receiving the same annual amount that had hitherto been expended for that purpose, upon the average of the last seven years. The advantages to be derived from the project, would be the suppression of the nuisances of opening the pavement; allowing the Gas-Light and Water Companies a comfortable access to their pipes, which would lie dry and sound, at no additional expence, and which might in future be of a lighter and cheaper make, particularly those for Gas. Besides which, it was a national object; would give active employment to a considerable number of hands; and, above all, promised a fair prospect of profit upon the capital that might be engaged in so useful an undertaking.

Several persons gave their decided opinion

that the plan proposed, was fully adequate to the purpose intended.

Mr. Jenkins, a surveyor, objected to the plan, as impracticable in many parts of the City. He was persuaded that no such passage could be made below the common sewers, in any part of the City. The passages should have a drainage to the high water-mark of the river; but the present sewers were so low, as scarcely to carry away the water. As to their being made on a level with the sewers, it was equally palpable that walls of the nature proposed, between the houses and the sewers, must stop the drains from the cesspools, which must flow into the sewer at a height of three feet from the bottom.*

He (Mr. Jenkins) was of opinion that the passages could in no street be erected, where the sewers were not at least nine feet below the surface of the pavement. Iron passages he did not consider strong enough to bear the pressure that must pass over them; and the proposed openings, if the passages were to be erected of brick or stone, he considered would be dangerous to the

* It has been thought proper to give the Newspaper reports strictly as they appeared at the time, in order that the observation of this History, being a mere ex-parte relation of the proceedings, may be avoided. In many cases these reports are defective and erroneous, arising rather, perhaps, from the novelty of the plan proposed, than from any other motive. The objections here and afterwards raised, the reader will find in the subsequent pages successfully answered.

strength of the arch. He considered the idea in itself excellent for a new City ; but he wished for more information. The levels of the City ought to be taken, the details furnished, and accurate calculations made. He also suggested a trial of the proposed plan in one street—Bishopsgate Street for instance.

Mr. Williams, in reply, said he had by no means finished the plan in its details.

A gentleman present asked whether any calculation had been made as to the probable expence of the undertaking.

Mr. Williams said it would require the same length of passage as there was of drain or sewer, which in the metropolis was two hundred miles of passage. No calculation had been made of the expence, as the material had not been decided upon.

A gentleman stated that at Rome such ways of the nature now proposed, had been long in use.

Mr. Williams, greatly astonished at this communication, asked how long the plan had been adopted.

The gentleman could not state exactly the time, but he believed some short time before the authority of the Popes commenced.

Mr. Williams remarked that the adoption of a plan abroad did not vitiate a Patent obtained in England, although it must alter its application.

A long discussion then followed. Thanks were ultimately voted to Mr. Williams, for giving the plan to the Public: and it was resolved that another public meeting should soon be held, for the purpose of taking efficient steps for carrying it into execution.

The meeting then broke up.

*Letters sent preparatory to the Public Meeting at the
City of London Tavern on December 4th, 1822.*

TO M. A. TAYLOR, Esq. M. P.

SIR,

Between five and six years ago I had the pleasure of communicating to you some thoughts respecting the improvement of the Pavements in London; at which period, finding I could not go further without disclosing the whole, I left the consideration of it to a future period.

In consequence of the London Bridge Water Company having been dissolved by an Act of the last Session, the New River Company have succeeded in supplying the inhabitants of the City. The nuisance they have created in the streets (unavoidably upon the present system) has indeed been intolerable, and the subject consequently revived in my mind.

The result has been, that to secure whatever may be profitable from this matter to myself and family, I have taken out a Patent, and have called a preliminary public meeting, the transactions of which are reported in the Herald, and Chronicle, of the 5th instant (November).

Another meeting is to follow, as then agreed; previous to which, I feel it to be my duty to send you, Sir, a printed Prospectus. This second meeting (which it is expected will be fully attended) is fixed for Wednesday, the 4th of December; and as you have the honour to be the parent of the last Act of Parliament respecting the pavements in the metropolis, I should feel myself wanting in courtesy, were I to omit soliciting the pleasure of seeing you, Sir, then preside at the City of London Tavern.

I remain, with the greatest respect,

Your obedient Servant,

JOHN WILLIAMS.

Cornhill, London, November 15th, 1822.

ANSWER.

Cantley, Nov. 19, 1822.

SIR,

I am very sensible of your politeness. It will not be in my power to attend the meeting, as I do not return to town till the Parliament

assembles for the dispatch of business. Permit me to state that, if the provisions of the Metropolis Paving Bill were strictly adhered to, the inconveniences, so justly complained of, would cease.

I have the honour to be, SIR,

Your faithful Servant,

M. A. TAYLOR.

To MR. WILLIAMS, Cornhill, London.

*To His Royal Highness the DUKE OF SUSSEX, Chairman
of the Society for promoting the Arts, Manufactures,
and Commerce, in the Adelphi.*

SIR,

Knowing your Royal Highness to be a zealous patron of the arts and sciences, and a promoter of useful inventions, I beg leave, with the greatest respect, to lay before you a project now instituting for the convenience of civilized society in this age of improvements.

Enclosed is a Prospectus for preventing the opening of the Pavements in the Streets for any purpose in future, which I hope will meet the approbation of your Royal Highness.

That a plan so simple was not thought of previous to laying down the immensely valuable pipes belonging to the Water and Gas Companies,

is much to be lamented ; but the loss is to them, and the nuisance to the Public, which will always remain, unless this plan is properly supported, and carried into effect.

To obtain this support, it is only necessary to receive the patronage of your Royal Highness. The Citizens of London are generally opposed to new ideas; but they are very capable of being led, whenever suitably impelled.

This your Royal Highness is eminently qualified to command, by honouring the assembly with your acceptance of the Chair, at the City of London Tavern, on Wednesday, the 4th of December, at twelve for one o'clock precisely, when a general meeting will be held, for the establishment of a CITY OF LONDON PATENT SUB-WAY COMPANY.

I shall have the honour, with your leave, to wait upon your Royal Highness on Wednesday, the 27th instant, at twelve o'clock;

And remain, most respectfully, SIR,

Your obedient Servant,

JOHN WILLIAMS.

Cornhill, Nov. 25, 1822.

P.S. A preliminary meeting, for the purpose of announcing the project, took place at the City of London Tavern on the 4th instant; the report

of which is in the Morning Herald, and Chronicle,
of the 5th.——

It having been ascertained from his Surgeon,
Mr. Pettigrew, in Spring Gardens, that His Royal
Highness was ill at Bognor, another letter was
forwarded.

To His Royal Highness the DUKE OF SUSSEX,
Bognor.

SIR,

I sent the original of the enclosed,
directed to your Royal Highness at Kensington
Palace, yesterday; where I learned you was at
Bognor, and not expected to return for some time.

Feeling the importance of your Royal High-
ness's support of this infant project, I venture to
intrude on your retirement, for the honour of a
reply, which I hope your Royal Highness will
excuse.

In the event of your Royal Highness not
being able to honour the meeting with your pre-
sence on the 4th of December, the favour of your
name, at the head of those who are desirous of being
proprietors eventually, will be most important.

I have the honour to be

Your Royal Highness's most obedient Servant,

JOHN WILLIAMS.

November 26, 1822.

The following Letter was also sent to each of the Aldermen, Sheriffs, and Members of the Common Council.

SIR,

I take the liberty to introduce to your notice, as one of the Members of the Corporation of the City of London, a Prospectus for the establishment of a Public Company, to remedy the nuisances we have always been subject to from the opening of the Pavements in the Streets, &c.

In consequence, as you know, of the London Bridge Water Company having been dissolved by an Act of Parliament, and the New River Company having succeeded to supply the inhabitants of the City, they have created, during the last few months, which they could not avoid upon the present system, an intolerable inconvenience:—their valuable pipes, some parts of which are of beautiful workmanship, have been buried in the mud; and the pavements must again be opened for the Water and Gas Companies, whenever required.

This nuisance of opening the pavements will again and again occur, and cannot be prevented by any plan hitherto known. Your attendance, therefore, as a Member of the Corporation, interested in increasing the comforts of the Citizens, and facilitating the conveniences for business, which are greatly hindered by the stoppages in the

streets, is particularly requested, to support this public improvement, at the second meeting (which it is expected will be fully attended), to be held at the City of London Tavern, on Wednesday, the 4th day of December, at twelve for one o'clock precisely.

A preliminary meeting assembled on the 4th of November, the report of which you will see in the Morning Herald of the 5th instant.

I remain, SIR,

Most respectfully your's,

JOHN WILLIAMS.

Cornhill, Nov. 25, 1822.

Before the next meeting, advertisements were sent to the daily Papers; and Bills were printed and posted about the City by six men, for a week previous to December 4th, 1822.

"IMPROVEMENT OF THE STREETS.

"A second public meeting will be held at the City of London Tavern, on Wednesday, the 4th of December, 1822, at twelve for one o'clock precisely, for the purpose of establishing a CITY OF LONDON PATENT SUB-WAY COMPANY, by the authority of Parliament, for preventing the removal of the pavements for the Water and Gas Pipes, &c. &c.

“ This plan will be an effectual remedy for an evil the Public have so long complained of, from the obstructions in the streets, and the interruptions to the business of the City.

“ The Prospectus of the Plan may be had of Chapman Barber, Esq. No. 44, Chancery Lane ; at Mr. Croggon’s, No. 64, Cornhill ; and at the City of London Tavern ; where all persons desirous of eventually becoming Proprietors, may now enter their names.”

*EXTRACT FROM THE DIURNAL PUBLICATIONS
OF THE 5TH DECEMBER, 1822.*

PUBLIC SUB-WAYS.

Yesterday a second meeting was held at the City of London Tavern, for the purpose of entering into the preliminary arrangements respecting the establishment of a public Company, to construct Sub-ways, to obviate the recurrence of those constant repairs on the surface of the pavement, by the proprietors of the Water and Gas Companies in the progress of their works.

The business was entirely confined to the consideration of the appointment of a Committee to deliberate upon the whole plan, and to report thereon to a future meeting.

Mr. Williams, who is the Patentee of the new project, was called to the chair.

Mr. Barber read the specification of the Patent—(*Vide page 43.*)

Mr. Williams then addressed the meeting, as follows :—

Gentlemen,

It having pleased God to put into my mind a remedy for a public evil, the nature of which you are fully acquainted with, the Prospectus of the Plan by which it may be produced, has been printed, and generally issued, previous to this meeting.

As every new idea is a fair subject for discussion, I have at once boldly entered into the arena, to prove its value.

I have accordingly ventured to call a meeting of my fellow-citizens by public advertisement, in consequence of the great inconvenience we have all suffered for some time past, from the opening of the pavements in the City. Of this we have been witnesses from necessity ; as almost every street in every Ward and Parish has been disturbed, to the great annoyance of the inhabitants.

That men's minds differ, we know, and consequently they oppose each other : this I am fully aware of, and now come before you prepared to hear objections. Some of these I shall anticipate,

and endeavour, with your leave, to explain and obviate.

It has been said, that a difficulty will exist in removing so large a quantity of earth, where the Sub-ways will be formed :—to this I answer, that the same means may be adopted as were used when the Docks were excavated, and when the common sewers were originally made.

The next objection is, that in narrow streets the foundations of the houses may be weakened, and probably fall.—I reply, that this objection is taken from an erroneous view of the subject, and from not recollecting or knowing upon what ground or base our houses are built; for how have our forefathers built the City of London? Why, by digging ten or twelve feet below the surface of the streets, leaving the earth standing like a causeway between each side; which causeway or street is supported by the houses and buildings: therefore the earth does not support the houses, but the houses support the earth or street, and they act as an abutment; in fact, the whole of this causeway or street might be cleared away, to the foundation of your houses and buildings, without the slightest danger of their falling. Into this depth of earth in your streets, all the various pipes are bedded, or buried I should rather say; and the cause of complaint is, that they are not suffered to remain in their quiescent state, to be no more

seen ; therefore these Sub-ways *will-not, cannot,* injure the safety of the buildings. This second objection therefore vanishes like the first.

A third objection is, that the Water and Gas Companies have now laid down iron pipes, and it will never be necessary to remove them. But how do we know this ? What kind of pipes Peter Morrys, at the old London Bridge Water Works, or Sir Hugh Middleton, at the New River, first used, we do not exactly know, but probably they were of wood ; since then stone pipes have been employed, and now iron are the fashion. One error in these iron pipes is, they are so large, that the body or weight of water bursts the small leaden service-pipes, and your streets are continually opened to mend them. At this very moment, the number of complaints in the books of the Water Company is greater than at any former period : the weight of water is such, that a very considerable force is necessary to raise it above its level ; and I should not be surprised if some alterations were to be made : therefore, although iron is an excellent material for water to flow through, your streets will nevertheless be constantly opened, and the nuisance to the public remain.

With respect to iron pipes for gas, they have not yet been sufficiently tried ; but this is a plain fact, that any cheaper pipes will do for the flow of this article through the Sub-ways, and a very

important saving will follow to the proprietors of gas shares ; indeed, the same may be said for the Water Companies:—when it is considered that an immense sum has been paid for these iron pipes, some parts of which are of very ingenious and costly workmanship, and that they lay buried in the mud, in a state of constant corrosion, it is much to be lamented that Sub-ways had not been formed before they were used.—Excuse this short digression.—Now, I say, although iron pipes are generally used, yet the streets will nevertheless be continually opened, for some reason or other, and the annoyance to the public will remain. I do therefore trust that Parliament will now interpose in behalf of the public, and legislate a remedy, to prevent the streets being thus opened. It is not a fair answer, that the streets will now do very well ; the experience of every year has given abundant evidence that, what with the water, the gas, and the sewers, this public nuisance has been intolerable. And why has it been borne with so many years ?—Because no remedy was known. This one is now presented to you, which is evidently an effectual one.

Now, Gentlemen, the chief objection to Sub-ways that I have heard, is this ; and I own it appears to be a plausible one. In some of the streets of London, the sewers are not deep, being no more than six feet from the surface ; and it is said that the Sub-ways are in danger of being inundated, in

the event of an accident to the sewers. Now I solicit your patient attention to this :—we do not come here to let objections defeat the project, but to hear them calmly, and discuss them candidly. I grant that in some parts of the City of London the sewers are too near the surface for us.—What then? We will avoid those places, and not leave an opening in our Sub-ways near any part that can injure us: we only want openings into the sewers in a few places, and those with close iron doors, for the accommodation of the work-people; and these may be made in those parts where the sewers are sufficiently below them, but they may be entered wherever required from the upper part, or the top of our Sub-ways: so that this apparently alarming objection is removed.

Having said thus much, I now submit this object to your liberal patronage. It was first presented to my mind five or six years ago, at the time Mr. M. A. Taylor obtained his Act relative to the Pavements, to whom I then wrote, as also to the Chancellor of the Exchequer; but having an important and rising concern in business to conduct*, I had in a measure forgot it, until the sad condition of the streets lately forced the subject forward again.

* Mr. Williams, who is a Stationer, obtained a Patent some years ago for improving Account Books, which is now universally adopted.

It may be proper also to reply to another probable objection that may be raised, namely—that I propose to interfere with other Bodies already authorized by Parliament to take care of the public streets, &c.—I mean the Commissioners of Sewers and Pavements. With those respectable Bodies I do not intend to quarrel ; but if they have been unable to remedy an evil, of as long a date as their own authority, I trust to their candour and impartiality not to interfere with us, who originate and bring forward such a valuable and effectual plan. They had their commencement for the public benefit ; and probably our forefathers complained at that time of the extensive power then granted. Now we intend to aid and assist those Bodies in their original object, for which that power was so largely granted by the Legislature ; and whatever arrangements they may want with the City of London Sub-way Company, may be settled in the Committee of the House of Commons.

Mr. Williams then suggested the appointment of a Committee, as the best course now to be taken.

Mr. Samuel Dixon remarked, that many difficulties to such an undertaking were apparent. In the first place, the work could not be carried on without the concurrence of the present existing public Water and other Companies ; and in the

next place, in those parts of the City which were excavated for valuable storeage, great difficulties would arise.

Many gentlemen observed, that the undertaking appeared to them absolutely impracticable, and that, at all events, some probable estimate of the expence, and of the sources of revenue to indemnify the shareholders ultimately, ought to precede the appointment of a Committee. Some objections were also started, from the escape of gas in the proposed Sub-ways, and also respecting the lateral communications to service-pipes.

Baron de Berenger suggested the propriety of putting scientific men of high influence upon the Committee ; and Mr. Samuel Dixon said that it ought also, if possible, to include men of great commercial influence in the City.

A Committee was ultimately appointed to consider of the plan, and probable expence.

The Patentee intimated that it was his intention to apply to Parliament for a Bill to establish a Company of Shareholders to undertake the work.

A gentleman said, that at Rome these Sub-ways were common, to convey the water-tubes to the public fountains ; but there was no modern instance of their erection.

The Committee were directed to report to a future meeting.

*ADVERTISEMENT SENT TO THE TIMES, AND
OTHER DAILY PAPERS, DECEMBER 4th, 1822.*

IMPROVEMENT OF THE STREETS.

At a meeting held at the City of London Tavern, on the 4th of December, 1822, for taking this subject into consideration—Mr. Williams in the Chair.

It was resolved—

That the Pavements in the Streets of the City of London having been for a long time past in a disgraceful state, it is expedient that some plan be adopted to remedy the evil.

That upon the present system of frequently opening the pavements, for the repairs of the common sewers, and laying down and taking up the pipes for the Water and Gas Companies, no probability exists that the evil will be diminished in future.

That this meeting having heard read part of the specification of a Patent recently obtained for a method to prevent the frequent removal of the pavements, &c. &c., by constructing Sub-ways and

Passages, wherein the pipes may be laid, without opening the pavements, is of opinion that the plan in question is of sufficient importance to require further investigation.

That, for the effectual construction of these Sub-ways, authority must be obtained from Parliament.

That Josiah Robert Harrison, Henry Willey Reveley, and Leapidge Smith, Esqrs. be a Committee (with power to add to their number), to ascertain the number of miles in the City of London capable of receiving Sub-ways; the expence per mile of making the same in brick, and in iron; and the probable amount of income; and to report thereon to the next public meeting, to be convened for that purpose.

JOHN WILLIAMS, Chairman.

The first meeting of the Committee for Sub-ways was held on the 13th of December, 1822, at No. 78, Cornhill—

Present—Messrs. Harrison, Reveley, Smith, and Williams, to enquire into the sources of income previous to the next meeting.

Adjourned to January 6, 1823.

The second meeting of the Committee was held on January 6th, 1823—

Present—Messrs. Harrison, Reveley, Hill, and Williams.

The Annual Report of the Corporation of the City of London was read.

Mr. Williams was requested to obtain the amount of the expenditure of the London Bridge and New River Water Companies, and the City of London and Corporation Gas Companies; as well as an abstract of their expences, on the average of the seven years, for laying down and taking up Pipes; and the Parliamentary Reports containing the whole, from the London Institution.

Adjourned to the 27th instant.

On the 24th of January, 1823, a paragraph appeared in the Morning Chronicle, under the following head of

SEVERE WINTERS.

We understand that, among the advantages held out to be derived by the construction of public Sub-ways in the Metropolis, it is intended to give a constant supply of water to the inhabitants during the hardest frost, without plugs in the streets; and to remove the heaviest fall of snow, by thawing it as fast as it is received into the Sub-ways.

*Letter from the COMMITTEE, to the DIRECTORS OF THE
NEW RIVER COMPANY, dated February 3d, 1823.*

Gentlemen,

At a public meeting held at the City of London Tavern on the 4th of December last, for the purpose of establishing a City of London Sub-way Company, it was referred to us, as a Committee, to enquire, among other things, into the probable amount of income to be derived from the proposed undertaking.

As one of the sources will be the money paid by your Company, for laying down and taking up pipes, and the expences you have incurred thereon per annum, during the last seven years, within the City of London only; we very respectfully solicit the favour of your order to obtain an extract from your books for this purpose. In soliciting this information for a public undertaking of great magnitude, connecting itself very materially with your valuable works, we are not acting from any sinister motives, or idle curiosity, but for the public welfare: we shall therefore be most happy to explain any point you may wish us to elucidate, by a personal interview, or otherwise, in a most frank and honourable manner; and should it even be your wish that the information should, in the first instance, be of a confidential nature, it is fully our intention in that case not to disclose

any facts you may be kind enough to communicate, without your especial authority, or until required to do so in the Committee of the House of Commons, upon an application in the approaching Session for an Act of Incorporation.

We are, Gentlemen, with great respect,
Your obedient Servants,

Committee Room, 78, Cornhill,
February 3, 1823.

Letter to each Member of the Committee.

Dear Sir,

The above is the draft of a letter for your correction, previous to our next meeting. I have the pleasure to inform you that Mr. Harrison and myself have obtained some important information on the subject of income from the Parliamentary Reports; and we think our next meeting should be postponed until Monday, the 3d of February, 1823, at eleven precisely.

Yours,

JOHN WILLIAMS.

Jan. 21st, 1823.

The third meeting of the Committee of Subways was held the 3d of February, 1823—

Present—Mr. Harrison and Mr. Williams.

Mr. Williams was requested to obtain the Chamberlain's Report for the last seven years,

from an Alderman, or one of the Members of the Common Council ; and also the " Report of the Select Committee, on the supply of Water to the Metropolis," ordered to be printed by the House of Commons, 18th May, 1821—No. 537, Vol. 5.

Letters to the Directors of the Water and Gas Companies were determined upon ; and, if approved by the Committee, ordered to be signed by them, and sent immediately.

Mr. Williams was requested to enquire about the Society of Civil Engineers ; their place for meeting being in Buckingham Street, Strand.

At a meeting of the Committee held the 17th of February, 1823—

Present—Messrs. Harrison, Smith, Reveley, Hudson, and Williams.

The following letter was approved of, and signed by the Committee.

Letter from the COMMITTEE, to the Directors of the NEW RIVER COMPANY, dated February 17th, 1823.

Gentlemen,

The Committee, appointed at a public meeting held at the City of London Tavern, on the 4th of December last, for the purpose of establishing a City of London Sub-way Company, having proposed to recommend a Petition to Parliament for a Bill to form Sub-ways from Aldgate

to Temple Bar, beg to point out the many advantages accruing to your Company, by placing your pipes therein, *viz.*

The immediate access to them without opening the ground—the power of protecting their external decay, by covering them with tar or other materials—the convenience of stopping the joints whenever leakage occurs—and their removal or exchange when necessary—together with other economical arrangements the Sub-ways will afford, embracing the facility for a complete supply of cocks and plugs every ten years, and entire new iron pipes in forty-five years: for the necessity of which, see the Report of the Select Committee of the House of Commons, on the supply of Water to the Metropolis, ordered to be printed the 28th of June, 1821.

Such being the advantages, considering you to be greatly interested in its success, the Committee have been induced to apply to your Company, to ascertain the rent you would be willing to pay for this convenience; which will prevent the removal of the pavements and carriage paths for any of your works in future.

We are, Gentlemen, with great respect,

Your obedient Servants,

J. R. HARRISON.

R. W. REVELEY.

L. SMITH.

Committee Room, Cornhill,

Feb. 17th, 1823.

Mr. Harrison and Mr. Williams reported that they had obtained the brief statement of the City Cash by the Chamberlain of London, containing the receipts and expenditure for opening and repairing the streets of the City of London; from which they had extracted as much as referred to the probable income, for the Sub-way Company: and also that they had obtained the Reports presented to Parliament from the Water Companies in 1821, containing their expences for the same purposes.

IN PARLIAMENT, *Session 1823—Feb. 25th.*

Mr. Peter Moore, the Member for Coventry, having moved for a Committee of the House of Commons, to enquire into the powers vested in, and exercised by, the Commissioners of Sewers in the Metropolis, &c., the following Gentlemen were appointed.

Lord Duncannon.	J. H. Calcraft, Esq.
Sir Francis Burdett,	Edward Ellice, Esq.
Sir James Graham.	Thomas Wilson, Esq.
Sir Robert Wilson.	Samuel Barrett, Esq.
Alderman Wood.	James Brogden, Esq.
W. Smith, Esq.	D. Ricardo, Esq.
T. B. Lennard, Esq.	W. Astell, Esq.
Honourable C. Hutchinson.	John Smith, Esq.
P. Grenfell, Esq.	John Fane, Esq.
W. Dickinson, Esq.	S. Marjoribanks, Esq.
J. C. Hobhouse. Esq.	R. Bernal, Esq.

*The following Gentlemen
were added, 13th March.*

Alderman Bridges.
Joseph Pitt, Esq.
Saville Onley, Esq.

—
*The following were subse-
quently added.*

Lord Viscount Belgrave.
Lord William Bentinck.

Lord William Stanley.
Sir Robert Heron.
Davies Gilbert, Esq.
Stuart Wortley, Esq.
Vere Fane, Esq.
E. J. Curteis, Esq.
G. Holme Sumner, Esq.
John Mansfield, Esq.

—
Peter Moore, Esq. *Chairman.*

Mr. Williams was in attendance on this Committee ; but as they seldom met, a Letter was addressed to each of the Members of the House of Commons on the Sewer Committee.

Cornhill, Feb. 28th, 1823.

SIR,

As a member of the Committee for enquiring into the powers of the Commissioners of Sewers, &c., I respectfully solicit the pleasure of an interview, respecting the possibility of rendering the opening of the pavement for their works unnecessary in future.

Although this is not the immediate object of the Committee, yet as the public have been much annoyed by the taking up of the stones in the streets, and the stoppage of the carriage ways, for the formation and reparation of the sewers, it may possibly be considered by you, Sir, and by

the Committee, not altogether foreign to this enquiry. Waiting your commands,

I have the honour to remain

Your obedient Servant,

JOHN WILLIAMS.

The following was contained in the envelope of the circular sent to all the Peers and Members of Parliament.

The Committee of the House of Commons, now sitting to enquire into the powers of the Commissioners of Sewers in the Metropolis, having individually received one of the enclosed papers on the subject of public Sub-ways, which will probably be referred to in Parliament upon the Report of that Committee ; the Patentee, with the view of inviting a candid and liberal consideration of the subject, respectfully presents to you, Sir, a similar brief statement of the proposed Sub-ways.

Cornhill, March, 1823.

Circular sent to all the Peers, and to the Members of Parliament, March 3d, 1823.

In the month of October last, a Patent was obtained by John Williams, of Cornhill, in the City of London, "for a method to prevent the frequent removal of the Pavement and Carriage Paths, for laying down and taking up Pipes, and for other purposes, in Streets, Roads, and Public Ways, &c. &c."—*See page 43, for Specification.*

The nature of this Patent being of a public and universal character, not to be worked by any individual, but by public Bodies—either by subscriptions, or by the appointment of Government—but in neither case without the authority of Parliament; a meeting was convened at the City of London Tavern, on the 4th of November, 1822, for the purpose of stating the object, and announcing Sub-ways in the daily Papers, for the discussion of public opinion; submitting that a City of London Sub-way Company should be established upon the plan as stated in a Prospectus then issued, which meeting was adjourned to the 4th December, at the same place; when a Committee was appointed to report to the next meeting the number of miles in the City of London capable of receiving Sub-ways—the expence per mile of making the same in brick and in iron—and the probable amount of income to be derived from the proposed undertaking. This Committee is now sitting, and will report the result of their enquiries in the course of the Spring, which, from the large sums now expended in disturbing the Pavements, and the general advantage to the public by preventing a nuisance of such long standing, and daily notoriety, there is great expectation will be favourable to its adoption.

Whether a Public Company of individual interests, or Trustees under Government, will be the best for the general welfare, is a question for

consideration? In the first, their property, being their own, is likely to be well done, and properly attended to for their own advantage; in the second, the annual taxes for Paving, &c. may be taken off, and the income derived from the Water and Gas Companies, who make use of the convenience of these public Sub-ways.

The extent of this project is so considerable, and the utility of it, not to say the necessity of it, is so manifest, that several sets of Commissioners, or Directors, will be necessary to carry the whole into immediate effect. The magnitude of the metropolis will require, in addition to the one in the City, a north, east, west, and south Sub-way Company; and those large provincial Towns, where sewers are constructed, and pipes laid in the streets, will each of them require a Sub-way Company.

Sub-ways connecting themselves so intimately with the public sewers, this brief narrative of the early proceedings respecting them is very respectfully laid before the Parliamentary Committee of the Honourable House of Commons, appointed to enquire into the powers of the Commissioners of Sewers in the Metropolis, and to report their observations and opinion thereupon to the House,

By their obedient Servant,

THE PATENTEE.

No. 78, Cornhill, London.

*Circular sent to each Member of the House of Commons
on the Sewer Committee, April 12th, 1823.*

SIR,

Having had the pleasure of communicating to you my project for forming Sub-ways, to prevent the opening of the ground for the water and gas pipes, or for disturbing the pavement for any purpose whatever; I now beg leave very respectfully to acquaint you, Sir, as a Member of the Parliamentary Committee appointed to enquire into the powers of the Commissioners of Sewers, &c., that, in addition to any information I can give, an Engineer of eminence is willing to attend the Committee, to explain any points that, in their opinion, require elucidation, as to the practicability of constructing Sub-ways in the metropolis; more particularly as to their connection with the Sewers.

Waiting your order, I remain, SIR,

Your obedient Servant,

JOHN WILLIAMS.

No. 78, Cornhill, London.

The following observations respecting the proceedings of this Committee, and the subject, appeared shortly after, in one of the Public Journals :—

PUBLIC SEWERS.

This subject, so important to the cleanliness and health of the metropolis, and upon which we believe little more is generally known by the public, than the fact that a collector makes his periodical application for "the sewers rate," was brought under the consideration of the House of Commons in the course of last Session. Soon after the meeting of Parliament, a Select Committee was appointed "to enquire into the powers vested in, and exercised by, the Commissioners of Sewers in the metropolis, and to report their observations and opinions thereupon to the House." This enquiry was, we believe, intended as preliminary to the introduction of some general legislative measure on the subject. If this was the object, the labours of the Committee went just far enough to shew its necessity, but not "a jot" farther. We never saw another instance where a Select Committee so completely mismanaged their time, or so entirely lost sight of that which the examination of their first witness had clearly established, namely, the necessity of some *immediate* legislative measure by which the powers and duties of Commissioners of Sewers might be more clearly defined, and an authority to exercise an efficient controul over their proceedings vested in some public and responsible officer. The Committee met first on the 5th of March (Peter Moore, Esq. Chairman); next on the 11th; again on the 25th;

from which time the subject appears to have been *sent to Coventry* until the 11th of June. The enquiry was then resumed, and continued on the 12th, 17th, and 19th of that month, when it ceased. From this period to the 10th of July (the date of the Report), one would imagine that there was sufficient time for the Committee to put together in regular form their "observations and opinions" (as they were directed to do by the House) upon the evidence before them. Instead of this, we find them, on the 10th of July, making the following report, or rather apology for not making one:—

"The Select Committee appointed to enquire, &c., have, pursuant to the order of the House, examined into the several matters to them referred, and have examined several witnesses" (four in four months!), "but from the *advanced stage* of the Session"—(what were they doing during the four months? one of which, if well employed, would have been time fully sufficient for all the purposes of the enquiry)—"they do not deem it expedient to offer any opinion on the subject to the House at the present time, *except*" (which, in fact, is no *exception*) "to *report* the evidence taken before them."—Had the Committee made this or any other report two months earlier, as they well might have done, full time would have remained for the introduction and completion of some legislative measure on a subject so important to the health of the metropolis. We do not think that

the sewers will be worse attended without such Act; but we know that, under the present system, the public are called upon to pay for sewers rates immense sums annually, upon the application of which there is, in our opinion, a very inefficient controul. This will be best proved by giving an abstract of the evidence as far as it relates to the powers of the Commissioners, and the manner in which they act.—There are three Courts or Boards of Commissioners in the metropolis (at the north side of the Thames.) The first superintends the district of the Tower Hamlets, extending to the sewers in Spitalfields, Hackney, Mile End Old Town, Mile End New Town, and part of Limehouse, all the parts in the vicinity of the Tower, the Commercial Road, Ratcliffe, &c. The second Board is for the Holborn and Finsbury division, extending to the Parish of St. Leonard, Shoreditch, and the Liberty of Norton Falgate, (this is for the Finsbury district). The Holborn district comprises the parishes of Hampstead, St. Pancras, St. Andrew, Holborn; St. George the Martyr, part of St. George, Bloomsbury; part of St. Giles, and the Liberty of the Rolls. The third Board is for “the City and Liberties of Westminster, and part of the County of Middlesex.” The jurisdiction of this Board extends to Hampton, Teddington, Twickenham, Isleworth, Hanwell, Brentford, Acton, Ealing, Hammersmith, Fulham, Kensington, and Chelsea; and to and within the City and Liberty of Westminster, to Temple Bar, and to parts of

St. Pancras, Marylebone, Hampstead, Wilsdon, and Paddington. In the Tower Hamlets division, the Commissioners are appointed by the Commission of the Lord Chancellor, which is renewed at intervals. The last Commission is dated February, 1821, and contains 150 names. The original Act under which the appointment was made, was the 23d of Henry VIII., c. 5. By this Act it appears that the qualifications necessary for a Commissioner of Sewers were, "that the Commissioner shall be an *utter* Barrister in one of the four Inns of Court, which is a gentleman practising in the Courts, not a Chamber Barrister; that he have lands of the yearly value of forty marks; that he be free of some City or Corporate Town; and that he have moveable substance (personal estate) to the clear yearly value of £100, and that he take an oath prescribed, to discharge his duty impartially, and without fear, favour, affection, &c." These were formerly the qualifications; but we presume that most of them have long since been dispensed with. It would be very difficult for the Lord Chancellor to find 150 practising Barristers who would undertake so troublesome a task, particularly for the kind of remuneration hereafter mentioned. In the evidence of J. W. Unwin, Clerk to the Commissioners, it appears that "they have no remuneration, excepting a *dinner* on the Court-days, which happen *four times* a year." The average number of Commissioners who assemble on Court-days is from 35 to 40. The principal business of

the Commission is performed by a standing Committee, consisting of 12, who are appointed at the first meeting of the Court, under a Commission. The Committee meet once in every month (except the month of August), and are also remunerated by *a dinner* on each day of meeting. The duties of the Committee are to give directions for doing the necessary works in the interval between the quarterly Courts; and to receive and decide upon petitions for leave to use the public sewers. They report their proceedings to the full Court, by which they are ratified or reversed. Under the orders of the Committee are the clerk, surveyor, inspectors, and messengers, who have fixed salaries. The business of the Board is conducted at No. 15, Great Alie Street, Goodman's Fields.—The nature of the proceedings of the Board is thus explained by Mr. Unwin:—"Upon the declaration of a new Commission, this Court issues a precept to the Sheriff of Middlesex, to summon from the body of the County 48 good and lawful men, of whom 23 are sworn;—this the Court has power to do, under 23d Hen. VIII., cap. 5, before alluded to: this Jury are sworn in Court, and charged by the Chairman, who directs them to present, upon oath, the state of the embankments and of the sewers. On this presentment, which is chiefly formed on views taken, and which also comprehends the persons and property liable to be rated, the Court proceeds to nominate assessors, who state the apparent value of each man's estate

which the Jury find liable to be assessed, and which, upon proper evidence, is adopted; an estimate is then made by the surveyor of the necessary expences of these works, upon which the rate is founded, at so much, in the pound. Collectors are then appointed in open Court, who enter into bond in a sufficient penalty; defaulters, or persons aggrieved, are summoned, and may be heard by the Court before any distress warrant issues against their property. If they are over-rated, or rated higher than the poor-rate, they are relieved. If they are desirous of trying the question, whether the rate is legally assessed or not upon them, and whether they receive benefit, or avoid damage, they may bring an action of trespass against the Collector, when the Commissioners of Sewers are bound to shew that all their proceedings are legal, and that the parties do actually receive a benefit, or avoid a damage (by the sewers): otherwise they cannot make out their defence."—The assessment is made by a poundage on the rental, the same as the poor-rates. The rate is in all cases paid by the landlord, except where an agreement to the contrary is made between him and the tenant. It appears that the Jury are remunerated for their trouble in inspecting the sewers, by *a dinner* every day they are out. The inspection generally occupies five or six days. They are always attended by the Surveyor and Clerk of the Board. The authority under which the Commissioners of the Tower Hamlets act, seems doubtful; and they

may be put to the defence of an action for trespass by every person on whom they levy. In this and other respects, some legislative measure seems necessary. The Board of Commissioners for the Finsbury and Holborn districts are appointed by the Lord Chancellor; but their proceedings are regulated by local Acts, (the 18th and 54th Geo. III.) The Commissioners are remunerated by dinners, for which the sum of £450 is allowed. The difference between their powers, and those of the Commissioners of the Tower Hamlets is thus stated by Mr. J. W. Lush:—"Under the new Act we do not empanel any Jury: when a rate is necessary to be made, we call upon the Vestry Clerks to furnish copies of the poor-rates; these are transcribed, and a rate made adequate to the supposed expence of the ordinary repairs of the sewers, and the contingent expences of the Commission, upon the rentals returned by the Vestry Clerks. Two copies are signed by the Commissioners in Court, and one part delivered to the collectors. Immediately after the expiration of three months from the time of making the rate, the persons who have not paid are summoned; and at the ensuing Court, unless the parties have been relieved, or their rates mitigated, distress-warrants are issued. By those Acts the tenant is liable to be distrained for the rate; but it is to be allowed him by the landlord, except in cases where there is an agreement to the contrary. Here, also, as in the Tower Hamlets, actual benefit, or avoidance of injury, must be

the ground of the demand for any rate ; but the Commissioners are empowered to decide who does or does not receive a benefit from the sewers. The number of Commissioners appointed for this district by the Commission of 1816 was 179, of whom many have since died. In the Westminster district there are 196 Commissioners, upwards of 40 of whom are "Peers, and other Right Honourables ;" the remainder are for the greater part gentlemen of rank and fortune. They act under some local Acts (47th Geo. III.) There is a small remuneration allowed them for attendance (4s. each day), but it is never claimed. The Court is formed by from 12 to 18 Commissioners ; but there must be six at least to render their proceedings legal. A Jury here, as in the Tower Hamlets, is sworn to present for the works and repairs, and also the parties liable to pay ; but with this difference—that the Westminster Juries *do not proceed to view the several places respecting which they present*. According to the evidence of Mr. Houseman, the Clerk to the Commissioners, it is *ten years since a Jury went out to inspect*. Maps and plans of the several places are drawn up, and estimates of the expences are submitted to them by the officers of the Commission, who are sworn to answer all questions which the Jury may think proper to ask. Upon the information thus afforded, they form their opinion, and return their presentments."—We do not pretend to say that any unfair advantage is taken of the public by this mode of

presenting public works ; but undoubtedly it is liable to abuse, and we think ought to be remedied. The average amount of the expences under the Westminster Commissioners is from £20,000 to £25,000 a year. The expences of the Finsbury and Holborn divisions are about £10,000 a year. In the Tower Hamlets division no regular annual rate is made. There have been four rates made within the last 20 years, amounting to £49,565 ; but the amount actually collected was only £38,365. Of this £22,293 were expended in works ; the remainder in contingent expences. The only controul over the extent of the rate, or the mode of its application, is the discretion of the acting Commissioners. Would it not tend to diminish the chances of abuse if each Board of Commissioners were obliged to make an annual return to Parliament of their receipts and disbursements for the preceding year ?—If the “ Select Committee ” should ever resume their labours, we trust they may turn their attention to the public sewers at the Surrey side of the Thames :—they will find much matter on which to exercise their legislative functions, provided they shall be of opinion that the sewers of Southwark and its vicinity ought to be considered as belonging to “ the metropolis.” The following are the levels or altitudes of certain streets above the highest high-water-mark of the River Thames, measured from the surface of the carriage-roads :—

	Above the highest high-water-level.	
	Feet.	In.
North end of Northumberland-street, (Strand)	19	7
North end of Wellington-street, (Strand)	35	6
North end of Essex-street, (Strand)	27	0
West end of Coventry-street, (Haymarket)	52	0
Pall-mall, (opposite the south end of St. James's-street)	13	3
Piccadilly, (at the south end of Air-street)	49	8
Piccadilly, (at the north end of St. James's-street) ..	46	7
Ditto, (at the south end of White Horse-street)	24	6
Prince's-street, (at the west end of Gerrard-street, Soho)	61	4
Broad-street, Bloomsbury, (at the west end of Drury- lane)	65	0
Oxford-street, (at the south end of Berners-street) ..	74	3
Ditto, (near to Stratford-place)	59	4
Ditto, (crossing Regent-street)	76	0
Ditto, (at the south end of Orchard-street)	70	4
New-road, St. Marylebone, (opposite the north end of Cleveland-street)	80	10
Ditto, (at the centre of the Regent Circus)	77	2
Ditto, (at the north end of Gloucester-place)	72	3
Regent's-park, (at the road on the north side of the aqueduct crossing the Regent's-canal)	102	6
Great George-street, Westminster, (opposite the south end of King-street)	5	6

Westminster.—The whole surface of Westminster, excepting a small part surrounding the Abbey, and a very small part of the Horseferry-road, is below the level of the highest tide.

In April, 1823, the Sheriffs of London presented a Petition to the House of Commons from the Corporation of the City of London, praying for leave to bring in a Bill to amend the Acts relative to the Sewers in the City of London; which was referred

to a Committee, consisting of the Members for the City and others—Alderman Wood, Chairman.

On the 11th of April, Mr. Alderman Wood, Member of Parliament for the City of London, presented a Petition on the subject of the Subways of the Metropolis:—Ordered to be printed, and referred to the Committee on the London Sewers Bill.

*TO THE HONOURABLE THE COMMONS OF GREAT
BRITAIN AND IRELAND, IN PARLIAMENT
ASSEMBLED.*

The PETITION of JOHN WILLIAMS, of Cornhill, in the City of London, most respectfully sheweth—

That your Petitioner in the month of October last obtained His Majesty's Royal Letters Patent, for preventing the opening of the Pavements in Streets, Roads, and public Ways, for laying down and taking up pipes, and for other purposes; which Patent promises to be of great public utility;—that your Petitioner has seen a Bill lately presented to your Honourable House, for amending the Acts relative to the Sewers in the City of London;—that your Petitioner by his said invention can importantly aid the objects of that Bill, and prevent the annoyance of frequently opening the Pavement for forming and repairing

the Sewers;—that he is willing to surrender his Patent for that general purpose, upon such terms as Parliament shall deem meet;—and prays that a clause or clauses shall be introduced into the said Bill, to prevent the frequent opening of the Pavements in the City of London, by connecting Subways with the public Sewers.

This gratuitous offer to the Corporation of London was intended to give the power for commencing the work whenever and wherever it should be thought proper. By inserting this clause, the full authority would be possessed, without its being obligatory on the Commissioners to build Subways; and the money would be raised for this purpose under the authority of the Sewer Act. But it is not very easy to drive new matter into old heads, or change the habits of ancient Bodies:—this was particularly evident in this instance; for the Commissioners of Sewers having had great power for centuries, all improvement seemed innovation, and could not be thought of even at the threshold of Parliament itself, from whom they derived their authority. It should, however, be observed here, that in conversation with several Members of the House on this subject, it was their opinion that Subways were of sufficient importance to claim a separate Act of Parliament.

This Committee on the London Sewers Bill consisted chiefly of the City Members, who were

attended by the Chairman, Mr. Deputy Greenaway, and some of the Commissioners of Sewers from Guildhall.

Mr. Williams attended this Committee constantly; but they avoided the enquiry with peculiar jealousy, and at length filled up their new Bill to advance the City Rates, from one shilling to eighteen pence in the pound; the preamble and particulars of which are inserted in pages 27 to 31, without hearing him, or investigating the subject. In consequence of which, the following letter was sent to Mr. Alderman Wood.

To Mr. Alderman Wood, South Audley Street.

May 8th, 1823.

SIR,

On attending you this morning in the Committee Room of the House of Commons, on the London Sewers Bill, respecting the Petition you presented from me to the House on the 11th of April, on the subject of Sub-ways, which was referred to that Committee, you informed me it was not before them, and referred me, with the Clerk of the Committee, to inspect the minutes of the House. In those minutes we found the reference *to the Committee on that Bill*, which Committee has not received it. Blame therefore must attach itself somewhere, either in non-compliance with the forms of Parliament, or in disobedience to its orders.

Why it was not before that Committee, you, Sir, have the best knowledge; but Mr. Gunnell considers there has been some mistake.

It was fully my intention to obtain from Parliament a clause in the London Sewers Bill, for power to construct Sub-ways, which would have greatly increased the comforts of every individual, and enlarged the authority of the Commissioners of Sewers; which I lament this mistake has prevented at present.

I am more concerned for this circumstance, because the sections and drawings of the Sub-ways, which the Engineer, Mr. Reveley, had to shew to the Committee to-day, would have removed any prejudice from every candid mind, of the facility and safety of the construction of Sub-ways in the City of London.

I have now therefore to request the favour that, as a Member for the City, you will advise me, either to present another Petition to the House—to refer my Petition back to the Committee on the London Sewers—or to receive the order of the House to refer it to Mr. Moore's Committee, who at present have no authority from the House to enquire into it.

I remain, Sir, your obedient Servant,

JOHN WILLIAMS.

No. 78, Cornhill.

H

A second Petition was then presented.

*TO THE HONOURABLE THE COMMONS OF GREAT
BRITAIN AND IRELAND, IN PARLIAMENT
ASSEMBLED.*

The PETITION of JOHN WILLIAMS of Cornhill,
in the City of London, most respectfully sheweth,

That your Petitioner, on the 11th day of last month, presented a Petition to your Honourable House on the subject of Sub-ways, to prevent the opening of the Pavements in Streets, Roads, and public Ways, for laying down and taking up pipes, and for other purposes ; praying that a clause or clauses might be introduced into the London Sewers Bill, then and now in progress through your Honourable House ; which Petition was referred to the Committee on that Bill.

That your Petitioner, in consequence, and with the importance of your order, attended that Committee, accompanied by an Engineer, with sections and drawings of the said Sub-ways ; when he was informed by the Chairman that his said Petition was not before them, and they had no authority to enquire into it ; which refusal appears to have originated in some mistake on the part of the Member who presented the said Petition.

Your Petitioner therefore most humbly prays that the said Petition, presented by him on the

11th of April, 1823, on the subject of Sub-ways, be referred back to the Committee on the London Sewers, or that it be referred to the Committee of your Honourable House now sitting, to enquire into the powers of the Commissioners of Sewers, &c. in the Metropolis, and to report thereon to the House.

May 28th, 1823.

The City Members and the Commissioners of Sewers now found themselves in a very awkward dilemma, as the Bill was evidently in the hands of Mr. Williams; for had he got any Member of the House to move that the Bill should be recommitted, to consider of his Petition, in obedience to their own order, the Session would have closed before the Bill could have been passed, and it would consequently have been lost.

The City Remembrancer accordingly called upon him, to request, as a favour to the Corporation, that he would suffer the Bill to pass without opposition; as the new rates could not be collected if he persisted in having it recommitted.

Had he shewn the same temper which the City Authorities displayed towards him, he might have delayed this enormous increase of taxes for twelve months at least, and in the meantime have awakened the attention of the Citizens to resist it, or at any rate to enquire into the necessity of the Bill altogether; but that not being his object, he

consented to Mr. Remembrancer's request, to oblige the Corporation of the City of London.

Having thus closed the proceedings with the two Sewer Committees in the House of Commons, the subject will come forward with considerable interest, by the addition of the drawings for the elucidation of Sub-ways, presented to the Patentee by Mr. Reveley, Civil Engineer.

The following letter was received from Mr. Reveley, April 30th.

Dear Sir,

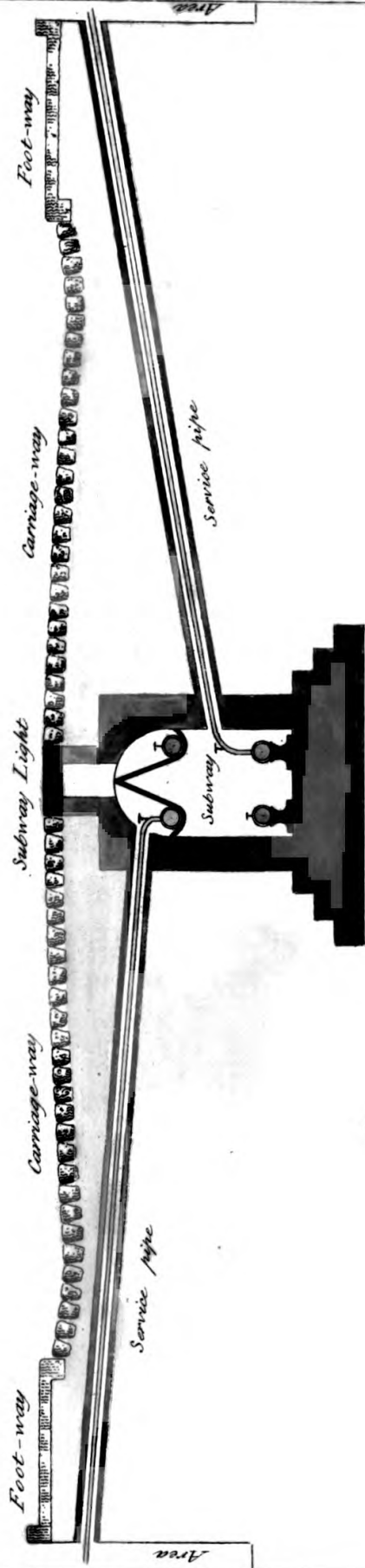
In reply to your favour of the 29th instant, I have the pleasure to acquaint you that the drawings are ready. They are four in number, *viz.*—1st, A transverse section of a Street provided with a Sub-way or Tunnel, for the reception of the Water and Gas Pipes ; in this drawing are also represented the lateral openings for the service-pipes.—2d, A transverse section of a Sub-way, including the common sewer; the lateral communications are also shewn.—3d, A longitudinal section of a Street with its Pipes.—4th, A Plan of the same.—Whenever you can make it convenient to call, I shall be happy to shew you these drawings. I shall generally be at home in the forenoon of every day, except Friday next.

Dear Sir, your's very truly,

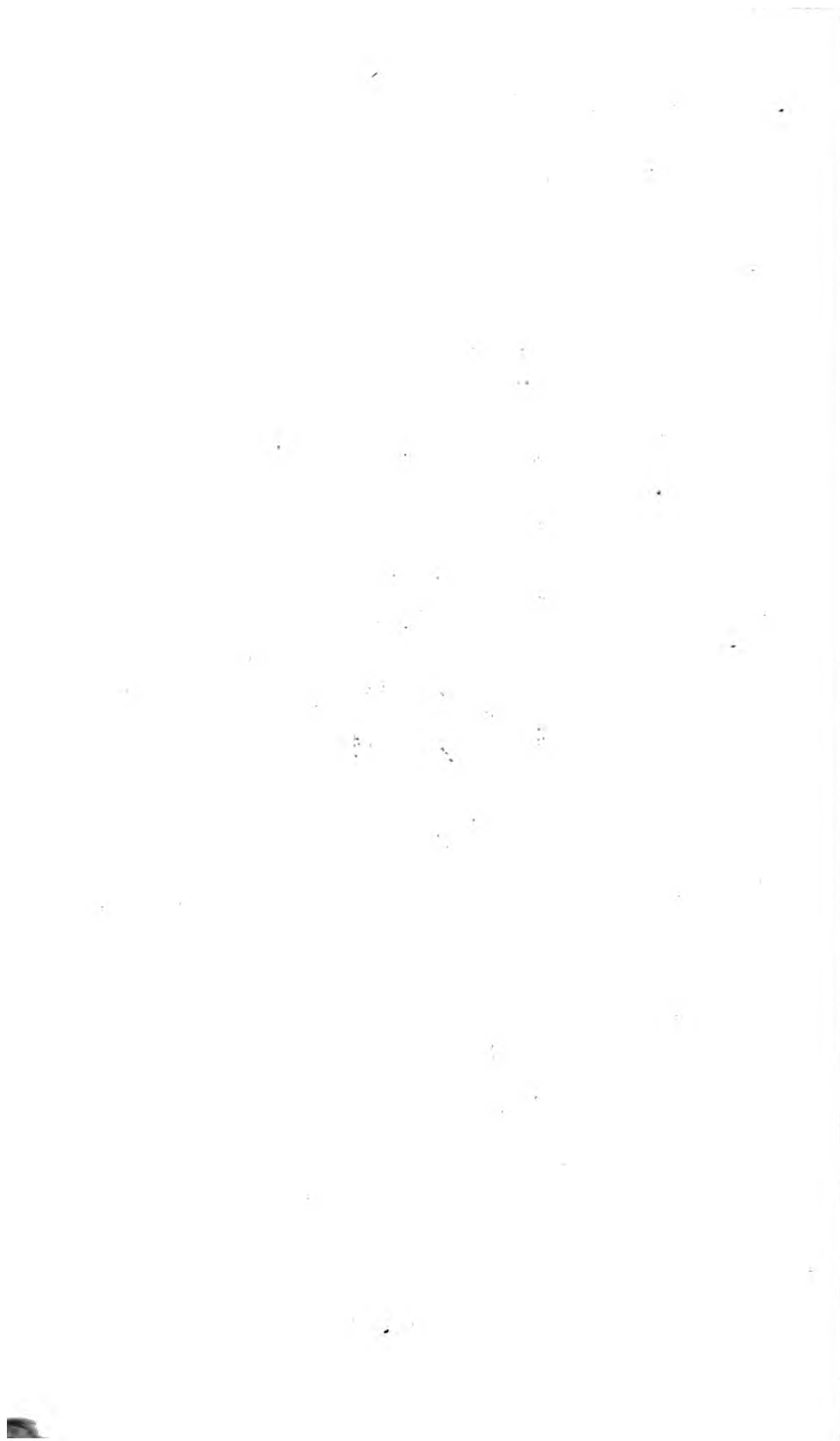
HENRY W. REVELEY.

33, King Street, West, Bryanstone Square.

A Subway with Service pipes



N^{os} 2, 3, 4, half the size of N^o 1.



A few days after the receipt of the drawings from Mr. Reveley, Mr. Williams waited on several Members of Parliament, to exhibit the Plans as laid down by this competent Engineer. Among these Gentlemen was Mr. Davies Gilbert, F. R. S., who frankly gave his opinion that the project for building Sub-ways was quite practicable. Mr. M. A. Taylor was also waited on at his house at Whitehall, who was pleased to recommend that the drawings should be immediately shewn to the Surveyor General of the Board of Works, Colonel Stevenson. This attentive officer entered minutely into the subject; and during an hour's conversation, strongly recommended that a Public Company should be formed to bring the work forward; and although he could not say that Government would support it, he thought it was very probable it would not be opposed.

Letters were then sent to the two Secretaries of State :—

To the Right Honourable the Earl of Liverpool.

May 13th, 1823.

My Lord,

Having lately obtained His Majesty's Royal Letters Patent, for a method to prevent the frequent removal of the Pavement and Carriage Paths, for laying down and taking up pipes, and other purposes, in Streets, Roads, and public Ways, which is effected by constructing Sub-ways

in the manner specified, and enrolled according to the terms of the said Letters Patent ; and having petitioned the Honourable House of Commons, offering to surrender the said Patent, as therein stated, which Petition has been referred to the Committee now sitting upon the subject of the Sewers of the Metropolis; I beg, with the greatest respect, to address you, my Lord, as the Prime Minister for the Crown, to permit me to introduce the subject to your notice, as a national object of great magnitude and public importance, for the improvement of every City and Town in this great empire, and of the metropolis in particular ; and request the honour of an interview, to exhibit the Sections and Drawings of the said Sub-ways, now first brought forward, before they are presented to the Committee of the House of Commons.

I have the honour to remain,

With the greatest respect,

Your obedient Servant,

JOHN WILLIAMS.

Cornhill, London.

To the Right Honourable Robert Peel.

May 13th, 1823.

Sir,

Having lately obtained His Majesty's Royal Letters Patent, for a method to prevent the frequent removal of the Pavement and Carriage Paths, for laying down and taking up pipes, and other purposes, in Streets, Roads, and public

Ways, which is effected by constructing Sub-ways in the manner specified, and enrolled according to the terms of the said Letters Patent; and having petitioned the Honourable House of Commons, offering to surrender the said Patent, as therein stated, which Petition has been referred to the Committee now sitting upon the subject of the Sewers of the Metropolis; I beg, with the greatest respect, to address you, Sir, as the Secretary of State for the Home Department, to permit me to introduce the subject to your notice, as a national object of great magnitude and public importance, for the improvement of every City and Town in this great empire, and of the metropolis in particular; and request the honour of an interview, to exhibit the Sections and Drawings of the said Sub-ways, now first brought forward, before they are presented to the Committee of the House of Commons.

I have the honour to remain,

With the greatest respect,

Your obedient Servant,

JOHN WILLIAMS.

Cornhill, London.

The paving being up in various parts of the metropolis, the following Placards (one on each side of the boards), by two men, were carried through the streets daily, from June 30th to August 12th :—

LONDON SUB-WAYS.

The Public are respectfully informed, that Sections and Drawings of the Proposed Sub-ways, to prevent the removal of the Pavement and Carriage Paths for the Water and Gas Pipes, and for other purposes, which will ultimately reduce the Sewer and Paving Rates, may be seen *gratis* at Mr. Clay's, Printseller, Ludgate Hill.

IMPROVEMENT OF THE STREETS.

Copies of the Sections and Drawings, with Estimates and Particulars of the proposed Sub-ways, will be sent to those Gentlemen who are friendly to this national work, by leaving their names and address at Mr. Clay's, Printseller, Ludgate Hill.

JOHN WILLIAMS, Patentee.

HENRY WILLIAM REVELEY,
Architect and Civil Engineer.

Notice was given three times in the London Gazette and two Morning Papers, of an application to Parliament in the next Session, for leave to build Sub-ways.

Notice is hereby given—That application is intended to be made to Parliament in the next Session, for leave to bring in a Bill for making Sub-ways, to prevent the frequent removal of the

Plan a new layout with a road



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IMPROVEMENT OF THE

Copies of the and Drawings, with
Notes and Particulars of
will be sent to those who are
to this national work, by leaving their
name and address at Mr. Clay's, Printers, Lud-
low Hill, London.

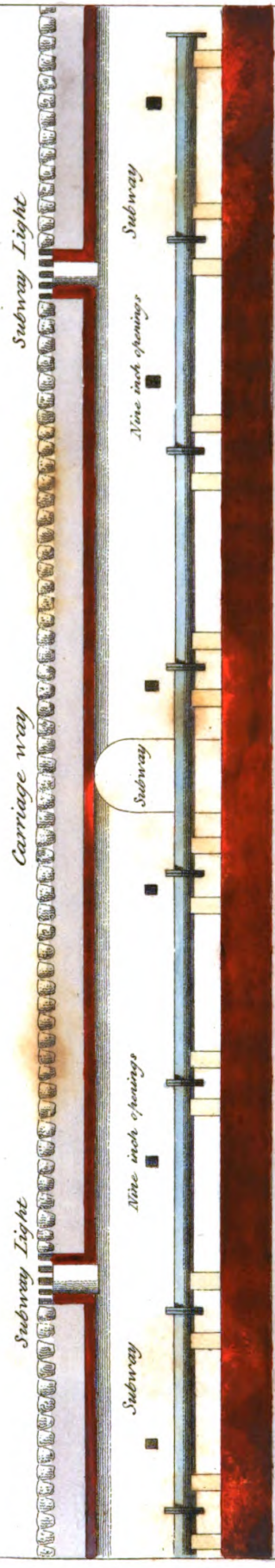
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LEAM REVELLEY,
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... was given three in the London
... Morning of an applica-
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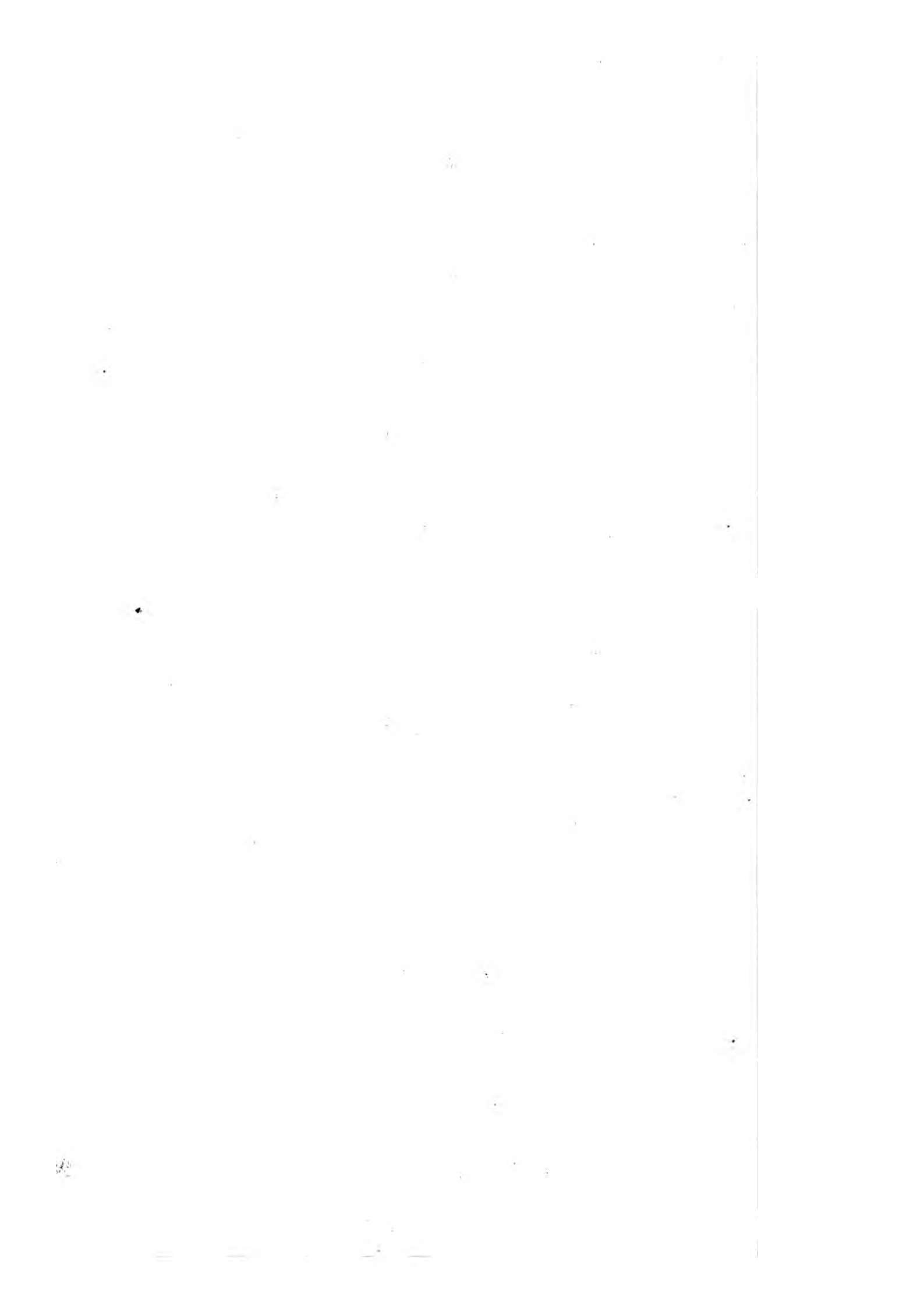
... given application is
... made to Par in the next
... to bring for making
... the frequent removal of the

Plan of a Street provided with a Subway



Longitudinal Section of a Street provided with a Subway





Pavement, and Carriage Paths for the Pipes and Sewers, from and in Aldgate, through Leadenhall Street, Cornhill, Mansion-house Street, Poultry, Cheapside, St. Paul's Church-yard, Ludgate Street, Ludgate Hill, and Fleet Street, in the City of London;—Strand, Charing Cross, Cockspur Street, Pall Mall, Regent Street, and Piccadilly, in the City and Liberties of Westminster, and County of Middlesex.

CHAPMAN BARBER, Solicitor,

11, Serle Street, Lincoln's Inn.

Dated this 19th day of September, 1823.

25th September.

Dear Sir,

On my return to town from Sunbury, on Tuesday morning last, I found your letter of the 20th instant. I have lost no time in complying with your request relative to the Frontispiece for the Prospectus. Had I not been prevented by business, I should have called upon you with the Drawing, which is finished, and will, I trust, meet your approbation. If you have an opportunity of sending this way, I shall leave orders for the Drawing to be delivered to your messenger. I observed the Notice in the Gazette of last Saturday evening.

Dear Sir, your's very truly,

HENRY W. REVELEY,

33, King Street, West.

Mr. John Williams, 78, Cornhill, London.

