[Report of the Medical Officer of Health for Limehouse].

Contributors

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Publication/Creation

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BOARD OF WORKS

FOR THE

LIMEHOUSE DISTRICT.

STATEMENT of ACCOUNTS, REPORTS, &c., from Lady-day, 1866, to Lady-day, 1867.

BOARD OF WORKS

FOR THE

LIMEHOUSE DISTRICT.

STATEMENT of ACCOUNTS, REPORTS, &c., from Lady-day, 1866, to Lady-day, 1867.

BOARD OF WORKS

FOR THE

LIMEHOUSE DISTRICT,

1866-67.

MEMBERS FOR LIMEHOUSE.

Mr. THOMAS BLUNDELL.
„ BENJAMIN DIXON.
„ WILLIAM FARR.
„ WILLIAM GRAY.
„ JOHN ROBERT HARPER.
„ WILLIAM RUNDELL HODGE.
„ WILLIAM BENSLEY HOPSON
„ JAMES EDWARD HORN.
„ WILLIAM NATHAN.
„ FREDERICK PEACHEY.
„ THOMAS CARTER POTTO.
„ JAMES THOMAS ROBERTSON
„ ISAAC SNAPE.
, JAMES THOMAS.
„ JOHN WOODLEY.

MEMBERS FOR WAPPING.

Mr. EDWARD MIDDLETON.
„ ROBERT MORTON.
„ WILLIAM ROSE.

MEMBERS FOR RATCLIFF.

Mr. WILLIAM BARRATT.
„ EDWIN AUGUSTUS CREER.
„ JAMES GILRUTH.
„ FRANCIS HARRISON.
„ EDWARD CHARLES HOOD.
„ JOSEPH MYERSCOUGH.
„ JAMES HICKS PARKINSON.
„ HENRY ROLLINSON.
„ JOSEPH HUGHES.
„ JOHN SHERREN.
„ THOMAS WALTER.
„ HENRY WEST.

MEMBERS FOR SHADWELL.

Mr. JOHN ARTHUR.
„ ROBERT BOYD.
„ HENRY FRIEBERG ISAAC.
„ DANIEL ROSS.
„ WILLIAM RUMSEY.
„ JOHN WATERS.

BENJAMIN DIXON, Esq., represents the Board at the Metropolitan Board of Works.

OFFICES OF THE BOARD.

WHITE HORSE STREET, COMMERCIAL ROAD, EAST.

TREASURER—WILLIAM BIRD, Esq., London Joint Stock Bank.

CLERK OF THE BOARD—MR. THOMAS WRAKE RATCLIFF.

SURVEYOR—MR. CHARLES DUNCH.

MEDICAL OFFICER OF HEALTH—MR. THOMAS ORTON.

INSPECTORS OF NUISANCES AND STREETS.

For No. 1 District—GEORGE HURLOCK.

For No. 2 District—WALTER BURGIN.

For No. 3 District—THOMAS STACE.

OFFICE CLERK—JAMES BENSLEY.

No.

No. 1.

BOARD OF WORKS FO[R] [T]HE LIMEHOUSE DISTRICT.

Comprising the Parish of Limehouse, the Hamlet [o]f Ratcliff, and the Parishes of Shadwell and Wapping.

Revenue and Outlay from Le[ady-day] 1866, to Lady-day, 1867.

REVENUE.

	£	s.
Balance brought forward	2,849	15
To Cash of Overseers of the Parishes in the District upon Order of Contribution, viz.:—		
General purposes 16,700 0 0		
Sewerage do. 1,490 0 0		
	18,190	0
,, Ditto to meet Precepts of Metropolitan Board	2,724	9
,, Ditto for Main Drainage	2,932	12
,, Ditto for Reinstatements of Paving and Contributions ...	1,109	0
,, Ditto Contributions to Sewers	53	4
,, Ditto Rents, Sundries, &c.	208	4
	£28,067	6

OUTLAY.

