

**Report on the supply of water fo [to] the metropolis : Appendix no. I.  
returns to the queries addressed to the several metropolitan companies /  
Presented to both Houses of Parliament by command of Her Majesty.**

**Contributors**

Great Britain. General Board of Health.  
Royal College of Physicians of London

**Publication/Creation**

London : Printed by W. Clowes & Sons, Stamford Street, for Her Majesty's  
Stationery Office], 1850.

**Persistent URL**

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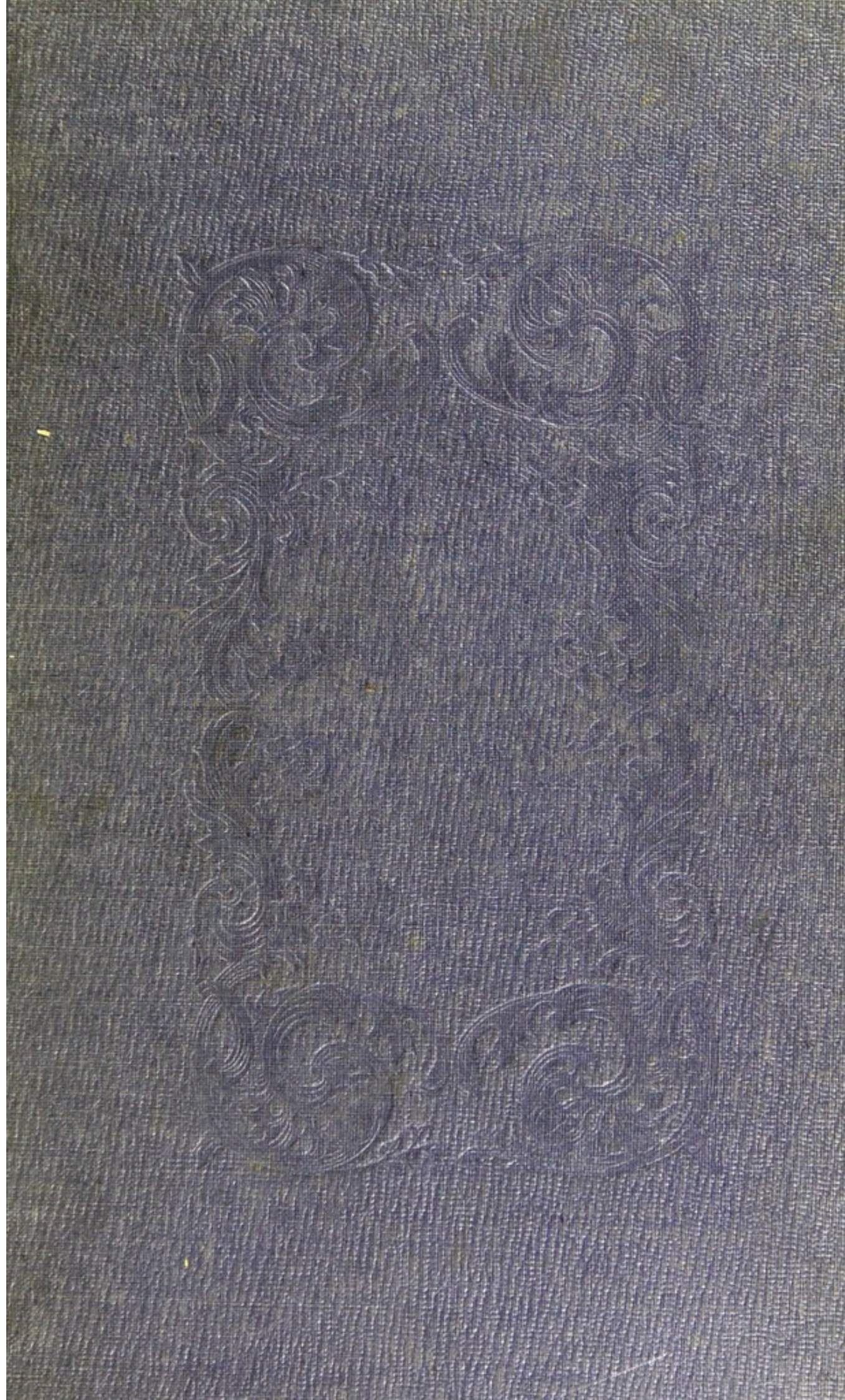
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rank him above the accomplished gentleman and engineer, Robert Stephenson, who is mentioned at p. 270 for an implied reprimand.

The contemptuous reference which is more than once made to Mr. W. Cubitt and Mr. James Walker, men to whose judgment many important Government functions have been and are confided for decision, is, to say the least, indecent from any Public Board.

To descend to smaller fry, nothing can be more disgraceful than the manner in which they hold up to ridicule a Corporation Officer, for the use of an expression, which from the mouth of one of their own officers would have been quoted as a cutting piece of irony on the effects of bad drainage; and in fact an unprejudiced mind cannot read the sentence without putting such a construction on it.

At p. 44 is the following :—"The witness on behalf of the Lambeth water company, Mr. Richard Phillips, the Chemist, when questioned as to whether the water there delivered might not be objectionable on account of the quantity of offensive animal matter which it contained, says 'it would not be so pleasant;' as if the subject were, from the incidental or occasional use of the water, one of no great moment affecting only some few people."

Against this the following may be quoted from p. 105 :—"The witness on behalf of the General Board of Health, Dr. Angus Smith, the Chemist, when questioned as to whether the water to be collected from the Surrey wastes might not be objectionable on account of the infusion of peat which it contained, says, "No, it is not thought so. The only objections I know to it are the taste and color, which are disagreeable when the infusion is considerable;" as if the subject were from the incidental or occasional use of the water, one of no great moment, affecting only some few people. Sneering should be impartial.

A remonstrance must also be made against the 45th conclusion which states that the Surrey water may be delivered at constant high pressure in London, and taken away again by a proper drainage system for a charge of 3*d.* or 4*d.* per week per house; whereas that cannot be done as the Board propose without first buying up the plants of the old companies, a charge which will probably double the rate mentioned.

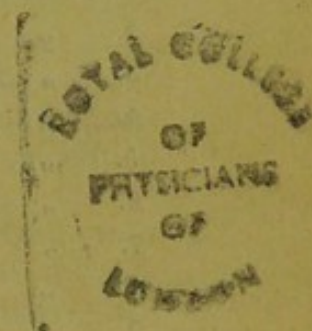
In conclusion, I will state that my reason for investigating and exposing the fallacies of this Report, is to do what lies in my power to prevent the public adoption of any course which would tend to retard the attainment of the much desired object of an *efficient supply of good water* at constant high pressure over the whole of this metropolis.



REPORT  
ON THE  
SUPPLY OF WATER  
FO  
THE METROPOLIS.

APPENDIX No. I.

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RETURNS TO THE QUERIES ADDRESSED TO THE  
SEVERAL METROPOLITAN WATER COMPANIES.

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*Presented to both Houses of Parliament by Command of Her Majesty.*

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LONDON:  
PRINTED BY W. CLOWES & SONS, STAMFORD STREET,  
FOR HER MAJESTY'S STATIONERY OFFICE.  
1850.



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NOTE.—For the Plans of the Districts referred to in the following Returns, see the General Plan showing the Districts supplied by existing Companies, prefixed to the Report of the General Board of Health on the Supply of Water to the Metropolis.



## RETURNS TO QUERIES ADDRESSED TO THE SEVERAL METROPOLITAN WATER COMPANIES.

### RETURN from the NEW RIVER COMPANY.

[Part of the Questions of the Sanitary Commissioners and Answers thereto by the  
New River Company.]

1. What is the name of the Company?—The Governor and Company of the New River, brought from Chadwell and Amwell to London. New River  
Company.

2. Will you recite your Act or Acts of Parliament?—3 Jas. I., cap. 18; 4 Jas. I., cap. 12; 11 Geo. II., cap. 14 (private Act); 12 Geo. II., cap. 32; 3 Geo. IV., cap. 109. Incorporated 21 June, 17 Jas. I.

3. What are the sources of supply?—The Chadwell spring, near Ware, in Hertfordshire; together with a further supply from the river Lea, Spital Brook, and other small springs taken into the river in its course; also from the water-shed of the Northhall district, and the yield of four deep wells sunk into the chalk in Middlesex and Hertfordshire, two of the latter being situate in the parish of Great Amwell.

4. Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing works?—See plan accompanying this return, within which there are no competing Companies.

5. Set forth also the position of the sources of supply; the engine-houses and the reservoirs, for storage or filtration?—The engines for the distribution of the water are situated at Newington, at the New River Head, and at Tottenham Court-road, at which places there are storage reservoirs marked on the annexed plan.

6. Describe the capacity and construction of the reservoirs?—The reservoirs, with the exception of one at Highgate and another at Tottenham Court-road, which are lined with brick, are all excavated out of the clay with slopes of  $2\frac{1}{2}$  to 1, and faced on the surface with broken stone, where the action of the wind on the water has the effect of creating a scour on such internal surface.

7. Give the internal and external diameter in inches, and length in yards of—

1st. The largest trunk-main, and of the second, third, and other sizes of trunk-mains.

2nd. Branch-mains, distinguishing length and diameter of the various sizes.

3rd. Side-services, distinguishing length and diameter as above.

4th. Services for small streets, distinguishing as above?

These are details which have never been kept, and for obtaining which there is not sufficient time to permit of its being done with accuracy.

8. Is the whole of the water which is supplied filtered?—The water



New River  
Company.

has generally a period of seven days for subsidence in the store reservoirs before alluded to.

9. Describe the mode of filtration?—In the reservoir at Cheshunt, where it is taken from the water-shed of the district, north of the same, it is generally retained a month; and in the New River, where the current is gentle, as also at five enlarged portions of the same there is much time for the deposit of any alluvial matter which it may contain. No description of filter is used.

10. What is the amount of steam-power employed? of coals burnt under the boilers, and price of the coals? also quantity of water used in the boilers?—The amount of steam-power exerted during the summer is equal to about 360 horses, working 16 hours each day; in the winter it may be taken at 260; and as there are in some cases duplicate engines, in others the engines are larger than now required, the power possessed may be taken at double that amount, or 720 horses. Welsh coals are used to avoid smoke, their cost delivered about 27*s.* per ton, and the quantity consumed 2,000 tons per year. Of the water used in the boilers no return can be made.

11. How frequently is the supply given? distinguishing different districts in case it varies therein?—On the plan annexed the portion coloured dark blue has an every-day supply. In the country district coloured light blue, which remains north of the Regent's Canal, the supply is four days in the week.

12. What is the total number of tenements supplied, distinguishing dwelling-houses?—

1st class	. . . . .	5,975
2nd class	. . . . .	16,800
3rd class	. . . . .	22,294
4th class	. . . . .	38,137

Also distinguishing those who have pipes on the main with constant supply, as many hatters have?—About 230 houses, &c., have main or constant supplies.

And large consumers, distinguishing, as nearly as you are able, the classes as set down?—

		Daily.
500 and under 1,000	. . . . .	233
1,000 do. 2,000	. . . . .	118
2,000 do. 3,000	. . . . .	26
3,000 do. 4,000	. . . . .	25
4,000 do. 5,000	. . . . .	15
5,000 and upwards	. . . . .	27

13. What number of dwelling-houses supplied have not the water laid on, but take their supply from stand-cocks?—2,435 houses supplied from stand-cocks, or 1-35th of the whole supply.

14. How many courts and houses are there in your district that cannot be supplied for want of drains to carry off the water, if it were laid on?—None. As the Company have never regarded the want of drains as a reason for not laying on water.

15. What is the total number of stand-cocks? greatest number of houses and persons to one stand-cock? least? average?—



347 stand-cocks.

18 houses, the greatest number to one cock.

2 houses, the least number to one cock.

7 houses, the average number to one cock.

156 persons, including children, the greatest number to one cock.

8 persons, the least number to one cock.

56½ persons, the average number to one cock.

16. How many hours per day are they running, and what is the run from each per hour?—429 gallons are delivered on an average for each stand-cock per day, Sundays excepted.

17. What is the total number of fire-plugs?—About 10,500 fire-plugs.

18. Can you state the total number of dwelling-houses with water-closets supplied, and those with baths supplied?—No, as the Company do not charge water-closets or baths separately.

19. What has been the total number of gallons delivered, distinguishing that pumped during the last year?—The quantity of water delivered to the town per day, in the year 1847, during the summer drought, was—

Estimated at . . . . 15,000,000 gallons

In the following year . . 16,500,000 gallons

And in 1849 . . . . 18,000,000 gallons

The latter quantity could be continued during winter, if the town required it.

20. What has been the total quantity delivered, distinguishing that pumped during the year preceding? What was the quantity delivered, distinguishing that pumped per month during the last year?—No special return of these quantities has been made, the quantity pumped has increased very materially during the last three years. The increase is estimated at full one-third more, but this is not from an increased demand for high supply, but from an increased discharge at low points, and thus as a greater quantity has been required to be discharged through given orifices within the same period, greater steam-power has been applied to effect it.

21. What has been the average quantity delivered to each dwelling-house per diem during the last year?—This question cannot be answered with correctness, but from the reports of the officers of the Company, full one-third of the quantity delivered to the dwellings has been discharged over the wastes, or by the inmates into drains and water-closets, chiefly from the dread existing at the time of the prevailing epidemic. An enormous number of pipes having been laid down from the supply-pipes leading into privies and drains of the houses.

22. What has been the average quantity delivered to large consumers per diem during the last year?—During the year 1848 about 918,517 gallons were delivered to large consumers per diem on an average, Sundays excepted.

23. What has been the quantity delivered by special agreements at a special rent?—This is supposed to refer to large consumers, see preceding answer.

24. What has been the quantity supplied for street-watering? and



New River  
Company.

what charge or charges? quantity supplied for fires? quantity supplied for flushing?—During the year 1849 about 45,410,900 gallons were supplied for street-watering. The charge for street-watering is 5*s.* per 100 superficial yards, if watered once a-day, and 7*s.* 6*d.* if watered twice a-day. Watering season from Lady-day to Michaelmas. No actual data on these latter points, but the quantity has been estimated as follows:—

About 10,000,000 gallons for fires,  
12,906,570 gallons for flushing,

afforded gratuitously.

25. State (if known) the average quantity of water used per mile for road-watering per diem, distinguishing paved and Macadamized roadways?—About 8,774 gallons used per mile for watering roads in one day. The distribution being twice a-day. (Average of seasons.)

26. What was the quantity supplied for other special purposes?—Answered in reference to large consumers. Supplied for flushing, fires, &c.

27. What is the highest service afforded by the Company above high-water mark?—430 feet above high-water mark.

28. What is the lowest service?—5 feet above high-water mark. (See section accompanying this return.)

29. What height of supply do you consider and charge for as high service?—Above 6 feet 6 inches, and not exceeding 13 feet, 25 per cent. on the ordinary supply rent is charged; above 13 feet and not exceeding 50 feet, 50 per cent. on ordinary service rent; above that height 75 per cent. extra; all measured from the pavement in the street. Houses of from one to four rooms have the benefit of high supply, if the ordinary service will effect it, and without paying high-service charge.

30. What is the number of turncocks and other servants employed?—There are 37 turncocks, each attending to about 2,300 tenants, with as many labourers to repair pipes and to attend to tenants' complaints, also two labourers to attend upon the sewer-flushings carried on by the commission.

FREDERICK INGLIS, *Clerk.*

*New River Office, January 21, 1850.*

[The New River Company's Answers to the remaining Queries of the Sanitary Commissioners.]

1. What is the number of shares?—Seventy-two.

2. What is the amount paid up on each share?—These questions appear to refer to modern establishments.

3. What is the total amount of subscription paid up?—There was no definite amount paid up per share originally, nor subscription list entered into.

4. What has been the total expenditure on the Works?—The New River Company's capital, as stated to the Select Committee of the House of Commons in the year 1834, was . . . £1,116,964

Increase since then to 1848 inclusive . . . 304,753

Total . . . 1,421,717



5. Will you state your scale of charges for water supply?—

New River  
Company.

Houses of 2 rooms	.	£0	6	0	per ann. farmed.
" 3 "	.	0	9	0	" "
" 4 "	.	0	12	0	" "
" 6 "	.	1	4	0	" not farmed.
" 8 "	.	1	12	0	" "
" 10 "	.	2	0	0	" "

Houses of a superior description in squares, &c., range from the above scale to 4*l.* 4*s.*, with 25 or 50 per cent. extra for high service according to height. The houses of from one to four rooms do not pay extra for high service, and large houses occupied by poor people are rated at 3*s.* per room when farmed.

6. What was the yearly produce of the water rents for the last year made up?—

Year 1848—Rents for houses, &c.	.	£125,712
Watering streets	.	3,721
Total	.	136,296

7. Will you give the annual amount of expenditure under such heads as they can be furnished?—

Collector's poundage	.	£4,932
Salaries	.	4,120
Street expenses	.	5,774
New River Head expenses	.	2,687
Steam engine expenses	.	1,498
River expenses	.	4,631
Stable expenses	.	154
Coals	.	2,048
Paving	.	5,155
Plumbing	.	482
Stationery, stamps, and printing	.	546
Rents and annuities	.	5,428
London Bridge annuitants	.	3,750
Taxes and rates	.	3,372
Income tax	.	2,900
Land tax	.	3,627
Law charges	.	398
Management or Committee attendance	.	2,245
Gratuities and donations	.	158
Annuities and pensions	.	486
Compensations	.	27
Repairs of mills, &c.	.	13
Benevolent fund for servants	.	150
Insurance	.	530
Incidents	.	471
Total	.	55,582



New River  
Company.

8. What was the last dividend per share?—439*l.* 0*s.* 10*d.* for the half year to Midsummer, 1849.

9. Dividend per cent. on the total cost of the Works?—About 4 $\frac{1}{8}$ ths per cent.

10. Dividend per cent. on the paid up capital?—See preceding answer.

FREDERIC INGLIS, *Clerk.*

*New River Office,  
January 26, 1850.*

THE NEW RIVER COMPANY'S GROSS INCOME and DIVIDENDS, from the Year 1834 to 1848, inclusive.

Years.	Water Rents for Dwelling-houses, &c.			For Watering Streets and Roads.			Rents for Lands and Houses.			Gross Income.			Dividends.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
1834	97,950	6	4	1,717	6	5	6,800	7	8	106,468	0	5	639	1	11 $\frac{1}{2}$
1835	99,861	6	1	1,820	0	0	6,787	13	2	108,468	19	3	647	9	5 $\frac{1}{2}$
1836	103,009	17	10	1,905	14	1	7,109	2	9	112,024	14	8	646	8	2 $\frac{3}{4}$
1837	105,153	19	11	1,801	9	0	7,865	4	6	114,820	13	5	650	9	9 $\frac{1}{2}$
1838	106,517	2	0	2,245	15	1	8,508	12	9	117,271	9	10	660	9	11 $\frac{1}{2}$
1839	108,461	10	7	2,207	0	7	8,563	19	0	119,232	10	2	682	16	0
1840	110,419	17	11	1,876	12	2	8,832	13	6	121,129	3	7	706	11	11 $\frac{1}{2}$
1841	111,912	19	10	1,771	3	6	8,995	5	11	122,679	9	3	726	9	1 $\frac{1}{2}$
1842	112,981	16	9	2,242	1	7	9,452	9	2	124,676	7	6	755	19	1 $\frac{1}{2}$
1843	114,330	3	8	2,017	9	3	9,263	6	5	125,610	19	4	791	5	11 $\frac{1}{2}$
1844	116,438	8	9	2,081	16	3	9,484	2	6	128,004	7	6	820	6	0
1845	118,550	12	5	2,290	13	8	9,204	7	1	130,045	13	2	834	8	0
1846	122,141	11	7	2,284	7	10	10,157	9	1	134,583	8	6	849	17	7 $\frac{1}{2}$
1847	125,444	19	2	1,622	10	1	9,969	5	3	137,036	14	6	864	10	4 $\frac{1}{2}$
1848	125,712	2	5	3,721	15	0	10,136	8	7	139,570	6	0	873	4	1

*New River Office, January, 1850.*

FREDERIC INGLIS, *Clerk.*

*Copy of a Communication between the New River Company and the Committee of City Lands.*

[Extracts from Minutes of the New River Board, December 13, 1849.]

The following letter from Mr. Saunders was read:—

*Comptroller's Office, Guildhall,  
December 7, 1849.*

SIR,

IN consequence of the interview this day by the Sub-Committee of City Lands with Mr. Mylne and yourself, on behalf of the New River Company, I am directed to state, that the Committee would be glad to receive, before Saturday next, your observations upon the following particulars.\*

I am, Sir,

Your very obedient servant,

*Frederic Inglis, Esq.,  
Clerk to the New River Company.*

THOMAS SAUNDERS,  
*Comptroller.*

\* See particulars in the Company's reply.



The foregoing letter having been considered, the clerk was instructed to reply as follows:—

New River  
Company.

SIR,

*New River Office, December, 1849,*

THE Directors of the New River Company instruct me to acknowledge the receipt of your communication of the 7th instant, containing a list of questions on which the Committee of City Lands desire information; and these having received every attention from the Directors, I am instructed to reply as follows:—

1. What is the present rate of charges of the New River Company, for the supply of water in the city of London and its suburbs?—The New River Company's general mode of charge for water in 1828 was as under; and is stated in the answers of the Company to certain questions of the Select Committee of the House of Commons appointed in that year (page 51) for ordinary house supply:—

	£.	s.
For houses of 2 rooms . . .	0	10
„ 3 „ . . .	0	15
„ 4 „ . . .	1	0
„ 6 „ . . .	1	4
„ 8 „ . . .	1	10
„ 10 „ . . .	1	16 to 2l.

And that houses of a superior description in squares or large streets ranged from the above scale to about 4l. 4s., and that high-service was charged 50 per cent. extra.

Since the above period the Company have generally reduced the charge for ordinary house supply to 4s. per room; and in the poorer class of houses, say houses consisting of from one to four rooms, and in the case of large houses occupied by poor families, to 3s. per room, farmed, including high service, without any extra charge.

They have also, since the above-mentioned period, reduced the charge for high service under 13 feet to other houses from 50 per cent. to 25 per cent. upon the rental for ordinary service.

The New River Company beg to refer the Committee of City Lands to their letter of the 23rd May, 1822, addressed to the Committee of the Bridge-house Estates, as bearing upon this point, a *copy of which is hereto annexed*, remarking only that the Company *did not make the addition of 10 per cent.* on the rates therein alluded to.

With respect to charges for trades, the New River Company some years back reduced the price to large consumers having permanent supplies, from 2l. 2s. to 1l. 14s. per 1,000 hogsheads. They also supply cisterns for public urinals at a nominal rent of 5s.

The following additions to the rent for ordinary supply is made for trades using an *extra* quantity of water:—

Publicans, 6s. per annum.

Butchers, 6s. to 10s. and 20s., according to what extent slaughtering is carried on, on the premises.

Bakers, 6s.

Horses, 3s. 6d. per horse.

Cows, 3s. 6d. per cow.



New River  
Company.

Carriages, 5s. per carriage.

Cabs, 2s. 6d. per cab.

And watering streets *once* per day, 5s. 0d. } per 100 superficial  
 ,, *twice* ,, 7s. 6d. } yards, for the  
 season.

Fishmongers, 5l. 5s. per annum; the supply being continuous.

Public baths and wash-houses are charged about a third less than the usual price to large consumers.

The Company have also within the last six months supplied the City and Metropolitan Commissioners of Sewers with an immense quantity of water free of all charge, even though they have incurred extra expense.

2. What is the quantity of water now supplied by the Company in gross, and the average per house or building, and for courts, alleys, &c., and how often is the supply of water furnished to the same?—The supply by the New River Company is about 17,427,600 gallons per day, averaging (according to the number of houses supplied, viz., 85,269) 204 gallons per day per house.

The ordinary service is supplied every day throughout the city and suburbs, and in the courts and alleys in the city of London, having common cocks, twice daily.

3. Whether, as to the quality, any of the water is taken from the River Thames, or solely from the New River and River Lea, or from any other source, and in what proportions?—The New River Company, although they have an establishment at Broken-wharf, under the authority of an Act of Parliament, and by which a large quantity of water can be drawn from the Thames, yet for many years they have not supplied any water from that service. Their supply is entirely derived from the New River, from the River Lea, near Ware, from wells at Amwell, at Cheshunt, and in the Tottenham Court-road, and also by several large reservoirs on the line of their river, in which the water is husbanded and allowed to settle.