At a meeting held at the Committee Room, 78, Cornhill, September 30th—Present, Messrs. Josiah Robert Harrison, Stephen Syfret, Henry Willey Reveley, and John Williams—

It was resolved,

That the Prospectus of the application to Parliament for leave to raise a capital for, and the lithographic Drawings of, Sub-ways, be presented by a Deputation of the Committee to the Corporation of the City of London, the Commissioners of Sewers and Paving, and the Water and Gas Companies, on the first Meeting or Board Days of those respective Bodies; and that Messrs. Harrison, Syfret, and Williams shall compose that Deputation.

Having ascertained, from the progress already made, that it was the wish of His Majesty's Ministers that public works should be undertaken by public Bodies, formed by subscriptions, in shares, and authorized by Parliament, a second Prospectus was issued for that purpose :—

BY HIS MAJESTY'S ROYAL LETTERS PATENT.

IMPROVEMENT OF THE STREETS OF LONDON.

The project of Sub-ways, which has for some time been before the public, has already obtained the approbation of many unprejudiced and enlightened persons, especially in the House of Commons;

with several Members of which, the Patentee had the honour of frequent intercourse, during the time that he attended the House, for the purpose of presenting two Petitions on the subject of the present undertaking.

It has been determined to apply to Parliament in the approaching Session, of which due notice has been given in the Gazette, for leave to raise a capital to form Sub-ways in London, and to embody the proprietors, under the title of

THE LONDON SUB-WAY COMPANY.

The capital proposed to be raised at present, is £100,000, in shares of £100 each ; 5 per cent. only to be paid immediately, into the hands of the Bankers, to the account of the London Sub-way Company.

The line of Sub-way now to be formed, is intended to be from Aldgate, through Leadenhall Street, Cornhill, Mansion House Street, Poultry, Cheapside, St. Paul's Church Yard, Ludgate Street, Ludgate Hill, Fleet Street, Strand, Charing Cross, Cockspur Street, Pall Mall, Regent Street, and Piccadilly, to Hyde Park Corner. It is to be made of sound Stock Bricks, and the best Lime Mortar, upon the Plan shewn in the annexed Drawings. The distance is less than five miles, at an expence, as per estimate, of from £16,000 to £20,000 per mile.

The calculation of the cost of this work has been made by professional Gentlemen, whose accuracy is to be depended upon. In forming these Sub-ways, the Company will have no ground to purchase, it being public property, subject to the controul of the Legislature; and the Fabric, when constructed with their sanction, will become the Freehold of the Sub-way Company.

The estimate of the Sub-ways, from Aldgate to Hyde Park Corner, being £100,000, and the property Freehold, the simple interest for that sum, at 5 per cent, will be £5000 per annum; which will be paid by those Public Bodies who make use of them. Should the Sub-way Company receive only £1000 per annum from the Water, and £1000 per annum from the Gas Companies, together with £3000 per annum merely from the Commissioners of Sewers and Paving, it will be sufficient to pay the proprietors of Sub-ways 5 per cent.

But upon reference to the last Reports of the Water and Gas Companies to the House of Commons, the money they have respectively paid for many years past, considerably exceeds £1000 each per annum; and from the annual brief statement of the City of London, it appears that the amount paid into the Chamberlain's Office for Paving and Sewers, very far exceeds the sum of £3000 per annum!—to which is to be added, the money

now expended for Water, Gas, the Paving, and Sewers on the West of Temple Bar, a sum not less than that within the City; which, in the aggregate, will produce an interest of 10 per cent.

If, then, the Sub-way Company provide accommodation for the pipes and sewers, without disturbing the paving, after it is once done; they may be presumed to have an equitable claim to the whole annual receipt which those Public Bodies have hitherto expended.

The foregoing facts sufficiently shew that the London Sub-way Company have the fairest prospects of an ample return for their capital; the property being Freehold, under the authority of an Act of Parliament, and the income derived from a few highly respectable Public Bodies, there cannot be said to be either risk, or probability of failure.

It should also be kept in mind, that this line of Sub-way is only a beginning of the undertaking, and will include the greatest portion of the metropolis; a distance of not less than 200 miles, after omitting the very narrow streets, &c. This ultimate extension of Sub-ways will necessarily increase the profits of the original proprietors, which in the first instance are estimated according to the small extent of the proposed commencement.

*Proposals for raising the Sum of £100,000, with the
Consent of Parliament, as a Capital for the
London Sub-way Company.*

1st. That it shall be in transferrable shares of £100 each.

2d. That 5 per cent on each share be immediately deposited, on account of the London Sub-way Company, in the Banking House of Messrs. Hankey ; who will deliver a receipt, authorizing the holder to one share in the London Sub-way Company, as soon as the Act of Parliament is obtained for that purpose.

3d. That this deposit is for the sole purpose of defraying the Parliamentary and other contingent expences, for establishing the London Sub-way Company ; which deposit is not to be drawn out from the Bankers, without the signatures of three of the Provisional Directors.

4th. That proprietors of ten shares will be qualified for Directors.

5th. That proprietors of five shares shall have one vote for Directors, and so on for every five shares.

6th. That Provisional Directors shall be chosen, for adopting the measures necessary for obtaining the Act of Parliament, as soon as the deposits are completed for one thousand shares.

THE ACT OF PARLIAMENT

is intended to oblige the Company to receive into their Sub-ways, the pipes of the several Companies now in existence, and those that may be created in future, for the flow of any material ; at the same price per annum it has hitherto cost each Company for laying down and taking up the pipes, upon the average of the last seven years.

That access shall be given to the work-people of the Commissioners of Sewers, into and through their Sub-ways, for the formation and repair of the sewers and drains, and other purposes ; upon receiving the same sum per annum which they have hitherto expended for opening, shoring, and closing the streets, roads, and public ways, upon the average of the last seven years.

That this Company shall engage to preserve the pavement and carriage paths in the most perfect condition, after they are properly laid down to their satisfaction ; upon receiving the same annual amount that has been hitherto expended for that purpose, upon the average of the last seven years.

The advantages the Public will derive from the establishment of this Company, must be sufficiently obvious to every one who has observed the

state of the streets, in the trading part of London, for the last few years—Fish Street Hill, Wallbrook, and the Strand in particular. The same nuisances will continually occur, however it may be stated to the contrary, and probably increase as new Companies are formed, without the intervention of such an effectual remedy as this ; which the public will enjoy without any additional expence.

The Water and Gas Companies will also have a ready access to their pipes, which will not be laid in the earth, but lie dry and sound, without pressure or injury, at no additional expence. Whenever their tenants do not pay, their supply may be stopped by turning it off in the Sub-ways, and again turned on when they do, without opening the ground. They will be able instantly to stop the leakage of water, and the escape of gas, particularly the latter, which Sir William Congreve, in his recent Report to Government on the Gas establishment in the metropolis, particularly recommends shall all be covered with clay : he likewise recommends several other alterations, for which Sub-ways are peculiarly calculated, some of which have been made lately by an order from the Lords of his Majesty's Treasury, at a considerable expence to those Companies ; the greater part of which would have been saved, had Sub-ways existed only a few months ago !

The Commissioners of Sewers will have the

same superintendence, controul, and authority, as heretofore, for the regulation of their valuable concerns ; without being subject to the nuisance in common, or the delay that usually takes place in preparing for, carrying on, and completing their works.

The Paving Committee will be especially relieved from never-ending and troublesome applications, for leave to take up and lay down the paving, and from the numerous complaints they are continually hearing on that subject. These complaints will never cease until Sub-ways are made ; for the ground immediately under the paving in the streets of London, has at length become soft and tender, by frequent removal for the Pipes and Sewers, as well as by the rain and water received into it between the stones : it is therefore now so rotten, that when heavy carriages go over, it is pressed into holes, and the mud is forced up between them. This is the reason why the City is so proverbially dirty ; and every winter will increase the evil until this remedy is effected. By this plan, as much of the rotten mould and mud as the Sub-ways occupy, will be removed from the centre of the streets, and an arch of sound brick-work substituted, against which the selected solid earth will be well rammed and supported ;—over the surface of the ground so prepared, a coat of lime, as a cement, will be laid, into which the paving will be bedded ; either on the most approved

of the plans heretofore adopted, or according to the more recent one of Mr. M^cAdam: in both cases, the rain and water will no longer penetrate between the stones, and rot the earth, but will merely wash away the dirt, and tend to keep the streets clean:—in fact, the streets, roads, and public paths will become regular, firm, and beautiful, like terraces; without expence to the Public, or comparative injury to any one.

The various advantages capable of being comprehended in this important subject, cannot be wholly stated in a Prospectus, without danger of being considered too highly coloured, and delusive; but the truth is, this object has been so moderately shewn, as to create the censure, that the Prospectus has said too little:—the whole is, however, well known to Members of Parliament,—to the numerous Bodies of Water and Gas Proprietors,—to the Corporation of the City of London,—the Commissioners of Sewers and Paving,—and generally, to the whole intelligent Public.

Patentee.....MR. JOHN WILLIAMS, *Cornhill*
Civil Engineer and Architect ...HENRY W. REVELEY, Esq.
Bankers.....MESSRS. HANKEY.
SolicitorC. BARBER, Esq. *Chancery Lane*

London, December, 1823.

In the month of October, 1823, the Lord Mayor, William Heygate, Esq., M. P. was waited

upon at the Mansion House, to whom the drawings were shewn, and the plan explained. His Lordship, having expressed his satisfaction, undertook to present a memorial respecting Sub-ways at the next Court.

October 25th.

This day the following Memorial was put into the hands of the Right Honourable the Lord Mayor, in the Court of Common Council, Guildhall; and presented to the Court by Mr. Hick.

*TO THE RIGHT HONOURABLE THE LORD MAYOR,
ALDERMEN, AND COMMONS, IN COMMON
COUNCIL ASSEMBLED.*

The Memorial and Representation of JOHN WILLIAMS of CORNHILL, in the City of London, most respectfully sheweth—

That your Memorialist has lately invented a method to prevent the frequent removal of the pavement and carriage paths, for laying down and taking up pipes, and for other purposes, in streets, roads, and public ways; for which he has obtained His Majesty's Royal Letters Patent.

That your Memorialist has been encouraged by several Members of Parliament, and men of science, to whom he has shewn his plans, to establish a public Body, under the title of the London

Sub-way Company, for effecting the purposes of the said Patent; which public Company is now forming, on the terms of the prospectus herewith presented.

That due notice has been given in the London Gazette of their intention to apply to Parliament in the next Session, for leave to raise a capital, and embody the subscribers, empowering them to make Sub-ways in and from Aldgate, through Leadenhall Street, Cornhill, Mansion House Street, Poultry, Cheapside, St. Paul's Church Yard, Ludgate Street, Ludgate Hill, Fleet Street, Strand, Charing Cross, Cockspur Street, Pall Mall, Regent Street, and Piccadilly, to Hyde Park Corner.

That the Corporation of the City of London, being greatly interested in this important object, which will not only remove so many impediments to the comforts and business of its Citizens, but become the admiration of all for its cleanliness and beauty, are particularly, and principally looked to for their liberal support of this work, which is an undertaking of great cost, magnitude, and extent, worthy of the metropolis of the British empire; inasmuch as no City in the world possesses a remedy for the annoyance the inhabitants are subject to, in opening the surface of the streets, for the pipes for water, and other purposes, and for the sewers and drains. Other nations have

their bridges, sewers, and canals, as well as water and gas ; but it is reserved for England, and primarily for this ancient City, to possess its Subways.

Your Memorialist, therefore, desirous of obtaining the support and active assistance of his fellow-citizens, with whom he has been many years united in extensive business, offers to the Corporation of the City of London a participation in this national work, of 100 Shares, which the Sub-way Company have agreed, on his recommendation, shall be reserved for the especial benefit of the City of London.—

The following Address by Mr. Williams to the Court, was made from the Bar, when called upon to state any thing additional in support of the foregoing Memorial.

My Lord Mayor, and Gentlemen of the Corporation of the City of London—

Having now had the pleasure of presenting to this Court, by the hands of his Lordship, an offer to participate in the construction of Subways through the principal streets of this ancient city, I respectfully solicit your patient and candid attention to some additional particulars respecting them.

I beg to state, that as soon as I obtained His Majesty's Letters Patent for this important work,

being a Citizen of London, I addressed a letter to every Member of the Corporation on this subject, soliciting his individual support. - That in the last Session of Parliament, an Act was applied for by the Commissioners of Sewers of the City of London, for leave to enlarge their powers; which, among other things, had for its object the increase of the Consolidated Rates on the inhabitants. I immediately presented a Petition to the House of Commons, a copy of which I now present to this Court, praying that a Clause should be introduced into that Act, to authorize those Commissioners to form Sub-ways, which Petition the House referred to the Committee on that Bill. From some inaccuracy in the forms of the House, the Petition did not come before that Committee. I therefore presented another Petition to the House of Commons, which was again referred to the same Committee. This was shortly previous to the termination of the last Session; when, had I persevered in the House of Commons at that moment, it would in all probability have prevented the passing of that Act during the last Session. Perceiving the dilemma in which the Corporation was placed with respect to that Bill, I forbore to move the House for its recommittal; and your Act was accordingly obtained.

Having stated to this Honourable Court the early proceedings on this subject—having shewn you the great attention paid to every member of

it individually, and to the Corporation as a Body ; you will I hope readily agree, that my conduct towards the City of London respecting Sub-ways, has been both handsome and liberal. It is, my Lord, from your Lordship's polite attention in presenting my Memorial this day, that I am now present to address the Court on the subject of Sub-ways ; which, with great humility, I beg to state, is such an effectual remedy for the removal of the paving in a crowded city, that it has no parallel for its usefulness in the history of the world.—

After some discussion, it was proposed by Mr. Hick, and seconded by Mr. Favell, that the Memorial should be referred to the Committee of Improvements, which was carried by a large majority.

October 24th, 1823.

Mr. Williams attended the Committee of Improvements in Guildhall, in compliance with their note to him this morning, with the original drawings of the Sub-ways ; when, after an explanation of half an hour, he was informed by the Chairman, Mr. Alderman Key, that the Committee would see him again on the subject, accompanied by Mr. Reveley, who had been named as the Civil Engineer, to be engaged for the execution of the proposed object.

As the intention of forming a public Company to build Sub-ways had indirectly received the sanction of His Majesty's Government, and

notices for applying to Parliament for an Act had been inserted in the London Gazette and in other Papers, it was considered to be becoming, in the first place, before the next meeting, to offer a portion of the shares to those Corporations and Companies whose interests were immediately connected with the work :—accordingly 100 shares were appropriated to the Corporation of London; 100 to the Commissioners of Sewers at Guildhall; 100 to the Chartered Gas Company; 100 to the City Gas Company; 100 to the Holborn Commissioners of Sewers; 100 to the New River Company; 50 to the Chelsea Water Company; and 50 to the Grand Junction Water Company, as being in the line from Aldgate to Hyde Park Corner, where the Sub-ways would be.

These respective Bodies were then waited on by a deputation of the Committee in their respective Court and Board Rooms, by whom the subject was entertained with great attention and respect; and, after careful discussion, it was left with them for further consideration. It hardly deserves notice, but as this volume may be considered as a faithful record, it should be known, that an exception to this polite reception was shewn by the Guildhall Commissioners, who are all tradesmen in the City, meeting every Tuesday evening in a considerable number :—and this inattention requires notice the more, from the courtesy so lately displayed towards them.

These preliminary measures having taken place, the Committee resolved, on the 28th of October, that a public meeting should be called at the City of London Tavern, as soon as convenient, for the purpose of establishing the London Subway Company; and that Mr. Alderman Garratt, as Lord Mayor for the next year, be requested to accept the Chair.

Mr. Alderman Garratt was waited upon by the Patentee and the Committee, requesting the favour of his acceptance of the Chair at the next meeting; to which, after some explanation, he very handsomely consented.

Advertisements and placards were then issued:

Sub-ways for the Reception of Water and Gas Pipes, and Access to the Sewers, without opening the Ground and Paving in the Streets.

A public meeting will be held at the City of London Tavern, on Wednesday next, December 17, "to receive a Report from the Committee appointed in December last, and for the purpose of establishing a Sub-way Company, in consequence of that Report:"—John Garratt, Esq. Alderman, in the Chair, at twelve for one o'clock. The Prospectus of the Plan, and rough Sketches of the Sub-ways, may be had at Mr. Porter's, 75, Pall Mall; Mr. Clay's, 18, Ludgate Hill; at the Patentee's, 78, Cornhill; and at the City of London Tavern.

And the following account of the proceedings at that meeting appeared in the public Papers of December 18, 1823 :—

SUB-WAY MEETING.

A meeting took place yesterday at the City of London Tavern, to receive the Report of the Committee appointed to consider the practicability of constructing Sub-ways through the principal streets of the metropolis. A patent had been obtained for this purpose by Mr. Williams, of Cornhill, and a meeting was held twelve months ago upon the subject. At that meeting a Committee was appointed to ascertain the utility of carrying his plan into effect, and the present was convened, to be informed of the result of their enquiries. On the table several official documents were laid relative to the money expended for repairing the disturbed pavement in the streets of London ; as also a plan of the Sub-ways, executed by Mr. Reveley, the engineer engaged in the undertaking. Without expressing an opinion now upon the practicability of constructing Sub-ways, we concur with some of the meeting that the plan, as exhibited before them, was materially defective. It was not accompanied with a scale, to point out the space that would be occupied by those Sub-ways,* or any explanation

* This statement of the reporters for the press is incorrect, but may be, however, easily accounted for, as five distinct drawings were laid before the meeting ; and on the first only,

of the manner in which the various obstructions of gas-pipes, water-pipes, under-cellars, &c. were to be overcome by the construction of them.

At a few minutes after one o'clock, Alderman Garratt was called to the Chair.

The Chairman said, that in taking the Chair, he was desirous of informing the meeting that he had no connection whatever either with the Patentee or the Committee who were to submit the present Report to the meeting. So far he was perfectly free, independent, and impartial: he only attended for the purpose of affording every facility in his power to the discussion of a question of very great importance to the improvement of the metropolis. No doubt could be entertained, that if the present plan were practicable, great benefit would result from its adoption. Every day afforded frequent instances of the interruptions in the streets, and other inconveniences which resulted from the breaking-up of the pavement by the several Gas

exhibiting the architect's design for the entrance to the Subways, was given the scale upon which the whole were executed; indeed, the prospectus of the plan, in which was inserted the specification of the patent for their erection, had it been carefully investigated, would, without any reference to the drawings, have explained this, and shewn their proportion to the streets under which they were proposed to be built—at any rate, under that line of the principal streets which the Committee recommended in the report afterwards adopted at the meeting.

Companies and Water-work Societies. It was proposed by the projector of the present design, to supersede the necessity of taking up the pavement; and it was also part of his design to provide, at a cheap rate, for the removal of heavy falls of snow, which in winter were of the greatest inconvenience to the Citizens, and were removed at a vast expence by the Commissioners of Sewers.* There were also other advantages which would be stated in the Report. That Report would be submitted; and as it was desirable that every man bringing forward a plan for the public good, should have that plan fairly discussed and investigated, he attended there that day in order to facilitate the promotion of fair discussion upon the subject. As far as he himself entertained any opinion upon the plans submitted to him, he was impressed with the conviction of their practicability and utility. It might be a matter of surprise to some to see him, who was a Commissioner of Pavements, preside at the present meeting; but, desirous of promoting any object of public service, he did not hesitate to attend their discussions, in order that the plans submitted to them might be adopted, if found practicable and beneficial; and that, on the other hand, they might be rejected, if they appeared to be founded on erroneous principles and views. For his own part, he wished to state, that

* A few years since upwards of £1500 was paid for this purpose in one winter.

whatever might be the resolution of the meeting, it was not his intention to purchase any share in the present speculation ; and his sole reason for declining to do so was, the multiplicity of pursuits in which he was already engaged. So far, therefore, he was perfectly disinterested in taking the chair on the present occasion, and would impartially listen to the observations which Gentlemen might be disposed to make on either side.

Mr. Williams, the Patentee, said, that the Committee had now come to submit to the public the Report which, twelve months ago, they were entrusted to prepare. He was desirous of bearing testimony to the high qualifications of the Committee, in order that the public might have the greater confidence in the recommendations they put forth. There were also many persons of high rank and eminence in the arts and sciences, who had stamped the projected plans with their approbation. An erroneous opinion prevailed as to the intentions of the Sub-way Company. It was supposed that they intended to break through the cellars of the City. This could not be, as they would be under the middle of the streets, so as not to touch the cellars. When the subject came last year before the House of Commons, favourable opinions were entertained, and their views met at least with partial approbation. Mr. Davies Gilbert gave a favourable opinion upon their feasibility, and

Mr. Michael Angelo Taylor, who directed him to wait upon the Surveyor-General of the Board of Works. Accordingly he did wait upon him, and was informed by that Gentleman, that if a public Body were formed, he did not perceive that any material objection would be made to extend parliamentary aid to them. Amongst others who expressed their approbation of his plan, was Mr. Brunell, whose invention of the Block Machine deserves to be recorded amongst the greatest efforts of human genius. It had been said, that the construction of Sub-ways might be very well adapted to a new City, but were not so well suited to an old one. He was of a different opinion.— They were not to look for a modern Utopia, a Poyais settlement, or some other chimerical spot, in order to introduce Sub-ways into them. It was into this City, which wanted such accommodation, and into which the introduction of the convenience was practicable, that those who favoured the measure, should first introduce their plans. If he were asked what parts of the City he thought most favourable to the introduction of these plans, he should say that they were suited to all parts of the City; but the part of the metropolis in which he would recommend the experiment first to be made, would be in a line extending from Aldgate to Temple Bar, and from thence to Hyde Park Corner. He would now submit the Report to the meeting, and request the Secretary to read it.—

At a public meeting held at the City of London Tavern, 4th December, 1822, it was agreed unanimously that a Committee, composed of Josiah Robert Harrison, Henry Willey Reveley, and Leapidge Smith, Esqrs. should be appointed to report their opinion respecting the practicability, utility, and necessity of Sub-ways, as proposed to be constructed by Mr. John Williams of Cornhill, by a Patent obtained by him, "for a method &c." *Vide Specification.*

Pursuant to that appointment, your Committee now beg to state that they have with the greatest assiduity carefully enquired into the subject, and they can assure the public that the utility and necessity of Sub-ways will be found to be of much greater extent than were at first contemplated; as they will not only materially tend to the convenience, the comfort, and health of the inhabitants of those districts through which they may pass, but to the public at large.

Your Committee presume it would be quite useless to point out the manifest nuisances that arise from the pavement being so frequently disturbed in laying down new pipes, for the supply of water and gas, or in repairing such as are continually suffering by corrosion or other causes.

In the event of Sub-ways being constructed, these nuisances will seldom, if ever occur; as the

operation of putting down new pipes, or repairing old ones, will be accomplished in the Sub-ways, without in the least disturbing the pavement, and consequently without the smallest inconvenience to the public.

Your Committee think it right thus generally to allude to the convenience the public will derive from the Sub-ways; and they think it their duty also to state that they contemplate a great acquisition of comfort in the firmness and evenness of the pavement; advantages which will greatly contribute to the cleanly state of the streets of this metropolis. This result of the present plan will also be found an incalculable advantage in preventing the wear and tear of carriages, and the destruction of horses; and it will also prevent the frequent repetition of those accidents which so constantly and sometimes fatally occur. Another most important advantage in the plan, which should not be passed over in silence, is the facility and expedition with which water may be obtained in cases of fire, whereby many lives may be saved, and the destruction of property in these lamentable cases much diminished.

Your Committee, having been requested to enquire into, and determine the extent in miles to which Sub-ways are applicable in the City of London, together with the expence of construction, and the income derivable from them, when formed,

proceed to state that, with regard to the number of miles, they are applicable to all streets in which they may be required ; but your Committee recommend the leading thoroughfare from Aldgate to Temple Bar, in the City of London ; and from thence to Hyde Park Corner, in the City of Westminster, as, in the first instance, most suitable and proper for a plan so important and advantageous ; and your Committee have little doubt but that when that line is completed, the plan will be adopted in every district in the metropolis, and in all cities and towns in the British empire.

In reply to the second enquiry, *viz.* the expence of making Sub-ways, your Committee have used due diligence in informing themselves on the subject, with the aid of scientific and practical men ; and after the most mature and careful consideration of the question, they are fully enabled to state that, supposing the Sub-ways to be made of the best stock bricks, and stone-lime mortar, which your Committee recommend as the most suitable material for their construction, they will cost, upon the average, about the sum of £20,000 per mile.

With regard to the third and last question, *viz.* the income to be received from them when constructed, your Committee cannot possibly foresee what may be the extent of income, or advantage derivable from them ; but they trust they

can abundantly shew, even in their present infant state of mere proposal, ample funds to pay the Proprietors, without loss to those public Bodies who will be benefited by them, or without calling in any way upon the public for contributions. But in order to enable the public to form a proper and just opinion themselves upon the subject, your Committee beg to refer you to a printed pamphlet copied from the "Reports of the Chamberlain of the City of London's Annual Brief Accounts," ordered to be printed by the Court of Common Council; wherein it will appear that, upon an average of the last seven years, the Citizens of London have paid the Commissioners of Pavement, for paving and cleansing only the streets of London, the annual sum of £26,330, being a portion of the taxes raised annually under the denomination of Consolidated Rates.

Now your Committee being aware that the Sub-way Company will keep the pavement, wherever Sub-ways are formed, in complete and substantial repair, it became them to estimate what proportion of this £26,330 would be applicable to the line in which the Sub-ways are proposed to be constructed; and on the fairest consideration of the matter, they are of opinion, that one-sixth part of that sum is a just and adequate proportion for the preservation and clearance of the pavement in the principal thoroughfare in the City of London, which, if their opinion be correct, will be an annual income to the Company of about £4,388.

This sum being to be paid by the City of London Commissioners of Pavements, your Committee presume necessarily, that the same sum would be paid them by the Commissioners of Pavements in Westminster, the distance being nearly the same ; so that the annual revenue arising from the pavements alone to the Sub-ways will be £8,776.

Your Committee presume that the above will be considered in itself a certain, but by no means an only source of income. And here again they beg to refer you to the pamphlet, into which are copied the Reports ordered to be printed by the Honourable the House of Commons, from the minutes of evidence on the supply of water to the metropolis,* in which the receipts and expenditure of the New River Company (which your Committee consider a fair criterion for other Water and Gas Companies), as applicable to Sub-ways, will be all distinctly seen.

Your Committee cannot particularize what exact proportion may be due to them, for the utility and convenience each of the Water and Gas Companies will derive from the Sub-ways ; but they beg leave to point out what those advantages will be, and think they may safely leave the measure of remuneration to the wisdom and decision of Parliament.

* For this document, see a future page on the expences of the Water Companies.

In the first place, the whole of their expences for opening the streets where Sub-ways are constructed, will be avoided.

In the second place, the convenience to the different Companies, of having their pipes laid in a perfectly dry tunnel, to which they can have so easy an access, and where the flow of any fluid may be stopped instantaneously, must be evidently deserving some remuneration.

And last, though not least, the facility of repairing them, whenever flaw or any other detriment may appear, and the great length of time they may endure when protected by a brick archway, are advantages so decided and manifest, that your Committee presume, they need only mention them, to establish the claim of the Company to a fair remuneration for them. And to this end, the Committee beg to refer you to Mr. Mylne's evidence before the Honourable House of Commons, wherein it will appear that, as engineer to the New River Company, he says, that iron pipes, when laid in the earth, will decay in 45 years, and cocks and plugs in 10 years; by which it will be seen, that not only the expence of the raw material in pipes, but the enormous expence under the head of "Pipe-laying," will also be saved to them by the use of Sub-ways: for the pipes thus laid in the dry Sub-ways, with a capability of being covered with coal-tar, or any other coating

calculated for their preservation, would do away with the necessity of the reserved fund necessary to provide against the wear and tear of capital for a water-work, as stated by Mr. Mylne.

Your Committee cannot refrain from alluding to a subject of importance connected with the Sub-ways, *viz.* the Sewers of the metropolis, with which it may be presumed the Sub-ways may interfere ; but the public should be apprized that the Sub-ways will facilitate the Commissioners in their access to them, for the purpose of repair, alteration, or improvement ; so that the public may be assured that the Sub-ways will materially assist in the improved plans which the Commissioners are actually putting into practice with regard to the Sewers.

Your Committee cannot conclude without respectfully, but earnestly, recommending this plan to the Citizens of London, which they are confident will as much redound to the honour of its projector and supporters, as it will contribute to the comfort and convenience of its inhabitants ; and at the same time form a distinguished and honourable feature in the improvements effected in the metropolis, in the reign of His Majesty King George the 4th.—

Mr. Stephenson, after the Report had been read, proposed several questions to the engineer,

upon the practicability of the plan which the Report recommended.

The answers given by Mr. Reveley were to this effect: that in some instances it would be necessary to build the Sub-ways alongside the sewers; but generally, indeed he would say always, it was intended to pass over them. On the point of the inconvenience that would result from laying the pipes in streets, the level of which was below high-water mark, as also on the point of the obstruction arising from the intersection of the Sub-way pipes with those of other Societies, the engineer did not offer any explanation.

After having interrogated the engineer at considerable length, Mr. Stephenson complained of the unsatisfactory answers which had been given by the engineer. He was unwilling to offer any obstacle to a design which, if practicable, would doubtless be one of great and extensive benefit. Neither would he go so far as to say that the design was not practicable; but when such a sum as £20,000 a mile was demanded for the construction of the Sub-ways, he would contend that it was not reasonably practicable. Such a sum would be sufficient to lay down a new set of pipes for any of the Societies already existing in the City. Although great inconvenience resulted from the frequent disturbance of the pavement, yet that inconvenience was daily diminishing,

and improvements were at present in contemplation, which would make that disturbance far less frequent. He did not contend that the designs of the projector, who certainly was entitled to commendation for his excellent intentions to benefit the community, were impracticable; it was sufficient for him to shew that they were extremely difficult. He would point out Leadenhall-street, where several pipes were already laid, occupying twelve feet in width. From the answers of the engineer, he collected, that the Subway pipes would occupy seven feet in height, and six in width. Here then 18 feet were required for the accommodation of the pipes, whilst the width of the street was only 17. He could enumerate other instances, but considered that it was unnecessary, from any thing that had as yet been stated to the meeting, to embark in an undertaking, the expenditure of which would amount to a million.

Mr. Reveley, the engineer, said that he did not consider the enquiry instituted now, one fit for public discussion. If any person, however, would meet him in private, he would be ready to enter into a minute explanation of the details of the intended undertaking to him.

Mr. Jenkins proposed the first resolution. He had attended to the subject of the present undertaking, and considered it one fraught with many

advantages to the public. The first resolution was one on which he thought little objection could be offered, as it only declared a nuisance, the existence of which no person could deny, and for the removal of which, he was sure, every person would feel anxious. He concluded by proposing the following resolution :—

1. “ That the paving in the streets of the principal thoroughfares has long been in a discreditable state; and that upon the present system of frequently opening the ground for the water and gas pipes, and repair of sewers, no probability exists of the abatement of the nuisance.”

This resolution was seconded. It was carried on a shew of hands, though not without some opposition.

Mr. Jenkins also proposed the second resolution. In his prefatory observations to this resolution, he regretted that a more ample explanation had not been exhibited to the public of the design which was that day laid before the meeting.

2. “ That a patent having been granted to Mr. Williams, of Cornhill, for a method to prevent the frequent removal of the pavement and carriage paths, by forming Sub-ways and Passages wherein the pipes may be laid; and having heard

the Report of the Committee, this meeting is of opinion that it is an effectual remedy for the evil complained of."

A desultory conversation here took place on the minute details of the plan, in the course of which very little satisfactory information upon the subject was elicited.

Mr. Francis proposed an amendment, to the effect, that the meeting had not been enabled to come to a conclusion upon the subject, from the inadequate information afforded them that day as to its practicability.

Mr. Stephenson suggested a verbal alteration, which was adopted by the Chairman.

Baron De Berenger next addressed the meeting. From his attachment to science, he was disposed to favour the present design. He must say, however, that a satisfactory explanation had not been given, to induce the meeting to come to a conclusion. The plans that day suggested should be matured. He had himself tried several plans and inventions, and without vanity he might say successfully. It was his constant practice to criticize his own inventions with the most scrupulous jealousy. He recommended a similar line of conduct to the gentleman who brought forward the present projected improvement; and at a future

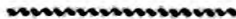
day he hoped that he might arrive at ultimate success. (*Hear, hear!*)

The amendment was then put from the Chair, and carried almost unanimously.

Mr. Matthews, the engineer, proposed an adjournment of the meeting for three months, in order to mature the subject which had that day been submitted to them. In proposing it, he eulogized the motives of the projector, and the merits of the undertaking in which he had embarked.

This resolution was unanimously carried.

Thanks were voted to Alderman Garratt, and the meeting adjourned until the 18th of March; on which day it was understood that the plans would be submitted to the public in a more matured and perfect state.



Another object connected with Sub-ways was now presented to the Patentee. A superior description of earthen pipes, highly vitrified, of the substance of an inch and a half, capable of being made five inches diameter, was shewn to him. Upon enquiry, these pipes had been tried on a large scale, as appears by the following extract of a letter directed to him:—

Sir,

In reply to your favour respecting the earthen pipes, the largest I make is five inches bore, and from that to any size less, each pipe four feet long. I have tried several in the presence of different engineers, by Bramah's hydraulic press: the weakest was burst at 291, and the others from 300 to 350 pounds pressure on the square inch.

I began to make them in 1821; but the only Water Company I have made any quantity for, is at Lynn. The Newcastle-on-Tyne Water Company laid a few on trial about twelve months since, at 150 feet below the level of the reservoir; and I expect shortly to receive an order from them.

Several gentlemen have had them for conveying water to their houses; and two years since I laid 140 yards from a spring, down one hill and up another, which answer very well;—the depth of the valley is 60 feet.

They have not been tried for Gas; but as they are vitrified inside, and hold water at a great pressure, there is no doubt but they will answer that purpose.

Iron pipes are apt to harden the water, but it is not the least affected by the earthen pipes;

and I think, from the hardness of the fire they receive, that they will outlast both wood and iron.

I am, Sir, your's respectfully,

ANTHONY SCOTT.

Southwick Pottery, near Sunderland,

February 2, 1824.

Fully to ascertain their value, a visit was made to Lynn, to see the pipes, and learn the result from the best authority. The intelligent Engineer and Secretary of the Water Company there, informed the Patentee that these pipes were better than any they had previously used, and gave great satisfaction : the only objection to them was, that, when laid in soft ground, they sunk with it, and that on rising into harder soil, they sometimes cracked or broke, from not laying even.

This new pipe immediately produced new views in connection with Sub-ways. In the first place, no material could be so sweet as vitrified clay for any fluid to pass through. Chemistry is wholly conducted in earthen vessels, as emitting the least of foreign matter ; then, their eternal durability, as they will not rot like wood, or corrode like iron ; and lastly, the moderate expence, compared with every other description of pipes.

Upon considering the subject, it was plain that these pipes might be worked into the body of the Sub-ways ; that is, that the whole interior sur-

face of the Sub-ways might be lined with them, as so many earthen tubes, each and all of them capable of holding and conveying water and gas; at any rate, these tubes would supply the place of bricks, even should other pipes be preferred; but should they prove to be equally useful, no pipes whatever would be wanted, and an immense saving be effected for the Water and Gas Companies.

This thought is, however, but a project, and may or may not connect itself with Sub-ways; it is capable of being tried without injuring the fabric, and cannot be adopted so well in any other place.

Advertisements having been again issued, the last public meeting took place on the 18th of March, 1824, the proceedings of which were reported as follow:—

LONDON SUB-WAY COMPANY.

Pursuant to public notice, an adjourned meeting took place at the City of London Tavern, Bishopsgate Street, at one o'clock, on Thursday, the 18th instant, to receive the Report of the Committee appointed at a former meeting, in December, 1822, to enquire into the practicability of forming Sub-ways in London.

Mr. Williams, of Cornhill, was called to the Chair, and stated the object of the meeting. This

was the adjourned meeting from December last, in consequence of the subject not being sufficiently comprehended by some of the speakers ; although it was so plain that no engineer would now refuse to undertake building Sub-ways—any bricklayer could make, and even his labourer comprehend them. The whole was as simple as possible, and no difficulty existed in accomplishing the work. Prejudice, together with private interest, was all that remained ; but they must give way to public opinion.

Sub-ways possessed peculiar advantages over every other modern undertaking. Bridges, Canals, Water, Gas, indeed almost every establishment in subscription shares, were altogether dependent on the individual choice of the public for their prosperity. No one was obliged to go over a Bridge, to send goods by a Canal, or even use Water or Gas, unless he chose it ; but in these Sub-ways there is nothing left for individual choice or refusal—none but public Bodies can use them ; and their interest is so deeply engaged in the work, that they are desirous and willing to become the occupiers of these Sub-ways, and pay an adequate rent for the use of them. This is therefore no speculation : there is no doubt of success here, as an ample return for any capital embarked in it, is secure and certain.

The Secretary having read the Report, Mr. John Sidney Taylor, Barrister, moved the first

resolution. He prefaced the motion by a review of the merits of the proposed plan, demonstrating its usefulness and practicability. He briefly enumerated the several inconveniences which were produced by the present mode of laying down and repairing pipes for the conveyance of Water and Gas, by the obstruction which the frequent breaking up of the foot-ways, and the pavement of the carriage-way for this purpose, occasioned to all the operations of mercantile intercourse. He remarked upon the superior facility with which water would be procured, according to the new plan, in the dreadful casualties of fire; and the prevention of those accidents resulting from a broken and obstructed pavement, which often proved destructive to property, and fatal to life. The learned gentleman concluded by enforcing, in a very argumentative manner, the propriety of carrying into effect an invention which would be a monument to future times of the public spirit, energy, and science of the present day, and would so essentially contribute to the convenience, cleanliness, beauty, and mercantile facilities of this great metropolis.

A gentleman connected with the present system of paving, opposed the motion, on the ground that he did not think the plan practicable; although he admitted that he was unacquainted with the principle on which it was founded, not having given it, he said, any previous consideration.

Mr. Humphrey Marten, of the East London Water Works Company, declared his decided conviction of the practicability of the plan; but thought it would be difficult to carry it into effective operation.

Mr. J. S. Taylor, in reply, went more fully into the merits of the plan, explaining some of its details, to the great satisfaction of the meeting.

Mr. Henderson seconded the motion, which was carried unanimously.

Mr. Harrison moved the second resolution, which was opposed by the gentleman who had opposed the previous one, and on similar grounds.

Mr. William B. Taylor, in seconding the motion, replied very fully to the last speaker; pointing out to him the means by which he might inform himself of the nature and practicability of the plan now adopted, which he proved to be founded upon the most obvious principles of mathematical science, and clearly elucidated by the plans before them, drawn by a very able engineer.—The resolution was carried unanimously.

The third resolution was proposed by Mr. William Harrison, and seconded by Mr. William B. Taylor.—It passed unanimously.

Mr. Chapman Barber was then called to the Chair; and the thanks of the meeting were voted to Mr. Williams for his very gentlemanly conduct in the Chair.—(*For the Resolutions, see the following Advertisement.*)

LONDON SUB-WAY COMPANY.

At a respectable meeting, held at the City of London Tavern, on the 18th of March, 1824, convened pursuant to public advertisement, Mr. John Williams in the Chair—

The following resolutions were moved, seconded, and unanimously agreed to:—

That this meeting, having heard read the report of a Committee, appointed at a public meeting in December, 1822, to enquire into the practicability of forming Sub-ways in London, which report is favourable to their construction, resolve— that a London Sub-way Company shall now be formed, with a capital of £100,000, in shares of £100 each, and that subscriptions be immediately received for that purpose.

That a deposit of £1 per cent. be paid into the Banking House of Messrs. Hankey, to the account of the London Sub-way Company, which shall not be drawn out without the signature of three of the provisional Directors.

That a general meeting of the proprietors shall be called, as soon as 500 shares are subscribed for, to elect the Directors and other officers.—

Another advertisement announced—That this Company is established, in pursuance of the unanimous resolutions of a public meeting, held at the City of London Tavern, and presents the most

promising aspect of usefulness to the public, and profit to the proprietors. Independent of the income to be derived from the Water and Gas Companies, whose pipes are in the ground, several other Companies are forming, to whom the Subways will be indispensable prior to the commencement of their works. The capital for the present is £100,000, in shares of £100. Printed receipts, for the deposit of £1 per share, may be had at the Banking House of Messrs. Hankey; and at the office of the Solicitor, Chapman Barber, Esq., Chancery Lane.—

After this unanimous consent of a public meeting to the establishment of a Sub-way Company, against the direct and indirect opposition that had presented itself, it remained that the same steady perseverance should be continued, to finish that which had now been determined upon without one dissentient voice.

In the Session of Parliament, 1824, petitions were presented from two Gas Companies, for leave to establish their works in various parts of London and its vicinity, *viz.*—“ To establish a
“ Company for lighting the Cities of London and
“ Westminster, and the Liberties thereof, and parts
“ adjacent, within the County of Middlesex, with
“ Oil Gas.

“ Whereas inflammable air or gas may be procured from oil and other materials than coal :

“ And whereas the same gas, being conveyed by means of pipes or tubes, may be applied or used in lighting streets, squares, roads, highways, bridges, market-places, courts, lanes, yards, passages, and other places ; and also in lighting churches, chapels, theatres, public establishments, warehouses, manufactories, private houses, shops, inns, taverns, and other buildings :

“ And whereas it would be of great public benefit and advantage if the inhabitants of London and Westminster, and the Liberties thereof, and parts adjacent, were supplied with gas made from oil, and other materials than coal, and had the power of using the same, if inclined so to do :

“ And whereas the several persons hereinafter named, together with other persons, are willing to supply such air or gas for the purposes aforesaid ; and are desirous of erecting proper works, and laying down pipes, and completing all proper preparations for affording such air or gas, and light, to the several inhabitants aforesaid, or such of them as may be desirous of obtaining the same ; but the same cannot be effected but by the aid and authority of Parliament :

MAY IT THEREFORE PLEASE YOUR MAJESTY,

That it may be enacted ; and be it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that sundry persons herein named, and all and every such other person and persons as shall from time to time become a subscriber and subscribers, and be duly admitted a proprietor and proprietors as hereinafter mentioned, shall be, and they are hereby declared to be, one body politic and corporate, by the name of *The London and Westminster Oil Gas Company* ; and by that name shall have perpetual succession, and a common seal, and by that name shall and may sue and be sued, plead and be impleaded at law and in equity, and shall and may

prosecute any person or persons who shall commit any felony, misdemeanor, or offence punishable by the laws of this realm, or by any enactment in this Act contained."

And another, "To establish an additional Company for more effectually lighting with Gas certain places within the Borough of Southwark, and certain other Parishes and Places in the Counties of Surrey and Kent.

"Whereas the Parishes and Townships of Saint Olave, Saint John, Saint George the Martyr, Saint Saviour, and Saint Thomas, in the Borough of Southwark, and County of Surrey; and the Parishes of Saint Mary, Lambeth; Saint Giles, Camberwell; Saint Mary, Rotherhithe; Christchurch; Saint Mary, Newington; Saint Mary Magdalen, Bermondsey; the Clink Liberty; Clapham; Walworth; Streatham; Blackman Street, in the Borough of Southwark; Vauxhall, and Stockwell; and other roads, streets, and places in the East Half Hundred of Brixton, in the County of Surrey; Wandsworth, Tooting, Battersea, and Putney, and other roads, streets, and places in the West Half Hundred of Brixton, in the said County of Surrey; and the several parishes and places of Saint Paul, Deptford; Saint Nicholas, Deptford; and Greenwich, in the Counties of Surrey and Kent, and the several places adjacent or contiguous thereto, are large and populous, and many of the roads, streets, and places within the said parishes and townships, are either wholly without, or have insufficient public lamps and lights; and it would be a great public advantage to all the inhabitants thereof, and to all persons travelling along the streets, roads, and ways in and through the same, if such several parishes and places were lighted with gas:

"And whereas the several persons hereinafter named, together with other persons, have subscribed, and are willing to subscribe, all such sum and sums of money as are necessary for the erection of proper works, laying down pipes, and com-

pleting all proper preparations for lighting all such places with gas ; but the same cannot be effected without the aid of Parliament :

MAY IT THEREFORE PLEASE YOUR MAJESTY,

That it may be enacted ; and be it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that the Right Honourable Lord Holland, the Honourable James Abercromby, Matthias Attwood, George Bridges, Thomas Fowell Buxton, Arthur Holdsworth, James Scarlett, John Plummer, Charles Barclay, David Barclay, Charles Bevan, Joshua Blackburn, Jonathan Chapman, Archibald Corbett, John Calvert Clarke, Francis Cresswell the younger, William Miller Christy, Abel Chapman, Benjamin Currey, William Fry, Joseph Fry, Richard Fell, John Fell the younger, William Frampton, John Garratt, Emanuel Goodhart, Isaac Lyon Goldsmid, Henry Hunt, William Heygate, James Heygate, Richard Heale, John Key, John Petty Muspratt, Frederick Perkins, Charles Perkins, Charles Pott, Jacob Foster Reynolds, Horatio Ripley, Thomas Allen Shuter, George Thackerah, Charles Hampden Turner, the Reverend John Vane, Matthew Wood, Thomas Wilson, Charles Allen Young, and John Adolphus Young, and all and every such other person or persons as shall or may, from time to time, in such manner as is hereinafter mentioned, become a proprietor or proprietors of shares in the undertaking hereby established, and their respective successors, executors, administrators, and assigns, shall be, and are hereby united into a Company, and they are hereby declared to be one body politic and corporate, by the name of *The Phoenix Gas Light and Coke Company.*"

Mr. Williams then presented a petition to the House of Commons, praying for a Clause in these Bills, to prevent the Gas Companies from breaking up the streets of London, until Sub-ways were built to receive the pipes.

In this Session applications were made to Parliament for leave to erect Gas Works in all parts of the United Kingdom, by the British Gas Light Company, and the United General Gas Light Company. The Prospectus of the latter states, that

“The very general use of Gas Light throughout all parts of the metropolis, and in some of the principal cities and towns in the kingdom, and the uniform success of the different Gas Companies already established, have sufficiently shewn the benefits which result to the public at large, as well as to the individual projectors, from the adoption of that mode of illumination.

“The great beauty and brilliancy of this light, its cheapness in comparison with oil or candles, its effect in consuming the produce of our own soil and fisheries, and its affording an eligible employment for surplus capital, are amongst the many inducements to its extended use.

“But although London, and a few large cities and towns, are already lighted with Gas, it is notorious that many populous places in the country, though anxious to enjoy the same advantage, are unable, either from the want of the requisite capital, or information, or unwilling, from the apprehension of failure, *alone* to incur the trouble and expence attendant on the origination of new establishments.

“ The General Gas Light Company has been formed with the view to obviate these difficulties, and to afford facilities, in the shape of capital and co-operation, to those places which may be desirous of being supplied with Gas, and may wish for the assistance of a public Body in possession of whatever the combination of capital, skill, science, and experience can contribute towards the attainment of that object.

“ It must be evident that the works necessary for this purpose—and from the erection of which a profit has, in every instance, hitherto been realized—can be undertaken with much greater advantage by a Company engaged in constructing many such works, than by individuals.

“ The capital of the Company is £600,000, divided into shares of £50 each. Of this sum it is intended to raise at present £200,000 only; and the Directors have the power to raise £100,000 further, in shares, which may be distributed among the inhabitants of such places as may be lighted by, or in conjunction with, the Company. The remaining capital of £300,000 to be raised hereafter, when it may be required.

“ It will appear, from the plan of this Institution, that it is in no wise intended to interfere with any of the Gas Companies now existing.

“ The Directors are ready to receive proposals

from any place, for the formation of a Gas establishment, either jointly with the inhabitants, or at the Company's sole risk and expence; and it will be their endeavour, in either case, to place the arrangements for that purpose on such a basis of fairness and liberality, as shall make the success of the different establishments the common interest of all parties concerned."

The titles and preambles of these two Gas Bills are as follow:—

" A Bill for leave to obtain certain Powers
" and Authorities to a Company, to be called *The*
" *British Gas Light Company*, for lighting with
" Gas certain Cities, Towns, Parishes, and Places in
" the United Kingdom, subject to restrictions.

" Whereas the lighting of cities, towns, public roads, parishes, and large and populous places with Gas, is attended with great convenience and advantage to the public:

" And whereas many cities, towns, public roads, parishes, and large and populous places in the United Kingdom, are without the benefit of Gas lights:

" And whereas divers commissioners, trustees, bodies politic and corporate, and others empowered to light and pave cities, towns, public roads, parishes, and places, and the inhabitants thereof are, and hereafter may be, desirous of having the same lighted with Gas, but are or may be unable conveniently to accomplish that object, by reason of the expence necessarily attendant on the erection of works, and laying down of pipes and apparatus for that purpose, and the difficulty and expence of obtaining skilful and experienced persons to superintend the erection and laying down of the same:

“ And whereas the several persons hereinafter named, with many other persons, are willing and desirous to supply such Gas light, and to erect proper works, and make all necessary preparations for that purpose, but which cannot be effected without the aid and authority of Parliament ;

MAY IT THEREFORE PLEASE YOUR MAJESTY,

That it may be enacted ; and be it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that sundry persons herein named, and all and every such other person or persons as shall from time to time, in such manner as is hereinafter mentioned, become a proprietor or proprietors of shares in the undertaking hereby established, their respective successors, executors, administrators, and assigns, shall be, and are hereby united into a Company, and shall be, and are hereby declared to be, one body politic and corporate, by the name of *The British Gas Light Company.*”

“ An Act for granting certain Powers and Authorities to a Company, to be called *The United General Gas Light Company*, for lighting with Gas certain Cities, Towns, Parishes, and Places in the United Kingdom, subject to restrictions.

“ Whereas the use of Gas, for lighting cities, towns, parishes, and places, has been found very convenient and advantageous to the public :

“ And whereas divers bodies politic and corporate, commissioners, trustees, and others empowered to light cities, towns, parishes, and places, and the inhabitants thereof are, and hereafter may be, desirous of having the same lighted with Gas, but are or may be unable conveniently to attain that object,

by reason of the expence of the works, pipes, and apparatus necessary for that purpose, and the difficulty and expence of obtaining the aid of skilful and experienced persons in erecting and making the same :

“ And whereas the several persons hereinafter named, together with other persons, are willing to supply such Gas Light, and to erect proper works, and complete all necessary preparations for that purpose, but which cannot be effected without the aid of Parliament ;

MAY IT THEREFORE PLEASE YOUR MAJESTY,

That it may be enacted, and be it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that John Adams, James Hughes Anderdon, Joseph Clarke, William Frampton, Charles Franks, William Gaussen, Thomas Greg the younger, Roger Harries, Richard Heale, Henry Kater, Philip Monoux Lucas, Simon M'Gillivray, Charles John Manning, Isaac Nicholson the younger, George Richardson Porter, William Henry Porter, Henry Sampson Hyde Wollaston, and William Pitter Woodhouse, and all and every such other person or persons as shall from time to time be duly admitted a proprietor or proprietors, as hereinafter mentioned, and their respective successors, executors, administrators, and assigns, shall be, and they are hereby declared to be, one body politic and corporate, by the name of *The United General Gas Light Company.*”

In consequence of these Gas Companies making application to the House of Commons, for leave to break up the pavements all through

* The reason for these extracts forming part of this Work, is to shew the powers solicited from the Legislature by these four Gas Companies.

the kingdom, Mr. Williams presented another Petition to Parliament.

*“ TO THE HONOURABLE THE COMMONS OF GREAT
BRITAIN AND IRELAND, IN PARLIAMENT
ASSEMBLED.*

The humble Petition of John Williams, of Cornhill, in the City of London, most respectfully sheweth,

That your Petitioner, in the month of October, 1822, obtained His Majesty's Royal Letters Patent, for preventing the frequent opening of the pavement in streets, roads, and public ways, for laying down and taking up pipes, and other purposes, which Patent promises to be of great public utility :

That your Petitioner has seen a Bill, lately presented to your Honourable House, for granting certain powers and authorities to a Company, to be called *The United Gas Light Company*, for lighting with Gas certain Cities, Towns, Parishes, and Places in the United Kingdom, subject to restrictions.

That your Petitioner, by his said invention, can importantly aid the object of that Bill, and prevent the annoyance of frequently opening the pavements in the several Cities and Towns in England and Wales, in which the said Company propose to lay their pipes.

That it is in contemplation to form a General Sub-way Company, upon the principle of his Patent, in all those Cities and Towns where Water and Gas are supplied to the inhabitants through pipes; and he therefore prays your Honourable House—

That a Clause or Clauses may be introduced into the said Bill, to enact—that the United General Gas Light Company shall not disturb the paving in the streets of any City or Town in England and Wales, until Sub-ways are constructed for the reception of the pipes.”——

And also one respecting the Oil Gas Company in London, both of which were referred to the Committee on those Bills.

Public notice was then given respecting Sub-ways in country towns:—

Cornhill, February 6, 1824.

Two public Companies having been recently established in London, with a capital of upwards of a million, for the supply of Gas in any part of the Kingdom, the Patentee of Sub-ways, for preventing the removal of the pavement and carriage paths for water and gas pipes, will be happy to attend to any application on the subject for the formation of Sub-ways in any City or Town desirous of possessing them.

A Sub-way Company is recommended to be a separate establishment, to receive a rental for the use of the Sub-ways, as no capital will now be required for pipes, either for gas or water.—

A Proposal was also issued, for publishing three Engravings of Sub-ways :—

Shortly will be published, as the Act directs, in the style of aqua-tinta, price One Guinea the Set, three large coloured Prints, representing Sub-ways for the reception of Water and Gas Pipes, and access to the Sewers, without opening the ground and paving in the streets, of all Cities and Towns in every part of the world.

These elegant Prints are intended for the libraries of noblemen, gentlemen, architects, and public bodies, being drawn to a scale for building, giving a full view of this novel and important object.

The first impressions will be reserved for the earliest subscribers, by the Patentee, John Williams, Cornhill, London.—A rough lithographic sketch on one sheet is now ready.—

And a circular prepared, in answer to enquiries from the country.—

Cornhill, April 21, 1824.

Sir,

In reply to the enquiry for mains, &c. for your town, to pass Gas through to the

inhabitants, I beg to submit, that any you may obtain of iron, can, from the nature of them, be only temporary in their duration, perhaps 50 years, or 10 more at the utmost, with a certainty of the streets being frequently opened for repairs, from corrosion, expansion, and contraction.

I beg, therefore, to offer for your consideration, the propriety of building Sub-ways, lined with durable or everlasting tubes, which are in every respect superior to pipes, and are always accessible, for any purpose, without opening the ground. In the first instance, the expence will be greater, but the comfort and durability will be economy, and more than compensate the first cost.

The tubed Sub-ways will also be freehold property; and any number of tubes may be built in at first, to be ready for water and other fluids.

Should your Commissioners approve of my suggestion, I shall be happy to wait upon them, to explain the full particulars;

And remain, Sir, your's, respectfully.

Enclosed are rough plans and estimates, without the tubes.

These applications to Parliament for establishing new Companies in London, produced immediate and active opposition from the old ones, particularly against the Oil Gas Company; Petitions were presented against them by the Chartered, and by the Imperial Gas Companies, especially by the former, whose objections were answered in the following circular, published by the Oil Gas Company:—

LONDON AND WESTMINSTER OIL GAS BILL.

Answers to the objections made to the Oil Gas Bill by the Chartered Gas Light and Coke Company.

The Gas Light and Coke Company object,

That the proposed Oil Gas Company ask for an Act to light London, Westminster, and the whole of the County of Middlesex with Oil Gas.

The London and Westminster Oil Gas Company do not ask for an Act to light London and Westminster and the whole of the County of Middlesex with Oil Gas, but merely London and Westminster, and certain parishes adjacent, which parishes form part of the metropolis.

That such an Act would be alike injurious to the public, and unjust to the existing Companies, particularly to the Chartered Gas Light and Coke Company.

1. That *it would be injurious to the public* in point of price—in point of convenience—and point of collateral benefit.

The proposed Act will not be injurious to the public: on the contrary, the public are subjected to injury by the continuance of that monopoly for which the Chartered Company now contend. A fair competition in the manufacture and sale of any article of general consumption, is universally allowed to be beneficial to the community; and it is more particularly desirable in those branches of business which are susceptible of improvement, from the application of skill and science. An exclusive right to supply the public with any article, especially one in great demand, and of variable quality, has a tendency to make the parties enjoying the monopoly, inattentive to their customers, careless as to its manufacture, inactive as to improvement, and unreasonable as to terms.

It will be no injustice to subject the existing Coal Gas Companies to the effects of competition. All capital employed in manufactures is exposed to competition, arising from improved methods of carrying them on, and with unquestionable national advantage; and the Coal Gas Companies had the benefit of this state of things when they brought Coal Gas into competition with Oil Lamps. Whether the individuals investing capital in manufactures, are incorporated or not incorporated, can in justice make no difference. The Coal Gas Companies neither possess patent privileges in this respect, nor are they for any reasons entitled to them.

That Oil Gas, even at the present low price of oil, is not cheaper, light for light, than Coal Gas ; but whilst coal is an article of steady price, oil is particularly liable to be enhanced in value, not only from accidental deficiency, but in a more especial degree from commercial speculation, and may therefore rise very far above its present rate.

Oil Gas, at the present price of oil, is decidedly cheaper, light for light, than Coal Gas ; and calculations, founded upon the average price of oil during fourteen years of war, prove that Oil Gas may be supplied upon terms as advantageous to the public as Coal Gas. Oil is not likely to be materially enhanced in value, either from accidental deficiency or from commercial speculation, as every variety of common oil may be used for the production of Gas, and the numerous sources of supply will prevent the effects of commercial speculation.

That the existing Companies are fully empowered to use Oil Gas ; and if they should think fit to do so, in competition with the proposed Oil Gas Company, the result would probably be that, after a considerable expenditure on both sides, the Coal Gas Companies would be left in possession of the exclusive supply, and would be under the necessity of reimbursing themselves for the capital sunk, by an additional charge on the public.

The benefit which will result to the public from a fair competition, and the danger they will run in leaving the Coal Gas Companies in possession of the exclusive supply, cannot be placed in a stronger light than by the threat held out in

the preceding objection. The Chartered Company distinctly avow their intention of imposing an additional charge upon the public, for the purpose of reimbursing themselves any loss they may sustain in opposing the Oil Gas Company, the moment they can make that charge with impunity. If, by the rejection of the proposed Oil Gas Bill, the Chartered Company shall be left at liberty to demand an increased rental for this purpose, they may for any other, and the public must submit to pay whatever sums they may think proper to ask. The existing Coal Gas Companies are, however, not fully empowered to supply Oil Gas, nor does it follow that, if they were, the public would have the benefit of it. These Companies have already erected works, at a very heavy expence, for making Coal Gas ; and if they continue to possess the exclusive power of supplying the public, it is not very probable that they will feel inclined to erect Oil Gas works, as their present amount of sunk capital would render such change unproductive of rental.

That Coal Gas not only is more convenient in itself for use than Oil Gas, but the regulations of the existing Companies have been framed with a special view to public convenience. Coal Gas will resist tempestuous weather much better than Oil Gas ; a street lit with the latter is therefore more exposed to the danger of sudden darkness, from the force of the wind. Oil Gas, when it escapes, is most offensive in smell, especially if made from fish-oil, which, as being cheaper than vegetable oil, the Oil Gas Companies would generally use.

The assertion, that Coal Gas is more convenient for use than Oil Gas, is not well founded; on the contrary, there are numerous inconveniences attending the use of it, which do not arise from the use of Oil Gas. Coal Gas corrodes and destroys the metallic pipes used to convey it, which Oil Gas does not; from the same cause, it tarnishes various articles, which Oil Gas does not. Coal Gas produces a greater quantity of heat and vapour than any other artificial light, which Oil Gas does not. Coal Gas, from its lightness, has a great tendency to escape from every imperfect place in the pipes, which Oil Gas, from its density, has not.

From the numerous trials which have been made of Oil Gas, it has been found to resist tempestuous weather. It has been extensively employed in lighting streets, squares, and even harbours, and in no one instance has the danger of sudden darkness from the force of the wind been realized. The Lighthouse of Holyhead is the only one in which Gas is used, and there Oil Gas is employed, and it is unquestionably the most brilliant and steady light on the British coast. The Pier-light on the Humber is perhaps a more convincing proof of the power of Oil Gas to sustain the force of the wind; this light is in a very exposed situation, and is merely sheltered by a common protecting lamp. That Oil Gas, when it escapes, is most offensive in smell, is by no

means true ; neither is it true that Gas produced from fish-oil has a more offensive smell than that produced from vegetable oils. The Gas made from the most foetid fish-oil, is far less offensive than that made from coal. The London and Westminster Oil Gas Company have no fear that a comparison in this respect will prejudice their case.

That the existing law requires the Gas Companies each to confine itself to a particular district of the metropolis, in order to prevent numberless public inconveniences—such as injury to persons and carriages—constant breaking up of pavements and newly Macadamized roads for the purpose of laying down or taking up pipes of different Gas Companies in the same street—casualties and nuisances arising from the escape of Gas from adjacent pipes, &c. All the benefits of this important regulation the proposed Oil Gas Company would at once annihilate, by extending their pipes and mains through every district occupied by the existing Companies.

The confining the existing Gas Companies to particular districts of the metropolis, was perhaps proper when all supplied the same article ; but the same reason does not apply to the London and Westminster Oil Gas Company, who do not seek to compete with the Coal Gas Companies in the manufacture and sale of the same commodity. They expect their demand to arise principally from a class of persons who are not in the habit of consuming Coal Gas.

Parliament has already granted Acts for in-

corporating Oil Gas Companies in cities and towns where Coal Gas had been previously introduced. On every such occasion the Coal Gas Companies have manifested great anxiety about the pavement ; but the laying down pipes for Oil Gas is not attended with all the evils which the Coal Gas Companies set forth. The pipes required for conducting Oil Gas are much smaller than those for Coal Gas, and consequently are laid with greater expedition, and less inconvenience to the public. The service-pipes do not, as in the case of Coal Gas, require to be constantly repaired, and frequently renewed. When once laid down, all trouble ceases, and the pavement need not be again broken up.

That the great collateral advantage of Coal Gas, is the support it gives to the Coal Trade, and thereby to the Navigation of the Country. No one can doubt that the Coal Trade is a much ampler nursery for seamen than the Whale Fisheries, which supply the material for Fish-oil Gas. Nor should it be overlooked, that the Coal Gas Works afford a cheap fuel to the poor of the metropolis.

The collateral advantages of Oil Gas are greater, and of more national importance than those which are stated to arise from the use of Coal Gas. The official Report of Sir William Congreve to the House shews that the Coal Trade has not been benefited by the introduction of Coal Gas. The establishing Oil Gas Companies will, on the contrary, essentially serve

the great and established Fisheries of Greenland, Newfoundland, and the South Sea; and from the circumstance of every species of oil being applicable to their purpose, they will cause these kinds of common fish-oil, which are now scarcely saleable, to be produced in abundance on the Coast of Great Britain, and thus furnish a vast object for productive labour and maritime employment to the inhabitants of those parts of the empire in which employment is most desirable.

The assertion, that Coal Gas works afford a cheap fuel to the poor of the metropolis, is true in appearance, but not so in reality; for although coke may seem to last longer during combustion, and is on that account purchased by the poor, it gives out much less heat than the same quantity of coal, and is therefore not an economical fuel.

That the protection and security of the public are amply provided for at present, by subjecting the Gas Companies to the controul of His Majesty's Secretary of State for the Home Department; and every private individual has a right to light his premises with Oil Gas, or in any other manner he may think fit.

It is rather puzzling to discover the relation which the two parts of this sentence bear to each other, or the application of them to the argument. With respect to the first, the London and Westminster Oil Gas Company, in the event of their obtaining the Act they have applied for, will be equally under the controul of his Ma-

jesty's Secretary of State for the Home Department, as the Coal Gas Companies ; and of course the protection and security of the public will be as amply provided for as at present.

With respect to the second part, it does not follow that, because an individual has a right to light his premises with Oil Gas, he has therefore the power. It is neither convenient nor economical for persons residing in the metropolis to manufacture Oil Gas for their own use.

That, upon the whole, if Oil Gas were preferable to Coal Gas, it would undoubtedly be used by the Chartered Company ; but they prefer Coal Gas, because they have found it, from many years' experience, more serviceable than Oil Gas to the public.