	£	s.	d.
Charges for Paving	3,882	6	10
Lighting	3,215	16	8
Cleansing and Watering	2,868	11	9
Stone and Materials	864	19	3
Urinals	110	17	6
Charges on General Rates—			
Interest... ... ... 796 11 9			
Principal repaid 1,919 19 11			
	2,716	11	8
Improvements—			
Limehouse 50 0 0			
Wapping 1,153 10 6			
	1,203	10	6
Common Charges and Sundries	1,214	12	3
Compensations	136	16	2
Rent—Shadwell Stone Yard	12	0	0
Cholera expenses, incurred under order in Council	2,694	1	5
Expenditure on Sewers Account	7,292	7	3
Balance	1,854	15	5
	£28,067	6	8

We hereby certify that we have examined and allowed the Accounts, of which this Account is an abstract.

Dated this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY. } *Auditors.*

No. 2.

GENERAL PU[illegible]ES ACCOUNT.

Revenue and Outlay from La[illegible]866, to Lady-day, 1867.

REVENUE.

	£	s.
Balance brought forward	2,934	17
To Cash received of Overseers of Parishes in the District upon Orders of Contribution...	16,700	0
,, Ditto for Reinstatements of Payments and Contributions ...	1,109	0
,, Ditto Rents, &c.	109	2
,, Ditto for sale of Building Materials—Wapping Improvements	99	1
	£20,952	2

OUTLAY.

	£	s.	d.
[illegible]aving	3,882	6	10
[illegible]ighting	3,215	16	8
[illegible]leansing and Watering	2,868	11	9
[illegible]tone and Materials	864	19	3
[illegible]rinals	110	17	6
[illegible]harges on Rates—			
Interest 796 11 9			
Principal repaid... ... ... 1,919 19 11			
	2,716	11	8
[illegible]nprovement Account...	1,203	10	6
[illegible]ommon Charges and Sundries	1,214	12	3
[illegible]ompensations	136	16	2
[illegible]ent—Shadwell Stone Yard	12	0	0
[illegible]holera expenses, incurred under Order in Council	2,694	1	5
Balance	2,031	18	5
	£20,952	2	5

[illegible]hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ed this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
} *Auditors.*

No. 3.

SEWER[illegible] COUNT.

Revenue and Outlay from Lad[illegible] 1866, *to Lady-day*, 1867.

REVENUE.

	£	s.
To Cash received of Overseers of the Parishes in the District on Orders of Contribution	1,490	0
,, Ditto of ditto to meet Orders of Metropolitan Board	2,724	9
,, Ditto of ditto for Main Drainage	2,932	12
,, Ditto for Contributions to Sewers	53	4
Balance	177	3
	£7,377	9

OUTLAY.

	£	s.	d.
Balance brought forward	85	1	11
[illegible]ayment to Metropolitan Board amount of precept for general expenditure	2.724	9	10
[illegible]Ditto for Main Drainage	2,932	12	0
[illegible]Sewers Construction	83	16	9½
[illegible]Openings	20	15	4½
[illegible]Repairs	76	14	3½
[illegible]Cleansing and Cleansing Cesspools	41	16	3½
[illegible]Incidental Works	8	0	3
[illegible]Carting deposit	20	3	6
[illegible]Flushing and Gullies	260	7	4
[illegible]Common Charges	681	4	6
[illegible]Charges on Rates—			
Interest 175 13 9			
Principal repaid 266 13 4			
	442	7	1
	£7,377	9	2

[illegible]e hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ated this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
} *Auditors.*

No. 4.

PARISH OF LIMEHOUSE.—GENERAL PURPOSES ACCOUNT.

Revenue and Outlay from Lady-day 1866, *to Lady-day*, 1867.

REVENUE.

	£	s.	d.
Balance brought forward	852	15	3
To Cash of Overseers upon Orders of Contribution	5,745	0	0
„ Ditto for Reinstatements of Paving and Contributions ...	632	0	6
„ Ditto Rents, &c.	24	0	0
	£7,253	15	9

OUTLAY.