4. Whether inequality of distribution of water exists in the city of London by the New River Company, and, if any, under what circumstances and exigencies?—The Company state that there is no inequality of distribution of water (except in case of high service, a mode of supply not required by all tenants). It may, however, happen that owing to some tenants laying on within their own premises a branch pipe leading into the drains, a great flow of water has been occasioned in particular districts, and the ordinary supply to other tenants has been thereby prejudicially affected.

5. What altered advantages do the New River Company propose in relation to increased quantity, reduction of price, and quality of the future supply?—The New River Company, anxious to meet the further demands for an increased supply of water for sanitary and domestic purposes, have given the necessary Parliamentary notices, and deposited the necessary plans and sections to enable them to take water from the River Lea, near Tottenham Mills, and to convey the same about the distance of two miles into their existing reservoirs at Stoke Newington, from whence it will be distributed as may be required through the existing works of the Company over that district.



of the metropolis now supplied by them, comprising nearly the whole of the city of London, and a large portion of the metropolis northward of the River Thames.

It is to be observed that this plan was recommended by the late eminent engineer, Mr. Telford, in his report made by order of the Government in 1834, as being the most feasible plan which could be adopted by the New River Company for giving an increased supply of water to the metropolis.

With reference to *price*, the Directors of the New River Company submit that, upon a careful examination and inquiry, their charges will be found, almost without exception, lower than those of any other Water Company on the north side of the Thames, and that they do not, in the aggregate, exceed 3 per cent. on the gross rentals of the city parishes. That they have already made reductions to a considerable extent, as alluded in their reply to the first question.

The Company will necessarily have to make a very large further outlay to carry out their contemplated new works, and to give an increased supply of water. Having stated these facts, the Company will be most anxious to consider the subject with a view to reduction; but whilst they are not dividing one-half of the profit allowed by the Legislature in the public Act called "The Water Works Clauses Act, 1847," the powers of which Act are conceded to all recent Water Companies, it is a proof that they *have not*, and an earnest that they *will not* abuse their position. Having, however, a public object in view, the Company propose forthwith to place themselves in communication with Her Majesty's Government, in order that their views may be ascertained, and such provisions inserted in the proposed Bill as it is hoped will be satisfactory to all parties.

With reference to the *quality* of the supply, since Mr. Telford's Report in 1834, the Company have expended many thousands of pounds in works to render the water both in its passage to London and before its distribution free from all contamination.

It may be proper to add, that the quality of the water supplied by the Company seldom forms a subject of complaint. Where it has occurred, some local defect in the *pipe or cistern* has generally been the cause.

6. Whether, if the existing or contemplated negotiation with the trustees of the River Lea or any other source of additional supply *should fail*, how does the Company propose to obtain the necessary increased supply of water, and what engagements can the citizens of London receive for securing such additional supply at a reduced price? —If there were any question as to the quantity of surplus water in the River Lea, then the Directors might contemplate the contingency adverted to by the Committee of City Lands; but as it appears from the examination and reports of the most scientific men, especially of Mr. Telford in 1834, that there is a superabundance of water, the New River Company do not therefore contemplate such a contingency, and confidently expect that they will have the support of the Government and of the city of London, when it is understood that the chief object the Company have in view is, to bring, without increased rate of charge to the public, an increased supply of water for sanitary and domestic purposes.



New River  
Company.

Should, however, the result be contrary to their reasonable expectations, the New River Company will promptly direct their attention to other means of supply, and obtain water from other sources, and by other works, and which they are advised by eminent engineers can be easily obtained, though at a large expenditure to the Company.

7. Whether the New River Company are willing to relieve landlords from the payment of water-rent due from tenants running away, or who are unable to pay?—It has always been with reluctance that the New River Company have applied to landlords for arrears of water-rent due from their tenants on quitting premises for water supplied to houses. The collectors have strict orders to take every possible means to trace the tenant before applying to the landlord. Since, however, the County Courts have been established, and facilities afforded which did not previously exist for obtaining arrears of rent, the Company have it in contemplation at an early period to relieve landlords altogether from the payment in question.

In conclusion, the Directors instruct me to assure the Committee of City Lands of their great desire to treat with attention any suggestions made to them, and to carry those suggestions out if compatible with their duty to their proprietors and the interests of the public.

I have the honour to be, Sir,

Your most obedient and faithful servant,

FREDERIC INGLIS, *Clerk.*

To Thomas Saunders, Esq.,  
Comptroller of City Lands.

[Additional Questions of the General Board of Health, March 15, 1850.]

Of the total amount of rates levied by your Company, how much is received for high-service?—

For ordinary dwellings	.	.	£ 8,642
For large consumers, about	.	.	2,800
			<hr/> £11,442

What is the total cost of collection of the rates?—4,932*l.* in poundage to collectors (for the year 1848).

East London  
Water  
Company.

#### RETURN from the EAST LONDON WATER COMPANY.

1. What is the name of the Company?—The Company of Proprietors of the East London Water Works.

2. Will you recite your Act or Acts of Parliament?—47 Geo. III., cap. 72; 48 Geo. III., cap. 8; 10 Geo. IV., cap. 117.

3. What are the sources of supply?—The river Lea, except that about 1 per cent. of the whole quantity of water taken is from a branch of that river.

4. What is the number of shares?—5,000.

5. What is the amount paid up on each share?—100*l.*

6. What is the total amount of subscription paid up?—500,000*l.*

7. What has been the total expenditure on the works?—Up to Midsummer, 1849, 745,781*l.*



8. Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing works?—The accompanying map, No. 1, shows the district in which pipes are at present laid. The district is extending very much to the east and south-east. There are no competing Companies in the district.

9. Set forth also the position of the sources of supply; the engine-houses and the reservoirs, for storage or filtration?—The accompanying plan, No. 2, shows the position of the whole of the Company's works, canal, and reservoirs. The greatest portion, or about 87 per cent. of the water supplied, is distributed by the engines at Oldford, and is brought thither from the river Lea, at Lea Bridge, by a canal which is fenced in to the reservoirs. About 12 per cent is taken into the reservoir near Lea Bridge, and is distributed by the water-wheels at that station. And about 1 per cent. is taken from a branch of the Lea called the Water-works Stream, and is distributed by a water-wheel.

10. Describe the capacity and construction of the reservoirs?—There are two reservoirs or basins at the Oldford works, made in 1809, lined with brickwork. (See Plan No. 2.) Two on the eastern side of the river Lea, communicating by an iron tunnel under the bed of the river, with the reservoirs or basins before mentioned, made in 1826. These are partly lined on the sides with Kentish rag stone, and partly with brickwork. (See Plan No. 2.) The canal communicating with the last-named reservoirs, and which brings the water from Lea Bridge, by the very slow motion of the water acts as a reservoir. (See Plan No. 2.) One reservoir at Lea Bridge, lined with Kentish rag stone and gravel. (See Plan No. 2.) One reservoir at Stamford Hill, lined with brickwork. (See Plan No. 2.) These six reservoirs and canal contain 35,000,000 gallons. These reservoirs are constructed for the purpose of allowing the water to be cleared, by the deposition of mechanical impurities. For nine or ten months in the year, the water from the river at Lea Bridge is clear and bright. During the remainder of the year, the Company consider that the arrangements previously described at length, are sufficient for the purpose intended.

11. Give the internal and external diameter in inches, and length in yards, of

1. The largest trunk main, and of the 2nd, 3rd, and other sizes of trunk mains.
2. Branch mains, distinguishing length and diameter of the various sizes.
3. Side services, distinguishing length and diameter as above.
4. Services for small streets, distinguishing as above?

—The number and diameters of the main pipes, proceeding directly from the various stations, are as follows:—

One	.	.	36-inch.
One	.	.	26-inch.
Two	.	.	18-inch.
Two	.	.	12-inch.
One	.	.	9-inch.

As no plan of the pipeage was made for several years after the East London Water Company was established, no correct answer can be given to these questions. It appears, however, from a recent measure-



East London  
Water  
Company.  
—

ment of the streets, that there are at least 88 miles of mains, varying in size from 42-inch to 5-inch, which are always charged with water under pressure; and 140 miles of service-pipes, of 4 and 3 inches diameter, charged once every day, or oftener if required. This admeasurement is much less than was stated in evidence for the Health of Towns Commission; the evidence then given was based upon statements supposed to be correct, but which the recent admeasurements prove to have been fallacious.

12. Is the whole of the water which is supplied filtered?—No. The water supplied (with the exception referred to in answers Nos. 3 and 9), is taken from the Lea, upwards of six miles from its mouth, in the Thames, and nearly two miles beyond the flow, or the influence of the tide; and after passing through a canal nearly two miles in length, cut through Hackney Marshes, it is received into large reservoirs of deposit where its impurities subside, previously to flowing into smaller reservoirs, from whence it is pumped into the Company's district.

13. Describe the method of filtration?—See answer to question No. 12.

14. What is the amount of steam-power employed? Of coals burnt under the boilers, and price of the coals; also quantity of water used in the boilers?—The amount of steam-power is equal to—

516·8 horses; and of water-wheels to  
34·5 ditto.

—  
Total 551·3 horse power.

The average power employed in 1849 was equal to 372·6 horses, working 12 hours per diem.

The quantity of coals burnt under the boilers was equal to 2,121½ tons; the price, when the last contract was made in May, 1849, was 10s. 6d. per ton delivered.

The quantity of water used in the boilers was 3,633,118 gallons.

15. How frequently is the supply given; distinguishing different districts in case it varies therein?—Six days in the week, or oftener if required, throughout the Company's district.

16. What is the total number of tenements supplied, distinguishing dwelling-houses—

1st class.

2nd class.

3rd class.

4th class.

Also distinguishing those which have pipes on the main, with constant supply as many hatters have, and large consumers, distinguishing as nearly as you are able the classes as set down—

Gallons.	Daily.
500 and under	1,000
1,000     ,,	2,000
2,000     ,,	3,000
3,000     ,,	4,000
4,000     ,,	5,000
5,000 and upwards?	—

—The total number of tenements supplied is 56,673, calculated to Christmas, 1849.

There are 475 private houses on the main.



			Gallons per Diem.
There are 143 large consumers, at and under			500
42	„	„	1,000
29	„	„	2,000
8	„	„	3,000
4	„	„	4,000
4	„	„	5,000
34 large consumers, above			5,000

East London  
Water  
Company.  
—

Total 264

17. What number of dwelling-houses supplied have not the water laid on, but take their supply from standcocks?—

3,297 houses supplied from stand-cocks.

516 „ „ common cisterns.

The Company would be glad to dispense with this mode of supply altogether and to supply each house separately, provided the owners would consent to adopt the necessary means to effect such an improvement, which is continually suggested.

18. How many courts and houses are there in your district that cannot be supplied for want of drains to carry off the water, if it were laid on?—None known.

19. What is the total number of stand-cocks? Greatest number of houses and persons to one stand-cock, least average?—There are 389. There is one cock which supplies 23 houses; but the average number of houses to each cock is less than  $8\frac{1}{2}$ .

20. How many hours per day are they running, and what is the run from each per hour?—From three quarters of an hour to two hours; varying according to the situation. All are kept on long enough to give a supply to the whole of the houses using them.

21. What is the total number of fire plugs?—There are about 3,900.

22. Can you state the total number of dwelling-houses with water-closets supplied, and those with baths supplied?—The number is unknown, as no special charge is made either for water-closets or baths.

23. What has been the total number of gallons delivered, distinguishing that pumped during the last year?—The Company's engineer can only speak to the quantity delivered during the period he has been in their service, which commenced in September, 1829.

For the first ten years, viz., from 1830, it was 21,518,745,300 gallons.

For the last ten years to the end of 1849, it was 30,051,688,464 gallons.

For the last year, ending at Christmas 1849, it was 3,222,753,876 gallons.

24. What has been the total quantity delivered, distinguishing that pumped during the year preceding?

For the last 20 years . . . 51,750,433,764 gallons.

For the year 1848 . . . 3,298,157,784 „

It will be seen, on reference to the previous answers, that a larger



East London  
Water  
Company.  
—

quantity was pumped in 1848 than during last year. This, it is considered, is owing to the introduction of the system of daily instead of alternate supply, and the saving of waste consequent thereon.

25. What was the quantity delivered, distinguishing that pumped per month during the last year?—The quantities delivered, commencing from 25th December 1848, to 25th January 1849, and so to the 25th day of each consecutive month, were as follows:—

1849.	Gallons.	1849.	Gallons.
January .	267,249,996	August .	299,861,352
February .	254,266,308	September .	304,388,460
March .	230,998,320	October .	275,503,932
April .	252,600,696	November .	272,348,352
May .	246,615,516	December .	268,409,160
June .	265,931,136		
July .	284,580,648	Total .	3,222,753,876

26. What has been the average quantity delivered to each dwelling-house per diem during the last year?—The average quantity, exclusive of the supply to large consumers, watering roads, &c., was, for seven days per week, 140 gallons per house per diem.

27. What has been the average quantity delivered to large consumers per diem during the last year?—The average quantity delivered to each large consumer per diem, six days in the week, was about 3,536 gallons.

28. What has been the quantity delivered by special agreements at a special rent?—The whole quantity of water delivered in 1849 (*see* answers to Questions Nos. 23 and 25) may be divided as follows:—

	Gallons.
56,409 private houses . . .	2,880,451,740
247 large consumers . . .	271,617,136
8 supplies for watering roads .	11,466,000
*9 charities, hospital, baths, and wash-houses . . .	8,219,000
Victoria Park (gratis) . . .	4,000,000
†Flushing sewers, cleaning courts, alleys, cesspools, &c. . .	23,000,000
Water used at fires, and at starting end plugs of services . . .	24,000,000
Total in 1849 . . .	3,222,753,876

29. What has been the quantity supplied for street watering? and at what charge or charges? quantity supplied for fires? quantity supplied for flushing?—See answers to Questions No. 28 and No. 30. The charge per mile for watering must depend on the width of the road. The Commissioners for Metropolis Roads are charged at the

\* These are large consumers, which, together with 80 charitable establishments and model lodging-house in Spitalfields, are supplied at half price, except the London Hospital, which is supplied for 30*l.* per annum, and the Free Baths in Glasshouse-street, near the London Docks, which are supplied gratis.

† No charge has been made for this supply.



rate of 75*l.* per mile for the season for watering. In other cases a charge is made of 1*s.* per month for every 100 square yards watered.

30. State (if known) the average quantity of water used per mile for road watering per diem, distinguishing paved and Macadamized roadways?—The quantity of water used for one watering was found to be equal to 1,000 gallons for every 3,360 square yards. According to experiments tried on the Commercial-road, which may be considered as half paved and half Macadamized.

31. What was the quantity supplied for other special purposes?—See answer to Question No. 28.

32. What is the highest service afforded by the Company above high-water mark?—About 120 feet.

33. What is the lowest service?—About 3 feet below high-water mark.

34. What height of supply do you consider and charge for as high service?—More than 10 feet above the pavement in front of the house supplied. The Act 10 Geo. IV., c. 117, restricts the height at which the Company is compelled to supply to 6 feet above the pavement.

35. Will you state your scale of charges for water supply?—Printed forms are enclosed.

# EAST LONDON WATER WORKS.

SCALE OF RATES, and LIST of TRADES subject to Extra Charge for Consumption of Water.

Houses of the smallest description, and others supplied by common cock or tank.

	£.	s.	d.	
If cabins or single rooms. . . . .	0	5	0	per annum each
If 2 rooms. . . . .	0	8	0	„ „
If 3 rooms, small. . . . .	0	12	0	„ „
If 3 rooms, large. . . . .	0	15	0	„ „
Houses of 2 small rooms. . . . .	0	10	0	„ „
„ 2 large rooms. . . . .	0	12	0	„ „
„ 3 small rooms. . . . .	0	14	0	„ „
„ 3 large rooms. . . . .	0	16	0	„ „
„ 4 rooms, with shed roof, and only 3 fire-places. . . . .	0	16	0	„ „

Farmed, or  
contracted for,  
full or empty.

KITCHENS and WASH-HOUSES rated as Rooms.

	Small Rooms.						Large Rooms.					
	Tenant's Rate.			Farmed.			Tenant's Rate.			Farmed.		
Houses of—	£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
4 Rooms, in first rate situations .	1	2	0	1	0	0	1	4	0	1	2	0
„ „ second rate „ „ .	1	0	0	0	18	0	1	2	0	1	0	0
5 „ „ first rate „ „ .	1	5	0	1	3	0	1	7	0	1	5	0
„ „ second rate „ „ .	1	3	0	1	0	0	1	5	0	1	3	0
6 „ „ first rate „ „ .	1	8	0	1	6	0	1	10	0	1	8	0
„ „ second rate „ „ .	1	6	0	1	4	0	1	8	0	1	6	0
7 „ „ first rate „ „ .	1	11	0	1	9	0	1	13	0	1	11	0
„ „ second rate „ „ .	1	8	0	1	6	0	1	10	0	1	8	0
8 „ „ first rate „ „ .	1	18	0	„	„	„	2	2	0	„	„	„
„ „ second rate „ „ .	1	12	0	1	10	0	1	14	0	1	12	0
9 „ „ first rate „ „ .	2	2	0	„	„	„	2	5	0	„	„	„
„ „ second rate „ „ .	1	18	0	„	„	„	2	0	0	„	„	„

Houses of 10 rooms, from 2*l.* 2*s.* to 2*l.* 10*s.* per annum; and for every room above 10, 5*s.* per room.



East London  
Water  
Company.

## Public Houses.

	£.	s.	d.
First rate . . . . .	4	0	0
Second rate . . . . .	3	0	0
Third rate . . . . .	2	10	0
Fourth rate . . . . .	2	0	0

## Watering Houses extra, according to consumption.

	£.	s.	d.
First rate . . . . .	6	0	0
Second rate . . . . .	4	0	0
Third rate . . . . .	3	0	0
Fourth rate . . . . .	2	0	0

Houses with stables, gardens, &c., according to consumption.

Butchers and bakers, 25*l.* per cent., extra.

Horses and cows, 5*s.* each.

Manufacturers and large consumers of water, on special agreement according to consumption.

Subject in all cases to alterations upon appeal to the Court of Directors, according to situation, consumption and other circumstances.

## High Service.

Above 10 feet to 14 feet . . . . 25 per cent. on ordinary rate.

From 14 feet upwards . . . . 50 ditto ditto

*A List of the Trades and Manufactories which are considered as subject to an extra Charge in respect of their Consumption of Water.*

Baker	Dyer	Publican
Basket-maker	Feilmonger	Scourer
Brewer	Fishmonger	Soap boiler
Butcher	Gardener	Slaughterman
Chemist	Gas works	Sugar refiner
Currier	Laundry	Steam-engine manufacturer
Cowkeeper	Livery stables	Tripe boiler
Colour manufacturer	Orchill manufacturer	Watering house
Distiller	Potato dealer and washer	

And others requiring a quantity of water beyond the ordinary supply of private houses.

June, 1846.

J. CECIL, Chief Clerk and Secretary.

Baths and wash-houses, and charitable institutions, are supplied at half rates.

## SCALE of RATE for Large Consumers.

Quantity of Water.		Per 1000 Barrels.			Amount of Rate.		
		£.	s.	d.	£.	s.	d.
5,000 Barrels . . . . .	at	1	17	0	9	5	0
10,000 . . . . .	"	1	16	0	18	0	0
15,000 . . . . .	"	1	15	0	26	5	0
20,000 . . . . .	"	1	14	0	34	0	0
30,000 . . . . .	"	1	13	0	49	10	0
40,000 . . . . .	"	1	12	0	64	0	0
50,000 . . . . .	"	1	11	0	77	10	0
60,000 . . . . .	"	1	10	0	90	0	0
70,000 . . . . .	"	1	9	0	101	10	0
80,000 . . . . .	"	1	8	0	112	0	0
90,000 . . . . .	"	1	7	0	121	10	0
100,000 . . . . .	"	1	6	0	130	0	0
150,000 . . . . .	"	1	5	0	187	10	0
200,000 . . . . .	"	1	4	0	240	0	0
250,000 . . . . .	"	1	3	0	287	10	0
300,000 . . . . .	"	1	2	0	330	0	0
400,000 . . . . .	and upwards	1	1	0	420	0	0



RATES by Parliamentary Scale, without calculating to a Fraction.

East London  
Water  
Company.

Rent.		Water Rate.
£.		£. s. d.
10	Per annum rent, or annual value $7\frac{1}{2}$ per cent.	0 15 0
12		0 18 0
14		1 1 0
16		1 4 0
18		1 7 0
20		1 10 0
22	Per annum rent, or annual value 7 per cent.	1 10 9
24		1 13 6
28		1 19 2
30		2 2 0
32		2 4 9
34		2 7 6
36	Per annum rent, or annual value $6\frac{1}{2}$ per cent.	2 10 4
40		2 16 0
42		2 14 6
45		2 18 6
50		3 5 0
52		3 7 6
55	Per annum rent, or annual value 6 per cent.	3 11 6
58		3 15 6
60		3 18 0
63		3 15 6
65		3 18 0
68		4 1 6
70	Per annum rent, or annual value $5\frac{1}{2}$ per cent.	4 4 0
72		4 6 6
74		4 8 9
80		4 16 0
84		4 12 6
88		4 16 9
90	Above 100%, 5 per cent. per annum.	4 19 0
92		5 1 3
96		5 5 0
100		5 10 0

Above 100%, 5 per cent. per annum.

Maximum, 20% per annum. Minimum, 12s. per annum.

36. What was the yearly produce of the water-rents for the last year made up?

The gross charge, 1849, was . . . £70,585 14 0

Net cash paid in, after deducting commission to collectors, was . . . £66,431 14 2

The remainder was for said commission, deductions for empty houses, losses, allowances, &c. . . 4,153 19 10

70,585 14 0

37. Will you give the annual amount of expenses under such heads as they can be furnished?



East London  
Water  
Company.

	£.	s.	d.
Permanent expenses (1849) . . . . .	17,379	11	6
Non-permanent expenses (1849), viz.:—			
New mains and services . . . . .	3,668	17	8

38. What is the number of turncocks and other servants employed?  
—26 turncocks, 40 other servants, exclusive of foreman, superintendant, and clerks.

39. What was the last dividend per share?—At 8*l.* per annum.

40. Dividend per cent. on the total cost of works?—About 5*l.* 7*s.* per cent.

41. Dividend per cent. on the paid-up capital?—8*l.*

42. Of the total amount of rates levied by your Company, how much is received for high service?—Of the total amount of rates charged by this Company, at Christmas last, 747*l.* 17*s.* (seven hundred and forty-seven pounds seventeen shillings) was charged for high-service supply; that is for a supply 10 feet above the pavement.

43. What is the total cost of collection of the rates?—The amount of commission paid to our collectors, during the year 1849, was 2,388*l.* 13*s.* 6*d.* (two thousand three hundred and eighty-eight pounds thirteen shillings and sixpence).

STATEMENT of the AVERAGE CHARGES which would be made by the East London Water Works Company for Water Supply on High and Low Service in the undermentioned Cases, according to the existing Scale of the Company, (25th April 1850.)

	Low Service.			High Service.			Total.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
4-ROOMED HOUSE (ground and upper floor farmed.	0	16	0	0	4	0	1	0	0
* Add for water-closet on ground floor.				If not above 15 feet.					
6-ROOMED HOUSE (ground and two floors above).	1	6	0	0	6	0	1	12	0
* Add for water-closet on ground and first floor, charge for each.				If not above 15 feet.					
10-ROOMED HOUSE (basement, ground, and two floors above).	2	2	0	1	1	0	3	3	0
* Add for water-closet on ground and first floor, charge for each.									
12-ROOMED HOUSE (basement, ground, and three floors above).	2	12	0	1	6	0	3	18	0
* Add for water-closet on basement, ground and first floor, charge for each.									
16-ROOMED HOUSE (basement, ground, and four floors above).	3	2	0	1	11	0	4	13	0
* Add for water-closets on basement, ground, first and second floors, charge for each.									
Add for coach-house and stable . . .				5 <i>s.</i> per horse. No charge unless horses are kept.					
On the high service the water is supposed to be supplied to the top floor in each case.									

\* No charge for water-closets. A charge is made for high service above 10 feet.

By order of the Court of Directors  
of the East London Water Works,

March 16, 1850.

J. CECIL, Chief Clerk and Secretary.



RETURN from the SOWTHWARK and VAUXHALL WATER COMPANY.

Southwark  
and Vauxhall  
Water  
Company.

1. What is the name of the Company?—The Southwark and Vauxhall Water Company.

2. Will you recite your Act or Acts of Parliament?—The Southwark and Vauxhall Company's Act is 8 Vict., cap. 69; but the two Companies, now constituting the Southwark and Vauxhall Company, were created respectively under the following Acts:—The Southwark Water Company by the 4 and 5 Will. IV., cap. 79; the Vauxhall Water-works Company by the 45 Geo. III., cap. 119; the 53 Geo. III., cap. 155; and 4 and 5 William IV., cap. 78.