It is perfectly natural that such Companies as have erected Coal Gas works, should assert that Coal Gas is preferable to Oil Gas ; but where, when, or how the Chartered Gas Light Company, who have never supplied a single place or house with Oil Gas, should have gained the experience which has enabled them to decide the question, is difficult to discover. The opinion of the public, however, or at least such portion of them as have had an opportunity of making trial of the two Gasses, is decidedly in favour of Oil Gas. This objection, which shews the intention of the Chartered Company to supply Oil Gas not to be sincere, is, however, a strong argument in favour of the proposed Act. If

the inhabitants of the metropolis are to have the liberty of using Oil Gas, they will only be enabled to procure it by means of a Company established for the purpose of supplying it ; and it is difficult to suppose that they would be deprived of an advantage which has been granted to so many towns in the kingdom, though the necessity was by no means so great.

2. *That the proposed Act would be unjust to the Chartered Company.*

That the capital of the Chartered Company is £900,000, of which upwards of £600,000 have been actually expended.

An Oil Gas Company would have benefited the public to a much greater extent with a third part of the money ; and the circumstance of so large a capital having been necessary, proves that they are not, nor ever will be, in a condition to supply Oil Gas upon terms as advantageous to the public as a Company established for the express purpose.

That the expence incurred by the Chartered Company, both prior and subsequent to their incorporation in 1810, was enormous, in surmounting prejudice, and in making experiments for bringing Gas Lights to their present high degree of brilliancy, purity, and perfection. Of this expenditure, the public and the other Gas Companies are now reaping the advantage.

The Chartered Company have enjoyed the exclusive supply of Gas to the greatest proportion of the metropolis for 14 years—an advantage

equal to that granted to parties having the highest claim for valuable inventions, perfected at great expence. The Chartered Company have no such claim ; for Coal Gas had been brought to a state of great perfection, and had been extensively introduced by Mr. Murdoch, ten years before the Chartered Company were incorporated.

That the Chartered Company, by the Act for their Incorporation, possessed powers extending over London, Westminster, Southwark, and the suburbs ; and in order to effect the arrangement of districts for the convenience of the public, they last year relinquished a rental of £15,000 a year ! This great sacrifice will have been made by them in vain ; and public convenience will be wholly set at nought, if the proposed Oil Gas Company be suffered to intrude upon the district of the Chartered Company.

The Chartered Company take merit to themselves for having given up a portion of their rental to another Company. This sacrifice, however, was not made by them for the public benefit, but in order to secure themselves from the effect of a competition.

That, finally, there is no public necessity, no public demand for Oil Gas, to occasion all this public injury and private injustice.

That there is a necessity for the introduction of Oil Gas into the metropolis, is shewn by the numerous applications which have been made for it. It can only be supplied to the public, at a reasonable rate, by a Company established for

that express purpose; and it has been already shewn that such a Company will not occasion either public injury or private injustice.

In reference to this reply of the Oil to the Chartered Gas Company, it is worthy of remark, that one point of objection from the old to the new Company, was the very nuisance of breaking up the ground, to lay the pipes down. This was the primary motive in inducing Parliament to reject their Bill. Had the undertaking here proposed been carried into effect, there might have been a different result to their application for an Act of Incorporation, the main objection by the Commons being obviated; and looking to the future, Sub-ways will afford facilities, even for experiments, which are now entirely out of the question, and the public may enjoy all the advantages which succeeding Companies may propose. It would have been well had they in other instances been equally as tenacious of the rights and comforts of the people as in this. If that rejection was unjust to the petitioners for the Bill, it would have been more so to have subjected the public to the inconvenience they would have created, not for once merely, but to be reiterated. If considered as a matter of expediency, the public are now actually the losers; for they are deprived of all the advantages which that Company promised, whether we regard the economy and the purity of the material, or the

absence of competition for the supply, and the consequent monopoly of the present existing Companies, to whom the opportunity was afforded of levying an additional charge upon the public—a charge, by the way, considerably more than was proposed by the originators of the Chartered Company: as it is, the individuals composing the Oil Gas Company, are minus a portion of their capital in expenditure for their incorporation;* and the public do not enjoy any of the advantages which they proposed, and bid fair to realize. This alone speaks volumes in favour of Sub-ways, and is an undeniable proof of their necessity.

A special application was now made to Mr. Peel, the Secretary of State, to protect the public from this constant and eternal nuisance.

*To the Right Honourable Robert Peel, &c. &c.
Stanhope Street, May Fair.*

Cornhill, May 18, 1824.

Sir,

As the Secretary of State for the Home Department, I solicit the honour of an interview, respecting the Bills now in progress through Parliament for new Gas Works in London, and the kingdom generally; being the

* It is understood that no less a sum than £30,000 was spent by the Oil Gas Company in soliciting this Bill, and nearly £15,000 were expended by each of the Coal Gas Companies in opposing it.

Patentee of a method to prevent the frequent removal of the pavement and carriage paths, for laying down and taking up pipes, &c.; which Patent will not only prevent the paving being disturbed, but supersede the use of pipes altogether.

As this important object cannot be effected without the enlightened support of His Majesty's Ministers, I purpose doing myself the honour of waiting on you, Sir, on Tuesday morning next, at ten o'clock, to explain the subject, should it be agreeable.

I beg also to say, that a large annual revenue to the State may be obtained from it, without loss to the public.

With great respect, I remain,

Your obedient Servant,

J. WILLIAMS.

An answer to which was received, directed "John Williams, Esq. Cornhill."

Whitehall, May 18, 1824.

Mr. Peel presents his compliments to Mr. Williams, and requests that he will be so good as to communicate to Mr. Peel, in writing, any information on the subject of the Bills now before Parliament for new Gas Works, which Mr. Williams may think it desirable that Mr. Peel should be in possession of.

Cornhill, May 19th, 1824.

Sir,

In reply to the honour of your note of yesterday, I beg to lay before you a copy of the Specification of the Patent I obtained for a method to prevent the frequent removal of the pavement and carriage paths, for laying down and taking up pipes, &c.

The necessity for the immediate adoption of a measure for the protection of the public from the annoyance of the universal disturbance of the streets, now contemplated by the various Gas Companies soliciting Parliament for powers, &c., appears to be imperative on the part of His Majesty's Ministers, particularly of you, Sir, as Secretary of State for the Home Department. Not only the paving in London, but the whole of the environs of its extensive circuit, are now threatened to be taken up, resembling, in some degree, the preparation for a siege; and no sooner than these have done, but other Companies for Water, Gas, and other purposes, will arise, and the same operations commence again.

Nothing, in short, but the activity and decision of His Majesty's Government, can prevent the annoyance contemplated through the whole of the kingdom, as it appears by the clauses in the numerous Gas Bills now before both Houses of Parliament; which, with great

humility, I conceive may be easily and readily prevented by the construction of Sub-ways to receive the pipes.

I beg, Sir, to lay before you copies of a correspondence with Mr. M. A. Taylor on this subject, as long since as 1817; and also with the late Chancellor of the Exchequer in 1819, before I took out the Patent, which followed in 1822. Since which, I have proposed to establish a Sub-way Company, of which the Prospectus is enclosed; but the work being evidently national, the same as the public sewers, to which it is properly the handmaid, it remains.

The drawings, by a skilful engineer, together with the fullest explanation of the subject, it will give me great pleasure to produce, upon receiving your order for that purpose.

I have the honour to be, Sir,

Your obedient Servant,

J. WILLIAMS.

When the first Gas Company was brought forward by Frederick Albert Winsor, about twenty years ago, they applied to Parliament for an Act of Incorporation, to enable them to light the streets of London. Great opposition was then raised against it by the Oil Trade, and others, who apprehended considerable injury to their respective establishments. Two Sessions passed without success; but the activity of the

Committee who had been authorized by the Proprietors to obtain the Act, aided by Mr. James Ludovico Grant, their Chairman, and Mr. Peder, the Secretary, at length succeeded, in the third Session, not only to obtain an Act of Parliament, but a Charter from the King. Mr. Williams was one of this Committee, and attended frequently at the experiments in Pall Mall,* and in the Committees of the Lords and Commons during those three Sessions. One of the most attentive Peers in the Lords' Committee was the Earl of Lauderdale, who watched every clause with peculiar jealousy. A letter was therefore sent to his Lordship upon this occasion.

*To the Earl of Lauderdale, Warren's Hotel,
Regent Street.*

Cornhill, May 25, 1824.

My Lord,

I most respectfully address your Lordship on the subject of the Bills now in Parliament for establishing new Gas Works in Lon-

* An anecdote, scarcely to be believed at this day, was connected with these experiments. After the Committee had ascertained the capability and importance of lighting the streets with Gas from coals, leave was obtained from the Commissioners of Pavements to lay down pipes, and light up Pall Mall. For a considerable time an immense concourse of people came from all parts to see these lights, which gratified the public exceedingly ; but after the street had been lit a few months, an order came from these same Commissioners of St. James's, to take the posts, pipes, and all away, as a public nuisance !

don, its environs, and the kingdom generally ; to complete which, it will be necessary that they shall have powers granted to break up the streets and roads, wherever they please, for their pipes.

Having obtained a Patent in October, 1822, for a method to prevent the frequent removal of the pavement and carriage paths, &c. &c., I beg to submit to your Lordship, whether the construction of Sub-ways to receive the pipes for water, gas, and every other purpose, should not be first considered, before a public annoyance, of the extent contemplated, should be permitted ; and by which method even the pipes themselves may be superseded, if necessary.

Your Lordship having been a very active Member of the House of Peers, upon the introduction of the first Gas Company, and looking at that period with some doubt on those new establishments, I have taken the liberty to address myself to you ; and it will give me great pleasure to be honoured with your Lordship's order to wait on you with the drawings.

The enclosed circular, sent to the Members of Parliament with the Prospectus, last Session, will in some degree inform your Lordship of the nature of the object ; but the drawings will be necessary to give the full idea.

I have the honour to remain,

Your Lordship's obedient Servant,

J. WILLIAMS.

Towards the latter end of the year, a letter was sent:

*To Henry Hobhouse, Esq. Under Secretary of State
for the Home Department, Whitehall.*

Cornhill, October 28, 1824.

Sir,

I beg to solicit the honour of an interview with you, as the Under Secretary of State for the Home Department, respecting the Water and Gas Companies now forming, whose intention it is to apply to Parliament for Acts of Incorporation.

The first operation of these Companies must be to lay down their pipes, and add to the interruptions of the public streets, already in a very bad state.

My object in this application is to submit, through you, Sir, to His Majesty's Government, the offer of my Patent for a method to prevent the frequent removal of the pavement and carriage paths, for laying down and taking up pipes, and other purposes, by the construction of Subways to place them in; which at the same time produces a solid foundation immediately under the surface, instead of so much mud, and thereby strengthens the streets in a durable manner.

As the public sewers are under Commissioners in the controul of Government, so the Subways are connected immediately with the sewers, being built over, so as to drain into them;

and may be added to that Commission, with a rate, payable by the Water and Gas Companies who place their pipes there, by which the streets will be improved in the most permanent and complete style.

The honour of your reply, with an appointment to shew you the plans, and give further information, will greatly oblige, Sir,

Your obedient Servant,

J. WILLIAMS.

Home Office, October 28, 1824.

Mr. Dawson presents his compliments to Mr. Williams, and informs him, that his letter of this morning has been forwarded to Mr. Hobhouse, who is at present in the country.

Some weeks afterwards, another letter was sent

To G. R. Dawson. Esq. Under Secretary of State.

Cornhill, December 7, 1824.

Sir,

Your courtesy in an immediate reply to mine of the 28th of October last, addressed to Mr. Hobhouse, of the Home Department, on the subject of the threatened dilapidation of all the streets in London, by the projected new marine and fresh water companies, and others, induces me, after having waited thus long without attention from that gentleman, to address myself to you, Sir, as the most efficient of the two Under Secretaries of State.

The subject of my letter being of the most novel and beneficial character for the comfort of society in crowded cities, *viz.* to prevent the frequent removal of the pavement and carriage paths, for laying down and taking up pipes, and other purposes, for which I have his Majesty's Royal Letters Patent, my object is to submit the drawings and plans of the Sub-ways to His Majesty's Government, through the Under Secretary of State, for adoption or rejection, as shall appear, after due consideration by His Majesty's Ministers, to be the most desirable.

I beg to point out, Sir, to your notice, that the splendour of every city, ancient and modern, consists in the cleanliness and width of its streets, as well as in the magnificence of its buildings; that it is this chiefly which at this moment gives the palm to London before Paris. But no remedy has existed for the necessity of opening the ground to receive and repair the pipes, until this Patent was obtained, which possesses the double property, not only of preventing the evil, but at the same time strengthening the ground either for paving or Macadamizing the surface.

I also beg to add, that the proposed Thames Quay Company, which is under high patronage, is peculiarly a spot for this object; and that the fires which have been frequent lately, would have been less extensive, and water would have been instantly accessible by this method.

I am now desirous to obtain the honour of an appointment to wait on you, Sir, that I may, through your introduction, proffer this Patent to His Majesty for the purposes contemplated.

I have the honour to be, Sir,

Your obedient Servant,

J. WILLIAMS.

To this Mr. Dawson replied immediately from

Drayton, December 8.

Sir,

I have had the honour of receiving your letter of the 7th instant, which has followed me to the country.

My absence from London will prevent me from having the honour of seeing you; but I am sure Mr. Hobhouse will be most ready to receive you at the Home Office, if you call upon him.

I have the honour to be, Sir,

Your most obedient Servant,

G. R. DAWSON.

J. Williams, Esq.

Accordingly a letter was sent

To H. Hobhouse, Esq. &c.

December 10, 1824.

Sir,

On the 28th of October last, I addressed myself to you, as the Premier Under Secretary of State for the Home Department, on the enclosed subject, to which I received an instant reply from the Home Office.

Having waited for a further communication from you, Sir, until the 7th instant, I felt it to be my duty to write to Mr. Dawson, the joint Under Secretary, to the following effect, from whom I have this morning received the enclosed reply.

In consequence of his letter, I again respectfully address myself to you, requesting the honour of an interview, to lay before you the drawings and plans referred to, which, in the event of approval, will distinguish this period, and this country above all others, either ancient or modern, for the advantages of this civic accommodation ; nothing of the kind, with the exception of the Sub-ways at Rome, for a very different purpose, having ever been known.

As I am largely engaged in an extensive business, my time is valuable ; and as yours, Sir, is much more so, I shall feel obliged by the appointment being promptly made, and it shall be punctually kept by yours respectfully,

JOHN WILLIAMS.

Mr. Hobhouse answered this immediately, appointing the next day for an interview with the Patentee in his office at the Treasury. The drawings having been shewn to him, and the subject fully gone into in a long conversation, Mr. Hobhouse stated, that the peculiar genius of the British Government was to let the people do

every thing with new ideas, and the Government nothing ; that in foreign countries it was usually the reverse. Here, public Bodies were formed by individual subscription ; they undertook to construct docks, canals, and works of that description, with the sanction of Government ; and he recommended that a Sub-way Company should be established for this purpose ; and that he would be sure to communicate the whole subject to Mr. Peel, the Secretary of State.

A letter was sent about this time, under the head of

THE STREETS OF LONDON,

To the Editor of the Times.

Sir,

The streets of London are now in a condition so bad, that as soon as a fall of snow comes, it will render many of the principal thoroughfares altogether impassable. Tower Street and Mincing Lane, have been stopped up for some months, under the authority of the Commissioners of Sewers ; where the ground has been excavated to the depth of, from twenty-five to thirty-five feet below the surface, and has endangered the safety of the houses, which are now propped up from side to side, to prevent them from falling.

Ludgate Hill is likewise now impassable, although a new sewer was constructed there about three years ago, under the same authority.

Blackfriar's Bridge resembles a country lane, full of holes and mud. Bridge Street and the Old Bailey are very little better.

At the west end of the town, the public are equally annoyed. The Strand was lately stopped up for several weeks, to be entirely new paved; and now it is in as bad a state as before it was done. From Charing Cross to Parliament Street is at this moment an exhibition for the nobility and gentry of muck and mire, under the immediate notice of His Majesty's Ministers, and of the learned profession in their way to Westminster.

The enquiry is, what is the reason of all this? and why is it not prevented?

The public pay very heavy paving rates for the comfort of good paving, and clean streets; instead of these, they have bad, wretched ways, and not a clean crossing, except some poor person volunteers to sweep one.

Surely Parliament will enquire into this subject, and not permit the rates to be collected without the value being received; and the public provided with good paving, and clean streets.

It is however clearly manifest that the *basis*, the actual *cause of the evil*, has been altogether lost sight of, or not properly attended to when

pointed out, not only to the City Authorities, but to the Executive ; for His Majesty's Ministers, and the Corporation of London, have both been respectfully addressed on this subject, and a remedy, an unexceptionable remedy, for the whole of the mischief has been submitted to them.

Why they have so long delayed taking it into their impartial consideration, and candidly examining the subject, I know not, as the party proposing it has no motive in recommending the plan, beyond the public weal—not being either a Pavier, Surveyor, Contractor for Roads, or in any way connected with building or road concerns.

The annual sum collected for paving the City is upwards of £30,000, and not less than that is paid by the inhabitants of Westminster ; these sums, exceeding £60,000 a year, and including the other parts of London and Southwark, not less than £100,000 annually, are now paid by the inhabitants of this great metropolis, for the luxury of being over their shoes in mud, through the whole winter, without appeal.

I trust, Sir, that the present lamentable state of the streets of London will call for an immediate examination into the facts ; and that the public will soon enjoy the advantages resulting from the ingenuity and labours of

A CITIZEN.

December, 1824.

Up to this period the whole labour and expence had been borne by Mr. Williams, whose other avocations required the best of his attention. In the expectation of success, he laboured unceasingly, until the validity of his views was publicly acknowledged; *and independent of any subscriptions*, which he declined receiving until the money should be wanted, he carried the point at his own cost and charges.

It was not, however, to be expected that, after continuing above two years without a return of his capital, the advance of further sums would be continued *ad infinitum*. The attention he had given to Sub-ways produced great impediments to his regular engagements in business; and, in common prudence, as a family man, it became necessary to transfer the whole to persons of leisure and unemployed capital: he therefore decided to put the Patent up for sale on the following terms, at Garraway's Coffee House.

PATENT COMPANIES.

ADVANTAGES OF SUB-WAYS.

Previous to submitting the conditions to the public for the grant of an exclusive licence from the Patentee to build Sub-ways, to receive water and gas pipes, &c., it is necessary to point out to the capitalist, and to the promoters of

public improvements, the following striking advantages this Patent possesses.

1stly. In the first place.—The income will be certain, as it will be paid by the Water and Gas Companies, and other public Bodies.

2dly. The income will be returnable immediately after the Sub-ways are built, which may be finished in a few months.

3dly. They will not require an annual expence of any consequence to produce the income.

4thly. There will be no ground to purchase, nor houses to pull down, as the streets are public property.

5thly. It will be to the advantage of the Water and Gas Companies to use the Sub-ways, because the pipes may be covered with tar, so as to make them last considerably longer.

Note.—The iron pipes now in the ground, some of which have been there many years, will corrode and decompose in 45 years.

6thly. Sub-ways will be to the advantage of the public, as the ground will not be opened, and the streets stopped up, for water and gas pipes, and other purposes; the centre of the streets will be stronger to support the paving, and will materially assist the modern plan of Mr. M^cAdam.

7thly. In Sub-ways, the present description of water and gas pipes may be altogether superseded, by substituting tubes of equal proof with iron, to be built at the bottom and round the inside of the Sub-ways.

8thly. No capital can be called for until the Act of Parliament is obtained for forming Subways.

9thly. Subways will not interfere with, nor disturb any vested rights or private property; no houses, lands, gardens, or the livelihood of any one will be injured; but, on the contrary, they will essentially contribute to the social comfort of all ranks in society.

Lastly. Subways will be peculiar to this Country, as no other possesses them for this purpose; they will be decidedly unique, and altogether worthy of the metropolis of the British empire.

Particulars of the Districts for the establishment of five public Companies, which will be licensed distinctly and separately by the Patentee, for forming Subways, to receive Water and Gas Pipes.

LOT I.—THE WEST LONDON SUB-WAY COMPANY

Will include the Parishes of Saint Clement Danes, St. Mary-le-Strand, St. Martin's in the Fields, St. James's, Westminster; St. Ann's, Westminster; St. Margaret's, St. John's, St. George's, Hanover Square; Marylebone, Paddington, Chelsea; St. George's, Bloomsbury; St. Giles's, St. Pancras, and all the other Parishes West of the City of London, in the County of Middlesex.

LOT II.—NORTH LONDON SUB-WAY COMPANY

Includes the City of London, St. Giles's, Cripplegate; Clerkenwell, Islington, St. Luke's, Old-street; Bishopsgate, Shoreditch, and all the other Parishes North of the City of London, in the County of Middlesex.

LOT III.—EAST LONDON SUB-WAY COMPANY

Includes Spitalfields, Whitechapel, Trinity, in the Minories; St. Catharine's, St. John's, Wapping; St. George's in the East, Shadwell, Limehouse, Poplar, Blackwall, and all other Parishes East of the City of London, in the County of Middlesex.

LOT IV.—SOUTH LONDON SUB-WAY COMPANY

Includes the Borough of Southwark, Christchurch, Surrey; Lambeth, Bermondsey, Rotherhithe, Deptford, Greenwich, Peckham, and Camberwell; together with all other Parishes and places within the extremity of the aforesaid Parishes in the Counties of Surrey and Kent.

LOT V.—THE PROVINCIAL SUB-WAY COMPANY

Will comprehend the whole of the Counties in England and Wales, with the exception of Middlesex, and those Parishes in Surrey and Kent included in the South London Sub-way Company.

*Which will be sold by Auction, by Messrs. Burrell & Son,
at Garraway's, on February 10th, 1825, at 12 o'clock.*

CONDITIONS OF SALE.

1. The highest bidder for each of the five districts, as stated in these particulars, shall be entitled to the sole licence from the Patentee to form Sub-ways therein respectively, upon the plan, and to the full extent of his specification.

2. That no less than £10 shall be advanced at each bidding.

3. That the Patentee reserves a right to become a perpetual Director in each of the five Sub-way Companies, and have equal advantages with the other Directors, without advancing any capital.

4. That the Patentee, having had the full and undisturbed possession, right, and privilege of his patent, which was granted to him by His present Majesty in October, 1822, and has continued unquestioned and undiminished to this day, will grant his sole licence, right, and enjoyment of the same; to the highest bidder for each district, in the same manner and full extent as though he continued to possess it himself; the licence being to that effect and purpose, that he shall not be answerable or accountable for any question respecting it, so as to invalidate this Sale.

5. That the auction duty be paid in equal moieties by the Patentee and the purchaser.

6. That a deposit of 25 per cent. shall be paid to the auctioneers at the time of sale, and the remainder on the granting of the licence, which shall be completed on or before the 25th of March next, and be prepared at the expence of the purchaser, by Mr. Chapman Barber, of Chancery Lane, Solicitor to the Patentee.

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A remarkable period in British history commenced some time after Sub-ways came forward. In consequence of the abundance of capital in the kingdom, and the want of adequate employment for it, projects were presented daily, if not hourly in the City, for both of these purposes. Some of them were highly laudable, and gave activity to thousands; while many, on the contrary, were suggested in fraud, for foreign purposes, and produced great distress and ruin.

At the period of the sale, numerous endeavours were made among the Brokers and others at the Stock Exchange, to bring forward Sub-ways with the view of speculating in the shares; but the object having nothing speculative in it, they could not succeed: not one share ever appeared in the market—none were allowed to be issued, although they were printed and stamped ready for circulation, so that no bubble ever connected itself with this important work.

The immense quantity of these projects soon

overwhelmed Sub-ways. They were lost, and literally buried under a mass of evanescent matter, which, when cleared away at some future period, after the fever of speculative intoxication shall have subsided, will again appear like a mine of gold, for sober and enlightened construction.

A list of these projects has been published, which is apparently correct. From the number of them, and the immense capital they required, some idea may be formed of the interest they excited at that moment. Several came out at premiums of from £5 to £50 per share, by which the projectors pocketed large sums of money, and the Stock Exchange market was glutted with them. It is, however, proper to observe, that many of these plans have since been undertaken, and are now in progress or complete ; they have become ornaments to the metropolis, and profitable to the proprietors ; consequently these valuable works should not be classed among the number of Bubbles.

It is also worthy of remark that His Majesty's Ministers decidedly encouraged subscription Companies ; and some, if not the whole of them, took shares in many of those public undertakings.

From all these circumstances, it was decidedly a prudent measure to let the subject rest until a favourable opportunity presented itself.

The following is the list referred to.

*Schemes and Bubbles projected during the late Mania.*

It has been attempted to collect an accurate List of the recent Schemes and Bubbles, distinguishing those extinct, expiring, and others declared convalescent, from the commencement of the Mania, with their Projectors, Capital required, number of Shares, and other particulars: the result has proved the undertaking impossible, from the obscurity in which many are involved, and the ephemeral duration of others. The first of the following Tables of those which appeared at the commencement, and during the heat of the Projects for the absorption of Capital, is, however, presumed to be generally correct, and sufficient to shew the rage that prevailed for wild speculation.

## No. I.

| <i>Loans, Mines, Canals, Docks, Bridges, Rail Roads, Steam Navigation, Fire, Water, Gas, Assurance, Building, Bath, Provisions, &amp;c. Companies.</i> | <i>Capital.</i> | <i>No. of Shares.</i> | <i>Reported Projector, Contractor, Director, Banker, or Solicitor.</i> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|------------------------------------------------------------------------|
| 1824.—JANUARY.                                                                                                                                         |                 |                       |                                                                        |
| Australian Loan .....                                                                                                                                  | 3200000         |                       | Baring & Co. and others.                                               |
| Portuguese ditto, 76 per cent. 1824 .....                                                                                                              | 1500000         |                       | L. A. Goldschmidt, Esq.                                                |
| Mexican ditto .....                                                                                                                                    | 3200000         |                       | Ditto                                                                  |
| FEBRUARY.                                                                                                                                              |                 |                       |                                                                        |
| Anglo Mexican Mining Association .....                                                                                                                 | 1000000         | 10000                 | Masterman & Co.                                                        |
| United Empire and Continental Life.....                                                                                                                | 4000000         | 4000                  |                                                                        |
| Greek Loan .....                                                                                                                                       | 1800000         |                       | Loughnan & Co.                                                         |
| General and United Kingdom Gas.....                                                                                                                    | 1000000         | 20000                 | W. K. Porter, Esq.                                                     |
| Thames Tunnel .....                                                                                                                                    | 200000          | 2000                  | W. Smith, Esq. M. P.                                                   |
| Hammersmith Bridge .....                                                                                                                               | 160000          | 1600                  | Thomas Neill, Esq.                                                     |
| MARCH.                                                                                                                                                 |                 |                       |                                                                        |
| St. Catherine Dock.....                                                                                                                                | 1500000         | 15000                 | Thomas Tooke, Esq.                                                     |
| Alliance British and Foreign Fire and Life .....                                                                                                       | 5000000         | 50000                 | N. M. Rothschild, Esq.                                                 |
| Storn and Sandwich Navigation.....                                                                                                                     | 80000           | 3200                  | W. M. Pettman, Esq.                                                    |
| London Sub-way.....                                                                                                                                    | 100000          | 1000                  | John Williams, Esq.                                                    |
| APRIL.                                                                                                                                                 |                 |                       |                                                                        |
| Equitable Loan .....                                                                                                                                   | 2000000         | 40000                 | Sir William Congreve, M. P.                                            |
| Colombian ditto .....                                                                                                                                  | 4750000         |                       | L. A. Goldschmidt, Esq.                                                |
| Irish Equitable ditto .....                                                                                                                            | 1000000         | 20000                 | E. Ellice, Esq. M. P.                                                  |
| Metropolitan Loan and Investment .....                                                                                                                 | 1000000         | 10000                 | Sir T. B. Lennard, M. P.                                               |
| Palladium Fire and Life .....                                                                                                                          | 2000000         | 40000                 | Sir E. H. East, M. P.                                                  |
| Australian Agricultural .....                                                                                                                          | 1000000         | 10000                 | John Smith, Esq. M. P.                                                 |
| British Annuity .....                                                                                                                                  | 3000000         | 60000                 | Peter Moore, Esq. M. P.                                                |
| Thames and Isis .....                                                                                                                                  | 120000          | 1200                  |                                                                        |
| Table Ale and Beer .....                                                                                                                               | 200000          | 2000                  |                                                                        |
| St. Catherine Suspension .....                                                                                                                         | 400000          | 4000                  | Earl Morley                                                            |
| West India Company.....                                                                                                                                | 4000000         |                       | Wm. Manning, Esq. M. P.                                                |
| Manchester and Salford Equitable Loan .....                                                                                                            | 500000          | 10000                 |                                                                        |
| MAY.                                                                                                                                                   |                 |                       |                                                                        |
| Peruvian Loan, 60 per cent.....                                                                                                                        | 1200000         |                       | Thomas Kinder, Esq.                                                    |
| South London Dock .....                                                                                                                                | 750000          | 7500                  | T. S. Benson, Esq.                                                     |
| Brazil Loan .....                                                                                                                                      | 1000000         |                       | Bazett & Co. and others.                                               |
| Indemnity Mutual Marine .....                                                                                                                          | 5000000         | 50000                 | Thomas Wilson, Esq. M. P.                                              |
| Protector Life Assurance .....                                                                                                                         | 3000000         | 120000                | Marquis of Lansdown                                                    |
| Berkshire and Provincial Fire and Life .....                                                                                                           | 500000          | 10000                 | Earl Craven                                                            |
| JUNE.                                                                                                                                                  |                 |                       |                                                                        |
| Bristol Channel Ship Canal .....                                                                                                                       | 1750700         | 17500                 | Sir T. Lethbridge, M. P.                                               |
| Asylum Life Assurance.....                                                                                                                             | 240000          | 4800                  | Sir J. Macintosh, M. P.                                                |
| London and Westminster Oil Gas .....                                                                                                                   | 300000          | 6000                  | S. M'Gillivray, Esq.                                                   |
| London Patent Steam Washing .....                                                                                                                      | 40000           |                       | J. Tyrrell, Esq.                                                       |



| <i>Loans, Mines, Canals, Docks, Bridges, Rail Roads, Steam Navigation, Fire, Water, Gas, Assurance, Building, Bath, Provisions, &amp;c. Companies.</i> | <i>Capital.</i> | <i>No. of Shares.</i> | <i>Reported Projector, Contractor, Director, Banker, or Solicitor.</i> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|------------------------------------------------------------------------|
| <b>JULY.</b>                                                                                                                                           |                 |                       |                                                                        |
| General Steam Navigation .....                                                                                                                         | 200000          | 20000                 | M. Attwood, Esq. M. P.                                                 |
| Hibernian Mining .....                                                                                                                                 | 500000          | 10000                 | Marquis Downshire                                                      |
| Buenos Ayres Loan .....                                                                                                                                | 1000000         |                       | Baring & Co.                                                           |
| Economic Life Assurance .....                                                                                                                          | 200000          | 4000                  | Sir J. Mackintosh, M. P.                                               |
| Yorkshire Fire and Life ditto .....                                                                                                                    | 500000          | 10000                 | Archbishop of York                                                     |
| Gas Engine Carriage .....                                                                                                                              | 200000          | 2000                  | George Palmer, Esq.                                                    |
| Real Del Monte Mining .....                                                                                                                            | 200000          | 500                   | Fry & Co. and others                                                   |
| Canada Company .....                                                                                                                                   | 1000000         | 10000                 | S. M'Gillivray, Esq.                                                   |
| British Gas .....                                                                                                                                      | 400000          | 8000                  |                                                                        |
| <b>AUGUST.</b>                                                                                                                                         |                 |                       |                                                                        |
| Medical, Clerical, and General Life .....                                                                                                              | 1000000         | 20000                 | A. A. Mievill, Esq.                                                    |
| Hibernian Gas .....                                                                                                                                    | 100000          | 2000                  |                                                                        |
| London Portable ditto .....                                                                                                                            | 250000          | 2500                  | J. R. Ward, Esq.                                                       |
| New Imperial ditto .....                                                                                                                               | 250000          | 5000                  |                                                                        |
| Irish Provincial Banking .....                                                                                                                         | 2000000         | 20000                 | M. Attwood, Esq. M. P.                                                 |
| Birmingham and Staffordshire Gas .....                                                                                                                 | 120000          | 2400                  |                                                                        |
| Kensington Canal .....                                                                                                                                 | 200000          | 2000                  | Regent's Canal                                                         |
| Metropolitan Marine Bath .....                                                                                                                         | 500000          | 10000                 | W. Holmes, Esq. M. P.                                                  |
| Royal National ditto .....                                                                                                                             | 250000          | 5000                  | Sir Walter Stirling, M. P.                                             |
| <b>SEPTEMBER.</b>                                                                                                                                      |                 |                       |                                                                        |
| Phoenix Gas .....                                                                                                                                      | 450000          | 9000                  | Christ Smith, Esq. M. P.                                               |
| Metropolitan Water Works .....                                                                                                                         | 500000          | 10000                 | J. Allnut, Esq.                                                        |
| Thames New ditto .....                                                                                                                                 | 1000000         | 20000                 |                                                                        |
| Neapolitan Loan .....                                                                                                                                  | 2500000         |                       | N. M. Rothschild, Esq.                                                 |
| Independent Gas .....                                                                                                                                  | 50000           | 2000                  |                                                                        |
| <b>OCTOBER.</b>                                                                                                                                        |                 |                       |                                                                        |
| Thames Water Company .....                                                                                                                             | 750000          | 7500                  | Sir Edward Banks                                                       |
| Stroud and Severn Rail Road .....                                                                                                                      | 50000           | 1000                  | J. H. Pelly, Esq.                                                      |
| St. Patrick's Marine Insurance .....                                                                                                                   | 2000000         | 20000                 | J. Birch, Esq.                                                         |
| Colombian Pearl Fishery .....                                                                                                                          | 625000          | 25000                 | E. W. Rundell, Esq.                                                    |
| <b>NOVEMBER.</b>                                                                                                                                       |                 |                       |                                                                        |
| Greenwich and Poplar Tunnel .....                                                                                                                      | 300000          | 6000                  |                                                                        |
| Surrey Docks .....                                                                                                                                     | 800000          | 8000                  |                                                                        |
| River Lea Water Works .....                                                                                                                            | 400000          | 8000                  |                                                                        |
| Isle of Dogs Collier Docks .....                                                                                                                       | 800000          | 8000                  | Duke of Rutland                                                        |
| Thames Quay .....                                                                                                                                      | 611000          | 6110                  |                                                                        |
| Edinburgh Joint Stock and Pawnbroking .....                                                                                                            | 300000          | 6000                  |                                                                        |
| Ditto Distillery Company .....                                                                                                                         | 200000          | 4000                  |                                                                        |
| Alliance Marine Assurance .....                                                                                                                        | 5000000         | 50000                 | N. M. Rothschild, Esq.                                                 |
| Mexican Loan .....                                                                                                                                     | 3200000         |                       | Barelay, Herring & Co.                                                 |
| Junction Canal, Kennet to Basingstoke .....                                                                                                            | 100000          | 2000                  | J. R. Birnie, Esq.                                                     |
| Liverpool and Manchester Rail Road .....                                                                                                               | 700000          | 7000                  | Charles Lawrence, Esq.                                                 |
| Provincial Portable Gas .....                                                                                                                          | 1000000         | 10000                 | J. R. Ward, Esq.                                                       |
| Landed Property Company .....                                                                                                                          | 3000000         | 30000                 |                                                                        |
| Worcester and Gloucester Union Canal .....                                                                                                             | 200000          | 2000                  |                                                                        |
| Bridgewater and Taunton ditto .....                                                                                                                    | 200000          |                       |                                                                        |
| Continental Gas .....                                                                                                                                  | 2000000         | 20000                 | Sir William Congreve, M. P.                                            |
| <b>DECEMBER.</b>                                                                                                                                       |                 |                       |                                                                        |
| Imperial Brazilian Mines .....                                                                                                                         | 1000000         | 10000                 | E. Oxenford, Esq.                                                      |
| Colombian ditto .....                                                                                                                                  | 1000000         | 10000                 | Herring & Co.                                                          |
| Paseo Peruvian ditto .....                                                                                                                             | 1000000         | 10000                 | F. Kinder, Esq.                                                        |
| Leeds and Selby Rail Road .....                                                                                                                        | 300000          | 3000                  |                                                                        |
| Kentish ditto .....                                                                                                                                    | 1000000         | 10000                 | Sir J. Cockburn, M. P.                                                 |
| Edinburgh Albyn Company .....                                                                                                                          | 200000          | 2000                  |                                                                        |
| Ditto Dairy ditto .....                                                                                                                                | 25000           | 1000                  |                                                                        |
| Manchester Van ditto .....                                                                                                                             | 40000           | 400                   | R. Cunliffe, Esq.                                                      |
| Birmingham and Liverpool Rail Road .....                                                                                                               | 1000000         | 10000                 | R. Smith, Esq.                                                         |
| Bristol Northern and Western ditto .....                                                                                                               | 800000          | 16000                 | T. Hassell, Esq.                                                       |
| Bristol and London ditto .....                                                                                                                         | 1500000         | 15000                 | Thomas Wilson, Esq. M. P.                                              |
| London and Birmingham ditto .....                                                                                                                      | 1500000         | 15000                 | M. Attwood, Esq. M. P.                                                 |
| London and Northern ditto .....                                                                                                                        | 2500000         | 25000                 | George Hibbert, Esq. M. P.                                             |
| Norfolk, Suffolk, and Essex ditto .....                                                                                                                | 1000000         | 10000                 | Lord Teynham                                                           |
| Metropolitan Alderney Dairy .....                                                                                                                      | 150000          | 6000                  | Sir J. Perring                                                         |
| London and South Wales Rail Road .....                                                                                                                 | 1000000         | 10000                 | Alderman Thompson, M. P.                                               |



| <i>Loans, Mines, Canals, Docks, Bridges, Rail Roads, Steam Navigation, Fire, Water, Gas, Assurance, Building, Bath, Provisions, &amp;c. Companies.</i> | <i>Capital.</i> | <i>No. of Shares.</i> | <i>Reported Projector, Contractor, Director, Banker, or Solicitor.</i> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|------------------------------------------------------------------------|
| <b>1825.—JANUARY.</b>                                                                                                                                  |                 |                       |                                                                        |
| Manchester and Bolton Rail Road.....                                                                                                                   | 80000           | 1000                  | J. R. Watkins, Esq.                                                    |
| Bristol and Bath ditto .....                                                                                                                           | 112500          | 4500                  | — Gardiner, Esq.                                                       |
| Arigna Iron and Coal Mining Company .....                                                                                                              | 300000          | 6000                  | Marquis Conyngham                                                      |
| British Mining Association .....                                                                                                                       | 400000          | 8000                  | Ogle & Co.                                                             |
| Chilian ditto .....                                                                                                                                    | 1000000         | 10000                 | M. D. Egana                                                            |
| London, Portsmouth, and Southampton Dock and Rail Road .....                                                                                           | 1000000         | 20000                 | Sir J. Perring & Co.                                                   |
| Limerick and Waterford ditto.....                                                                                                                      | 300000          | 6000                  | Elmes & Co.                                                            |
| Metropolitan Flour and Bread.....                                                                                                                      | 200000          | 4000                  | Bourdillon & Hewitt                                                    |
| Bermondsey Dock .....                                                                                                                                  | 800000          | 8000                  | J. M. Bonnel, Esq.                                                     |
| United British and Foreign Loan .....                                                                                                                  | 2500000         | 25000                 | W. G. Bolton, Esq.                                                     |
| Protector Life Assurance .....                                                                                                                         | 5000000         | 100000                | J. Brogdon, Esq. M. P.                                                 |
| London and Portsmouth Grand Ship Canal ...                                                                                                             | 5000000         | 50000                 | Elmes & Co.                                                            |
| Equitable Mining .....                                                                                                                                 | 200000          | 4000                  | G. W. Newton, Esq.                                                     |
| Anglo Chilian ditto.....                                                                                                                               | 1500000         | 15000                 | W. Ward, Esq.                                                          |
| General Benefit Assurance .....                                                                                                                        | 100000          | 2000                  | W. H. Medhurst, Esq.                                                   |
| Crown Life Assurance .....                                                                                                                             | 1500000         | 30000                 | W. P. Litt, Esq. and others.                                           |
| Gold Coast Association .....                                                                                                                           | 750000          | 7500                  | S. Samuel, Esq.                                                        |
| Sea and Inland Coal .....                                                                                                                              | 500000          | 10000                 | Maugham & Co.                                                          |
| Grand Western Rail Road .....                                                                                                                          | 3000000         | 30000                 | Lord Teynham                                                           |
| Great Westminster Dairy .....                                                                                                                          | 200000          | 8000                  | F. Booth, Esq.                                                         |
| Tlalpujahua Mining Company .....                                                                                                                       | 200000          | 500                   | J. Smith, Esq. M. P.                                                   |
| Bolanos ditto .....                                                                                                                                    | 200000          | 500                   | Fry & Co.                                                              |
| Crown ditto .....                                                                                                                                      | 1000000         | 10000                 | N. M. Rothschild, Esq.                                                 |
| General United Coal .....                                                                                                                              | 1000000         | 10000                 | M. Spencer, Esq.                                                       |
| Feversham Navigation .....                                                                                                                             | 33000           | 1320                  | T. Barnes, Esq.                                                        |
| East London and United Docks Rail Road.....                                                                                                            | 100000          | 4000                  | R. Armstrong, Esq.                                                     |
| British Patent Brick .....                                                                                                                             | 300000          | 6000                  | Thomas Wilson, Esq. M. P.                                              |
| Saint Ives Pier .....                                                                                                                                  | 30000           | 1200                  | Halse and Hickens                                                      |
| Grand Junction Rail Road .....                                                                                                                         | 2000000         | 40000                 | J. Walker, Esq. M. P.                                                  |
| British Paving, Building, and Investment .....                                                                                                         | 2000000         | 20000                 | — Fuller, Esq.                                                         |
| Metropolitan Investment .....                                                                                                                          | 2000000         | 80000                 | J. Brickwood, Esq.                                                     |
| South American and Colonial Gas .....                                                                                                                  | 1000000         | 20000                 | C. Ogilby, Esq.                                                        |
| Manchester and Leeds Rail Road .....                                                                                                                   | 500000          | 5000                  | T. Holdsworth, Esq. M. P.                                              |
| Surrey, Sussex, Hants, and Somerset ditto.....                                                                                                         | 1500000         | 15000                 | T. R. Kemp, Esq. M. P.                                                 |
| Westminster Fish .....                                                                                                                                 | 100000          | 2000                  | Sir Peter Pole.                                                        |
| South London Milk .....                                                                                                                                | 100000          | 4000                  | F. A. Bell, Esq.                                                       |
| English Mining .....                                                                                                                                   | 250000          | 10000                 | Martin & Co.                                                           |
| Equitable Investment.....                                                                                                                              | 500000          | 5000                  | Stevenson and Salt                                                     |
| Investment Bank .....                                                                                                                                  | 200000          | 4000                  | Sir J. Perring                                                         |
| Royal Hibernian General Rail Road.....                                                                                                                 | 1000000         | 10000                 | Rogers & Co.                                                           |
| London Brick .....                                                                                                                                     | 500000          | 10000                 | Edmonds and Wolfe                                                      |
| British Fishing.....                                                                                                                                   | 1000000         | 20000                 | Amory and Coles.                                                       |
| New Corn Exchange.....                                                                                                                                 | 200000          | 4000                  | Tilson and Preston                                                     |
| London, Brighton, and Devon Fishing and Steam Navigation .....                                                                                         | 500000          | 10000                 | W. Williams, Esq. M. P.                                                |
| Promoter Benefit Society .....                                                                                                                         | 60000           | 6000                  | Perring & Co.                                                          |
| Welch Iron and Coal Mining .....                                                                                                                       | 250000          | 5000                  | Peter Moore, Esq. M. P.                                                |
| Metropolitan Fish .....                                                                                                                                | 300000          | 12000                 | Lord George Seymour                                                    |
| South Wales Mining .....                                                                                                                               | 2000000         | 20000                 | Coutts & Co.                                                           |
| Bognor New Town Company.....                                                                                                                           | 300000          | 3000                  | J. Calcraft, Esq. M. P.                                                |
| British Iron .....                                                                                                                                     | 2000000         | 20000                 | J. Burton, Esq.                                                        |
| Kent and Essex Genuine Flour .....                                                                                                                     | 210000          | 7000                  | Perring & Co.                                                          |
| Irish Investment and Equitable Loan .....                                                                                                              | 500000          | 10000                 | T. S. Rice, Esq. M. P.                                                 |
| Hibernian General Rail Road .....                                                                                                                      | 1000000         | 20000                 | W. H. Trant, Esq. M. P.                                                |
| Hibernian Joint Stock Banking Company .....                                                                                                            | 1000000         | 20000                 | W. Murphy, Esq.                                                        |
| Brazilian Mining .....                                                                                                                                 | 2000000         | 20000                 | J. Irving, Esq. M. P.                                                  |
| Jamaica Oil Gas .....                                                                                                                                  | 250000          | 5000                  | R. Wadson, Esq.                                                        |
| British Shipping Loan .....                                                                                                                            | 1000000         | 10000                 | J. Norton, Esq.                                                        |
| Metropolitan Banking .....                                                                                                                             | 500000          | 10000                 |                                                                        |
| South American General Mining .....                                                                                                                    | 2000000         | 20000                 | E. W. Rundell, Esq.                                                    |
| Rio de la Plata ditto .....                                                                                                                            | 1000000         | 10000                 | Hullett & Co.                                                          |
| East London Dairy.....                                                                                                                                 | 125000          | 5000                  |                                                                        |
| General Coal Company .....                                                                                                                             | 500000          | 10000                 |                                                                        |
| General Journal ditto.....                                                                                                                             | 100000          | 2000                  |                                                                        |
| 15 Months' Payment on French Loan, 1823; 11,700,000 Rentes, half made good by English money .....                                                      | 4500000         |                       |                                                                        |
| United Mexican Mining .....                                                                                                                            | 1000000         | 10000                 | Hullett & Co.                                                          |
| Irish Shipping .....                                                                                                                                   | 300000          | 6000                  | L. Alexander, Esq.                                                     |
| No. 160 Schemes, amounting to.....£                                                                                                                    | 160962200       | 1943330               | Shares.                                                                |

## ABSTRACT OF THE ABOVE LIST.

|                                                                                             | Capital.   | Amt. paid. |
|---------------------------------------------------------------------------------------------|------------|------------|
| Mining Companies in Great Britain and Ireland .....                                         | 10400000   | £520000    |
| South American Mining Companies .....                                                       | 14475000   | 1447500    |
| Foreign Loans ... ..                                                                        | 26950000   | 19000000   |
| Rail Roads.....                                                                             | 21942500   | 219425     |
| Canals, Docks, Tunnels, Bridges .....                                                       | 14134000   | 282680     |
| Fire and Life Assurance Companies .....                                                     | 32040700   | 2242800    |
| Water Works .....                                                                           | 2650000    | 26500      |
| Gas Companies.....                                                                          | 7370000    | 737000     |
| Loan, Pawnbroking, Investment, Annuity, and Banking Companies                               | 22160000   | 2216000    |
| Colonial Companies.....                                                                     | 2000000    | 200000     |
| Steam Navigation, Building, and Bath Companies .....                                        | 3680000    | 368000     |
| Provision, Milk, Flour .....                                                                | 3160000    | 158000     |
|                                                                                             | £160962200 | £27417905  |
| Amount paid up .....                                                                        | £27417905  |            |
| Balance of the Foreign Loan Account; the Loans have<br>been taken below par.....            | 7950000    |            |
| Balance of Fire and Life Assurance Companies, the<br>whole Capital not being required ..... | 28836000   |            |
|                                                                                             | £64203905  | £64203905  |
| Sums remaining to be paid up, January, 1825 .....                                           | £96758295  |            |

## No. II.

## SCHEMES

Not included in the preceding List, on which Payments have been made to the Year 1825.

| Per Cent.    | £               |                                         | £       |
|--------------|-----------------|-----------------------------------------|---------|
| 75           | on ... 2000000  | Brazilian Loan of 1825 .....            | 1500000 |
| 75           | " " ... 3500000 | Danish ditto .....                      | 2625000 |
| 25           | " " ... 1428571 | Guatemala ditto .....                   | 357143  |
| 60           | " " ... 400000  | Gaudalaja ditto .....                   | 240400  |
| £ Per Share. | Shares.         | COMPANIES.                              | 4722143 |
| 3            | " " ... 10000   | Bolivar .....                           | 30000   |
| 5            | " " ... 10000   | Castello .....                          | 50000   |
| 2            | " " ... 2500    | Cobalt and Copper .....                 | 5000    |
| 5            | " " ... 10000   | Chili and Peru .....                    | 50000   |
| 15           | " " ... 10000   | Cornwall and Devonshire .....           | 150000  |
| 2            | " " ... 2500    | Consolidated Copper .....               | 5000    |
| 12½          | " " ... 1000    | Famatina .....                          | 12500   |
| 5            | " " ... 20000   | General Mining .....                    | 100000  |
| 3            | " " ... 1800    | Gwenappe .....                          | 5400    |
| 5            | " " ... 10000   | Haytian .....                           | 50000   |
| 3            | " " ... 5000    | Hoomeavy .....                          | 15000   |
| 7½           | " " ... 10000   | London United .....                     | 75000   |
| 2            | " " ... 2000    | Manganese .....                         | 4000    |
| 5            | " " ... 20000   | Potosi .....                            | 100000  |
| 1            | " " ... 3000    | Polbreen Tin and Copper .....           | 3000    |
| 3½           | " " ... 16000   | Royal Irish .....                       | 56000   |
| 5            | " " ... 8000    | Royal Stannary .....                    | 40000   |
| 1            | " " ... 5000    | Waldeck .....                           | 5000    |
| 3            | " " ... 10000   | Scottish National Mining .....          | 30000   |
| 3            | " " ... 10000   | Tywarnhale .....                        | 30000   |
| 10           | " " ... 500     | Tarma .....                             | 5000    |
| 10           | " " ... 6000    | United Mexican Mines .....              | 60000   |
| 10           | " " ... 18000   | Ditto (New) .....                       | 180000  |
| 10           | " " ... 10000   | Welch Slate, Copper, and Lead .....     | 100000  |
| 5            | " " ... 10000   | International Gas .....                 | 50000   |
| 5            | " " ... 10000   | Angola Mexican Mint .....               | 50000   |
| 10           | " " ... 6000    | American and Colonial Steam .....       | 60000   |
| 10           | " " ... 10000   | Atlantic and Pacific .....              | 100000  |
| 2            | " " ... 5000    | Egyptian Trading .....                  | 10000   |
| 6            | " " ... 50000   | British Rock, and Patent Salt .....     | 30000   |
| 3            | " " ... 10000   | British and Foreign Paper .....         | 30000   |
| 2            | " " ... 20000   | British, Irish, and Colonial Silk ..... | 40000   |
| 5            | " " ... 5000    | Steam and Packet Navigation .....       | 25000   |
| 5            | " " ... 20000   | British and Foreign Timber .....        | 100000  |
| 5            | " " ... 20000   | British Chunam, and Roman Cement .....  | 5000    |
| 1            | " " ... 5000    | Canal Gas Engine .....                  | 5000    |
| 5            | " " ... 13000   | Colombian Agricultural .....            | 60000   |
| 10           | " " ... 1000    | Canada and Nova Scotia .....            | 10000   |

| £ Per Share.                      | Shares. | COMPANIES.                                     | £        |
|-----------------------------------|---------|------------------------------------------------|----------|
| 2                                 | 4000    | Devon Haytor Granite.....                      | 8000     |
| 10                                | 5000    | Droitwich Patent Salt .....                    | 50000    |
| 2                                 | 1000    | Elbe and Weser Steam.....                      | 2000     |
| 2                                 | 5000    | East London Drug .....                         | 10000    |
| 2                                 | 2000    | French Brandy .....                            | 4000     |
| 2                                 | 20000   | Guernsey and Jersey Steam.....                 | 40000    |
| 3                                 | 3500    | Ground Rent .....                              | 10500    |
| 5                                 | 10000   | Honduras .....                                 | 50000    |
| 1                                 | 20000   | Irish Manufactory .....                        | 20000    |
| 2                                 | 2000    | Imperial Plate Glass .....                     | 4000     |
| 10                                | 12000   | Imperial Distillery.....                       | 120000   |
| 2                                 | 5000    | Imperial Estate .....                          | 10000    |
| 1                                 | 1000    | London and Gibraltar Steam.....                | 1000     |
| 2                                 | 1000    | London Window Glass .....                      | 2000     |
| 1                                 | 1000    | Lower Rhine Steam .....                        | 1000     |
| 1                                 | 5000    | London Drug .....                              | 5000     |
| 1                                 | 4000    | London Smelting .....                          | 4000     |
| 2                                 | 1000    | London and Portsmouth Steam .....              | 2000     |
| 2                                 | 2000    | London and Gravesend ditto .....               | 4000     |
| 10                                | 10000   | Mexican Company .....                          | 100000   |
| 10                                | 2000    | Medway Lime and Coke .....                     | 20000    |
| 2½                                | 7500    | Netherlands Patent Salt .....                  | 18750    |
| 2                                 | 5000    | New Brighton.....                              | 10000    |
| 1                                 | 10000   | National Drug and Chemical.....                | 10000    |
| 5                                 | 4000    | Pacific Pearl Fishery.....                     | 20000    |
| 4                                 | 15000   | Pearl and Coral Fishery .....                  | 60000    |
| 10                                | 20000   | Provincial Banks .....                         | 200000   |
| 15                                | 6000    | Patent Distillery .....                        | 90000    |
| 10                                | 5000    | Rio de la Plata .....                          | 50000    |
| 2                                 | 3500    | Roman Brick and Tile.....                      | 7000     |
| 3                                 | 3500    | Scarlet Dye .....                              | 7500     |
| 1                                 | 4000    | Swedish Iron .....                             | 4000     |
| 3                                 | 3000    | Steam Engine Manufactory .....                 | 9000     |
| 2                                 | 2000    | Tobacco and Snuff .....                        | 4000     |
| 3                                 | 4000    | Thames and Medway Brick and Lime.....          | 12000    |
| 2                                 | 1500    | Thames and Rhine Steam .....                   | 3000     |
| 1                                 | 1000    | Thames and Loire ditto .....                   | 1000     |
| 5                                 | 20000   | United Pacific.....                            | 100000   |
| 5                                 | 10000   | United Chilian .....                           | 50000    |
| 1                                 | 10000   | United London and Hibernian Corn and Flour ... | 10000    |
| 5                                 | 1000    | Foreign Stock and Share Investment .....       | 5000     |
| 637800 Shares.....83 Schemes..... |         |                                                | £7596793 |

## No. III.

## LIST OF ONE HUNDRED SCHEMES,

*Not included in preceding Lists, which have been advertised, containing such whose progress is not known, with others, the amount of whose payments (if any) cannot be ascertained.*

|                                             |                                            |
|---------------------------------------------|--------------------------------------------|
| London University.                          | Peruvian Trading and Mining Association.   |
| Share Investment Company.                   | Metropolitan United Company for cleaning   |
| London Palais Royal Institution.            | Manchester Goods by Steam.                 |
| General Dying and Printing Company.         | British Lead Company.                      |
| East India Tea Company.                     | Imperial Swedish Iron Company.             |
| British and Foreign Tobacco, Snuff, and Se- | Savannah Company.                          |
| gar Manufacturing Company.                  | Irish Company for promoting Manufactures.  |
| Dorset and Somerset Canal and Rail Road     | London Paving Company.                     |
| Company.                                    | London Company for Sale of Horses and Car- |
| Imperial Tivoli Gardens Joint Stock Com-    | riages.                                    |
| pany.                                       | Battle Bridge and Holloway Road Improve-   |
| London Gold and Silver Refining and Plate   | ment Company.                              |
| Bullion Company.                            | National Stud Company.                     |
| Western Lead Company.                       | London and Boulogne Steam Packet Com-      |
| Demerara, Trinidad, and adjacent Islands    | pany.                                      |
| Steam Packet Company.                       | London Lime & Building Material Company.   |
| American Smelting Association.              | London, Madeira, and Cape of Good Hope     |
| American & Canary Island Steam Navigation.  | Company.                                   |
| Landlord and Tenant Life Assurance Society. | London and United States Steam Packet      |
| Cornish Union Mining Association.           | Company.                                   |
| South Devon Marine Fire and Life Assu-      | London Bread Company.                      |
| rance.                                      | London & Falmouth Steam Packet Company.    |
| British United Mines.                       | Lisbon and Brazil Steam ditto.             |
| Oil, Colour, Varnish, & Drysalting Company. | Imperial Mining Company.                   |
| United Kingdom Tea Agency Company.          | London, Falmouth, Bombay, Madras, and      |
| London and St. Petersburg Steam Packet      | Calcutta Steam Navigation.                 |
| Company.                                    | Royal Union Mining Association.            |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Alliance Granite and China Clay Company.<br/>London, Madeira, and Barbadoes Steam Packet Company.<br/>London, Portsmouth, Falmouth, and Jamaica ditto.<br/>London, Colombian, and Mexican ditto.<br/>National Brewery.<br/>London and Alexandria Steam and Trading Company.<br/>Hull and Hamburg Steam Packet Company.<br/>London, Portugal, and Madeira ditto.<br/>London, Weymouth, Exeter, and Plymouth ditto.<br/>London and Calais ditto.<br/>Timber and Wood ditto.<br/>General Stage Coach Company.<br/>London and Westminster General Improvement and Capital Investment Company.<br/>British Commercial Insurance Company.<br/>Reversionary and Loan Society.<br/>Isle of Dogs Collier Docks Company (Fortune's).<br/>Ditto (Rowland's).<br/>British Coast and Deep Sea Fishery, Sea and River Fishery Association.<br/>City of London General Street and Northern Improvement Company.<br/>British Estate and House Company.<br/>Biscaina and Moran Vein Mining Association.<br/>Patent Mosaic Gold Company.<br/>Foreign Wine Association.<br/>South American Gem Company.<br/>United Medical, Chemical, and Drug Company.<br/>Leasehold Estate Investment Company.<br/>British Stone and Slate Company.<br/>Borneo, Saloo, and Banca Company.<br/>Poultry Company.</p> | <p>Guernsey and Jersey Patent Ship Building Company.<br/>South American and Hibernian Manufacturing and Trading Association.<br/>British and Foreign Patent Association.<br/>Cattle Food Culture Association.<br/>London Water Company.<br/>Rent Redemption Company.<br/>London Cemetery.<br/>Surgeons' and Apothecaries' Drug Company, and Benevolent Medical Fund.<br/>British Tontine Building Association.<br/>London United Brick and Tile Company.<br/>New Zealand Trading Company.<br/>London Ale Company.<br/>Newcastle-upon-Tyne and Carlisle Rail Road.<br/>New Levant Free Trading Company.<br/>British Forest Planting Company.<br/>United Kingdom Estate Association.<br/>Cheshire Iron and Coal Company.<br/>British North American Ship Building Company.<br/>Society for the Prosecution and Encouragement of the Herring and Cod Fisheries in the deep Sea, and Coast of Ireland.<br/>General Burial Ground Company.<br/>Economic Funeral Society.<br/>British Invention and Discovery Company.<br/>London Short Stage Coach Company.<br/>Cotton Importing and Manufacturing Company.<br/>Licensed Victuallers' Rectifying and Distillery Company.<br/>India Steam Packet Company.<br/>Plymouth Public Baths Company.<br/>Irish Patriotic Assurance Company.<br/>London Pure Water Company.<br/>Irish Bogs Draining Company.</p> |
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SUMMARY.

|                                                                                                                                                                                                                                                                             |            |                                 |                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------|-----------------|
| Schemes in List 1.....                                                                                                                                                                                                                                                      | 160        | Shares in List 1 .....          | 1943330         |
| Ditto in List 2 .....                                                                                                                                                                                                                                                       | 83         | Ditto in List 2.....            | 637000          |
|                                                                                                                                                                                                                                                                             | <u>243</u> | Amount of Shares in 243 Schemes | <u>2580330</u>  |
| <br>                                                                                                                                                                                                                                                                        |            |                                 |                 |
| Total Amount of 243 Schemes, each averaged at one million, as appears in List 1, where 160 Schemes amount to more than as many millions; the actual amount of those in List 2 not being known, but the projects being of equal importance to those contained in List 1..... |            |                                 |                 |
|                                                                                                                                                                                                                                                                             |            |                                 | 243000000       |
| <i>Per Contra.</i>                                                                                                                                                                                                                                                          |            |                                 |                 |
| Paid as in List 1, to January, 1825 .....                                                                                                                                                                                                                                   |            | 27417905                        |                 |
| Admitting that 5 per cent. may have been paid since on the amount of List 1, 160962200, of which no proof appears .....                                                                                                                                                     |            | 8048110                         |                 |
| Paid as in List 2 .....                                                                                                                                                                                                                                                     |            | <u>7596793</u>                  |                 |
|                                                                                                                                                                                                                                                                             |            |                                 | <u>43062808</u> |
| Balance due on 243 Schemes at the close of 1825 .....                                                                                                                                                                                                                       |            |                                 | 199937192       |

From the above Tables it will be seen, that of 243 Schemes, which have been acted upon, a capital of Two Hundred and Forty-three Millions has been required; of which, admitting £43062808 to have been paid, leaves a balance of near Two Hundred Millions! In observing the One Hundred selected Schemes in List III, they will be found to be of equal importance to those of the two preceding Lists. Numerous other Schemes, to which equal publicity has not been given, are known to have been projected throughout the United Kingdom; and without exaggeration, it may be inferred, though it may astonish *Dupes and Directors*, that the Bubble Mania, carried into execution to its meditated extent, would have required, if it could have been procured, a capital of *Three Hundred and Fifty Millions Sterling!*



Having thus gone through the history of the *Origin and Progress* of Sub-ways in considerable detail, in order that the record of the patience, labour, and expence necessary to bring forward a work of this magnitude, may remain for the information of others; and before the introduction of the last portion of this volume, *viz.* the *Completion* of Sub-ways in London, it may be proper to bring to recollection a concise view of those useful works connected with Sub-ways, which now adorn the metropolis, and take a retrospect of their rise and progress. In their infancy they met with great opposition, the more so as they presented flattering prospects of utility and profit. That temper which stems and interrupts all new ideas—the obstinacy and perverseness of the human mind—annoyed them, although they have since overtopped their enemies, and are now flourishing establishments of great importance to the community.

The first in antiquity is the public Sewers—then the Paving, or Pitchings, in the Highways—the Water Companies—and Lighting the Streets, including the system of Mr. M<sup>c</sup>Adam for a Stone Surface on the Streets, in lieu of Carriage Paving.

These will each demand some consideration; and a succinct account of their history will suffice.

The public Sewers appear, from the famous and learned Robert Challis, who lectured upon them at Gray's Inn, in August, 1662, to have

been placed in the hands of Commissioners as early as the 9th year of the reign of Henry III.; and after several Acts to extend their powers, became consolidated in the 23d of Henry VIII., when almost absolute authority was granted to certain persons as Commissioners, in various districts of the kingdom, to construct and build sewers for drainage, and to levy rates or taxes for that purpose.

The powers of these Commissioners remain to this day, with very little abatement of their original unlimited authority. They can summon, examine, and even imprison without molestation, although this latter case is seldom or never enforced; and it is doubtful whether any of the Law Courts can interfere with the extraordinary power their Commission bestows. This will be proved by the following extracts from Robert Challis's valuable work.

*“ A General Act concerning Commissions of Sewers, to be directed in all parts within this Realm.*

“ Our Sovereign Lord the King, like a vertuous and most gracious Prince, nothing earthly so highly weying as the advancing of the common profit, wealth, and commodity of this his realm, considering the daily great damages and losses which have happened in many and divers parts of this his said realm, as well by the reason of the outragious flowing surges and course of the sea, in and upon marsh grounds and other low places heretofore through politick wisdom won, and made profitable for the great common-wealth of this realm, as also by occasion of land-waters and other outragious springs, in and upon meadows, pastures, and other low grounds adjoyning to



rivers, flouds, and other water-courses: and over that, by and through mills, mill-dams, weres, fishgarths, kedels, gores, gotes, floudgates, locks, and other impediments, in and upon the same rivers and other water-courses, to the inestimable damages of the common-wealth of this realm, which daily is likely more and more to encrease, unless speedy redress and remedy be in this behalf shortly provided; wherein albeit that divers and many provisions have been before this time made and ordained, yet none of them are sufficient remedy for reformation of the premisses:—hath therefore by deliberate advice and assent of his Lords Spiritual and Temporal, and also his loving Commons in this present Parliament assembled, ordained, established, and enacted, that Commissions of Sewers, and other the premisses, shall be directed in all parts within this realm from time to time, where and when need shall require, according to the manner, form, tenor, and effect hereafter ensuing, to such substantial and indifferent persons as shall be named by the Lord Chancellor and Lord Treasurer of England, and the two Chief Justices for the time being, or by three of them, whereof the Lord Chancellor to be one.