	£	s.	d.
By Paving	1,009	2	4
„ Lighting	1,249	6	3
„ Cleansing and Watering	1,143	10	6
„ Stone and Materials	758	11	5
„ Urinals	39	15	6
„ Charges on Rates—			
Interest 361 18 11			
Principal repaid 874 12 6			
	1,236	11	5
„ Common Charges and Sundries	424	14	2
„ Compensations	49	5	0
„ Improvements	50	0	0
„ Cholera expenses, incurred by Order in Council	1,035	19	5
Balance	256	19	9¼
	£7,253	15	9¼

We hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

Dated this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
Auditors.

No. 5.

PARISH OF LIMEHOUSE. SEWERS ACCOUNT.

Revenue and Outlay from Lad[illegible] 1866, to Lady-day, 1867.

REVENUE.

	£	s.
Balance brought forward	5	3
To Cash of Overseers upon Orders of Contribution	690	0
„ Ditto Contribution to Sewers...	36	7
„ Ditto of Overseers, Metropolitan Board's General Expenditure	992	12
„ Ditto of ditto on account of Main Drainage	1,098	1
Balance	93	1
	£2,915	5

OUTLAY.

			£	s.	d.
By Sewers Construction			56	6	3
„ Openings			11	19	4
„ Repairs			27	18	8
„ Cleansing and Cleansing Cesspools			37	11	3
„ Incidental Works			2	9	4
„ Carting deposit			16	4	0
„ Flushing and Gullies			97	18	5
„ Common Charges and Sundries			258	12	4
„ Charges on Rates—					
Interest	121	13 0			
Principal repaid	193	19 7			
			315	12	7
„ Metropolitan Board General Expenditure			992	12	6
„ Metropolitan Board Main Drainage			1,098	1	0
			£2,915	5	8

[illegible] hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ted this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
} *Auditors.*

No. 6.

HAMLET OF RATCLIFF. ENERAL PURPOSES ACCOUNT.

Revenue and Outlay from Lad[illegible], 1866. to Lady-day, 1867.

REVENUE.

	£	s.
Balance brought forward	542	0 1
To Cash of Overseers upon Orders of Contribution	4,210	0
,, Ditto for Reinstatements of Paving	298	7
,, Ditto Rents, &c.	28	6
	£5,078	14

OUTLAY.

			£	s.	d.
Paving			2,108	1	0
Lighting			796	6	6
Cleansing and Watering			729	6	9
Stone and Materials			103	19	7
Urinals			29	7	4
Charges on Rates—					
Interest	170	10 3			
Principal repaid	61	6 8			
			231	16	11
Compensations			25	8	10
Common Charges and Sundries			302	5	8
Cholera expenses, incurred under order in Council			644	0	4
Balance			108	1	6¾
			£5,078	14	5¾

[illegible]e hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ted this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
} *Auditors.*

No. 7.

HAMLET OF RATCLIFF[illegible]WERS ACCOUNT.

Revenue and Outlay from La[illegible] 1866, *to Lady day*, 1867.

REVENUE.

	£	s.
To Cash of Overseers upon Orders of Contribution	360	0
,, Ditto Contributions to Sewers	9	11
,, Ditto of Overseers Metropolitan Board General Expenditure	738	0
,, Ditto of ditto Main Drainage	769	10
Balance	53	3
	£1,930	5

OUTLAY.

	£	s.	d.
Balance brought forward	58	10	1¼
Sewers Construction	27	10	6½
Openings	5	14	9
Repairs	24	14	5½
Cleansing and Cleansing Cesspools	2	1	9½
Incidental Works	0	6	4½
Carting deposit	3	4	6
Flushing	68	12	0
Common Charges	178	8	9
Metropolitan Board General Expenditure	738	0	0
Ditto Main Drainage	769	10	0
Charges on Rates—			
Interest 22 18 6			
Principal 30 13 4			
	53	11	10
	£1,930	5	1¼

[illegible] hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ed this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
} *Auditors.*

No. 8.