3. What are the sources of supply?—The Thames, at Battersea.

4. What is the number of shares?—3,036 shares.

5. What is the amount paid up on each share?—93*l.* per share.

6. What is the total amount of subscription paid up?—

£.

On 1,610 shares allotted to the Southwark Company	
on the union of the Companies . . . . .	140,000
On the 1,150 shares allotted to the Vauxhall Company . . . . .	115,00
On 276 shares raised since the union by the Southwark and Vauxhall Company . . . . .	27,600
	<hr/>
	£282,600
	<hr/>

Or 93*l.* per share, as by the preceding answer. But to this sum should be added 22,647*l.*, the money expended by the Vauxhall Company in the five years, from 1841 to 1845 inclusive, during which period that Company were under the necessity of expending on their works the whole sum they received beyond the current expenses, in consequence of having exhausted their Parliamentary power of raising capital. The money thus expended on their works amounted to 22,647*l.*, which added to the former sum of 282,600*l.* gives an aggregate of 305,247*l.*, or 100*l.* 10*s.* per share.

7. What has been the total expenditure on the works?—

£.

All the subscribed capital . . . . .	282,600
By the Vauxhall Company, money expended out of revenue . . . . .	22,647
Money on mortgage . . . . .	120,000
Money on loan . . . . .	10,000
	<hr/>
	£435,247
	<hr/>

8. Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are two or more competing works?—(See the accompanying tracing).

9. Set forth the position of the source of supply: the engine-houses and reservoirs, for storage and filtration?—The Company possess 24 acres of land on the banks of the river Thames, near the Red House,



Southwark  
and Vauxhall  
Water  
Company.

at Battersea, 4 acres of which are unappropriated. The source of supply is in the bed of the river, considerably below low-water mark on the southern side; the water is taken in through a 4 feet culvert-pipe by a lifting engine, which is worked between four and five hours of each falling tide, commencing to pump two hours and a half after ebb.

10. Describe the capacity and construction of the reservoirs?—There are two depositing and two filtering reservoirs; the first depositing reservoir is 120,000 superficial feet in area, and is capable of containing 11,000,000 gallons; the second will contain 21,000,000 gallons, and is 250,000 superficial feet in area, the first depositing reservoir being usually filled to 9,360,000 gallons, and the second to 19,500,000 gallons. The first filtering reservoir has 33,000 superficial feet of surface, and is capable of containing 3,000,000 gallons. The second 88,000 superficial feet in area, and a capacity of 8,000,000 gallons. The arrangements for deposit are as follows:—The water is received from the lifting engine into the first reservoir, and passes from thence to the extreme end of the second reservoir, by which means the whole of the water has to travel over the entire surface of both reservoirs before it is taken on to the filtering beds.

11. Give the internal and external diameter in inches, and the length in yards, of—

1st. The largest trunk main, and of the 2nd, 3rd, and other sizes of trunk mains.

#### 1. *Trunk Mains.*

Internal diameter	27 inches	}	length 2,000 yards.
External	29 "		
Internal	24 "	}	" 1,050 "
External	25 $\frac{3}{4}$ "		
Internal	20 "	}	" 4,150 "
External	21 $\frac{1}{2}$ "		
Internal	15 "	}	" 1,100 "
External	16 $\frac{3}{8}$ "		
Internal	12 "	}	" 12,000 "
External	13 $\frac{1}{4}$ "		
Internal	9 "	}	" 29,500 "
External	10 $\frac{3}{16}$ "		

#### 2. *Branch Mains.*

Diameter 7 inches, length 45,500 yards.

" 6 " " 26,000 "

" 5 " " 65,500 "

#### 3. *Side Services.*

Diameter 4 inches, length 49,500 yards.

" 3 " " 16,500 "

#### 4. *Services for small Streets, &c.*

4 inch, 3 inch, and 2 inch . . . 408,000 yards.

Making altogether a total length of . . . 380 miles.

12. Is the whole of the water which is supplied filtered?—All the water supplied is filtered.



13. Describe the method of filtration?—After the water has passed through the reservoirs of subsidence it enters the filtering reservoirs, where it has to percolate through the filtering medium, which is composed of the following strata:—

Southwark  
and Vauxhall  
Water  
Company.

- 1st. A layer of clean sharp river sand 2 feet thick.
- 2nd. A layer of hoggin, or fine gravel, 1 foot.
- 3rd. A layer of fine screened gravel, 9 inches.
- 4th. A layer of rough screened gravel, 9 inches.
- 5th. A layer of coarse gravel, 1 foot.

It is then received into brick tunnels, formed with open joints in cement, which communicate with a main tunnel leading to the pump wells of the engines.

14. What is the amount of steam power employed, of the coals burnt under the boilers, and the price of the coals; also quantity of water used in the boilers?—There are four engines at the Company's works, viz.:—

- One pumping engine of 50-horse power (Boulton and Watt).
- One pumping engine of 130-horse power (Cornish).
- One pumping engine of 145-horse power (Cornish).
- One lifting engine of 30-horse-power (Sim's patent).

They are worked by eight Cornish boilers, burning on an average eight tons of coal per day, at an average price for the last four years of 13s. 3d. per ton; but, in the last year, in consequence of small coal being used, and the price of it low, the cost has not exceeded 10s. per ton. Between 17,000 and 18,000 gallons of water are evaporated per day.

15. How frequently is the supply given, distinguishing different districts in case it varies therein?—The supply of water is given daily throughout the whole of the Company's district.

16. What is the total number of tenements supplied, distinguishing dwelling-houses—

- 1st class.
- 2nd class.
- 3rd class.
- 4th class.

Also distinguishing those that have pipes on the main, with constant supply, as many hatters have? And large consumers, distinguishing as nearly as possible the classes set down:—

500 and under 1,000 gallons daily.			
1,000	„	2,000	„
2,000	„	3,000	„
3,000	„	4,000	„
4,000	„	5,000	„
5,000 and upwards.			

—This Company have no means of dividing the dwelling-houses of their tenants into classes, as the term is ordinarily understood; but, in the following division, the houses are classed according to the rates charged. There are 34,864 tenements supplied, viz.:—



Southwark and Vauxhall Water Company. —		£. s. d.			
	699 of the 1st class paying	3	0	0	per annum and upwards.
	The mean rate being	3	12	6	
	2,184 of the 2nd class paying	2	0	0	„ „
	The mean rate being	2	6	8	
	10,740 of the 3rd class paying	1	0	0	„ „
	The mean rate being	1	5	0	
	12,459 at . . . . .	0	10	0	„ „
	The mean rate being	0	12	6	
	8,782 at . . . . .	0	4	0	„ „
	The mean rate being	0	6	11	

Of which about 1,000 are on the main, and have nearly a constant supply.

There are 647 consumers supplied, viz. :—

450 taking	500 and under 1,000 gallons daily.
90 „ 1,000 „	2,000 „
30 „ 2,000 „	3,000 „
25 „ 3,000 „	4,000 „
20 „ 4,000 „	5,000 „
32 „	5,000 and upwards.

17. What number of houses have not the water laid on, but take their supply from stand-pipes?—About 2,000 houses.

18. How many courts and houses are there in your district that cannot be supplied for want of drains to carry off the water if it were laid on?—It is difficult to produce an answer to this question; but many owners of small property state that they would have the water laid on, if there was any way in which the waste could be carried off.

19. What is the total number of stand-cocks, greatest number of houses, and persons who have stand-cocks, least average?—There are 243 common stand-cocks, each supplying from three to sixteen houses.

20. How many hours per day are they running, and what is the run from each per hour?—They are running from one to three hours, and the average run is from 100 to 200 gallons per hour; but no very correct estimate can be given.

21. What is the total number of fire-plugs?—There are 3,500 fire-plugs, and 1060 stopcocks.

22. Can you state the total number of dwelling-houses with water-closets supplied, and those with baths supplied?—Between 5,000 and and 6,000 houses are supplied that have closets; many of the houses in portions of the Company's district have baths, but no charge is made for them.

23. What has been the total number of gallons delivered; distinguishing that pumped during the last year (1849)?—2,195,006,370 gallons.

24. What has been the total quantity delivered, distinguishing that pumped during the year preceding (1848)?—2,037,780,270 gallons.

25. What was the quantity delivered, distinguishing that pumped per month during the last year (1849)?—



	Gallons.		Gallons.
Jan.,	175,374,300	July,	190,050,690
Feb.,	159,755,430	Aug.,	203,998,080
Mar.,	174,656,340	Sept.,	191,602,650
April,	157,930,050	Oct.,	203,586,000
May,	175,617,360	Nov.,	188,129,190
June,	187,228,170	Dec.,	187,078,110

Southwark  
and Vauxhall  
Water  
Company.

26. What has been the average quantity delivered to each dwelling-house per diem during the last year?—143 gallons (7 days in the week).

27. What has been the average quantity delivered to large consumers per diem during the last year?—1,296 gallons (7 days in the week).

28. What has been the quantity delivered by special agreement at a special rent?—

29. What has been the quantity supplied for street-watering, and at what charge or charges? State (if known) the average quantity of water used per mile for road-watering per diem, distinguishing paved and macadamized roadways?—43,200,000 gallons per annum, at a rate of 50*l.* and 60*l.* per mile per annum for road-watering; but the Company supply so little for street-watering (only receiving 120*l.* per annum, paid for some portion of the east division of Southwark) that quantity has never been made a matter of calculation.

30. What was the quantity supplied for other special purposes?—For flushing sewers, extinguishing fires, &c., 26,000,000 gallons.

31. What is the highest service afforded by the Company above high-water mark?—150 feet.

32. What is the lowest service?—Below high-water mark.

33. What height of supply do you consider and pay for as high service?—The Company have no separate charge for high service; but some addition is made to the rate for houses which have water-closets or are in a high situation.

34. Will you state your scale of charges for water supply?—The scale of charges commences at 2*s.*, and rises where there are water-closets, &c., to 3*s.*, 4*s.*, and 5*s.* per room, according to situation and the nature of the supply afforded.

35. What was the yearly produce of the water rents for the last year made up?—The gross rental of the Company in charge from Michaelmas 1848 to Michaelmas 1849 was 36,396*l.* 16*s.*; but in consequence of the general depression of trade in 1848 and the early part of 1849 among the middle class of tenants, and subsequently of the severe epidemic, the collection of the Company's revenue was much below the ordinary standard, only 33,665*l.* 6*s.* having been received.

36. Will you give the annual amount of expenses under such heads as they can be furnished?—From the short time that has elapsed since the completion of the Company's works it is difficult to define the exact yearly expenditure, but it is assumed that it will be from 10,000*l.* to 12,000*l.* per annum.

37. What is the number of turncocks and other servants employed?—14 labourers, 12 turncocks, and 16 engineers, stokers, and assistants at the Battersea establishment.

38. What was the last dividend per share?—5*l.*



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and Vauxhall  
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Company.

39. What is the dividend per cent. on the cost of the works?—

4l. 17s. per cent.

40. What is the dividend per cent. on the paid-up capital?—

5l. 6s. 6d. on 282,600l., or 5l. per cent. on 3,036 shares, reckoned at 93l. per share; but at 100l. 10s. the real cost of the shares, as explained in answer to Query 6, 5l. per cent.

41. Of the total amount of rates levied by your Company how much is received for high service?—This question cannot be answered with precision. The total annual amount received by the Company for sums especially charged as high service amount to 423l.; but some addition has been made to the rates in the more elevated parts of the district for service, considered to be in the nature of high service, and this addition produces as nearly as may be 460l.; the two sums together making 883l.

42. What is the total cost of the collection of the rates?—The average amount per annum paid by the Company for collecting rates during the last four years has been 1,195l. 15s., being a charge of 9d. in the pound, and some additional expenses of 30l. per annum.

STATEMENT of the AVERAGE CHARGES which would be made by the Southwark and Vauxhall Water Works Company for Water Supply on High and Low Service in the undermentioned Cases, according to the existing Scale of the Company.

	Low Service.	High Service.	Total.
	£. s. d.		£. s. d.
4-ROOMED HOUSE (ground and upper floor)	0 14 0	No extra charge.	
Add for water-closet on ground floor . . . . .	..		
6-ROOMED HOUSE (ground and two floors above).	1 1 0	..	1 11 0
Add for water-closet on ground and first floor, charge for each . . . . .	0 5 0 0 5 0		
10-ROOMED HOUSE (basement, ground, and two floors above).	1 15 0	..	2 10 0
Add for water-closet on ground and first floor, charge for each . . . . .	0 5 0 0 10 0		
12-ROOMED HOUSE (basement, ground, and three floors above).	2 2 0	..	3 3 0
Add for water-closet on basement, ground, and first floor, charge for each . . . . .	0 5 0 0 6 0 0 10 0		
16-ROOMED HOUSE (basement, ground, and four floors above).	2 16 0		
Add for water-closets on basement, ground, first and second floors, charge for each . . . . .	0 5 0 0 5 0 0 7 0 0 7 0	..	5 1 0
Add for coach-house and stable . . . . .	1 1 0		

On the high service the water is supposed to be supplied to the top floor in each case.

The only charge beyond the above sums is for a constant supply from a leading main, and this does not exceed 50 per cent. on the low-service charge, the water-closets remaining the same.



NUMBER of HOUSES laid on from the establishment of the SOUTHWARK COMPANY in 1582, and of the VAUXHALL COMPANY in 1805, to the period of their union in October 1845.

Southwark  
and Vauxhall  
Water  
Company.

27,200	houses under	£5
41	„	10
17	„	15
2	„	20
1	„	35

*From October 1845 to March 1850.*

7,982	houses under	£5
143	„	10
2	„	15

[Observations and Statements in answer to the Inquiries made by the Metropolitan Sanitary Commissioners on 31st December, 1849.]

*Southwark and Vauxhall Water Company,  
Sumner-street, February 2, 1850.*

SIR,

1. THE accompanying replies to the queries of the Commissioners of Metropolitan Sanitary Inquiry, afford very full information as to the state and condition of the Southwark and Vauxhall Company, and the mode in which its functions are discharged; the Directors, nevertheless, availing themselves of the invitation of the Commissioners, beg leave to subjoin some few general observations with reference to the plans and intentions of the Company.

2. The only Parliamentary obligation as to the quality of the water supplied, to which the Company is subjected, is that it shall be filtered; how amply this obligation has been fulfilled, the replies to the queries of the Commissioners satisfactorily demonstrate.

3. The arrangements for taking water only during the ebb tide, and after a sufficient time has elapsed to admit of the reflux of all water which can have been affected by London drainage, are not imposed on the Company by any legal provision, but were adopted at no inconsiderable addition to the cost of the Battersea works, from a conviction of their great value as a means of improving the character of the supply. Difficulties arising from the delay in carrying out the Battersea Park plan, with the details of which the Directors need not trouble the Commissioners, have hitherto prevented the Company's reaping the full benefit of this portion of their arrangements; but these difficulties have been surmounted by an extension of the culvert, and the supply is now wholly taken during the last two-thirds of the ebb.

4. As to the exact period during which it would be necessary to abstain from pumping, with the view above stated, the Directors do not feel that they are yet in a position positively to decide. Until very recently, they were under the impression that the only experiment on the tides made since the removal of Old London Bridge, was that of which they annex a statement (No. 1). Having become aware that an experiment had been made 16 years since by direction of a Committee of the House of Commons (in June 1834)\*, showing that the flood-tide

\* The results of this experiment will be found detailed in the Appendix to the Report of a Committee of the House of Commons of the Session 1834 (No. 571). The



Southwark  
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Water  
Company.

during springs does at times ascend beyond the point reached in the experiment stated in the Appendix, No. 1, they directed another experiment to be made under circumstances which seemed the most favourable to its utmost possible ascent. This latter experiment was made on the 15th January last, three days after the new moon, in the greatest strength therefore of the springs; after a severe frost of several weeks which, by suspending all land drainage, reduced to its minimum the natural stream of the Thames, and after a long continuance of strong easterly winds, of which the effect is to impel into its estuary the greatest amount of water from the North Sea. From the subjoined statement of this experiment (No. 2), it will be seen that a float put in at the same place as in the experiment of 1834, stopped five furlongs below Kew Bridge, or upwards of a mile short of the point reached on that occasion.

5. From the two experiments of which statements are subjoined, and yet more from the experiment of 1834, supposing it to have been carefully made, it follows that there are occasionally great differences in the distance above London to which the flood ascends. These differences are no doubt to be traced to combinations of circumstances, the influence of which can only be perfectly appreciated by experiments made in different states of the river, and at different seasons of the year. Such experiments it is the intention of the Directors to make; but in the mean time, and as bearing more immediately on the matter in hand, the two following considerations should be borne in mind:—1st. That the distance reached by the flood affords no correct measure of the time occupied by the reflux of the water carried up, the ebb being more rapid in proportion to the elevation above its mean height attained by the flood. Thus, for instance, although the spring-tide reached two miles higher up the river after than before the removal of old London Bridge, the ebb had passed Battersea in a somewhat shorter time. 2nd. There can be no doubt, looking at the vast volume of the natural stream of the Thames, taken even at its lowest conceivable amount, that there must be ample opportunity during the two tides which occur in the 24 hours, to take any required amount of water at Battersea free from the possibility of intermixture with London drainage. The exact periods of the tide to which it would be necessary with this view to attend, would be shown by the experiments which the Directors propose to institute.

6. The near approach of the period when the drainage of London will be wholly diverted from the Thames, renders no doubt of less importance the precautions which have been adopted by the Southwark and Vauxhall Company; but they will at least be of great value until that period shall have arrived, and under any circumstances perhaps it would be desirable that water should be taken only during the ebb.

7. On the quality of the water supplied by the Company, the Directors would only have thought it necessary to refer, first, to the very complete system of deposit and filtration by which it is rendered

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explanation of the unusual height reached by the flood-tide in this experiment is probably to be found in the fact, that the rain which fell during the first six months of 1834 was less than in any one of the 30 years from 1820 to 1849, being only 6.60 inches, or little more than two-thirds of the mean of the 30 years, which is 9.38 inches.



perfectly bright at all times of the year ; and, secondly, to the various analyses already made with reference to its saline ingredients, had it not been for the sensitiveness on every question connected with the sanitary condition of the community, which the late epidemic has very naturally produced in the public mind. Under the circumstances they have thought it right to concur with the Grand Junction Company in having a fresh and elaborate analysis made by three of the most eminent chemists in London, whose report they hope to be able to forward in a few days to the Commissioners. In the mean time they annex the statements of analysis of Thames water (Nos. 3 and 4), the one made by Dr. Pearson and Mr. Gardiner, the chemists employed by the Commissioners of Inquiry into the State of the Supply of Water to the Metropolis, in 1828 ; the other by Mr. Brande, in the course of last year.

Southwark  
and Vauxhall  
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Company.

8. The last point to which the Directors think it necessary to call the attention of the Commissioners, is the substitution of what has been called the "continuous" in lieu of the present mode of supply. The application of this system in the Company's district would, in the opinion of the Directors, require much care. Without such care there might be reason to fear that the lead service-pipes of the tenants throughout a very great portion of the district, would be burst by the head of water. It might possibly, for this reason, be advisable to try, in the first instance at least, some such modification of the system as is explained in the accompanying report of the Company's engineer, Mr. Quick (No. 5) ; but so strongly has the experience of the last few years impressed the Directors with the importance of putting a stop to the enormous waste occasioned by the present mode of supply, that they will willingly, on being armed with the necessary powers, adopt the continuous system throughout the district, if such should be the course recommended on full consideration by the Commissioners.

9. The Directors, in conclusion, have only to state their full conviction that the real interests of the public and the Companies coincide, and to express their perfect readiness to carry out whatever improvements the Commissioners may suggest, and the Legislature may sanction. In stating this conviction, however, and in intimating this disposition, they may be permitted to remind the Commissioners that the Southwark and Vauxhall Company does already supply to a large, and in great part a poor district, at rates low even as compared with many provincial towns, water unexceptionably good ; perfectly bright at all seasons of the year, and at least inferior to none that can be procured for the metropolis as respects its saline ingredients. They cannot but think, in consequence, that very great consideration should be bestowed on the question, whether sufficient grounds exist for resorting, at a cost which cannot be otherwise than enormous, to new sources of supply. They see no reason to believe that water, from whatever source procured, would prove more acceptable to the Company's tenants than that now furnished, of which it should be distinctly understood the Company receives no complaints.

I am, Sir,

Your obedient servant,

JAMES ROSSETER, *Secretary.*

*Alexander Bain, Esq., Assistant-Secretary,  
Metropolitan Sanitary Commission.*



Southwark  
and Vauxhall  
Water  
Company.

## No. 1.

Wednesday, December 12th, 1849.

Flood at Vauxhall Bridge at a quarter past 8 A. M. The float was a sphere of alder 9 inches in diameter, attached by a cord 2 feet long to a ball of the same size, properly weighted. The tide rose 2 feet before there was any current.

	Hrs.	Min.
Started from Vauxhall Bridge at . . . . .	8	30
Arrived at Southwark Water Works Suction . . . . .	9	15
„ Chelsea Water Works . . . . .	9	21
„ Red House, Battersea-fields . . . . .	9	27
„ Old site of Grand Junction Water Works . . . . .	9	35
„ Battersea Bridge . . . . .	10	5
„ 2-mile post . . . . .	11	19
„ Putney Bridge . . . . .	11	33
„ 3-mile post . . . . .	11	56
„ Suspension Bridge, Hammersmith . . . . .	12	40
„ West Middlesex Water Works . . . . .	12	58
„ 5-mile post . . . . .	1	14
„ Chiswick Old Church . . . . .	1	24
„ High water $5\frac{1}{4}$ miles from Battersea Bridge, at 6 furlongs above Hammersmith Bridge . . . . .	1	35
Here the tide was stationary 20 minutes. Tide commenced to ebb and the float to descend from the $5\frac{1}{4}$ mile post above Battersea Bridge at . . . . .		
Arrived at Chiswick Old Church . . . . .	2	0
„ 5-mile post . . . . .	2	8
„ West Middlesex Water Works . . . . .	2	20
„ Suspension Bridge, Hammersmith . . . . .	2	35
„ 3-mile post . . . . .	3	11
„ Putney Bridge . . . . .	3	29
„ 2-mile post . . . . .	3	40
„ Battersea Bridge . . . . .	4	35
„ Old site of Grand Junction Water Works . . . . .	4	57
„ Red House, Battersea-fields . . . . .	5	4
„ Southwark Water Works . . . . .	5	11

## No. 2.

January 15th, 1850.

	Hrs.	Min.
Started from King's Scholars' Pond Sewer at low water. The float was a sphere of alder, 6 inches in diameter, attached by a cord 2 feet long to a ball of the same size, properly weighted . . . . .	11	10
Arrived at Southwark Waterworks Suction . . . . .	11	46
„ Chelsea Water Works . . . . .	11	52
„ Red House, Battersea-fields . . . . .	11	58
„ Old site of Grand Junction Water Works . . . . .	12	7
„ Battersea Bridge . . . . .	12	34
„ 2-mile post . . . . .	1	37
„ Putney Bridge . . . . .	1	50
„ 3-mile post . . . . .	2	8
„ Suspension Bridge, Hammersmith . . . . .	2	44
„ West Middlesex Water Works . . . . .	2	55
„ 5-mile post . . . . .	3	4
„ Chiswick Old Church . . . . .	3	8
„ High water $7\frac{1}{2}$ miles from Battersea Bridge . . . . .	4	47



No. 3.

Copy of Analysis of Thames Water, made by Dr. Pearson and Mr. Gardner,  
1828.

Southwark  
and Vauxhall  
Water  
Company.