“ Henry the Eighth, &c.—Know ye, that forasmuch as the walls, ditches, banks, gutters, sewers, gotes, calcies, bridges, streams, and other defences by the coasts of the sea, and marsh ground being and lying within the limits of A, B, or C, in the County or Counties of                    or in the borders or confines of the same, by rage of the sea, flowing and reflowing, and by mean of the trenches of fresh waters descending and having course by divers ways to the sea, be so dirupt, lacerate, and broken; and also the common passages of ships, balengers, and boats in the rivers, streams, and other flouds within the limits of A, B, or C, in the County or Counties of                    or in the borders or confines of the same, by mean of setting up, erecting, and making of streams, mills, bridges, ponds, fishgarths, mill-dams, locks, hebbing-wears, hecks, and floudgates, or other like lets, impediments, or annoyances, be letted or interrupted, so that great and inestimable damage for default of reparation of the said walls, ditches, banks, fences, sewers, gotes, gutters,

calcies, bridges, and streams ; and also by mean of setting up, erecting, making, and inlarging of the said fishgarths, mill-dams, locks, hebbing-wears, hecks, floudgates, and other like annoyances in time past, hath happened, and yet is to be feared, that far greater hurt, loss, and damage is like to insue, unless that speedy remedy be provided in that behalf.

“ We therefore, for that by reason of our dignity and prerogative royal we be bound to provide for the safety and preservation of our realm of England, willing that speedy remedy be had in the premisses, have assigned you, and six of you, of the which we will that A, B, and C shall be three, to be our Justices to survey the said walls, streams, ditches, banks, gutters, sewers, gotes, calcies, bridges, trenches, mills, mill-dams, floudgates, ponds, locks, hebbing-wears, and other impediments, lets, and annoyances aforesaid ; and the same cause to be made, corrected, repaired, amended, put down, or reformed, as case shall require, after your wisdoms and discretions ; and therein as well ordain and doe after the form, tenor, and effect of all and singular the statutes and ordinances made before the first day of March, in the three and twentieth year of our reign, touching the premisses, or any of them ; as also to inquire by the oaths of the honest and lawfull men of the said Shire or Shires, place or places, where such defaults or annoyances be, as well within the liberties as without (by whom the truth may the rather be known), through whose default the said hurts and damages have happened ; and who hath or holdeth any lands or tenements, or common of pasture, or profit of fishing, or hath or may have any hurt, loss, or disadvantage, by any manner of means in the said places, as well near to the said dangers, lets, and impediments, as inhabiting or dwelling thereabouts by the said walls, ditches, banks, gutters, gotes, sewers, trenches, and other the said impediments and annoyances : and all those persons, and every of them, to tax, assess, charge, distrain, and punish, as well within the metes, limits, and bounds of old time accustomed or otherwise, as elsewhere within our realm of England, after the quantity of their lands, tenements, and rents, by the number

of acres and pearches, after the rate of every person's portion, tenure, or profit, or after the quantity of their common of pasture, or profit of fishing, or other commodities there, by such ways and means, and in such manner and form, as to you, or six of you, whereof the said A, B, and C to be three, shall seem most convenient to be ordained and done for redress and reformation to be had in the premisses: and also to reform, repair, and amend the said walls, ditches, banks, gutters, sewers, gotes, calcies, bridges, streams, and other the premisses, in all places needful: and the same as often, and where need shall be, to make new, and to cleanse and purge the trenches, sewers, and ditches in all places necessary. And farther, to reform, amend, prostrate, and overthrow all such mills, streams, ponds, locks, fishgarths, hebbing-wears, and other impediments and annoyances aforesaid, as shall be found by inquisition, or by your surveying and discretions, to be excessive or hurtfull. And also to depute and assign diligent, faithful, and true keepers, bailiffs, surveyors, collectors, expeditors, and other ministers and officers for the safety, conservation, reparation, reformation, and making of the premisses, and every of them, and to hear the account of the collectors and other ministers, of and for the receipt and laying out of the money that shall be levied and paid, in and about the making, repairing, reforming, and amending of the said walls, ditches, banks, gutters, gotes, sewers, calcies, bridges, streams, trenches, mills, ponds, locks, fishgarths, floudgates, and other impediments and annoyances aforesaid. And to distrain for the arrearages of every such collection, tax, or assess, as often as shall be expedient, or otherwise to punish the debtors and deteinors of the same, by fines, amerciaments, pains, or other like means, after your good discretions. And also to arrest and take as many carts, horses, oxen, beasts, and other instruments necessary, and as many workmen and labourers, as for the said works and reparation shall suffice, paying for the same competent wages, salary, and stipend in that behalf: and also to take such and as many trees, woods, under-woods, and timber, and other necessaries, as for the same works and reparations shall be sufficient, at a reasonable price, by you, or six of you, of the

which we will that A, B, and C shall be three, to be assessed or limited as well within the limits and bounds aforesaid, as in any other place within the said County or Counties near unto the said places: and to make and ordain statutes, ordinances, and provisions from time to time, as the case shall require, for the safeguard, conservation, redress, correction, and reformation of the premisses, and of every of them, and the parts lying to the same necessary and behoovefull, after the laws and customs of Romney Marsh, in the County of Kent, or otherwise, by any ways or means after your own wisdoms and discretions. And to hear and determine all and singular the premisses, as well at our sute, as at the sute of any other whatsoever, complaining before you, or six of you, whereof A, B, and C shall be three, after the laws and customs aforesaid, or otherwise by any other ways and means after your discretions. And also to make and direct all writs, precepts, warrants, or other commandments by virtue of these presents, to all Sheriffs, Bailiffs, and all other ministers, officers, and other persons, as well within liberties as without, before you, or six of you, whereof the said A, B, and C to be three, at certain days, terms, and places to be prefixed, to be returned and received. And farther to continue the process of the same, and finally to doe all and every thing and things, as shall be requisite for the due execution of the premisses, by all ways and means after your discretions. And therefore we command you that at certain days and places, when and where you, or six of you, whereof the said A, B, and C to be three, shall think expedient, ye do survey the said walls, fences, ditches, banks, gutters, gotes, sewers, calcies, ponds, bridges, rivers, streams, water-courses, mills, locks, trenches, fishgarths, floudgates, and other the lets, impediments, and annoyances aforesaid, and accomplish, fulfill, hear, and determine all and singular the premisses in due form, and to the effect aforesaid, after your good discretions: and all such as ye shall find negligent, gainsaying, or rebelling in the said works, reparations, or reformation of the premisses, or negligent in the due execution of this our Commission, that ye doe compell them by distress, fines, and amerciaments, or by other

punishments, ways, or means, which to you, or six of you, whereof the said A, B, and C shall be three, shall seem most expedient for the speedy remedy, redress, and reformation of the premisses, and due execution of the same. And all such things as by you shall be made and ordained in this behalf, as well within liberties as without, that ye doe cause the same firmly to be observed, doing therein as to our Justices appertaineth, after the laws and statutes of this our realm, and according to your wisdoms and discretions. Saved always to us such fines and americiaments as to us thereof shall belong. And we also command our Sheriff or Sheriffs of our said County or Counties of                    that they shall cause to come before you, or six of you, of the which A, B, and C shall be three, at such days and places as ye shall appoint to them, such and as many honest men of his or their bailywick, as well within the liberties as without, by whom the truth may best be known, to inquire of the premisses; commanding also all other ministers and officers, as well within liberties as without, that they and every of them shall be attendant to you in and about the due execution of this our Commission. In witness whereof, we have caused these our letters patents to be made. Witness ourself at Westminster the        day of        in the year of our Reign.”

“ LECTURA PRIMA.

“ My most worthy fellows and companions of this noble and renowned Society, the hourglass of my puisne time is run, and I am now come to take possession of your Reader’s place; wherein I must hazard to your censures the fortunes of my inability. These twenty and six years compleat I have had continuance here, and in that time I have onely taken the measure and length of your hall: and herein I acknowledge *Gray’s Inn* to be the patron of my best fortunes, and yourselves the best companions of my forepast and present life. I made a question, when it came to my turn to reade, whether I should turn therefrom or not, being then troubled about two things,



*Charge* and *Care*, both which I put into a pair of scales, wherein I thought *Charge* weighed heavy and solid (for *ibi ponebantur solidi*). *Care* notwithstanding had his equal weight with the other, and poised the scales even; yet I considered the small substance I had got, came by my profession: I therefore took myself, both in credit and conscience, bound to undertake this burthensome place, for the maintenance and preservation of the honour of this house; and with that I put *Charge* and *Care* in one scale, and *Resolution* in the other, which scaled them both up. Twenty years likewise of my last past time I have in the practice of my profession spent, but I hope little consumed thereof; in which time I lanch'd forth my ship (*in profundum Maris*) for a voyage to the sea, and now she is returned to your shores, furnish'd and ballist with merchandize of several estimates. By my ship I mean my Statute which I reade on, which be the Laws of Shewers; the merchandize be the weighty matters therein contained: by the governours and rulers of this ship, I mean the grave and prudent Commissioners who are put in charge and trust with the execution of these laws: by the mariners, I intend the officers of this law; the merchant's place I reserve unto myself. The wares brought home be of divers sorts, some onely fit for the Imperial Majesty of a King, and these be Royal Prerogatives, shewing forth their splendour like the *Flower de Luce* in the Crown; others belong to high nobility, and some be usefull for the homely commonalty; the rest which shall remain, I have cast under hatches for my last day's mart, when I mean to make chaffer on them all. But though I seem to make these markets of my legal merchandize, yet I do not mean to set such rates upon them as merchants use to do, which be all for (*utile dulce*), for I onely set one price upon all, which is your kind acceptance. Marvell not, I pray you, at these my sea-like salutations; for this day I am become God *Neptune's* oratour, and I mean to display the power of his empire; for my statute, my cases, and my argument, will all depend upon the element of water, over which, as poets feign, *Neptune* hath chief predominance. Well, now my ship is at



shore, and I have cast anchor there, and to my great comfort I see many chapmen attending the market; and therefore now presently I will unlock, and set open the closet of my store, which be contained in the fair volumes of the law, and especially in that law made and enacted in the Parliament held in the 23d year of Henry the 8th, cap. 5, which is *A General Act concerning the Commissioners of Sewers for all the Realm of England*.

“ The causes whereof I made choice to reade upon this law, be five in number, *viz.*

“ *First*, For the antiquity of these Laws of Sewers, though this Statute bear date but 23 Hen. 8.

“ *Secondly*, For the largity and extent thereof; which appears in the style of this Statute, and there termed, *A general Act for all the Realm of England*.

“ *Thirdly*, For the necessary use thereof, which continual practice and daily experience teacheth us.

“ *Fourthly*, I have had a more desire to reade upon these laws, because never any reader did heretofore undertake the same; and upon perusal of this Statute, and upon due consideration taken of others, I thought I could not make my choice of a more fitting, and more necessary law, nor more profitable for my native countrey of *Lincolnshire*, and other maritime places of this kingdom, than this is.

“ And, *Fifthly*, His Majesty's general care, which these laws require at his hands, and his special care, by the which His Highness of late hath taken these laws into his gracious and provident protection.

“ And upon due consideration taken of all these cases, I resolved to proceed in the exposition of this Statute, being made perpetual by the Statute of 3 Ed. 6, cap. 8.

“ And to speak something of the three first causes, I am of opinion, for the reasons and authorities ensuing; that the

laws of Sewers have been, and be of great antiquity, and have told over as much time, and as many years as any other laws of this realm have done: for as Mr. *Cambden* in his *Britannia* saith, *Quod insula Britannia avida in mare omni ex parte se projecit*; therefore this realm adjoining on every side upon the sea, could not be safe, without those provident laws made and used for the defence thereof.

“ And although it is said in Scripture, that Almighty God hath bound the seas by the word of his commandment, and had shut up the deep, and sealed it with his terrible and glorious name; yet God, who bestowed wisdom on man, it was his pleasure he should providently use it over the rest of the creatures, not giving way that he should be remiss or presumptuous in any thing, which by his foresight or judgment might be prevented, helped, and relieved.

“ It is true, that at the floud, *Cum cataracta Cæli fuerint aperta*, when the windows of Heaven were by God’s determinate will set open, and that the seas did *Suum excedere modum*, no power of man’s hand could stay the swallowing and devouring surges of the seas and waters; yet then notwithstanding had God appointed that his servant *Noah* and his children, and such creatures as he appointed, should be preserved by the ark, which was a work of their own hands: therefore the laws of God and nature have appointed man to make provision for the necessary defence and safety of himself, and of his countrey; and the laws of this realm, most of which have received their *primam essentiam* from the divine laws of the Almighty, and have fetched their pedigree from the law of nature, have *à principio* been so predominant in this kingdom of *England*, that they have never been wanting at any time to provide for the safety thereof.

“ And if the Register be so ancient a book as Sir *Edward Cook* in one of his Epistles hath there declared it to be, then it may give satisfaction in this kind, that these laws of Sewers

were in those times of great eminency and authority ; for there I find two several Writs or Commissions of that nature ; the one authorizing certain persons to survey the defences in the parts of *Holland* in the County of *Lincoln* ; the other for the viewing and surveying of the surrounded grounds lying between the two rivers *Humber* and *Auckholin*, in the said County of *Lincoln* ; and the first of the said Commissions is set down *verbatim* in *Fitz. nat. bre. fo. 113*. Yet the first Statute which appears to us in print, wherein the frame of a Commission of Sewers is set down, is the Statute of 6 Hen. 6, cap. 5. Yet I make no question but the said Commissions expressed in the Register, and *Fitz. na. bre.* were in their forms long before *Henry* the Sixth's time ; and that the Statute of *Henry* the Sixth adds some more power and strength thereto than was before, having backt them with the power of the Parliament ; and it is something additional in matter, as it was in power, as by both the Commissions compared together is apparent.

“ I do likewise find in the 38th of *Edward* the Third, *Lib. Ass. plac. 15*, that a Commission was awarded to inquire of bridges, and of the repairs thereof, which is a branch of these laws : and Sir *Edward Cook* in his 10th Report, in the case of the Isle of *Ely*, saith, that the Kings of this Realm, before the making of any Statute of Sewers, might grant Commissions for the surveying and repairing of walls, banks, and rivers, and other defences. And of the same opinion is the book of Sir *John Davies* in his *Irish Reports*, in the case of the Royal Piscary of the *Banne*. And Sir *Edward Cook* hath in his first case set the first Statute of Sewers to be in time the 9th of *Henry* the Third, which is in *Magna Charta* the first volume of Statutes, and the most ancient that be extant in our Laws.

“ By all which is manifest, that these laws have been received into the government of this realm, in time as ancient as any other were : and I am the rather herein confirmed ; for that in the ancient Commission expressed in the Register

aforesaid, there be these words, that the King *Ratione dignitatis suæ regis ad providendum salvationi regni sui circumquaque fuit astrictus*. Wherein it is hereby made plain, That the King, by the tenure and prerogative of his crown, was bound to see and foresee the safety of this realm; and so this law is a prerogative law, and seems to be as ancient as any laws of this realm, and all prerogatives be without limitations of time; neither can it be presumed, that all or any Kings till the time of *Henry the Sixth* were so improvident as to want these laws, without the which the realm could not be defended from the violence of that unmercifull enemy, the sea; wherein I do conclude, that these Laws of Sewers be as ancient as any other laws of this kingdom be."

Several Acts have subsequently been passed in more modern times, for amending that of *Henry the 8th*, particularly as respects the metropolis:—for an account of these, see an interesting paper in this volume, pages 84 to 93. But it appears that the Sewers in the metropolis have not been built in a manner, and of such materials, as entirely to effect the purposes intended. This has been noticed in a respectable Periodical—“*Register of the Arts and Sciences*”—under the head of

#### PROPOSED IMPROVEMENT IN THE PUBLIC SEWERS.

“The preservation of health must be an object of the highest interest to every body. The air we breathe is necessary to our mere *existence*, but on the purity of it depends our *health*. An eminent Physician\* has said, that “*a proper attention to air and cleanliness, would do more to preserve the health of mankind than all the prescriptions of the Faculty.*”

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\* Buchan.

“ Owing to the present defective construction of the London Sewers, prodigious quantities of filth and rubbish, of every denomination, are accumulated in them ; and to such a degree at times, that the masonry is incapable of withstanding the enormous pressure, and a bursting, or “ blowing up,” as it is called, is the consequence.

“ The Sewers are, in fact, the abode of pestilence ; in them large quantities of various animal and vegetable matter are constantly undergoing the putrefactive fermentation which sends forth their noxious exhalations, infecting and contaminating the surrounding atmosphere. In the neighbourhood of distilleries, brewhouses, and dyehouses, where large quantities of hot liquid are frequently poured off into the Sewers, the most offensive vapours arise ; and in all parts of London, the same effect is produced in a greater or less degree by a change of weather for wet, which stirs up the masses of filth, accelerating the putrefactive processes by the supply of water. Need we then be at a loss to account, in a great measure, for the sallow, unhealthy appearance of the inhabitants who breathe this impure air, when we consider that at every inspiration their lungs are filled with it (twenty times in a minute), a portion of it thus enters the blood, circulates through every vein and artery of the body, vitiating all the secretions ? We are ourselves fully persuaded that the nauseous gasses continually being extricated from the putrefying substances contained in the Sewers, must be prejudicial to the health even of the most robust ; but to the delicately constituted, to invalids, and to infants and children, the effects must be pernicious in the highest degree.

“ The scavengers have a practice (which we have ourselves noticed), when they have sent away their intended last cart-load of the sweepings of the day, to sweep all the remainder into the nearest Sewer, to save themselves trouble. Individuals, too, who live near to the gratings, avail themselves of the convenient and ready means afforded by the Sewers, to get rid of all their rubbish or filth ; and under cover of the



night, whole cart-loads of various offensive matter, from slaughter-houses and other places, are brought to the gratings, and forced through them. The matters thus thrown down, pass immediately out of sight, owing to their falling upon the inclined plane of the collateral or branch Sewer, which forms a very obtuse angle with the well or opening into the street ; the matters, therefore, proceed forward to the end of the branch Sewer, and fall into the main Sewer. Here a solid heap of ponderous matter is formed, which is constantly increasing in bulk. The same effect takes place in all those parts of the main Sewers, where the collateral Sewers form a junction, till in time (the space of a year or two) the entire main Sewer is choked up, and nothing more can pass through it. Then, from necessity, is commenced an operation of a very annoying and offensive description ;—the street is stopped up, the pavement removed, and the Sewer is laid open for the purpose of clearing out its foul contents : this done, the upper arching is rebuilt, the ground remade, and the pavement laid afresh.\* The cause of the first choking up of the Sewer remains unchanged ; therefore the same occurrence takes place in the period of a very few years, and recourse is necessarily had to the previous disgusting operations of opening, clearing out, and rebuilding ; only to be renewed again at the end of a similar period of time. The expence of these proceedings is enormous ; the sum is levied upon the inhabitants by a tax, called the *Sewer Rate*, and placed in the hands of the *Commissioners of Sewers*, for their disbursement."

That the evils described may be perfectly understood, as necessarily resulting from an improper construction, an illustrative diagram is given in page 200 of the Publication from which these extracts have been made.

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\* The inconvenience of breaking the ground is felt a considerable time, as the paving stones are obliged to be repeatedly laid ere a smooth surface can be maintained.



“ Not doubting that our readers are generally satisfied of the mechanical defects in the present structure of the Sewers, we now come to the agreeable task of announcing to them that a plan has been proposed for their improvement, which cannot fail, in our opinion, to afford a perfect cure for all the evils and inconveniences experienced. It is therefore with sincere pleasure we have noticed the laudable exertions of a very respectable and intelligent man,\* to procure its general adoption, in lieu of the present ill-constructed, pernicious, and extravagant expensive plan.

“ In the preceding page we have given an engraved representation of the proposed new plan, by figure 2, to which we now refer our readers, together with the explanation of the letters of reference.

“ It will be readily perceived on inspection, that stones and all ponderous substances cannot possibly enter the Sewer—that nothing but the water can pass into it, which quickly flows off when above the level of the bottom of the collateral Sewer 1, as shewn in the engraving.

“ The ponderous matter and silt collected at the bottom of the well lies in a compact and quiescent state, and the water which covers it, to the depth of several feet, effectually prevents all noxious exhalations; acting precisely as the “stink-trap” commonly used in the sinks and drains of private houses; and, like them, the supernatant water is constantly being changed by fresh accessions of that fluid almost unceasingly running into the Sewer. It is proposed that the cesspool shall be cleared out once a month, or oftener, if required. The solid matter may be removed by means of a rake, or other proper instrument; and whenever necessary, a man might be employed to go down for the purpose of cleansing it, which might take ten or twenty minutes to do thoroughly. If, by

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\* Joseph Cuff, Esq. of Ebenezer Terrace, London Hospital.

extreme negligence, a foul smell should at any time arise from the well or cesspool, the remedy is in every body's power, and may be instantly effected, at the most trifling expence, instead of suffering under the dreadful perpetual nuisances of the present absurd and expensive system, which is a disgrace to us, in this mechanical and scientific age.

“ If the Sewers were to be constructed upon the plan now proposed, it would materially check the common abuse of throwing all manner of rubbish into them ; as whatever is thus thrown down, does not pass away into the main Sewer, but remains in the cesspool till cleared out ; therefore, persons living contiguous to the gratings, would not suffer others to continue their former malpractices, nor misuse them themselves, as they might previously have done.

“ The Sewers are at present the resort of a prodigious quantity of rats, which come through the gratings at pleasure, and pass into the dwelling-houses. By the new plan they could not do this, which is evident on inspection : the rats would indeed no longer resort to the Sewers, as there would be no food for them ; and as they could not possibly find any other such strong hold, they would rapidly fall a prey to the ensnaring arts of the rat-catcher, and their numbers be thus greatly reduced.

“ Feeling assured ourselves, that *health, convenience, and economy* would be greatly promoted by the adoption of the proposed alterations in the Sewers, we have been anxious to submit the plan to the consideration of our readers ; and we now put it forth, in the firm hope that it will receive their approbation generally, and that the gentleman before mentioned, who has taken up the matter with such a laudable spirit, will eventually receive the support of the public at large.”

An important invention has also been announced, called a Purifying Furnace, by Mr. R. Bulkeley, of New York, who has pre-

sented a memorial to the Corporation, for erecting small purifying furnaces over sewers and canals, which, with small coal-fires, will destroy the foul air, greatly contribute to the health of the City, and add to the value of property in the neighbourhood of these Sewers.\*

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The paving of streets arose, first, from loose stones being placed in muddy roads, to step over them—

“ But one step more : be not in haste ;
“ This stone’s as slippery as the last.”

By degrees the number was increased, until a regular paving, or pitching, was formed ; in which state the streets remained for ages, without any flat or flag-stones, as a pavement, to walk on. Some of the streets of London, and of many country towns, continue so to this day ; and on the Continent they are almost universally so. The pavement is a modern improvement, supposed to be suggested by a Mr. Spranger, in 1754, after seven years’ labour in persuading his neighbours to adopt it.

The words *paving* and *pavement* are consequently distinct terms.

The earliest record we have in the History of London of paving the streets, appears in Vol. 5,

* Perhaps were *nitre* to be added, this ingenious invention would prove more effectual.

p. 774, of the *Fœdera*. It is an ordinance of King Edward III. in Council, dated in 1353, “for laying a tax of threepence on every sack of wool, and every 300 of woolfels; sixpence on every last of leather; fourpence on every fodder of lead; four-pence on every tun of wine; and one halfpenny on every twenty shillings value of all other goods, carried either by land or water to the staple of Westminster, in order to repair the highway leading from the gate of London, called Temple Bar, to the gate of the Abbey at Westminster; that highway being, by the frequent passing of carts and horses, carrying merchandize and provisions to the said staple, become so deep and miry, and the paving so broken and worn, as to be very dangerous both to men and carriages. And as the proprietors of the houses near, and leading to, that staple, have, by means of the said staple, greatly raised their rents, the way before those houses should, at their charge, be paved; and that part of the said way where no houses are, should be paved anew out of the said duties; and the remainder of the said duties should be applied towards the erecting a Bridge near the royal palace of Westminster, for the convenience of the said staple.” —It does not appear what bridge is here alluded to; though probably it was only that mentioned by Stow as being “over Long Ditch;” for it is certain that there was not any over the Thames at this period.

Holborn was first paved in 1417, as appears from an order in the *Fœdera*, Vol. 9, p. 447 ; in which King Henry V. taking notice “ that the highway named Holborn, in London, was so deep and miry, that many perils and hazards were thereby occasioned, as well to the King’s carriages passing that way, as to those of his subjects ; he therefore ordained two vessels, each of twenty tons burthen, to be employed at his expence, for bringing stones for paving and mending the same.”—This shews the gradual improvement of London’s suburbs.

By a statute, cap. 11, the street-way between Charing Cross and Strand Cross, in the suburbs of London, was directed to be sufficiently paved and maintained at the charge of the owners of the land adjoining.—This shews that the Strand was not then built in a continued street.

An Act of Parliament was passed in 1539, for paving the following streets in London, *viz.* the street leading from Aldgate to Whitechapel Church ; the upper part of Chancery-lane ; the way leading from Holborn Bars, westward, towards St. Giles’s in the Fields, as far as any habitation is on both sides of the said street ; Gray’s Inn-lane, Shoe-lane, and Fenter’s, now Fetter-lane, the two last being thoroughfares and passages from Fleet-street into Holborn. That part of Chancery-lane now to be paved, is thus described:—“ From the Bars, beside the Rolls,

lately set up by the Lord Privy Seal, unto the said highway in Holborn." All the streets directed to be paved, are said to be "very foul, and full of pits and sloughs, very perilous and noxious, as well for the King's subjects on horseback as on foot, and with carriages."

The Parliament, which met in January of 1543, resumed the consideration of the bad state of those parts of the metropolis which still remained unpaved, and were become almost impassable, and made an Act as follows:—"Whereas, the streets named Whitecross-street, Chiswell-street, Golding-lane, Grub-street, Goswell-street, Long-lane, St. John-street, from the Bars of Smithfield up to the Pound, at the corner of the wall extending along the highway leading up to Islington; and also the street from the said Bars to Cow-cross; Water-lane, in Fleet-street; the way without Temple Bar, leading westward, by and unto Clement's Inn gates and New Inn gates to Drewry-place, in the County of Middlesex; and also one little lane stretching from the said way to the sign of the Bell, at Drewry-lane end; and the common way leading through a certain place called Petit-France, from the Bars of the west end of Tothill-street, at Westminster, unto the uttermost part of the west end of the said place called Petit-France; Bishopsgate-street to and above Shoreditch Church; the Strand Bridge, and the way leading from the said Bridge towards

Temple Bar ; the lane called Foskue-lane, from the garden and tenement of the Bishop of Litchfield ; and the gardens and tenement called the Bell and Proctors, down to Strand Bridge ; be very foul, and full of pits and sloughs, very perilous and noxious, and very necessary to be kept clean, for the avoiding of corrupt savours, and an occasion of pestilence : for the amendment and reformation whereof, they are directed to be paved with stone, and a channel made in the midst of them, at the charge of the ground landlords, in like manner and form as the streets of the City of London be paved." And it was also enacted, " that the Lord Mayor, Aldermen, &c. of London, shall have power to enquire into, hear, and determine the defaults of paving and reparation of streets ; and that any three Justices in London, whereof the Mayor to be one, may set fines upon such as do not pave and repair any street or lane in London, or the Liberties thereof, to be levied by distress or action, &c. by the Chamberlain, to the use of the Mayor and Commonalty of the said City." And further it was enacted, " that the Conduits of London should be made and repaired, for the better watering of the City and its Liberties ; and that the Mayor and Citizens should have power to bring water to the said from Hampstead Heath, St. Mary-lebone, Hackney, and Muswell Hill, upon their indemnifying the owners of lands for damages that might be done by the said water-courses, &c."

An Act of Parliament was passed in the year 1571, directing a new cut or trench to be made at the charge of the Mayor, Commonalty, and Citizens of London, whereby the River Lea was to be made to convey all kinds of victuals, corn, and other necessaries, from the town of Ware to the City of London, and from London to Ware. By this means the conveyance of grain, and other provisions, out of Hertfordshire, was greatly facilitated, and a considerable expence of land-carriage saved. In the same year the streets in the eastern suburbs of London, as far as Whitechapel Bars, were, by an Act of Parliament, ordered to be paved.

In the year 1662, the Hackney Coaches having created an extraordinary charge on the inhabitants of London and Westminster, by destroying the paving, the Parliament enacted—that all hackney coaches, in and about the Cities of London and Westminster, should annually pay towards the charge of paving and cleansing the ways and streets in and about the said Cities, the sum of £5 each; and every load of hay 6d., and straw 2d. The same Act likewise provided for enlarging the passages at Stock's Market; from Fleet Conduit to St. Paul's Church; the passage and gateway out of Cheapside into St. Paul's Church-yard; the passage at St. Dunstan's Church, in Fleet-street; from Cheapside to Bucklersbury; the passage at Temple Bar, and

several others in the out-parts; and to pave Petty France to St. James's House, St. James's-street, Pall Mall, and Hedge-lane.

About 1754, Mr. Spranger, a gentleman, of Covent-garden, published the outline of a plan for paving the streets of the City and Liberty of Westminster in an uniform manner.

Mr. Hanway, ever attentive to the public interests, published a "Letter to Mr. Spranger, on his excellent proposal for cleansing and lighting the streets of Westminster, &c." About seven years after, by the assistance of Parliament, the plan was adopted, agreeably to Mr. Hanway's hints and observations, who attended closely to the business, till it was carried into execution; and when he found the Citizens of London had come to a resolution to adopt the new mode of paving, he directed his attention to other objects of general utility.—*Extract from the Memoirs of Jonas Hanway, Esq. page 26.*

In the Session of Parliament 1762, an Act was passed for new paving the streets, and removing the posts and signs that had long been a blemish to the principal parts of this metropolis. The paving before was exceedingly inconvenient, as well to foot-passengers, as to those who were obliged to travel in the highway; but by virtue of this Act, they were both altered,

and the principal parts of the Cities of London and Westminster were paved in the elegant as well as convenient manner in which they now appear.

But even to this year, 1828, the paving and pavement in the streets of London are, generally speaking, in a bad state. This is in a great measure to be attributed to the ground being undermined by so many sewers, water and gas pipes, &c. added to the almost incessant passing of heavily laden carriages, the consequences of which it will be every day more difficult to obviate.

Mr. John Loudon M^e Adam, in the introduction to his System of Road-making, says—“ The present very defective state of the turnpike roads and highways in the United Kingdom, and the continual and apparently unlimited increase of the toll duties, are the considerations which have given rise to the publication of the following remarks.

“ Of the value of the information contained in them, the intelligent reader will be the most competent judge; the author can only venture to assure him, that the few facts brought forward in the course of the work, have been most carefully authenticated; that the opinions advanced are the result of much thought, and patient investigation; that whatever may appear theore-

tical, has, for the most part, been already reduced to practice; and that where practice has been wanting, a long experience of the evils arising from the present system, and not the mere love of innovation, has been the motive for the suggestion of the remedies proposed.

“ These, however, the author gladly submits to the good sense and candour of the public; only requesting, in the words of a celebrated writer, that whoever favours him with a perusal, will not judge, by a few hours' reading, of the labours of nearly thirty years.

“ In the neighbourhood of London, the roads are formed of gravel; in Essex and Sussex they are formed of flint; in Wilts, Somerset, and Gloucester, limestone is principally used; in the North of England, and in Scotland, whinstone is the principal material; and in Shropshire and Staffordshire, large pebbles mixed with sand.

“ Excellent roads may be made with any of these materials.

“ The gravel of which the roads round London are formed, is the worst, because it is mixed with a large portion of clay, and because the component parts of gravel are round, and want the angular points of contact, by which broken stone unites, and forms a solid body. The loose

state of the roads near London is a consequence of this quality in the material, and of the entire neglect, or ignorance of the method of amending it.

“ Flint makes an excellent road, if due attention be paid to the size ; but, from want of that attention, many of the flint roads are rough, loose, and expensive.

“ Limestone, when properly prepared and applied, makes a smooth, solid road, and becomes consolidated sooner than any other material ; but, from its nature, is not the most lasting.

“ Whinstone is the most durable of all materials ; and wherever it is well and judiciously applied, the roads are comparatively good and cheap.

“ The pebbles of Shropshire and Staffordshire are of a hard substance, and only require a prudent application to be made good road materials.

“ On the other hand, the Scottish roads, made of the very best materials, which are abundant and cheap in every part of that country, are the most loose, rough, and expensive roads in the United Kingdom, owing to the unskilful use of the material.

“The *formation* of roads is defective in most parts of the country ; in particular, the roads round London are made high in the middle, in the form of a roof, by which means a carriage goes upon a dangerous slope, unless kept on the very centre of the road.

“These roads are repaired by throwing a large quantity of unprepared gravel in the middle, and trusting that, by its never consolidating, it will in due time move towards the sides.

“When a road has been originally well made, it will be easily repaired. Such a road can never become rough or loose, though it will gradually wear thin and weak, in proportion to the use to which it is exposed ; the amendment will then be made by the addition of a quantity of materials, prepared as at first. As there will be no expence on such road, between the first making and each subsequent repair, except the necessary attention to the water-ways, and to accidental injuries, the funds will be no longer burdened with the unceasing expenditure at present experienced, from continual efforts at repairing, without amendment of the roads.”

Mr. M^cAdam directs the surface of his road to be made as follows :—

“No addition of materials is to be brought

upon a road, unless in any part it be found that there is not a quantity of clean stone equal to ten inches in thickness.

“ The stone already in the road is to be loosened up and broken, so as no piece shall exceed six ounces in weight.

“ The road is then to be laid as flat as possible; a rise of three inches from the centre to the side is sufficient for a road 30 feet wide.

“ The stones, when loosened in the road, are to be gathered off by means of a strong heavy rake, with teeth two and a half inches in length, to the side of the road, and there broken; and on no account are stones to be broken *on* the road.

“ When the great stones have been removed, and none left in the road exceeding six ounces, the road is to be put in shape, and a rake employed to smooth the surface, which will at the same time bring to the surface the remaining stone, and will allow the dirt to go down.

“ When the road is so prepared, the stone that has been broken by the side of the road is then to be carefully spread on it; this is rather a nice operation, and the future quality of the road will greatly depend on the manner in which it is performed. The stone must not be laid on

in shovels full, but scattered over the surface, one shovel full following another, and spreading over a considerable space.

“ Only a small space of road should be lifted at once ; five men in a gang should be set to lift it *all across* : two men should continue to pick up and rake off the large stones, and to form the road for receiving the broken stone ; the other three should break stones ; the broken stone to be laid on as soon as the piece of road is prepared to receive it, and then break up another piece ; two or three yards at one lift are enough.

“ The proportioning the work among the five men must of course be regulated by the nature of the road : when there are many very large stones, the three breakers may not be able to keep pace with the two men employed in lifting and forming ; and when there are few large stones, the contrary may be the case : of all this the Surveyor must judge and direct.*

“ It is plain that the first *turnpike* roads were merely attempts to open more direct communications through the country, in continuing, by mechanical means, the rocky paths to which travellers were obliged to resort. With this view,

* This is inserted in consequence of some of the streets of London having been Macadamized.

large masses of stone were first sunk into the ground, and afterwards thick layers of broken stone strewed over them, so as, in fact, to form an artificial rock. The insecurity of this unskilful structure must be obvious. The rain penetrating through every part of the surface, kept it continually in a loose state ; and as it was imbedded *below* the *ground* water, it was constantly broken up in winter by the frost : hence the vast sums required for the forming new roads, and the heavy and incessant expence of keeping them in a passable state. Any improvements that have been made on this plan, merely relate to the smoothness of the surface, by more carefully laying on the stones, at consequently a greater expence ; but the original principle remains the same in every road, except those where the new system has been fully adopted. Under such disadvantages, it is not surprising that the roads of the kingdom have not kept pace with the advancement of every other useful art. The large sums demanded for the first outlay, and the frequent failure of such speculations from the badness of the roads, and the expence of their subsequent repairs, sufficiently account for the tardy progress of road-making. From conviction of the very insufficient and expensive nature of the method in use, I was led to consider of the possibility of constructing lines of communication, capable of conveying the heaviest weights over every kind of soil, and at all seasons, upon principles purely

scientific: a plan which, even in theory, differs as widely from the inartificial methods of road-making hitherto practised, as the principle by which an arch is thrown over a river, differs from the heap of stones which constitutes the ford.

“ Although no measures have yet been taken for establishing any systematic plan for the management of roads, it is gratifying to observe the spirit of improvement which is extending itself over the country. This is manifest in various ways. The plan of converting the paving of streets into stoned roads, was introduced into the Bristol district about six years ago; and it may reasonably be expected, that paving will very soon be nearly superseded by the more convenient, safe, and economical substitute of stoned roads. Of the superior convenience of roads, there can be no question; and all the minor objections which have been started, can be so easily obviated, that a very little reflection will be sufficient for any candid mind. The inhabitants of towns are generally apprehensive that roads will be less commodious for foot-passengers than pavements; but (if proper care be bestowed on cleaning and watering) a road made of broken stone will be found more eligible than such pavements as those of London. In some towns, where the principal streets are turnpike roads, the Commissioners have caused them to be made of materials broken very small, which,

when skilfully laid, form a smooth, firm surface.

“The great difference between the cost of a road, and even the worst London pavement, would enable the City to bestow such care on the cleanliness of the carriage-ways, as would allow the inhabitants to enjoy all the advantages of smooth road, with even increased comfort to the foot-passenger.”

The foregoing paragraphs are extracts from the Parliamentary Report of the Committee on Mr. M^cAdam's Petition, dated the 20th of June, 1823, on Road-making.

“And in the Appendix to that Report, the Committee state it will be found, from the evidence of Mr. Freeling, ‘That the Post Office did not take Mr. M^cAdam's services into consideration, or suppose that £2,000 would be a sufficient remuneration for those services; they merely stated, in answer to papers from the Treasury, that they considered it would be right to *advance* to Mr. M^cAdam the sum of £2,000, and consider Mr. M^cAdam's claims as establishing a ground for further remuneration.’

“In consequence of that report, the Lords Commissioners of His Majesty's Treasury again, on the 23d of September, refer the subject to the Postmasters General, who, considering the first sum of £5,019. 6s. to be admitted as proved

before the Committee, recommended the payment of his expences from 1814, to be calculated upon the same principle as the travelling allowance is made to the Superintendent of the Mail Coaches, amounting to £1,837. 17s. 6d.; and they further propose the sum of £2000 or £2500 to be granted to Mr. M^cAdam, as a moderate compensation for his services. Upon this, the Lords Commissioners of the Treasury issued a second sum of £2,000, stating that their Lordships, advertent to the large amount of Mr. M^cAdam's claims, cannot feel themselves justified in issuing any further sum to him on account thereof, without the express authority of Parliament for that purpose. On the 5th December, 1820, Mr. M^cAdam again addressed a letter to the Lords of the Treasury, which was transmitted to the Post Office; and the Postmasters General, referring to their former letter, observe that they have no difficulty in bearing their testimony to the services of Mr. M^cAdam, and to the benefits which the public were likely to derive from them; and also stated that in their opinion the charges were reasonable.

“ The last memorial presented by Mr. M^cAdam was to the Postmasters General, who, in transmitting it to the Treasury, observe—‘The favourable opinions which we entertained and expressed in our former reports upon this subject, have been confirmed by experience; and that, by employing Mr. M^cAdam to survey the

roads in Lancashire, the most beneficial results are likely to follow.'

“Having thus given a succinct and connected account of these different proceedings, and having taken into their consideration the whole of the correspondence which has passed previous to this enquiry between the Lords Commissioners of His Majesty's Treasury and the Postmasters General, together with several memorials presented at different periods to these Departments by the petitioner, with the documents accompanying them; and having considered Mr. M^cAdam's statement of his case, and the proof adduced in support of it, which accompany this report; your Committee are of opinion that Mr. M^cAdam has, by means of great assiduity, skill, and many years' personal labour, and at a considerable expence out of his private property, introduced into very extensive practice a system of repairing, making, and managing the turnpike roads and highways of the kingdom, from which the public have derived most important and valuable advantages.

“That, in addition to the notoriety of the fact, that the improved condition of the public roads is in a great degree to be ascribed to the ability, zeal, and indefatigable exertions of Mr. M^cAdam, it now for the first time appears that Mr. M^cAdam has gratuitously given his personal

attention upon, and advice and assistance to, no less a number than seventy turnpike trusts, in twenty-eight counties of the kingdom, from many of which he has not received the payment even of his expences; that he has, for a considerable length of time, been engaged in an extensive correspondence with persons connected with the management and improvement of roads, affording, in the most unreserved manner, information and instruction wherever required; and that he has attended, during several Sessions of Parliament, the Committees of this House, for the same purpose of communicating information: all which services, together with the assistance he has been called upon to give to the Post Office, he has rendered without reward or pecuniary compensation of any kind, beyond the sum of £4,000 advanced to him by the Lords Commissioners of the Treasury, in part payment of his expences.

“ Looking to the result of these services as affecting the community at large; the increase of comfort, convenience, and safety to the public generally; the diminution of expence in the wear and tear of carriages of all descriptions; the reduction of horse labour, and consequent expence of horses; the relief of the oppressive burthen of the poor-rates, by the additional means created for employing the surplus labouring population of the encumbered parishes; the abolition in many instances of a great part, and in some of

the whole of the statute duty, complained of by the agriculturists ; and the very essential benefit to the agricultural, commercial, and manufacturing classes, by the more easy and equal diffusion of the produce of the soil over the various parts of the kingdom ; the free as well as rapid circulation of commercial capital, thereby adding greatly to the national wealth and prosperity which this system has materially contributed to effect ; the Committee cannot hesitate to express their opinion, in concurrence with that already pronounced by the heads of the department of the Post Office, that the sum of £2,000 or £2,500, in addition to his expences, to be calculated after the same rate of allowance as is granted by that office to the Surveyor or Superintendent of Mail Coaches, will be but a moderate compensation to Mr. M^cAdam for his great exertions and very valuable services.

“ The Committee, with a view to abridge the Appendix, have omitted to include several testimonials forwarded to them from different innkeepers and postmasters, stating the advantages they have derived from the improvement of the roads under Mr. M^cAdam’s system ; but which tend to confirm the general opinion favourable to the system.

“ It appears that Mr. M^cAdam has held, from the year 1816 to the present time, and now holds, the situation of General Surveyor of the

Bristol Turnpike Roads, at a salary, the first year, of £400, and each subsequent year, of £500 ; but taking into consideration that, out of this annual salary, £200 is for expences incident to his office, the remaining sum of £300 is, in the opinion of this Committee, not more than an adequate payment for the constant and laborious duties attached to the situation, and cannot, or ought not, to be considered as constituting any remuneration to Mr. M^cAdam for his other distinct and important services.

“ It further appears, that the three sons of Mr. M^cAdam are employed, as general surveyors, upon various lines of road in different parts of the kingdom ; that they have been, and are competitors with all other road surveyors, over whom they possess no other advantage than such as their superior intelligence, skill, and industry entitle them to, having no exclusive or preferable privilege whatever ; that they have improved, and at the same time have very considerably reduced the expence upon almost all the roads under their management ; and that their incomes, when diminished by the necessary disbursements and payments to the persons acting under them, and their own expences, cannot be deemed too large a sum for their own individual services ; but, on the contrary, that they have returned to the public, for the amount of their gains, a fair and full measure of benefit, by the personal

activity, skill, and labour so conspicuous in the management of the roads, and the funds of the trusts under their superintendence; that two of the three had relinquished situations of profit, to afford their aid in giving effect to, and carrying the system into execution, and are justly entitled to the fruits of their industry, and hard-earned incomes, without the participation of any other person; and it does not appear that the petitioner has profited in any manner from the salaries allowed to his sons.

“ In conclusion, your Committee desire to state it as their opinion, that the value of Mr. M^cAdam's system, and consequently of his services, by no means appears to its full extent upon the roads under the immediate management of himself, or of his sons; but that the effect produced upon a considerable portion of the roads generally throughout the kingdom, since the adoption of his system, has been manifest, and, as your Committee conceive, too apparent to escape the most common or indifferent observer; and further, that it must be obvious, from past experience, that a system from which so much good has been already derived, would, if extended over the whole face of the kingdom, be productive of the most beneficial consequences, both to the condition of the roads, and in effecting a reduction of the amount of the present enormous and improvident expenditure.

“ Your Committee cannot close their Report without directing the attention of the House to that part of Mr. James M^cAdam’s evidence, in which he states the practicability of converting the pavement of the streets of London into smooth and substantial roads ; and your Committee have the satisfaction to inform the House, that the experiment is about to be tried in two very different and distinct parts of the metropolis, *viz.* in St. James’s-square, and over Westminster Bridge and its boundary. This most desirable improvement has, as appears from the evidence of Mr. M^cAdam, senior, and from that of Mr. William M^cAdam, already been tried, and completely succeeded (as is well known to many Members of the House) both at Bristol and Exeter, and is in progress of execution upon the paved ways in the county of Lancaster.

“ The benefit to the inhabitants of this large City by such an important improvement, in all its various advantages of comfort, convenience, and economy, can scarcely be appreciated ; and your Committee hope, that the plan about to be tried in two separate parts of London, will be found so far to succeed, as to induce its adoption at least in all the large streets of the metropolis ; observing, that they believe that it is a plan which Mr. M^cAdam has for many years urged the adoption of, and, as constituting a part of his system, will be found mentioned in all his

publications on the improved system of Road-making.”



The next important public work which this generation enjoys from the talents and enterprise of our forefathers, is a mechanical supply of water, laid into our houses without going to the springs, wells, conduits, and fountains for it, or purchasing it at the doors from the water-carriers, aforetime a numerous body of men, who of course resisted every attempt to introduce a remedy as a substitute for their labours.

It will be seen in the Histories of London, that about the year 1236, a great want of water prevailing in London, occasioned in a great degree by the encroachments of buildings on the fresh water canals about the City, many of the more substantial citizens contributed in a liberal manner to a scheme for bringing water from six fountains in the town of Tyburn; which was accordingly carried into execution, and is the first instance on record of water being conveyed to the City by means of pipes. Several foreign merchants, who were involved in the general prohibition against landing their goods in London, and were consequently obliged to dispose of their merchandize on ship board, purchased this year, of the Mayor and Citizens of London, the privilege of landing and housing their wood,

at the rent of 50 marks per annum, and a fine of £100, which was applied in aid of the above useful project.

In several parts of the City, conduits were erected for the reception of this water; the first of which was built in the year 1285, at the west end of Cheapside, then called West Cheap; and these conduits were found so convenient, that they soon increased to nineteen in number, and were supplied by water-pipes from different wells or fountains in the neighbourhood of the City, and from the river Thames.

But these conduits having been long since rendered useless by the present method of conveying water from the Thames and New River, they have been totally removed for some years past; by which the passage through the principal streets of the City is much less obstructed than it was in former times.

Stow informs us, that when these conduits were in use, it was customary for the Lord Mayor, Aldermen, and principal Citizens to repair on horseback annually, on the 18th of September, to visit the heads from whence the conduits were supplied; and to hunt a hare in the morning, and a fox after dinner, in the fields adjacent to the town of Tyburn.

Maitland says—Before this time, the City

and places adjacent, were supplied with water by the river of Wells, in the west parts; whose first decay was owing to certain mills erected thereon by the Knights of St. John, which obstructed its navigation, and by degrees gave it the name of Turnmill-brook, which is still preserved in a street of that name, called Turnmill-street, through part of which this water took its course, towards the bottom of Holborn-hill, and thence into the Thames, between the Fleet and St. Bride's that now is: it being entirely choked up above, by various encroachments as low down as Holborn-bridge, in process of time, Turnmill-brook was lost in the name of Fleet-ditch, or Fleet-dyke. The other waters were—Olborn, or Holbourn, a rivulet, which springing up near Middle-row, made its way in a clear current, and fell into a river of Wells at Holborn-bridge: this rivulet underwent the same fate, whose remains are still to be seen in the common sewer under the street that bears its name. Wallbrook, which entered the City through the wall between Bishopsgate and Moorgate, near the west end of Bethlehem Hospital, after many turnings and windings, emptied itself into the Thames at Dowgate: the loss of this river was owing to the many bridges built over it; which at last increased to such a number, covered with houses, that whole streets rose upon its surface, and the channel of the river was reduced to a common sewer. Langbourn, which took its rise in or near the east end

of Fenchurch-street, ran with a swift current, due west, to Sherborne-lane, at the west end of St. Mary, Woolnoth; then dividing its stream into several rills, ran directly south, and was lost in the Wallbrook, on Dowgate-hill: the stoppage of this bourn was owing to the like circumstances as the former.

Besides these running waters, we read of several springs, which supplied the City and suburbs with clear, sweet, and wholesome water; as Holywell, which was a fine spring, and even famed for its miraculous virtue in the times of Popery, but now choked up with soil. The other wells were Clerk's, or Clerkenwell, which spring not far from the west end of Clerkenwell Church: and near to it was Skinner's Well, famous for the plays and interludes acted there at certain seasons of the year: and more eastward, towards the Charter House, were Foyg's Well, Tod's Well, Loder's Well, and Radwell; which, and another in Smithfield, called the Horsepool, or Horsepond, all united their streams, and formed the river of Wells, above mentioned.

Without Cripplegate there was a large pool, supplied by a neighbouring well, which was sometimes so deep as to drown those who slipped into it; but that is diverted into the common sewer, and the well is still preserved, and in great repu-

tation, by the name of Crowder's Well, adjoining to St. Giles's Churchyard, on the north-west side. At the south entrance into the small village of Hoxton was another celebrated spring, called Dame-Annis-the-Clear : this is now enclosed, and made to supply a cold bath, for private property. And less than half a mile more to the east, was a very free, sweet, and clear spring, which served to supply the neighbourhood of Lothbury, where its pipes terminated close to the south-west corner of the Church. This spring overflowed, and formed a piece of water named Perilous Pool, from the many accidents which happened to it : it is now called Peerless Pool.

In the year 1438, Sir William Eastfield, Knight of the Bath, and Mayor of this City, at his proper cost brought water from Tyburn and Highbury Barn to London, and caused conduits to be erected in Fleet Street, Aldermanbury, and at Cripplegate, for the convenience of his fellow-citizens.

In the year 1439, the Abbot of Westminster granted to Robert Large, the Mayor, and Citizens of London, and their successors, one head of water, containing twenty-six perches in length, and one in breadth, together with all its springs, in the Manor of Paddington ; in consideration of which grant, the City is for ever to pay to the said Abbot and his successors, at the Feast of

St. Peter, two pepper-corns. But, if the intended work should happen to draw the water from the ancient wells in the Manor of Hida, then the aforesaid grant to cease, and become entirely void.

The Cross in Cheapside, which had been erected to the memory of Queen Eleanor, being greatly decayed, John Hatherley, the Mayor, applied to King Henry the 6th, for permission to rebuild it. He also solicited the royal aid towards repairing the common granary of the City, and the conduits, as well as for completing other improvements then carrying on for supplying the City with water.

These several requests were readily granted by the King, as will appear from the following letter :—

“The King to whom these shall come, greeting :—Know ye, that whereas our beloved John Hatherley, Mayor, and the Citizens of London, do intend, for the common utility and decency of all the said City, and for the universal advantage ; likewise for the well-pleasing of all liege subjects flowing thither from other parts, at convenient places therein, as it well becomes them so to do, to build and erect divers aqueducts of fresh water, with standards and other machines, and leaden pipes, which have and do run under

and above the earth, above three miles ; and to rebuild a certain common granary, and a certain beautiful Cross in the Westcheap of the said City, which may serve for a reservoir, or, as it were, a mother to the said conduits or aqueducts ; which works cannot be performed without a very large quantity of lead, and workmen proper to carry on the said works :—We, well considering the utility, decency, and advantage of the said works, do, of our own special grace, grant and give our licence for completing the same ; and for the said Citizens to take up two hundred foder of lead for the building thereon, and to impress plumbers, labourers, &c. for carrying on the said works, paying them their wages.”

And the several grants of springs, heads of water, &c., under which the City was provided with water, were also ratified and confirmed by the King and Parliament, for the consideration of twenty pounds paid into the hanaper.

In the year 1443, the Common Council granted one thousand marks towards erecting a new conduit near St. Paul's Gate, at the upper end of Cheapside, and for the repairing of others. About the same time the King, by his letters patent, empowered Thomas Knowles, John Chichie, &c., executors of John Wells, some time Mayor of London, to repair the highway leading from London to Westminster, before and near

the Palace of the Savoy, which, for the space of 500 feet, they substantially performed with stones and gravel.

It also appears that about the year 1540, Robert Broche, Chaplain to the King, invented the method of making leaden pipes for conveying water under ground, without using solder. Robert Cooper, a goldsmith of London, was the first who made them, and put them in practice.

The supply of water in London, with the exception of the Thames water at London Bridge, mentioned hereafter, appears to have remained in this state for many years, until the time of an enterprising citizen and goldsmith, " Mr. Hugh Middleton, who, by virtue of several Acts of Parliament, passed in the late and present reign (*viz.* James the 1st), granting powers to cut and convey a river from any part of Middlesex or Hertfordshire, to supply the City of London with a sufficient quantity of water for domestic uses, undertook, after several others had attempted it without success, to bring such a river from Chadwell and Amwell, near Ware, in Hertfordshire, to a bason or reservoir near Islington, on the north side of London, for that purpose. He began this work on the 20th of February, 1608, and with great difficulty, art, and industry, and a prodigious expence (of, as it

is recorded, no less than five hundred thousand pounds), with the assistance of King James the 1st, he cut a trench, in some places full thirty feet deep, through oozy, muddy, and stiff, craggy, and stony ground, and with so many windings, to find out a proper current, that it measured thirty-eight miles, three-quarters and six poles from the fountain to the reservoir. This great work was finished so far as to be brought to the intended reservoir; but the water was not let into it till Michaelmas-day, A. D. 1613, when Sir Thomas Middleton, Lord Mayor elect, and brother to the great undertaker of this scheme, accompanied by Sir John Swinnerton, Lord Mayor, many Aldermen, the Recorder, and other gentlemen, repaired to the place called New River Head, in solemn cavalcade. On their arrival, sixty labourers, handsomely dressed, with green caps, marched with pickaxes, shovels, and spades, thrice round the bason, preceded by drums and trumpets, who stopped before the Mayor, &c. seated upon an eminence, and one addressed them in a long copy of verses; which being ended, the sluices were opened, and the stream ran plentifully into the reservoir, under the sound of drums and trumpets, the discharge of cannon, and loud acclamations of the spectators.

The source or head of the New River is at the village of Amwell, twenty miles from London, in the road to Hertford, where a number of

springs are collected into a large bason of considerable depth. On the margin of this bason is a large stone, with inscriptions on each side, containing a short notice of the opening of the stream in 1608, and stating the length of its course from the Chadwell spring, to be forty miles; but by an exact measurement of the river, taken by the Company's surveyor in the year 1723, its length appears to be thirty-eight miles, three quarters, and sixteen poles. By the vast increase of London, the original sources of this river were found inadequate to supply its wants; and the Company applied to Parliament for permission to obtain an additional supply from the River Lea. This application was opposed by the City, but in vain: an Act was passed to sanction the measure; the citizens were constrained to accept of the blessing against their will, and the River Lea may be numbered among the sources of the New River. In the circuitous course which was found necessary to be given to this river, in order to preserve its level, it passes the towns of Ware, Hoddesdon, Broxbourne, and Cheshunt, in Hertfordshire, in nearly a north and south direction; at Waltham Cross it enters Middlesex, where it turns westward; and returning again to Forty Hill, it passes Enfield; from hence its course is continued, with many devious windings, by Winchmore Hill, Hornsey, Newington, Highbury, and Islington, to the great reservoir or bason, from whence the metropolis is supplied

with its waters. Here it is received by fifty-eight main pipes of a seven-inch bore, by which it is conveyed to those parts of the town lying south and west of the reservoir. The eastern part is supplied from a building erected over the river, at a short distance before it reaches its termination, in the lower part of which are several main pipes for that purpose; and a steam engine, erected on the west side of the reservoir, throws the water into a smaller one, from which the inhabitants of Pentonville, and the places in its vicinity, are supplied. It has been several times in agitation to extend the service of this water through Marylebone, for which purpose an immense bason has been constructed in the Hampstead road, near St. James's Chapel; but this plan has not hitherto been successful. Prior to the knowledge of canal navigation we at present possess, it was found necessary to convey the water of the New River over two vallies, in large wooden troughs lined with lead: the one near Bush Hill, two hundred and twenty yards in length; the other, between Hornsey and Highbury, one hundred and seventy-eight yards; both of which had experienced occasional ruptures, to the great injury of the low lands in the vicinity; but about the year 1787, mounds of earth and clay were raised to a sufficient height to imbed the former channels, which, as soon as the new materials had settled, were removed; and since that period no accident of any moment has occurred.

In 1619, the proprietors of this river were incorporated by the name of the New River Company ; previous to which, Sir Hugh Middleton had divided his part of it into thirty-six shares, most of which he sold to different persons, amounting, with himself, to twenty-nine in the whole ; but though the King was proprietor of half the work, he was precluded from having any share in the management of it, being only allowed to have an agent present at the meetings of the Company. No dividend was made until the year 1633, when only eleven pounds, nine shillings, were paid upon each share. The second dividend amounted to only three pounds, four shillings, and two pence ; and a call being expected instead of a third division. Charles 1st, disliking a scheme which appeared not only unproductive, but likely to be attended with loss, reconveyed his moiety to Sir Hugh, on condition of receiving a clear annual rent of five hundred pounds out of the profits. This moiety Sir Hugh also divided into thirty-six shares, to equal those of the adventurers, as they are called, to distinguish them from the others, which are called King's shares ; and he subjected these new proprietors to the payment of the annuity, which, added to their exclusion from the management, renders their shares less valuable than the adventurers'. Though the original projector of this stupendous undertaking was ruined by it, few speculations ever produced so large an ultimate profit ; a share,

which was originally purchased for one hundred pounds, having been lately sold for fifteen thousand, and their value being still increasing.

Sir Hugh Middleton, a public spirited man, to whom the City of London is indebted for having brought the New River thither, was a native of Denbigh, in North Wales, and a citizen and goldsmith of London. Though that great city was furnished with water by means of sixteen common conduits, besides the larger supply it received from the River Thames ; yet, these not being found sufficient, other methods were devised to bring in fresh supplies. For that purpose, three Acts of Parliament were obtained ; one in the tenth of Queen Elizabeth, and two others in the third and fourth of James 1st ; granting the citizens of London full power to bring a river from any part of Middlesex, or Hertfordshire, to serve the City. But after several attempts, and long and deliberate considerations, the expence being looked upon as infinite, and the danger and difficulty extreme, the project was laid aside. At length Mr. Middleton, who had enriched himself by a profitable speculation in a copper, or, according to some, a silver mine, in Cardiganshire, which he farmed of the Mines Royal Company, at the rent of four hundred pounds per annum, undertook it on his own account ; in consideration of which, the City conferred upon him and his heirs, on the 1st of

April, 1606, the full right and power granted to them by the above Acts of Parliament, provided he should begin this cut within two years, and use the best endeavours to finish it within four years from the date of the agreement.

Another historian states " the work was commenced on the 20th of February, 1608, but was so obstructed by the complaints exhibited against it, by divers persons of the counties through which the river was brought, that in 1609, Mr. Middleton was obliged to petition the Lord Mayor and Commonalty of London, for a prolongation of the term in which he was to complete the undertaking, who granted an additional term of five years ; but his difficulties did not terminate here, for by the time he had brought the water into the neighbourhood of Enfield, his whole fortune was nearly spent, and he was again constrained to apply to the Corporation, to interest themselves in a work so directly calculated for their advantage. On their refusal to embark in an enterprise which appeared to them both chargeable and hazardous, he next applied to King James 1st, and was successful. His Majesty, willing to encourage so useful a work, consented to bear half the expences past, and to come ; in consideration of which, Mr. Middleton conveyed to him one moiety of the whole concern. This agreement is dated on the 2d of May, 1612; and it appears from the books

of the Exchequer, that the sums issued from thence to Mr. Middleton, in pursuance of it, amounted to upwards of six thousand, three hundred, and forty-seven pounds; but in an abstract of the Royal Revenue, published in a book called, "Truth brought to Light," it is said that "His Majesty's charge towards bringing the New River to London, from Amwell and Chadwell, for the new Waterworks, was seven thousand, eight hundred, and fifty-six pounds." This assistance enabled Mr. Middleton to surmount all his difficulties and discouragements; and notwithstanding the many hindrances he was compelled to encounter, from persons through whose grounds the channel was cut, he completed his undertaking within the time allowed by the City; and the water was brought into the reservoir at Islington, on Michaelmas-day, in the year 1613. The completion of this work, which Anderson, in his History of Commerce, describes as "suitable to the power and grandeur of ancient Rome, in its zenith of glory," was so acceptable to King James, that he first knighted Mr. Middleton, and afterwards created him a Baronet; and in 1619 he incorporated the proprietors of the concern by letters patent, dated June 21st, under the denomination of "The Governor and Company of the New River, brought from Chadwell and Amwell to London."

The first mechanical supply of water from

the River Thames, appears to be from the skill and science of a foreigner, Mr. Peter Morrys, a Dutchman, who on the 30th of May, in the year 1581, undertook to raise the water to all parts of the City of London, upon condition of receiving a grant from the Mayor and Corporation, of the use of one of the arches of London Bridge, for the term of 500 years, to erect his engine, which he successfully accomplished. In November, 1583, he obtained another grant of the second arch for 500 years. Subsequently, in November, 1701, the fourth arch was obtained for 381 years. The third arch was also obtained in September, 1761, for 321 years; and the fifth, and the Borough wheel, at the south end, for 315 years, in September, 1767. These works proved of great importance to the City, in supplying Thames water in abundance for upwards of 200 years; but at length they were pulled down, under the authority of an Act of Parliament passed in July, 1822, entitled—"An Act for removing the Waterworks at London Bridge.