PARISH OF SHADWELL—GENERAL PURPOSES ACCOUNT.

Revenue and Outlay from La[illegible], 1866, to Lady-day, 1867.

REVENUE.

	£	s.
Balance brought forward	1,153	12
To Cash of Overseers upon Orders of Contribution	3,465	0
„ Ditto for Reinstatements of Paving	113	0
	£4,731	12

OUTLAY.

	£	s.	d.
Paving	291	0	8
Lighting	703	15	6
Cleansing and Watering	524	6	9
Stone and Materials	0	4	9
Urinals	21	8	4
Charges on Rates—			
Interest 131 16 6			
Principal repaid 942 6 0			
	1,074	2	6
Compensations	6	13	4
Common Charges and Sundries	209	2	10
Rent of Stone Yard	12	0	0
Cholera expenses, incurred under Order in Council	501	11	6
Balance	1,387	6	9¾
	£4,731	12	11¾

[illegible] hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ted this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
} *Auditors.*

No. 9.

PARISH OF SHADWELL.—SEWERS ACCOUNT.

Revenue and Outlay from Lad[illegible], 1866, to Lady-day, 1867.

REVENUE.

	£	s.	d.
To Cash of Overseers upon Orders of Contribution	220	0	[illegible]
„ Ditto Contributions to Sewers	3	4	11
„ Ditto Metropolitan Board General Expenditure	498	1	[illegible]
„ Ditto Main Drainage	533	2	[illegible]
Balance	21	10	[illegible]
	£1,275	19	

OUTLAY.

	£	s.	d.
Balance brought forward	20	2	3
By Openings	1	17	10½
Repairs	9	5	4
Incidental Works	5	4	6½
Flushing	47	10	5
Common Charges	123	13	4
Metropolitan Board General Expenditure	498	1	5
Metropolitan Board Main Drainage	533	2	0
Charges on Rates—			
Interest 15 18 11			
Principal repaid 21 3 0			
	37	1	11
	£1,275	19	1

[illegible]e hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ated this 14th day of June, 1867.

Richard Jolly, Jun.
G. L. Mustoph,
J. H. Ridgway,
} *Auditors.*

No. 10.

PARISH OF WAPPING.—GENERAL PURPOSES ACCOUNT.

Revenue and Outlay from Lad[illegible]*L*, 1866. *to Lady-day*, 1867.

REVENUE.

	£	s.	d.
Balance brought forward	386	8	[illegible]
To Cash of Overseers upon Orders of Contribution	3,280	0	[illegible]
„ Ditto Reinstatements of Paving	65	12	[illegible]
„ Ditto Rents, &c.	56	16	[illegible]
„ Ditto Sale of Building Materials	99	1	[illegible]
£3,887	19	[illegible]	

OUTLAY.

			£	s.	d.
[illegible]	Paving		474	2	10
[illegible]	Lighting		466	8	5
[illegible]	Cleansing and Watering		471	7	9
[illegible]	Stone and Materials		2	3	6
[illegible]	Urinals		20	6	4
[illegible]	Charges on Rates—				
	Interest	132 6 1			
	Principal repaid	41 14 9			
			174	0	10
[illegible]	Improvement Account		1,153	10	6
[illegible]	Compensations		55	9	0
[illegible]	Common Charges and Sundries		278	9	7
[illegible]	Cholera expenses, incurred under order in Council		512	10	2
	Balance		279	10	3¼
			£3,887	19	2¼

[illegible]e hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

[illegible]ated this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H. RIDGWAY,
} *Auditors.*

No. 11.

PARISH OF WAPPING.—SEWERS ACCOUNT.

Revenue and Outlay from Lady-day, 1866, to Lady-day, 1867.

REVENUE.