	Specific Gravity.	Muriate of Magnesia.	Muriate of Soda.	Sulphate of Lime.	Carbonate of Lime.	Silica and Vegetable or Carbonaceous Matter.	Amount of all the Ingredients in each Water.
		Grains	Grains	Grains	Grains	Grains	Grains
Distilled water, being assumed as . . . . .	1000						
Teddington water, from 1 gallon . . . . .	1000.18	0.14	1.0	1.31	8.55	0.10	11.10
"Dolphin," water at high water . . . . .	1000.40	0.28	1.40	1.44	11.80	0.30	15.22
From the Surrey side, opposite the "Dolphin," at high water. . . . .	1000.40	0.28	1.30	1.44	10.60	0.20	13.72
Water from the second starting of the centre arch of Battersea Bridge . . . . .	1000.40	0.20	1.24	1.30	10.70	0.20	13.64
From second starting of ditto, low water . . . . .	1000.40	0.14	1.09	1.30	9.10	0.15	11.78
From Surrey side, opposite the "Dolphin," 150 feet from the bank . . . . .	1000.18	0.14	1.09	1.22	9.60	0.15	12.20
From the "Dolphin," 5 minutes before 1 o'clock, half-an-hour after flood . . . . .	1000.40	0.28	1.20	1.30	9.90	0.20	12.88
Ditto, 20 minutes after 3 p.m., tide half up . . . . .	1000.30	0.28	1.26	1.44	10.20	0.20	13.38
From second starting of Battersea Bridge, centre arch, at $\frac{1}{2}$ before 4, p.m. . . . .	1000.30	0.28	1.20	1.44	10.30	0.20	13.42
From Surrey side, opposite "Dolphin," about 120 feet from the bank, 25 minutes after 3 o'clock . . . . .	1000.40	0.20	1.18	1.30	10.0	0.30	13.93

It appears then, according to the preceding analysis, now submitted to consideration, that the Thames water between Teddington Lock and the "Dolphin" at Chelsea, on examination from ten different places, contains on the average about thirteen grains of impregnating matter in each wine gallon, or three grains and a quarter in each quart, the largest quantity being fifteen and a half grains, and the smallest being nearly eleven grains in each wine gallon, the largest quantity of carbonate of lime (chalk or limestone) being eleven grains and nearly a half, and the smallest quantity being eight grains and a half, or nearly so in each wine gallon; *i. e.* on the average about one grain and a quarter in each pint. The largest quantity of muriate of soda (common salt) being less than one grain and a half in a gallon, and the smallest being one grain in a gallon, *i. e.* one-eighth of a grain in each pint; the largest quantity of muriate of magnesia being one grain and  $\frac{28}{100}$  of a grain in a gallon of water of sulphate of lime, being less than one grain and a half in a gallon. Siliceous earth and vegetable carbonaceous matter being  $\frac{38}{100}$  of a grain in the largest quantity. It will be easily imaginable from these results, that the impregnating ingredients of the Thames water are as perfectly harmless as any spring water of the purest kind used in common life; indeed there is probably not a spring, with the exception of Malvern and one or two more, which are so pure as the Thames water. The well-known fact, that the Thames water becomes frequently offensive after being confined in casks, is owing to the dissolution of the wood of the vessel, or at least it is chiefly, if not entirely owing to this circumstance, and perhaps occasionally from adventitious suspended matter. The same offensive smell is liable to occur from any other water under similar circumstances.

128  
160  
4 1/2  
more



Southwark  
and Vauxhall  
Water  
Company.

No. 4.

*Copy of Analysis of Water, by Mr. Brande. March 9, 1849.*

No.	Marks.	Clark's Test.	Solid Contents in 1 Gallon.	
			Grains.	
1	A 1	15½	20	New River.
2	B 2	16	21	Ditto.
3	C 3	16½	21	Ditto.
4	No. 45	16	21.5	Southwark and Vauxhall.
5	No. 46	15½	20.1	Ditto.
6	No. 33	17	22.5	Thames at Medenham.
7	No. 33	..	..	Ditto.
8	No. 33	..	..	Ditto.
9	No. 51 X	16½	22	Chelsea.
10	No. 52 X	16	21.2	Ditto.
11	No. 53 X	15¼	23	Ditto.
12	No. 54 X	15¾	21	Ditto.
13	No. 55 X	15¾	21.1	Ditto.
14	XX A	17	22.3	East London.
15	XX B*	17¼	23	Ditto.
16	I	15½	20.5	Grand Junction.
17	O	15¼	20.1	Ditto.
18	U	15¼	21	Ditto.
19	R B	14½	19.5	West Middlesex.
20	60 X	8¾	11.5	} Grand Junction Canal, Kensal Green.
21	61 X	8¾	11.8	
22	62 X	17	23	} Ditto at West Drayton.
23	63 X	16¾	22	

(Signed) WILLIAM THOMAS BRANDE.

NOTE.—The explanation of the peculiar characters of X 60 and X 61, is to be found in the fact that they were taken from the Grand Junction Canal after it has received the water from the Runslip Reservoir, which collects drainage (rain water). The specimens X 62 and X 63 are from the canal above the junction of the Runslip Feeder, and where it is filled with Colne water.

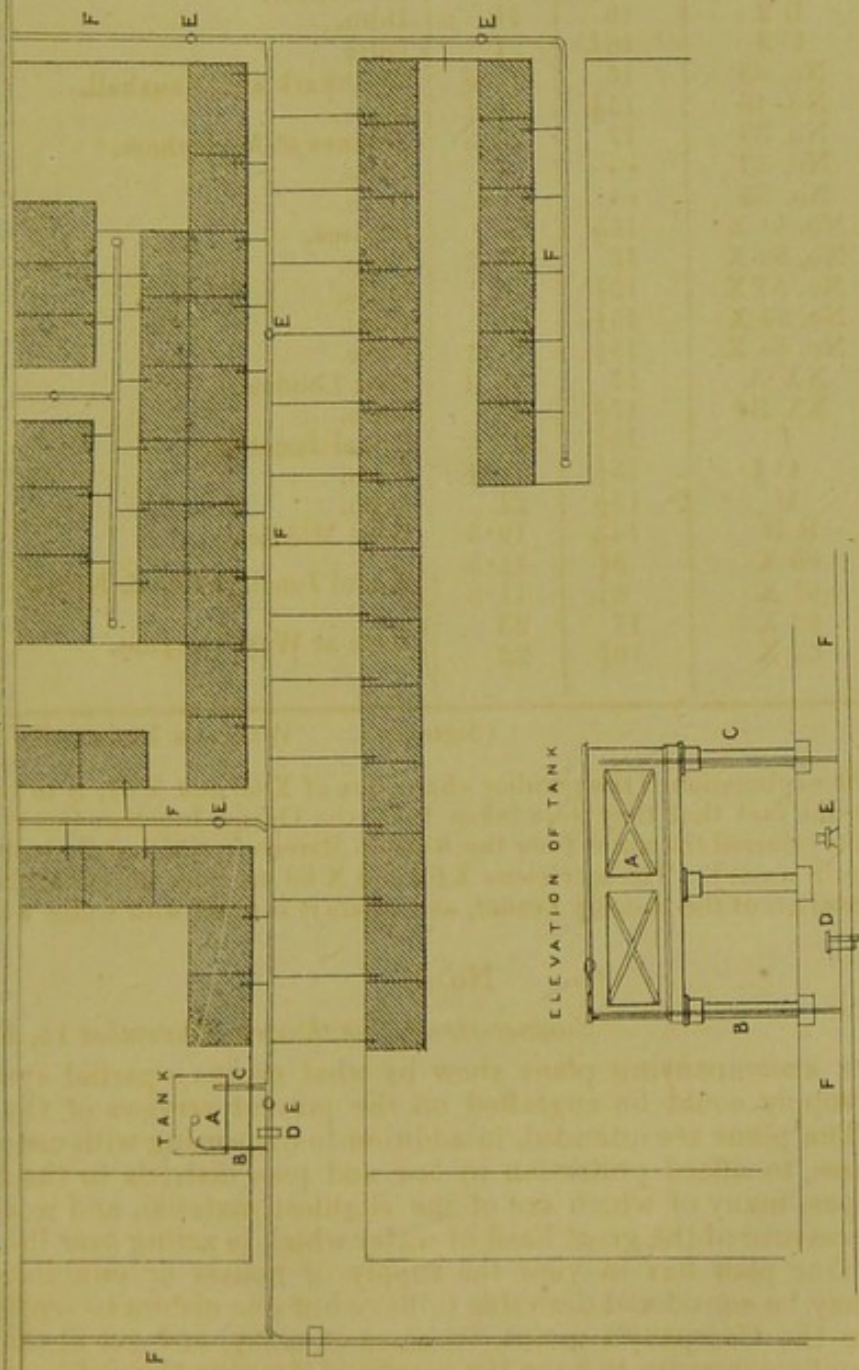
No. 5,

*Sumner-street, Southwark, December 15, 1849.*

THE accompanying plans show by what means a partial system of constant supply could be engrafted on the present services of the Companies. The plans are intended, in addition to dispensing with cisterns in small houses, to afford protection in low and poor districts to the house-service pipes, many of which are of the slightest material, and would not bear the pressure of the great head of water which is acting over the whole district. One plan has in view the supply of houses or establishments where it may be considered desirable to have but one cistern to receive the water from the Company's mains, in place of many, and yet at the same time it may be necessary to have the means of drawing the water on every floor at the same time.

By plan No. 1, a number of houses can be supplied from one small cistern marked A, placed at the top of the house nearest the Water Company's leading main, the cistern acting as a sort of stand-pipe or safety-valve to the whole of the house-pipeage under its influence, and by placing a stop-cock S C on the Water Company's main, M, and conveying a supply-pipe B to the cistern A, and a service-pipe C from thence to the same main at the back of the stop-cock, it will keep the house-pipes always charged, and











enable persons to draw the water at all times from every floor of the houses.

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Plan No. 2, shows a large establishment with one cistern A, at the highest elevation to be fed constantly from the Water Company's main F through the lead service pipes D D D, leading to every situation where cisterns E E E have been in use. This arrangement is made to obviate the necessity of taking a service pipe from the Water Company's main to every cistern, which would be necessary if all the cisterns were supplied from one rising service (unless of very large dimensions), and the water required at the same time at different levels.

Plan No. 3, shows a number of small houses supplied from one tank A, on the intermittent principle, by means of a supply pipe leading from the Water Company's main F, having a stop cock D, and a house-service pipe C leading from the tank into the pipe F, the tank being made of sufficient capacity to afford a given number of gallons to each tenement per day, and the Company's present iron pipes being used as feeders to the house services.

I should add, that in all the plans it is assumed that the cisterns should be without waste-pipes.

(Signed) JOSEPH QUICK.

*Southwark and Vauxhall Water Company,  
Sumner-street, January 25, 1850.*

SIR,

THE Directors of this Company having had under their consideration some recent Reports of the Registrar-General, I am instructed to request the favour of your laying before the Commissioners of Metropolitan Sanitary Inquiry the following observations on those reports:—

In his Reports of the 5th and 12th of January, the Registrar-General states the different rates of mortality from cholera in the different water districts of London, and distinctly raises the inference that this difference is mainly owing to a difference in the quality of the water supplied. The mean rate of mortality is stated to be 10 in 10,000 in the Grand Junction district, and in the Southwark and Vauxhall district, 156 in 10,000.

The Directors are satisfied that this inference is without even the shadow of foundation; they believe that its effect must be dangerously to mislead the public mind, and they cannot but feel that it is most injurious to the interests of the Company over which they preside, and which has made great, and as the Directors believe, successful efforts to obtain for its tenants a perfectly unexceptionable supply.

To render such an inference consistent with probability, it should have been shown that while the districts compared resembled each other in all other particulars affecting the sanitary condition of their inhabitants, the water supplied had at least some appreciable difference of quality.

The precise reverse is the fact,—taking the district of the Grand Junction Water Company where the mortality was lightest, and the district of the Southwark and Vauxhall Water Company, in some portions of which it was the heaviest, it will be found on the one hand that the water supplied by the Companies respectively is exactly similar in quality; on the other, that the difference in all other circumstances, whether physical or social, affecting the two districts, is so great as



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sufficiently, and more than sufficiently, to account for the difference in the sanitary condition of their inhabitants.

The water of both Companies is filtered and delivered in a state perfectly bright to the consumers; there is no difference perceptible to either sight, taste, or smell between them, while as regards saline ingredients, the extract at foot of an analysis made by Mr. Brande will show that in that important respect they are absolutely identical in quality.\*

But what are the differences between the two districts in all other essential particulars? The Grand Junction district is situated at the extreme west of London, partaking therefore but little, especially during the summer months (the prevalent winds being south-west), of the atmosphere of London. It is bounded by the parks, having the Green Park and St. James's Park on the south, Hyde Park on the west, and the Regent's Park, at a little distance, on the north. It is not in the vicinity of the Thames, the nearest point being an extreme corner at the bottom of the Haymarket. It is all above the level of the river, most of it on high ground, rising from the north side of Pall-Mall to the highest inhabited parts of London. It is perfectly drained, the houses are large, well built, and well ventilated, the streets are wide, and there are in the district (comparatively a small one in extent) no less than 15 squares; there is but little poverty, and the inhabitants who are not well fed and clothed, therefore, but very few in number.

Of the Southwark and Vauxhall Company's district, on the contrary, a large portion, that which suffered most from the cholera, is at the east of the metropolis, all but three of the parishes served by the Company, are on the banks of the Thames, and most of them at the worst part of the river, after it has received the London drainage; they are below high-water mark, they are either imperfectly drained, or have no drainage, and they are in many places intersected by stagnant and putrid ditches. There are large regions where the most squalid poverty prevails, where the inhabitants are ill fed and clothed, where their houses are wretched hovels, undrained, ill ventilated, and the inmates exist in the midst of noisome smells and abominations which language wants decent terms to describe; Jacob's-island, Lock's-fields, or Walworth-common amply justify this description.

But a still stronger illustration of the real value of this generalization remains to be noticed. In the Grand Junction district all the inhabitants are abundantly supplied with water. Out of 14,000 tenants of that Company, 131 are supplied from spring-water wells—there are none supplied from common taps—142 from tanks, common to several houses, and only 95 have no known supply. In the Southwark and

\* Extract from Analysis of Samples of Water, by William Thomas Brande, 8th March, 1849.

Solid contents in  
1 Gallon.

21.5

20.1

20.5

20.1

21

} Southwark and Vauxhall.

} Grand Junction.



Vauxhall district, out of 48,000 tenants,\* there are 4,383 houses supplied from common taps (scarcely better than being absolutely without water), 5,231 supplied by spring and *tide* wells, and 1,312 without any supply at all. Does the mortality among the inhabitants of these 11,000 houses enter into the calculation of the mortality which the Registrar-General infers is produced by the use of the Southwark and Vauxhall Company's water? If the water supplied by the Company were among the main causes, or even in an inferior degree, among the exciting causes of cholera, the mortality should be greatest where that water was used in the greatest abundance. The Directors believe the exact reverse of this to be the fact; they are satisfied it will be found, on investigation, that the cholera was least destructive precisely in those portions of the district where the dwellings are most amply supplied, that it was more prevalent where the supply is imperfect, and that the mortality was greatest precisely among the inhabitants of those regions where the water, assumed to be a main cause of that mortality, is not supplied at all.

To the foregoing considerations may be added, that the water supplied by the Company is used at Guy's and St. Thomas's hospitals; and it is absolutely impossible to suppose that in these wealthy and admirably conducted establishments, the authorities having the power of sinking wells to the deep springs, would have permitted the inmates to use the water if there had been even the very shadow of a suspicion that it could have any tendency to produce disease.

There are some inaccuracies as to facts, not wholly unimportant,—such, for instance, as comprehending Wandsworth in the Southwark and Vauxhall district, no portion of the parish being supplied by the Company; but the Directors feel it to be unnecessary to trespass further on the attention of the Commissioners on the subject.

I have the honour to be, Sir,

Your most obedient Servant,

JAMES ROSSETER,

*Secretary.*

*To Alexander Bain, Esq.*

*Southwark and Vauxhall Water Company,  
Sumner-street, April 3, 1850.*

SIR,

I AM instructed by the Court of Directors of this Company to transmit the accompanying copy of a report of the analysis to which they allude in the letter which accompanies the replies to the queries of the Commissioners of the Metropolitan Sanitary Inquiry.

Samples of water as sent to the eminent chemists by whom the analysis was performed, were only distinguished by letters. Those letters designate respectively—

M. A. Water taken from the Thames at Midmenham Abbey Ferry at midstream, and immediately opposite the point whence the projectors of the Henley Water Works scheme propose to take their supply.

K. W. Water taken from the pump-well of the Grand Junction Water Works Company at Kew Bridge.

\* The above figures apply to some extent to the Lambeth Company, the districts being in part intermixed.



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B. W. Water taken from the 'pump-well' of the Southwark and Vauxhall Water Company at Battersea.

I have also the honour to transmit a report of one further experiment on the action of the tides.

I am, Sir,

Your obedient servant,

Henry Austin, Esq.,  
Gwydyr House.

JAMES ROSSETER,  
Secretary.

March 1, 1850.

SPRING TIDE.

	H.	M.
Flood at Vauxhall Bridge, P.M. . . . .	12	30
Started from Vauxhall Bridge . . . . .	12	49
Arrived at Southwark Water Works suction . . . . .	1	32
„ Chelsea Water Works . . . . .	1	37
„ Old site of Grand Junction Water Works . . . . .	1	45
„ Battersea Bridge . . . . .	2	15
„ Putney Bridge . . . . .	3	27
„ Hammersmith Bridge . . . . .	4	7
„ Chiswick Church . . . . .	4	30
„ Railway Bridge, Barnes . . . . .	4	55
„ 7 mile post . . . . .	5	32
Stopped at $7\frac{1}{4}$ miles above Battersea Bridge . . . . .	5	50
Started back at . . . . .	5	52
Arrived at Hammersmith Bridge . . . . .	7	25
„ Putney Bridge . . . . .	8	12
„ Battersea Bridge . . . . .	9	16
„ Southwark Water Works . . . . .	9	45
Time running up from Southwark Water Works . . . . .	4	18
Time running down to Southwark Water Works . . . . .	3	53

REPORT OF ANALYSIS of three SPECIMENS of WATER, marked M. A.,  
K. W., B. W.

THE quantity of each water, received for analysis on Friday the 15th of February, amounted to 364 fluid ounces. Each water was contained in four glass bottles marked as above, tied over with leather and sealed.

The waters were without *taste*, except M. A., which had a slight earthy *taste*, and a faint yellowish colour. They were without odour, and, with the exception of M. A., were free from colour. They all contained a small quantity of mechanically diffused impurity which rendered them turbid when shaken. This was most apparent in B. W. When the water was allowed to stand for hours, or when passed through a paper-filter, each became quite clear.

*Mechanical impurity.*

By the careful filtration of about *one hundred* ounces of each water, it was ascertained that B. W. contained the largest quantity of me-



chanically diffused impurity, then M. A., while K. W. contained the smallest quantity. This amounted to only one-fourth of that which was contained in B. W. The mechanical impurity, obtained by the filtration of the last-mentioned water, was in sufficient quantity to enable us to apply a test in order to determine its chemical nature. It consisted partly of mineral and partly of organic matter containing nitrogen. We are inclined to believe, that this was nothing more than *vegetable* mixed with *earthy* matter.

It contained no sulphur. The residues on the filters from the two other waters were in too small a quantity to allow any test to be applied to them. In appearance they resembled the residue obtained from B. W. Of the mechanical impurity an imperial gallon of B. W. yielded  $\frac{1}{10}$ ths of a grain; of M. A.  $\frac{1}{10}$ ths; and of K. W.  $\frac{3}{10}$ ths, *i. e.*, by weight, B. W.  $\frac{1}{87500}$ th part, M. A.  $\frac{1}{175000}$ th part, and K. W.  $\frac{1}{350000}$ th part.

#### Gaseous Contents.

A solution of acetate of lead was added to each water; this produced only a white precipitate without any brown tint; the precipitate thus formed was almost entirely soluble in nitric acid, we thence inferred that the waters contained no sulphuretted hydrogen nor hydro-sulphuret of ammonia, which are the noxious compounds found in sewer and other *foul waters*.

The addition of lime-water and other tests showed that these waters were nearly equally aerated and impregnated with carbonic acid, and that in this respect they resemble ordinary water used for drinking. There was a certain degree of flatness in M. A.

#### Solid Contents.

By slow evaporation an imperial gallon of each water yielded a whitish brown residue, having much the same appearance in the three, but weighing respectively, in

M. A.	K. W.	B. W.
24.6 grs.	20.84 grs.	22.22 grs.

and making a fractional proportion in solid contents in

M. A.	K. W.	B. W.
$\frac{1}{2845}$ ths.	$\frac{1}{3358}$ ths.	$\frac{1}{3150}$ ths.

A portion of each residue, when heated, became blackened, and yielded ammonia in small quantity, thus showing the presence of nitrogen; but B. W. only, gave a slight trace of sulphur. Hence, the residues of the three waters contained organic matter, probably of a vegetable nature. The presence of a small quantity of decayed or decomposed leaves would account for the result obtained by us from our experiments.

#### Chemical Constitution.

By the application of the usual chemical tests and processes for the qualitative and quantitative examination of water, each was found to be constituted as described in the subjoined tables. It is proper to observe that, in this analysis the principal salts contained in the waters were separated as such, and their proportions checked by counter experiments on other portions of the waters.



Southwark  
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## M. A.

The imperial gallon of 70,000 grains contains:—

	Grains.
Carbonate of lime with traces of carbonate of magnesia and phosphate of lime . . . . .	11·38
Sulphate of lime . . . . .	5·09
Chloride of sodium, with traces of chlorides of magnesium and calcium, as also of nitrate of lime . . . . .	1·48
Organic matter (nitrogenous) containing no sulphur, probably of vegetable origin . . . . .	3·73
Mechanical impurity (sedimentary matter not dissolved in the water) . . . . .	0·42
Silica with traces of <i>oxide of iron</i> and residuary carbon . . . . .	2·50
Total weight of dry residue from evaporation	<u>24·60</u>

## K. W.

The imperial gallon of 70,000 grains contains:—

	Grains.
Carbonate of lime, as in M. A. . . . .	13·11
Sulphate of lime . . . . .	2·80
Sulphate of soda . . . . .	0·97
Chloride of sodium, &c., as in M. A. . . . .	1·23
Organic matter, as in M. A. . . . .	2·13
Mechanical impurity . . . . .	0·20
Silica and oxide of iron . . . . .	0·40
Total weight of dry residue from evaporation	<u>20·84</u>

## B. W.

The imperial gallon of 70,000 grains contains:—

	Grains.
Carbonate of lime, as in M. A. . . . .	11·94
Sulphate of lime . . . . .	3·37
Sulphate of soda . . . . .	1·32
Chloride of sodium, as in M. A. . . . .	1·54
Organic matter containing nitrogen, with traces of sulphur . . . . .	2·74
Mechanical impurity . . . . .	0·82
Silica and oxide of iron . . . . .	0·49
Total weight of dry residue from evaporation	<u>22·22</u>

The three waters contained no salts of potash or ammonia, nor any traces of soluble alkaline phosphates.

## Soap test.

The application of the soap test, according to the form in which it is usually and safely employed by chemists gave the following results:—



	Relative hardness of water.	Grains of residue in imperial gallon.
M. A. . .	19·6	24·6
K. W. . .	18·6	20·84
B. W. . .	17·	22·22

These results nearly correspond to the relative proportion of hardening salts in the three waters:—

	Relative hardness of water.	Grains of residue in imperial gallon.
M. A. . .	19·6	16·47
K. W. . .	18·6	15·91
B. W. . .	17·	15·31

The figures under the columns of relative hardness denote the hardness of each water compared with an equal measure of fresh distilled water. Thus, it will require 17 parts of soap in a given quantity of B. W. to produce in it the softening and detergent qualities produced by one part of soap in an equal measure of fresh distilled water. The figures, therefore, represent degrees of hardness according to a fixed and uniform standard.

#### Remarks.

The three waters may be considered to be very similar in their properties. K. W. and B. W. are preferable to M. A., partly because the latter has a slight taste and colour, and partly, because it contains a larger proportion of saline and organic matter, and is harder than the other two. This increased hardness is probably due to the greater proportion of sulphate of lime which M. A. contains. The differences between K. W. and B. W. are slight; if any selection is to be made B. W. is preferable. It is a softer water than K. W., and will, therefore, consume less soap. On the other hand K. W., by reason of its containing a larger proportion of carbonate of lime would have a tendency to deposit a larger quantity of fur in steam-boilers. Our conclusion, therefore, is that these waters, but especially the two last-mentioned, K. W. and B. W., may be regarded as good, wholesome, and "proper," free from any noxious impregnation of animal matter, and well adapted to dietetic, domestic, and manufacturing uses. They are not so aerated as good spring water; but in this respect they resemble good river water. Like all potable waters found on the earth, they contain mineral and vegetable matter, but not in undue proportion, nor in a state to be in any respect injurious to health. The presence of this mineral matter in water is, in one respect exceedingly beneficial, since it tends to prevent that poisonous action on lead which would render them unfit for the use of man and animals after having been distributed through pipes of this metal.

Although, therefore, like all other *spring* and *river* waters, these waters contain foreign matters, they are, in the full sense of the terms, wholesome and proper for the supply of a town. They may be placed in the following order as to their good qualities, B. W., K. W., and M. A.