"Whereas by an indenture, bearing date the thirtieth day of *May*, in the twenty-third year of the reign of Her Majesty Queen *Elizabeth*, and made, or expressed to be made, between the Right Honourable Sir *John Braunche*, Knight, Lord Mayor of the City of *London*, and the Commonalty and Citizens of the said City, of the one part; and *Peter Morrys*, of the other part; and an indenture bearing date the twenty-fourth day of *December*, in the twenty-fifth year of the reign of her said Majesty Queen *Elizabeth*, and made, or expressed to be made, between the Right Honourable *Thomas Blanche*, Lord Mayor

of the said City of *London*, and the Commonalty and Citizens of the same City, of the one part, and the said *Peter Morrys*, of the other part; and an indenture bearing date the twenty-fourth day of *November*, one thousand seven hundred and one, and made, or expressed to be made, between the Mayor and Commonalty and Citizens of the said City of *London*, of the one part, and *Thomas Morrys*, administrator of his grandfather, the said *Peter Morrys*, of the other part; the said Mayor and Commonalty and Citizens granted licences to erect certain engines in the River *Thames*, at *London Bridge*, and to lay down pipes for supplying the Inhabitants of *London* with water, for terms, of which two hundred and sixty years, or thereabouts, are now unexpired: And whereas certain persons entered into a copartnership, for carrying on the said Waterworks, under the firm or style of "Proprietors of the *London Bridge Waterworks*;" and by virtue of an indenture, or deed of regulations, bearing date the twenty-ninth day of *June*, one thousand seven hundred and three, the property of the said copartnership was divided into three hundred shares, and the management, controul, and direction of the same, and the business thereof, were vested in nine persons, proprietors of the said works, to be appointed as therein is mentioned, and called "A Committee of Assistants," or the major part of them: And whereas two further licences to erect engines in the said River, at the said Bridge, for supplying the inhabitants of *London* and *Southwark* with water, have been granted to certain of the proprietors of the said Waterworks, for terms of which two hundred and sixty years are now unexpired, by certain indentures, one of them bearing date the fifth day of *August*, one thousand seven hundred and sixty-one, and made, or expressed to be made, between the said Mayor and Commonalty and Citizens, of the one part, and *Thomas Strode*, *John Anthony Merle*, *Abraham Atkins*, and *Bibye Lake*, Esquires, for and on behalf of themselves and the rest of the proprietors of the *London Bridge Waterworks*, of the other part; and the other of them, bearing date the eighth day of *July*, one thousand seven hundred and sixty-seven, and made, or expressed to be

made, between the said Mayor and Commonalty and Citizens, of the one part, and the said *John Anthony Merle, Abraham Atkins, and Bibye Lake*, for and on behalf of themselves and the rest of the proprietors of the *London Bridge Waterworks*, of the other part: And whereas the said proprietors of the *London Bridge Waterworks* have, from time to time, purchased and obtained, for the purposes of their said copartnership, certain messuages, ground, buildings, tenements, and hereditaments: And whereas the proprietors of the said Waterworks who now form the Committee of Assistants, under or in pursuance of the said indenture, or deed of regulations, are *Richard Clark, Esquire, William Child, Esquire, Joseph Bradney, Esquire, William Willis, Esquire, David King, Esquire, George Scholey, Esquire*, an Alderman of the said City of *London*; *Thomas Poynder, Esquire, William Wix, Esquire*, and Sir *Francis Molyneux Ommanney, Knight*; and *Richard Percival, Esquire*, is now the Treasurer of the said proprietors of the said Waterworks: And whereas each and every of the said three hundred shares of and in the said copartnership hath been divided into five shares, so that the property of the said copartnership now consists of one thousand five hundred shares: And whereas by an Act passed in the twenty-ninth year of the reign of King *George the Second*, intituled *An Act to improve, widen, and enlarge the passage over and through London Bridge*, it was provided, that nothing in that Act contained should extend, or be construed, deemed, or taken to extend, to empower the Mayor, Aldermen, and Commons of the City of *London*, in Common Council assembled, to remove or alter any of the Arches under the said Bridge, or any engines fixed up therein, which then belonged to the proprietors of the *London Bridge Waterworks*, or to take away any right which the said proprietors of the said *London Bridge Waterworks* then had, to the use or enjoyment of any of the Arches of the said Bridge by Grant or Lease from the Mayor and Commonalty and Citizens of *London*, for raising water therefrom; and it was thereby enacted, that if it should be found necessary to take down or alter any of the piers of the said bridge, in order to enlarge any of the

Arches thereof, and thereby the raising of water by the said works should be prejudiced, that then, and in every such case, the said Mayor, Aldermen, and Commons of the said City, in Common Council assembled, should, and they were thereby required, on complaint and proof of such damage, to stop or pen up, or cause to be stopped or pent up, a like body of water as should be discharged by the taking down or altering any of the said piers, for the use of the proprietors of the said Waterworks: And whereas by virtue of the powers of the said Act, two of the arches or waterways of the said bridge were converted into one, by making the present large arch near the centre thereof: And whereas, in order to give force to the said Waterworks, several of the arches or waterways under the said bridge have since been partially dammed or stopped up, in pursuance of the said Act, and additional wheels and other machinery have been since erected, extending further into the river from both shores, on the west side of the said bridge: And *whereas the great fall of water occasioned by the said Waterworks and obstructions renders the navigation through the Bridge, at particular times of the tide, dangerous, and destructive to the lives and property of His Majesty's subjects:* And whereas it is necessary that the said Waterworks *and obstructions should be removed from the said river;* but it is expedient that the public should not be deprived of the supply of water which is now afforded by the said Waterworks: And whereas by Letters Patent of His Majesty King *James the First*, bearing date the twenty-first day of *June*, in the seventeenth year of the reign of His said Majesty, after reciting (amongst other things) that *Hugh Middleton* (afterwards Sir *Hugh Middleton*), with the aid of other adventurers, had brought a fresh stream of running water from the springs of *Chadwell* and *Amwell* in the County of *Hertford* to the City of *London* and the suburbs thereof, it was granted, ordained, and appointed, that the said Sir *Hugh Middleton* and the twenty-eight other persons therein named, and all and every person or persons who thereafter should be elected and chosen into the place of them, or any of them who should die or

be removed, thereafter should be One Body Corporate and Politic, by the name of "The Governor and Company of the *New River* brought from *Chadwell* and *Ammell* to *London*," and that by the same name they should have perpetual succession: And whereas, for the purpose of obtaining the removal of the said Waterworks and obstructions, and procuring the continuation of a supply of water to the inhabitants of the places who are at present supplied with water from the said Waterworks, the Mayor and Commonalty and Citizens of the City of *London*, and the said Committee of Assistants of the proprietors of the said *London* Bridge Waterworks, and the Governor and Company of the *New River*, are willing and desirous of effecting an arrangement, whereby all the herein-before mentioned Licences for erecting engines on the said River may become void, and all the messuages, buildings, ground, tenements, and hereditaments of the proprietors of the said Waterworks, and all the wheels, pipes, engines, apparatus, and stores, and all the water-rents payable to them from and after the twenty-fourth day of *June* now last past, should be absolutely vested in the said Governor and Company of the *New River*, who should be empowered to raise water, by means of steam engines, from the said River *Thames*; and that in part compensation to the said proprietors of the said Waterworks, the said Governor and Company of the *New River* should secure to them certain annuities or yearly sums during the term of two hundred and sixty years, being the residue remaining unexpired of the terms of years for which the aforesaid Licences were granted; and should also secure certain life annuities, by way of pensions, now payable to certain servants of the said proprietors, or the relatives of such servants; and that to provide further compensation to the said proprietors, the said Mayor and Commonalty and Citizens should be empowered to raise and pay them the sum of ten thousand pounds, together with interest (if any) as hereinafter is mentioned: And whereas, with a view of improving the present approaches to *London* Bridge, or any new Bridge which may be erected near the site thereof, it is expedient

that the said Mayor and Commonalty and Citizens should be empowered to purchase from the said Governor and Company of the *New River*, such of the estates of the said proprietors of the *London Bridge Waterworks* as are situate near the said present *London Bridge*, to the eastward of the Hall of the Fishmongers' Company: And whereas the said Mayor and Commonalty and Citizens are possessed of a considerable sum of money, arising from the estates vested in them as Trustees for the repairs and support of *London Bridge*: And whereas, if the said Mayor and Commonalty and Citizens be empowered, out of the monies of which they are possessed, as Trustees as aforesaid, to raise a sum of money not exceeding fifteen thousand pounds, to enable them to pay the said sum of ten thousand pounds to the said proprietors of the *London Bridge Waterworks*, and to purchase the said estates from the said Governor and Company of the *New River*, and to defray the expences of this Act, the same may be repaid with interest out of such fund as may hereafter be raised by authority of Parliament for improving or making approaches to the said present bridge, or any new bridge, or for the improvement of the navigation of the said river: May it therefore please Your Majesty that it may be enacted, and be it enacted by the King's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, That from and after the payment of the sum of ten thousand pounds to the proprietors of the *London Bridge Waterworks*, as hereinafter is mentioned, so much of the said recited Act of the twenty-ninth Year of the Reign of King *George* the Second, as obliges the water to be stopped or pent up at the said bridge, to give effect to the said Waterworks, and as prevents the Mayor, Aldermen, and Commons of the City of *London*, in Common Council assembled, from removing or causing to be removed the wheels, machinery, and works belonging to the said proprietors of the said Waterworks, or removing or altering any of the arches of the said bridge, shall be, and the same is hereby repealed.

“ II. And be it further enacted, That it shall be lawful for the said Mayor and Commonalty and Citizens of the City of *London*, and they are hereby authorized and empowered to raise and apply, by and out of the monies of which they are possessed as Trustees as aforesaid, any sum or sums of money not exceeding the sum of fifteen thousand pounds, for the purposes of this Act, and that the sum of ten thousand pounds part thereof shall be paid to the said *Richard Percival*, or other the Treasurer for the time being of the said proprietors of the *London Bridge Waterworks*, together with (in case the said sum of ten thousand pounds shall not be paid within fourteen days next after the passing of this Act) interest for the same in the meantime at the rate of five pounds *per centum per annum*, to be computed from the expiration of the said fourteen days.

“ III. And be it further enacted, That it shall be lawful for the Mayor, Aldermen, and Commons of the City of *London*, in Common Council assembled, and they are hereby empowered, in the name of the said Mayor and Commonalty and Citizens of the City of *London*, to agree with the said Governor and Company of the *New River* for the purchase of the houses, buildings, grounds, tenements, and hereditaments in the City of *London*, to be conveyed and assigned by the Committee of Assistants of the said proprietors of the *London Bridge Waterworks*, as hereinafter is mentioned, which are situate to the eastward of Fishmongers' Hall, and to pay any part of the monies to be raised and applied for the purposes of this Act, not exceeding the sum of three thousand pounds, for the purchase thereof, and to accept and take a conveyance thereof from the said Governor and Company of the *New River* (who are hereby empowered to sell and convey the same), notwithstanding the Statutes of Mortmain, or any other law or statute to the contrary.”

The Chelsea Water Company commenced their works, for the same purpose, of drawing

water from the River Thames, under an Act in 1723, for the supply of that place, and the parts adjacent.

The York Buildings Water Company also commenced their works about the same time, for the supply of a part of Westminster, from the River Thames.

After these the Shadwell and West Ham Company drew water from the Thames for the supply of their neighbourhood; and the Hampstead Water Company undertook to supply the north side of London with water from the springs at that place.

In this state the supply of water to the metropolis remained until 1806, when the East London purchased the Shadwell and West Ham works, and obtained their Act for supplying that side of London, and its environs, on a larger scale.

In 1807 the West Middlesex undertook to supply the west side of the metropolis with water from the springs and rivers north-west of London; and the Grand Junction Company commenced their's upon the same plan in 1810.

Other Companies supply the south side of London chiefly, if not entirely, from the River Thames.

Lighting the Streets of London, is the next subject. This was anciently accomplished by hanging lanterns at the doors of the houses and shops, by those who chose to do so; afterwards it became imperative, in consequence of the streets being infested with robbers and housebreakers, owing to the insufficiency of the lights in the night. Application was made to Parliament by the Lord Mayor and Common Council, to enable them to light the streets in a more effectual manner; in compliance with which, an Act was passed, empowering the Lord Mayor, Aldermen, and Commonalty, to erect a sufficient number of glass lamps, and in such places as they should judge proper, to be kept burning from the setting to the rising of the sun, throughout the year; and giving them power to make a rate to defray the expence thereof.

London was accordingly lit by the Corporation in, and the respective parishes out of the City, together with several private lamps in various parts of the metropolis. In this state a number of years elapsed without alteration, except now and then a new reflector or a new lens was placed before the burner, not doing much more than making darkness visible.

At length Mr. Winsor, a Prussian, appeared in London about the year 1800, and gave lectures at the Lyceum Theatre, on the theory of

lighting with Coal Gas, on the principle of Monsieur Le Bon, at Paris. For a year or two it was a popular amusement to go to the Lyceum to see the gas; and after a few years, a public meeting was called at the London Tavern, to raise subscriptions to bring this theory of gas into public use. £20,000 were then placed at the disposal of twenty-four gentlemen, as a committee of trustees, to ascertain the possibility of lighting the streets with it; and, if practicable, to apply to Parliament for an Act to enable the proprietors to light the streets of London. Difficulties unknown came forward to oppose this project. No one appeared bold enough to shew himself a friend to it:—it was the insidious sneer of the wise, and the bold ridicule of the ignorant; until after three years' perseverance, not only an Act of Parliament, but a Charter from King George III. was obtained for this national undertaking.

It is to the honour of His Majesty King George the Fourth, that while this headstrong prejudice existed with the multitude, a noble independent mind induced His Majesty, then Prince of Wales, to become one of the exalted patrons of this infant project; and for this purpose, His Royal Highness granted leave to exhibit the first specimen of public gas lights on the wall of his garden in St. James's Park.

At present but few lamps in London are

lit with oil. Gas has almost extinguished the whole of them; and there are now in London four great Gas Light Companies—the Chartered, the City of London, the Imperial, and the Phoenix; having altogether forty-seven gasometers at work, capable of containing in the whole, nine hundred and seventeen thousand, nine hundred and forty cubic feet of gas, supplied by one thousand, three hundred and fifteen retorts; and these consuming thirty-three thousand chaldrons of coals in a year, and producing forty-one thousand chaldrons of coke; the whole quantity of gas generated annually, being upwards of three hundred and ninety-seven millions of cubic feet, by which sixty one thousand, two hundred and three private, and seven thousand, two hundred and fifty-eight public or street lamps are lighted in the metropolis. Besides these, there are several other minor Companies and public establishments that light with gas.—

The great importance of Sub-ways has now been considered as combining within themselves the four vital objects of municipal regulation in every City, especially in the British Metropolis; *viz.* the *public Sewers*—*paving the Streets*—*the supply of Water*—and *lighting the Streets*.

The annual income these four establishments derive from the public, in the metropolis only, cannot be estimated at less than one million sterling.

This vast sum, properly applied in a different manner, in the way it is capable of being applied, will give increased advantages of great importance to the public in each of those objects ; and the amount may be considerably reduced from year to year, so as to relieve the public very essentially.

THE COMPLETION OF SUB-WAYS,

from the foregoing considerations, becomes an object of undeniable necessity; but in addition to what has been shewn, as respects disturbing the streets to get to the sewers, as well as the water and gas pipes, the quality of the water itself is connected in some degree with the subject of Subways ; for whatever the quality of the water, or wherever it may be drawn from, or however pure, in its progress through the pipes, while they lay in the ground, the mud will be imbibed at the joints, and it will be contaminated.

In an exposé of Mr. Wright, who has exerted himself with great labour to bring the question before the public, he thus expresses himself :—

“ About two years ago my attention was directed, in the way which I shall presently have occasion to state to the Commissioners, to the bad quality of the water furnished to the western portion of the metropolis, by one of the five Com-

panies which had partitioned the town between them, and had thereby established a monopoly of an element of nature, and prime necessary of life. The result of the enquiries which I was in consequence induced to make, was a strong conviction that, owing to a variety of causes, partly arising out of that monopoly, and partly out of the enormously increased size and population of the metropolis, the supply of water thereto rested upon a very unsound foundation.

“ In the December of 1826, I came to the determination of directing the attention of the public to the subject ; but before I carried that determination into execution, I thought proper to address a letter to Sir Francis Burdett, in which I pointed out to him the evils which a monopoly of an article, designated by the great Mead as ‘ *the vehicle of all our nourishment*,’ had brought upon his constituents, and expressed a confident hope that he would further the object I had in view, by calling the attention of the House of Commons to so crying a grievance. To this letter I received from Sir Francis an immediate reply, in which he stated that he considered the subject to be one of great importance ; that he would recommend a public meeting of the aggrieved inhabitants, and a petition to Parliament ; and that he should be happy to lend a helping hand towards the overthrow of so mischievous and so unprincipled a confederacy.

“ Thus encouraged to proceed, I set about collecting together my facts ; and on the 19th of March last year, I published a small pamphlet, which I called ‘ *The Dolphin*.’ I have been blamed for giving to it a title which I was told not one man out of a thousand would comprehend the meaning of : but that very ignorance on the part of the inhabitants was precisely my reason for selecting it. So immediately bound up are the health and comfort of every family with the supply of pure and wholesome water to their habitations, that a knowledge of the qualities of that which they are daily using for domestic purposes, must at all times be an object of great importance. Self-evident, however, as this proposition appears to be, it is nevertheless a fact, that during the twelvemonth’s attention which I had paid to the subject, I had not met with half a dozen individuals, out of the many hundred thousands interested in the present enquiry, who could point out to me the *source* whence the impure water which they saw running into their cisterns, was drawn.

“ Being anxious that such a state of things should no longer continue, but that every man, woman, and child, compelled by monopoly to drink the water supplied by the Grand Junction Company, should be aware of the *spot* from which it was taken, I determined on calling my publication ‘ *The Dolphin* ;’ that being the name

given by the Water Companies to the small wooden erection, somewhat resembling a Martello-tower, which they place in the river, to enclose, and to indicate the source or head from which, by means of a steam-engine, their supply is obtained.

“*The Dolphin*’ had not been published many days, before it excited a good deal of attention at the west end of the town. Indeed, it has been charged against me as a crime by the Grand Junction Company, that I ‘created a sensation approaching to a panic; and that, through malevolent and interested motives, I had endangered the very existence of the Company.’ On the other hand, many noblemen, gentlemen, and tradesmen called upon me, to express their approbation of what I had done—their hope that a public meeting would be immediately convened, to take into consideration the best means of procuring a pure and wholesome supply of water to the western parts of the metropolis—and their readiness to sign their names to a requisition for that purpose.

“A public meeting accordingly took place on the 9th of April. It was numerously attended; and the newspapers, one and all, agreed in stating that, for the rank of the persons composing it, it was one of the most respectable that had ever been held. The following is a copy of the resolutions agreed to thereat:—

SUPPLY OF WATER TO THE WESTERN PORTION OF
THE METROPOLIS.

“ At a public meeting, held on Monday, the 9th of April, 1827, at Willis’s Great Room, St. James’s, to take into consideration the means of procuring a supply of pure and wholesome water to the inhabitants of the western portion of the metropolis—Present, Sir Francis Burdett, Bart., M. P., in the Chair ; the Marquess of Salisbury ; the Earl of Jersey ; the Earl of Sefton ; Lord Auckland ; Lord Wharncliffe ; Sir W. W. Wynn, Bart. M. P. ; Sir Henry Halford, Bart. ; the Hon. William Ponsonby, M. P. ; the Hon. Douglas Kinnaird ; John Cam Hobhouse, Esq. M. P. ; C. Baring Wall, Esq. ; M. P. ; Dr. Turner ; Dr. Paris ; Dr. Macmichael ; Dr. Robert Bree ; Professor Brande ; Samuel Rogers, Esq. ; John Murray, Esq. ; M. W. Andrews, Esq. ; H. Robson, Esq. ; Mr. Fores ; Mr. W. B. Stone, &c. &c. &c.

“ Resolved,

“ 1st. That a constant supply of pure and wholesome water is essential to the health and comfort of the inhabitants of this great and thickly-peopled metropolis.

“ 2d. That the principle of the Acts of Parliament under which the several Companies supplying the metropolis with water, were instituted, was to encourage competition ; seeing that it is only from competition that a perfect security can be had for a good, a cheap, and a plentiful supply.

“ 3d. That, nevertheless, by an arrangement entered into, about the year 1817, between the several Companies supplying the metropolis with water, all competition was put an end to, and a monopoly of this necessary of life virtually established.

“ 4th. That the water taken up from the River Thames at Chelsea, for the use of the inhabitants of the western portion of the metropolis, being charged with the contents of the great common sewers, the drainings from dung-hills and lay-stalls, the refuse of hospitals, slaughter-houses, colour, lead, and soap works, drug-mills, and manufactories, and with all sorts of decomposed animal and vegetable substances, rendering the said water offensive, and destructive to health, ought no longer to be taken up by any of the Water Companies from so foul a source.

“ 5th. That the Grand Junction Waterworks Company, having engaged to supply their customers with water of the purest and most wholesome quality, to be drawn from the Rivers Colne and Brent, and from an immense reservoir of nearly 100 acres, fed by the streams of the Vale of Ruislip, have, nevertheless, since the month of September, 1820, drawn their supply from the Thames, at the foot of Chelsea Hospital, and nearly adjoining to the mouth of the great Ranelagh common sewer.

“ 6th. That the water supplied by the Grand Junction Company to more than 7,000 families,

has been pronounced, by professional men of the first eminence, to be a filthy fluid, loaded with decayed vegetable matter and other substances, equally deleterious to health, and unfit for domestic purposes.

“7th. That the Grand Junction Company, having promised to supply their customers with water at a comparatively small charge, have, nevertheless, exacted an increased rate, equivalent, in no case, to less than 50 per cent. and extending, in most instances, to 90 and 100 per cent.; and that they obtained, in May last, the sanction of the Legislature to a new table of rates, by which an addition of from 50 to 300 per cent. may be levied on their customers.

“8th. That a petition be presented to both Houses of Parliament, praying that a full enquiry into the constitution and practices of the several Companies supplying the metropolis with this all-important necessary of life, may be instituted; in order that the nuisance complained of may be speedily abated, and the supply of pure and wholesome water to the western portion of the metropolis, be henceforward placed on a sure and lasting foundation.

“9th. That a subscription be entered into to defray the expences which must be incurred in preparatory measures connected with the object of the present meeting; and that the following noblemen and gentlemen be a committee to receive and appropriate the same, *viz.*

“ The Marquess of Lansdowne ; the Marquess of Salisbury ; the Earl of Essex ; the Earl of Jersey ; the Earl of Tankerville ; the Earl of Hardwicke ; Earl Grey ; the Earl of Rosslyn ; the Earl of Sefton ; Lord Grantham ; Lord Auckland ; Lord Wharncliffe ; Lord Francis Leveson Gower ; Sir Francis Burdett, Bart. M. P. ; Sir W. W. Wynn, Bart, M. P. ; Sir Henry Halford, Bart. ; Sir Ronald Fergusson, M. P. ; the Hon. G. A. Ellis, M. P. ; the Hon. William Ponsonby, M. P. ; the Hon. Douglas Kinnaird ; John Cam Hobhouse, Esq. M. P. ; H. Brougham, Esq. M. P. ; C. Baring Wall, Esq. M. P. ; W. J. Denison, Esq. M. P. ; E. W. Pendarves, Esq. M. P. ; John Marshall, Esq. M. P. ; Joseph Birch, Esq. M. P. ; W. S. Poyntz, Esq. M. P. ; R. Knight, Esq. M. P. ; Dr. Turner ; Dr. Robert Bree ; Dr. Paris ; Dr. Hooper ; Dr. Macmichael ; Dr. Hume ; Dr. Kerrison ; Professor Brande ; Robert Keate, Esq. ; Samuel Rogers, Esq. ; Richard Sharp, Esq. ; R. Williams, Esq. ; B. C. Brodie, Esq. ; Alexander Rainy, Esq. ; Charles Dumergue, Esq. ; John Murray, Esq. ; E. Driver, Esq. ; Everard Brande, Esq. ; M. W. Andrews, Esq. ; Henry Colburn, Esq. ; H. Robson, Esq. ; Joseph Kennerly, Esq. ; G. Squibb, Esq. ; Mr. William Stewart ; Mr. Fores ; Mr. J. Ridgway ; Mr. W. B. Stone ; Mr. J. Wright ; with power to add to their number.

“ 10th. That the thanks of this meeting be given to Mr. Wright, of Regent-street, for hav-

ing directed the public attention to this important subject.

“ 11th. That Sir Francis Burdett, Bart. and John Cam Hobhouse, Esq., our representatives in Parliament, be instructed to support the prayer of the said petition.

“ 12th. That the thanks of this meeting be given to Sir Francis Burdett, Bart. for his impartial conduct in the chair.

(Signed) “ FRANCIS BURDETT.”

“ On the 12th of April, the committee appointed at the above meeting, met at the Thatched House Tavern, the Earl of Sefton in the chair, and agreed to the following petition :—

“ TO THE HONOURABLE THE COMMONS OF THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND, IN PARLIAMENT ASSEMBLED.

“ The Petition of the undersigned inhabitants of the western portion of the metropolis, sheweth,

“ That your Petitioners beg leave to submit to your Honourable House, that the principle of the Acts of Parliament, under which the several Companies supplying the metropolis with water, were instituted, was to encourage competition ; seeing that it is only from competition, that a perfect security can be had for a good, a cheap, and a plentiful supply.

“That, nevertheless, by an arrangement entered into, about the year 1817, between the several Companies supplying the metropolis with water, all competition was put an end to, and a monopoly of this necessary of life virtually established.

“That the water taken up from the River Thames, at Chelsea, for the use of the inhabitants of the western portion of the metropolis, being charged with the contents of the great common sewers, the drainings from dung-hills and lay-stalls, the refuse of hospitals, slaughter-houses, colour, lead, and soap works, drug-mills, and manufactories, and with all sorts of decomposed animal and vegetable substances, rendering the said water offensive, and destructive to health, ought no longer to be taken up by any of the Water Companies from so foul a source.

“That the Grand Junction Waterworks Company, having engaged to supply their customers with water of the purest and most wholesome quality, to be drawn from the Rivers Colne and Brent, and from an immense reservoir of nearly 100 acres, fed by the streams of the Vale of Ruislip, have nevertheless, since the month of September, 1820, drawn their supply from the Thames, at the foot of Chelsea Hospital, and nearly adjoining to the mouth of the great Ranelagh common sewer.

“That the water supplied by the Grand Junction Company to more than 7,000 families,

has been pronounced, by professional men of the first eminence, to be a filthy fluid, loaded with decayed vegetable matter, and other substances, equally deleterious to health, and unfit for domestic purposes.

“ That the Grand Junction Company having promised to supply their customers with water at a comparatively small charge, have, nevertheless, exacted an increased rate, equivalent in no case to less than 50 per cent., and extending, in most instances, to 90 and 100 per cent.; and that they obtained, in May last, the sanction of the Legislature to a new table of rates, by which an addition of from 50 to 300 per cent. may be levied on their customers.

“ That your Petitioners are convinced that, if an enquiry be instituted by your Honourable House, the several allegations of this Petition will be satisfactorily established; and that means will be discovered for placing the supply of water to the western portion of the metropolis on a sure and lasting foundation.

“ Your Petitioners therefore humbly pray that your Honourable House will forthwith cause an enquiry to be made before a Committee of your Honourable House.

“ And your Petitioners will ever pray.”

“ This Petition, and a similar one to the House of Lords, were, after they had been

signed by the members of the Committee present, and by a numerous body of the inhabitants, presented to both Houses: the former by Sir Francis Burdett; the latter by Lord Wharncliffe. The prayer of the Petition was, that an enquiry might be instituted by Parliament; but, owing to the adjournment which immediately after took place, in consequence of the negotiations going on at that time for the formation of a new Administration, it was found, on the re-assembling of the two Houses, that a Parliamentary enquiry could not be satisfactorily gone into at that late period of the Session, and it was thought proper to substitute for it a Commission, to be appointed by the Crown."

Petitions were also presented from other parts of the metropolis.

*" TO THE HONOURABLE THE COMMONS OF THE
UNITED KINGDOM OF GREAT BRITAIN AND
IRELAND, IN PARLIAMENT ASSEMBLED.*

" The humble Petition of the undersigned inhabitants of the Parish of St. Mary, Lambeth, and parts adjacent, in the County of Surrey, sheweth,

" That an Act of Parliament was passed in the 25th year of the reign of his late Majesty, authorizing the Company of Proprietors of the

Lambeth Waterworks to supply the inhabitants of the Parish of Lambeth, and parts adjacent, with water.

“ That another Act of Parliament was passed in the 45th year of the same reign, incorporating another Company, for the purpose of supplying with water the inhabitants of part of the Parish of Lambeth, and several other parishes and places adjacent; but such Company is expressly restricted from supplying the district inhabited by your Petitioners (which has much increased in population since the passing of the first-mentioned Act), under a penalty of £10 per annum for every house so supplied, whereby an impolitic monopoly is in effect secured to the Lambeth Company, manifestly prejudicial to the interests of the inhabitants of the prohibited districts, whereby your Petitioners' security in cases of fire is materially hazarded.

“ Your Petitioners therefore most humbly pray, that the supply of water to your Petitioners may be thrown open to competition; and that the Commissioners, in any Commission that may issue to enquire relative to the supply of water to the metropolis, may be directed to extend their enquiries to the district now supplied by the Lambeth Waterworks Company, or to grant your Petitioners such other relief as to your Honourable House shall seem meet.

“ And your Petitioners will ever pray.”

*“ TO THE HONOURABLE THE COMMONS OF THE
UNITED KINGDOM OF GREAT BRITAIN AND
IRELAND, IN PARLIAMENT ASSEMBLED.*

“ The humble Petition of the undersigned inhabitants of the Parishes of Lambeth and Christchurch, in the County of Surrey, sheweth,

“ That the inhabitants of the Parish of Christchurch, and parts of the Parishes of Lambeth, St. George the Martyr, in the Borough of Southwark, all in the County of Surrey, and other places adjacent, containing many thousand houses, and above 100,000 inhabitants, are mainly supplied with water from the Lambeth Waterworks Company, established under an Act of Parliament passed in the 25th year of the reign of his late Majesty.

“ That in the 45th year of the same reign, another Company was incorporated for supplying the inhabitants of other parts of the Parish of Lambeth, and several other parishes and places in the County of Surrey, with water; but your Petitioners are thereby prohibited from receiving a supply from any other Company except that established under the first-mentioned Act, which continues to enjoy a monopoly of the supply of water to a very populous and increasing district, whereby your Petitioners are deprived of the benefit of competition, and are subjected to the payment of whatever rates may be demanded of them.

“ Your Petitioners therefore, strongly impressed with the injustice and impolicy of this monopoly, most humbly but earnestly pray, that your Honourable House will be pleased to take their case into consideration, and to throw open to competition the supply of water to your Petitioners, or to grant them such other relief as to your Honourable House shall seem meet.

“ And your Petitioners shall ever pray, &c.”

“ *TO THE RIGHT HONOURABLE THE MEMBERS
OF HIS MAJESTY'S CABINET COUNCIL.*

“ The humble Petition of the undersigned inhabitants of Battle Bridge, in the Parish of St. Pancras, and extending from thence to Camden Town, to the New River Head to the east, to St. Pancras New Church to the west, and parts adjacent :

“ That your Petitioners, understanding that a Commission has been ordered by His Majesty to enquire into the state and supply of water to the metropolis, beg leave to represent that, from a deficiency in the supply of pure and wholesome water, the streets and roads in front of their houses are watered from the common sewers, by which abominable and disgusting practice the health of your Petitioners is greatly injured, their lives endangered from contagion, and their property rendered less valuable.

“ Your Petitioners therefore, strongly im-

pressed with the serious consequences certain to accrue from breathing such obnoxious vapour, the natural effect of evaporation, most humbly beg that their case may be included in the aforesaid Commission, and that wholesome water may be ordered for that purpose ; or grant such relief as to the Honourable the Commissioners may seem meet.

“ Signed by T. L. FENNER, and 78 others.

“ *TO THE RIGHT HONOURABLE HIS MAJESTY'S
PRINCIPAL SECRETARY OF STATE FOR THE
HOME DEPARTMENT.*

“ We, the undersigned inhabitants of the Borough of Southwark, humbly beg leave to lay before you the following statement, in the hope that our situation may induce the Government to refer the case to the consideration of the Commissioners appointed to enquire into the state of the supply of water to the metropolis by the present existing Water Companies.

“ The water which is furnished to our houses, is taken out of the River Thames a very short distance west of London Bridge, and contains the impurities with which that part of the river is infected, without any attempt whatever to cleanse the same by competent reservoirs, although in other instances several of the present Water Companies have constructed such reservoirs at a very considerable expence.

“ We forbear to dwell upon the effects resulting from the present system, as we shall be perfectly content to have the case investigated by the Commissioners, to whom Government have referred the general supply.

“ Signed by DANIEL BIRT, and 17 others.

“ Accordingly, on the 11th of June, Lord Wharncliffe moved, in the House of Lords, ‘That an humble Address be presented to His Majesty, praying that His Majesty will be graciously pleased to order a Commission to be issued, to enquire into the supply of water in the western parts of the metropolis.’ The motion was agreed to without opposition; as was likewise a similar motion made in the House of Commons by Sir Francis Burdett. A Commission was accordingly appointed by His Majesty; but, in consequence of the inhabitants of Lambeth and of the Borough of Southwark having petitioned to be included in the enquiry, its labours were not confined to the western parts of the town, but were extended to the whole metropolis.

**“COMMISSION FOR ENQUIRING INTO THE SUPPLY
OF WATER IN THE METROPOLIS.**

“ **GEORGE R.**

“ George the Fourth, by the Grace of God,
of the United Kingdom of Great Britain and

Ireland King, Defender of the Faith, &c. To Our trusty and well-beloved Peter Roget, Doctor of Medicine, and William Thomas Brande, and Thomas Telford, Esquires, greeting:—Whereas an humble Address has been presented to Us by the Lords Spiritual and Temporal in Parliament assembled, beseeching Us that we would be graciously pleased to order a Commission to be issued to enquire into the Supply of Water in the Western part of the Metropolis: And whereas two humble Addresses have been presented to Us by the Knights, Citizens, and Burghesses, and Commissioners of Shires and Burghs in Parliament assembled, beseeching Us that We would be graciously pleased to appoint a Commission to enquire into the state of the Supply of Water in the metropolis, and that We would be graciously pleased to direct that in the said enquiry should be included an enquiry into the Water Companies on the South and Surrey sides of the Metropolis:—Know ye, that We, reposing great trust and confidence in your intelligence, discretion, and diligence, have authorized and appointed, and by these presents do authorize and appoint you, the said Peter Roget, William Thomas Brande, and Thomas Telford, to be Our Commissioners for enquiring into the state of the supply of Water in the Metropolis, including the South and Surrey sides thereof: And We do by these presents give and grant unto you, Our said Commissioners, or any two of you, full

power and authority to enquire of and concerning the premises by all lawful ways and means, and to call before you, or any two of you, such persons as you shall judge necessary, by whom you may be the better informed of the truth of the premises : And We do further by these presents give and grant unto you, or any two of you, full power and authority, where the same shall appear to be requisite, to administer an oath to any person whatsoever to be examined before you, or any two of you, touching or concerning the premises : And We do hereby nominate and appoint our trusty and well-beloved *Robert Pauncefote* to be and act as your clerk, for the purpose of aiding you in the execution of these presents : And We further will and command, and by these presents ordain, that you, or any two of you, shall certify under your hands and seals unto Our Lord High Treasurer, or to the Commissioners of Our Treasury for the time being, what shall be a fit and suitable recompence for such Clerk's pains and service hereby required to be by him performed : And we do by these presents require and command you, Our said Commissioners, or any two of you, to report unto Us, in writing under your hands and seals, without delay, all and every of your proceedings by virtue of these presents, and your observations and opinions touching and concerning the premises : And We further will and command, and by these presents ordain, that this Our Commission

shall continue in full force and virtue, and that you, Our said Commissioners, or any two of you, shall and may, from time to time, proceed in the execution thereof, and of every matter and thing therein contained, although the same be not continued from time to time by adjournment. In witness whereof, We have caused these Our letters to be made patent.

“ Witness Ourselves at Westminster, the twelfth Day of July, in the eighth Year of our Reign.

“ By Writ of Privy Seal,

“ BATHURST.”

“ *Copy of a Letter from Mr. S. M. Phillipps, to the Commissioners of Water Enquiry.*

“ Whitehall, 10th November, 1827.

“ Gentlemen,

“ The inhabitants of Southwark, and the inhabitants of Battle Bridge, in the parish of St. Pancras, having addressed memorials to the Marquess of Lansdowne relative to the supply of water in their respective neighbourhoods, I am directed by his Lordship to transmit these memorials to you for your consideration.

“ I have, &c.

“ S. M. PHILLIPPS.”

Mr. Wright was requested to attend the Commissioners, to whom he presented a Me-

moir, from which is extracted the following statement :—

“ In support of the allegations, I proceed to lay before the Commissioners the facts which I have collected, and the observations which appear to me necessary for their illustration. For the sake of distinctness, I arrange those allegations under the following heads :—

I.—“ That a constant supply of pure and wholesome water is essential to the health and comfort of the inhabitants of this great and thickly-peopled metropolis.

II.—“ That, although the principle of the Acts of Parliament under which the several Companies supplying the metropolis with water, were established, was to encourage competition, an arrangement was nevertheless entered into, about the year 1817, between five of the said Companies, by which competition was put an end to, and a monopoly of a necessary of life was virtually established.

III.—“ That the Grand Junction Waterworks Company having engaged to supply their customers with water of the purest and most wholesome quality, at a comparatively small charge, have not only exacted a greatly increased rate, but have changed the source of their supply to a spot in the Thames, at the foot of Chelsea Hospital, and nearly adjoining to the mouth of the great Ranelagh Common Sewer ; and that

they now furnish to those customers water, which has been pronounced, by professional men of the first eminence, to be a filthy fluid, loaded with decayed vegetable matter, and other substances equally deleterious to health, and unfit for domestic purposes.

IV.—“ That the water taken up from the River Thames, between Chelsea Hospital and London Bridge, for the use of the inhabitants of the metropolis, being charged with the contents of more than 130 public common sewers ; with the drainings from dunghills and lay-stalls, the refuse of hospitals, slaughter-houses, colour, lead, gas, and soap works, drug-mills, and manufactories ; and with all sorts of decomposed animal and vegetable substances, rendering the said water offensive, and destructive to health, ought no longer to be taken up, by any of the Companies, from so foul a source.

V.—“ That it is the duty of the Legislature to deal with the monopoly—to revise the powers entrusted to the confederated Companies—and to devise means for placing the supply of water to this great metropolis on a sure and lasting foundation.”

“ I.—*On the necessity of a pure and wholesome supply of Water to the Inhabitants of the Metropolis.*

Allegation.—“ That a constant supply of pure and wholesome water is essential to the

health and comfort of the inhabitants of this great and thickly-peopled metropolis."

"The above allegation, which at the public meeting held at Willis's Rooms, was moved as a resolution by Sir Henry Halford, and seconded by Lord Wharnccliffe, has been called a truism, or proposition, too self-evident to require stating: but such persons do not seem to be aware how powerfully it tells against the Grand Junction Company; for, if 'a constant supply of pure and wholesome water be essential to health and comfort,' how criminal must those persons be who vend this necessary of life, 'loaded with all sorts of impurities, and unfit for domestic purposes!'

"It was with this view that I endeavoured, in my little publication, by impressing my readers with the salutary properties of *good* water, to make them alive to the dangerous consequences resulting from the use of *bad*: and I introduce some of my authorities into this memoir—not, assuredly, for the information of the Commissioners, but to shew them that my opinions were not lightly formed, but were founded upon those of wise and eminent men.

"I ventured to lay it down as a principle, that, 'without pure air and pure water, the inhabitants of large cities cannot enjoy a sound

mind in a sound body :? and the following are a few of my authorities for so thinking.

“ First, as to Air—

Sir William Temple.—“ The common ingredients of health and long life are great temperance, open air, easy labour, simplicity of diet, and pure water. The vigour of the mind decays with that of the body ; and not only humour and invention, but even judgment and resolution, change and languish with ill constitution of body and of health.”

Dr. Trotter.—“ The remote causes of nervous diseases are chiefly to be sought in populous cities. A pure air is of the first importance to sustain animal life in full health and perfection. High buildings and houses, narrow lanes, small apartments, huge warehouses, kitchens underground, consumption of fuel, and a dense population, are so many sources whence the air is contaminated. The ventilation of the upper parts of the building is imperfect : but the lower stories, particularly what is under ground, can receive no pure portion at all.”

Dr. James Johnson.—“ The air is the great agent in the production of disease, both by its vicissitudes of temperature and by its noxious impregnations. If we examine the streets, the

houses, the manufactories, the dormitories, &c. of great and crowded Cities, we shall be astonished that the incalculable mass of exhalations of all kinds, which is constantly floating in the lower strata of a civic atmosphere, is not more detrimental to health than it is. Even the respiration of man and animals must, in some degree, deteriorate the air of large and populous Cities. No man who has felt the exhilaration of the country air, and the depression of spirits which almost uniformly takes place on returning to town, can doubt, that a heavy tax is levied on the health of man in civic society. Its most visible effects are depicted in the complexion, which is pale and exanguious; and this uniformly obtains, whenever man is excluded from the pure breath of heaven. There is every reason to believe, that scrofula first originated, and still continues to be produced, by the confined air, sedentary habits, irregularity of clothing, and derangement of the digestive organs, so prevalent in civic life."

Again—"It is scarcely possible to form an idea of the debility and relaxation which must be induced throughout the muscular systems of people congregated in large Cities, cooped up in confined apartments, and employed in sedentary occupations, without adequate air or exercise. The physical effects resulting from these causes are so glaring and conspicuous, in every street

through which we pass, in every house or manufactory which we enter, in almost every individual whom we contemplate, that the medical philosopher is struck with the enormity of the evil."

Sir John Sinclair.—" Fresh air is found as necessary for man, as clear water is to fishes; and thence the choice of good air is accounted by Hippocrates a circumstance claiming the first rank in the regimen of health. This is particularly the case in regard to children; for it is a melancholy fact that, in a great measure owing to the impurity of the air in London, *one-half* of the children born there, die before they are two years old."

" Next as to Water—

Hippocrates.—" To distinguish that water which is wholesome, is of the first importance to health: for a train of evils are the consequence of the use of bad water."

Encyclopædia Britannica.—" Water, whether used pure, or mixed with wine, or taken in under the form of beer or ale, is the great diluter, vehicle, and menstruum, both of our food, and of the saline, earthy, and excrementitious parts of the animal juices; and it is more or less adapted to the performance of these offices, in proportion to its purity."

Dr. Griffiths.—“ With regard to the water we use, we cannot be too scrupulous, the purity of this element being almost of equal importance to us with the air we breathe.”

Dr. Frederick Hoffman.—“ If there is in nature a medicine that deserves the name of universal, it is, in my opinion, common water, of the best and purest kind. The use of this is so general, and so necessary to us all, that we can neither live, nor preserve our bodies sound and healthy, without it ; for it guards against every disease, protects and defends the body from all kinds of corruption that may prove fatal to life, and answers all possible intentions of cure ; so that without it, no disorder, whether chronic or acute, can be happily and successfully removed. For confirmation of this opinion, I do not insist on the medicinal springs, but confine myself to common water, but of the best and purest kind. If every physician would make it his practice carefully to examine into the quality of the water used in the houses he visits, he might confidently hope to practise with more satisfaction to himself, and benefit to his patients.”

“ If such are the salutary qualities of this element when used in a state of purity, its insidious and deadly attributes, when contaminated by animal and vegetable matters in a state of putrefaction, are, it will be seen, not less striking :—

Dr. Mead.—“ Thus much concerning poisonous exhalations and airs. I shall now make some remarks on the mischief of another fluid, which, as it is next in use to this we have been treating of, so the bad qualities of it, when it comes to be altered, must necessarily be almost equally fatal and dangerous. I mean water; which is of so constant service, not only for our drinks, but also in preparing of our flesh and bread, that it may justly be said to be the *vehicle* of all our nourishment; so that whenever this happens to put on other properties than are necessary to fit it for this purpose, it is no wonder if, in its passage through the body, these do make suitable impressions there.”

Again—“ A late author, by searching into the first accounts of the distemper we call the scurvy, finds that the origin of it was, in all times and places, charged upon the use of unwholesome water. He shews, that where the water is worst, there this malady is most rife; so that he has put it out of all doubt, that most of the complicated symptoms which are ranged under this one general name, if they do not entirely owe their birth to the malignity of this element, do, however, acknowledge it to be their main and principal cause.”

Dr. Lind.—“ The scurvy is to be seen chiefly among the poorer sort, who inhabit low, damp

parts of the provinces, and continue to live upon rancid pork, coarse bread, and are obliged to drink unwholesome water. Bad water is, next to bad air, a frequent cause of sickness in places situated under the Torrid Zone."

Encyclopédie Méthodique.—"Vitruvius informs us, that the ancients inspected the livers of animals, in order to judge of the nature of the water of a country. The size and condition of the liver are a pretty sure indication of the deleterious quality of the water, which, especially when it is stagnant, produces in cows, and particularly in sheep, fatal diseases—for instance, the rot, which frequently destroys whole flocks."

Dr. Harrison.—"The dry rot in sheep has its cause in the poisonous residuum of water. On a dry-limed lay, or fallow ground, in Derbyshire, a flock of sheep will rot in one day; and on some water-meadows in that neighbourhood, when the weather is sultry, in half an hour."

M. Cabanis. "*Rapports du Physique et du Moral de l'Homme.*"—"Water, loaded with putrid vegetable matters, or with earthy substances, acts in a very pernicious manner on the stomach, and the other organs of digestion. The use of it produces different kinds of diseases, both acute and chronical; all of them accompanied by a remarkable state of atony, and a great

debility of the nervous system. They blunt the sensibility, enervate the muscular force, and dispose to all, cold and slow diseases. It is well known that in many countries, otherwise fertile and rich, the inhabitants are forced to use unwholesome water. The incommodities which they produce, quickly extend their action to every point of the system."

Mr. Abernethy.—"It seems sufficiently ascertained, that diseases have been excited by water; and therefore it is necessary that whatever is used, should be as pure as possible."

Dr. William Lambe.—"It is the putrescent matter which is the most noxious principle of common water. It is a matter of common experience that water, according to its different qualities, affects the stomach with a peculiar feeling which we call weight; that the purest water feels the lightest, and what is reckoned the worst, feels the heaviest on the stomach. In healthy persons this sensation is little regarded; but in disease it becomes very distinct, and is often very tormenting: sometimes the stomach feels as if it would burst; sometimes the sensation is, as if a cord were tied round the middle of the body."

Again—"The peculiar noxious principle of bad waters is nothing but the corrupted animal

and vegetable matters with which they are impregnated; these matters are therefore poisonous: in consequence, they ought to be suspected wherever they are found. In enquiring, therefore into the salubrity of waters in general, or into that of any particular example, it is this impregnation which ought to be the chief object of research. Simple earthy matter (though much has been said against it) has never been shewn to be particularly unfriendly to the human system. Metallic matter, of all kinds, is a more just object of suspicion. But the putrid or putrescent matter, the animal or vegetable substances in a state of decomposition, is that which is actively mischievous: it is immediately and directly deleterious; and it is astonishing to consider how greatly the influence of this matter has been overlooked, even by writers who are fully aware of the general importance of the subject."

" II.—*Of the Monopoly.*

Allegation.—" That although the principle of the Acts of Parliament under which the several Companies supplying the metropolis with water were instituted, was to encourage competition, an arrangement was entered into about the year 1817, between five of the said Companies, by which all competition was put an end to, and a monopoly of a necessary of life virtually established."

“The Companies which have monopolized the supply of water to the metropolis are five in number:—1. The New River—2. The Chelsea—3. The East London—4. The West Middlesex—and, 5. The Grand Junction.

“The history of the arrangement above referred to, by which arrangement a monopoly of the sale of a necessary of life was, to all intents and purposes, established, will be found in the Report of the Committee of the House of Commons which sat in the months of February and March, 1821, on the supply of water to the metropolis; to which Report, as well as to the minutes of evidence taken before it, I beg leave to direct the attention of the Commissioners.

“It therein appears, that the principle of the Acts of Parliament under which the several Water Companies were instituted, was to encourage competition; seeing that in this, as well as in other cases, it is only from competition, or the expectation of competition, that a perfect security can be had for a good, a cheap, and a plentiful supply.

“By an arrangement, however, which took place between the five confederated Companies, all competition was virtually put an end to. The scheme for partitioning the town, and establishing a close monopoly, was arranged towards the close of the year 1817; and carried into effect at Christmas, by the simultaneous retirement from

each allotted district of all the Companies previously employed, except the individual Company which was thenceforward to be left in exclusive possession of the field.

“The Companies gave no previous notice whatever of their intentions ; and in reply to the remonstrances of their customers, informed them, that for the future they could only be supplied by the one continuing Company ; and those customers were also given to understand, that an increased rate would shortly be exacted. The indecency of the proceeding produced a temporary burst of indignation ; but so deadening are the effects of monopoly, that the imposition was, after a slight struggle, submitted to, and the nefarious scheme brought to completion.

“That a combination, bottomed in such a disregard for the public welfare, should exist for any long period without producing the train of evils ever attendant on monopoly, was not to be expected ; but that, in the space of less than nine years, it should have given birth to the enormous grievance which I am about to expose, could hardly have entered into the imagination.

The following letter was received from Dr. Johnson :—

‘ Suffolk-place, Pall-mall East, Feb. 13, 1827.

‘ Sir,

‘ I have always looked upon the water used in London, and taken up in or near

the metropolis, as most disgusting to the imagination, and deleterious to health. But as I have publicly stated my sentiments nearly twelve months ago, in the *Medico-Chirurgical Review* (which I herewith send you), on the subject of the water taken up at Chelsea, I need not now restate them here.

‘ I am, Sir, your most obedient Servant,

(Signed)

‘ J. JOHNSON.’

“The following is the extract from the *Medico-Chirurgical Review*, Vol. iv. p. 207, to which Dr. James Johnson refers. It is brief, but it embraces the great question which the Commissioners have to decide upon :—

‘ We sneer at the delicacy of the Hindoo, who slakes his thirst at the same tank where his neighbour is sacrificing to Cloacina ; but what shall we say to the delicate citizens of Westminster, who fill their tanks and stomachs with water from the Thames, at that very spot into which one hundred thousand cloacæ, containing every species of filth, and all unutterable things, are daily disgorging their hideous and abominable contents.

‘ It is absolutely astonishing that, in these days of refinement, and in a metropolis whose inhabitants pride themselves on delicacy and

cleanliness, a practice should obtain, at which posterity will shudder, if they can credit it. We do not believe that a parallel instance of bestial dirtiness can be cited from any part of the globe.

‘ A time *must* come when the people of London will open their eyes to this scene of corruption, veiled and concealed as it is by iron tubes and stone pavements. We are not among the idolaters of the ancients ; but we do admire the delicacy of their taste, in expending so much labour and wealth in commanding abundant supplies of pure and salubrious water for the everlasting City.

‘ The New River and the Hampstead Waters are ethereal streams, compared with those of Chelsea. It is difficult to say how far health may be affected by drinking from such a polluted source ; but surely such deleterious substances, however minutely divided, cannot be salubrious. It is therefore probable that part of the insalubrity of the City, as compared with the country, may be owing to this cause.’—

“ Such answers as Dr. Johnson’s, I received generally in reply to my letter to the medical gentlemen. The first question put to me was, as to the motives which had induced me to take up the subject ; and upon finding that I was totally unconnected with any of the Water

Companies, and had no object in view but a public one, they entered into my views with a liberality, and with a spirit of perfect independence, that do honour to the profession.

“ The following is an interesting extract from Dr. J. Cheyne’s ‘Medical Report on Dysentery.’

‘ Several years ago, when the dysentery raged violently in the old barracks at Cork, the care of the sick was, in the absence of the regimental surgeon, entrusted to the late Mr. Bell, surgeon of that City. At the period in question, the troops were supplied with water from the River Lee, which, in passing through the City, is rendered unfit for drinking, from the influx of the contents of sewers from the houses ; and likewise is brackish from the tide, which ascends into their channels. Mr. Bell, suspecting that the water might have caused the dysentery, upon assuming the care of the sick, had a number of water-carts engaged, to bring water for the troops from a spring called the Lady’s Well ; at the same time they were no longer permitted to drink the water from the river. From this simple, but judicious arrangement, the dysentery very shortly disappeared among the troops.’—

“ Although this enormous metropolis may at the present moment be, generally speaking, in a healthy condition, it does not therefore follow that it will always remain so. The Grand

Junction Company's water has been declared by professional men to be 'loaded with decayed vegetable matter, and other substances equally deleterious to health.' And how much an unusually sultry summer, or one of those great droughts with which countries are oftentimes visited, may add to its unwholesomeness, are points which it would be presumptuous in me to attempt to solve.

“For the above, as well as for other reasons, I did not consider it necessary to delay my exposure until I had proof positive of a fellow-creature having been actually poisoned by the use of this water ; and I am borne out in having so done by no less a man than Dr. Mead. ‘As we before took notice concerning airs,’ says the Doctor, ‘so it may be observed of waters, that there are some alterations of them, which, though not properly *poisonous*, yet are of so great consequence in their effects, that they may well deserve to be regarded.’

“But supposing for a moment the Grand Junction Company's water *not* to be deleterious to health, is there not a word to be said on the score of comfort and cleanliness? Is there nothing offensive to the senses in the use of this cleansed, this ‘improved’ water? Has it not an inevitable tendency to change the habits of Englishmen—to lower our notions of propriety—to reduce us to a filthy race?

“Cleanliness, we are told, is next to godliness. ‘The different nations of the world are as much distinguished,’ observes Mr. Addison, ‘by their cleanliness, as by their arts and sciences: the more any country is civilized, the more they consult this virtue.’—Dr. Forsyth says that, ‘cleanliness is a subject, the value of which must be obvious to every mind capable of the least reflection, whether estimated in a medical or a moral point of view. Cleanliness in person, and in all concerned with it, is a principal duty of man. It is better to wash twenty times a day, than to allow a dirty spot to remain on the skin.’

‘I recommend,’ says Dr. Adair, ‘as a habit conducive to general health, the washing of the whole head every morning, on first rising, with cold water. Children should be encouraged to dip their face into a basin of cold water, *keeping the mouth and eyes open*, until they require a fresh breath, and repeat this thrice every morning. This practice strengthens the eyes and gums, preserves the teeth, and acts, in some measure, as a cold bath, by sympathy on the whole body.’—

“But bold indeed must be the man, and much more bold the child, who can muster up resolution enough to plunge his head, and dip his face, “*keeping his mouth and eyes open*,” in

a fluid which, though it may have had its mechanical impurities skimmed away, still holds, we are assured, all its filthy and noxious particles in chemical solution.

“ IV.—*Of the River Thames, between Chelsea Hospital and London Bridge, considered as a Source for the Supply of Water to the Inhabitants of the Metropolis.*

Allegation.—“ That the water taken up from the River Thames between Chelsea Hospital and London Bridge, for the use of the inhabitants of the metropolis, being charged with the contents of more than 130 public common sewers, the drainings from dung-hills and lay-stalls, the refuse of hospitals, slaughter-houses, colour, lead, gas, and soap works, drug-mills, and manufactories, and with all sorts of decomposed animal and vegetable substances, rendering the said water offensive, and destructive to health, ought no longer to be taken up by any of the Companies from so foul a source.”—

“ The broad proposition here laid down by the Petitioners, goes, as the Commissioners will perceive, to affect two out of the five Companies which supply London and Westminster with water; as well as to affect all the Companies supplying the Borough of Southwark, and Lambeth. It should, however, always be borne in mind, that while the Grand Junction Company

have, with their eyes open, gone down to that nuisance, that nuisance has, in the progress of time, reached up to the Chelsea Company; Chelsea being, at the period of its incorporation in 1723, a mere village, at a distance of two miles from London.

“ In its actual condition, this enormous metropolis is said to present a spectacle to which the history of ancient and modern civilization affords no parallel. Within the limits of that civilization there is reason to believe that so large a mass of human beings never before congregated on so small a space of ground. New buildings rise up before us with almost the rapidity of an oriental vision, of every form of architectural design, spreading north, south, east, and west. In the neighbourhood of Chelsea; scarcely a blade of grass has been left growing in the extensive range between the rear of Grosvenor-place and Sloane-street; and a mass of buildings are springing up west of Grosvenor-place, consisting of squares and streets of the first order, and comprising houses fit to be the residences of the most wealthy.

“ In such a state of things, and at a time when the improvement of the metropolis is become so much the order of the day, it cannot, I think, but be useful to ascertain whether, from a multiplicity of causes, certain spots or positions in

the River Thames, running parallel with the habitations of more than a million of human beings, may not have become so changed, and the water drawn up from it so deteriorated, as to render it no longer a fit source for the supply of a necessary of life to any considerable portion of the inhabitants.

“That the water in that direction has become so deteriorated, is the opinion of the Petitioners: and in support of that opinion, I beg leave to lay before the Commissioners a few facts and observations:—

“1.—With respect to the water of the River Thames, taken up at London, two or three popular errors appear to me to prevail.

“The ground upon which those persons proceed, who maintain that the Thames water so taken up is the best of all possible waters, arises out of a notion, picked up from some old book of voyages, that it possesses a certain power of self-purification, not possessed by that of any other river. They tell us that in the course of *a long voyage*, it will, after *a month or two* tossing about on the ocean, ‘work and ferment like liquor, and become fine.’ And hence it is logically concluded, that the water taken up by the Grand Junction Company, near a common sewer, will, by making *a short voyage* from

Chelsea to Paddington, and remaining *a day or two* stagnant in reservoirs, in like manner ferment, and become fine. That the water of any other river, if equally loaded with filth, would purge itself in the same manner, if subjected to the same operation, there can be no doubt. In its excessive impurity must we look for the explanation of the above phenomenon.

“Another popular error, proceeding apparently upon the old maxim, that ‘what will not kill, will fatten,’ is very prevalent, namely, that to the rich and unctuous quality of the Thames water, in the aforesaid direction, and not to the virtues of hops and malt, the country is indebted for its far-famed London porter. The fact, however, is, that the water of the Thames is not used in the manufacture of this national beverage; seeing that the great houses of Barclay, Hanbury, Calvert, &c. have, at vast expence, sunk wells of immense depth, and have thereby obtained an abundant supply of pure and soft water.

“The third error which appears to me to prevail is, that the impurities of the Thames are all carried away, and swept into the ocean, with every ebb of the tide. The fallacy of this notion was shewn at the public meeting at Willis’s Rooms by Mr. Mills. That gentleman observed that, as an engineer, he would maintain, that it

was not in the power of any Company, let its capital, its intelligence, and its disposition be what they might, to find a supply of pure water in the direction pointed out in the allegation. 'The contents of the sewers, and the mass of other filth with which the river was loaded, were,' he said, 'carried about 30 miles by every ebb-tide. The same water came back by the flood; and thus, let the supply of London be taken how it might, if it was not derived out of the reach of this flux and reflux of filth, it would, of necessity, be impure: if the filth, emptied into the Thames at the ebb, were not brought back by the flood, it was evident that we should have salt water at London.'

"2. The following descriptions of the Thames water, as taken up at London, will, I have no doubt, be found the true ones:—

'No water carried to sea,' says Dr. Trotter, 'becomes sooner putrid. When a cask is opened after being kept a month or two, a quantity of inflammable air escapes, and the water is so black and offensive as scarcely to be borne. Upon racking it off into large earthen vessels, and exposing it to the air, it gradually deposits a quantity of black, slimy mud, and becomes clear.'

'Mr. Newton says, 'in a still of five and twenty or thirty gallons, the first three gallons

distilled should be thrown away; because the water taken up from the Thames at London is charged with so much septic matter, that the fluid which first runs off in distilling, will not keep many days: three or four gallons must likewise be left at the bottom of the still, on account of the residuum of filth which they contain.'

“ Mr. Ralph Walker, the engineer, says that ‘ the water of the River Thames is excellent until it comes to London, where it receives, not only the filth which is discharged from the common sewers, but also matters of a nature very pernicious to human life.’

“ 3.—If such was the foul condition of the River Thames, between Chelsea and London Bridge, when the above descriptions were written, it must inevitably be so at the present moment, in a greatly increased degree. Formerly it was considered necessary, for the sake of the health of the metropolis, to preserve the river in the greatest possible state of purity. Orders were, from time to time, issued by the Corporation of London, forbidding all persons from casting any soil or filth whatever into it, to the great annoyance and hurt of the said river; and so far back as the year 1535, an Act was passed, in the reign of Henry the Eighth, in which it was enacted, ‘ That if any person or persons do,

or procure any thing to be done, in the annoying of the stream of the River Thames, by casting of dung, or rubbish, or other things, in the said river, he shall forfeit, for so offending, a hundred shillings.' But this was not considered enough: 'If any person or persons, in great rains, sweep their soilage or filth off their houses into the channels, and the same afterwards is conveyed into the Thames, every person so offending shall forfeit, for every such offence, one shilling and eight-pence.'

"4.—Within the last few years a total and entire change in this respect has taken place in the municipal regulations of the metropolis. That which three centuries ago was considered an offence, to be visited with penalties, the inhabitants are now exhorted to perform as a duty. 'The drains and sewers,' says Sir Gilbert Blane, 'are now kept in a state of cleanness never before known. The Commissioners of Sewers not only permit the inhabitants, but *exhort* them, to let all the soil and filth drop into the drains instead of accumulating it in cesspools, to be removed by the nightmen as formerly, to the infinite annoyance of the senses.'

"The exhortation has not been unattended to. The race of men last mentioned by Sir Gilbert are nearly extinct—their 'occupations gone.' And this being the case, is it in the

nature of things, if the enormous mass of pollution, which was formerly taken away in waggons, and distributed over the land as manure, is now permitted to find its way into the Thames through the common sewers, that the water taken up near the mouth of those common sewers, can be otherwise than what professional men have declared it to be?—namely, ‘ a filthy fluid, loaded with decayed vegetable matter, and other substances equally deleterious to health, and unfit for domestic purposes.’

“ 5.—Sir Gilbert Blane, on Common Sewers, observes, that ‘ those stupendous works, the *Cloacæ* of ancient Rome, were accounted one of the wonders of the world;’ and that ‘ the excavations were so enormous, that a waggon loaded with hay could pass through them, and vessels sailed in them: the *Cloaca Maxima* being formed by Tarquinius Superbus.’—That the metropolis of Old England was not outdone in the number and in the size of its common sewers by the metropolis of ancient Rome, I think I shall be able to shew. The number of common sewers on the north side of the River Thames, between Chelsea and the Tower of London, will, I believe, be found to be nearly as follows. As the Commissioners, I trust, will put the matter beyond doubt, by directing an accurate survey of the river to be taken, I can be corrected, if I have inadvertently fallen into error.

From Chelsea to Vauxhall Bridge	17
— Vauxhall Bridge to Westminster Bridge ..	11
— Westminster Bridge to Waterloo Bridge ..	30
— Waterloo Bridge to Blackfriars Bridge....	10
— Blackfriars Bridge to Southwark Bridge ..	6
— Southwark Bridge to London Bridge	7
	<hr/>
	81

To which may be added :—

From London Bridge to the Tower.....	7
— the Tower to the River Lea	10
Southwark side of the River	41
	<hr/>
Total number....	139
	<hr/>

to say nothing of the refuse of colour, lead, gas, soap works, drug-mills, and manufactories of various descriptions.

“ Thus are nearly 140 common sewers daily and nightly disgorging their horrid contents into the Thames, in that very direction in which certain Water Companies draw up the supply for half the inhabitants of the metropolis. Sir Gilbert Blane boasts of the *Cloaca Maxima* of ancient Rome, through which a waggon loaded with hay might pass. Why ! disguise the fact as we may, the whole River Thames from Chelsea to the Tower is neither more nor less than one enormous common sewer—the *Cloaca Maxima* of London—containing the impurities of a million of human beings, and forming a mass of filth, pollution, and putridity, in a state of constant agitation to and fro, such as never before

was or could be collected together in so small a space. This is the undisguised state of the case; and in a matter which concerns the public health, it would be worse than affectation not to speak out.

“ 6.—Accounts are constantly appearing in the newspapers confirming the allegation of the Petition, and establishing beyond doubt the great impurity of the Thames water taken up at London. The Commissioners of Sewers have endeavoured to prevent the refuse of the gas-works from escaping into the river; but from the immense quantity now used, it inevitably finds its way thither. I am assured that the refuse water discharged into the Fleet-ditch sewer at Battle Bridge, which runs into the Thames, is equal to that of a gutter on a rainy day; forming a perpetual stream of poisoned fluid, and depositing a green sediment upon the stones over which it passes. Not long ago it was proved upon a trial, that a horse was actually poisoned by drinking water impregnated with the refuse of the gas-works in the Horseferry-road.

“ Clear water, we are told, is as necessary to fishes as fresh air to man. That the fish, therefore, should have deserted the spot which I have just described, is only natural. Nearly all descriptions have disappeared; and the few which

remain, are said to have generally a sickly unwholesome appearance. The lesson hereby afforded us by the finny tribe is, I submit, a striking one.

“ I copy the following paragraph from the ‘ Times ’ newspaper of the 20th of August last:—‘ The Thames on Saturday morning was covered with a film of an oily nature, which has proved destructive to the river-fish to a very great degree. An immense quantity of eels and flounders are brought to Billingsgate every morning. On Saturday morning shoals were found dead, supposed to have been killed by some deleterious drug in the water. The Dutch eels, which are brought alive in vessels with holes in the bottoms, died immediately on entering that part of the river where the oily fluid appeared.’

“ That the water in the London, the West India, and other Docks, is in an excessively foul and even *poisonous* condition, principally from the number of vessels in them with copper bottoms, has been stated to me by various persons; and I find the following article in the newspapers of the 28th of August:—‘ An inquest was held at Poplar, before Mr. Unwin, Coroner, on the body of William Nurse, aged 14 years, son of Mr. Nurse, of Charles-street, Westminster, who fell into the West India Export Dock. By the evidence of four witnesses, he was in the water

only three minutes, but was quite dead when taken out; owing to the numerous vessels with copper bottoms, causing the water to be full of copperas. *Coroner.*—‘Is not the dock-water very bad?’—‘It is.’ The father said that his son was poisoned by the foul water, and strongly advised that the flood-gates should be opened at certain times of the tide.’

“It has been stated to me by several watermen, that the composition used by them for the preservation of the bottoms of their boats, which formerly protected them for months, now undergoes decomposition in the course of a few days. Would this decomposition take place if the water was pure?

“7.—In a communication which I received on the 29th of October, from Mr. Evans, an intelligent person, who can give the Commissioners much useful information as to the state of the river, there is this passage:—‘On Monday morning last, about half an hour past high water, I saw the foul contents of the great sewer at Blackfriars Bridge running out in quantity sufficient to discolour the whole of the Thames water under the first arch of the bridge, and as far as I could see towards the Southwark Bridge. I observed the same foul appearance of the river at Broken Wharf, London Bridge, and Billingsgate.’