	£	s.	d.
To Cash of Overseers upon Orders of Contribution	220	0	0
,, Ditto Contributions to Sewers	4	0	7
,, Ditto Metropolitan Board General Expenditure	495	15	11
,, Ditto Main Drainage	531	19	0
Balance	9	7	1¼
	£1,261	2	7

OUTLAY.

	£	s.	d.
Balance brought forward	11	12	10¼
Openings	1	3	5
Repairs	14	15	10
Cleansing	2	3	3
Carting deposit	0	15	0
Flushing and Gullies...	46	6	6
Common Charges	120	10	1
Metropolitan Board General Expenditure	495	15	11
Ditto Main Drainage	531	19	0
Charges on Rates—			
Interest 15 3 4			
Principal repaid 20 17 5			
	36	0	9
	£1,261	2	7¼

We hereby certify that we have examined and allowed the Accounts, of which this Account is an Abstract.

Dated this 14th day of June, 1867.

RICHARD JOLLY, Jun.
G. L. MUSTOPH,
J. H RIDGWAY,
} *Auditors.*

No. 12.

LIABILITIES.

	£	s.
Ratcliff Paving Commission Debt, apportioned as follows :—		
To Ratcliff £1,691 10 7		
To Wapping 608 9 5		
	2,300	0
Shadwell Pavement Commission Debt	1,000	0
Wapping do.	1,000	0
Ditto, borrowed by the Board	400	0
Executrix of Mr. Dinmore	840	0
British Empire Life Assurance Company	11,266	13
General Annuity Endowment Association	1,800	0

ANNUITIES.

RATCLIFF PAVEMENT COMMISSION.

Apportioned as follows :—

	£	s.	
To Ratcliff	£42	13	8
To Shadwell	11	4	0
To Wapping	9	2	4
			63 0 0

ASSETS.

Balance in hands of Treasurer ..	1,854	15	5
	£1,854	15	5

No. 13.

CONTRACTS.

1865.			
March 25th.	Messrs. Mowlem and Co., paving works	...	As per schedu of prices.
1867.			
Jan. 21st.	Messrs. Mowlem and Co., broken granite	...	14s. 10d. per to
1866.			
July 17th.	Mr. R. Hubbard, sewers work	...	As per schedu of prices.
1867.			
Jan. 21st.	Mr. J. Rollinson, for gravel ballast ...	...	4s. 9d. per yard
1866.			
Oct. 13th.	Mr. J. Rollinson, scavenging and watering	...	£1,054 0
Oct. 13th.	Mr. C. T. Parsons, ditto ...	...	£778 0
1867.			
Jan. 24th.	Abbott & Son, flints	...	7s. 9d. per yar

No. 14.

PARTICULARS OF PAYMENT OFF BY BOARD' AMOUNTS SECURED BY OLD BONDS, &c.

WHEN PAID OFF.		NAMES OF HOLDERS.
1857.	18th March...	... W. WALTON, Esq.
1858.	18th October	... J. CHARRINGTON, Esq.
1859.	16th April ...	... GEORGE WARD, Esq.
,,	,, ...	... Ditto.
,,	,, ...	... Ditto.
,,	,, ...	... WILLIAM CREW, Esq.
,,	,, ...	... THOMAS DINMORE, Esq.
,,	,, ...	... SAMUEL FOULGER, Esq.
,,	,, ...	... Miss GIBB.
,,	,, ...	... Messrs. E. & P. ARMET.
,,	,, ...	... Ditto.
1859.	5th October	... E. HATFIELD, Esq.
,,	,, ...	... J. WALKER, Esq.
1860.	16th January	... Executors of THOMAS WARD, Esq.
,,	,, ...	... Miss GIBB.
,,	,, ...	... Ditto.
,,	,, ...	... Ditto.
,,	24th January	... S. FOULGER, Esq.
,,	17th October	... Executor of J. OLIVER, Esq.
1862.	10th April ..	... Rev. THOMAS BAKER.
,,	,, ...	... Executors of J. FLETCHER, Esq.
,,	,, ...	... C. W. ORDE, Esq.
,,	,, ...	... Executors of THOMAS WEST, Esq.
,,	21st May ...	... T. CLEGHORN, Esq. (Assignee of Miss Palmer.)
1863.	April 1st ...	... Executors of J. LOUCH, Esq.
1864.	December 9th	... Messrs. E. & P. ARMET.
,,	,, ...	... Ditto.
,,	,, ...	... Miss GIBB.
,,	,, ...	... Trustees of S. FOULGER, Esq.
,,	,, ...	... Ditto.
1865.	March 22nd...	... Trustees of H. F. JOHNSON, Esq.
,,	Sept. 20th ...	... JOHN HODGSON, Esq.
1867.	March 13th...	... Executors of J. SHELDRICK.
,,	,, ...	... Executors of J. URQUHART.