(Signed)

W. THOMAS BRANDE,  
JOHN THOMAS COOPER,  
ALFRED SWAINE TAYLOR, M.D.

March 27, 1850.



West  
Middlesex  
Water  
Company.  
—

# RETURN from the WEST MIDDLESEX WATER COMPANY.

1. What is the name of the Company?—The West Middlesex Water-works Company.

2. Will you recite your Act or Acts of Parliament?—1806; 46 Geo. III., c. 119; 50 Geo. III., c. 132; 53 Geo. III., c. 36.

3. What are the sources of supply?—Thames, through two subsiding reservoirs in the parish of Barnes, near to Barnes-terrace.

4. What is the number of shares?—8,300 shares.

5. What is the amount paid up on each share?

6. What is the total amount of subscription paid up?

7. What has been the total expenditure on the works?

*Ans.* 5, 6, and 7. Amount of capital stock of the Company (see Report of the Committee of the House of Commons, 1834, page 190, Answer to Question 8) . . . £568,045 10 0

Paid up since . . . . . 12 0 0

£568,057 10 0

Amount expended in new works since 1834 . . . 80,502 16 1

£648,560 6 1

8. Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing works?

9. Set forth also the position of the sources of supply; the engine houses and the reservoirs, for storage or filtration?

10. Describe the capacity and construction of the reservoirs?

11. Give the internal and external diameter in inches, and length in yards, of—

1. The largest trunk main, and of the second, third, and other sizes of trunk mains.

2. Branch mains, distinguishing length and diameter of the various sizes.

3. Side services, distinguishing length and diameter as above.

4. Services for small streets, distinguishing as above.

*Ans.* 8 and 11. The map sent herewith is a copy of that which was sent to the Committee of the House of Commons in the year 1834, as then showing the district of the Company, being that coloured yellow. The only difference in the Company's district between that time and the present is that the Grand Junction Company now supply that small portion which is inclosed within a red line. It also shows the leading mains of the Company's district. There are junctions between the mains of the Company and those of the Grand Junction Company and the New River, so as to be capable of rendering assistance in cases of emergency. No competing works in the Company's district. The West Middlesex Company is limited to certain parishes (see their Acts). The mains of the Company are of the following diameter in the bore:—30, 23, 21, 19, 18, 15, 12, 10, 9, 8, and 7 inches. The service-pipes are from 6 to 3 inches diameter in the bore. There are about 150½ miles of pipes.

*Ans.* 9 and 10. The Company have four reservoirs; two at Barnes, one at Kensington, and one at Barrow-hill. The two reservoirs at Barnes contain together above 16 acres area, the one at Kensington is 111 feet high above Trinity standard; it will hold about 16,000 tuns,



and is lined with brick. The one at Barrow-hill is 177 feet 6 inches above Trinity standard ; it will hold 22,000 tuns, and is lined with brick. A tun = 4 hogsheads ; a hogshead = 54 gallons. The engine-house and works are at Hammersmith.

12. Is the whole of the water which is supplied filtered?—The water passes through a duct from the Thames to the western reservoir at Barnes, where the water rests for subsidence ; thence through a duct to the eastern reservoir for the same purpose ; thence under the bed of the river in a 36-inch pipe to the wells of the engines. These reservoirs are partially supplied with water through gravelly beds. The reservoirs were constructed in the year 1838, at great cost. They were formed for the purpose of rendering the water bright and pure at all seasons, by means of depuration by subsidence ; and from the nature of the soil (fine gravel) they have proved eminently successful. As to the quality of the water, see the Analysis and Report of Dr. Bostock ; Minutes of Evidence taken by Select Committee of the House of Commons, 1834, pages 61 to 64 ; and the Table published by Dr. Bostock, and inserted in same Minutes, page 142.

13. Describe the method of filtration?—(See No. 12.)

14. What is the amount of steam power employed?—Three engines ; one 70-horse power, one ditto ditto, one 105-horse power.

15. How frequently is the supply given, distinguishing different districts in case it varies therein?—In all cases three times a-week, and in such parts of the district where it is required, more frequently.

16. What is the total number of tenements supplied, distinguishing dwelling-houses—

1st class.

2nd class.

3rd class.

4th class.

Also distinguishing those which have pipes on the main, with constant supply, as many hatters have, and large consumers, distinguishing as nearly as you are able the classes as set down—

Gallons.	Daily.
500 and under	1,000
1,000     ,,	2,000
2,000     ,,	3,000
3,000     ,,	4,000
4,000     ,,	5,000
5,000 and upwards?	—

The number of houses supplied by the Company is 24,480, at the following rates :—

s.	s.	
From 7 to 30,	ordinary service	7,461
30 to 40	,,	6,521
40 to 60	,,	5,329
60 to 80	,,	2,562
80 to 100	,,	1,590
Above 100	,,	1,017

---

24,480



West  
Middlesex  
Water  
Company.

The instances in which parties have pipes on the main are very rare. There are very few large consumers in the district, which is almost exclusively one of houses. (See Answers to Nos. 23 and 24.)

17. What number of dwelling-houses supplied have not the water laid on, but take their supply from stand-cocks?—

18. How many courts and houses are there in your district that cannot be supplied for want of drains to carry off the water if it were laid on?—The directors are not aware that there are any courts or houses which cannot be supplied from want of drains or otherwise.

19. What is the total number of stand-cocks? Greatest number of houses and persons to one stand-cock; least; average?—

*Ans.* 17 and 19. There are not any stand-cocks in the district. In a few instances more than one house is supplied from one service-pipe.

20. How many hours per day are they running, and what is the run from each per hour?—(See Answers to Nos. 17 and 19.)

21. What is the total number of fire-plugs?—About 3,000 fire-plugs.

22. Can you state the total number of dwelling-houses with water-closets supplied, and those with baths supplied?—The number who take high services are about 7,500, and who are supposed to have water-closets. About 100 are supposed to have baths.

23. What has been the total number of gallons delivered, distinguishing that pumped during the last year?—

24. What has been the total quantity delivered, distinguishing that pumped during the year preceding?—

	Gallons.
<i>Ans.</i> 23 and 24. Pumped in the year 1849	1,216,929,812
Delivered to dwelling-houses	1,108,929,312
Pumped in the year 1848	1,137,673,496
Delivered to dwelling-houses	1,029,473,496

Total quantity supplied to large consumers, watering roads, and flushing of sewers, is estimated at about 500,000 tons, equal to 108,000,000 gallons, as thus:—

Large consumers	93,162 tons.
Watering streets	121,256 do.
Flushing sewers	285,185 do.

Say about . . . 500,000 tons.

25. What was the quantity delivered, distinguishing that pumped per month during the last year?—(See p. 43.)

26. What has been the average quantity delivered to each dwelling-house per diem during the last year?—About 144 gallons. (See 23 and 24.)

27. What has been the average quantity delivered to large consumers per diem during the last year?—

28. What has been the quantity delivered by special agreement at a special rent?—

*Ans.* 27 and 28. (See Nos. 16, 23, and 24.)

29. What has been the quantity supplied for street watering, and at what charge or charges? Quantity supplied for fires? Quantity supplied for flushing?—



## WEST MIDDLESEX WATER-WORKS.

West  
Middlesex  
Water  
Company.

DATE.	PER MONTH.			DAILY.		
	Tuns.	Hhds.	Gallons.	Tuns.	Hhds.	Gallons.
1849						
29 to Jan. 26	425,838	1,703,352	91,981,008	15,208	60,832	3,284,928
27 to Feb. 23	416,210	1,664,840	89,901,360	14,864	59,456	3,210,624
24 to Mar. 30	528,596	2,114,384	114,176,736	15,102	60,408	3,262,032
31 to April 27	393,227	1,572,908	84,937,032	14,043	56,172	3,033,288
28 to May 25	398,537	1,594,148	86,083,992	14,233	56,932	3,074,328
26 to June 29	586,354	2,345,416	126,652,464	16,753	67,012	3,618,648
30 to July 27	499,310	1,997,240	107,850,960	17,832	71,328	3,851,712
28 to Aug. 31	564,184	2,256,736	121,863,744	16,119	64,476	3,481,704
1 to Sept. 28	452,828	1,811,312	97,810,848	16,137	64,548	3,485,592
29 to Oct. 26	418,875	1,675,500	90,477,000	14,960	59,840	3,231,360
27 to Nov. 30	528,902	2,115,608	114,242,832	15,111	60,444	3,263,976
1 to Dec. 28	421,071	1,684,284	90,951,336	15,038	60,152	3,248,208
	5,633,932	22,535,728	1,216,929,312	185,400	741,600	40,046,400

30. State (if known) the average quantity of water used per mile for road-watering per diem, distinguishing paved and macadamized roadways?—

*Ans.* 29 and 30. The quantity supplied is not known. The charge is 75*l.* per mile for watering gravel and granite roads twice in the day for the season. The quantity of water supplied for fires is not known. The mains are always full of water. This supply is given gratuitously. The quantity given for flushing the sewers in the year 1849 was about 285,185 tuns, or 61,599,960 gallons. This supply has also hitherto been given gratuitously.

31. What was the quantity supplied for other special purposes?—  
(See Nos. 16, 23, and 24.)

32. What is the highest service afforded by the Company above high-water mark?—207 feet 6 inches above Trinity high-water standard.

33. What is the lowest service?—About 20 feet. This is at Hammersmith. There are very few services at this level.

34. What height of supply do you consider and charge for as high service?—Any supply above 6 feet 6 inches from the level of the pavement in front of the house.

35. Will you state your scale of charges for water supply?—See No. 16. The charges are in proportion to the size of the house, and the height of the service, and the neighbourhood, and are subject to appeals to the directors, who sit weekly especially to hear these and any complaints.

36. What was the yearly produce of the water-rents for the last year made up?—

37. Will you give the annual amount of expenses, under such heads as they can be furnished?—

	£.	s.	d.
<i>Ans.</i> 36 and 37. Year ending Michaelmas, 1849	65,415	8	6
Ordinary expenses during same period	14,095	5	0
For new works and repairs	5,963	15	8



West  
Middlesex  
Water  
Company.

38. What is the number of turncocks and other servants employed?—Officers, engineers, workers, stokers, turncocks, and labourers, permanently employed, 61; extra men, for laying pipes, &c., on an average, 17 a-week.

39. What was the last dividend per share?—3*l.* per share for the half year.

40. Dividend per cent. on the total cost of works?—(See Nos. 5 and 39.)

41. Dividend per cent., on the paid-up capital?—(See Nos. 5 and 39.)

42. What was the amount of rates received for high service in the total amount of the year's water rental already furnished?—The amount of rates charged for high service in the year's income referred to was about 12,000*l.*

43. What was the total cost of collection of the rates?—The total poundage paid for collecting the year's rental amounted to 1,800*l.*

The mode of rating by this Company is not governed entirely by the number of rooms a house may contain, but by the size and value of the premises, and the situation—that is, the level of the district. Detached houses, or villas with large frontages and gardens, in the higher parts of the district, are charged more in proportion to their number of rooms than houses in streets at a lower level.

I am, however, desired to add the following scale of rates for high service cisterns; at which charges a water-closet, or closets, may be placed on any floor of the house, viz.:—Where the low service is—

25*s.* per annum and under, at  $\frac{1}{4}$  of the low service rate.

26*s.* per annum and under 41*s.*, at  $\frac{1}{2}$  of the low service rate.

41*s.* per annum and upwards, at not exceeding  $\frac{1}{2}$  of the low service rate.

And that no high service rate will be charged more than 3*l.* per annum.

(Signed) M. N. KNIGHT, Secretary.

Lambeth  
Water  
Company.

#### RETURN from the LAMBETH WATER COMPANY.

1. What is the name of the Company?—Lambeth Water Works Company.

2. Will you recite your Act or Acts of Parliament?—25th Geo. III., cap. 89; 4th Will. IV., cap. 7; 11th Victoria, cap. 7.

3. What are the sources of supply?—The Company's authorized sources of supply are the Thames at Lambeth and Thames Ditton; and the supply from the former place will be discontinued.

4. What is the number of shares? What is the amount paid up on each share? and what is the total amount of subscription paid up?—The number of shares is 1,438 shares of 100*l.* each, and 4000 half-shares of 50*l.* each. The whole of the 1,438 shares of 100*l.* each have been paid up in full, and 22,475*l.* has been paid on the half shares. The total amount of subscription paid up is 166,275*l.*

5. What has been the total expenditure on the works?—307,352*l.* 8*s.* 1*d.*

6. Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing works. Set forth also the



position of the sources of supply, the engine-houses, and the reservoirs for storage and filtration?—Tracings marked No. 1 and 2 respectively accompany these answers.

7. Describe the capacity and construction of the reservoirs?—Two reservoirs, 3 acres area: available capacity 12,150,000 gallons, constructed with brick walls and paved bottom. One reservoir,  $1\frac{1}{4}$  acre area: available capacity 3,750,000 gallons, constructed with brick walls and earth bottom.

8. Give the internal and external diameter in inches, and length in yards of

1. The largest trunk main, and of the 2nd, 3rd, and other sizes of trunk mains.
2. Branch mains, distinguishing length and diameter of the various sizes.
3. Side services, distinguishing length and diameter as above.
4. Services for small streets, distinguishing as above.

—The principal mains are 23 inches, 20 inches, 18 inches, 12 inches, and 10 inches in diameter. The secondary mains are 9 inches, 7 inches, and 5 inches in diameter. The service-pipes are 2 inches, 3 inches, 4 inches, 5 inches, and 7 inches in diameter. The total length of the mains and services is about 135 miles.

9. Is the whole of the water which is supplied filtered?—Yes.

10. Describe the method of filtration?—The water is passed through a vertical filtering medium of gravel and sand, about 7 feet thick.

11. What is the amount of steam-power employed? Of coals burnt under the boilers? and price of the coal? Also quantity of water used in the boilers?—252 horse power. The coals burnt and water evaporated are about the usual quantities for the best construction of ordinary condensing engines.

12. How frequently is the supply given; distinguishing different districts in case it varies therein?—A supply is given daily to the district lying below St. Matthew's church, Brixton, forming nine-tenths of the entire district supplied. The more distant and elevated localities receive the supplies of water three and four days per week.

13. What is the total number of tenements supplied, distinguishing dwelling-houses—

1st class.

2nd class.

3rd class.

4th class.

Also distinguishing those who have pipes on the main, with constant supply, as many hatters have, and large consumers, distinguishing as nearly as you are able the classes as set down—

500 and under 1,000 daily.

1,000	,,	2,000	,,
2,000	,,	3,000	,,
3,000	,,	4,000	,,
4,000	,,	5,000	,,
5,000 and upwards?			

—The Company are unable at present to furnish an answer to this question in more detail, than is given below without a general survey. The



number of dwelling-houses supplied is 23,396. The number of large consumers supplied from the mains is 147.

14. What number of dwelling-houses supplied have not the water laid on, but take their supply from stand-cocks?—731.

15. How many courts and houses are there in your district, that cannot be supplied for want of drains to carry off the water, if it were laid on?—There are 24 courts and alleys (containing about 150 houses) not supplied with water; this, however, does not altogether arise from the want of sufficient drainage, but principally from the houses lying near the river, (from which the inhabitants obtain their water,) from the bad condition of the property, and from an unwillingness to incur the expense of laying on the service-pipes.

16. What is the total number of stand-cocks? Greatest number of houses and persons to one stand-cock—least—average?

The total number of stand-cocks is . . . . .	103
The greatest number of houses to one stand-cock is . . . . .	16
The least . . . . .	2
The average . . . . .	7
The greatest number of persons to one stand-cock . . . . .	64
The least . . . . .	10
The average . . . . .	42

17. How many hours per day are they running, and what is the run from each per hour?—The stand-cocks are running from one to two hours per day, and the run from each is from 500 to 600 gallons per hour.

18. What is the total number of fire-plugs?—The number of fire-plugs on the Company's mains in the district is 2,246.

19. Can you state the total number of dwelling-houses with water-closets supplied, and those with baths supplied?—The exact number is not known, but it is estimated that the houses with water-closets supplied by the Company are about 6,000. The number of private baths is not known.

20. What has been the total number of gallons delivered, distinguishing that pumped, during the last year?—1,123,200,000 gallons delivered during the last year, the whole of which were pumped.

21. What has been the total quantity delivered, distinguishing that pumped during the preceding year?—973,400,000 gallons, delivered during the preceding year, the whole of which was pumped.

22. What was the quantity delivered, distinguishing that pumped per month, during the last year?—

	Gallons.
January . . . . .	90,100,000
February . . . . .	77,000,000
March . . . . .	96,700,000
April . . . . .	85,700,000
May . . . . .	93,500,000
June . . . . .	96,700,000
Carried forward . . . . .	539,700,000



	Gallons.
Brought forward . . .	539,700,000
July . . . . .	105,500,000
August . . . . .	103,300,000
September . . . . .	100,000,000
October . . . . .	96,700,000
November . . . . .	92,300,000
December . . . . .	85,700,000
	<hr/>
	1,123,200,000

23. What has been the average quantity delivered to each dwelling house per diem, during the last year?—The quantity of water supplied for all purposes, gives an average of 154 gallons per house, per diem. The quantity actually supplied to dwelling-houses, is estimated at about 125 gallons per house, per diem.

24. What has been the average quantity delivered to large consumers, per diem, during the last year?—Estimated at 525,000 gallons per diem.

25. What has been the quantity delivered by special agreements at a special rent?—None.

26. What has been the quantity supplied for street watering, and at what charge or charges?—About 28,600,000 gallons. The charges were 0·5 to 0·8 of a penny per superficial yard of road watered for a season.

27. What has been the quantity supplied for fires?—About 7,000,000 gallons.

28. What has been the quantity supplied for flushing?—About 10,500,000 gallons.

29. State (if known) the average quantity of water used per mile for road watering per diem, distinguishing paved and macadamized roadways?—About 16,000 gallons per day, per mile of road 10 yards wide, none of which are paved.

30. What was the quantity supplied for other special purposes?—None.

31. What is the highest service afforded by the Company above high-water mark?—About 350 feet.

32. What is the lowest service?—Some of the services are from 4 to 5 feet below high-water mark.

33. What height of supply do you consider and charge for as high service?—Ten feet and upwards, above the level of the footpaths.

34. Will you state your scale of charges for water supply?—

For small cottages, almshouses, &c., 3s. to 4s. per annum.

Houses, one room, small, 4s.; large, 5s.

Ditto two rooms, small, 7s.; large, 8s.

Ditto three rooms, small, 10s.; large, 12s.

Ditto four rooms, small, 14s.; large, 16s.

Ditto five rooms, small, 17s. 6d.; large, 19s.

Ditto six rooms, small, 21s.; large, 24.

For houses above six rooms the charge is 5 per cent. on the annual value; but, practically, the rate paid to the Company is from 10 to 20 per cent. less than the rents paid for houses containing 10 rooms and under.

Private baths 10s. each per annum.



Lambeth  
Water  
Company.

Consumers, such as factories, breweries, &c., low service, 5s. 2½d. per 1,000 cubic feet; high service, 7s. 9¾d. ditto.  
Horses in private stables, 7s. each per annum.  
Livery stables, 3s. 6d. per stall per annum.  
Two-wheel carriages, 4s. each per annum.  
Four-wheel carriages, 6s. each per annum.  
Water-closets, 10s. each per annum.  
Ditto, where more than one, 5s. each additional.

*Note.*—Water-closets in small tenements are supplied gratis.

Cows, 3s. 6d. each per annum.

Where landlords of tenements agree to pay farmed rents for the water, an allowance of 20 per cent. is made to them.

35. What was the yearly produce of the water-rents, for the last year made up?—22,446*l.* 17*s.* 9*d.*

36. Will you give the annual amount of expenses under such heads as they can be furnished?—

	£.	s.	d.
Wear and tear . . . . .	1,404	2	4
Consumption . . . . .	2,439	9	7
Direction . . . . .	600	0	0
Salaries and wages . . . . .	4,042	0	9
Additions to plant . . . . .	2,860	17	0
Taxes . . . . .	1,616	2	0
Interest on borrowed money . . . . .	2,883	15	8
Conduit pipe and filters . . . . .	1,031	9	1
	<hr/>		
	£16,877	16	5

37. What is the number of turncocks and other servants employed?—From 35 to 50, according to the wants of the district.

38. What was the last dividend per share?—5 per cent. per annum.

39. Dividend per cent. on the total costs of works?—2½ per cent.

40. Dividend per cent. on the paid-up capital?—5 per cent. per annum.

By order of the Board of Directors.

Lambeth Water Works,

W. S. PHIPPS, *Secretary.*

March 19, 1850.

[Additional Queries from the General Board of Health.]

41. Of the total amount of rates levied by your Company, how much is received for high service?—The amount of charge for high-service supply is not separately defined in the accounts of the Company, as in very many instances no charge is made for high service, and in many other cases high-service supplies have been laid on without the knowledge or consent of the Company. The estimated amount of water-rent derived from this service is believed not to exceed 945*l.* in the year 1849.

42. What is the total cost of collection of the rates?—895*l.* 12*s.* 4*d.* in the year 1849.



STATEMENT of the AVERAGE CHARGES which would be made by the Lambeth Water-Works Company for Water Supply on High and Low Service in the under-mentioned cases, according to the existing scale of the Company.

Lambeth  
Water  
Company.

	Low Service.	High Service.	Total.
	£. s. d.	£. s. d.	£. s. d.
4-ROOMED HOUSE (ground and upper floor) . .	0 14 0	Not required.	0 14 0
Add for water-closet on ground-floor . .	Exempt by	Company's Act of Par-	
	liament.		
6-ROOMED HOUSE (ground and two floors above)	1 1 0	Not required.	1 1 0
Add for water-closet on ground and first floor, charged for each . . . . .	0 10 0	..	0 10 0
(Few closets supplied in 6-roomed houses).			
10-ROOMED HOUSE (basement, ground, and two floors above) . . . . .	1 16 0 to 2 10 0	0 18 0	2 18 0
Add for water-closet on ground and first floor, charged for each . . . . .	0 12 0 0 6 0	..	0 18 0
12-ROOMED HOUSE (basement, ground, and three floors above) . . . . .	2 2 0 to 3 0 0	1 1 0	3 6 0
Add for water-closet on basement, ground, and first floor, charged for each . . . . .	0 15 0 0 7 6	..	1 2 6
16-ROOMED HOUSE (basement, ground, and four floors above) . . . . .	2 16 0 to 4 10 0	1 8 0	4 12 0
Add for water-closets on basement, ground, first and second floors, charged for each . . . . .	0 15 0 0 7 6 0 7 6	..	1 10 0
Add for coach-house and stable . . . . .	1 0 0 to 2 10 0	..	1 10 0

On the high service the water is supposed to be supplied to the top floor in each case.

By order of the Board of Directors.

W. S. PHIPPS, *Secretary.*

Lambeth Water Works,  
April 16, 1850.

RETURN from the CHELSEA WATER COMPANY.

Chelsea  
Water  
Company.

What is the name of the Company?—"The Governor and Company of Chelsea Water Works."

Will you recite your Act or Acts of Parliament?—The Company was incorporated by Act of Parliament, 8th Geo. I., cap. 26, under the style of the "Governor and Company of Chelsea Water Works," and further powers were conferred upon them by royal charter dated "8th March, 9th Geo. I.," letters patent dated 11th October, 7th Geo. II., and Act of Parliament 49th Geo. III. cap. 157.

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Chelsea  
Water  
Company.

What are the sources of supply?—The water is procured from the Thames by means of a conduit-pipe laid across the bed of the river beyond mid-stream, near the Red House, Battersea.

What is the number of shares?—4800.

What is the amount paid up on each share?—2000 shares at 20*l.* each, 2000 shares at 10*l.* each, and 800 shares at 12*l.* 10*s.* each.

What is the total amount of subscription paid up?—70,000*l.*

What has been the total expenditure on the works?—The capital raised by the company for the purposes of the undertaking is 70,000*l.*, in addition to which sum they have expended 350,712*l.* on plant and works, of which 51,500*l.* still remains due on debentures, and the company are now incurring an outlay of 35,000*l.* in addition, to meet the increasing demand for water.

Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing works?—(See accompanying plan.)

Set forth also the position of the sources of supply, the engine-houses, and the reservoirs for storage or filtration?—These are shown on the plan.

Describe the capacity and construction of the reservoirs?—No. 1, Green Park, 1½ acre area and 10 feet deep, constructed with brick walls and paved bottom. No. 2, Hyde Park, ¾ of an acre, and 7 feet deep, constructed with brick walls and concrete bottom. No. 3, Subsiding reservoirs; four reservoirs, together 3½ acres area, 15 feet deep, constructed with sloping sides and bottoms, paved with bricks on edge on concrete.