“The Broken Wharf here spoken of is situ-

ated in Thames Street, at nearly an equal distance between the Fleet-ditch and the Walbrook great common sewers. A more filthy spot it is scarcely possible to imagine. Yet at this spot the New River Company have erected a steam-engine, by which, during the excessive heat of summer, when their own good supply falls short, they add thereto the foul water taken up at the foot of this wharf. If that water be sent up into their reservoirs, it must injure the usual supply: if it be sent at once into the houses of their customers, it must, I submit, have a tendency to affect the health of the City. I do not mean to insinuate that even *such* water as this is not better than none; but I do consider it to be a strong proof that the supply of good water is not commensurate with the greatly increased size of the metropolis; and therefore it is that I call the particular attention of the Commissioners to the fact.

“ 8.—That the poisonous refuse of the gas-works should not find its way into the Thames, is impossible. The following article appeared in the daily papers of the 28th of November:—

‘ Last night, between seven and eight o’clock, the inhabitants of College Street, Wood-Street, and Cowley Street, Westminster, were greatly alarmed by several violent explosions in the sewers leading from the gas-works in Great

Peter Street. One vast body of flame was seen coming from the grating of the sewer opposite the door of the Bull's Head public-house in Wood Street; and also a discharge of a barrowfull of mud, accompanied with ignited air, struck a man that was coming out of the public-house with such force as to stun him, and drove him back into the passage. The violence of the shocks extinguished several of the gas-lights. One of the gas-lighters, who lives in Little College Street, was aroused from his chair; and he, with other men connected with the gas-works in Great Peter Street, commenced an investigation, to ascertain whether the explosions resulted from any defects in their works. They reported that they could find nothing wrong in them, and that the explosions were from gas collected in the great sewer, which is in a line with Great Peter Street and Wood Street, passing the wharf of Messrs. Hatchard & Dike *into the Thames.*

“ Mr. Evans has also sent me the following striking particulars :—

‘ November 29.—I saw this morning, in company with Mr. Hatchard, the whole front of the wharf covered with the blue film that was coming out of the said sewer, No. 49; and I saw great quantities of it carried by the rising tide past Mill Bank into Chelsea Reach. On my return, I saw much foul water coming from gut-

ters on each side of the Penitentiary House-gate into the moat, and from thence into the Thames.

‘ Dec. 13.—I took a walk to the Ranelagh common sewer, and found it discharging a stream of black, foul water, deep enough to float a wherry, in a channel about 25 feet wide, and issuing to the Grand Junction Company’s Dolphin.’

“ The Commissioners will have the goodness to bear in mind that this last is the common sewer which the Directors tell their customers ‘ is not a sewer at all, or only in a very minute degree!’ Now, I do not assert that, like the *Cloaca Maxima* of ancient Rome, a waggon loaded with hay could pass through it, but I do believe it is wide enough to admit a carriage.

“ To return to my intelligent, and I may add, venturous correspondent, Mr. Evans :—

‘ Dec. 23.—I and my son stood in the mouth of the sewer, No. 49, about five minutes, during which time we saw the gas bursting in the sewer three times, and each time it rose from the mud at the bottom, and floated on the surface, expanding itself the breadth of the sewer, and shewing green, blue, and yellow tints. It proceeded slowly into the Thames, a portion of it adhering to the mud-beds on each side. The

stench was so great, that we were afraid to stay more than five minutes.

‘ Dec. 27.—This day, at three o’clock, I saw the great common sewer at Dowgate Wharf pouring out filth as black as ink, and with such force as to turn a skiff about ten yards out of her course, up towards Southwark Bridge. At five o’clock I saw the large black stream from Fleet-ditch extend beyond the second arch, and greatly impede a wherry coming through the third arch of the bridge.

‘ Dec. 30.—I and my son saw the same foul black streams at the above sewers, and with this addition, floating gas was coming from Dorset Wharf, with the filth of the privies; and a piece of horse’s lights, about three pounds weight, came out of the Fleet-ditch sewer, quite putrid. This I consider a proof that the filth of the slaughter-houses finds its way through the common sewers into the Thames.’

“ I shall close this part of the subject with the following paragraph, which has appeared in the daily papers:—

‘ Dec. 27, Mansion House.—Yesterday the Lord Mayor issued directions to the proper officers to enquire into the extent of a nuisance, which has become so serious of late as to excite

apprehensions for the health of numbers of the inhabitants of London. It appears that for some time past the authorities at the Tower, in consequence of the overflow of the large ditch round that building, have been obliged to let the contents empty themselves into the river. The Governors of the Trinity House expostulated against this practice, as calculated to raise impediments in the river, to the prejudice of the navigation; but the evacuations still took place, and they proved to be excessively offensive. In fact, the common sewers emptied themselves into the ditch from various parts of the metropolis so copiously, that it often became necessary to turn the contents into the Thames. The water of the immediate neighbourhood became of course very impure, on account of the vast accumulation of filth from that very populous part of the town. Some years ago, it was the practice of nightmen to drive their cart-loads into the country, to be used as manure. This plan had been, however, in a great measure discontinued, and the nightmen emptied their carts into the common sewers; *so that the Thames was sure to receive all manner of offensive matter.* This was quite enough to raise fears for the health of those who drank of the water subject to such pollution; an objection which was certainly much greater than the other, that of the obstruction to the navigation, although the latter was in itself sufficient to demand investigation. The autho-

rities at the Tower insist upon their right to empty the ditch into the Thames, as the common sewers are emptied into their ditch instead of the Thames direct; and they intend to persevere in this course, in opposition to the Trinity House and the Corporation.'

"9.—In the City of Paris there are, I believe, more than 120 public fountains; and it has been proposed to add similar fountains to the numerous embellishments, and beneficial improvements, now going on in our own metropolis. A communication upon this subject has been forwarded to me, from which I extract the following passage:—

'It is not a little remarkable that there should be one species of ornamental structure in which foreign cities abound, combining both utility and beauty, of which the British islands scarcely afford a single public specimen—I mean fountains. Eustace observes, that 'it is surprising that London should be destitute of such decorations, when we consider the torrents that now roll under its pavements.' It may be said, that such structures are ill suited to our northern latitude; but the fountains of Paris are not the less useful or ornamental, though its climate differs but little from our own: and who has not, in traversing the Boulevards, admired the Fountain of St. Martin, or has hesitated to prefer it to any

of our leaden pumps? May I suggest this addition to the proposed improvements of the metropolis, especially of its western quarter? How beautiful would be the effect of such an ornament on the vacant site of Carlton House, terminating the grand perspective of Regent Street; its sparkling waters backed by the groves of St. James's! Or where could a similar structure appear to greater advantage, than in the grand area before St Paul's, should that Cathedral be thrown open, as has been suggested?"

"It becomes, however, a matter for serious consideration, *where* the immense supplies of 'sparkling water,' for any number of fountains, can be obtained, seeing that the supply of good water required for the domestic consumption of the metropolis is at times already so deficient; for, as to the idea of tossing into the air columns of filth taken up during the dog-days between Broken Wharf and the Chelsea Dolphin, that I should consider to be too preposterous, but for the disgusting statement which I am about to make.

"10.—From going for a supply of water to the mouth of a common sewer, the next step is to resort to the sewer itself. As the *former* had been declared excellent for the human stomach, it was very natural for those whom it concerned, to conclude that the *latter* was sufficiently good

for throwing about the streets and roads of the metropolis in sultry weather. That certain economical purveyors for the public have accordingly profited by the hint, will be seen by the following paragraphs, which appeared in 'The Times' of the 2d and 3d of August last :—

' August 2d.—In Whitechapel the putrid mixture of gore and excrementitious matters proceeding from the animals slaughtered there, is dispersed over the surface of the streets. The putrifying miasmata exhaled from this under the influence of a scorching sun, and wafted down the close and narrow lanes by the sultry breezes of summer, is, and must be, a most productive cause of typhus fever, and other putrid diseases. Were human imagination taxed to compound a malaria of concentrated power, none more deadly could be imagined.

' August 3d.—When we yesterday stated, that in Whitechapel the putrid mixture of gore and excrementitious matters, proceeding from the animals slaughtered there, was dispersed over the surface of the streets, we were not aware that the practice was delicacy compared with one which has obtained in another part of the town. Incredible as the abomination may appear, it is nevertheless as true as it is revolting, that in the direction of the Fever and Small Pox Hospitals there may be seen three pumps—that is to say,

one at Battle Bridge, one opposite the Elephant and Castle leading to Camden Town, and one nearly opposite to the Southampton Arms at Camden Town—which said pumps have, during the late sultry weather, been at work in pumping up, for the purpose of watering the roads, the putrid contents of the great common sewer which receives the filth of all the hospitals, gas-works, and what not, in that quarter. The residences of several hundred respectable families have at times been rendered scarcely habitable, in consequence of this nuisance; and some have actually abandoned them in consequence. ‘By this abominable practice,’ say they, in a petition to the noble Marquess at the head of the Home Department, ‘our health has been injured, our lives endangered, and our property rendered less valuable.’ We are confident that a scandal of such magnitude will, as soon as it shall be known to the noble Secretary, be instantly put a stop to. But this will not be enough. The men who have dared to sport in this way with the lives of their fellow-creatures, ought to be called to a strict account. Had a knot of devils clubbed their heads together to devise the surest mode of creating a plague in the metropolis, they could not have hit upon a better.’

“The above statement is enough to make a man shudder. I can, however, vouch for the truth of every part of it. I have seen the pumps,

and conversed with the poor creatures employed in working them. ' We are not,' said they, ' the men we were : our health is gone ; we can drink like fishes, but we can eat little or nothing.'

" I do not adduce these facts in the way of accusation ; but I do infer from them, and I have a right to infer from them, that if the supply of this necessary of life was as cheap and as abundant as it ought to be, such an abomination could never have entered into the mind of man.

" 11.—I have now presented the Commissioners with a faint picture of the present state of the River Thames between Chelsea and the Tower of London. It will be for them to decide whether the supply of water to the metropolis ought any longer to be taken up in that direction.

" For myself, after all I have seen, I am free to confess, that if their Report shall not contain a recommendation, that after a certain day no water shall henceforth be allowed to be taken up by any of the Companies from this, *the condemned spot*, I shall consider all the pains that I have devoted to the subject as so much labour lost.

" How far the health of its inhabitants has hitherto been injured thereby, it is not for me

to say. It is sufficient, for the case of the Petitioners, to know, that men of high professional reputation state it to be their opinion, that the most awful effects are likely to be produced by the continued use of it.

“ It should also be borne in mind, that the evil is constantly *on the increase*. In cases of unhealthy seasons, the sewers, and consequently the Thames, *must* partake of that unhealthiness; and thus, at the moment when the best and purest water is imperiously called for, at that very moment will it be in the worst and most impure condition.

“ The Grand Junction Company, as I have already stated, were about to erect three new reservoirs in the marshes at Chelsea. The works, however, have happily been suspended until the result of the present enquiry shall be known. How far it may be safe to establish a body of standing filth on a spot which has been called ‘the Walcheren of Middlesex,’ appears to be matter for serious consideration. ‘Great exhalations,’ says Dr. Griffiths, ‘are unfriendly to the human race, when they proceed from pure water only, occasioning intermittent fevers, &c.; but when the exhaled moisture is impregnated with noxious particles, communicated to it by putrid vegetable and animal matter, fevers of a more pernicious tendency may be looked for.’

“The preceding facts and observations shew, I submit, how intimately the health of the metropolis is bound up with the present enquiry; and that, by timely precaution, *the direst calamity that can befall a populous city may, by possibility, be averted.*

“ V.—*Of the Remedy.*

Allegation.—“That it is the duty of the Legislature to deal with the monopoly, to revise the powers entrusted to the confederated Companies, and to devise means for placing the supply of water to this great metropolis on a sure and lasting foundation.”——

“It has been alleged against me, that I have suggested nothing plausible in the way of remedy. Nothing plausible! Why, the very remedy that I did suggest is at this moment in full progress. ‘That pure and wholesome water can be obtained in abundance, there is,’ I observed, ‘no doubt.’ Let, then, the people of Westminster, in the words of Sir Francis Burdett, ‘have a meeting, and prepare a petition.’ What might not be effected by a committee which should invite men of science and knowledge to step forward! In whatever way I view the subject I see hope—‘*Spem bonam certanque domum porto.*’ Let the inhabitants come to the resolution to have good water, and good water they will assuredly obtain.

“ A meeting of the people of Westminster has taken place; a petition, signed by all ranks and descriptions of persons, from the first Duke in the land down to the humblest tradesman, has been presented to Parliament; a Commission of Enquiry has been appointed by His Majesty; and that that Commission will invite men of science and knowledge to step forward with plans for the removal of the evil, I have no doubt. If, therefore, I saw hope in the outset, that hope has settled down into conviction. All that remains for me to do, is to throw out a few hints on the three points contained in the above allegation of the petitioners.

“ That Parliament is perfectly competent to deal with the monopoly, to revise the powers granted to the several Companies, and, upon proof of bad faith with the public, to revoke all the rights and privileges granted under Acts of Parliament, there can be no doubt. The evils that have arisen out of this monopoly, were foretold by the Earl of Lauderdale in the year 1818.

‘ The object of Parliament,’ said the noble Earl, ‘ in passing the different Bills for supplying the metropolis with water, with a view to competition, has been by these Companies completely defeated, and a monopoly substituted. They have combined to divide the town between them. They have effected, by their own private arrange-

ment, that which Parliament refused to allow them to do. The consequence of this conduct is not merely increased price to the consumer, but bad water. While there were rival Companies, there was some security that the public would not be imposed upon ; but, as the matter now stands, a monopoly has been established. If ever there was a case proper for the deliberation of Parliament, this is one.'

' If,' said Lord Chancellor Eldon, in the House of Peers, nine years ago, ' the objects of the Legislature in passing the different Bills for the supply of water to the metropolis, which must be supposed to have been that of competition, have been defeated by the different Companies joining together to establish a monopoly, I trust your Lordships will not separate without its being distinctly understood that it is perfectly within the competence of Parliament to set that matter right.'

" The attention of the House of Peers was also, at that time, called to the subject by Earl Grosvenor, who observed that ' a coalition had taken place between the Water Companies in the metropolis, who had divided great part of the town between them ; and the consequence was, that some of his tenants were compelled to take the Grand Junction water, which was of a bad quality, discoloured, and very disagreeable to

the taste.' No man living is, in my mind, more deeply interested in the removal of this shocking nuisance, and in casting about for a supply of pure and wholesome water, than the noble Earl.

'Tis USE alone that sanctifies expense,
' And Splendour borrows all her rays from Sense.'

"I have already spoken of the splendid mansions that are covering the noble Earl's princely property in the fields of Chelsea and of Pimlico; but if the impurities of the Thames in that direction are to be constantly running into those mansions, they will, I fear, become little better than 'whited sepulchres, which appear beautiful outside, but are within full of all uncleanness.'

"We read also of the crescents, and the colonnades, and the other handsome buildings, that are rising on the estate belonging to the See of the Bishop of London, in the Parish of Paddington. Now, in return for the permission to erect certain buildings on the said estate, the Grand Junction Company bound themselves to serve the tenants of the Lord Bishop with water, at a rate *ten* per cent. below the average rate. But that water, the Commissioners will observe, was promised to be the pure and wholesome water from the Colne and the Brent, and the streams of the vale of Ruislip; and not the filthy puddle, taken up opposite the mouth of a great

common sewer, at the foot of Chelsea Hospital. The Right Reverend Prelate will therefore, I have reason to believe, feel it to be his duty to step forward, and to lend a helping hand, in a matter so closely affecting the comfort and health of so large a portion of his lessees.

“ Every inhabitant of this vast metropolis ought to have a rooted confidence that the water sent into his house is, at all times, of a pure and wholesome quality ; a confidence not so much in the persons who sell the water, as in the Government of the country, that it will not permit any but such as is pure and wholesome to be pumped into their dwellings. Upon this point I entreat the attention of the Commissioners to the following extract from the evidence given before the Committee of the House of Commons in 1821, by Mr. Weale, of the Office of Woods and Forests—a gentleman to whom the public are under the greatest obligation, for the noble stand made by him, at that time, against this monopoly.

‘ The defects,’ said that gentleman, ‘ to which I allude, are involved in the fact, that the supply is vested in the hands of trading Joint Stock Companies. Now, the supply of a large city with water cannot be assimilated, I conceive, to a trade in grain or other commodities. Water must be considered as one of the elements necessary to existence, the same as light and air ; and

not merely as an article of subsistence like corn, nor of convenience like coal ; and therefore its artificial supply to a great city ought not to be the subject of free trade, nor of any kind of trade.

‘ The supply ought not to be limited to the ordinary wants of domestic consumption ; nor ought that consumption to be kept down by the artificial checks which a high price to be paid for it, or any price to be paid for it, by the poor and needy, would produce ; but, on the contrary, the supply ought to be profuse, rather than merely sufficient—and gratuitous to the poor.

‘ The costs of the works required to provide the supply, and the expences attending the delivery of it, should be defrayed out of a local revenue, in the same manner as the expences of the pavements, drains, police, &c. are—raised by an equitable assessment on the property of the district ; and the management of such an establishment should be placed in the hands of local Commissioners, under the like regulations as the Commissioners of Sewers, and other similar bodies.’——

“ That the inhabitants of the metropolis *are not safe* in the hands of this monopoly, I have, I trust, fully established. Whether the supply ought to be placed under the management of

the Government, or to be entrusted to a Special Commission of the inhabitants, will be a matter for consideration.

“ That the establishment of a new Company, which would bring an additional supply of good water to the town, would be an essential benefit, there can be no doubt ; but that the establishment of new Companies (as such Companies are in general constituted) would remedy the evil of monopoly, is highly doubtful.

“ One objection that has been urged against the formation of new Companies is, that the streets would be in an impassable condition, from the constantly breaking up of the pavement. But this evil, I beg to suggest, might be entirely avoided, if the Government of the country would take upon itself the task of bringing the good water to the metropolis, and of making the proprietors of the pipes now laid down, pay a certain sum for the use of it.

“ That an abundant supply of pure and wholesome water can be obtained, no individual has stepped forward to deny. I know, indeed, that men of science, and engineers of eminence, are prepared to submit plans for the consideration of the Commissioners.

“ As nothing, therefore, but an entire falsi-

fication and overthrow of the facts that I have adduced, and am further prepared to adduce, in proof of the badness of the water supplied by certain of the Companies, ought to induce the inhabitants to submit to the imposition ; so nothing but a declaration, signed by the most eminent engineers in the country, that a better article can no where be procured, ought to deter those inhabitants from going in quest of it.

“ It has been calculated, that it would require ‘ an outlay of a million’ to bring the purest water to London, from a distance of thirteen or fourteen miles. The writer does not, however, give the data on which he founds his calculation. I, on the contrary, have been assured that the one-half of that sum would not be required. Be it, however, a million !—would not the overthrow of a grinding monopoly of an element of life, and the ‘ establishment,’ in the words of the Petitioners, ‘ of the supply of pure and wholesome water on a sure and lasting foundation,’ be cheaply purchased at any price? We expend a million on a bridge to carry us over the Thames, and more than a fourth part of a million on a tunnel to carry us under it ; but we submit to the disgrace of drinking the water of that very river, in a state of pollution, and hesitate to move up to a purer source ! If the Government of the country would but become the dispenser of the blessing, I confidently state, from what I have

witnessed of the feelings of the nobility, gentry, and tradesmen, having established residences at the west end of the town, that a loan, for the accomplishment of so godlike an object, would be filled up in the space of four and twenty hours.

“The immense works undertaken, in various ages, by the Governments of different countries, to supply the inhabitants of large towns and cities with water, and thereby to provide for one of the most important necessaries of life, have always been objects of great interest.

“The Romans, during more than 400 years, were contented with the yellow turbid water of the Tiber; but in the fifth century from the foundation of Rome, their magistrates brought from the adjacent mountains, at a great expence, the waters of copious springs, and even whole rivers. . . Aqueducts were afterwards constructed at an enormous charge, and carried through rocks and mountains, and over vallies, conveying, from a distance of sixty, and even a hundred miles, five hundred thousand hogsheads of pure water daily to ancient Rome. What difficulties, then, can present themselves to modern science, to bring to the City and Liberties of Westminster a fifth part of that quantity, from a distance of ten, or even twenty miles?

“Two centuries ago, previous to the disco-

very of the steam engine, and when the population of this metropolis was not a fourth part so great as it is at present, Bills were passed 'for bringing in a pure stream of running water to the north part of the City of London;' and our own countryman, the public-spirited and noble-minded Sir Hugh Middleton, at immense toil and expence, and in spite of innumerable hindrances on the part of the Corporation of that City, on which he was about to confer such an inestimable blessing, succeeded in uniting two streams in Hertfordshire, and in bringing them, through various soils, for a course of forty miles, to the metropolis.

“ In 1802, Buonaparte issued a decree, consisting of two lines, for bringing the water of the Ourcq, during a course of twenty-four leagues, to Paris: ‘ Il sera ouvert un Canal de dérivation de la rivière d’Ourcq, qui amenera cette rivière dans un bassin près de la Villette.’ The municipal body of Paris were afterwards authorized, by a special law, to borrow seven millions of francs to finish the canal. It is now on the eve of completion, and it promises to afford *tenfold* the quantity of water to Paris previously supplied.

“ To look nearer home. The City of Edinburgh receives a supply of excellent water from a distance of eight or ten miles. Under the able

direction of the late Mr. Rennie, Mr. Telford, and Mr. Jardine, and at an expence of only £175,000, the most magnificent works of the kind in Great Britain have been completed. The water is excellent; and the quantity to each inhabitant is nineteen gallons per day; and not less than 280,000 gallons are daily permitted to run to waste. In real utility, they rival the boasted aqueducts of ancient Rome, and are the admiration of all scientific strangers.

“ If such mighty works, then, have been accomplished in former times, and recently in the capital of a branch of the United Kingdom, what is there, I again ask, in the features of the present age, that should deter the inhabitants of the richest, largest, most populous City in the world, the seat of a more opulent body of nobility and gentry than is to be found in any other metropolis, from attempting, by one of those mighty efforts, which fix the character of a country, and elevate it in the scale of nations, to remove from that City *a national disgrace* ?

“ Emperors, we are told, have founded their chief glory on the encouragement which they had given to similar works; and the splendid and useful improvements that have been effected in this metropolis, under the auspices of His present Majesty, warrant the conclusion, that he would delight to patronize an undertaking, hav-

ing for its sole object the security of the health and the comfort of a million of his subjects.

“ It is generally admitted that London, with respect to architectural improvement, has made greater advances since the Peace, than in the entire century which preceded that event. If so, never was moment more favourable!—never had those upon whom has devolved the duty of watching over those improvements, and of directing the public taste, a more useful field opened to them!—never could men be addressed in language so appropriate as that, in which a noble patron of the useful arts was, nearly a century ago, addressed by our great poet, in his inimitable epistle on the proper objects of magnificence and expence, and the public works which become a Prince!—

‘ You too proceed! make falling Arts your care,
Erect new wonders, and the old repair;
Till Kings call forth the ideas of your mind,
(Proud to accomplish what such hands design’d;)
Bid Harbours open, Public Ways extend,
Bid Temples, worthier of the God, ascend;
Bid the broad Arch the dangerous flood contain,
The Mole projected break the roaring main;
Back to his bounds their subject Sea command,
AND ROLL OBEDIENT RIVERS THROUGH THE LAND.’

The Poet adds—

‘ These honours Peace to happy Britain brings:
These are Imperial Works, and worthy Kings.’

“ J. WRIGHT.”

The evidence of the following chemists was also given, in corroboration of the foregoing statement, *viz.* Doctors Bostock, Dill, Johnston, Kerrison, Lambe, Paris, Pearson, Somerville, and Yeates. Several of these gentlemen analyzed the water, and all condemned it as impure.

Evidence was also taken as to the fatal effects of the water on the fish in the Thames, from Mr. Goldham and others.

Examination of Mr. John Goldham.

“ What is your engagement?—Yeoman of Billingsgate Market; as clerk of the market, to ascertain the quality of the fish, to seize and condemn that which is bad, and to receive the dues, and regulate the market.

“ Do you know what effect the Thames water has upon fish?—I was yeoman of the market 25 years ago, and at that time there were 400 fishermen, each having a boat and a boy, fishing above and below London Bridge, from about Deptford to Richmond; and the fish they caught were roach, plaice, smelts, flounders, salmon, shads, eels, gudgeon, dace, dabs, &c. These men were apprenticed to the business.

“ And they gained their livelihood by fishing in the river?—Entirely; at that time I have known them to take 10 salmon, and as many as 3000 smelts, at one haul, up towards Wands-

worth; and as many as 50,000 smelts have been brought daily to Billingsgate. Some of these boats would earn as much as £6 per week; and as many as 3000 salmon have been brought to Billingsgate Market in the season, caught in the River Thames.—The Thames salmon were the best salmon, and would frequently fetch 3s. or 4s. per pound.

“What time are you now speaking of?—About 14 or 15 years ago.

“Was there no change in the quantity for the first 10 or 11 years that you was Yeoman?—No; the quantities did not begin to fall off till about 14 or 15 years ago, and every year since that period there has been a diminution in the quantity; and now there are not 200 men engaged in this fishery, and many of them are now selling off their nets and boats. Last week one man caught only 26 smelts, which he sold for 4s. 6d.

“So that you reckon that this fishery is gone?—Yes.

“Are there any salmon now?—No; I consider it impossible there should be any.

“How long since is it that the salmon have ceased to be caught?—I have not seen salmon for these 10 years, except a straggling fish now and then caught high up, or low down, the river.

“What do you attribute as the cause of the loss of this fishery?—First, the Docks. Near the West India Docks there was an inlet of 10 or

12 feet water, where the smelts used to resort ; but the gates of the dock were occasionally opened, and the water was let out, which was very impure, from the bilge-water, and the effect of the copper-bottomed vessels, and this I consider as the cause why all the smelts have left this spot. This water is so impure, that if a man falls into it, it generally proves fatal. Another reason is, that all the common sewers run into the Thames.

“ Was it not always so?—No; there are now a much greater number of drains which run into the common sewers, as well as privies and water-closets: formerly the scavengers used to carry away the soil at night, but that practice has of late years been much diminished. The filth that they used to carry away, is passed by the drains into the sewers. In the river, at Billingsgate, we have many Dutch boats with eels: I have been on board, and have seen 4000 alive in the wells and coffs, and the next morning three-fourths have been dead; and the same proportion of loss has been sustained by all the Dutch vessels.

“ What is the cause of the death of the eels?—When there is but little water in the river, they do not die so much, as the water is less disturbed; but on heavy rains, after a dry season, the filth which had been accumulating in the drains and sewers, is washed into the river, and disturbs the general sediment; the water is

thus rendered very impure, and contributes in producing the above effect.

“ Is it a matter of fact, that fish suffer more after rains than in dry weather?—Yes. Other causes of the increased impurity of the river, or its being worse than it formerly was, is from the accumulation of filth brought down by rains after dry weather, the great fall at London Bridge, and the steam-boats stirring up the filth of the Thames, and keeping it in a state of almost continual agitation.—Another nuisance is the gas: I have noticed it at 12 o'clock at night: the gas liquor is let out in the middle of the night; the river is often covered with it, having the appearance of an oily substance, in patches of three or four feet square. The tide ebbs seven hours, and goes about three miles per hour, and this will carry it on this side of Gravesend; and as the tide flows five hours, this substance returns with the tide. As a proof of the impurity of the water in the Thames, the flounders which are brought up from Sea Reach, Medway, &c. when they get to Woolwich, fly about in the wells of the boats, through which the water flows, and then turn up and die.

“ Where are the flounders brought from?—Some above, and some below bridge.

“ Will they not live in Thames water?—I think not; they are taken out of the wells about Woolwich, and put on the decks, then into baskets, and brought up dry to market.

“Do you know any thing about white-bait; are they in the same abundance as they formerly were?—White-bait are certainly obtained in greater abundance than formerly, by poachers (*viz.* fishermen who have been thrown out of their former employ), using unlawful nets; it should, however, be observed, that white-bait are taken at particular times of the tide, as they are a salt-water fish, and come and retire with the water which is partially salt; on this account they are never known above Blackwall.

“Do you think that the increase of manufactories within the last ten years have tended to injure the water?—Yes; and it can be proved that many fishermen have been ruined by the change in the water.

Examination of William Butcher.

“Where is your residence?—No. 132, Long Lane, Borough. I am a fish-salesman, and agent to several vessels from Holland.

“Where do you get your water from?—Vauxhall.

From what Company?—The South Lambeth Waterworks. The water I am supplied with, the servant told me smelt bad. I went into the cellar, and it had a smell similar to gas.

You use this water to keep eels in?—No; that is a distinct thing; I am speaking of my private supply. The vessels to which I am agent,

come to Billingsgate, and the water of the river runs through the wells where the eels are kept. The vessels are obliged to stop at Gravesend for the eels to get inured to the water. Formerly the eels would live a long while in the river; but of late years (within four or five years) vast numbers have died. When the hatches are opened in the river, a smell arises from them similar to the smell of gas. The state of the water is very bad. I have been engaged in this business two years, and each year the water has got worse.

Do the fishmongers at Billingsgate keep live fish, and do they keep them in Thames water?—Large quantities of live fish are kept, but not in Thames water. Formerly they were kept in Thames water, but now they are kept in New River water; because when the wheels were taken away from London Bridge, they could not get Thames water. The City is supplied with the New River water, and the West-end with Thames water. They cannot keep eels at the west end of the Town—that is, those who have the river water. Mr. Myers and Mr. Wise have the New River water; they never lose any eels.

“When the fishmongers at Billingsgate had the Thames water, did they complain of it?—I never heard of any complaints then; there are not many that keep live fish—Fenn is the principal one that does. I have known of vessels coming up the river at three parts flood-tide, and

three parts of the cargo of eels would die by the gas-water passing the vessel, which shewed itself like scum shining on the water. Mr. Rutt, of Simbury, has come to me for eels, and has taken 5 cwt.; and when I told him that he would lose them in going up the river, he replied, that when he got safe to Putney, they would all live, the water there not being bad.

“ Where do the eels come from?—From Friezland, in Holland. There are ten vessels in the trade: they are kept alive in wells, through which the water flows. They are a very curious fish, and will live either in salt or fresh water. Formerly the vessels used to come up at once to Billingsgate; but now they are obliged to wait some time down the river before they can come up. I have known a vessel to lose all their eels in one night. A captain, with a vessel coming up, ran through some bad water in the river, which affected the eels—they jumped up as though they were in pain. When he had passed the bad water, the eels became quiet and still; but when the vessel had been moored about half an hour, the eels began to be restless, and many died, the aforesaid bad water having overtaken him again. The bad water goes down the river, and returns with the tide.

“ How far does the bad water extend down the river?—I do not know.

“ How long since is it that the vessels could come up to Billingsgate?—Ten or twelve years;

and they laid only a day or two, to inure the fish to the change from salt water to fresh.

“How long do they lie now?—They formerly could send a coff in the summer, containing 15 cwt., to ease the well, and find no difficulty in keeping them; whereas last summer, if they sent a coff, containing 900 or 1000 weight, in some instances they could find no more than 3 cwt., and with but little life in them. One of the owners came over, and he said that if the evil continues, he should give up in the summer.

“Does the trade go on all the year?—Yes.

“Do they live better in winter than in the summer?—Yes, but many die even then. I have myself taken up some of the scum off the water.

Examination as to Mr. Butcher's private supply.

“Is the water you are supplied with at your dwelling muddy?—Yes; it comes in of a clayey colour, and it stands sometimes before it is fit to use.

“Have you a cistern?—I have a butt.

“How much will it hold?—About 100 gallons.

“Are you served every day?—Yes.

“Do you often clean out your butt?—About twice a year.

“How much sediment do you find?—I should think about two inches.

“ Do you draw it off?—Yes; the cock is about two inches above the bottom.

“ Would the mud fill up the two inches?—I should think not; I have a pipe which supplies the kitchen, and this is fixed in the butt two inches and a half from the bottom, so that we do not draw the water generally very low.

“ Does the water smell bad?—Not from the butt.

“ Do you find any insects in it?—Yes, frequently small insects, none so large as shrimps. I have had a pipe stopped with an eel.

“ Have you sufficient?—Sometimes not for two or three days. I lie higher than my neighbours; they are supplied sometimes when I do not get any.

“ You use this water for tea?—Yes.

“ Do you use any other water?—No.

“ Do you not filter?—No, I do not.

“ The water is then clear enough for your purpose of tea, and so on?—Yes.

Statement given in by Mr. Butcher.

“ Arrived at Gravesend during the month of July, 1827, having full cargoes of healthy eels, the several Dutch vessels annexed.

	lbs.
“ De Vrienderschap; K. B. Tappman, Master....	15,000
“ Marketed about 4,000 lbs. alive.	
“ De Het-dorp Gaastmeer; R. S. Visser, Master ..	14,000
“ Marketed about 4,000 lbs. alive.	

	lbs.
" De Jonge Jan Meini ; P. V. Der Tee, Master	13,000
" Marketed about 3,000 lbs. alive.	
" De Vissery ; A. L. Wild Chut, Master	14,000
" Marketed about 4,000 lbs. alive.	
" De Twee Jong Vreuwen Gerrit ; A. Dykstra, Master	13,000
" Marketed about 4,000 lbs. alive.	
" De Twee Ge Broeders ; A. Oversea, Master	13,000
" Marketed about 4,500 lbs. alive.	
" De Nederland Kroonprince ; J. P. Jelsma, Master	14,000
" Marketed about 4,000 lbs. alive.	
" De Vierge Broeders ; G. Nieuwland, Master	14,000
" Marketed about 5,000 lbs. alive.	

" About twelve years ago, in those warm months, more than about 30 lbs. dead in a night would not be found ; of late several vessels have lost all their eels in one tide, the weather being clear and fine at the time.

Examination of James Newland, Master of the Vessel, Four Brothers, trading in Eels from Holland.

" What trade are you engaged in?—The eel trade, and nothing else, from Holland to London.

" What cargo do you bring?—About 12,000 to 14,000 lbs. weight ; in summer less, in winter more ; this is the average.

" Have you found that of late the eels have not lived so well in the Thames as they did formerly?—Yes, particularly within the last two or three years ; and it gets worse every summer.

" How many years is it since you have

observed a difference?—It is five or six years since I first noticed it.

“ And you find it growing worse?—Yes, the last summer worst of all. Formerly the Thames water used to be bad at times, after storms of heavy rains, and the water ran into the river from the streets; but it was only at such times: now it is always bad.

“ What do you suppose to be the cause of the Thames water being bad?—The gas; I have smelt the gas in the streets when the pipes have been opened, and it is the same smell comes out of the hatches.

“ You have ascertained this yourself?—Yes, certainly.

“ What part of the river is worst?—We do not come up higher than Billingsgate. There are some fishsellers at Putney:—a person from the Star and Garter comes down at low water, and carries the eels up alive; he comes down with the tide, and returns with the tide, and the eels will live at Putney.

“ How far down the river have you noticed the eels feel the effect of the water?—Below Woolwich, at Gallion's Reach; I have noticed them to turn sick here, and have put about the vessel, and gone lower down, and they have recovered. I have come up with a flood-tide, and have found bad water in Blackwall Reach. When we came into the Pool, it was better, the vessel having come up faster than the water flowed;

consequently the water we came through at Blackwall, came past us when we moored off Billingsgate; it was bad, and had an effect on the eels.

“ You have then had much loss?—Yes; from two vessels in June and August last, each carrying 13,000 to 14,000 lbs., we had not more than 9,000 lbs. marketed from the two vessels alive.

“ How do you know when they are sick?—They jump up—are very uneasy; they start as if they would jump out of the water, and would very soon die.

“ Do they change colour?—Yes; and they become spotted like snakes.

“ Do you know about other fish?—In the Thames the fish will endeavour to get out of the bad water on to pieces of wood that are floating; but only when the water is bad.

“ Have you been in any other river?—No other than the Thames here. I have been to Antwerp, and never lost any; and when I first came here, I never lost any, except what is common out of so large a quantity, and from the effects of the floods of rain washing the streets. I have been Captain 16 years.

“ You were obliged to accustom the eels to the change from salt to fresh water?—Yes; about Erith we staid for two or three tides.

“ Your profits are of course diminished?—Yes; there are two Companies who send these ten vessels, of five persons in each Company;

and if the water continues so bad, they will be obliged to give up the trade.

“ [Mr. Newland referred to a paper that was given in by Mr. Butcher, as exhibiting the very great losses sustained by the eels dying in consequence of bad water.]

Examination of I. I. de D'Long, Master of the Vessel Cornelia, trading in Eels from Holland.

“ How long have you been in this trade?—Twenty-seven years, to and from London; I have been Captain three years longer than Captain Newland.

“ When was the first time you noticed the water of the Thames being bad?—Seven or eight years, and every year it has been getting worse and worse. An hour after high water the eels will die in a short time; I have had 3,000 weight dead in half an hour. In August last year a man came to me for 12 draft—a draft is 20 lbs.; and we had only 80 lbs. left. If the water gets worse in two years more, we must give up; the bad water comes lower and lower down; we did bring up at Gallions, but now we can only come to Erith.

“ What do you do with the eels when they die?—If they die at night, we sell them in the morning if we can, and at a very great loss; and those we cannot sell, are thrown away. The duty last year was £13. 16s.; and in three voyages I did not make half the money.

“ Where are the eels caught ?—Small boats are employed, and our cargoes are always ready for us ; the business is carried on entirely by poor persons, and a great many persons are employed in the eel trade, and entirely depend upon it for support. This fish is the best for poor persons to deal in, as eels can be kept alive better than any other fish ; and what is not sold one day, can be sold the next. There are two fishermen at Lambeth who used to catch fish in the Thames ; but owing to the bad water, the fish have died ; the men sold their boats, and now they come and buy eels of me, 20 or 30 lbs. a day, to sell again.

Examination of Thomas and William Hatherill.

(*Thomas Hatherill.*)—“ What is your employment ?—A fisherman ; I was brought up to it from the age of 12 years, but I have not done any lately.

“ In what part of the river did you fish ?—From Putney to Woolwich ; and we used to catch flounders, eels, roach, smelts, salmon, &c.

“ Why did you leave off fishing ?—The fishing dropped off, and we were obliged to give it up five or six years ago, and it got worse every year.

“ What was the reason ?—The gas ; we could get plenty of dead flounders, and no live ones ; I have seen the flounders put up their heads above the water, and if there was a bundle

of weeds in the river, they would get on it out of the water.

“ Did you ever see any gas liquor on the water?—Yes.

“ When is it most seen?—In dead water, like oil upon the water.

“ What do you now for a livelihood?—Buy fish at the market, and carry it about to sell. I have sold my boats.

“ Is there any thing else besides gas that injures the water?—There are other things that do no good.

“ What part of the river is worst?—Between Vauxhall and London Bridge.

“ So that the great mischief is there?—Yes; but the tide running up and down, it is bad also above and below these bridges.

“ Which is the worst time for fish, dry weather or rainy weather?—In summer, after dry weather; when the rains come, the fish turn up.

“ It was always so?—No; it has been greatly worse of late years.

(*William Hatherill.*)—“ You have heard what your brother has said—are you of the same opinion with him in what he has stated?—Yes.”

Having given a part only of the evidence before the Commissioners, their Report follows.

“REPORT OF THE COMMISSIONERS APPOINTED BY
HIS MAJESTY TO ENQUIRE INTO THE STATE OF
THE SUPPLY OF WATER IN THE METROPOLIS.

“ *To His Majesty George the Fourth, by the Grace of
God of the United Kingdom of Great Britain and
Ireland King, Defender of the Faith, &c. &c.*

“ In obedience to the commands contained in His Majesty's Commission, directing us to enquire into the state of the supply of water in the metropolis, and to report our observations and opinions touching and concerning the same, we proceeded without delay, as soon as the arrangements necessary for executing them could be completed, to investigate the important subject referred to us. The circumstances which prevented our meeting for the purposes of that enquiry until December last, are stated in our correspondence with the Secretary of State for the Home Department, which is contained in the Appendix to this Report. From the terms of our Commission, and from the tenor of the Petitions of the Inhabitants of the western portion of the Metropolis, and of the Borough of Southwark, to both Houses of Parliament, referred to our consideration, praying for an enquiry into the quality of the water furnished by the Water Companies, and into the means of procuring an effectual and permanent supply of pure and wholesome water, as well as from the communications with His Majesty's

Principal Secretary of State for the Home Department, it appeared that our attention was required to be directed to three principal points: namely, first, to ascertain the *sources* and *means* by which the metropolis is supplied with water, and their efficiency as to the *quantity* supplied; secondly, to determine the *quality* of the water; and, thirdly, to obtain such information as might enable us, if necessary, to suggest *new methods*, or *sources of supply*, or to point out the means of ameliorating those now in existence. But having since learned, by a recent communication from His Majesty's Principal Secretary of State for the Home Department, that our enquiry is to be limited to the description, the quality, and the salubrity of the water, and that we are not called upon either to consider new and more eligible sources of supply, or to suggest plans for the improvement of those already existing, we have agreed upon the following Report, respecting the two former subjects.

“ In investigating the supply of water in respect to *quantity*, we proceeded, in the first instance, to collect the requisite information as to the powers and resources of the different Water Companies upon the north side of the Thames; first procuring evidence from the Companies themselves as to the extent and facilities of their supplies, and afterwards checking such evidence by collateral testimony from other wit-

nesses, and occasionally by personal examination into the facts.

“ The supply of this, the most extensive portion of the metropolis, is dependent upon five Companies, which, arranged in the order of the number of tenants they serve, and nearly in that of the quantity of water which they respectively furnish, stand as follows :—

The New River,

The East London,

The West Middlesex,

The Chelsea, and

The Grand Junction Companies.

“ Of these Companies the New River derives its principal supplies of water from a spring at Chadwell, between Hertford and Ware, and about 21 miles north of London ; and also from an arm of the River Lea, the source of which is near the Chadwell Spring, in the proportion of about two-thirds from the former, and one-third from the latter. These united waters are conducted by an artificial channel, nearly 40 miles in length, to four reservoirs, called the New River Head, at Clerkenwell ; proper means being adopted to prevent the ingress of fish and weeds, and such arrangements being made in respect to the mains, as to prevent interruption of service in case of repairs. Since, however, the abandonment of the London Bridge, and of the York

Buildings Water-works, whose former districts are now supplied by the New River Company, they have found it advisable to erect an engine at Broken Wharf, Thames-street, by which they are enabled occasionally to supply parts of their district with Thames water, when from long continued droughts, severe frosts, or other accidental causes, the flow of the New River is impeded. It appears, however, that the quantity of Thames water thus supplied bears a very trifling proportion to the other source, the engine at Broken Wharf having been worked for 76 hours only, in January and February of last year, and for 100 hours during the drought of July and August. The number of tenants supplied by the New River Company is between 66,000 and 67,000, and the quantity of water which is daily supplied exceeds 13,000,000 of gallons, being about 2,000,000 of cubic feet.

“ The East London Water-works are situated at Old Ford, on the River Lea ; but as the tide of the Thames flows up that river to the extent of a mile beyond the works, and as their supplies are taken during the ascending tide, the description of water thus furnished will closely approximate to that of the Thames. This Company has four reservoirs ; the number of tenants supplied amounts to about 42,000, and the daily consumption of water to nearly 6,000,000 of gallons, or about 950,000 cubic feet.

“ The West Middlesex Water-works are upon the banks of the Thames, at the upper end of Hammersmith, and draw water exclusively from that river, opposite to the works. They have two reservoirs; one at Kensington, and one at Little Primrose Hill, which are supplied by the engines at Hammersmith, and they serve about 15,000 tenants. The average daily consumption of water is 2,250,000 gallons, or about 360,000 cubic feet.

“ The Chelsea Water-works are upon the banks of the river, about a quarter of a mile east of Chelsea Hospital; and their supplies are derived entirely from the Thames, opposite to their works. They have two reservoirs; one in Hyde Park, and one in the Green Park, close to Piccadilly. They supply about 12,400 houses; the average daily supply to the whole being about 1,760,000 gallons, or nearly 282,000 cubic feet.

“ The Works of the Grand Junction Company are also at Chelsea, immediately adjacent to, and east of the Hospital. They derive the whole of their supply of water from the River Thames, with which they fill three reservoirs situated at Paddington, and from these their district is served. The number of their tenants does not appear to exceed 7,700; but their daily consumption of water is about 2,800,000 gallons, or upwards of 450,000 cubic feet.

“ It appears from this statement, that the portion of the town upon the north side of the River Thames, including the Cities of London and Westminster, is supplied daily with a quantity of water amounting to nearly 26,000,000 of gallons, and that the total number of houses and buildings receiving this supply amounts to about 144,000. The water is of course very unequally distributed, the average consumption in each house being apparently greatest in the district supplied by the Grand Junction Company, where it amounts to about 363 gallons daily per house. Taking the average of the whole supply, the daily consumption of each house is about 180 gallons. Of this water, more than one-half of which is derived from the Thames, a large portion is delivered at very considerable elevations above the level of the river, constituting what is called *high service*; for which purpose 15 steam engines are employed, exerting a power of about 1105 horses.

“ It is obvious, from the above statement, that the *quantity* of water supplied in London and Westminster is abundant; and in our examinations of individuals touching the quality of the water, we have in no instance met with complaints of deficiency in quantity. We have reason to believe, that the hospitals, workhouses, and other similar establishments, where an abundance of water is an essential requisite, are in all

cases duly supplied ; and upon the important subject of supply in case of fire, our evidence leads us to believe that of late it has always been ample, and that when not immediately procured, the fault has lain with the turncocks ; for among other advantages of the reservoirs annexed to the works upon the Middlesex side of the river, is that of having at command a large head of water, by which the mains are kept full, and in many districts are under considerable pressure. The supply of a large quantity of water upon any sudden emergency is thus ensured ; and among other great advantages arising out of the substitution of iron for wooden mains, is that of their sustaining the pressure of a column of water which it would have been impossible, in the former state of the works, to have commanded.

“ As far, therefore, as regards the description and quantity of water supplied to the Cities of London and Westminster, it appears that more than half the consumption is derived from the Thames, and that it is in such abundance as not only to supply all necessary demands upon ordinary and extraordinary occasions, but that a proportion is constantly suffered to run to waste, by which the cleansing of the drains of houses and of the common sewers is effectually accomplished, all accumulations of filth obviated, and the general healthiness of the metropolis promoted.

“ We next proceeded to examine into the supply of water to those parts of the metropolis situated upon the south side of the river, including the Borough of Southwark. We found that they are dependent upon three establishments, known as

The Lambeth,

The South London, and

The Southwark Water-works.

“ The first of these is upon the banks of the Thames, between Westminster and Waterloo Bridges, drawing its supplies from the river immediately opposite to the works. They have no reservoir, the water being forced immediately from the river into the mains, and thence distributed to about 16,000 tenants, who consume 1,244,000 gallons daily, or nearly 200,000 cubic feet.

“ The Vauxhall, or South London Water-works are situated in Kennington-lane, and have also an engine on the river at the foot of Vauxhall Bridge. They supply Thames water exclusively, and have reservoirs for the service of their upper engine. The number of their tenants is about 10,000, and the daily consumption of water about 1,000,000 of gallons, or about 160,000 cubic feet.

“ The Southwark Water-works are upon

the bank of the river, between Southwark and London Bridges, and derive the whole of their water from the middle of the river opposite to their engines. It appears that about 7,000 tenants are supplied by this establishment with about 720,000 gallons of water, or 115,000 cubic feet daily.

“ Each of these establishments has two engines; the aggregate power of the six may be estimated at about 235 horses. The whole of the water which they supply amounts to nearly 3,000,000 of gallons, or 485,000 cubic feet daily, which is distributed among 33,000 tenants.

“ There appear to be no just complaints respecting the quantity of water furnished by any of these Companies, except in cases of fire, when there has occasionally been a serious deficiency. We have enquired into the causes of this, and are induced to refer it to the want of proper reservoirs for preserving a head of water upon the mains when the engines are not working. On these occasions much time is often lost in sending to the engine of the district; and if the steam be not up, and the fire low, further and fatal delay sometimes occurs.

“ In reference to the total amount of the quantity of water required for the daily supply of the inhabitants of the metropolis, and for the

use of the various manufactories requiring it, it appears to be about 29,000,000 of gallons, or 4,650,000 cubic feet.

“ We next directed our attention to such facts respecting the *quality* and *salubrity* of the water with which the inhabitants of London are supplied, as were in our judgment best calculated to enable us to form a correct and unprejudiced opinion upon this important question. Being a question, however, in which the interests of a great number of individuals and public bodies are deeply involved, and which has been the subject of acrimonious controversy, and also respecting which a variety of representations had gone forth to the public, we perceived that it would necessarily embrace a multitude of considerations of a delicate and complicated nature. We felt it to be our duty, therefore, to begin by dismissing from our minds whatever previous impressions might have been received from the reports and statements which had been circulated, and to be guided in our judgment solely by the evidence we should be enabled to obtain in the execution of our Commission.

“ In our remarks upon this evidence, we shall first confine ourselves to the water of the River Thames.

“ Assuming the supplies to be derived

directly from the river, and to be subjected to no intermediate process tending to purification, it is sufficiently obvious, that the state of the weather will materially affect the purity of the water, which is sometimes comparatively clean and clear, and at others loaded with various matters in mechanical suspension, rendering it more or less coloured and turbid. In the latter state, when thrown into cisterns, and other receptacles of houses, it is manifestly unfit for immediate use; but after being allowed to rest, it forms a certain quantity of deposit, and thus may become sufficiently clear for ordinary purposes. This deposit, however, is the source of several evils; it renders the cisterns foul, and runs off into those pipes which issue from or near the bottom of the reservoirs. By the agitation which accompanies every fresh influx of water, this deposit is constantly stirred up, and becomes a renewed source of contamination to the whole mass; and although chiefly consisting of earthy substances in a state of minute division, it is apt also to contain such proportion of organic matters, as will occasion a degree of putrefaction when collected in any quantity, and especially in warm weather. Of this deposit more or less is almost always collected, especially where the service is direct from the river; and although some of the Companies have reservoirs of such magnitude as to enable them to serve water, already partially purified by deposition, the system is still very

imperfect, and the water is frequently supplied in a turbid state. In other cases, the Companies' reservoirs, however eminently useful in cases of fire, become objectionable in regard to the purity of the water, since the mud accumulates in them, and also proportionately in the mains and branch pipes.

“ By far the greater number of complaints which have been made to us with respect to the quality of the water, have originated in the cause just alluded to; and hence some of the Companies have attempted to get over the difficulty, by suffering the water to remain at rest for a sufficient time to become clear before the public are supplied, and in this they have in some instances so far succeeded as materially to improve their service. When, however, from land-floods or other causes, the river is very thick, they cannot allow due time for such subsidence; and even when most perfectly performed, the insects contained in the water, so far from being got rid of, become, perhaps, even more numerous. This is another just cause of complaint in regard to the water, especially in hot seasons.

“ To obtain an effectual supply of clear water, free from insects and all suspended matters, we have taken into consideration various plans for filtering the river water through beds of sand and other materials; and considering

this, on many accounts, as a very important object, we are glad to find that it is perfectly possible to filter the whole supply, and this within such limits in point of expence, as that no serious objection can be urged against the plan on that score, and with such rapidity as not to interfere with the regularity of service.

“ It must, however, be recollected, that insects and suspended impurities only are separated by filtration, and that whatever substances may be employed in the construction of filtering beds, the purity of the water, as dependent upon matters held in a state of solution, cannot be improved by any practicable modification of the process. If, therefore, it can be shewn that water taken from the parts of the river whence the Companies draw their supplies, either is, or is likely to be contaminated by substances dissolved, or chemically combined, it will follow that the most perfect system of filtering can effect only a partial purification.

“ From the commencement of our enquiries, we have bestowed considerable attention upon this subject, and have endeavoured to obtain accurate information respecting it. But on examining such analyses of the water as had already been made, and were communicated by the Companies, as well as by several individuals of high authority on these matters, we found them

to be so far at variance with each other, as to prevent our drawing from them satisfactory conclusions. We therefore devised a more regular plan of procedure, which we conceived would be better suited to the particular objects of our present enquiry. After all the preparations for that purpose were completed, the occurrence of a heavy fall of snow, the effects of which on the water of the river would have introduced uncertainty in the results, induced us to defer for a time the execution of our plan. We waited till the river had returned to what may be regarded as its average state; and under these circumstances, directed portions of water to be taken, under the personal inspection of our Secretary, from different parts of the river at different times of the tide, and especially from those parts whence the Companies draw their water; and also from situations higher up the river, where its quality can in no degree be influenced by the tide. With the view of comparing the state of the Thames Water at London under different circumstances, we subsequently procured specimens from several parts of the river after an abundant fall of rain; and also others from places where it had been represented to us as particularly charged with impurities. A popular notion having prevailed that the water in the London Dock possessed peculiarly deleterious qualities, from an impregnation of copper derived from the bottoms of the ships, we likewise obtained, with a view to

enquire into the truth of this opinion, portions of water from the Dock, taken at three different depths from the surface.

“In order to ensure the subjecting of all these various specimens to the most careful and rigid examination, upon one uniform system, we put them for that purpose into the hands of Dr. Bostock, a gentleman eminently qualified for the task by his extensive knowledge of chemistry, and his practical experience in this department of analysis. In the Appendix will be found the detailed account of his examinations, in the accuracy of which we have every reason to repose the fullest confidence. In his report to us he justly remarks that it would have required a much longer space of time than was allowed him, to have performed a complete scientific analysis of so many specimens of water; but the results he obtained are quite sufficient for the object proposed, and to which we more particularly directed his attention, namely, ‘to ascertain how far the water of the Thames, contiguous to, or in the neighbourhood of London, is in a state proper for being employed in diet and various other domestic purposes.’

“The general conclusion he deduces from the whole series of examinations, is expressed in the following passage of his Report :—

‘It appears that the water of the Thames,

when free from extraneous substances, is in a state of considerable purity, containing only a moderate quantity of saline contents, and those of a kind which cannot be supposed to render it unfit for domestic purposes, or to be injurious to the health. But as it approaches the metropolis, it becomes loaded with a quantity of filth, which renders it disgusting to the senses, and improper to be employed in the preparation of food. The greatest part of this additional matter appears to be only mechanically suspended in it, and separates by mere rest. It requires, however, a considerable length of time to allow of the complete separation; while on account of its peculiar texture, and comminuted state, it is disposed to be again diffused through the water by a slight degree of agitation, while the gradual accumulation of this matter in the reservoirs must obviously increase the unpleasant odour and flavour of the water, and promote its tendency to the putrid state.'

“ Regarding the greatest part of the extraneous matter in the Thames as mechanically mixed with it, we may conceive that a variety of incidental circumstances will affect its quantity in the same situation, and under the same circumstances of the tide; but the observations are sufficiently uniform to warrant us in concluding, that the water is in the purest state at low tide, and the most loaded with extraneous matter at

half ebb. It would appear, however, that a very considerable part, if not the whole, of this extraneous matter may be removed by filtration through sand, and still more effectually by a mixture of sand and charcoal.

“ The examination of the water taken from the London Dock shewed that it did not contain the smallest appreciable quantity of copper.

“ We have also endeavoured to gain information from various other sources respecting the state and purity of the Thames water, and its general fitness for domestic use; and from such enquiries it appears proved to us, that the quality of the water within certain limits, included in what may be called the London District, has suffered a gradual deterioration within the last ten or twelve years. We found this opinion upon the well-ascertained fact of the disappearance of fish from those parts of the river, to such an extent as to have led to the almost entire destruction of the fisherman's trade between Putney Bridge and Greenwich; and upon the circumstance that the eels imported from Holland, can now with great difficulty be kept alive in those parts of the Thames where they were formerly preserved in perfect health. We also learn that the fishmongers in London find it impossible to preserve live fish for any length of time in water taken from the same district.

“The causes of these effects are, perhaps, principally to be traced to the increase of certain manufactories, amongst which those of coal gas are the most prominent, polluting the river by their refuse; to the constant passage of steam-boats, by which the mud is stirred up; and to the peculiar nature of that mud within the above-mentioned precincts. The very circumstance, also, of the great abundance with which water is supplied to the houses and manufactories of the metropolis, appears to be essentially connected with the augmented impurity of the river; for where refuse animal and vegetable matter of various descriptions used to be collected, and from time to time removed for the purposes of manure, it is now indiscriminately washed into the sewers, and conveyed into the Thames: and the sewers themselves are rendered much cleaner than formerly by the quantity of water which runs to waste, and which, as already remarked, has rendered them less offensive, especially in those parts of the town where they used to be most liable to stagnation and consequent putrescence. Thus it has been stated to us that the water of the river is more polluted immediately after heavy rains, which force down the contents of the sewers, than after a continuance of dry weather, when its course is sluggish, or altogether arrested; and the results of experiments we directed to be made on the subject, fully establish this fact. The great increase which has of late

years taken place in the population of London, and of its suburbs on every side, must also be attended by a proportionate augmentation in the quantity of extraneous matter carried down into the Thames.

There are other circumstances affecting the fitness of the water, as now taken from the river for the supply of the town, which, though less general in their influence, should not be overlooked; such as the position of the suction pipes of the engines belonging to some of the Companies, in regard to the mouths of sewers; the quantity of dead animals thrown into the river in and about London; its contamination by the offal of slaughter-houses; and a variety of other causes, which we need not here specify, but which will be found on reference to the evidence. Some of these we have enquired into in detail, and have anxiously sought for means by which the nuisances in question might be remedied or abated; but it is manifest that if the general quality of the river water be objectionable within the whole of that district whence the supplies for the metropolis are drawn, any remedies for local evils become comparatively unimportant; and, although these diminish as we ascend the river, we apprehend that their influence, with that of the other contaminating causes, will be more or less felt nearly to the extent to which the tide reaches.

The statements which have been made respecting the insalubrity of the Thames water, as supplied by the Companies, have also been considered by us; and although from the few cases which have been brought before us, of disorders imputed to this cause, we do not feel ourselves warranted to draw any general conclusions, we think the subject is by no means undeserving of further attention. There must always be considerable difficulty in obtaining decisive evidence of an influence, which, although actually operating to a certain extent as a cause of constitutional derangement, may yet not be sufficiently powerful to produce immediate and obvious injury. It cannot be denied that the continued use of a noxious ingredient in diet may create a tendency to disorders, which do not actually break out until fostered by the concurrence of other causes; for we unquestionably find an influence of the same kind exerted by other agents, which occasion merely a certain predisposition to disease, and of which the immediate operation must therefore be extremely insidious, and difficult to trace. It is obvious that water receiving so large a proportion of foreign matters, as we know find their way into the Thames, and so far impure as to destroy fish, cannot, even when clarified by filtration, be pronounced entirely free from the suspicion of general insalubrity. In reference also to this question, we apprehend that there are no grounds for assuming the probability of any im-

provement in the state of the water drawn from the London District of the River.

Although the principal supply of water by the New River Company is not open to the same objectionable impregnations as that of the Thames, we think it, nevertheless, susceptible of much improvement. The occasional deficiency in quantity, which suggested the necessity of the engine at Broken Wharf, might be obviated by allowing a portion of that supply to be drawn from the River Lea at Lea Bridge.

But here, as in respect to the Thames, the water is occasionally very muddy, receiving as it does the drainage of a considerable extent of country, in consequence of a right claimed by the proprietors of adjacent lands, and which the Company have at present no means of obviating; neither have they any power to prevent persons from bathing in their aqueduct.

These evils they would very gladly remedy, if enabled to do so; and their removal, together with the adoption of an extensive system of filtration, would materially contribute to the perfection of the New River supply. Great benefit would result, not only to the extensive district of London supplied by this Company, but also to the public at large, if the inducement to bathe in the open canal of the New River were super-

seded by the establishment of baths in the neighbourhood of the metropolis, to which the public might, under certain regulations, be allowed access. It has been stated to us in evidence, that the New River Company have voluntarily offered to furnish sufficient supplies of water for a purpose of such manifest and general utility.

Taking into consideration the various circumstances to which we have now adverted, together with the details of evidence by which they are proved and illustrated, and also the facts derived from our own observation and experience, we are of opinion, that the present state of the supply of water to the metropolis is susceptible of, and requires, improvement; that many of the complaints respecting the quality of the water are well founded; and that it ought to be derived from other sources than those now resorted to, and guarded by such restrictions as shall at all times ensure its cleanliness and purity.

Various schemes proposed by different individuals, for the attainment of these desirable objects, have occupied our attention in the course of our enquiries; but the complete examination of any plan of this kind, with reference to its practical efficiency and expediency, would necessarily have required the taking of surveys of the ground, and the determination of levels of different points comprehended in such plan. The

limits which have been assigned to our enquiry, and the manner in which our Report has been demanded, have precluded such further investigation of this important subject as we had originally contemplated, and for which, indeed, we had been making preparation. But while we must, consequently, refrain from any further remarks upon the remedies applicable to the existing evils, and upon the best means of conveying a sufficient supply of water of unexceptionable quality to the inhabitants of the metropolis, we are unwilling to close our labours, without expressing our strong sense of the importance of this object to the public, and our earnest hope that its full investigation by competent persons will not be long deferred. As, however, the materials we had collected, with a view to this more extended enquiry, may still be useful to those by whom the enquiry is resumed, we have thought it proper to insert them in the Appendix to this Report. Some part of the evidence offered to us by one of the Companies, relating to projected alterations and improvements, and which was not in a sufficiently mature state to be made public, has, at the request of that Company, been withdrawn, on their finding that we had not the power of prosecuting the enquiry to the extent originally contemplated.

We have not entered into the question of the effects resulting from the mutual compact

agreed upon by the several Water Companies on the Middlesex side of the Thames, with regard to the limitations of the districts they respectively supply ; it having been expressly stated to us by His Majesty's Principal Secretary of State for the Home Department, at the time our Commission was issued, that the grievances imputed to this cause were not to form any part of our present enquiry ; inasmuch as they had been the special subject of consideration by a Select Committee of the House of Commons, appointed for that purpose in the year 1821, and by whom a Report relating to those matters has been made. The opinion given by that Committee was, that in consequence of the peculiar nature of the undertakings of Companies for the supply of water, where large capitals must necessarily be vested in fixed machinery, and where from the commodity furnished being of no value, but for consumption on the spot, the sellers are confined to the market by the nature of the trade, the principle of competition in its application to such Companies requires to be guarded by particular checks and limits, in order to render it effectual without the risk of destruction to the competing parties, and thereby ultimately of a serious injury to the public. The only remark we shall venture to make upon this subject, is one naturally suggested by the evidence which has come before us in the course of our enquiries ; namely, that if, on the one hand, the preservation of the pre-

sent Water Companies, from which the public have undoubtedly derived immense benefits, would be endangered by unlimited competition with new Companies that might be established for similar objects, it must, on the other hand, be evident, when due regard is had to the consideration, that the constant and abundant supply of pure water is an object of vital and paramount importance to the inhabitants of this vast metropolis; that the dispensing of such a necessary of life ought not to be altogether left to the unlimited discretion of Companies possessing an exclusive monopoly of that commodity; and that the interests of the public require, that while they continue to enjoy that monopoly, their proceedings should be subjected to some effective superintendence and controul.

P. M. ROGET, (L. S.)

W. T. BRANDE, (L. S.)

T. TELFORD, (L. S.)

9, New Palace Yard, Westminster,
April 21st, 1828."

Some observations appeared on this subject in the Times, May 2d, 1828:—

“When a public grievance becomes the subject of discussion with the great body of the Legislative Assembly, we may reasonably hope that some rectification of the evil will ensue.

The state of the Thames Water, as respects

its fitness for family uses, has engaged the thoughts of many, and brought into exercise the skill of several scientific characters. Considering water as the menstruum of what constitutes the chief nourishment of the human body, its purity or impurity is surely a matter worthy of serious investigation; and that the water with which householders in London are generally supplied, is of the latter description, no one who has taken the trouble to examine, will be absurd enough to deny. During the time that I have resided on the Surrey side of Waterloo Bridge, the Thames water which is conveyed into my premises, has never been in a state fit for domestic purposes. Even during the cold season it abounded with animalculæ; and in the summer months it is often intolerable, so full of insects, and emitting such a fetid smell, as to render it totally unfit for any human necessity.

I have frequently introduced into the water a small portion of oxymuriate of lime, which has the effect of apparently destroying the animalculæ, as well as dissipating the noxious putrid effluvia with which the water is generally charged. From the unpleasant nausea it induces on the stomach and bowels, when drank in a raw state, I never knowingly suffer it to be taken in my own family without being previously boiled, and set aside to cool.