OLD COMMISSIONS.	AMOUNT.		
Wapping Pavement	£300	0	0
Shadwell Pavement	100	0	0
Ratcliff Pavement	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Commercial Road Debt	191	15	6
Ditto	172	11	11
Ditto	0	18	10
Ratcliff Pavement	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	100	0	0
Wapping Pavement	500	0	0
Commercial Road Debt	1,073	18	9
Shadwell Pavement	400	0	0
Ditto	300	0	0
Ditto	300	0	0
Ratcliff Pavement	200	0	0
Shadwell Pavement	300	0	0
Ratcliff Pavement	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Ditto	200	0	0
Commercial Road Debt	134	4	10
Ditto	824	12	7
Shadwell Pavement	200	0	0
Ditto	700	0	0
	£9,198	2	5

No. 15.

RETURN OF MONIES RAISED ON LOAN AT INTEREST.

No.	Date of Mortgage.	Amount.	Rate of Interest.	Secured on	For what purpose Borrowed.	From whom Borrowed.	For what Term.	Repayments.
1	1857, January 7	£400	£5	Wapping General Rate	For Improvements at Wapping.	R. Stephenson.	Three Years.	The whole £400
2	1857, January 7	£400	£5	Ditto.	Ditto.	W. Maud.	Ditto.	The whole £400
3	1857, January 7	£400	£5	Ditto.	Ditto.	W. Walton.	Ditto.	None.
4	1857, September 2	£300	£5	Ditto.	Ditto.	R. Stephenson.	Ditto.	The whole £300
5	1858, September 29	£1,800	£4½	Limehouse General Rate.	For Paving Works in Limehouse:	Thos. Dinmore.	Fifteen Years, to be repaid by fifteen equal annual instalments.	£960
6, 7, & 8	1858, October 27	£3,000	£4¾	Limehouse Sewer Rate	For Sewers Work in Limehouse.	General Annuity Endowment Association.	Twenty Years, to be repaid by twenty equal annual instalments.	£1200
9	1857, September 21	£5,000	£4	Limehouse General Rate.	For Paving Works in Limehouse.	British Empire Life Assurance Company.	Fifteen Years, to be repaid by fifteen equal annual instalments.	£2,333 6 8
10	1860, September 5	£5,000	£4½	Dittto.	Ditto.	Ditto.	Ditto.	£2,000
11	1862, July 23	£7,000	£4½	General Rates of the Limehouse District	For Board's new Offices.	Ditto.	Twenty years, to be repaid by twenty equal annual instalments.	£1,400
		£23,300						£3,993 6 8

PROPERTIES BELONGING TO THE BOARD.

Freehold Offices in White Horse Street, Ratcliff.

Freehold House and Shop in Three Colt Street, at the corner of Ropemakers Fields, Limehouse, let on lease to Mr. William Smith.

Two Leasehold Arches on the North side of the Mitre at Limehouse, and one Leasehold Arch on the south side thereof, under the London and Blackwall Railway.

Leasehold Arch under the London and Blackwall Railway, on the west side of Gill Street, Limehouse, and piece of ground adjoining the said Arch.