Give the internal and external diameter in inches, and length in yards, of—1st, the largest trunk main, and of the 2nd, 3rd, and other sizes of trunk mains; 2nd, branch mains, distinguishing length and diameter of the various sizes; 3rd, side services, distinguishing length and diameter as above; 4th, services for small streets, distinguishing as above?—The large mains are of the several diameters of 18 inches, 12 inches, and 10 inches; the auxiliary mains are 7 inches and 6 inches diameter; the services are 3 inches, 4 inches, and 5 inches diameter; the length of the main and service pipes is about 134 miles.

Is the whole of the water which is supplied filtered?—The Chelsea Company have filtered the whole of the water supplied since January, 1829, and they continue to do so, the water being pumped from the river during the last four hours of ebb-tides.

Describe the method of filtration?—The method of filtration is through gravel, shells, and sand, 8 feet thick, in water-tight reservoirs, comprising 90,000 superficial feet area.

What is the amount of steam-power employed; of coals burnt under the boilers, and price of the coals; also quantity of water used in the boilers?—310 horse-power; the evaporation of the boilers varies from 7 to 8 lbs. of water per 1 lb. of Newcastle coal.

How frequently is the supply given, distinguishing different districts in case it varies therein?—Daily throughout the district.

What is the total number of tenements supplied, distinguishing dwelling-houses 1st, 2nd, 3rd, and 4th class; also distinguishing those who have pipes on the main with constant supply, as many hatters have,



and large consumers, distinguishing as nearly as you are able the classes as set down :

Chelsea  
Water  
Company.

500 gallons and under 1,000 gallons daily			
1,000	,,	2,000	,,
2,000	,,	3,000	,,
3,000	,,	4,000	,,
4,000	,,	5,000	,,
5,000	,,	and upwards?—	

The Company supplied 20,996 houses and cottages in 1849, but are not in possession of a classified account of the kind required. 103 places served with water from the mains for trade and other purposes are commanded by cocks in the streets, the general practice of the works being to turn off the water from those places during the night; the gross quantity supplied daily is estimated at from 200,000 to 300,000 gallons; the separate quantities cannot be stated accurately.

What number of dwelling-houses supplied have not the water laid on, but take their supply from stand-cocks?—248 houses and cottages are supplied by stand-cocks.

How many courts and houses are there in your district that cannot be supplied for want of drains to carry off the water if it were laid on?—There are no courts and houses in the Chelsea Company's district which cannot be supplied with water, the drainage being sufficient in the worst cases to carry off one hour's service; but in many instances where the water is left on longer it is found that the drains become filled, and by that means the houses and cottages are liable to be flooded; and this is also found to be the case where the houses and cottages are dependent on cesspools; the drainage in the larger portion of the district is very imperfect.

What is the total number of stand-cocks—greatest number of houses and persons to one stand-cock—least—average?—47 stand-cocks; 15 houses or cottages to one stand-cock is the greatest number; number of persons to each stand-cock difficult to state, but from some observations which have been made the greatest is believed not to exceed 60, and the least 5; average 5 cottages, and 5 persons per cottage.

How many hours per day are they running, and what is the run from each per hour?—From one to two hours morning, and from one to two hours, evening, and the run of water from each stand-cock per hour is usually from 100 to 300 gallons; when the cocks are left open the run is from 400 to 500 gallons per hour.

What is the total number of fire-plugs?—2394.

Can you state the total number of dwelling-houses with water-closets supplied, and those with baths supplied?—Difficult to ascertain; but from recent investigation there is reason to believe the dwelling-houses with water-closets supplied exceed 10,000, and there are upwards of 500 houses with baths, supplied direct by pipes, and more than 2500 portable baths and shower-baths, which are frequently used, the water being obtained from the general domestic supplies and conveyed to such baths in pails.

What has been the total number of gallons delivered, distinguishing that pumped in the last year?—(See answer to succeeding question but one.)

What has been the total quantity delivered, distinguishing that



Chelsea  
Water  
Company.

pumped during the year preceding?—1,248,115,000 imperial gallons of water were pumped into the mains supplying the district in 1848.

What was the quantity delivered, distinguishing that pumped per month during the last year?—Quantity of water pumped for supplying the district in

1849.	Imperial Gallons.	1849.	Imperial Gallons.
January . . .	104,658,000	August . . .	132,819,000
February . . .	97,331,000	September . . .	130,105,000
March . . .	123,936,000	October . . .	121,623,000
April . . .	127,350,000	November . . .	113,997,000
May . . .	122,639,000	December . . .	116,615,000
June . . .	124,171,000		
July . . .	123,214,000	Total . . .	1,438,458,000

What has been the average quantity delivered to each dwelling-house per diem during the last year?—The average quantity supplied per dwelling-house per diem, including trade and other purposes, was 219 gallons; excluding trade and other purposes 187 gallons.

What has been the average quantity delivered to large consumers per diem during the last year?—From 200,000 to 300,000 gallons per diem.

What has been the quantity delivered by special agreements at special rents?

150,000 tons at 52s. 6d. per thousand tons.

50,000 „ „ 40s. „ „

150,000 „ „ 26s. 3d. „ „

What has been the quantity supplied for street watering, and at what charge or charges?—About 36,000,000 gallons in the year 1849, and the charges were:

Under 10,000 super. yds. of road watered, 8s. 4d. per 100 super. yds.

From 10,000 super. yds. to 20,000 do. do. 7s. per 100 ditto.

From 20,000 super. yds. to 100,000 do. do. 6s. 3d. per 100 ditto.

Above 100,000 super. yds. . . do. do. 5s. 9d. per 100 ditto.

Quantity supplied for fires?—The quantity of water supplied under this head is believed to have been about 5,000,000 gallons in 1849, but the number and magnitude of the fires in the Chelsea district was less than the average in that year.

Quantity supplied for flushing?—Cannot be stated accurately, as it was supplied under such variety of circumstances; it seems to have been about 15,000,000 gallons in 1849.

State (if known) the average quantity of water used per mile for road-watering per diem, distinguishing paved and macadamized roadways?—From 15,000 to 20,000 gallons per mile per diem; the watering of paved streets and macadamized roads has not been noted separately; the extent of streets and roads watered was equal to about 18 miles 11 yards wide, such being the average width of the roads in the district supplied by the Chelsea Company; the paved streets watered are less than half a mile, excluding places watered by the inhabitants from the house and other supplies, for which no charges are made.

NOTE.—The water for watering  $2\frac{1}{2}$  miles of roads in streets newly formed (in 1849) was supplied by the company without charge.



What was the quantity supplied for other special purposes?—  
Answered before. (See question relative to quantity delivered by special agreements.)

What is the highest service afforded by the company above high-water mark?—157 feet.

What is the lowest service?—4 feet.

What height of supply do you consider, and charge for, as high service?—10 feet above the pavement; the charges under this head being for water-closets, baths, and extraordinary supplies only.

Will you state your scale of charges for water supply?—

Cottages (of inferior class), almshouses, &c., 4s. to 5s. each per annum.

Houses or cottages, 1 room, small, 6s. per annum.

ditto, large, 8s. „

„ „ 2 rooms, small, 12s. „

ditto, large, 14s. „

„ „ 3 rooms, small, 16s. „

ditto, large, 18s. „

„ „ 4 rooms, small, 21s. „

ditto, large, 23s. „

„ „ 5 rooms, small, 24s. „

ditto, large, 26s. „

Houses, 400 to 600 superficial feet on plan, 875d. per foot on plan.

„ 600 to 850 „ „ 1d. „

Add or deduct proportionally if more or less than 4 stories,  
and allow for situation, state of property, &c.

„ 800 to 1000 superficial feet on plan, 1.125d. per foot on plan.

Add or deduct proportionally if more or less than 5 stories,  
and allow for situation, state of property, &c.

„ above 1000 superficial feet on plan, 1.25d. per foot on plan.

Allow for situation, state of property, &c.

Water-closets . . . . . 15s. each per annum.

Additional ditto in the same house . . . 10s. „

Water-closets in small houses and cottages, hitherto  
charged in few instances . . . . . 8s. to 10s. „

Baths, according to size . . . . . 5s. to 20s. „

Coach-houses, per coach and pair . . . . . 16s. „

„ single . . . . . 8s. „

Stalls for horses . . . . . 4s. „

Dwellings over stables, according to size 5s. to 20s. „

Horse and chaise . . . . . 10s. „

Horse and cart . . . . . 10s. „

Livery stables . . . . . per stall, 3s. „

„ each coach or stand for ditto . 8s. „

Trade purposes:

Services less than 20 feet above ground level, 20s. per 1000 barrls.

„ above 20 feet and under 40 feet . 30s. „

„ above 40 feet . . . . . 40s. „

Street-watering answered before.

What was the yearly produce of the water-rents for the last year made up?—35,917l. 9s. 3d.

Will you give the annual amount of expenses under such heads as they can be furnished?—



Chelsea  
Water  
Company.

	£.	s.	d.
Wear and tear . . . . .	6,252	18	7
Consumption . . . . .	4,798	15	5
Management, directors, secretary, and engineer	2,039	15	0
Salaries and wages . . . . .	5,007	11	6
Taxes. . . . .	1,146	13	1
Interest on loans . . . . .	2,454	0	4
Additions to plant . . . . .	2,401	0	6
General enlargement of mains, pipes, and works, to accomplish daily supplies, and meet the increased demand for water . . . . .	3,979	3	2

What is the number of turncocks and other servants employed?—  
Number constantly varying.

What was the last dividend per share?—26 shillings.

Dividend per cent. on the total cost of works?— $1\frac{3}{8}$  per cent.

Dividend per cent. on the paid-up capital?— $8\frac{1}{4}$  per cent.

Of the total amount of rates levied by your Company how much is received for high service?—The charges for high service have hitherto not been separately noted in the water-rent accounts of the Company, and high services have been laid on without their knowledge, for which no charges have been made. It is estimated that the receipts of the Company for high service did not exceed 2600*l.* per annum in 1849.

What is the total cost of collection of the rates?—1759*l.* 13*s.* 6*d.*

*Statement of the average Charges which would be made by the Chelsea Water-works Company for Water Supply on High and Low Service in the undermentioned cases, according to the existing Scale of the Company.*

	Low Service.	High Service.
Four-roomed house—		
Ground and upper floor . . . . .	21 <i>s.</i> to 23 <i>s.</i>	<i>Nil.</i>
Add for water-closet on ground floor, but only charged in very few instances . . }	8 <i>s.</i>	
Six-roomed house—		
Ground and two floors above . . . . .	28 <i>s.</i> to 32 <i>s.</i>	<i>Nil.</i>
Add for water-closet on ground and first floor (but charged in few instances) each }	10 <i>s.</i>	
Ten-roomed house—		
Basement, ground, and two floors above . .	50 <i>s.</i> to 70 <i>s.</i>	
Add for water-closet on ground and first floor, each . . . . . }	15 <i>s.</i>	
Twelve-roomed house—		
Basement, ground, and three floors above . .	60 <i>s.</i> to 80 <i>s.</i>	
Add for water-closet on basement, ground, and first floor, each . . . . . }	20 <i>s.</i>	
Sixteen-roomed house—		
Basement, ground, and four floors above . .	80 <i>s.</i> to 125 <i>s.</i>	
Add for water-closets on basement, ground, first and second floors, each . . . }	25 <i>s.</i>	
Add for coach-house and stable . . . . .	30 <i>s.</i> to 60 <i>s.</i>	



On the high service the water is supposed to be supplied to the top floor in each case.

Chelsea  
Water  
Company.

The charges for high service have not hitherto been separated from the ordinary rates of the Company, and the information required cannot be given at present. The only charges made for high service are for waterclosets, baths, and extraordinary supplies.

The Board find considerable difficulty in giving an average of the Company's charges in consequence of the disparity of houses within the district supplied by them. In the old and lower parts of the district the houses are of an inferior description, both in elevation and the size of rooms, though containing a similar number to those in the new part of the town towards Pimlico, Chelsea, and Brompton, and are therefore rated with reference to situation, state of property, &c.

#### RETURN from the GRAND JUNCTION WATER COMPANY.

Grand Junction  
Water  
Company.

1. What is the name of the Company?—Grand Junction Water-works,
2. Will you recite your Act or Acts of Parliament?—51 Geo. III., c. 169; 56 Geo. III., c. 4; 59 Geo. III., c. 111; 7 Geo. IV., c. 140; 5 and 6 Will. IV., c. 95; 7 and 8 Vict., c. 30.
3. What are the sources of supply?—The river Thames above Kew Bridge. (See also Question 9.)
4. What is the number of shares?—8,000.
5. What is the amount paid up on each share?—

In 1810	3,000 shares at £50	=	£150,000
1816	1,500 „	25 =	*37,500
1826	1,000 „	50 =	†50,000
1836	1,000 „	50 =	50,000
1837	500 „	50 =	25,000
1846	1,000 „	50 =	50,000
	<u>8,000</u>	Total	<u>£362,500</u>

Or an average of 45*l.* 6*s.* 3*d.* per share.

6. What is the total amount of subscription paid up?—(See reply to Question 5.)
7. What has been the total expenditure upon the works?—522,295*l.* 4*s.* 9*d.* divided as follows:—

	£.	s.	d.
Paid in calls by the proprietors	331,000	0	0
Expended on works out of revenue	111,168	10	9
Carried forward	£442,168	10	9

\* At the time the 1,500 shares were raised, at 25*l.* per share, the market value was only 23*l.* per share.

† Of the sum of 50,000*l.* raised in 1826, 31,500*l.* had, from time to time, instead of being paid to the proprietors in dividends, been reserved out of the income of the company, and 18,500*l.* was subscribed by the proprietors.



Grand Junction  
Water  
Company.

	£.	s.	d.
Brought forward . . .	442,168	10	9
Expended by the Grand Junction and Regent's Canal Companies upon the works of this Company . . .	80,126	14	0
Total . . .	*£522,295	4	9

8. Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing mains?—(See accompanying tracing.)

9. Set forth also the position of the sources of supply; the engine houses and the reservoirs for storage or filtration?—On the Surrey side of the river Thames, 360 yards above Kew Bridge, the stream at that part being separated from the Brentford or Middlesex side of the river, by an ait commencing about 150 yards above Kew Bridge, and extending nearly half a mile, six engines are situated on the north side of the Brentford turnpike-road near Kew Bridge, and one engine near the Great Western Railway Terminus at Paddington. The Company have a depositing reservoir and filter-bed at their Kew Bridge works, a storage reservoir at Campden-hill, and one also at the Paddington works.

10. Describe the capacity and construction of the reservoirs?—The capacity of the reservoirs is as follows:—

	Imperial Gallons.
Depositing reservoir, Kew Bridge	5,000,000
Filter-bed, Kew Bridge . . .	3,500,000
	8,500,000
Store reservoir, Campden-hill . .	6,000,000
Store reservoir, Paddington . .	3,400,000
	9,400,000
Total . . .	17,900,000

The depositing reservoir and filter-bed at Kew Bridge, together with the store reservoir at Campden-hill, are partly excavated and partly embanked, the sloped bank being formed of earth and puddled clay, the inside slopes lined with concrete, and the bottom paved with bricks or concrete. The walls of the Paddington reservoir are formed of brick-work and the bottom is coated with gravel.

11. Give the internal and external diameter in inches, and length in yards, of—

1. The largest trunk main, and of the second, third, and other sizes of trunk mains.
2. Branch mains, distinguishing length and diameter of the various sizes.

\* All moneys which have been received by the company for land and property no longer used, in consequence of the removal of the works to Kew, have been deducted from this account of expenditure.



3. Side services, distinguishing length and diameter as above.  
 4. Services for small streets, distinguishing as above.

Grand Junction Water Company.

	Internal Diameter.	External Diameter.	Length.
1. Trunk main	30 inches	32 $\frac{1}{4}$ inches	12,991 yards.
„	27 „	29 „	} 3,069 „
„	24 „	26 „	

Total length of trunk main 16,060 „

2. Branch main	12 inches	13 $\frac{1}{4}$ inches	7,869 yards.
„	9 „	10 $\frac{1}{8}$ „	4,860 $\frac{1}{2}$ „
„	8 „	9 $\frac{1}{8}$ „	484 „
„	7 „	8 „	8,267 $\frac{1}{2}$ „
„	6 „	7 „	4,614 $\frac{1}{2}$ „

Total length of branch mains 26,095 $\frac{1}{2}$  „

3. Side services	6 inches	7 inches	1,878 $\frac{1}{2}$ yards.
„	5 „	6 „	37,910 „
„	4 „	4 $\frac{3}{4}$ „	48,747 „
„	3 „	3 $\frac{3}{4}$ „	10,347 „

Total length of side services 98,882 $\frac{1}{2}$  „

4. The principal number of courts and small streets are supplied through three or four inch iron service-pipes, in some cases, however, the houses are supplied from leaden-pipes carried through the court to the main street, and there connected with the Company's iron service-pipe.

12. Is the whole of the water supplied filtered?—Yes.

13. Describe the method of filtration?—Through layers of gravel and sand arranged in the following order, viz.:—

	Ft.	In.
1. Rough gravel that will not pass through a screen of 2-inch mesh . . . . .	0	7 $\frac{1}{2}$ thick.
2. Gravel that will not pass through a screen of 1-inch mesh . . . . .	0	6 „
3. Gravel that has passed through the screen of 1-inch mesh . . . . .	0	9 „
4. Small shells . . . . .	0	1 $\frac{1}{2}$ „
5. Coarse sharp sand . . . . .	0	6 „
6. Fine sharp sand . . . . .	1	6 „

Total thickness of filtering medium 4 0

14. What is the amount of steam power employed?—

Grand Junction engine 300-horse power.

Maudslay's engine 130-horse power.

East Cornish engine 130-horse power.

West Cornish engine 130-horse power.



Grand Junction  
Water  
Company.

Paddington engine 70-horse power.  
North Filter engine 40-horse power.  
South Filter engine 40-horse power.

15. Of coals burnt under the boilers, and price of the coals; also quantity of water used in the boilers?—3,170 tons have been consumed during the last year; the cost per annum, taking an average of the last seven years, has been 2,285*l.* 4*s.* 11*d.* The quantity of water evaporated daily amounts to about 20,160 gallons.

16. How frequently is the supply given, distinguishing different districts in case it varies therein?—Every day, Sunday excepted, throughout the whole of the Company's district.

17. What is the total number of tenements supplied, distinguishing dwelling-houses—

1st class.

2nd class.

3rd class.

4th class.

—14,058. The Company have no account of the different classes of buildings.

18. Also distinguishing those who have pipes on the main, with constant supply, as many hatters have?—118 tenants have supplies from mains, chiefly club-houses, hotels, public baths, distillery, &c., of which 31 have supplies from trunk or leading branch mains (constant), 75 from other branch mains, 12 from other branch mains, with stop-cocks, worked daily by the Company's servants.

19. Large consumers, distinguishing as nearly as you are able, the classes as set down—

500 and under 1,000 gallons daily.

1,000 „ 2,000 „

2,000 „ 3,000 „

3,000 „ 4,000 „

4,000 „ 5,000 „

5,000 and upwards?—

No very exact answer can be given to this question. There are about 200 large consumers, consisting of the Great Western Railway, club-houses, hotels, chambers, public baths, breweries, distilleries, hospitals, barracks, theatre, livery stables, &c. At the periods at which these supplies respectively were first given, as accurate an estimate as could be arrived at of the probable requirements of each was made upon which to determine the rate, and although it is believed most of these establishments have since increased in extent and in consumption of water, no further means have been taken to ascertain correctly the quantities delivered; an approximative estimate of the total quantity is given in answer to Questions Nos. 30, 31, and 32.

20. What number of dwelling-houses supplied have not the water laid on, but take their supply from stand-cocks?—The Company do not give any supply from stand-cocks. There are about 142 houses not separately laid on, but drawing their supply from tanks or cisterns supplied by the Company.

21. How many courts and houses are there in your district that



cannot be supplied for want of drains to carry off the water if it were laid on?—None where the Company's mains are laid.

Grand Junction Water Company.

22. What is the total number of stand-cocks, greatest number of houses, and persons to one stand-cock, least average?—None.

23. How many hours a day are they running, and what is the run from each per hour?—See previous answer.

24. What is the total number of fire-plugs?—2,117 fire-plugs.

25. Can you state the total number of dwelling-houses with water-closets supplied, and those with baths supplied?—The Company having no separate charge for water-closets, their number cannot be ascertained, but it is believed that there are but few houses in the district without, and in many of the newer portions of the district they would be found on almost every floor. There is no doubt likewise that a very large number of baths exists in private dwelling-houses, but very few are known and charged for by the Company (only 78), as when they are erected after the first examination and occupation of a house, the Company are seldom informed of it.

26. What has been the total number of gallons delivered, distinguishing that pumped during the last year?—1,289,184,930 imperial gallons, from 1st October, 1848, to 29th September, 1849.

27. What has been the total quantity delivered, distinguishing that pumped during the year preceding?—1,246,163,050 imperial gallons for the corresponding period, 1848.

28. What was the quantity delivered, distinguishing that pumped per month during the last year?—

	Days.	Gallons.
1 Oct. 1848 to 28 Oct. 1848 . . .	28	95,011,040
29 Oct. , , to 25 Nov. , , . . .	28	95,813,590
26 Nov. , , to 30 Dec. , , . . .	35	115,093,940
31 Dec. , , to 27 Jan. 1849 . . .	28	94,286,070
28 Jan. 1849 to 24 Feb. , , . . .	28	96,966,180
25 Feb. , , to 31 Mar. , , . . .	35	123,286,180
1 April , , to 28 April , , . . .	28	93,888,130
29 April , , to 26 May , , . . .	28	99,957,210
27 May , , to 30 June , , . . .	35	130,073,390
1 July , , to 28 July , , . . .	28	112,913,520
29 July , , to 25 Aug. , , . . .	28	104,694,210
26 Aug. , , to 29 Sept. , , . . .	35	127,201,470
	<hr/> 364	<hr/> 1,289,184,930

29. What has been the average quantity delivered to each dwelling-house per diem during the last year?—The gross supply is equivalent to 252 imperial gallons per house per diem for seven days in the week, or, after deducting for street watering, large consumers, &c., about 223 imperial gallons.

30. What has been the average quantity delivered to large consumers per diem during the last year?—By a rough calculation, but which probably approximates to the truth, it would appear to be about 230,000 gallons per diem, independently of supplies for street watering, flushing sewers, and the extinction of fires.

31. What has been the quantity delivered by special agreement at a special rent?—The Great Western Railway Company is the only



Grand Junction Water Company.

tenant to whom a supply is delivered by special agreement, according to measured quantity. The quantity delivered last year, ending at Michaelmas, 1849, was 12,310,029 imperial gallons, at the rate of 121*l.* 10*s.* for 3,130,000 imperial gallons.

32. What has been the quantity supplied for street watering, and at what charge or charges, quantity supplied for fires, quantity supplied for flushing?—The quantity supplied for watering streets during the last year is calculated at upwards of 54,960,000 imperial gallons. The charge is made according to the measurement of surface, not the quantity of water; generally at 1*d.* per superficial yard for an unlimited supply given twice a-day during the season, professedly of six months from Lady-day to Michaelmas; but now generally extending to seven months, without any additional charge being made. The supply for the extinction of fires being taken from the reservoirs, which also furnish a portion of the domestic supply, it would not be easy to ascertain the precise quantities; for which also there would be the less motive, as the supply is gratuitous; but an approximative estimate for the last year would give 250,000 imperial gallons. The water supplied for flushing sewers during the last year has been calculated at 25,900,000 gallons: in this case likewise the supply has been gratuitous.

33. State (if known) the average quantity of water used per mile for road watering per diem, distinguishing paved and Macadamized roadways?—To water a mile of road of an average width of 30 feet twice a-day, would probably take upwards of 14,000 imperial gallons per diem.

34. What was the quantity supplied for other special purposes?—Supplies have occasionally been afforded to other Water Companies and to the Regent's Canal Company, but none during the last two years.

35. What is the highest service afforded by the Company above high-water mark?—150 feet above Trinity high-water mark.

36. What is the lowest service?—12 feet above Trinity high-water mark.

37. What height of supply do you consider and charge for as high service?—A cistern situated more than 6 feet above the foot-pavement is considered high service.