The deposit in this process is always con-

siderable, amounting to about three and a half grains in half a pint; it appears to be a kind of vegetable extractive matter, effervescing with nitric, sulphuric, and muriatic acid. The water, in its primitive state, throws down a dark brown precipitate, with a solution of nitrate of silver. With lime-water it deposits a sediment, after assuming a pale turbid appearance, which effervesces with muriatic acid. From these results it may be inferred, that the water is impregnated with hydrogen, carbon, and sulphur.

I am, Sir,

A CHEMIST."

The King's Commissioners have therefore proved to His Majesty, and to Parliament, that the evils complained of in the petitions to the House, are well founded; and that an additional evil also exists in the destruction of the fish in the River Thames, from the immense quantity of deleterious and poisonous matter constantly disembogued into it from the sewers.



It will now be necessary to enquire what REMEDIES can be found to abate these evils; and this cannot be too quickly attended to. The defective state of the sewers claims the first consideration, because they are at the foundation of the whole.

Without stopping to blame the Commis-

sioners of Sewers, who, notwithstanding, must have been remiss in their duty, or incompetent to their office, to suffer their sewers to be so loaded with soil and filth, and the residuum of factories and gas, so as within the last twenty years to have produced such a lamentable effect in the River Thames; the remedy itself must be sought for, and immediately applied.

Perhaps it has, and will be found impossible to prevent some of the noisome and foul substances getting into the sewers: a remedy, therefore, for the removal of this portion of the nuisance when there, is the first point, and that may be found in page 212 of this volume. The next is the fact itself, that the Thames, instead of being a river for fish, has become a *Cloaca Maxima*, by receiving all the foul contents of the sewers. The remedy for this will be found in the following papers, recently published in the Times, signed "*Fairplay*," and a "*Water Drinker*."

"THAMES WATER.

To the Right Honourable Robert Peel, M. P.

SIR,

I have most carefully perused the Report of the Commissioners for enquiring into the supply of water to the metropolis, and also the evidence given before those Commissioners, by which, even allowing that the Thames

water is worse than it was fifteen years ago, it appears manifest that the proprietors of water-works have in no way conduced to render it more impure than it was at that time: they should not therefore be made to suffer for the acts of others. At the time the majority of these works were established, the public were promised to be supplied abundantly with Thames Water; and by the Report it appears that no fault is, or can be found with the quantity. Many of these Companies have invested large sums of money in the construction of their works, and have received a return of about ten shillings per cent. upon their capital. I hope, therefore, before you determine that the Government shall expend a million of money in any new project which may tend to annihilate the existing Water Companies, you will consider whether it would not be more just to compel the Commissioners of Sewers, who, I am given to understand, have ample funds at their command, to carry their sewers below Greenwich, or with the aid of Government, below Gravesend; and thus restore the river water near the metropolis to the state in which it was at the time Acts of Incorporation were granted to the various Water Companies: by such a measure the trade of the poor fishermen would also be restored. These fishermen say that twelve years ago their eels and other fish experienced no inconvenience from the river water, and many of these unfortunate individuals procured a com-

petent livelihood by fishing in the river ; and certainly at that time the water was considered not unfit to drink. If Gas Companies have injured the water, they should be compelled to form capacious cesspools for the reception of their pernicious liquid, or be made to carry it to a considerable distance down the river.

FAIRPLAY."

To the Editor of the Times.

"SIR,

I have not for a long time read a paragraph in a newspaper on subjects connected with public improvement, which has given me more pleasure than the letter of Fairplay to the Right Hon. Robert Peel, in your paper of the 20th instant ; because it proposes an effectual and practicable plan for a great public benefit, by preventing the present injury to the Thames water, and improving the health of the metropolis. I beg, therefore, to offer a few additional observations founded on that hint. The main Sewer, or *Cloaca Maxima*, to receive the contents of the other sewers, should commence at Chelsea, eventually perhaps at Fulham, and be carried into the Thames, say at Tilbury Marsh. This sewer should, and easily might be, sufficiently below the level of all the present sewers, to prevent any temporary partial stoppage or flush of water affecting them. At Chelsea should be formed two large reservoirs, to be filled from the

Thames at high water, for the occasional cleansing of the great sewer at low water spring-tides, by means of sluices, as in Ramsgate and other harbours, and in order that the contents of the sewers might be turned to good account, instead of being a nuisance, as at present ; for in the present advanced state of science, it is disgraceful that the immense quantity of manure arising from so large a population, should be wasted, as at present, instead of fertilizing the land. There should be formed at Tilbury two large reservoirs to receive the soil from the sewer, so that when the first was full, the second might receive the deposit while the first was being emptied, which should be by barges, the soil being sold at so much a load for manure, for which I consider there would be a great demand ; when the first was empty, that would receive the deposit of the sewer, while the second was being emptied, and so alternately. To those who object that these reservoirs would be offensive, I would reply, certainly not to a greater extent than Greenland Dock, or many hartshorn and other manufactories, close to London ; or than the numerous fields in the vicinity of London, in which night-soil always used to be, and still is, nightly deposited in great abundance ; and that the openness of the spot would prevent their being any way injurious. Should this be found, as I am confident it would be, useful, it might be adopted on a smaller scale for South-

wark. I am aware the expence of such a measure as I propose would be great; but where the health of above a million individuals is concerned, the utility justifies the expence, which should fall on Government. This and such-like works are the legitimate objects of the Government's attention :

“ These are imperial works, and worthy Kings.”

I am, Sir,
Your very obedient Servant,
A WATER DRINKER.”

In addition to these views, it may be as well to carry up the brickwork over the Cloaca in successive arches longitudinally, so as to form respective series of Sub-ways, for pipes and other purposes, until the height shall be attained for a road. The London Cloaca might be carried beyond Tilbury to the Nore, to empty itself; and the *Sub-ways continued a mile beyond, or branch off in another direction* to the pure waters of the sea, from whence marine water might be brought through the tubes of the Sub-ways into the metropolis, and the intermediate places through which they are built.

In this case, not only will your river become inhabitable, but the shores of it be adorned with a breastwork, or abutment for the water itself. The River Thames formerly overflowed the low lands adjacent to it, especially at spring-tides, until it was embanked with stakes and earth, which

remain to this day, called the Walls. The project of Colonel Trench, for the Thames Quay, may then indeed be effected ; and a magnificent one may be on each side of the river, wherever required.

The remedy for the sewers, and the return of fish into the Thames, have thus been exhibited in an effectual manner.

If it should be said, the work is too extensive and grand, then let part of it be done where most wanted, from year to year, until the whole be finished. Should it also be said that the schemes are visionary and impracticable, the skilful engineer will reply, there will be difficulties, but they are not insuperable.

The next thing wanted is good water in abundance, at a moderate price.

It will be seen in the previous pages, that our fathers formerly looked for pure water from the springs and rivers in Middlesex and Hertfordshire, and not so much from the Thames. The Corporation of London obtained kingly and parliamentary authority for that purpose. These several powers they held for many years, and did nothing, until the noble-minded Middle-

ton came forward, who undertook alone, unaided, that which the gifted Body Corporate were afraid of. These powers they assigned to, and privily laughed at him ; but posterity enjoy his work, and the Corporation, having sold their birthright, have lost that privilege and the profit.

Now it is from the springs, and from the rivers of Hertfordshire and Middlesex, that pure water must come, to assist the supply from the upper waters of the Thames ; and the proposal of Mr. Philip Taylor, to collect it at Hampstead, is good. In addition to his supply at Hampstead, another supply may be obtained from the sister hill of Highgate, in a similar manner to his, by a branch from the New River at Hornsey, which is about one mile only from that spot.

As the metropolis is so full of inhabitants, the quantity of water daily necessary must be immense ; the supply, therefore, from one source may not be sufficient. The New River in its circuit passes through Hornsey ;—Highgate is a part of that parish, and by cutting a branch from the New River at Hornsey, on the same level, through an aqueduct under Highgate, the water may be raised there up a perpendicular shaft, the same as at Hampstead ; by which means two heads of water, drawing their supply from two different places, will be provided for the inhabitants of London.

To these may be added the plan proposed by Mr. Francis, of boring for water, and filling tanks.

“ PLAN by MR. FRANCIS, addressed to the Honourable the Commissioners appointed to enquire into the state and quality of the Water supplied to the Inhabitants of the Cities of London and Westminster.

PLAN submitted to their consideration for obtaining a supply of more pure and wholesome water than is at present afforded by the different Water Companies.

That pure and wholesome water, in unlimited quantity, is to be extracted from the earth, the experience of thousands of experiments for thousands of years past, have sufficiently proved. The incessant pumping that mines of great depth require, clearly demonstrate and prove, that the more abundant and purer the water becomes, the greater the depth excavated ; and that no failure occurs of finding springs of pure water. The very ingenious method discovered by Mr. Ryan, of boring and bringing up through a tube a fountain of water above the surface of the earth, hath in another way proved it, and introduced a new subject for discussion upon the theory of springs of water.

One instance which I am about to describe, as analagous with the principle I intend to propose for affording a supply of pure water, was

some years ago effected by order of the Board of Ordnance at Sheerness; a situation least likely by appearance to create such an effect as was produced, it being a swampy peninsula that projected into the sea. A well of large dimensions was sunk about 100 yards from the sea-shore, to a great depth, that produced a supply of the purest water; and which rose, when the spring was obtained, about 150 feet from the bottom in less than 30 minutes, overflowed the top of the well for several days, then subsided a few yards, and ever since has remained inexhaustible. The wet docks constructed in the vicinity of London, although excavated to a depth of not more than 20 to 30 feet from the surface, have usually employed three or more engines incessantly pumping.

The plan whereby I propose to supply the inhabitants with *pure spring water* is, to cause each Water Company to excavate a spring-water tank, near enough where their present engines are erected by the Thames side, so as to be within reach of them; as then no alterations in the main pipes will be required, and the advantage of supplying the engines with fuel by water-carriage will be continued.

The dimensions of these tanks to be 100 feet diameter, and excavated to a depth of 100 or more feet, or until the pure spring-water is produced. Each of these tanks will yield by

estimation 100,000 barrels every 24 hours. Eight of the Water Companies drawing their supply from the Thames, from those situations where the water is most turbid and impure, by adopting the method before stated, will be enabled to supply their tenants with pure and wholesome water.

I wish it to be understood, that the before-described tanks are to have no direct communication with the river, but to depend entirely for supply upon the springs. The same end will be obtained in almost every other situation ; but as engines will be required to work them, the advantages to the different Companies will be in continuing to the present sites.

An estimate of the expence of constructing a tank of the largest dimensions, as before stated, is enclosed herewith. Some of the Companies may require one of not more than half the amount.

No. 118, Regent Street, January 1828.

Estimate for constructing a Spring-water Tank, for the purpose of supplying the Inhabitants of the Metropolis with pure Spring Water, and calculated to yield a supply of 20,000 cubic yards, or about 100,000 barrels daily.

	£	s.	d.
Dimensions of the tank, 100 feet diameter, by 100 feet deep ; cubic contents, 29,085 cubic yards ; charge for excavating and depositing the earth, 1s. per yard cube ..	1454	5	0

Brought over. . . .	£1454	5	0
Steam-engine and machinery to raise the earth out of the tank.	500	0	0
Fuel and engineer working six months	600	0	0
472,500 Bricks for lining tank, at £1. 15s. per thousand	826	17	6
Workmen laying ditto, at 10s. per thousand. .	236	5	0
Cement.	100	0	0
Timber and implements attending the process of excavating.	600	0	0
	<hr/>		
	4317	7	6
 If the earth can be deposited in a convenient situation near the tank, about one-third may be deducted from the charge for ex- cavating			
		484	15 0
		<hr/>	
		£3832	12 6
		<hr/>	

Letter from Mr. Francis, addressed to the Honourable the Commissioners appointed to enquire into the state of the Supply of Water to the Inhabitants of the Cities of London and Westminster.

“ Gentlemen,

My plan for supplying the metropolis with pure spring water, in lieu of that at present so much complained of, I had the honour to submit for your consideration on the 1st of the present month; and as what I then took permission to present may be considered a preliminary and outlined statement of the method whereby it may be effected, I am desirous of adducing further experimental facts which are now in full operation and use, and on sufficient scale and magnitude, I consider, to carry

demonstration and proof of their efficacy and parallel as applicable to the purpose which I have in my plan stated.

If favoured by the Commissioners with an interview, should feel honoured by submitting my suggestions to their consideration.

I am, Gentlemen,

Your very humble Servant,

HENRY FRANCIS.

118, Regent Street, Feb. 19, 1828."

These three sources combined, placing the tanks midway between Hampstead and Highgate, to feed the two others when necessary, will produce an abundant supply of pure water for the metropolis, to any extent.

The plan of Mr. Philip Taylor was brought forward a few years ago, under the title of "The Thames Water Company;" but, like the Subways, it was overwhelmed at that moment with schemes and bubbles. The Prospectus, as given in the Commissioners' recent Water Report, states:—

"The following Plan was sent to the Board, in Mr. Philip Taylor's name, by Mr. Martineau:—Mr. Taylor was requested to attend on the 11th of February, but he was then in France.

THAMES WATER COMPANY.

At a meeting held the 6th of October, 1824, at the Albion Tavern, Aldersgate Street, for

the purpose of considering the expediency of establishing a Company for supplying the metropolis with pure water from the River Thames, a Report was read by Mr. Philip Taylor, Engineer, from which the following are extracts:—

The plan for supplying London with pure water, which I have now the honour of submitting to your consideration, has been formed in consequence of an application from some gentlemen who are desirous that the result of the present meeting may be the establishment of a new Water Company, possessing powers and advantages calculated not only to benefit the public in an essential manner, but also to ensure a fair return to those who may invest capital in it, which can only be accomplished by adopting means not hitherto acted upon, or proposed.

I do not consider it necessary to enter at length upon the various and powerful reasons which may be advanced in favour of such an undertaking. The vast importance of a copious and regular supply of *pure water* to the metropolis is sufficiently obvious, whether we consider the health, comfort, or safety of its inhabitants.

It is perfectly well known that the public are at present supplied, either with water of far inferior quality to Thames water, or with such as is drawn from the river after it has become

contaminated by torrents of impure matter of various kinds, arising from so vast a population:—that the number and offensive nature of the manufactories established on the banks of the Thames within late years, have tended to increase this evil:—that even this supply is languid and uncertain, especially in the more elevated parts of the metropolis, and when it is most urgently called for, in case of fires:—and that under the existing state of things, no option is left to the consumer of this great necessary of life, either as to *terms* or *quality*:—These are evils too notorious to be disputed, and for the remedy of which I have directed my attention to the two following most important points for consideration:—

First, The source from whence to obtain a sufficient quantity of pure and wholesome water; and, secondly, the best mode of producing a regular, equal, and effective supply, on fair and liberal terms to the public.

I believe that better water need not be desired than such as is to be found in the Thames before it has become polluted by the offensive matter from the sewers and manufactories of London and its widely extending neighbourhood, the impurities of which are carried by the tide to a considerable distance above the places where they are discharged into the river. In order,

therefore, to obtain a supply of pure and untainted water, it is absolutely necessary that some point of supply should be fixed upon beyond the influence of existing nuisances, or those which are likely to be created by the extension of population.

The modes at present resorted to for bringing water from a distance, and of raising it to reservoirs, from which mains are supplied for its distribution, are liable to various difficulties and objections.

The New River, after passing through 40 miles of country, terminates in a reservoir only 84 feet and a half above the level of the Thames, and steam-power is required to raise a portion of the water to a greater height. To execute a work on this plan, an immense quantity of land must be purchased, and compensation must be made for water-rights. The original cost of forming such a water-course is enormous, and the current expences of maintaining it, with all the bridges, embankments, tunnels, &c. upon the line, are extremely heavy.

Other Water Companies have placed their steam engines on the banks of the Thames, in London, or its immediate vicinity, and have forced water from the river to reservoirs on some elevated spot at a distance. By following such

a plan, much of the power exerted is lost, in consequence of the friction and resistance occasioned by forcing an ascending column of water through a long extent of pipe; and the desire of avoiding this waste of power has probably induced such Companies to draw water from parts of the river too near to the metropolis to obtain it of good quality, and to select situations for their reservoirs not sufficiently elevated for the effectual supply of the public.

The highest reservoir supplied in this way is only 121 feet above the level of the Thames, which has been found insufficient for the purposes required; and in consequence, the water has been also forced into the mains direct from the engines. This method is liable to all the objections arising from loss of power by friction; to which must be added the great evil of the supply depending on the constant action of mechanical power, as a large quantity of water may be required in case of an extensive fire, at a time when such power is not in operation.

To avoid these evils and objections, and to ensure to the public water of the best possible quality, at a moderate charge, delivered with such force as would produce a regular flow at any elevation that can be desired, I have projected the following plan :—

A part of the River Thames being selected,

from which pure and unpolluted water may be obtained (and which, I believe, will be best found between Brentford and Richmond), I propose cutting a subterraneous aqueduct from such point, in a line that will terminate under an elevated spot near the metropolis; and no situation presents so many advantages as Hampstead Hill or its vicinity.

The summit of Hampstead Hill is 437 feet above low-water mark at Hammersmith; and all the intermediate altitudes will be seen by reference to the Plan and Section which I have the honour of placing before you, and which are laid down from a survey made for the present object.

A reservoir or reservoirs may be formed at any elevation shewn on this plan, and an abundance of open space is to be obtained upon any part of the line for this purpose. The situation and altitude of the reservoirs being determined upon, engine-shafts will be sunk perpendicularly to meet the aqueduct, and the water at once raised by steam-engines into the reservoirs, from whence it will be distributed to the various parts of the metropolis with a force proportioned to the elevation.

Taking into consideration the advantages which would result to the public from having

a supply of Thames water drawn from so remote a part of the river—conveyed in a subterraneous aqueduct, where it would be subject neither to contamination nor obstruction from frost, as in a long open water-course—and raised to an elevation sufficient to ensure a supply to the top of any house—no fear need be entertained with regard to the support which such a work would meet with. It would not, perhaps, be too much to expect, even if such advantages could only be obtained at a greater expence than has been incurred by other Companies, that still the undertaking would be profitable; but I believe I shall be able to shew that the execution of the work I have proposed, will not be more expensive than others possessing very inferior powers, maintained at a heavier annual expence, and consuming a much larger quantity of coals.

The operation of raising water is carried on with more economy, and to a greater extent, in the mines of Cornwall than in any other part of the world; and the improvements of late years have rendered the means of doing this so certain and comparatively cheap, that many extensive mines, formerly abandoned, from the difficulty and expence of draining them, are now worked with large profit. It is not uncommon, in many of these mines, to raise the water from more than 1,000 feet in depth, in vast quantities, and of course, incessantly.

The means by which I propose raising water from the aqueduct to the reservoirs for the service of the metropolis, are the most improved means now adopted in the Cornish mines; and it is obvious that, by the use of such means, a like quantity of water will be raised to a given height with the same expence of fuel. No untried plan, and no doubtful calculations, are involved in this part of my proposal, as printed reports are published every month, giving the return of water raised, and coals consumed, by every large engine in Cornwall. I have already stated, that a considerable quantity of power is lost by the usual mode of forcing water through a sufficient length of ascending pipe to reach a reservoir at a distance, which loss will be obviated by the mode I have proposed of raising it at once by a perpendicular lift.

That it is most desirable to supply a city from a large reservoir at a considerable elevation, is so obvious, that I scarcely need to state the advantages. Should such water-works as I have proposed be undertaken, and brought into action, the supply of water would be certain in all parts of the metropolis, and cisterns might be filled on the roofs of houses, manufactories, and theatres, thereby giving a great security against the ravages of fire.

The works on this plan would be always

operative, as the force of supply would depend simply on the gravitation of a lofty column of water, fed by an ample reservoir at its summit. The pressure of such a column would produce so great a force, that fountains, equal to any in Europe, might be placed in our squares ; and an extinguishing main might be always charged with such a pressure, that by merely attaching to it an engine-hose, the water would be thrown to a greater height than it can be by the fire-engines at present in use ; and this might be resorted to in case of fire at a few minutes' notice, and be brought into action without labour. Branches for such an extinguishing main might also be laid into buildings or manufactories, to be used only in case of fire. With a hose fixed to such a branch, coiled up, and hung against a wall, any party, at a moderate annual charge, would have an engine commanding his whole premises, and one which would never fail him in case of need.

The supplying a city from a reservoir on a very elevated situation, would also be advantageous to the Company who engaged in such a work. It is well known that the quantity of water that can be delivered through a pipe, depends not only on its size, but also on the pressure or force applied. If the pressure is considerable, the pipes may be reduced in proportion ; and when it is taken into account that the laying

of mains must form the greatest item of expenditure to a Water Company, any reduction in the sizes required will materially reduce the amount.

I will only add, in conclusion, that the undertaking now proposed appears more likely to combine *public utility*, with adequate and *fair remuneration* to the individuals engaged in it, than any work of the sort hitherto projected. In this vast metropolis there is not a person, however high, or however low, who is not interested in obtaining an ample supply of good water. Every step, therefore, to attain this end is of the utmost public importance ; and it is not hazarding too much to say, that it would now be attained in a far greater degree than by any former attempts of the kind. The means by which it is proposed to effect it, rest upon no theory which may or may not admit of practical application. The positive effect of the improved steam-engines employed in draining the vast mines of this country is well known, and the aqueducts of Rome are amongst the most stupendous and indestructible monuments of that City's greatness : no doubt, therefore, need be entertained of the practicability of this plan, as it is simply a new combination of works well tried, and resting on the sure basis of experience. It is but fair to expect that a Company, possessing not only the advantages of the *purest water* which it is possible to obtain for the metropolis,

but also being enabled to afford an *ample and certain supply* of it at all times, with equal facility to the *highest* as well as to the lowest parts—not depending upon the constant action of artificial power for its conveyance, but upon the application of a natural power which acts equally at all times—it is, I say, but fair to expect that such a work will not fail to ensure the general and cordial support of the public.

PHILIP TAYLOR.

London, October 6, 1824.”

The above Report having been read, it was resolved—“That it has long been matter of just complaint throughout the metropolis, that the supply of water is of inferior quality for domestic use, besides being uncertain, and very generally insufficient for the ordinary consumption.

That this uncertainty and insufficiency have occasioned numerous and heavy losses of property, by reason of the impossibility of obtaining a supply of water in cases of fire for many hours after the arrival of engines.

That it is most essential to the safety of the inhabitants of this great metropolis that there should be a boundless and constant supply of water, and equally so to their comfort and health that it should be of unexceptionable purity.

That in consequence of the great increase of population in the neighbourhood of London and Westminster, and the establishment of manufactories of various kinds on the banks of the Thames, by which the stream is constantly polluted and rendered unwholesome, it is impossible to draw a supply of pure water from any part of the river near to the metropolis.

That Mr. Philip Taylor, having laid before this meeting the result of the surveys, and the estimate which he had prepared by order of the promoters of this undertaking, it is the opinion of this meeting that, by the adoption of the plan proposed by him, a boundless supply of water, drawn from a part of the River Thames so distant as to preclude the possibility of pollution, may be furnished even to the attics of the highest situations in the metropolis; that in the event of fire, that supply will always be instantly available in every part of the town, and may be carried in an overwhelming column to the top of the highest houses, even without the aid of fire-engines; and further, that it appears likely that this plan may be carried into execution at an expence which would enable the Company to furnish the supply upon terms in no case exceeding those of other Companies, and in many cases, and particularly where the water is carried to any considerable height, at much lower rates than are now charged, and also secure to the

proprietors a liberal return for the capital to be invested.

That application be made to Parliament, the next Session, for an Act to incorporate a Joint Stock Company, under the title of the *Thames Water Company*, to carry into effect these important objects.

That the Capital of the said Company be £750,000, to be raised by transferrable shares of £100 each, with power to increase the same; and that a deposit of £2 per share be paid at the time of subscribing; and that Messrs. Glyn, Mills, Halifax, Glyn, & Co., and Sir Walter Stirling, Bart. & Co., be authorized to receive the same.

That the concerns of the Company be managed by twenty-four directors, to be hereafter chosen by the body of proprietors.

That Mr. Philip Taylor be appointed Engineer to the Company; and that he be requested forthwith to prepare the estimates and details which are further necessary.

That it be referred to a Committee of management to investigate the further details and estimates, and to take such other steps as may appear to them to be necessary.

That the following gentlemen do form such

Committee, with power to add to their numbers :—Sir Edward Banks; William Stanley Clarke, Esq.; Thomas Brunton, Esq.; James Burton, Esq.; W. Crawshay, Esq.; Walpole Eyre, Esq.; John Garratt, Esq. Alderman; R. T. J. Glyn, Esq.; William Grenfell, Esq.; Thomas Halifax, Esq.; Thomas Hood, Esq.; George Lyall, Esq.; Richard Mee Raikes, Esq.; Robert Rickards, Esq.; Wm. Routh, Esq.; Edmond W. Rundell, Esq.; Robert Slade, Esq.; Sir Walter Stirling, Bart.; Wm. Thompson, Esq. Alderman, & M. P.; John Fam Timens, Esq.; Colonel Trench, M. P.; John Tulloch, Esq.; William Venables, Esq. Alderman; Samuel Williams, Esq.; Thomas Wilson, Esq.

That Messrs. Freeman and Heathcote be appointed Solicitors to the Company, and that they do forthwith give the necessary Parliamentary notices.

That all applications for shares be made by letter, addressed to the Committee of Management, to be left at the office of Messrs. Freeman & Heathcote, Coleman-street.

London, October 14th, 1824.

The Committee of Management are anxious to lay before the public the fullest information that can be afforded; but there are certain points, as to situation, and as to the detail of estimates,

which it would be premature to publish. They are justified, however, in stating that Mr. Taylor's estimates for the execution of an aqueduct capable of conveying a superabundant quantity of water from so distant a part of the Thames that its purity will be unquestionable, as well as for erecting steam-engines, and forming ample reservoirs, calculated to ensure an abundant and constant supply of water to the utmost height that it can be desired, do not exceed the sum of £180,000, leaving so large a proportion of the proposed capital for laying pipes, that by its expenditure this Company will be in a situation to command a very extended rental.

The Committee of Management feel confident that the mains will be executed on terms more advantageous than in the case of any other similar undertaking, not only from the various circumstances which have reduced the cost of such work, but also from the fact that smaller pipes will be required on account of the pressure which will result from having the supplying reservoirs at so great an elevation above the highest parts of the metropolis; as it is well known that the quantity of water which will pass through a pipe, depends not only on its size, but also on the pressure which is applied.

The Committee of Management are also satisfied, from calculations founded on ample

experience, that the water required by this Company, will be raised to a much greater height than that to which it is raised by the existing Companies, with a much smaller consumption of coals.

The benefits likely to result to the public and to this Company, may be judged of by comparing the amount of the estimates with the magnitude of the proposed works, which are calculated to supply a much larger quantity than is supplied by any Company in the metropolis, and having an effective steam power more than equal to that of all the present Companies.

The Committee of Management are convinced that no new Water Company will meet with the sanction of Parliament, or the support of the public, unless effectual means are adopted to supply purer water and in a better manner than at present; and they have every expectation that the plan suggested to their consideration, will afford the most effectual means by which these important objects can be attained, and that in an economical manner with reference to the magnitude of the work."

Conversation with Mr. Philip Taylor and His Majesty's Commissioners in 1828.

Mr. Philip Taylor came to the office of the Commissioners and requested an interview ; he

was accordingly called in, and he stated that his object in waiting on the Board, was to lay his own plan for bringing a supply of water to London before the Commissioners. Mr. Taylor brought with him a printed copy of the outline of his plan, and which had before been presented by Mr. Martineau, his partner in business, on Mr. Taylor's behalf, Mr. Taylor at that time being in France. Mr. Taylor stated that he had been at very considerable expence in making the survey, and taking the levels, the particulars of which, namely the original drawings, were in the hands of the solicitors who were employed at the time of the meeting, when these plans had been brought forward; that he had not received any remuneration whatever for the expence he had been at; and now he had applied for his own plans to the parties who held them, and he could not get them, the solicitors stating that they hoped to make something of the plan themselves; and he therefore naturally wished to present his own plans to the Board, as it was not improbable that it would be attempted to be done by others. Mr. Taylor then gave in a small drawing, shewing the general line of his proposed aqueduct, and the situation of the reservoirs referred to in the Report.

Mr. Taylor stated that the distance for the tunnel would be nine miles and a quarter, and he proposed a brick aqueduct of six feet dia-

meter, and with a head of one foot there would be a flow equal to the quantity of the New River.

Mr. Taylor was asked what power of engines would be required at Hampstead, and he replied that the expence of engines, on his plan, would not be more than one fourth of the expence of the engines now employed by the Water Companies ; for the forcing of water through a great length of iron tubes, and up inclined planes, was attended with so much friction, that these engines did more duty than to lift 18 millions of pounds one foot high, with the consumption of one bushel of coals ; whereas the Cornish engines which were employed in pumping water from the mines, by direct and perpendicular lifts, performed the duty of raising as much as 74 millions of pounds one foot high, by the consumption of the same quantity of coals ; and in this latter plan of employing engines, namely by a direct perpendicular lift, was the one, and the only one that would be adopted on his plan.

*Remarks by His Majesty's Water Commissioners
appended to Mr. Taylor's Plan.*

“ The following remarks are suggested under the supposition that the supply of water to the metropoils will have been proved to be inadequate, and of an impure quality, and to re-

quire the interference of His Majesty's Government, in order that the population may for the future have a certain, ample, and salubrious consumption, with as little interference as possible with the vested rights of individuals who have embarked capital in Water Companies on the faith of the Acts of the Legislature. The formation of any Company at the present moment would be looked upon with great suspicion by the public; and those who have read with attention the very able reports and evidence respecting Water Companies before Committees of the House of Commons, will perhaps have a strong impression that it would be ruinous to embark capital in such a Company, which must compete with those in existence.

The following is an extract from a Report dated the 18th of May, 1821:—"Competition in ordinary cases adjusts the supply to the demand through the liberty which the sellers have to go out of the market, as well as to come into it; but in trades carried on by means of large capitals vested in fixed machinery, and furnishing a commodity of no value but for consumption on the spot, the sellers are confined to the market by the nature of the trade, and the new comer has to seek immediate employment for large works, by taking custom from the established dealer:—as there can be no great difference in the quality of what they sell, they must vie in

the lowness of price, and will probably be driven to under-bid each other to the point of ruin, because it is better to take any thing than to take nothing for that which cannot be carried away; and this must go on until both are worn out, or one has out-lastcd the others, and succeeded to a real and effective monopoly, or until, by some arrangement between themselves, they can put a stop to their mutual destruction."—Supposing this view of the subject to be correct, the evil justly complained of does not arise from defective watercourses or pipes to supply the houses, but in the source from which the water is taken.

The remedy suggested is the making an aqueduct, or canal, from an eligible position of the Thames, to an elevated spot near the metropolis, sufficiently large to supply its wants. Mr. Philip Taylor's Report to the Committee for forming the projected Thames Water Company, will give some idea of the practicability of such a project. From the grand reservoir the different Water Companies should be obliged to lay down aqueducts to their reservoirs, and thus supply the metropolis with pure water. Capitalists might be found to make such an aqueduct, under the designation of "The Thames Aqueduct Supply Company," upon the following conditions:—

That they should be a chartered body:—

That the Water Companies should be compelled to take their supply from the projected Company, and the Company should be restricted from laying down pipes to supply houses in the metropolis, unless in places where the Water Companies could not do so :—

That the parties investing their capital in this undertaking shall, after deducting all expenses, be entitled to per cent per annum on the capital invested, and no more :—

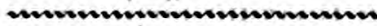
That the revenue shall be calculated *pro ratâ* on the quantity of water supplied to each Company :—

That an account shall be laid before Parliament annually, giving a statement of the affairs of the Companies.—Without making any pledge as to the accuracy of the calculation which may have been affected by events which have occurred since such calculations were made, or that Teddington and Hampstead are the most proper places for the commencement and termination of the project, it is taken for granted that the only certain and effectual mode of supplying the metropolis with water is by an aqueduct, or canal.

The necessity of making one being obvious, it is essential that the construction should be of the most durable materials, and sufficiently

capacious not only to meet the present, but the probable demand for water which an increasing population may require ; therefore the Companies will be supplied with water cheaper than if each had its own aqueduct, paying only a fair remuneration for capital, which they themselves would otherwise be obliged to invest.

That previous to the commencement of the work, the drawings shall be approved of by the Secretary of State for the Home Department."



The plan proposed by Dr. Kerrison approximates closely to Mr. Philip Taylor's, with the difference of the elevation to which it should be raised through a shaft. In this Mr. Taylor has his peculiar merit, and his plan appears to be unexceptionable.

Dr. Kerrison says, "The water in rivers and wells dissolves and holds in solution certain salts and other principles in the strata of earth through which they rise, or the channels in which they flow. These exist in various degrees and combinations. When they are in such abundance as to be very perceptible to the senses, or to produce active effects upon the functions of the human body, they are called saline and mineral waters, and are unfit for the daily use of man and animals in a state of health. Such

waters are found at Cheltenham, Harrowgate, Bath, Buxton, &c.

Purity in water then, for the supply of a large city, must ever be comparative; all that can be expected is to obtain it without much saline impregnation, in a state most free from palpable and insidious impurities; or, in other words, most exempt from adventitious and unwholesome substances in mechanical mixture or in chemical solution. The water in the Thames between Chelsea and Limehouse has long been contaminated with gross impurities, which have been of late so much augmented by the increased population of the metropolis, by the more general conveyance of night-soil into the sewers, by the establishment of gas-works, by the more extensive employment of copper sheathing, and other causes, that the water within that district has become so loaded with filth, as to be in all seasons less suitable for domestic purposes than it was formerly.

The extent to which this contamination must proceed, in order to produce an endemic mortality in the inhabitants of London, is too serious a subject to be put to the test of experience: it will not be denied, however, that such an unwholesome constitution of the air as occurred in London during several years, and was described by Sydenham to have been extensively

fatal, might be reproduced, and that its deleterious effects would be aggravated by the use of such impure water as exists at present in the Thames, within the limits just noticed. There seems to be a general conviction of the necessity of an improvement in the quality of water distributed to certain parts of the metropolis.

The history of Water Companies would be misplaced here. The fact is assumed that the water of the Thames, unmixed with the impurities of the City and suburbs of London, would answer every useful purpose; and the object of this communication is to suggest the means by which I believe it could be obtained with tolerable facility, and at moderate expence.

It is a self-evident proposition, that if the source of supply be beyond the point to which the tide flows, none of the contaminations of the London district could be derived, and that the only causes of impurity would be the drainage from the respective towns and villages higher on the stream. These being so largely diluted by upland water, are partly deposited and partly diffused through such a volume, and in some measure decomposed by the abundant vegetation at the bottom and sides of the Thames, as to become free from all important objections. It may be, however, inexpedient to go so far as the extremity of the tide, on account of the great

expenditure of pipes on a large scale; so that every mile of direct distance which can be saved consistently with the attainment of the object, must not be overlooked.

The tide at London Bridge, under ordinary circumstances, runs upwards about five hours and a half, and downwards, or towards the ocean, about seven hours. This occurring twice in twenty-five hours, causes the difference of high water at London to be an hour later every day. The variations of spring and neap-tides, of much or little upland water, from an abundance or deficiency of rain, are to be considered; still the tide flows downwards during a longer period than upwards, and the stream is stronger or more rapid in its course towards the ocean, by which a volume of fresh water is daily brought into the Thames at London, and serves to dilute the intensity of the refuse of animal and vegetable substances in a decomposing and decomposed state, although a large portion of such impurities returns far above Chelsea by the reflux of the tide.

The difference of time required for the flowing downwards and upwards of water at various places on the banks of the Thames, is worthy of notation. The flow upwards is shorter, and downwards of longer duration, at every village between London Bridge and Teddington, or thereabouts, where the tide ends, and the

water is always flowing towards London. It appears to me desirable to ascertain with exactness the ordinary rate of going of the tide at different places between London Bridge and Richmond:—when this has been defined, a computation could be made of the distance upwards to which the impurities of the river at London or Chelsea, near the great sewer, or King's Scholars Pond, usually reach, by comparing its celerity or tardiness of motion with the period of its reflux, from which could be deduced with tolerable accuracy the point nearest to London where the water is exempt from combination with the foulness from London, or the great sewer at Millbank, above the Vauxhall Bridge.

In reflecting upon this part of the subject, with reference to the avoidance of the large and dirty town of Brentford, in which gas-works have been established; the nearest point which occurred to my mind as likely to answer the proposed purpose, was at or near Isleworth, where I was informed, by personal enquiry these six years ago, that the tide ran upwards for about an hour, or rather longer, and downwards during near eleven successive hours. The exact period can be ascertained with precision; and it will be found, I believe, that the water is flowing towards London full 21 out of the 24 hours every day.

The Thames at Isleworth is tolerably clear,

except during a short time after a great rush of upland water from heavy rains; but in summer, and dry seasons, the bed of the river can be seen at considerable depth. The land or sediment on the shore presents a striking contrast with the deposit at Millbank, or in the Pool at London; and it is probable that the putrid matters held in solution, or other combination with the water at and below Chelsea, never reach Isleworth. A glance at the serpentine line of the river, and the greater distance by water than by land, will exhibit what I have endeavoured to describe by words.

If it should be found that London impurities never flow so high as Isleworth (presuming it to be an eligible spot), the next consideration would be to avoid the objectionable drainage into the Thames from the large villages on its banks between Chelsea and Brentford, including the latter, as Battersea, Wandsworth, Putney and Fulham, Hammersmith, Chiswick, Barnes, Mortlake, and Kew. This could be effected by permitting a short time to elapse, varying probably from an hour to an hour and a half at each tide, when whatever had passed upwards from Brentford will have returned below the intended or proposed source from which the water is to be drawn.

Above Isleworth the Thames proceeds in

a southerly and westerly direction, receding from London towards and beyond Teddington. It appears to me a proper subject for consideration, whether the three miles by land, from the former to the latter place, would not add to the difficulty or expence of conveyance (on a large scale) in a greater proportion than its comparative usefulness; for it will be shewn by a line traced on the annexed Plan, that water can be procured from Isleworth by a distance of only three miles further than it is now obtained from Hammer-smith Mall, whilst it would be taken from a point near six miles higher on the stream, and of great superiority as to purity.

The proposed Line of Conveyance from an open Space between Isleworth Church and Twickenham Lane to Notten Hill.

“ From Isleworth into the Great Western road through the town of Brentford, following the London road until within 200 yards of the Pack Horse at Turnham Green, then leaving the turnpike road, crossing a gardener’s ground diagonally on the north side of the road, and south of Fair Lawn House, to a strip of waste called Acton Green, or Back Common, traversing this near a mile from west to east, then proceeding through a lane at the eastern extremity of this strip to Cackle Goose Green, which is at the northern extremity of Mr. Scott’s house, the front of which is opposite Theresa Terrace,

Hammersmith; then continuing eastward by Gold Stock-lane to the south-western boundary of Shepherd's Bush, crossing that space in an easterly direction, with a few points to the north, and falling into the Uxbridge-road near Norland House (lately destroyed by fire), turning into a road at the western foot of Notten, called also Notting-hill, by the eastern wall of Norland House, and proceeding across a couple of fields on a line parallel with the Uxbridge-road, about 200 yards to the north of that road, to an elevated spot nearly opposite the two milestone from Tyburn turnpike, of sufficient extent to form a reservoir, and at an elevation equal or nearly so to the reservoir belonging to the West Middlesex Water Company, at a short distance on the south side of the Uxbridge-road. It will be seen that the sweep of turnpike road, between the western end of Turnham Green and Kensington town, will be avoided by the proposed line; and that near a mile will be saved without interference with property, which might be of difficult or expensive acquisition.

Whatever facilities exist for the distribution of water by the works of the West Middlesex Company, must attach to the spot described. If the supply of water at Isleworth should be too distant from Notting-hill for practical purposes, Ealing Common, an elevated flat, between three and four miles from Notting-hill, and not at a

greater distance from Isleworth than the works at Hammersmith Mall are from Kensington Gravel-pits, presents an intermediate station. If that should be required, the line of direction must be altered by turning northward at Brentford.

The manner in which the Directors of the West Middlesex and the Grand Junction, or new Chelsea Company, have broken their engagements with the public, was ably shewn in 1819-20, by the notices and pamphlets of Mr. Weale, and lately by a printed memoir to the Commissioners, by Mr. Wright, so that no remark of mine upon these points is necessary at this time. The recital of incontrovertible facts by these gentlemen affords another proof that in commercial speculations, public principle, even in men respectable as individuals, is too weak a protection against the temptations of cupidity, where the power of gratifying it is granted in the form of a monopoly, or (if the expression be admissible) a number of monopolies admitting of a collusion or confederacy of interests, for the exclusive advantage of the monopolists.

I am inclined to believe that the only safe course, and that alone which would satisfy the expectations of housekeepers, and remove every reasonable cause of complaint, would be the appointment by Parliament of Commissioners for the performance of a public trust, who would en-

gage engineers and subordinate agents, accountable for their acts, investing them with authority to establish works, and levy assessments on house-keepers, bearing an equitable reference to the expences incurred, and to the supply of water required at each house; the whole being conducted on principles of strict economy. The establishment of a new company of adventurers in water would inevitably lead to a repetition of the abuses of public confidence, which have been so justly exposed and censured.

I am not prepared to state the exact portion of London which could be conveniently supplied from Isleworth: such details are in the province of civil engineers. I think it not improbable that the parishes of St. Mary-le-bone, St. James, Westminster; St. George, St. Margaret, and St. Anne, also St. John, Westminster, could be adequately served with water in the manner I have endeavoured to describe; a population of near 300,000 individuals.

Having respectfully submitted these particulars for your consideration,

I have the honour to be, Gentlemen,
Your obedient Servant,
R. M. KERRISON, M. D."

Having thus brought water to Hampstead and Highgate, the next object is to filtrate it before it enters the pipes. Dr. Bostock, in his evidence before the Commissioners, concludes his valuable analysis by saying—

“ It would appear, however, that a very considerable part, if not the whole, of this extraneous matter may be removed by filtration through sand, and still more effectually by a mixture of sand and charcoal. The effect of filtration in purifying foul water is too well known to be insisted on; and I made some experiments expressly on the subject in December last, when, in consequence of the long continued rains, the water of the New River was delivered into my cistern in a muddy and discoloured state. I found that by filtering it through a stratum of clean sand mixed with a quarter of powdered charcoal, it was deprived of all its sensible impurities. Two bottles were sent to me for inspection on the 2d April, one containing the water of the Thames (I believe taken from the neighbourhood of Chelsea), the other containing water from the same source after having been filtered through a bed of sand: the former exhibited the usual appearance, while the latter was perfectly free from visible impurities, and had lost all unpleasant flavour or odour. I think, therefore, we may conclude that the process of filtration, if properly conducted, would be in all respects unexceptionable, pro-

vided a sufficient quantity of water could be prepared by these means for the supply of the metropolis.

J. BOSTOCK."

This filtration may take place in successive reservoirs, into which the water is received from the shaft, flowing through the filtering medium from the highest to the next below it, and so on into others, until it is sufficiently pure to enter the pipes. In addition to this, distillation even, as recommended by Dr. Lambe, may be added, in order to render the water more brilliant, so that no private filtration will be wanted in future for this water.

Before this water is suffered to enter the pipes, it should be analyzed, or approved by a Chemist appointed as a resident *Ædile*, or Curator of the public waters, and a daily register kept of their purity.

In this manner the metropolis may be supplied with water, clear as crystal, without diminution of quantity, or deterioration of quality, in all seasons of the year, from two abundant sources.

It will, however, be seen, by referring to the Parliamentary Water Report of 1821, that the iron pipes separate themselves by contraction in 300 yards; and a considerable leakage of water takes place during its passage under the streets, after it leaves the reservoirs, as appears from the evidence of Mr. Milne and others in that Report.

If, then, the pipes let the water out on an average at every 300 yards—this escape being multiplied by the number of miles the pipes extend to in London—the purest water, going into the pipes at the fountain-head, will become foul from the entrance of the soil and mud in which the pipes lay, at the apertures where the water goes out. *It therefore becomes necessary to place the whole of the pipes in clean dry Sub-ways, to prevent the pure water being contaminated in its flow from the fountain to the table.*

Sub-ways therefore become imperatively necessary, to receive pure water, and transmit it in its purity to the public:—without them no effectual remedy appears to be capable of preventing all the evils previously discussed.

The building of Sub-ways should therefore commence at the reservoirs at Hampstead and at Highgate, for the water so purified, and be inspected by the Ædile, or Curator of the public waters. Under the Sub-ways the improved Sewer should be built, and the upper surface Macadamized as a road. These Sub-ways, as they respectively meet the present series of pipes in the ground, may then terminate, if required, or be continued, street after street, through the metropolis, until the whole be completed.

For these Sub-ways and Sewers another Ædile should be appointed; or two would have

sufficient employment—one for the Sub-ways and Sewers—and the other for the public highways and streets.

These Ædiles should be men of practical skill, of known capacity for the work, not under 30 years of age, and of strict integrity; who must do their work personally and entirely, at a salary of at least £300 a year, besides their expences.

There will, therefore, be four Ædiles in London:—one for the Public Waters—one for the Public Lights—one for Sewers and Sub-ways—and one for the Paving and Superintendence of the Streets.

From the great extent of the metropolis, the probability is, that each of these Ædiles must have a deputy, in the north, south, east, and west of London. These may be at smaller salaries, but of the same qualifications: they must keep a daily register for delivery to the Ædile, subject to his approbation and signature. These daily reports should be submitted by the Ædile to the Commissioners regularly every week, whose appointment, constitution, and duties will now be considered.

The Commissioners of Sewers have their authority, as by the extract from Challis's work, inserted in this Volume, and by subsequent Acts; but the London Commissioners have a local Act

in addition, by which they annoy, instead of assist, their fellow-citizens whenever they have the painful necessity to apply to them. The whole metropolitan Commissioners having lost sight of their powers, granted for specific purposes, have, from the foregoing facts, proved themselves incompetent to their office, by suffering their Sewers to be overcharged with such impurities as actually to poison the fish in the River Thames, and render its waters unfit for the culinary use of man. No apology, therefore, is necessary for viewing the subject altogether independent of those Commissioners; but without enquiring into their capacity, it is enough to shew that, with all the improvements herein suggested, *new authority for new Commissioners* is indispensably necessary for the effectual attainment of the end.

Four sets of Commissioners should therefore be appointed, of seven gentlemen in each Commission; three of each to be a quorum:—one for the Public Waters—one for the Public Lights—one for the Sewers and Sub-ways—and another for the Paving and Superintendence of the Streets. Their qualifications should be approved by the King in Council, or by the Lords of His Majesty's Treasury. Their office to be during pleasure. Their salary to be regulated by the attention to the business of their office, at a rate per hour of attendance, so as not to exceed £500 per year.

The whole of this immense public work would thereby be condensed into a very small focus; and the present respective establishments of Water and Gas should be purchased.

The purchase of the existing Water and Gas Companies may be effected upon the same plan as the New River Water Company purchased the Hampstead, the York Buildings, and the London Bridge Water-works; which latter Company they obtained on the terms shewn in the Act of Parliament quoted in page 252.

No actual difficulty exists as to the purchase by the public, for their own benefit, of all the Water and Gas Companies in the metropolis. The amount of the Water Companies will be about five millions, and the Gas much the same; ten millions will therefore remove all these monopolies. The Public Waters will be pure, and the Public Lights pure also; the Sewers will be cleansed; the fish return into the Thames; and the Paving and Pavements will not be disturbed for many years, but remain permanently beautiful, like terraces.

The public taxes and private rates now collected in the metropolis for the sewers, paving, and lighting, together with the water, and gas lights, exceed one million sterling per annum. When these works become public property, and the public are supplied at a moderate rate, the sewers and the paving being also permanently

constructed, so as to diminish the annual expenditure, the rates on the inhabitants will be gradually reduced, and relieve the public most essentially.

The whole of this Volume is intended to prove the necessity of preventing the frequent removal of the pavement and carriage-paths in streets, roads, and public ways, by the construction of Sub-ways, to receive the pipes for water and gas, and give access to the Sewers. The other subjects discussed are so intimately associated with Sub-ways, forming one beautiful whole, that they cannot be separated without injury. This has been most elaborately shewn to be practicable and easy, although Herculean in appearance:—the difficulties vanish as they are approached, and the *ignis fatuus* disappears. Nothing, in truth, is now impossible to the faculties of man, when steadfastly pursued with patience and perseverance.

This can only be effectually accomplished by the Government of the Country. It is of too great magnitude for individual capital or exertion: even a body of individuals, with their joint property, cannot undertake it, without specific powers from the Legislature, which it may not be prudent to grant:—therefore it remains to be the grand work of a great people, united in one purpose for their mutual advantage, to obtain health, cleanliness, and comfort.

It will now be necessary to shew the estimated expence of a Water Company, and the capital of the New River Company, as exhibited to Parliament.

Report of the Select Committee on the Supply of Water to the Metropolis:

Ordered by the House of Commons to be printed May 18, 1821, No. 537, contained in Vol. 5, Sess. 1821.

APPENDIX I.—PAGE 243.—MR. MILNE.

Estimate of the Fund necessary to provide against the Wear and Tear of Capital for Water Works.

If a Capital be expended in an undertaking, consisting of the following items, they will require renewal in the number of years set opposite the respective sums, and the per Centage for the renewal will be as stated in the third Column.

	£	s.	d.	Renewed in 60 Years at	0	8	5	per Cent.	£	21	0	2	per Annum.
Engine Houses.....	5000			25						120	1	2	
Machinery	5000			45						48	6	8	
Iron Pipes $\frac{1}{10}$ of	58500			10						749	12	2	
Cocks and Plugs.....	9000			45						185	18	2	
Pipe laying.....	22500												
Capital.....	100000									1124	18	4	

Estimate of the Capital engaged in the Works of the New River Company, from 1815 to Christmas 1820.

The Capital employed in the New River Works was estimated in 1815 at £ 846,640 7 0

Since which, have been expended the following sums:—

Amount paid Fereday & Co. for Iron since 1815	127,918 0 0
Pipe-laying account	52,994 0 0
Value paid for Cocks	3,849 19 0
Expenditure in machinery and buildings requisite for carrying on the works since 1815	9,019 0 0
Value of Pipes purchased of other Companies, when they abandoned the supply of the district now served by the New River Company	102,042 6 3½

The portion of the above stated Capital sold to various Companies where the New River Company abandoned the most distant districts..

58,940 0 3	43,102 6 0½
<hr/>	<hr/>
	£1,083,523 12 0¼

*One Year's Expenditure of the New River Company
in 1820.*

Poundage	£3,300	Rents, &c.....	£3,500
Salaries	2,300	Taxes	4,500
Street expences	2,500	Committee.....	500
Pipe-yard	500	Incidents, including Law	500
Water-house.....	2,400		<u>27,000</u>
River.....	3,500	Reserve.....	3,700
Engine	300		<u>30,700</u>
Coals	900		
Stable	150	Deduct on Paving and	} 1,000
Paving	1,600	some other articles	
Plumbers	300		<u>£29,700</u>
Stationery, Printing, &c.	250		<u>£29,700</u>

Another important fact of the necessity of Sub-ways has been proved by the letter of the City Surveyor of Pavements to the Commissioners at Guildhall in September last.

*“ To the Committee of the Honourable Commissioners
of Sewers for the City of London, and the
Liberties thereof.*

Having been directed to report my opinion, whether, if additional Gas Companies were allowed to lay pipes in the City, any injury would be done to the pavement; and whether any additional expence to the Commission would ensue in consequence of such pipes being laid—

especially considering the present and future effect such proceeding would have upon the new pavement—I have given the subject my most serious consideration; and, although upon the broad statement that the whole City must be ploughed from end to end, it may as broadly be concluded that almost incalculable injury would be done to the interests of the Commission, I should be guilty of dereliction from my duty, did I not, as plainly as I can, describe the nature of that injury.

You are, Gentlemen, perfectly aware that the whole surface of the City has been raised above its former pavement, upon an average between three and four feet, with rubbish of all kinds, imperfectly crusted by the gravel used from time to time in paving.

Below the old line of pavement, the earth is in many places loose and hollow; and in the best, excepting in the few places where there is a thick stratum of hard gravel, the ground has not much strength in itself; but yet it has been so compressed, that if left undisturbed, it will probably not settle more.

If this earth were good, cutting one trench through it in favourable weather, were that trench carefully filled in, and well rammed, might not be permanently injurious; because there would

be a wall of earth on each side, and the pavement would also have comparatively strong abutments, so that probably twice relaying it might remedy the evil.

But if two or more are laid, and that in narrow ways, it is obvious the undisturbed ground will bear so small a proportion to that which has been removed, that the most careful filling in and ramming could scarcely prevent the whole pavement falling to pieces; for the untouched ground would be as it were the piers of a bridge, of which the trenches represent the water-way. The pavement over each is one of a series of extremely flat segment arches, mutually supporting, and supported by each other. If one fails, all fail necessarily; and that one or other will in this case fail, is almost a certainty.

For it is to be considered that, with reference to these piers of earth left untouched by new trenches, they are themselves unsound, being but the filling in over recently driven gas and water mains, trenched across also at every ten feet by more recent services, and which, although compressed into comparative solidity, cannot be considered in a state to stand by themselves.

Besides, that ground cannot in many situations be left to act even as piers or longitudinal

walls ; for it will be necessary that the new pipes should be laid so as to avoid the old, which, it is to be recollected, run across the streets as well as lengthwise, and also so as to escape the gully holes and the openings into the sewers : and if we reflect that in most streets there are already four mains, it may readily be conceived how completely the earth must be ploughed up and pulverized, longitudinally and laterally, for new mains and services.

It is obvious that all pavement must depend either on the strength of its abutments, or upon the firmness of the sub-soil.

In narrow streets the foot-ways pressing against the houses, form good abutments ; but in wider ways the curve is so very flat, that, form the stones how you will, and lay them how you will, the stability of pavement must result from the strength of the substratum. If that substratum should be destroyed, or merely injured, it must so necessarily follow that dislocation or destruction of the reposing pavement will ensue, that I should almost consider it an insult to the understanding of the Commissioners, to endeavour representing it in a clearer light.

But there is a species of injury resulting from such proceedings not comprised in the above statement.

You are well aware, Gentlemen, that some of the stone used in pavement has been originally ill dressed ; more of it has been so cut away as to be almost worn out.

But, in very many situations, such stone will, if unmoved, remain serviceable for years, resting upon the indurated earth beneath it, and reasonably good work may be made with such stone upon a good foundation ; yet, when the ground has been loosened, a very great portion of that stone must be rejected, because it cannot effectually be made to key in with the rest ; and, as a necessary consequence, new stone will have to be supplied.

It will follow, as an immediate effect, consequent upon such works being done, that the public must sustain all the inconvenience, and the Commissioners contend against increased expenditure for the first laying of the mains.

But the ill effect will not rest there.

If there should be any thing like vigorous competition between the Companies, before one or other is ruined, an evil more insidious in its nature, and worse in its consequences, will arise.

Renters will naturally be often, not to say constantly, changing from one Company to another, and small openings will be made.

These, if they fail, will cause short holes, which are far more dangerous than extensive depressions ; because, in the latter a carriage has a chance of sinking and rising easily, but in the former the jerk is sudden ; and with the most vigorous exertion of the most vigilant officers, it will be scarcely practicable to guard against grievous accidents: and the expence to the Commission will be great, because these Companies will, like all similar Companies, relay as little beyond the bare width of their trenches as they possibly can. Their neglect will naturally affect the Commission ; because it cannot be endured that life is to be endangered, while the officers are squabbling who is to do the work.

It has been suggested that, when the new mains are laid, borings may be made, and services inserted from the mains to the line of the houses, without disturbing the foot-ways.

This, though feasible in conversation, will, I fear, be very difficult, if not impossible, in practice.

Buried stone may in some places repel them ; in others they may accidentally tap a water-service ; in others they may not hit exactly the point at which a wall is vulnerable, or where it is convenient for the supply to be received ; or conceding that none of these mischances would

occur, in wide pavements it will not be an every-day-man's task to kneel and bore a horizontal auger-hole twelve feet in length, and to insert a pipe twelve feet in length, from a trench two feet in width.

But, even granting that it may be done at first, I believe it will be admitted by the Gas Companies, that services will not upon an average last above three or four years without renewal. Of course, openings must be made for those exchanges—certainly in the carriage-way, and almost certainly in the foot-way.

So far as respects work done in the accustomed manner, these remarks are applicable; but with respect to the present more systematic conduct of the work, they have much greater strength.

Taking portions of the carriage-way of Fleet-street as supposed samples of good work:—

If two or four trenches, with the necessary services, were to be cut through the foundation which has been formed, can we form any opinion as to when it would, if ever it could, be put again into a good state?

The same system is being silently carried into effect in other streets, though, from the limited means of the Commission, it cannot be

at present done upon a broad scale ; but all the good which has been done, will, if this measure is adopted, be annihilated.

Adverting to the new pavement which has been laid for foot-ways, and which will be constantly taken up for exchange of services :—

If we consider that it is liable to have two trenches cut through it in front of every house, the one to take up the rejected Company's service (or merely a hole to cut it off), the other for the new supply ; and if there should be three or four Gas Companies in one street, together with one Water Company, each with a service-pipe used, or in preparation for use, by each house ; and if two or more occupants of separate floors of each house, should chuse to deal each with a different Company (for to such occurrences the Commissioners are liable) ; and if the houses are taken upon an average at twenty feet each, some idea may be formed of the devastation that will ensue.

It must also be borne in mind, that the Contractors are now bound to keep the new foot-ways in repair during their contracts.

They necessarily calculated upon having to encounter only the disadvantages of the present service-pipes ; but if the Commissioners do an act which in its consequences will subject

them to constantly recurring exchanges, they must in equity at least, if not in law, take the reparation upon themselves.

I am so convinced of the evils likely to result from such a competition—a competition which, advantageous or not to these Companies, will certainly be detrimental to the Commission—that, as your officer, I must, in discharge of my duty, declare that, should this rivalry be allowed, it would no longer be advisable to attempt completing the projected improvements; although I clearly see that even such a proceeding can save but little, because many stones of the old footways will decay; and no longer having good old stone to supply their place, probably as much new stone must be used for patchwork as would lay new foot-paths, and no commensurate advantage be derived.

Whereas, upon the present system, a whole street being laid with new stone, much of the old stone from that street is good enough when re-squared, to repair others of inferior importance.

Having thus stated my opinion upon the injuries likely to ensue from the works of additional Gas Companies, I beg leave to state, in corroboration of this opinion, practical facts which must, from their nature, be better than any reasoning.

First—Between the years 1813 and 1822, both inclusive, permission was granted for gas pipes to be laid in streets, whose aggregate length amounted to about thirty-one miles.

In most of these, double, and in some, treble mains were laid; and considering the various ramifications down courts and alleys, of which no lists were kept (all in one or more Wards at a time, and at length all that remained unoccupied being granted, but not enumerated), the quantity of main pipe laid cannot be considered less than one hundred miles lineal.

Second—Between the years 1815 and 1818, nearly all the New River Company's wooden mains were replaced with iron; and subsequent exchanges of the London Bridge mains have taken place.

Third—The average expenditure for pavior's work, taking the six years from 1809 to 1814, both inclusive, was, per annum, £7281.

And the average expenditure for pavior's work, taking the six years from 1818 to 1823, both inclusive, was, per annum, £10,718.

Although it is now impracticable to ascertain what expence was incurred in direct consequence of pipes being laid, and what belonged to

the usual wear and tear of the pavement ; yet the naked fact that the expenditure has been increased 50 per cent. per annum, upon the pavior's work alone, since the commencement of the Gas and Water Companies' operations, almost necessarily leads to the conclusion that they were the causes of that increase.

To strengthen this conclusion, it may be deemed not irrelevant to say it has been distinctly stated, in the enquiry laid before Parliament into the conduct of the Dublin Paving Board, that their expenditure has doubled itself in consequence of similar works.

With regard to the expences the Commissioners may have to meet, if the prayer of the new Gas Companies is assented to, I am unable to state any sum which could be relied on ; but if in Dublin their expences were doubled, and if your own expences were increased 50 per cent., it may fairly be assumed that now the cost, which must ultimately fall upon the Commissioners, will be equally great in proportion, especially when it is considered that stone, which some years back was barely fit for use, must now be considerably worse.

As I presume the Commissioners intend, whenever their funds allow it, to proceed with putting a sound foundation in all the streets,

and laying a better pavement than heretofore used, I beg to observe that any intention of that kind must be deferred until the whole of the new mains are laid, and the ground consolidated; or such new foundation will be almost irreparably destroyed, and the expence of restoring the pavements be nearly equal to that of its first formation.

SAMUEL ACTON, Surveyor.

September, 1827."

The impossibility of having the streets perfectly paved without Sub-ways, is here clearly exhibited. One would almost suppose the foregoing to be the statement of the Author of this work, rather than that of an executive Officer of the Paving Commission; so strongly does it corroborate his views, as well as all the other extracts on the subject of the paving in the metropolis that have been introduced. They all authenticate the existence of a crying evil—an evil that, instead of diminishing, must rapidly and annually increase—And are the public to forego the advantages of the remedies? If they were compensated by the possession of any pecuniary equivalent, this might induce them to endure it; though such a feeling would ill accord with the liberality and magnificence of the English People!

The King's Commission, then, appears to be the most suitable for this great undertaking—

under Commissioners of adequate capacity for the work, who shall lay their proceedings before the House of Commons every Session.

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Respecting the existing Water Companies, with the monopoly they have taken among themselves, which the Legislature never contemplated or authorized, and in defiance of the preamble of their local Acts, which were to encourage competition, their property in these establishments should not be sacrificed. The purchase of them is indispensable to national justice: they have been greatly beneficial to the public for a long period, and it should be handsomely acknowledged, even though it might be necessary to state in the preamble of the Act for abolishing Water Companies in the metropolis, as was done in that for removing the London Bridge Water-works lately, that they "had become a nuisance."

That Act, also, has become a precedent for the mode of valuing this description of property; and, together with the sale of the York Buildings Water Company, is at once a basis for the value of these Water establishments.

They must, however, remain for a few years longer, until the Sub-ways reach those places they supply; when their pipes, and other property, may be removed, and pure water substi-



tuted by the Commissioners under the new Act of Parliament.

There is a precedent also for the advance of the capital necessary for this national work :—the New Street Commission for forming a street from Pall Mall to the Regent's Park, have powers granted them for that purpose ; and this, like that undertaking, will repay the cost in abundant interest for the capital.

There are also other Acts of Parliament for advancing capital to Commissioners for the erection of public works :—the Caledonian Canal—the Breakwater at Plymouth—and the building of Palaces—and Churches.

I cannot conclude this Volume without referring to the opinion so frequently expressed by the Secretary of State, during the late enquiry into the state of the water in the metropolis, that other Companies should be established, to correct the defects of the existing ones. Opinions, however, are nothing when opposed to facts ; and abundant evidence is shewn in this work, that the latest and newest Water establishments have done the most mischief. No effectual remedy of private subscriptions for another Water Society can abate the nuisance :—His Majesty alone, with the advice of his Parliament, has the power to effect it.

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A DUTIFUL ADDRESS TO THE KING.

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Having thus, ROYAL SIRE, brought my labours to a conclusion, I humbly place the whole in the hands of Your Majesty, trusting that the Work will have its perfection by your royal command—that the same good taste and sound judgment, which in Your Majesty's early life induced the selection of the then barren, though healthy, downs at Brighton for a Princely residence, under whose notice it has since risen into an opulent town of great extent and beauty—whose mind was always filled with thoughts of the erection and splendid decoration of Palaces, to encourage the Arts, and employ the Artisan; and of the adornment of your metropolis, by magnificent streets and royal parks, tending to increase the comfort and happiness of your people—whose eye, also, is ever quick to seize the opening suggestion of others, when respectfully submitted for your royal approbation:—

These considerations induce the hope, that Subways will be built by Your Majesty's royal authority, for the flow of pure water to a million of Your Majesty's loyal subjects in the metropolis, and form a distinguished era in the splendid reign of HIS MAJESTY KING GEORGE THE FOURTH.

I have the honour to remain,

Your Majesty's faithful Subject to command,

JOHN WILLIAMS.

Cornhill, London, July, 1828.