Five Freehold Houses, Nos. 7, 9, 11, 13, and 15, White Horse Street, Ratcliff, let on lease to Mr. William Hood.

Two Leasehold Arches under the London and Blackwall Railway, on the west side of White Horse Street, Ratcliff, and Ground on the North side of the said Arches.

Leasehold Arch in Little John Street, Ratcliff, under the London and Blackwall Railway.

No. 16.

TO THE

BOARD OF WORKS FOR THE LIMEHOUSE DISTRICT.

DEPARTMENT OF WORKS,
OFFICES,
WHITE HORSE STREET,
COMMERCIAL ROAD, EAST.

GENTLEMEN,

I beg to submit to you my Report upon the works executed in the district from Lady-day, 1866, to Lady-day, 1867.

SEWERS.

New Sewers have been constructed of the following lengths and sizes, viz.:—

82 feet of 12 in. pipe sewer in Stainsby Road, Limehouse.
138 feet of 9 in. pipe sewer in Steels Lane, Ratcliff.

GOODLAD & COTTON ESTATES, LIMEHOUSE.

302 feet of 12 in. pipe sewer in Burgess Street.
360 „ „ „ in Walker Street.

These sewers have been constructed at the expense of the owners, under the superintendence of the Board.

A new Penstock has been fixed at the outlet of the sewer passing under the "Grapes" Public-house, Fore Street, Limehouse.

One manhole has been constructed to the sewer in Spread Eagle Street, and one to the sewer in Catherine Street, Limehouse. A new side entrance has been constructed in Bower Street, Ratcliff. One new Flushing-box has been fixed in Shoulder of Mutton Alley, and a new side entrance grate in Henry Street, Limehouse.

7 Flushing Boxes have been altered.
7 New Gullies have been constructed.
1 New Gully pan has been fixed.
40 Gullies have been repaired, altered, and trapped.
19,740 feet of brick sewers, and 15,610 feet of pipe sewers have been cleansed by the workmen employed by the Board.
735 feet of brick sewers, and 324 feet of pipe sewers have been cleansed by the Contractor of the Board.

HOUSE DRAINAGE.

104 applications have been received for permission to construct new drains to premises, and 45 applications have been received for cleansing old drains. 249 houses and other buildings, and 10 railway bridges have been connected with the sewers, and the following works executed in connection therewith, viz.:—

20 feet of 12 in. pipe drains laid.
870 feet „ 9 „ „ „
7,144 feet „ 6 „ „ „
1,988 feet „ 4 „ „ „
198 Closet pans and traps fixed.
215 Sinks and traps fixed.

61 Cesspools cleansed and filled up.
6 Gullies constructed.
180 feet of 12 in. drains cleansed.
80 „ 9 „ „
33 Temporary stoppages removed.
87 New buildings have been erected.

The Low Level Main Sewer has been completed by the contractor, through the Limehouse District, and the shafts have been filled in, and the pavements and surfaces of the roads made good.

PAVING.

New footway paving has been laid in the following streets and places, viz. :—

LIMEHOUSE—Rigman's Rents.

RATCLIFF—Part of White Horse Street (formerly Old Road); High Street; additional width of footpath opposite Regent Terrace, Commercial Road; part of Henry Street, York Square.

New carriage-way paving has been laid as follows :—

LIMEHOUSE—Old Road.

RATCLIFF—White Horse Terrace, Totton Street, and High Street.

Old footway paving has been relaid as follows, viz.:—

LIMEHOUSE—Part of Frederick Street.

RATCLIFF—West side of Ratcliff Square, part of Pump Yard, part of Bath Street, and Devonport Street, Bower Street, and Ann Street.

WAPPING—Part of south side of Upper East Smithfield, Green Yard, Cooper's Court, Brown Bear Alley, and Cooper's Row.

Old carriage way paving has been relaid as follows :—

Ratcliff—Glass House Fields, from Brook Street to Messrs. Ravenhill's Factory; Cock Hill, and part of Butcher Row.