38. Will you state your scale of charge for water supply?—The ordinary service rates have always been calculated as nearly as circumstances would permit, upon the basis of the mean rates of 1819, and average throughout the Company's district from 4*s.* to 5*s.* per room. The scale of high service charge now acted upon is lower than that in use in 1819, and is as follows:—

#### HIGH SERVICE RATE.

	Entrance.	1st Floor.	2nd Floor.	3rd Floor.
	£. s.	£. s.	£. s.	£. s.
Ordinary Rate not exceeding £1 10 <i>s.</i>	0 10	0 18	1 5	. .
„ „ 2 0	0 12	1 1	1 10	2 0
„ „ 3 0	0 15	1 5	1 15	2 5
„ „ 4 0	0 18	1 10	2 0	2 10
„ Above . . 4 0	1 1	1 12	2 2	3 3



The above charges are not cumulative; the highest includes the others. Grand Junction Water Company.

39. What was the yearly produce of the rents for the last year made up?—43,387*l.* 8*s.* 9*d.* one year to Michaelmas, 1849, including street watering.

40. Will you give the annual amount of expences under such heads as they can be furnished?—Current annual expences from an average of the last seven years:—

	£.	s.	d.
Coals . . . . .	2,285	4	11
Other working expences and repairs . . . . .	7,363	1	3
Rents, rates, and taxes, including property tax . . . . .	1,518	18	6
Collectors' commission . . . . .	1,223	17	3
Law charges . . . . .	146	5	4
	<hr/>		
	£12,537	7	6

The cost of coals during the present year has been less than the above average, in consequence of a larger proportion of small coals having been used; and the item for rates and taxes has been more than above stated.

41. What is the number of turncocks and other servants employed?—9 turncocks and 2 assistant turncocks; 19 engine-workers, stokers, boiler cleaners, reservoir men, &c.; and from 10 to 15 labourers, exclusive of those periodically employed in cleansing the filter bed at the Kew Bridge works: making 40 to 45 in all.

42. What was the last dividend per share?—2*l.* per share for the half year, payable 15th January, 1850.

43. Dividend per cent. on the total cost of works?—No dividends were paid from 1810 to 1819; from that year the following table will show the cost of works and dividend per cent:—

	Cost of Works.	Yearly Dividends.	Per Cent.		Cost of Works.	Yearly Dividends.	Per Cent.
	£.	£.	£. s. d.		£.	£.	£. s. d.
1819	222,679	5,625	2 10 6	1835	336,789	13,750	4 1 7
1820	223,555	2,812	1 5 1	1836	346,785	13,750	3 19 3
1821	226,433	11,250	4 19 4	1837	398,444	14,375	3 12 1
1822	280,894	11,250	4 0 0	1838	428,076	16,562	3 17 4
1823	283,036	11,250	3 19 5	1839	443,194	18,375	4 2 11
1824	283,657	12,375	4 7 3	1840	450,137	19,250	4 5 6
1825	289,286	13,500	4 13 4	1841	463,666	19,250	4 3 0
1826	300,863	13,500	4 9 8	1842	467,945	19,250	4 2 3
1827	318,818	14,000	4 7 9	1843	478,838	21,000	4 7 8
1828	321,308	15,500	4 16 5	1844	473,027	21,875	4 12 5
1829	325,376	13,250	4 1 5	1845	492,491	23,625	4 15 9
1830	327,070	12,500	3 16 5	1846	502,068	24,500	4 17 7
1831	330,844	13,750	4 3 1	1847	514,452	27,250	5 5 1
1832	332,718	13,750	4 2 4	1848	521,955	31,000	5 18 9
1833	334,728	13,750	4 2 1	1849	522,295	32,000	6 2 6
1834	335,844	13,750	4 1 9				

Or from the commencement of the Company, in 1810, including the



Grand Junction Water Company. years when no dividend was paid, an average of 3*l.* 18*s.* per cent. per annum.

44. Dividend per cent. on the paid-up capital?—The present dividend is equal to 8*l.* 16*s.* 6*d.* per cent. on 362,500*l.*; or 9*l.* 1*s.* 3*d.* per cent. on paid-up calls, 331,000*l.* The total amount of dividends is equal to a mean rate of interest upon the paid-up calls in each year, from the commencement of 5*l.* 19*s.* per cent.

45. Of the total amount of rates levied by your Company how much is received for high service?—At Michaelmas 1849 there were 6,172 high-service rates charged the gross amount of yearly rental, from which is 10,763*l.* 17*s.* 5*d.* average 1*l.* 14*s.* 10*d.* per tenement.

46. What is the total cost of collection of the rates?—

Total amount of water rental received for one year to Michaelmas 1849 was . . . . .	£.	s.	d.
	43,387	8	9
Total cost of collecting the above . . . . .	1,169	3	1
Averaging rather less than 6½ <i>d.</i> in the pound.			

An ACCOUNT showing the number of TENEMENTS supplied with WATER by the above Company in each of the undermentioned Years, arranged in Classes according to the Amount of the Water Rates charged therein respectively.

Rate per Annum.	Number of Tenements.			
	1814	1819	1828	1849
Under 5 <i>l.</i> . . . .	1,478	6,222	6,659	11,485
5 <i>l.</i> and under 10 <i>l.</i> . . . .	68	757	935	2,207
10 <i>l.</i> „ 15 <i>l.</i> . . . .	5	174	178	303
15 <i>l.</i> „ 20 <i>l.</i> . . . .	6	16	17	30
20 <i>l.</i> „ 25 <i>l.</i> . . . .	1	5	8	16
25 <i>l.</i> „ 30 <i>l.</i> . . . .	..	4	9	8
30 <i>l.</i> „ 35 <i>l.</i> . . . .	..	..	1	4
35 <i>l.</i> and upwards.	..	2	2	5
	1,558	7,180	7,809	14,058

The above rates comprehend not only the high service charges, and those for trades and large consumers, the latter now about 200 as specified in the replies to the queries of the Metropolitan Sanitary Commissioners, but many of them include likewise a rate for one or more stables, detached or otherwise, belonging to the same proprietor.

The above is as near a compliance with the terms of the Return requested as can be given without a very lengthened research.

In transmitting to you the accompanying statement, it is necessary to observe that the rates in the greater part of the Grand Junction district have not been made with reference to the rooms contained in each house, consequently the Company have no record of the number of such rooms, except in houses laid on within a comparatively recent period; and even as regards those the object has been rather to assimilate the rates with the average rates of 1819 than strictly to affix them at per room. The Return is, however, the result of a careful examination of the Company's rating book during the last six years. The charge for high service is stated (in conformity with the question) at the rate which would be charged according to the scale adopted by the Company,



if the water were sent to the top floor in every case; but, in point of fact, in the smaller class of houses no such top floor services are at present known to exist, and in the larger the high service rarely exceeds the height of the third floor, and the houses are in consequence only charged according to the scale stated in answer to No. of the former queries.

STATEMENT of the AVERAGE CHARGES which would be made by the Grand Junction Water Works Company for Water Supply on High and Low Service in the undementioned Cases according to the existing Scale of the Company.

	Low Service.	High Service to Top Floor.	Total.
	£. s. d.	£. s. d.	£. s. d.
4-ROOMED HOUSE (ground and upper floor)—			
Farmed { Lowest rate . . . . .	0 12 0	{ No high service rate in any case charged upon this class of houses.	
Highest ditto . . . . .	0 15 0		
Not farmed. . . . .	1 0 0		
Add for water-closet on ground floor . .	No extra charge made.		
6-ROOMED HOUSE (ground and two floors above)—			
Farmed . . . . .	1 2 6	..	..
Not farmed { Lowest rate . . . . .	1 5 0	1 5 0	2 10 0
Highest ditto . . . . .	1 10 0	1 5 0	2 15 0
Add for water-closet on ground and first floor, charge for each . . . . . }	No extra charge made.		
10-ROOMED HOUSE (basement, ground, and two floors above)—			
Lowest rate. . . . .	1 18 0	1 18 0	3 16 0
Highest ditto . . . . .	2 2 0	2 0 0	4 2 0
Add for water-closet on ground and first floor, charge for each . . . . . }	No extra charge made.		
12-ROOMED HOUSE (basement, ground, and three floors above)—			
Lowest rate. . . . .	2 5 0	2 5 0	4 10 0
Highest ditto . . . . .	2 15 0	2 5 0	5 0 0
Add for water-closets on basement, ground, and first floor, charge for each. . . }	No extra charge made.		
16-ROOMED HOUSE (basement, ground, and four floors above)—			
Lowest rate . . . . .	3 5 0	3 0 0	6 5 0
Average ditto . . . . .	3 15 0	3 0 0	6 15 0
Highest ditto . . . . .	4 4 0	3 3 0	7 7 0
Add for water-closets on basement, ground, first and second floors, charge for each }	No extra charge made.		
ADD FOR COACH HOUSE AND STABLE—			
Single coach-house . . . . .	0 10 0	..	..
For each additional coach-house . . .	0 5 0	..	..
Stables at per stall . . . . .	0 5 0	..	..
Livery stables charged 25 per cent. lower.			

On the high service the water is supposed to be supplied to the top floors in each case.



Grand Junction Water Company.  
SIR,

Office of Grand Junction Water Works,  
Brook-street, February 4, 1850.

1. IN transmitting the accompanying replies to the queries of the Commissioners of the Metropolitan Sanitary Inquiry, the Directors avail themselves of the invitation of the Commissioners to add some general remarks on the subject to which those queries relate.

Some few of their observations will apply to the earlier proceedings of the Company; but the reference will be only to the extent necessary to elucidate clearly its present condition and existing relations to the public.

2. The Grand Junction Company was established in 1810: until 1819 it was engaged in competition as well with the old Companies (the New River and the Chelsea) as with the West Middlesex Company, incorporated in 1807. On any review of that disastrous struggle, the Directors feel it unnecessary to enter: much that occurred during those years cannot be defended on any other ground than the excitement of a long-continued and utterly ruinous contest; but the blame of what was wrong must be at least shared by the Legislature, which had sanctioned and encouraged the competition. Nor on any fair review of the conduct of the Companies can it be contended that they should have been permanently bound to serve water at rates which experience had shown to be inadequate to pay any return on the capital expended, if even the receipt of those rates could have been depended on, which, for reasons sufficiently obvious, it was found in vain to expect.\*

3. With 1819 commences the period when the proceedings of the Companies in their relations to the public may be fairly judged of. The facts about to be adverted to, will show what has been the conduct of the Grand Junction Company during the 30 years to which that period has now extended.

4. The arrangement of 1819 between the competing Companies was, that each should restrict its service to an agreed district, and that the rates should be raised to a scale 25 per cent. above those charged by the old Companies prior to 1810. This arrangement received the distinct sanction of the Committee of the House of Commons which sat in 1821. The Committee recommended,—“That a Bill should be introduced and limited to four years, restraining the Companies from advancing the rates beyond the proportion of 25 per cent. on the old rates of 1810, for what is termed the ordinary service of water for domestic purposes, leaving high and extra services as matters of agreement between the parties, but defining the one and the other, and establishing, as far as may be found practicable, fixed rules for the rates of charge on trades consuming large quantities of water.” Such a Bill was brought in by the Chairman of the Committee, but at too late a period to be proceeded with that Session. It was not again brought forward; but the Water Companies had been assenting parties to its introduction, and thereafter considered themselves as

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\* The public must also share the blame; the instances were numerous during the competition, where the company was requested by memorial to drive mains in some particular locality, the memorialists agreeing to take a supply on certain terms. This agreement was commonly forgotten when the mains were laid, and the rival companies were left to bid against each other for tenants, “to the point of ruin.”



honourably bound by an agreement to which the sanction of Parliament might be fairly assumed to have been substantially given.

5. In 1826, a rate-clause was introduced into a Bill brought in with a view to some private arrangements by the Grand Junction Company. This clause, which was not introduced at their own instance, would have enabled the Company greatly to raise their rates; but they never for a moment conceived that it released them from the engagement into which they held themselves to have entered with the public, and it has been accordingly, as regards any influence on the charges of the Company, wholly a dead letter. It has been, in some few cases referred to, adversely to the Company; that is to say, that where, from some peculiar circumstances, houses had been let greatly below their value, and the rates that had been fixed by the Company's officers exceeded in consequence the scale in the Act, a claim of abatement has been made, and of course immediately attended to.\* By the Company, as has been stated, the scale has never been adverted to; the rates on all new houses having been assimilated, as nearly as possible, to the mean rates of 1819.

6. Those rates had been originally adjusted, with the utmost care that could be taken, to the understanding which has been referred to. It had been found, however, difficult to carry into effect that understanding with perfect fairness to all parties; first, because the rates prior to 1810, which were to be the basis of the new scale, had been originally fixed on no very intelligible or uniform principle; and, secondly, because during the competition rates had been accepted rather with reference to the keenness of the struggle in each particular locality than to any fair estimate of the character of the supplies afforded. The Company began and had made some progress in an equalization of rates, but found themselves unable to carry it through; and, correcting as far as was in their power the more striking anomalies of the rating, were compelled in consequence to content themselves with distributing as justly as they could the amount of charge which the advance of 25 per cent. on the aggregate rates of 1810 produced. That care was taken not to exceed that aggregate is evident from the fact, that when the whole of the new rating was completed the total increase was only found to exceed by 200*l.*, or a mean of 7*d.* per tenement per annum, an advance of 25 per cent. on the aggregate rates of 1810. This sum, even of 200*l.*, the Company relinquished by an abatement of rates in such instances as seemed most fairly susceptible of reduction.

7. The following statement will show that the Company has adhered to the understanding of 1819. In 1820, after the new scale of rates was fully in operation, the following (as stated to the Committee of 1821) was the state of the Company's revenue: the net revenue of the year ending at Michaelmas, 1820, was 19,991*l.* 6*s.* 10*d.*,† the number of tenants 7180; deducting—

\* The only instances, however, which can be recollected of such a claim occurring, is with regard to 23 houses of small size, on the Norland estate, at the bottom of Notting-hill, where a large building speculation having been entered into, and which did not turn out well, the rents are much below the ordinary standard, the mean reduction on each house was 5*s.* per annum.

† The charge for street-watering is not included in either of the above totals.



Grand Junction  
Water  
Company.

High service . . . .	£1,681 9 6
Extra service . . . .	1,319 12 4
<hr/>	
Together . . . .	£3,001 1 10

The remaining sum, 16,990*l.* 5*s.*, gives 2*l.* 7*s.* 4*d.* as the mean charge for ordinary service to each tenant. The net revenue for the year ending at Michaelmas, 1849, was 42,409*l.* 14*s.* 3*d.*;\* the number of tenants, 14,058, and—

High services . . . .	£10,763 17 5
Extra services . . . .	3,334 0 5
<hr/>	
Together . . . .	£14,097 17 10

Being in like manner deducted, leaves 28,311*l.* 16*s.* 5*d.*, giving a mean charge for each tenant for ordinary service of 2*l.* 0*s.* 3*d.*, or 15 per cent. below the mean rates of 1819.† The amount received for high service has increased, although the rate per tenement is somewhat lower than in 1819: this has arisen partly from the altered habits of the community, and partly from the discontinuance of force pumps. It should be recollected, moreover, that high service now means something totally different from high service 30 years ago; that water is used with a profusion then unknown on the upper floors of lofty houses; that water-closets have become universal, several each to the better classes of houses; and that baths, for which a separate charge is, in point of fact, rarely made, are common in many of the houses in the newer parts of London. But with reference to the conduct of the Company, it must be also borne in mind that a separate rate for high service not only formed a distinct part of the understanding with the Committee of 1821, but has been sanctioned by the Legislature as a legitimate charge in every 'Water-works' Act passed from that year to the present time. The fair comparison is with the ordinary rates of 1819; and on such comparison it cannot be denied but that the Company have carried out with fidelity the understanding of that period,—the rather when it is recollected that their main increase of revenue has arisen from the new buildings in Paddington, almost all of them of the better description of tenements.

8. On the financial branch of the question, the Directors will only trouble the Commissioners with one other observation. It will be observed (in reply to Query 5) that of the 50,000*l.* raised in 1826 only 18,500*l.* was called for in money, the balance on the 1,000 shares, 31,500*l.* being already in hand from the savings on revenue. The Directors submit that this was as undeniably a contribution from the

\* See Note (†) p. 58.

† The above comparison, however, is subject to the following observation. The means do not now exist of ascertaining with precision, whether the number of tenants stated to the committee of 1821 had been calculated upon the same principle as has of late years been adopted. Now, the exact number of separate tenements (classing under this head, stables where separately served, and having living rooms over) is known; formerly the number of tenants only was known, and one sum of rent received from a person compounding for several houses was considered as only one supply. The rental book of 1820, recently cast up, shows a total of 6,601 tenants, 579 less than the Parliamentary return, but it cannot now be ascertained whether this difference arose from the cause above stated, and if so, whether it were sufficient for the purpose. Taking, however, all circumstances into consideration, there can be no doubt of the mean rates at this period being below the mean rates of 1819.



shareholders as the 18,500*l.* which was paid in calls. It was money legally their own, and which they might have divided (the rather as they had been many years without dividends), but which they abstained from taking, in order to apply it to the improvement of the works. The Directors of the Grand Junction Company, with the full acquiescence of the proprietors, have always abstained from dividing the entire amount of the annual profits as appearing on a contrast of the income with the current expenses. They have done so for a double reason: first, because an exact annual division of the profits would have led to a fluctuation of dividends, always to be deprecated as conducing to gambling in shares, and also as giving the better-informed shareholders an advantage over persons less conversant with business; and, secondly, because the peculiar character of a Water Company's business renders necessary a constant small outlay of capital for extension of mains, which it would be manifestly inconvenient to call up year by year. It has always been thought better accordingly to reserve some net income in hand rather than to divide it to the utmost shilling and call again for precisely a like sum from the shareholders as fresh capital. It is, however, quite clear that had this been done (and under a strict interpretation of their Act of incorporation perhaps it ought to have been done) there could have been no doubt as to the outlay being capital, and it must therefore be fair so to consider it, notwithstanding the source whence it was derived. The total sum so reserved and expended during the 30 years has been 111,168*l.* 10*s.* 9*d.*; had the whole been divided from year to year, and an equivalent amount of money called up from the proprietors, the share capital of the Company (that on which dividends are paid) would have been by so much the larger, the dividends therefore lower, and the apparent rate of interest on the capital stock of the Company less; but the real result would have been precisely the same.

9. But what have the Company done in the way of improving their supply of water, in return for increase of revenue arising from the growth of their district? To appreciate fairly the conduct of the Company in this particular, it should be known what were their Parliamentary obligations. The Company was incorporated to exercise powers of water supply, originally granted to the Grand Junction Canal Company, and first served water taken from the canal. In 1821–22 the source of supply was changed to the Thames. The motive for this change was to get an unlimited command of water, it having become probable that the canal could not at all seasons supply the growing wants of the district. It should be clearly understood, however, that the change was in accordance with the opinion of the Company's tenants, complaints having been frequently made that the water from the canal (derived mainly from the Colne) was harder than that which they had formerly had from the Chelsea Company.

10. In changing the source of supply to the Thames, the great and wholly unaccountable error was committed of placing the mouth of the culvert-pipe in close proximity to the point of confluence of the Ranelagh sewer. The Company's engineer of that day, under whose supervision it was so placed, certainly contended that by some arrangements he had made the injury occasioned was only apparent and not real, and, as the Directors believe, there was truth in the allegation; but the



Grand Junction Water Company.

blunder was scarcely the more pardonable. It was, moreover, wholly gratuitous, as the works were constructed, not at the expense of the Grand Junction Company, but the Regent's Canal Company, as an equivalent for obtaining the surplus water of the Grand Junction Canal, and must have been so placed and so constructed as the Grand Junction Company should require. This position of the culvert was the cause or the pretext \* of the attack on the Company contained in the pamphlet called the "Dolphin," and the occasion of the appointment of the Commission of 1828 for inquiring into the state of the supply of water to the metropolis. The Commissioners are aware that no general legislative interference ensued on the Report of that Commission; but as regarded the Grand Junction Company, the suction-pipe was extended so far into the river as to be obviously beyond the influence of the Ranelagh drainage. A clause had been introduced into a private Bill, brought into Parliament by the Company in 1826, rendering it obligatory on them to deliver no water to their tenants which had not been previously deposited in reservoirs of not less than three acres in extent; and although they were already in possession of reservoirs which would have enabled them to comply with this provision, they constructed another reservoir of about 2½ acres on some high ground they possessed at Paddington. They were thus in a condition to more than fulfil their Parliamentary obligations, and might, without the possibility of their conduct being impeached, have divided as profits the whole of their increasing revenue.

11. The Company, however, were of opinion that while, in accordance with the principles laid down by the Committee of 1821, they were left in undisturbed possession of a district comprehending some of the best portions of the metropolis, their duty to the public coincided with an enlarged view of their own interests in dictating the selection of some source of supply which should be wholly unobjectionable. They accordingly had various plans under consideration, among them one for returning to the Colne; but all were ultimately abandoned, and the plan on which their present works are constructed adopted in 1834. A particular description of those works is given in the answers to the queries. The outlay incurred by their formation has somewhat exceeded 170,000*l.*; and this outlay, it should be clearly understood, was wholly gratuitous, the Company having been under no parliamentary obligation either to move their source of supply, or to filter the water they delivered. It may be added that filtration, in addition to the first cost of the lifting engines and filtering reservoirs, occasions a considerable annual expense, both in pumping, and cleansing, and renewing the filter-beds. The Directors wish to claim no especial merit for the Company's having thus acted; they are aware that such conduct would have been dictated by a regard to the interests of the proprietors alone; but they may, perhaps, be permitted to add, that it is also evidence of the existence, on the part of the Company, of a sincere anxiety faithfully and efficiently to discharge their duties towards the public.

12. The Directors believe that the Company now gives a supply

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\* The real motives were very different from those alleged; but it would be as unnecessary, as it would be painful, to open up the history of this bygone matter.



which cannot be surpassed. The quantity is more than ample, and the quality at least as good as, possibly better than, could be got from any other source. The waters of the Colne or the Wandle are harder than those of the Thames; and, with reference to the Thames itself, it may at least be doubted (freedom from intermixture with London drainage being secured) whether there is any sufficient motive for seeking the source of supply higher up the stream. Speaking generally, a large river will be a better source of supply than a smaller one, any possible cause of deterioration in its downward course being more than compensated for by the depuration produced in a length of flow by the action of the atmosphere, deposition, and perhaps other causes.

13. In point of fact, there are never any complaints of either the quantity or the quality of the water supplied by the Company; and this leads to the consideration of the last point on which the Directors feel it necessary to trespass on the attention of the Commissioners, viz., the substitution of what has been called the "continuous," for the present system of supply. On the question generally, the Commissioners are no doubt so fully informed as to render it unnecessary for the Directors to enter on any general comparison of the merits of the two systems; but they may be permitted to suggest one or two considerations applying more particularly to the district of the Grand Junction Company. The great value of the "continuous" system is its being better adapted to the supply of the dwellings of the poor; but there are scarcely any dwellings that can be so characterized in the Grand Junction district. Speaking of the district generally, the houses are amply furnished with cisterns; and although, as far as the Company is concerned, the "continuous" system would be more economical, the Directors do not believe that it would insure to the Company's tenants a more efficient service of water than they at present receive, while it would, they apprehend, involve the necessity of a stricter supervision as regards waste than has hitherto been customary in the Grand Junction district. The substitution of the "continuous" for the present system, moreover, could not be made without a considerable change in the internal arrangement of houses—a diminution, probably, of the number of cisterns, certainly the suppression of waste-pipes, and probably a change of all, or nearly all, the lead service-pipes, which are strong enough to bear the flow of water through them, but not to endure a dead pressure of from 100 feet to 200 feet. They may add that, if they have been correctly informed, stoppage of supply from frost (the service-pipes being always full) is more felt in towns supplied on the continuous system than in London. The Directors have thought it their duty to throw out these suggestions for the consideration of the Commissioners; but they wish it to be understood that the Company has ample power to give a continuous supply if the change should be thought desirable, and will willingly adopt the system if armed by Parliament with the necessary powers to enforce the regulations indispensable to its working.

I am, Sir,

Your most obedient servant,

Alexander Bain, Esq.

W. M. COE, Secretary.



Kent Water  
Company.

## RETURN from the KENT WATER COMPANY.

1. What is the name of your Company?—The Company of Proprietors of the Kent Water-works.
2. Will you recite your Act or Acts of Parliament?—49th Geo. III., c. 189, and 51 Geo. III. c. 145.
3. What are the sources of supply?—The river Ravensbourne.
4. What is the number of shares?—2,310 shares are issued.
5. What is the amount paid upon each share?—Issued at various prices, producing 183,104*l.* 13*s.* 6*d.*
6. What is the total amount of subscription paid up?—

	£.	s.	d.
Raised by shares . . . .	183,104	13	6
On mortgage . . . .	19,000	0	0
Total capital raised . . .	£202,104	13	6

7. What has been the total expenditure on the works?—The Company's books do not contain any account showing this result. For many years a large proportion of the earnings was laid out in purchase of pipes and other works properly chargeable to capital, which would be to be added to the 202,104*l.* 13*s.* 6*d.* actually raised as capital.

8. Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing works?—The Kent Water-works Company supply a part of Camberwell, a part of Rotherhithe, the parishes of St. Paul and St. Nicholas Deptford, Greenwich and Woolwich, parts of Lee, Lewisham, Charlton, and Plumstead; these towns being widely detached the Company's plans are not connected, the accompanying engraved map has the Company's district distinguished by a red tint. There are no competing works.

9. Set forth the position of the sources of supply; the engine-houses and the reservoirs, for storage or filtration?—(See accompanying plan).

10. Describe the capacity and construction of the reservoirs?—The capacity of the reservoirs at the works for water previous to filtration is 4,845,410 gallons. The reservoirs for filtered water are situate in Greenwich Park, on Woolwich Common, and near the Marine Barracks at Woolwich. These reservoirs will contain together 3,865,344 gallons, they are formed partly by excavation and embankment, and are lined either with concrete or Kentish rag-stone, and are securely enclosed. It is from these reservoirs that fire-mains are laid to command the docks and victualling-yards at Deptford, Greenwich Hospital, the dockyard at Woolwich, the Marine Barracks, and the Artillery Barracks, the pressure being constant and sufficient to raise water over any buildings in the above establishments without the use of fire-engines.

11. Give the internal and external diameter in inches and length in yards of—1st. The largest trunk main, and of the 2nd and 3rd, and other sizes of trunk mains?—

403 yards of 24 inch main			
681	,,	18	,,
150	,,	14	,,
5,085	,,	12	,,
15,657	,,	10	,,



2nd. Branch mains, distinguishing lengths and diameters of the various sizes?—Kent Water Company.

12,193 yards of 8 inch mains  
 12,498   ,,   6   ,,  
 1,933   ,,   5   ,,

3rd. Side services, distinguishing length and diameter as above?—

32,308 yards of 4 inch service  
 66,370   ,,   3   ,,

4th. Services for small streets, distinguished as above?—

2,325 yards of 2 inch service  
 822   ,,   1½   ,,

12. Is the whole of the water which is supplied, filtered?—Yes. The result will be seen in Professor Brande's report at the end of this return.

13. Describe the methods of filtration?—In two basins lined bottom and sides with brickwork. The filtering medium is clean washed gravel at the bottom, with a layer of shells on the gravel, and sand on the shells. The sand surface is  $1\frac{1}{4}$  acre, on which the water is admitted, and passes through it direct to the engine pumps.

14. What is the amount of steam power employed? of coals burnt under the boilers, and price of the coals; also quantity of water used in the boilers?—Two Boulton and Watt engines of 38 inches cylinder, 8 feet stroke. One Cornish engine of 70-inch cylinder, 10 feet stroke. Coals used in 1849, 710 tons; average price 21s. per ton.

15. How frequently is the supply given, distinguishing different districts, in case it varies therein?—Six days per week; and to railways and Government establishment at Woolwich, seven days. Turnpike roads are partially watered on Sundays.

As this question has a direct reference to the system of constant supply it should be understood that the whole of the works have recently been remodelled and enlarged, and are applicable to the system of constant supply at efficient pressure.

It will be necessary, previous to the adoption of this mode, that power shall be given to make the necessary changes in the arrangements now existing in the houses of the Company's tenants for receiving the water, and to enforce all regulations usually adopted in towns now in supply under this system. To small tenements let at weekly rents, where the constant change of occupants does not induce the tenants to provide receptacles for retaining water, or proper care of such receptacles when provided for them, to this class of houses the change from an intermittent to a constant supply would be an undoubted improvement; but unless the owners were in all cases required to lay efficient pipes and affix approved cocks, to keep them in repair, and to be responsible for any agreed charge, a waste of water would ensue that would disturb the supply to the vicinity. It is obvious, that with the facility of access to an unfailing source, but few houses would be paid for, while, in fact, the whole of such districts would be in supply, unless, as above suggested, there was an obligation on all owners to take and pay for water.

If these difficulties, at present unsurmountable by the Company, could



Kent Water  
Company.

be removed, the Kent Water-works could, from existing arrangements, supply this district at all points with efficient pressure to any part of the buildings.

16. What is the total number of tenements supplied, distinguishing dwelling-houses of 1st class, 2nd class, 3rd class, and 4th class?—

1st Class .	3,633	supplied at 16s. and under
2nd Class .	2,954	,, 16s. to 26s.
3rd Class .	2,819	,, 26s. to 40s.
4th Class .	1,020	,, 40s. and upwards.

10,456 less 824 empty houses, leaving 9632 houses in supply.

Also distinguishing those who have pipes on the main with constant supply, as many hatters have?—None.

And large consumers, distinguishing, as nearly as you can, the classes as set down—

500 and under 1,000 daily ?—	Five.
1,000 ,, 2,000 ?—	Six.
2,000 ,, 3,000 ?	
3,000 ,, 4,000 ?	
4,000 ,, 5,000 ?	
5,000 and upwards ?—	Two.

17. What number of dwelling-houses supplied have not the water laid on, but take their supply from stand-cocks?—430.

18. How many courts and houses are there in your district that cannot be supplied for want of drains to carry off the water if it were laid on?—The Kent Water-works district is, with a few exceptions, either surface-drained or by cesspools; and as the streets, &c. are for the most part with a good fall to the Thames, the difficulty supposed by the question has not yet been experienced.

19. What is the total number of stand-cocks?—Fifty.

20. Greatest number of houses and persons to one stand-cock?—Twelve houses.

21. Least average?—One house.

22. How many hours per day are they running, and what is the run from each per hour?—Average two hours per day, and can deliver at each cock an average of 1,400 gallons per hour.

23. What is the total number of fire-plugs?—770 fire-plugs; and 44 iron stand-posts, with screws attached for leather hose.

In addition, a separate fire-main, with fire-cocks, and with a pressure equal to 140 feet head of water, maintained day and night, with provision for doubling this pressure in case of accident; is extended throughout Her Majesty's Dock-yard, Deptford; Victualling-yard, Deptford; Greenwich Hospital; Royal Observatory; with constant pressure of 100 feet. Marine Barracks, Woolwich; Artillery Barracks, Woolwich; Dock-yard, Woolwich; constant pressure of above 200 feet. And main in connexion with the reservoir used for the protection of the Royal Arsenal.

In addition, several public and private establishments have special protection from fire in connexion with the Company's works.

24. Can you state the total number of dwelling-houses with water-



closets supplied, and those with baths supplied?—As there is no extra charge made for water-closets or baths, there is no record made of the number supplied.

25. What has been the total number of gallons delivered, distinguishing that pumped away during last year?—393,948,750 gallons, in 1849.

26. What has been the total quantity delivered, distinguishing that pumped during the year preceding?—330,170,810 gallons, in 1848.

27. What was the quantity delivered, distinguishing that pumped per month last year?—

	Gallons.
1849. January . . . . .	23,527,460
February . . . . .	24,349,940
March . . . . .	32,042,580
April . . . . .	21,648,970
May . . . . .	34,882,100
June . . . . .	38,841,400
July . . . . .	44,009,640
August . . . . .	38,663,600
September . . . . .	32,240,760
October . . . . .	34,646,520
November . . . . .	36,481,080
December . . . . .	32,614,650

28. What has been the average quantity delivered to each dwelling-house per diem during the last year?—91·8 gallons, seven days per week.

Attention is requested to this reply, as approximating more nearly than usual to the actual quantity required for use as distinguished from waste.

Care has been taken that the above reply shall represent faithfully, and independent of all other supplies, the quantity required by the private houses.

In a suburban district like the “Kent,” there is, without doubt, more water used and less wasted than in and nearer to London; the demand for washing, gardens, and many other out-door purposes less applicable to houses in the metropolis, increases the quantity used, while the absence of sewers diminishes the waste.

It must be observed, with reference to the above average, that there are positively no restrictions upon the use of the water, nor any limit to supply beyond the size of the receptacles to receive the water. The only rule of supply is to keep the service open until the highest house has its last cistern filled.

29. What has been the average quantity delivered to large consumers per diem during the last year?—37,490 gallons per diem, seven days per week.

30. What has been the quantity delivered by special agreements at a special rent?—31,320,000 gallons.

31. What has been the quantity supplied for street-watering?—22,520,000 gallons, delivered at an average pressure of 215 feet head of water.

32. And at what charge or charges?—14s. per 100 tons.

33. Quantity supplied for fires?—About 180,000 gallons.



Kent Water  
Company.

34. Quantity supplied for flushing?—3,423,600 gallons, for which no remuneration whatever has been received.

35. State (if known) the average quantity of water used per mile for road-watering per diem, distinguishing paved and macadamized roadways?—This is so dependent upon the varying surfaces of the roads and streets, and greatly upon weather, that no correct information can be furnished.

36. What is the quantity supplied for other special purposes?—None.

37. What is the highest service afforded by the Company above high-water mark?—220 feet.

38. What is the lowest service?—High-water mark.

39. What height of supply do you consider and charge for as high service?—The Kent Water-works district has two divisions, each having separate engines and mains.

The pressure on the lower division averages 160 feet head of water at the works.

The pressure on the upper division is 275 feet at an average.

Each division has its own scale of charges, without reference to the height of the cisterns supplied, which may be placed at the tenant's pleasure at any part of the premises in supply.

40. Will you state your scale of charges for water supply?—According to class of house, from 4s. to 5s. per room on the lower district, and from 5s. to 7s. per room on the upper district, delivered at any part of the premises at the tenant's option; and the above rates include all charges upon the premises supplied. A reduction of 25 per cent. is made when houses are farmed.

41. What was the yearly produce of the water rents for the last year made up?—14,442*l.* 13*s.* 3*d.* for the year ending 31st December, 1849.

42. Will you give the annual amount of expenses, under such heads as they can be furnished?—

	£.	s.	d.
Tradesmen's bills . . . . .	1,670	11	1
Rates and taxes, income tax, rent of springs, and reservoirs, insurance . . . . .	864	17	7
Salaries, poundage to collectors, directors and auditors . . . . .	1,880	17	7
Workmen's wages, and sundries . . . . .	1,571	4	1
Interest of mortgage . . . . .	866	9	8

43. What is the number of turncocks and other servants employed?—*Permanent.*—Seven turncocks, three engine-keepers, three stokers, and seven labourers.

*Casual.*—Labourers for cleansing filter-beds, reservoirs, river, and to repair accidents.

44. What was the last dividend per share?—4*l.* per annum.

45. Dividend per cent. on the total cost of works?—For the reasons already stated, this cannot be now correctly ascertained.

46. Dividend per cent. on the paid-up capital?—The dividend is about 5*l.* per cent. on the capital actually raised on shares and on mortgage.



The filtered water delivered by the Company (and they deliver none other) was analysed by Professor Brande, F.R.S., in September last, when he personally took samples of the water for that purpose. His analysis, dated 14th September, 1849, is as follows:—

In one imperial gallon of filtered water—

	Grains. 10th of a grain.	
Carbonate of lime . . . . .	9	9
Carbonate of magnesia . . . . .	traces.	
Sulphate of lime . . . . .	2	5
Sulphate of soda . . . . .	1	5
Chloride of sodium . . . . .	3	7
Alumina, with a trace of iron ; silica ; organic matter, with traces of a nitrate . . . . .	1	1
	18	7

The water appears to contain no appreciable trace of the salts of potassa, no phosphates, no carbonate of soda. The filtered water is free from animalcules, vegetable films, and suspended earthy matter, and is bright.

(Signed) WILLIAM THOMAS BRANDE.

E. E. GEORGE MARTEN,

*Secretary to the Kent Water-works Company.*

*Mincing-lane, March 5, 1850.*

47. In relation to the additional queries relative to the charges made by the Company for water supplied by them I am desired to state, that as, in their diatriet, the charge for a house of any given number of rooms would depend on the size of the house to be supplied, its situation and other particulars affecting its relative value, and the probable consumption of water in it, the Board are unable to give any more definite answer to the queries now sent on the subject of their charges than they have already given in their replies to your former queries. It is, however, right to repeat that the Kent Water-works Company make no extra charge for what, in popular language, is called high service, or for water-closets, or (except in extraordinary and exceptional cases) for stabling, or gardens attached to a dwelling-house, unless there is a separate service pipe laid on for supplying them distinct from the pipe communicating with the house.

(Signed) GEORGE MARTEN.

#### RETURN from the HAMPSTEAD WATER COMPANY.

What is the name of your Company?—The Hampstead Water-works Company.

Will you recite your Act or Acts of Parliament?—The 35th King Henry VIII., cap. 10.

What are the sources of supply?—Springs at Hampstead, Ken Wood, two Artesian wells, and temporarily the New River.

What is the number of shares?—Six hundred.

Hampstead  
Water  
Company.



Hampstead  
Water  
Company.  
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What is the amount paid up on each share; and what is the total amount of subscription paid up?—A fire occurred at the Company's Office in 1763, and all their Records were burnt, except a Copy of the Articles of their Constitution, a List of Proprietors, and a few unimportant papers, which were at the time in the hands of the Chairman. From the former of these it appears that, in 1692, the City of London granted a lease (renewable every 21 years on payment of a fine of one years' improved value) of the exercise of the powers of the Act before recited, in the parishes of St. Pancras, Hampstead, and Hornsey; the rent reserved was 80*l.* a-year. The lessees formed a Company, divided the undertaking into 600 shares, and the first contribution was 20*l.* per share. There are unfortunately no means of ascertaining the amount of subsequent calls. It was stated, in an action brought by the Lord of the Manor of Hampstead against the Company in 1768, that upwards of 60,000*l.* had been expended on the works up to that period.

What has been the total expenditure on the works?—From the circumstances just alluded to, it is very difficult to reply satisfactorily to this question: assuming, however, that 60,000*l.* had been expended on the works from 1692 to 1763, and adding thereto the outlay from 1763 to 1849, the total expenditure would amount to 121,231*l.* From a careful survey of the works, it may be estimated that about 20,000*l.* was the proportion of the capital expended on the formation of the reservoirs up to 1763, and that the remaining 40,000*l.* was the cost of the pipes, &c.; these being of wood, are long since decayed. The cost of substitution of iron for wood pipes is included in the subsequent outlay. Deducting therefore 40,000*l.* from the total expenditure of 121,231*l.*, it results that the capital invested in these works, as they now exist, amounts to 81,231*l.*

Will you give a tracing of the district supplied, showing your main lines, and distinguishing severally over what portions of the district (if any) there are one, two, or more competing works?—The district supplied by these works is set out on the accompanying map of the parish of St. Pancras, together with the other particulars required by these questions. There are no competing works in this district.

Set forth the position of the sources of supply, the engine-houses, and the reservoirs for storage or filtration?—[No answer.]

Describe the capacity and construction of the reservoirs?—The reservoirs are formed by embankments across the valleys between Highgate and Hampstead at different elevations. Their total superficial area, when full, is about 35 acres; the depths vary considerably, and the bottom is so irregular, that no estimate has ever been made of their total capacity that can be depended on.

Give the internal and external diameter in inches, and length in yards, of

1. The largest trunk-main, and of the 2nd, 3rd, and other sizes of trunk-mains.
2. Branch-mains, distinguishing length and diameter of the various sizes.
3. Side-services, distinguishing length and diameter as above.
4. Services for small streets, distinguishing as above?—
  1. 453 yards, 12 inches, internal diameter.
  - 9,878 yards, 7 inches,       ,,       ,,



2. 340 yards, 6 inches, internal diameter.
- 3,306 yards, 5 inches, „ „
3. 28,221 yards, 4 inches, „ „
4. 3,913 yards, 3 inches, „ „

Is the whole of the water which is supplied filtered?—No, part of the water is filtered.

Describe the method of filtration?—[No answer.]

What is the amount of steam-power employed? of coals burnt under the boilers, and price of the coals, also quantity of water used in the boilers?—One high-pressure non-condensing engine, of 12-horse power, one Cornish pumping-engine with a 44-inch cylinder and 10-feet stroke, equal to about 60-horse power. To avoid the annoyance of smoke to the neighbourhood, Merthyr coals are used. The quantity burnt under the boilers for the year 1849 was 234 tons, and the price, including the land-carriage, 28s. per ton. The quantity of water used in the boilers is not gauged.

How frequently is the supply given; distinguishing different districts in case it varies therein?—The supply is given three days a week throughout the district.

What is the total number of tenements supplied, distinguishing 1st, 2nd, 3rd, and 4th class dwelling-houses; also distinguishing those who have pipes on the main with constant supply, as many hatters have; and large consumers, distinguishing as nearly as you are able the classes as set down—

500 and under 1,000 daily			
1,000	„	2,000	„
2,000	„	3,000	„
3,000	„	4,000	„
4,000	„	5,000	„
5,000 and upwards?—			

The total number of houses supplied during the year 1849 was 4490, empty houses inclusive. We have no data from which to make a return, distinguishing the classes, as required by this question. Five of the houses have pipes on the main, for the convenience of the Company; there being no side-services near, and consequently no extra charge is made. One, 500 gallons per diem for 6 days per week; two, 1,500 gallons per diem for 6 days per week.

What number of dwelling-houses supplied have not the water laid on, but take their supply from stand-cocks?—Twelve.

How many courts and houses are there in your district that cannot be supplied for want of drains to carry off the water if it were laid on?—We know of none.

What is the total number of stand-cocks? greatest number of houses and persons to one stand-cock, least average?—Two; one supplying eight tenements of four rooms each, the other four tenements of two rooms each.

How many hours per day are they running, and what is the run from each per hour?—The stand-pipes are furnished with cocks, and the tenants draw during the time of service. That which supplies the eight tenements is on about 3 hours, the other  $1\frac{1}{2}$  hour.

What is the total number of fire-plugs?—Four hundred and sixty.

Can you state the number of dwelling-houses with water-closets sup-



Hampstead  
Water  
Company.  
—

plied, and those with baths supplied?—We cannot state the number of houses with water-closets or baths.

What has been the total number of gallons delivered, distinguishing that pumped, during the last year?—We have no means of determining the quantity delivered during the early part of the year, as at that time the runs into the reservoirs considerably exceed the quantity withdrawn. These runs continued last year until the end of May, and recommenced the beginning of December; we can therefore only furnish an account of the quantity drawn from the reservoirs from June 1st to December 1st, which amounted to 35,578,000 gallons. The quantity pumped during the same period, including the temporary supply afforded by the New River Company, was 42,435,000 gallons, making a total of 78,013,000 gallons delivered in the six months.

What has been the total quantity delivered, distinguishing that pumped during the year preceding?—We have no data which enable us to answer this question.

What was the quantity delivered, distinguishing that pumped per month during the last year?—We have no data to determine the quantity drawn from the reservoirs per month. The quantity returned as pumped was the same for each of the six months stated.

What has been the average quantity delivered to each dwelling-house per diem during the last year?—Deducting from the total quantity delivered for the six months, the estimated quantity furnished for road-watering, flushing, and large consumers, the average quantity delivered to each house was 86 gallons per diem.

What has been the average quantity delivered to large consumers per diem during the last year?—3000 gallons per diem, exclusive of the road-watering and flushing.

What has been the quantity delivered, by special agreements, at a special rent?—None.

What has been the quantity supplied for street-watering, and at what charge or charges, quantity supplied for fires, quantity supplied for flushing?—Five miles of roadways and streets are watered from these works, the water consumed is estimated at 43,200 gallons per day. The charge for the season, which begins in March and ends in September, is 60*l.* per mile. For flushing, the quantity estimated was 27,000 gallons per day, from June 20th to August 20th, for this supply no charge has been made. The quantity supplied for fires has never been estimated; not half-a-dozen fires have occurred in this district for the last 20 years.

State (if known) the average quantity of water used per mile for road-watering, per diem, distinguishing paved and macadamized roadways?—The roadways and streets, watered from these works, are all macadamized; the average quantity consumed per mile per diem is estimated at 8640 gallons.

What was the quantity supplied for other special purposes?—None.

What is the highest service afforded by the Company above high-water mark?—The highest service in this district is 215 feet above high-water mark.

What is the lowest service?—The lowest service is 60 feet above high-water mark.

What height of supply do you consider and charge for as high ser-



vice?—Exceeding 7 feet above the level of the foot-pavement in front of the house.

Hampstead  
Water  
Company.

Will you state your scale of charges for water-supply?—For the better description of houses, from 3*s.* 9*d.* to 6*s.* per room, according to the frontage and extent of building and premises; for the lowest class of houses, the number of which is small in this district, the water-rent is generally farmed by the landlord at a considerable reduction from the lowest of these rates.

What was the yearly produce of the water-rents for the last year made up?—The produce of the water-rents, for the year made up, to 31st of March, 1849, was 7009*l.* 12*s.* 10*d.*

Will you give the annual amount of expenses under such heads as they can be furnished?—

Remuneration to Directors . . . . .	£75
Secretary's Salary . . . . .	£60
Poundage on Collection . . . . .	350
	<hr/>
	410
Engineer and Inspector's salary . . . . .	100
Rents, Rates, and Taxes . . . . .	412
Rent of Office . . . . .	60
Printing, Stationery, Stamps, Postage, and sundry	
Office expenses . . . . .	100
Turncocks' and Labourers' Wages . . . . .	366
Tools, Smiths' work, &c. . . . .	50
Engine-drivers and Stokers' Wages, Tallow, Oil, and	
Engine-house expenses . . . . .	300
Coals for Engines . . . . .	327
New River Company for Water . . . . .	966
Repairs to Pond-heads, being an average of 20 years .	110
Repairs to Engines and Pumps . . . . .	150
Plumbing and repairs to Pipes, Cocks, Plugs, &c. .	50
	<hr/>
	£3476

What is the number of turncocks and other servants employed?—2 engine-drivers, 2 stokers, 1 foreman, 2 turncocks, 1 walksman at reservoirs, and 3 labourers.

What was the last dividend per share?—2*l.* 5*s.*

Dividend per cent. on the total cost of works?—1*l.* 13*s.* 1½*d.* per cent. on 81,000*l.*

Dividend per cent. on the paid up capital?—The paid up capital being unknown, for the reasons stated in reply to the 5th and 6th queries, this question cannot be answered with any certainty. It may be proper, however, to mention, that since the formation of the Company in 1692, a period of 157 years, 95 dividends only have been paid, averaging 13*s.* 10½*d.* per share, or 8*s.* 6*d.* per share per annum.

Of the total amount of rates levied by your Company, how much is received for high service?—441*l.* 5*s.* 6*d.*

What is the total cost of collection of the rates?—Five per cent. on the amount received.



Hampstead  
Water  
Company.

STATEMENT of the Charges which would be made by the Hampstead Waterworks Company for Water Supply, on High and Low Service, in the undermentioned cases, according to the existing Scale of the Company.

Low Service—

Houses not exceeding 15 feet in frontage,	4s. 0d. per room per ann.
„ above 15 ft. and not exceeding 18 ft.	4s. 6d. „
„ „ 18 „ „ 21 „	5s. 0d. „
„ „ 21 „ „ 24 „	5s. 6d. „
„ „ 24 ft. . . . .	6s. 0d. „

High Service—

	More than 7 ft. and not exceed- ing 14 ft. above the pavement, per cent. extra.	Exceeding 14 ft., per cent. extra.
Houses, the low service rate of which does not exceed 1l. 4s. per annum . . . . .	25	30
Houses above 1l. 4s. and not exceeding 1l. 10s. per annum . . . . .	30	40
Houses above 1l. 10s. . . . .	40	50

No extra charge for water-closets.

Coach-houses, 10s. per annum for each carriage-standing.

Stables, 5s. per annum for each stall.



6  
REVIEW

OF

THE REPORT

BY

THE GENERAL BOARD OF HEALTH

ON THE

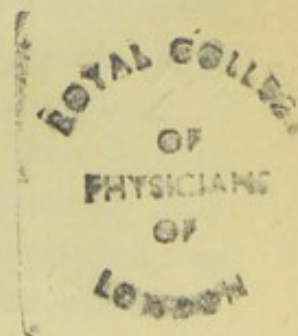
*Supply of Water to the Metropolis;*

CONTAINED IN A REPORT TO THE DIRECTORS OF

THE LONDON (WATFORD) SPRING WATER COMPANY.

BY

SAMUEL COLLETT HOMERSHAM, C.E.



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LONDON :

JOHN WEALE, 59, HIGH HOLBORN.

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1850.