## GENERAL INDEX.

### A.

- ABSTRACT** from City accounts for paving, 37, 438.
- Access** given to the pipes and sewers by the Sub-ways for any purposes 47, 77, 111, 112; the advantages of, 132, 362, 422.
- Act** in 1539, to pave part of London, 216; in 1543, to pave additional streets, 217; to repave the streets, and remove signs and lamp-posts, and when passed, 220; to tax hackney coaches, for repairs of paving, and when passed, 219; (M. A. Taylor's), for regulating the streets, its utility, and when passed, 38; in 1543, for repairing conduits, 218; for cutting New River, and when obtained, 249; to whom granted, 249; transferred to Sir Hugh Middleton, 249; the consideration, 250; for the removal of London Bridge Water-works, 252; to *preserve the purity of the Thames*, in 1535, 306, 307; ancient sewer Act, 199; Act to levy new rates, 11th Geo. 3d, 28; Do. 33d Geo. 3d, 29; another for additional rates, 31, 209; proposed Sub-ways, Act for the, its object, 111.
- Address** to the King, praying the appointment of a Water Commission, agreed to in Parliament, 279.
- Address**, the Author's first, at public Meeting, 51; at second Ditto, 64; at third Ditto, 125; at 4th Ditto, 141; to Court of Aldermen and Common Council, 117; concluding, to the King, 443.
- Adjournment**, motion for, at third 'meeting, and by whom proposed, 138.
- Advantages** of Sub-ways; ready access to the pipes and sewers without disturbing pavement, 47, 77, 111, 112; prevention of decay of the pipes, 77; and of escape of gas, 112; facilities afforded at fires, 128, 143; superseding necessity of reserved fund for relaying pipes, 133; prevention of wear and tear of carriages, 128; and destruction of horses, 128, 143; firm and even paving, 48, 113, 128; another, alluded to in *Morning Chronicle*, 73; income certain, 142, 186; no interference with private property, 187; employment for the poor, 49, 53; preservation of the purity of the water, 422, 423, 425.—*Vide* "Pipes," "Sewers," "Fires," &c.
- Advertisements** for first public meeting, 45; for second Ditto, 62; of the resolutions at, 71.

- Advertisements for third public meeting, 121 ; for fourth Ditto, 141 ; of resolutions passed, 145.
- Advertisement, Government, for the encouragement of public works, &c. 49.
- Ædiles, or Curators of Public Ways, State officers in Rome, their office, 15 ; their non-estimation in modern times, 15 ; proposed for London, 421 ; their necessary qualifications, duties, &c. 423.
- Ancients, their estimation of the importance of pure water, 15, 297 ; their aqueducts, 1 ; their roads, 21 ; their pavements, 24 ; how constructed, 21.
- Anecdote of the opposition to gas lights, 175.
- Annoyance of repairing pavement, 2, 6, 8, 10, 17, 20 ; always recurring, 2, 27 ; the cause, 7, 211, 430.
- Answers to the objections of the Chartered to the Oil Gas Company, 159 ; remarks upon them, 170.
- Application to Secretary of State, 171 ; reply to, 172 ; re-reply, 174.
- Aqueducts in Rome ; their great cost, 332, 398 ; method to procure pure water, 394, 409
- Aqueduct Supply Company suggested by His Majesty's Commission, 408.
- Average supply of water to each house in the metropolis, 356.

## B.

- Baths, erection of, recommended by the Water Commission, 372 ; the offer of New River Company to supply them, 372.
- Battle Bridge, pumps there communicating with sewers used for watering streets, 321 ; the consequences to the inhabitants, 321, 322.
- Bill to construct Sub-ways, notice given of, 104.
- Boring for water, Mr. Ryan's method, 385 ; proposed as an additional source for the supply of London, 389.
- Bristol roads Macadamized, 228.
- British Gas Light Company, their establishment, and application to Parliament, 150 ; their prospectus, 150 ; and capital, 151.
- Broken Wharf, its filthy situation, 312 ; an additional source of the New River Company's supply, 313, 354 ; how the necessity for it may be superseded, suggested by Water Commission, 371.
- Bubbles of 1825 encouraged by the Government, 191.

## C.

- Calculation of the cost of Sub-ways, 108, 129.—*Vide* "Construction," "Expence."



- Calculation of the quantity of gas consumed, 262; of the quantity of water consumed, in London, 356, 359.
- Capital of New River Company, 428; amount proposed for Sub-way Company, 46, 145; of British Gas Company, 151; none required for pipes after Sub-ways are constructed, 157; its abundance, 1825, 190; Bubble Companies produced, 190; amount required for the several schemes and bubbles of 1825, 192 to 197; summary of, 197.
- Carriage-ways, their deficiencies, 17, 430; improved in the country alone, 17; pavements, extract from Mr. Bryan Donkin's publication on, 6.
- Challis's ancient Lectures on Sewers, extract from, 198.
- Chalybeates at Cheltenham, &c. not fit for daily use, 411.
- Charing Cross, when paved, 216.
- Charles the First reconveys the royal moiety in the New River project to Sir Hugh Middleton, 248; the consideration, 248.
- Chartered Gas Company established, 261; their capital, 168; their enormous expence in opposing the Oil Gas Company, 171; their charges more than originally contemplated, 171.
- Chelsea Water-works established, 259; where situated, 355; its reservoirs, 355; number of houses supplied, 355; and the quantity of water, 355.
- Chemicals prepared in earthen vessels, and why, 140.—*Vide* "Earthen Tubes."
- Circular sent to the House of Peers, 80; to the Parliamentary Sewer Committee, 79, 83; prepared for country towns, 157; sent to Aldermen and Common Council, 61.
- City, how formerly supplied with water, 237, 239; first instance of supply through pipes, 237; expenditure for paving, 33, 184, 438; its annual increase, 439.
- Cleanliness, Addison's observations on, 300; others, 300.
- Cloaca Maxima of Rome, 2; by whom erected, 308; one proposed for London, 379 to 382; its advantages, 382, 383; mode of cleansing it, 381.
- Cocks and plugs, their non-durability in their present situation, 132; their preservation in Sub-ways, 132.
- Colne River, the *proposed* source of the Grand Junction Company's supply, 327.
- Combination of the water companies, 294; subversive of the intentions of Parliament, 325, 326.
- Commissioners of Sewers, their constitution, 86; account of their three Courts, 86 to 93; their antiquity, 199, 206, 208, 209; their great powers, 199, 424; their ample funds, 379; suggestion to Government to ingraft on it a Sub-way Commission, 178; their application to Parliament for levying higher rates, 27; observations

- thereon, 84 ; their inefficiency, 86, 95, 378, 424 ; their destruction of paving, 17 ; their *ancient* requisite qualifications, 87 ; their reconstitution proposed, and mode, 424.
- Commissioners of Pavement, their conduct when Pall Mall was first lighted with gas, 175 ; their application for leave to levy higher rates ; 27.
- Commissioners appointed by the King on the supply of water in London, 279 ; the Commission itself, 279 ; its proceedings, 282 ; employ Dr. Bostock and others to analyze the Thames water, and his opinion as to its insalubrity, 366 ; their report, 351 ; their observations on Mr. Taylor's plan, 406 ; their opinion as to the establishment of a new Water Company, 407 ; their enquiry into a remedy checked by Mr. Peel, 352, 374.
- Committee of Improvements ; the Author's memorial to the City referred to them by the Court, 115 ; interview with, 119.
- Committee, Parliamentary, to revise Sewer Act, 78, 95 ; when appointed, 79 ; observations on their proceedings, 106.
- Committee, Parliamentary, on the supply of water in 1821, extract from their report, 407 ; another appointed July 1828.
- Committee appointed by Thames Water Company, 402 ; their report, 403.—*Vide* "Thames Water Company."
- Committee, Sub-way, appointed at second public meeting, minutes of their proceedings, 72, 73, 75, 76, 106 ; their report, 127.
- Companies, additional Water, *insufficient* as a remedy for present evils, 330, 407, 418.
- Companies, Water.—*Vide* their respective nomenclatures.
- Companies, Gas.—Ditto Ditto.
- Company, Sub-way, when and how proposed to be constituted, 46 ; why not proceeded in, 191, 185.
- Competition for supply of water at an end, by a coalition of the five Companies, 294, 325 ; differs from ordinary cases, 328, 407.
- Competition for supply of gas, the advantage of, 160 ; no injustice to present Companies, 160, 161 ; its bad effects as it respects the paving, 164, 170, 436 ; the ill results provided against by Subways, 170.
- Completion of Sub-ways necessary, and why, 263, 362.
- Conduits, when first erected, and where, 237, 243 ; their number, and how supplied, 237 ; more built, and by whom, 241, 242, 243 ; the expences of their repair, how defrayed, 242, 243 ; authorities to enforce Parliamentary order to repair, 218 ; why removed, 237.
- Construction of Sub-ways, the mode of, 43 ; drawings explanatory of, 44, 100, 104 ; cost of, repay itself, 442 ; by whom should be undertaken, 329.—*Vide* "Income," "Sub-ways," "Government."

- Contamination of the water by fissures in the pipes, how occasioned, and the remedy, 422, 421, 362.
- Contraction, iron pipes separate by, 421; consequent contamination of the water, 362, 422.
- Copper, impregnation of the water in the Docks by it, 311, 328; Dr. Bostock's opinion, 367; Dr. Kerrison's, 411.
- Cornwall mines, the method of raising water at, 395; many, previously abandoned, now worked, and why, 395; the same method proposed for supplying a reservoir at Hampstead and Highgate, 394.
- Corporation, their powers to bring pure water into London, 383; assignment of them to Sir Hugh Middleton, 384; their refusal to assist him in his difficulties, 250; interested in the remedies proposed by this object, 16; memorial presented to them by the Author on Sub-ways, 15; their opposition to all new objects, 95; their application to Parliament for leave to levy additional rates, 27; oppose application of New River Company to Parliament for leave to join the River Lea to their supply, 246.
- Corrosion of iron pipes, obviated by Sub-ways, 67, 112, 165.
- Custom, ancient, of the citizens, with respect to the conduits, 238.

## D.

- Defective state of the pavement, 7; and the causes, 8, 12, 16, 430.
- Description of Thames water, 296, 301, 305, 306, 309 to 322.
- Deterioration, daily, of the quality of the Thames water, and the causes, 312, 317, 338, 346, 367, 411.
- Diameter of the pipes not necessary for an abundant supply, 397, 403.
- Distillation suggested, 421.—*Vide* Dr. Lambe's publication.
- Docks, water in the, impregnated by the copper sheathing, 311, 328; Dr. Bostock's opinion upon it, 367.
- Dolphin, publication under that name, 265; a mark in the River Thames, whence the Water Company draws its supply, 266.
- Drainage, Dr. Kerrison's suggestion respecting it, 413.
- Drawings by Mr. Reveley, 44, 100, 104; exhibited to the public, 104.
- Durability of the pavements in ancient and modern Rome and Naples, and the causes, 21, 22.
- Duration of pavement in Rome, the causes of, 21, 24.
- Duration of pavement in London, why so short, 7, 12, 15, 16, 430.
- Duration, the long, of the pipes by construction of Sub-ways, 77, 132.

## E.

- Earthen vitrified pipes suggested, 138; adopted at Lynn Regis, 139;

- their adaptation for supply of water in connection with Sub-ways, 140, 141.
- East London Water-works established, 259; where situated, 354; they purchase Shadwell Water-works, 259; the source of their present supply, 354; their reservoirs, 354; their tenants, 354; the quantity and quality of supply, 354.
- Edinburgh, how supplied with water, 333; its purity and abundance, 334.
- Employment Sub-ways will give to the poor, 49.
- Endemic mortality in London must eventually ensue from bad water, 324, 411, 412.
- Engagements of the Grand Junction and West Middlesex Water Companies with the public not faithfully preserved, 268, 418.
- England, the seat of science, 9; should not want that which in former ages was enjoyed, 334; a patent not vitiated by adoption of it in foreign countries, 55.
- Enquiry into the purity of the water, 264.—*Vide* "Grand Junction," "Water."
- Estimate of reserved fund necessary for water-works 8 years ago, 427.
- Expenditure of New River Company in 1820, 429.
- Expence, supposed, of cutting New River in 1608, 245.
- Expenditure for present bad paving in the City, 31, 438; its enormous increase, 439; the increase in Dublin, and the causes, 439; in Naples almost confined to primary outlay, 22.
- Expences of Oil Gas Company to obtain an Act, 171; of the Chartered Company in opposing it, 171.
- Expence of supplying pure water to the metropolis, how to be defrayed, 329, 419; the amount but of secondary importance, 331.
- Expence of building Sub-ways, 129; how to be defrayed, 329; how alleviated, 383; outlay justified by its utility, 331, 382; but ultimately will repay itself, 442.
- Expences considerable of *bringing* forward Sub-ways, and all defrayed by the Author, unassisted, 185.
- Expence, estimated, of constructing an aqueduct to Hampstead and Highgate, 403; of constructing a spring-water tank, as an additional source of supply, 387; Water Company's great for forcing a supply, 392; considerably less on the proposed plan, 393, 396.
- Evidence, Mr. Weale's, as to Joint Stock Companies, 328.
- Evidence, Mr. Goldham's, as to the fatal effects of the Thames water on fish, 336; Mr. Butcher's, 340; Mr. Newland's, 345; Mr. I. I. D'Long, 348; Messrs. Hatherell, 349.—*Vide* "Thames Fish."
- Evidence, Dr. Bostock's, on filtration, 420.
- Evils of competition for supply of water, 328, 408, 437.
- Exhalation from bad water injurious, 323.

- Existence of the annoyance of disturbing the paving authenticated, 38, 123.  
 Extract from Dr. Cheyne on Dysentery, 298.  
 Extract from Mr. Deyke on Defectiveness of Pavement, 8.  
 Extract from Mr. Donkin on Paving, 6; Mr. Robertson on Do. 17.  
 Extract from Macarthy on Biangular Paving, 14.  
 Extract from M'Adam on Road-making, 221.—*Vide* "Macadamization."  
 Extract from Jonas Hanway's Memoirs, 220.

## F.

- Feeling, public, as to the state of the water, 266, 332, 360; not unfounded, 372.  
 Filtration, practicable, 363, 420; the best mode of, 420; inefficient for total purification of the water, 363, 370; none will be necessary in private houses, by the adoption of the plan here proposed, 421.  
 Fires, the facilities afforded by Sub-ways for extinguishing, 128, 243; inefficiency of present supply in those cases, 391, 393; the great losses sustained in consequence, 359, 399, 400.  
 Fish, their desertion of the Thames, 310, 337; the causes, 311, 338; their actual destruction, 311, 336, 337; the former good supply, 337; reason of its rapid diminution, 337, 340, 349.  
 Fishery, Salmon, in the Thames, destroyed by its impurity, 337.  
 Fishermen, Thames, their number in 1806, 336; their great losses, 343, 347, 348; their consequent depreciated condition, 337, 340.  
 Flagstones lately introduced, 9, 214.  
 Flaminian ancient Roman road, how constructed, 21.—*Vide* "Rome."  
 Flow of the Thames upward progressively shorter, 413.  
 Fœdera, Extract from Vol. 5th—the tax levied by Edward III., 215; Extract from Vol. 9th, and tax levied by Henry V., 216.  
 Fountains, beauty of the Parisian, 318; why not desirable in London with *impure* water 319; sites where desirable with *pure* water, 319, 321; facility afforded for their construction by plan here proposed, 397.  
 Fund reserved by Water Companies, the purpose of, 132, 427; done away with by Sub-ways, 132.

## G.

- Gas, by whom and when brought forward in London, 174, 260; by whom first introduced, 169; Lectures delivered at the Lyceum Theatre on, 261; the difficulties then encountered, 168, 175, 261; subscriptions raised, and a Committee formed to ascertain its practicability, 261; encouraged by his present Majesty, 261; leave



- given to lay down pipes, when, and to what extent, 438.—*Vide* “Chartered Company,” “Oil Gas Company.”
- Gas Companies, the four principal, their consumption of coal, 262; and the Gas generated, 261; number of lights supplied, 262; their vast income, 263; their destruction of the paving, 16.
- Gas pipes, ordered to be removed as a nuisance, when first laid down, and by whom, 175.—*Vide* “Iron” and “Pipes.”
- Gas, refuse discharged into the Thames, 310, 339, 346, 411; its appearance on the water, 339, 342, 350, 368; its effects on the fish, 310, 311, 337, 379; losses of the fishermen, 343, 347; instance of a horse poisoned by, 310.
- General Sub-way Company proposed, 156.
- Government, their encouragement of the speculations of 1825, 106, 191; new objects never undertaken by them, 182; reasons why the supply of water should, 407, 419; also the Sub-ways, 426; great works their legitimate object, 382.
- Grand Junction Company, when established, 259, 302; its reservoirs where situated, 355; number of tenants, and quantity supplied, 355; its offensiveness, 268, 299; the causes, 268, 315, 369; public meetings called in consequence, 267; erection of additional reservoirs suspended on account of the recent enquiry into the nature of their supply, 323.

## H.

- Hackney Coach Proprietors, Act to impose extra paving rate, when passed, 219.
- Hampstead Hill, site for the erection of reservoirs, 393; its altitude, 394; mode of raising the water, 394.—*Vide* “Cornwall Mines.”
- Hampstead Water Works established, 259; bought up by New River Company, 252; their purchase a basis to effect others, 425.
- Health of primary importance, 209; materially affected by bad water, 323; and the ultimate consequences, 324, 411; further authenticated, 288.
- Highgate Hill, site for another water reservoir, 384; branch aqueduct from the New River to it, 384; mode of raising the water, 394.
- Holborn, when first paved, and by whose order, 216; and by what means, 216.
- Horses, injury occasioned to, by imperfect paving, 12; obviated by Sub-ways, 128; instance of a horse poisoned by impregnation of the water with gas, 310.

## I.

- Impartiality of this account of Sub-ways shewn, 54.

- Imperial Gas Company**, their opposition to Oil Gas Bill, 159, 262.
- Improvement of the streets**, necessity of, 9, 14, 17; why so tardy, 15, 227; prevented by the operations of Gas and Water Companies, 51, 112, 221, 434, 436; public meetings in consequence, 50, 62, 71, 122, 141; the author's plan then suggested and approved, 51, 64, 125.
- Impurity of the Thames**, 278, 301, 310, 361; daily increasing, 306, 323, 341, 345; the different causes of, 268, 284, 296, 304, 309, 362, 391, 422; destructive of the fish, 311, 336, 345; its effects upon eels, 338 to 348; upon flounders, 339; on the bottom of boats, 312; consequent losses of the fishermen, 343, 347; the ultimate consequence to the inhabitants of London, 324, 411.
- Income of the Sub-ways**, different sources of, 82, 131, 132, 142, 133; its certainty, 186; ample to remunerate the capital employed, 108, 130.—*Vide* "Expences," "Paving," &c.
- Inquest on an individual who fell into the Docks**, 311; the evidence, 312; authenticated, 338.
- Interview of Sub-way Committee with the Gas and Water Companies**, 120; with the City Commissioners, 120; with Alderman Garratt, 121; of the Author with Mr. Hobhouse, 181; of the Author with the Lord Mayor, 114.
- Iron pipes**, their superiority to wood, 357; their short duration, 132, 186; an objection against them, 66; inutility of their present great capacity for Gas, 66; facilities afforded by Sub-ways for their preservation, 112, 132; the cause of their contaminating the water, 139, 362, 422.
- Isleworth**, the river clearer at, 414; Dr. Kerrison's suggestion to bring water from thence, 416.

## J.

- James the 1st.**, his liberal assistance to Mr. Middleton, the projector of the New River, 245, 250; his moiety in the work, 248, 250.
- Joint Stock Companies**, evil of entrusting to them the supply of water to the metropolis, 328, 330, 375, 407, 418.—*Vide* "Competition in Water."

## K.

- King (the)**, His present Majesty appoints Commissioners to enquire into state of the water, 279; his commission most suitable for the construction of Sub-ways, 440, 442; his general encouragement of science, 260, 443.—*Vide* "Gas," and "Water."

King James 1st supports New River project, 245, 250 ; his moiety in it, 248, 250.

King Charles 1st reconveys his predecessor's moiety in the New River Company, 248 ; the consideration, 248.

## L.

Lambeth Water Works, when and where established, 274, 358 ; quantity of water, and number of houses supplied, 358 ; petitions against them on account of its impurity, 275, 276.

Lea River, when made navigable to Ware, 219 ; constitutes one-third of New River Company's supply, 353 ; application to Parliament to join the two rivers opposed by the City, 246.

Lectures, Roger Challis's on, sewers, 204.

Legislature—*Vide* "Government."

Letter, No. 1, to M. A. Taylor, Esq. M. P., 39—answer, 40 ; No. 2, 50—answer, 57 ; Letter to His Royal Highness the Duke of Sussex, 58 ; to Sub-way Committee, 75 ; to Alderman Wood, M. P., 96 ; to Earl of Liverpool, 101 ; to Mr. Peel, No. 1, 101 ; No. 2, 171—answer, 172 ; Letter to the Earl of Lauderdale, 175 ; to Mr. Hobhouse, No. 1, 177—answer, 178 ; No. 2, 180—answer, 181 ; Letter to Mr. Dawson, 178—answer, 178, 180 ; Letter to the Editor of The Times, signed, "A Citizen," 182, 375, 378, 380 ; "A Chemist," 375 ; "Fairplay," 378 ; "Water Drinker," 380 ; Letter from Mr. Phillips to Water Commissioners, 282 ; from Dr. Johnson to Mr. Wright, 295 ; from Sub-way Committee to the Public Companies, 74 ; from Mr. Reveley, C. E., to the Author, 100, 105 ; from Mr. Scott to the Author, 139 ; from Mr. Francis to Water Commissioners, 388.

Level of cities heightened by time, and the cause, 23.

Level of Westminster below high water mark, 93 ; those streets above, 93

Lighting the streets, how formerly accomplished, 260 ; ancient Act passed for their improvement, 260 ; Gas introduced, 261 ; supersedes the oil lights, 262.—*Vide* "Gas."

List of Speculations in 1825 and 1826, 192.

London, wonder of the world, 9 ; its increasing magnitude, 302 ; how formerly supplied with water, 237, 238 ; its conduits, 238, 249 ; supplied now with bad water, 263, 265, 283, 301 ; the estimated quantity, and number of houses, 356 ; when first paved, 9, 214, 220, 221 ; Acts for it, when passed, 216, 219.—*Vide* "Paving," "Conduits," "Water."

London Bridge Water Works, when and by whom established, 252 ; declared a nuisance, 42, 441, 252 ; and Company dissolved by Parliament, 252.

## M.

- Macadamization** recommended by Parliament, 236 ; its inadaptation to Cities, 10, 18 ; where only desirable, 10, 16, 19 ; causes of its failure, 18 ; extra expence occasioned by it in Bishopsgate Street only, 18 ; Sub-ways necessary to perfect it in Cities, by affording firm substrata, 20, 48, 114, 422 ; extract from the Projector's publication, 221 ; his remuneration by Parliament, 229, 233 ; also from the Treasury, 230 ; his Salaries, 234.
- Manure**, reservoirs for, proposed, and where, 381 ; now wasted, 381.
- Materials for Roads**, 223 ; what used by the Ancients, 21 ; in Naples, 22 ; in Italy, 23.
- Memorial** presented to Court of Common Council, 115 ; the Author's address in supporting it, 117 ; the result, 119.
- Meeting**, first public, to consider a remedy for the bad state of the Streets, when called, 45 ; Newspaper reports of the proceedings, 50 ; Sub-ways suggested, 51 : second called, 62 ; preparations for, 56 to 62 ; and reports of it, 63 ; a Committee appointed, 69 ; resolutions advertised, 71 ; proceedings of the Committee, 72, 106 ; their report, 127 ; the third called, 121 ; Newspaper report of the proceedings, 122 ; Alderman Garratt's liberal speech, 123 ; fourth called, 141 ; Newspaper account of the proceedings at, 141 ; resolutions advertised, 145.
- Meeting** to establish a Thames Water Company, 389 ; Committee appointed, 402 ; its report, 402.
- Meeting**, public, respecting the impurity of the Metropolitan Water, when called, 266 ; the resolutions passed, 267 ; subscriptions raised, 269.—*Vide* "Petition."
- Memoirs** of Jonas Hanway, extract from, 220.
- Middleton**, Sir Hugh, his history, 249 ; projects a plan for supplying London with water, 244, 333 ; his great difficulties, 248, 250 ; petitions the City, and their refusal of assistance, 250 ; petitions King James I., who grants him a loan, 250 ; the considerations 250 ; his ultimate success, 245 ; created a Baronet, 251 ; the royal moiety reconveyed to him, 248.—*Vide* "New River," "Charles I," "James I."
- Millbank**, the state of the Thames at, 314.
- Mines** in Cornwall, many, formerly abandoned, now worked profitably by aid of machinery, 395.
- Minutes** of the Sub-way Committee, extracts from, 72, 120.
- Mode** of raising water to Hampstead and Highgate from the proposed aqueduct, 395, 396.
- Monopoly** of the Water Companies, when and how arranged, 293, 294 ; the ill consequences, 268, 295 ; observations of Earls Lauderdale, Eldon, and Grosvenor, 325, 326.

## N.

- Naples, partially provided with Sub-ways, 22; its paving most similar to ancient Rome, and the mode of its construction, 22, 23.
- Necessity under present system for removing the Paving, 26, 45, 123; of constructing Sub-ways as a Substrata to Paving, 19, 20, 173, 179; confirmed by statement of the City Surveyor, 429; also to preserve the purity of the water, 132, 362, 422; also to enable competition, 170.—*Vide* "Thames Water," "Paving," "Advantages of Sub-ways."
- New River, Acts obtained for its formation, and when, 244, 245, 246, 249, 250; its sources, 245, 246, 353, 354; its circuitous route, and junction with the River Lea, 246; conveyed over two vallies, and by what means, 247; when finished, and ceremony observed on the occasion, 245; its length, 245, 353; expence of its formation at that time, 245, 392; its reservoir, where situated, 244, 392; its level above the Thames, 392.—*Vide* "Middleton," "Lea River."
- New River Company, when incorporated, 248, 251; Sir Hugh Middleton's interest in it, 248; the King's, 248; amount of first dividend declared, and when, 248; the second, 248; Charles I. resigns his moiety, and the equivalent, 248; their application to Parliament to join River Lea, and opposed by the City, 246; their capital in 1820, 428; their expenditure, 429; their reserved fund for pipes, 427; erect an engine at Broken Wharf, 312, 354; replace their wood with iron mains, 438; their supply objectionable, and the causes, 371; the number of their tenants, and quantity of their supply, 354.—*Vide* "New River," "Charles I.," "James I."
- Nuisance, London Bridge Water Works declared a, 254, 441.

## O.

- Objections against the construction of Sub-ways, as to the excavated earth, replied to, 65; as to weakening foundations of the houses, replied to, 65; as to durability of iron pipes, replied to, 65; as to the depth of the sewers, obviated, 68; as to the size of the present mains, obviated—first, by the inutility of their present great capacity, 397; second, by the proposal for substituting earthen tubes, 135, 138; objections to the formation of new Water Companies, 330, 419, 442; to the Oil Gas Company, 151.
- Official documents regarding City expences for paving, 33.
- Oil Gas, its advantages discussed, 161, 166; used by the Holyhead and Hull Lighthouses, 163.
- Oil Gas Company, their petition to Parliament for Act of Incorporation



opposed by the Chartered and Imperial Gas Companies, 159 ; their replies to the objections against them, 159 ; petition against them on account of the additional annoyance they would create by disturbance of the paving, 156 ; their enormous expences in bringing forward their Bill, 171 ; why rejected, 170.

Opinions not to be formed hastily of long digested plans, 222.

Opposition, great, to the introduction of Gas, 174 ; to the Oil Gas Bill, 159 ; to the formation of the New River, 250.

Origin of paving and pavements, 14, 214 ; New River, 244 ; the difficulties, 250—*Vide* " New River : " Gas, 171 ; the difficulties of, 175—*Vide* " Gas ; " Sub-ways, 42 ; the great labour and expence, 184—*Vide* " Expence."

## P.

Pall Mall, Petty France, and St. James's Street, when paved, 220.

Paris, its fountains, 318 ; Napoleon's Decree for the supply of water, 333.

Parliament, their object defeated by combination of the Water Companies, 271, 294, 325 ; their duty and power to remedy, 325, 326.

Patent for the construction of Sub-ways, specification, its originality, and when obtained, 43 ; offer to Parliament to surrender it, 95 ; adoption of a plan abroad not vitiatory of a patent in England, 55 ; put up for sale, and why bought in, 185 ; the only one for improving the manufacture of Account Books, obtained by the Author, and its universal adoption, 68.

Patronage, great objects accomplished by liberal, 9.

*Pavement*, a modern improvement, when suggested, 214 ; a distinct term to *paving*, 214.

*Paving*, its origin, 14, 214 ; different Acts passed for, 216 ; description of in ancient and modern Rome, 21, 23 ; in Italy, 23 ; in Naples, 22 ; causes of its durability in those places, 24.

Paving in London, why not durable, 7, 8, 24, 113, 430, 431 ; its present defectiveness, 8, 10, 20, 51, 123, 182, 211 ; dangerous to horses, 6, 120 ; destructive of carriages, 6, 128, 434 ; the frequent repairs necessary, and why, 7, 8, 177, 211, 430 ; the want of a sound substratum, 10, 114, 432 ; destroyed by operations of Water and Gas Companies, 16, 123 ; by Commissioners of Sewers, 17, 18.—*Vide* " Ancients," " Paving Acts," and " Extracts for Paving."

Paving Acts, sundry, when passed, 216, 220 ; authorities to enforce them, 218.—*Vide* " Acts of Parliament."

Peerless pool, its origin, 241.

Perseverance necessary for the accomplishment of great objects, 426.

Petition, City, to Parliament, to obtain additional sewer rates, 93 ; and the result, 94 ; the Author's, 94 ; a second presented, 98 ;

- Petitions from new Companies for Acts of Incorporation, 146; the Author's petition against their disturbing the paving, and the result, 155, 156.
- Petition to Parliament resolved upon at a public meeting, to institute enquiry into the state of the water, 269; the petition, 271; subscriptions raised, 269; Committee appointed for their appropriation, 270; petitions to include the Lambeth and the Southwark Water-works, 274, 276, 278; others from different parishes, 276; another representing the evil of watering the streets with the contents of the sewers, 277, 321.
- Pipes, water, their length in the reign of Henry VI., 238, 243; Broche's invention, 244; the accumulation of the mud in them, one reason of bad water, 422; authenticated by report of the King's Commissioners, 362; the inutility and disadvantages of their present great capacity, 397, 403, 66.
- Pipes, iron, their separation by contraction, 362, 421; their contamination of the water, 263, 362, 422; their short duration, 132; why objectionable, 66; unnecessary for gas, 66.—*Vide* "Iron," and "Earthen Tubes."
- Pipes, gas, permission given to lay down, when and to what extent, 438.—*Vide* "Iron," "Earthen," and "Gas."
- Pipes, earthen, vitrified, suggested in connection with the Sub-ways, 138, 140; now used at Lynn Regis, 140; the only objection to them obviated by construction of Sub-ways, 140.—*Vide* "Earthen," "Chemicals."
- Plan, P. Taylor's, for supplying London with water, 384; Dr. Kerrison's, 416; improvements on them suggested, 384; plan to restore purity of the Thames, 379; Francis's, for obtaining spring water, 385; Mr. Cuff's, for constructing sewers, 209; Mr. Spranger's, for paving, &c., when proposed, 220.
- Postmaster General, his recommendation to Government of Mr. M'Adam's plan, 236.
- Power for raising water, natural superior to artificial, 399.
- Precedent for advance of capital, 442.
- Pressure of the water, decrease of the diameter of the pipes proportionate 397, 403.
- Projects in 1825 and 1826, list of, 192.
- Proposals for establishing Sub-way Company, 110; recommended by His Majesty's Ministers, 3; prospectus of the plan first submitted, 2, 45; the second issued, 3, 106.
- Proposal to create new Sewer Commission under regulations, 424.
- Prospectus of Thames Water Company, 389; of United General Gas Company, 150.

Purchase of the Water Companies, how to be effected, 383, 425, 441.—  
*Vide* "Expenditure."

Public Meetings on the Sub-ways, reports of, 50, 63, 122, 141; on  
the state of the water, 266.—*Vide* "Meetings," "Sub-ways," and  
"Water."

Purifying furnaces in America, 213.

Purity of water essential to health, authenticated by the first medical  
practitioners, 288, 300; the necessity of Sub-ways to obtain it,  
422; register of its salubrity to be kept by a public officer, 423  
—*Vide* "Pipes," "Access;" Popular errors respecting the purity  
of the Thames water, 303, 304.—*Vide* "Impurity."

## Q.

Quality of the water generally offensive to the senses.—*Vide* "Impu-  
rities of the Thames," "Petitions to Parliament."

Quantity of water supplied by the New River Company, 354; by the  
East London Water-works, 354; by the West Middlesex, 355;  
by the Chelsea, 355; by the Grand Junction, 355; total estimate  
on the north side of the River Thames, 356.

Quantity supplied generally sufficient, 357.

Quantity of water supplied to Southwark by the Lambeth Water-works,  
358; by the Vauxhall, 358; by the Southwark, 359; total con-  
sumption, 359; aggregate power employed, 359; great deficiency  
by these Companies in cases of fire, 359.

## R.

Ranelagh Sewer, its vicinity to the Dolphin of the water-works at  
Chelsea, 315; its effects, 315.—*Vide* "Impurities."

Rates, paving and sewer, Commissioners of Sewers' petition to advance  
them, 27; the Author's petition to Parliament in consequence, 94,  
99; may ultimately be reduced, 426.

Register of Arts and Sciences, plan suggested therein to better the con-  
struction of sewers, 209.

Regulations proposed for London Ædiles, 423, 425.

Relay of iron pipes necessary in 45 years from their commencement,  
77, 427; cocks and plugs in ten years, 77; reserved fund for the  
purpose, 132, 427.

Remarks on the Reply of the Oil to the Chartered Gas Company, 170;  
by the Water Commission on Mr. P. Taylor's plan, 407.—*Vide*  
"Plans."

Remedy for preventing the removal of the paving, 43; when originated,

- 38 ; for preventing the further contamination of the Thames water, 378, 381 ; proposed by the Water Commission, 408 ; inefficient without the Sub-ways, 421.
- Repairing the pavements, a continual annoyance and expence, 27, 31 ; the causes rendering it necessary, 7, 10, 12, 20, 22, 430 ; obviated by construction of Sub-ways, 42, 48.
- Report of the first public meeting on Sub-ways, 50 ; of the second, 63 ; of the third, 121 ; of the fourth, 141 ; preference given by the Author to the newspaper reports, the reason, 54 ; of Sub-way Committee, 125 ; of Parliamentary Committee on the Sewers, 84 ; observations on, 84 ; of City Surveyor on the paving, 429 ; its corroboration of the Author's views, 440 ; of Parliamentary Committee, 1821, on the supply of water, extract from, 407 ; of Committee appointed by Thames Water Company, 402 ; of His Majesty's Commissions for Enquiry into the supply of water, 351.
- Resolutions at meeting to establish Thames Water Company, 399 ; of second public meeting on the Sub-ways, 71 ; on the third ditto, 136 ; on the fourth ditto, 141 ; at public meeting respecting the impure state of the water, 271.
- River Thames, origin of its supplying the metropolis, by whom undertaken, and when, 252 ; now become a large common sewer, 309 ; still the chief source of present supply, 353, 355 ; remedy against its further contamination, 379, 380.—*Vide* "Thames Water," and "Impurities."
- River Fleet, account of, 237 ; others now dammed up, 239, 241 ; River Lea, one of the sources of supply to NewRiver Company, 246, 353.
- Roads, M'Adam's plan for their improvement, 223 ; their materials in different Counties, 222 ; cause of their defectiveness nearer London, 223, 224 ; the badness of the Scottish roads, 223.—*Vide* "M'Adamization," and "Rome."
- Road Surveyor, modern, not in the same estimation as formerly, 15.
- Rome, its Sub-ways, 1, 55 ; supplied four centuries with turbid water, 332 ; afterwards improved, and when, 332 ; aqueducts constructed, 332 ; the distance from which pure water was brought, and the sacrifices they made to obtain it, 332 ; its roads, 21 ; how constructed in ancient times, 21 ; in modern, 22 ; one cause of their durability, 24.—*Vide* "Naples."

## S.

- Sabina Road in ancient Rome, how constructed, 21.
- Sources, the three new, proposed for supply of water to London, 389 ; in connection with Sub-ways to preserve their purity, 263, 422.

- Scrofula, opinion of Dr. Johnson as to its origin, 287.
- Scurvy attributable to impurity of water, 290.
- Service pipes, their short duration, 435 ; their repairs, continual expence, and destruction of paving, 435 ; the effect upon them of the large water-mains, 66, 397.—*Vide* “ Iron pipes.”
- Sewers, access given to them by the Sub-ways, 2, 46, 113, 133 ; the defectiveness of their construction, 26 ; their number, 309 ; their contents disgorged into the Thames, 309, instead of being sold as manure, 381 ; their foul condition, 210 ; an improved mode of constructing them, 209, 212 ; Sub-ways to drain into them, 43, 210.—*Vide* “ Commissioners.”
- Sewer at Blackfriars, its effect upon the water, 312 ; at Westminster, singular occurrence related, 313 ; at Dowgate, and Fleet Ditch, their strong currents, 316 ; at Ranelagh, its vicinity to Dolphin of the Water Works, 315 ; its appearance on the water, 315 ; Sewer, a new grand, one proposed, and where, 379.
- Shadwell Water Works, when established, 259 ; and bought up by the East London, 259.
- Shares, the King's, in the New River Company, reason of, 248 ; their reconveyance by Charles 1st, and how disposed of, 248 ;
- Slaughter-houses, the refuse of, issuing into the Thames, 316, 369.
- Southwark Water Works, where situated, 359 ; the number of tenants, and quantity of water supplied, 358 ; the deficiency in cases of fire, 359 ; petitions to Parliament in consequence of its unfitness for use, 278.
- South London Water Works—*Vide* “ Vauxhall.”
- Springs, ancient, in London, account of, 240, 241 ; spring water, how London may be supplied with, 385.
- Steam Engine used by the New River and other Water Companies, 247, 313, 392 ; the great expence, 392 ; the computed power employed in supplying the metropolis with water north of the Thames, 356 ; and on south side, 359 ;
- Strand, the, its condition in the reign of Henry 5th, 216 ; an Act to pave it, 216, 243.
- Streets of London, their state in 1353, 215 ; in 1417, 216 ; in 1542, 217 ; sundry Acts passed for their improvement, 216, 217, 219 ; M. A. Taylor's useful Act, 38 ; their present disgraceful condition, 6, 8, 18, 20 ; public meetings in consequence, 45 ; the enormous expences for repairing, thrown away for want of sound substrata, 432, 440—*Vide* “ Expences :” the streets watered with the contents of the sewers, &c., 320 ; petitions to Parliament in consequence, 277.
- Sub-ways, a national work, 49 ; how to be constructed, 43 ; their object, 1, 51, 124 ; differ from the Roman aqueducts, 1 ; necessary



to preserve the metropolitan water pure, 263, 422; also as a solid foundation for the paving, 20, 177, 179; where desirable they should commence, 422, and also in connection with the proposed grand sewer, 382; the line recommended by the Sub-way Committee, 129; estimated cost of, and income derivable from their construction, 108, 129; ample to repay itself, 442; great facilities afforded by them not now existing, 47, 128, 132, 170, 382.—*Vide* "Paving Expences," "Income," &c.

Supply of water, in all ages, deemed of infinite importance, 332; instanced in the Romans, who obtained a pure supply at great cost, 332; in London, the different Companies who afford it, and whence derived, 353; their average consumption north of the Thames, 356; south of, 359; its impurity, and the causes, 263, 272, 301, 339, 376, 399; a national disgrace, 334; all interested in the enquiry, 328, 398; public meetings held in consequence, 267; and petitions to Parliament agreed to, 269; evil of entrusting it to Joint Stock Companies, 328, 330, 375, 418; how it ought to be regulated, 422; new and purer sources proposed, 384, 385, 389, 394; and Sub-ways for the preservation of its purity, 422.

## T.

Tarpeian Rock, its present and former altitude, 23.

Taxes, their present enormous amount, reducible after the construction of Sub-ways, 82, 130, 425, 426.—*Vide* "Paving," "Sewers," &c.

Taxes, ancient, by Edward the 3d, and their application, 215.—*Vide* "Foedera."

Thames water, its salubrity when unmixed with impurities of London, 306, 391, 412; popular errors with regard to it replied to, 303, 304; its deposit by introducing chemicals, 376; contaminated by filthy pipes, 263, 362, 422; its present disgusting condition, 296, 376, 411; authorities quoted, 305, and the causes, 263, 291, 296, 307, 400; reported by His Majesty's Commission as unfit for use, 361.—*Vide* "River Thames."

Thames Aqueduct Supply Company proposed by His Majesty's Commission, its object, 408; the restrictions, 409.

Thames Water Company, prospectus of, 389; meeting held to establish it, 389; the resolutions, 399.

Thames, the proposed Quay more eligible with Sub-ways, 179, 383.

Tide at London Bridge, its flux and reflux, 339, 414; when low, the water purest, 366; the contrary when at ebb, 367; not sufficiently rapid to carry away the impurities, 339, 342, 413; the distance up river the impurities are conveyed, 415.

**Tower Ditch**, emptied into the Thames, the cause and consequences of, 317; remonstrated against by Trinity House, 317.

**Tubes**, earthen, proved by hydraulic pressure, 139; desirable for their purity, 140; now laid down at Lynn Regis, 140; suggested in connection with the Sub-ways, 158.

## U.

**United General Gas Company**, when established, and preamble of their Act, 153; petition to Parliament against their disturbing the paving, 156.

**Utility**, expence justified by, 327, 382.

## V.

**Vauxhall Water-works**, where situated, 358; the number of tenants, and the supply they afford, 358.

**Via Appia**, ancient Roman road, how constructed, 21.—*Vide* "Rome."

## W.

**Water**, how formerly procured, 233, 383; great want of in 1236, 237; when first supplied through pipes, and by whom, 237; singular aid to effect it, 238; nauseous state of present supply to London, 309, 341; daily increasing, 323; great loss sustained at fires by the uncertainty of its supply, 399; general ignorance of inhabitants of impurity of the source, 265; publication called the "Dolphin," respecting it, 263; public meetings called, and the resolutions of, 267.—*Vide* "Pipes," "New River," and "Impurities."

**Water**, *pure*, essential to health, 263, 283, 390, 399; well authenticated, and the authorities, 285, 297; more or less adapted to its offices in proportion to its purity, 288; singular custom of the ancients to ascertain its purity, 291; unattainable in London without Sub-ways, and the reason, 263, 362, 422.

**Water**, bad, origin of scurvy attributable to, 288; also of the scrofula, 290; other ill effects, 291, 298, 299; the ultimate consequence, 324, 411, 412.—*Vide* "Endemic," "Impurity."

**Water Companies**, the offensive nature of their present supply, and the causes, 263, 268, 301, 309, 362, 422; their combination, 294; they increase their rates, and afford a worse supply, 269, 323; no previous notice given of their intention, 295; petitions to Parliament in consequence, 271, 274, 276, 277, 278; fallacy of

Mr. Peel's opinion for establishing new ones, 442; establishment of others unsatisfactory to the public, 407, 418.—*Vide* "King's Commission," and the Titles of each Company.

Water-works, 252, 353.—*Vide* "London Bridge," and their respective nomenclatures.

## Y.

York Buildings Water-works, when established, 259; bought up by New River Company, 252, 425; their purchase a basis for the value of the present Water Companies, 441.

# INDEX

TO

## NAMES IN THIS VOLUME.



**A**BERCROMBY, Hon. James,  
*M. P.* 149.  
Abernethy, 292.  
Acton, Samuel, 440.  
Adair, Dr. 300.  
Adams, John, 154  
Addison, 300.  
Alexander, L. 194.  
Allnutt, J. 193.  
Amory and Coles, 194.  
Anderdon, James Hughes, 154.  
Anderson, 251.  
Andrews, M. W. 267, 270.  
Armstrong, R. 194.  
Astell, W., *M. P.* 78.  
Atkins, Abraham, 253, 254.  
Attwood, Matthias, *M. P.* 149,  
193.  
Auckland, Lord, 267, 270.  
  
Banks, Sir Edward, 193, 402.  
Barber, Chapman, 45, 63, 64,  
105, 114, 144, 146, 190.  
Barclay, Charles, 149.  
Barclay, David, 149.  
Barclay, Herring, & Co. 193.  
Baring & Co. 192, 193.  
Barnes, T. 194.  
Barrett, Samuel, 78.  
Bathurst, Earl, 282.

Bazett & Co. 192.  
Belgrave, Lord Visc., *M. P.* 79.  
Bell, F. A. 194.  
Bell, 298.  
Benson, F. S. 192.  
Bentinck, Lord Wm., *M. P.* 79.  
Bernal, R., *M. P.* 78.  
Bevan, Charles, 149.  
Birch, Jos. *M. P.* 193, 270.  
Birnie, J. R. 193.  
Birt, Daniel, 279.  
Bishop of London, 327.  
Blackburn, Joshua, 149.  
Blanche, Thomas, 252.  
Blane, Sir Gilbert, 307, 308, 309.  
Bolton, W. G. 194.  
Bonnell, J. M. 194.  
Booth, F. 194.  
Bostock, Dr. 336, 365, 420, 421.  
Bourdillon & Hewitt, 194.  
Bradney, Joseph, 254.  
Brande, Professor, 267, 270, 280.  
Brande, Everard, 270, 375.  
Braunche, Sir John, 252.  
Bree, Dr. Robert, 267, 270.  
Brickwood, J. 194.  
Bridges, Alderman, *M. P.* 79, 149.  
British Gas Company, 140, 152,  
153.  
Broche, Robert, 244.

H h

- Brodie, B. C. 270.  
 Brogden, James, *M. P.* 78.  
 Brogden, J., *M. P.* 194.  
 Brougham, H., *M. P.* 270.  
 Brunel, C. E., 126.  
 Brunton, Thomas, 402.  
 Bulkeley, Sir Ralph, 214.  
 Burdett, Sir F., *M. P.* 78, 264,  
 267, 270, 271, 274, 279, 324.  
 Burrell and Son, 189.  
 Burton, J. 194, 402.  
 Butcher, William, 340, 343, 344,  
 348.  
 Buxton, Tho. Fowell, *M. P.* 149.  
  
 Calcraft, J. H., *M. P.* 78, 194.  
 Challis, Robert, 198, 423.—*Vide*  
*General Index.*  
 Chancellor of the Exchequer, 68.  
 Chapman, Jonathan, 149.  
 Chapman, Abel, 149.  
 Chartered Gas Company, 120,  
 159, 160, 162, 167, 168, 169,  
 170, 262.—*Vide General Index.*  
 Chelsea Hospital, 268, 272, 283,  
 284.  
 Chelsea Water Works Company,  
 4, 120, 258, 294, 353, 355.—  
*Vide General Index.*  
 "Chemist" (A) 377.  
 Cheyne, Dr. J. 298.  
 Chichie, John, 243.  
 Child, William, 254.  
 Christy, William Miller, 149.  
 City Remembrancer, 99, 100.  
 City of London Gas Company,  
 4, 73, 120, 262.  
 Clarke, John Calvert, 149.  
 Clarke, Joseph, 154.  
 Clarke, Richard, 253.  
 Clarke, William Stanley, 402.  
  
 Clay, 104, 121.  
 Colbourn, Henry, 270.  
 Cockburn, Sir J., *M. P.* 193.  
 Commissioners of the Sewers, 4,  
 40, 48, 69, 79, 80, 82, 84, 89,  
 95, 96, 97, 106, 111, 112,  
 118, 120, 423, 429.—*Vide*  
*General Index.*  
 Committee of Improvements at  
 Guildhall, 4.—*Vide Gen. Index*  
 Congreve, Sir William, *M. P.*  
 112, 165, 192, 193.  
 Conyngham, Marquis of, 194.  
 Cook, Sir Edward, 207, 208.  
 Cooper, Robert, 244.  
 Corbett, Archibald, 149.  
 Corporation of the City of Lon-  
 don, 93, 95, 100, 106, 114,  
 116, 117, 120, 383.—*Vide*  
*General Index.*  
 Coutts & Co. 194.  
 Craven, Earl, 192.  
 Crawshay, W. 402.  
 Cresswell, Francis, Jun. 149.  
 Croggon, 63.  
 Cunliffe, R. 193.  
 Currey, Benjamin, 149.  
 Curteis, E. J., *M. P.* 79.  
  
 Davies, Sir John, 208.  
 Dawson, *M. P.* 3, 178, 180.  
 De Berenger, Baron, 70, 137.  
 Denison, W. J., *M. P.* 270.  
 Deykes, William, 8.  
 Dickinson, W., *M. P.* 78.  
 Dill, Dr. 336.  
 D'Iong, I. I. 348.  
 Dixon, Samuel, 69, 70.  
 Dolphin (The) 265, 266.  
 Donkin, Bryan, C. E. 6.  
 Downshire, Marquis of, 193.



- Driver, E. 270.  
 Dumergue, Charles, 270.  
 Duncannon, Lord, *M. P.* 78.  
  
 East London Water Company,  
   294, 353, 354.—*Vide General*  
   *Index.*  
 East, Sir E. H., *M. P.* 192.  
 Eastfield, Sir William, 241.  
 Edmonds & Wolfe, 194.  
 Egana, M. D. 194.  
 Eldon, Lord, 326.  
 Ellice, Edward, *M. P.* 78, 192.  
 Ellis, Hon. G. A., *M. P.* 270.  
 Elmes & Co. 194.  
 Essex, Earl of, 270.  
 Eustace, 318.  
 Evans, 312, 314, 315.  
 Eyre, Walpole, 402.  
  
 "Fairplay," 378, 380.  
 Fane, John, *M. P.* 78.  
 Fane, Vere, *M. P.* 79.  
 Favell, 119.  
 Fell, Richard, 149.  
 Fell, John, Jun. 149.  
 Fenner, T. L. 278.  
 Fergusson, Sir Ronald, *M. P.* 270.  
 Fereday & Co. 428.  
 Fores, 267, 270.  
 Forsyth, Dr. 300.  
 Frampton, William, 149, 154.  
 Francis, 385, 388, 389.  
 Francis, 137.  
 Franks, Charles, 154.  
 Freeling, 229.  
 Freeman & Heathcote, 402.  
 Fry, William, 149.  
 Fry, Joseph, 149.  
 Fry & Co. 193, 194.  
 Fuller, 194.  
  
 Gardiner, 194.  
 Garratt, Alderman, 4, 121, 123,  
   138, 149, 402.  
 Gaussen, William, 154.  
 General Gas Company, 151.  
 Gilbert, Davies, *M. P. F.R.S.*  
   3, 79, 101, 125.  
 Glyn, Mills, Hallifax & Co. 401.  
 Glyn, R. T. J. 402.  
 Goldham, John, 336.  
 Goldsmid, Isaac Lyon, 149.  
 Goldschmidt, L. A. 192.  
 Goodhart, Emanuel, 149.  
 Gower, Lord Francis Leveson,  
   *M. P.* 270.  
 Graham, Sir James, *M. P.* 78.  
 Grand Junction Water Company,  
   3, 120, 259, 265, 268, 269,  
   272, 273, 283, 285, 294, 299,  
   301, 303, 323, 326, 327, 353,  
   355, 418.—*Vide Gen. Index.*  
 Grant, Ludovico, 175.  
 Grantham, Lord, 270.  
 Greenaway, Mr. Deputy, 96.  
 Greg, Thomas, Jun. 154.  
 Grenfell, William, 402.  
 Grenfell, P., *M. P.* 78.  
 Grey, Earl, 270.  
 Griffiths, Dr. 289, 323.  
 Grosvenor, Earl, 326.  
 Gunnell, 97.  
  
 Halford, Sir Henry, 267, 270,  
   285.  
 Hallifax, Thomas, 403.  
 Halse & Hickens, 194.  
 Hampstead Water Company,  
   259, 297, 425.—*Vide Gen. Ind.*  
 Hankeys, 110, 114, 145, 146.  
 Hanway, Jonas, 220.  
 Hardwicke, Earl of, 270.

- Harries, Roger, 154.  
 Harrison, Dr. 291.  
 Harrison, William, 144.  
 Harrison, Josiah Robert, 72, 73,  
 75, 76, 77, 78, 106, 127.  
 Hassell, T. 193.  
 Hatchard & Dyke, 314.  
 Hatherley, John, 242.  
 Hatherill, Thomas & William,  
 349.  
 Heale, Richard, 149, 154.  
 Henderson, 144.  
 Heron, Sir Robert, *M. P.* 78.  
 Herring & Co. 193.  
 Heygate, Wm., *M. P.* 114, 149.  
 Heygate, James, 149.  
 Hibbert, George, *M. P.* 193.  
 Hick, 115, 119.  
 Hill, Rev. Isaac, *M. A.* 73.  
 Hobhouse, J. C., *M. P.* 3, 78,  
 267, 270, 271.  
 Hobhouse, H. 177, 178, 180, 181.  
 Hoffman, Dr. Frederick, 289.  
 Holdsworth, Arthur, 149.  
 Holdsworth, T. 194.  
 Holden, William, 50.  
 Holland, Lord, 149.  
 Holmes, W., *M. P.* 193, 408.  
 Hood, Thomas, 403.  
 Hooper, Dr. 270.  
 Houseman, 91.  
 Hudson, 76.  
 Hullett & Co. 194.  
 Hume, Dr. 270.  
 Humphries, 45.  
 Hunt, Henry, 149.  
 Hutchinson, Hon. C., *M. P.* 78.  
  
 Imperial Gas Company, 159, 262.  
 —*Vide General Index.*  
 Irving, J., *M. P.* 194.  
  
 Jardine, 334.  
 Jenkins, 54, 135, 136.  
 Jersey, Earl of, 267, 270.  
 Johnson, Dr. James, 286, 295,  
 296, 297, 336.  
  
 Kater, Henry, 154.  
 Keate, Robert, 270.  
 Kemp, T. R., *M. P.* 194.  
 Kennerley, Jos. 270.  
 Kerrison, Dr. 270, 336, 410, 419.  
 Key, Alderman, 119, 149.  
 Kinder, Thomas, 192.  
 Kinder, F. 193.  
 King, David, 254.  
 King George IV. 5, 261, 279,  
 442, 444.—*Vide Gen. Index.*  
 King James I. 245, 250, 251.—  
*Vide General Index.*  
 Kinnaird, Hon. Douglas, 267,  
 270.  
 Knight, R., *M. P.* 270.  
 Knowles, Thomas, 243.  
  
 Lake, Bibye, 253, 254.  
 Lambe, Dr. William, 292, 336,  
 421.  
 Lambeth Water Works, 275,  
 340, 358.—*Vide Gen. Index.*  
 Lansdowne, Marquis of, 192,  
 270, 282.  
 Large, Robert, 241.  
 Lauderdale, Earl of, 175, 325.  
 Lawrence, Charles, 193.  
 Le Bon, 261.  
 Lennard, T. B., *M. P.* 78.  
 Lennard, Sir T. B., *M. P.* 192.  
 Lett, W. P. 194.  
 Lethbridge, Sir T., *M. P.* 192.  
 Lind, Dr. 290.  
 Liverpool, Lord, 3, 101.

- London Bridge Water Works, 42  
 56, 61, 66, 73.—*Vide Gen. Ind.*  
 Lord Mayor, 4, 115, 117.  
 Loughnan & Co. 192.  
 Lucas, Philip Monoux, 154.  
 Lush, J. W. 90.  
 Lyall, George, 402.
- Macarthy, 14.  
 Maceroni, Colonel, 20.  
 Mackintosh, Sir J., *M. P.* 192,  
 193.  
 Macmichael, Dr. 267, 270.  
 M'Adam, Sen. 10, 15, 16, 17,  
 18, 19, 114, 186, 198.—*Vide*  
*General Index.*  
 M'Adam, James, 236.  
 M'Adam, William, 236.  
 Maitland, 238.  
 Manning, Charles John, 154.  
 Manning, William, *M. P.* 192.  
 Mansfield, John, *M. P.* 78.  
 Marjoribanks, S., *M. P.* 78.  
 Marshall, John, *M. P.* 270.  
 Marten, Humphrey, 144.  
 Martin & Co. 194.  
 Martineau, 389, 405.  
 Masterman & Co. 192.  
 Matthews, C. E. 138.  
 Maugham & Co. 194.  
 Mead, Dr. 290, 299.  
 Medhurst, W. H. 194.  
 Merle, John Anthony, 253, 254.  
 M'Gillivray, Simon, 154, 192,  
 193.  
 Middleton, Sir Hugh, 66, 244,  
 248, 249, 250, 251, 255, 333.  
 Middleton, Sir Thomas, 245.  
 Mievile, A. A. 193.  
 Mills, 304.  
 Milne, C. E. 132, 133, 421.
- Moore, Peter, *M. P.* 78, 79, 84,  
 97, 192, 194.  
 Morley, Earl of, 192.  
 Morning Chronicle, 57, 60, 73.  
 Morning Herald, 50, 60, 62.  
 Morriss, Peter, 66, 252, 253.  
 Morriss, Thomas, 253.  
 Murdoch, 169.  
 Murphy, W. 194.  
 Murray, John, 267, 270.  
 Muspratt, John Petty, 149.  
 Myers, 341.
- Napoleon Buonaparte, 333.  
 Neill, Thomas, 192.  
 New River Water Company, 3,  
 42, 56, 73, 74, 76, 120, 131,  
 294, 297, 313, 353, 354, 371,  
 372, 425, 428, 429, 438.—  
*Vide General Index.*  
 Newcastle-on-Tyne Ditto 139.  
 Newland, 345, 348.  
 Newton, 305.  
 Newton, G. W. 194.  
 Nicholson, Isaac, Jun. 154.  
 Norton, J. 194.  
 Nurse, 311.
- Ogilby, C. 194.  
 Ogle & Co., 194.  
 Oil Gas Company, 159, 161, 162,  
 164, 165, 168, 170.—*Vide*  
*General Index.*  
 Ommanney, Sir Francis Moly-  
 neux, *M. P.* 254.  
 Onley, Saville, *M. P.* 79.  
 Oxenford, E. 193.
- Palmer, George, 193.  
 Paris, Dr. 267, 270, 336.

- Pauncefote, 281.  
 Pearson, Dr. 336.  
 Pedder, 175.  
 Peel, Right. Hon. Robert, *M. P.*  
     3, 102, 171, 172, 173, 182,  
     378, 380.  
 Pelly, J. H. 193.  
 Pendarves, E. W., *M. P.* 270.  
 Percival, Richard, 254, 258.  
 Perkins, Frederick, 149.  
 Perkins, Charles, 149,  
 Perring, Sir J. 193, 194.  
 Pettigrew, 60.  
 Pettman, W. M. 192.  
 Phillips, S. M. 282.  
 Phoenix Gas Light and Coke  
     Company, 149, 262.—*Vide*  
     *General Index.*  
 Pitt, Joseph, 79.  
 Plummer, John, 149.  
 Pole, Sir Peter, 194.  
 Ponsonby, Hon. W. M. P. 267, 270.  
 Porter, 121.  
 Porter, William Henry, 154.  
 Porter, W. K. 192.  
 Postmaster General, 230, 231.  
 Pott, Charles, 149.  
 Poynder, Thomas, 254.  
 Poyntz, W. S., *M. P.* 270.  
  
 Raikes, Richard Mee, 402.  
 Rainy, Alexander, 270.  
 Rennie, C. E. 334.  
 Reveley, Henry Willey, *C. E.* 72,  
     73, 77, 97, 100, 101, 104, 105,  
     106, 114, 119, 122, 127, 134,  
     135.  
 Reynolds, Jacob Foster, 149.  
 Ricardo, D., *M. P.* 78.  
 Rice, T. S., *M. P.* 194.  
 Rickards, Robert, 402.  
  
 Ridgway, J. 270.  
 Ripley, Horatio, 149.  
 Robertson, J. C. 17.  
 Robson, H. 267, 270.  
 Rogers & Co. 194.  
 Rogers, Samuel, 267, 270.  
 Roget, Dr. 280, 375.  
 Rosslyn, Earl of, 270.  
 Rothschild, N. M. 192, 193, 194.  
 Routh, William, 402.  
 Rundell, E. W. 193, 194, 402.  
 Rutland, Duke of, 193.  
 Ryan, 385.  
  
 Salisbury, Marquis of, 267, 270.  
 Samuel, S. 194.  
 Scarlett, James, 149.  
 Scholey, George, 254.  
 Scott, 416.  
 Scott, Anthony, 140.  
 Sefton, Earl of, 267, 270, 271.  
 Seymour, Lord George, 194.  
 Sharp, Richard, 270.  
 Sheriffs of London, 93.  
 Shuter, Thomas Allen, 149.  
 Sinclair, Sir John, 288.  
 Slade, Robert, 402.  
 Smith, Leapidge, 72, 73, 76, 77,  
     127.  
 Smith, Wm., *M. P.* 78, 192.  
 Smith, John, *M. P.* 78, 192, 193.  
 Smith, Charles, *M. P.* 193.  
 Smith, R. 193.  
 Somerville, Dr. 336.  
 South London Water Company,  
     358.—*Vide General Index.*  
 Southwark Ditto, 358.  
 Spencer, M. 194.  
 Spranger, 214, 219.  
 Squibb, G. 270.  
 Stanley, Lord William, *M. P.* 79.

- Stephenson, 133, 137  
 Stevenson & Salt, 194.  
 Stewart, William, 270.  
 Stirling, Sir Walter, *M. P.* 193.  
 Stone, W. B. 267, 270.  
 Strode, Thomas, 253.  
 Sumner, G. Holme, *M. P.* 79.  
 Surveyor General of His Majesty's Board of Works, 3, 101.  
 Sussex, His Royal Highness the Duke of, 58, 60.  
 Syfret, Stephen, 106.
- Tankerville, Earl of, 270.  
 Taylor, M. A. *M. P.* 3, 38, 39, 40, 42, 56, 58, 68, 101, 126, 175.  
 Taylor, John Sydney, 142, 144.  
 Taylor, William B. 144.  
 Taylor, Philip, 384, 389, 390, 399, 400, 401, 404, 405, 406, 408, 410.  
 Telford, T., *C. E.* 10, 280, 334, 375.  
 Temple, Sir William, 286.  
 Teynham, Lord, 193, 194.  
 Thackrah, George, 149.  
 Thames Quay Company, 179.  
 Thames Water Company, 389, 401, 408.—*Vide Gen. Index.*  
 Thames Aqueduct Supply Company, 408.—*Vide Gen. Index.*  
 Thompson, Ald., *M. P.* 193, 402.  
 Tilson & Preston, 194.  
 Timens, John Fam, 402.  
 Tooke, Thomas, 192.  
 Trant, W. H., *M. P.* 194.  
 Trench, Colonel, *M. P.* 383, 402.  
 Trotter, Dr. 286, 305.  
 Tulloch, John, 402.  
 Turner, Charles Hampden, 149,
- Turner, Dr. 267, 270.  
 Tyrrell, J. 192.
- Vane, Rev. John, 149.  
 Venables, Alderman, 402.  
 United General Gas Company, 150, 153, 154, 155, 156.—  
*Vide General Index.*  
 Unwin, J. W. 87.  
 Unwin, 311.
- Wadeson, R. 194.  
 Walker, J., *M. P.* 194.  
 Walker, Ralph, *C. E.*, 306.  
 Wall, C. Baring, *M. P.* 267, 270.  
 Ward, J. R. 193.  
 Ward, W., *M. P.* 194.  
 "Water Drinker" (A) 378, 382.  
 Watkins, J. R. 194.  
 Weale, 328.  
 Wells, John, 243.  
 West Middlesex Water Comp. 294, 353, 355, 418.—*Vide General Index.*  
 Wharncliffe, Lord, 267, 270, 274, 285.  
 Williams, William, *M. P.* 194.  
 Williams, R. 270.  
 Williams, Samuel, 402.  
 Willis, William, 254.  
 Wilson, Sir Robert, *M. P.* 78.  
 Wilson, Thomas, *M. P.* 78, 149, 192, 193, 194, 402.  
 Winsor, Fred. Albert, 174, 260.  
 Wise, 341.  
 Wix, William, 254.  
 Wollaston, H. S. H. 154.  
 Wood, Alderman, *M. P.* 78, 94, 96, 149.  
 Woodhouse, William Pitta, 154.



Wortley, Stuart, *M. P.* 79.

Wright, J. 263, 270, 282, 335,  
418.

Wynn, Sir W. W. *M. P.* 267, 270.

Yeates, Dr. 336.

York Buildings' Water Com-  
pany, 259, 425, 441.—*Vide*  
*General Index.*

York, Archbishop of, 193.

Young, Charles Allen, 149.

Young, John Adolphus, 149.

FINIS.