Shadwell—Milk Yard, part of Back Road, Short Street, Ellow Lane, Fox and Goose Yard, part of New Gravel Lane.

Wapping—Parson's Street.

The approaches to the new bridges over the Lea Cut at Risbie's Rope Walk and Narrow Street have been paved, and the footway and carriage ways altered as required, at the expense of the Trustees of the River Lea Navigation.

New carriage way crossings have been formed at the following places—Commercial Road, Limehouse; North end of Three Colt Street, Burdett Road, opposite Clemence Street.

New galvanized iron screens have been fixed by the Great Eastern Railway Company under the Railway Bridges over the following streets:—

Limehouse—Church Row, the Mitre, Three Colt Street, Limehouse Causeway, Salter Street, Gun Lane, and Gill Street.

Ratcliff—White Horse Street and Regent Street.

The Ratcliff Gas Company have, by consent of the Limehouse District Board, erected an iron bridge over New Crane, Shadwell, for the purpose of carrying coals over the street, thereby preventing the obstruction to the traffic which previously was caused by the coals being carried by men across the street.

LIGHTING.

The number of public lamps in the district is 711, being an increase of 36 on the number reported at Lady-day, 1866. The situation of the lamps have been altered in the Commercial Road and West India Dock Road, and the number very much increased, many complaints having been made of the want of light in those thoroughfares.

PUBLIC URINALS.

There has been no increase in the number of Urinals in the district.

In some of the Urinals there is a constant supply of water running for the purpose of flushing the same.

The others are flushed and cleansed with water twice daily by men employed by the Board.

CLEANSING & WATERING.

The principal paved streets are cleansed daily, and the others not less than twice a week.

During the past season the whole of the streets, &c., have been constantly watered by the contractors with water from the East London Water Company.

RENUMBERING STREETS, &c.

At the request of the Board, the Metropolitan Board of Works made orders for re-maning the following thoroughfares, and for re-numbering the houses therein, viz. :—

The whole of the thoroughfare known as White Horse Street and Old Road to be called "White Horse Street" only, and the houses re-numbered.

The whole of the thoroughfare known as Belgrave Street and Totton Street to be called "Belgrave Street" only, and the houses re-numbered.

The whole of the thoroughfare known as Broad Street and Cock Hill to be called "Broad Street," and the houses re-numbered.

The whole of the thoroughfare known as Queen Street, Phœnix Place, and Pump Yard, to be called "Queen Street," and the houses re-numbered.

The whole of the thoroughfare known as Three Colt Street and Lime-kiln Hill to be called "Three Colt Street," and the houses re-numbered.

The whole of the thoroughfare known as New Crane and New Gravel Lane to be called "New Gravel Lane," and the houses re-numbered.

Notices of the above have been served upon the occupiers, and the alterations made accordingly.

IMPROVEMENTS.

Limehouse—Negociations are pending with the owners of the several properties required for carryiug out the proposed improvement in Limehouse Fields.

The Metropolitan Board have been requested to sanction the Board borrowing a sum not exceeding £3,000, for the purposes of the improvement, to be repaid in 20 years by equal annual instalments.

Wapping—The North Country Sailor public-house, the house adjoining, the shed at the back, and the three houses in Cross Alley, have been pulled down, and the old materials sold by auction.

The front of the premises at the west corner of Church Street has been set back, according to the arrangement made with the owner.

Arrangements have been made with the Churchwardens and Trustees of Wapping for pulling down and setting back the Churchyard Wall to the improved line of the street.

The freehold of No. 102, High Street, has been purchased.

The lessees' interest and goodwill of the businesses lately carried on at Nos. 106 and 107, High Street, have been purchased.

The sum of £6,000 has been borrowed by the Board from the Lendon Life Association, for the purposes of the improvement, to be repaid in 25 years by equal annual instalments, and to bear interest, payable half-yearly, at £5 per cent. per annum.

Regent's Canal Improvement—Arrangements have been entered

into with the Regent's Canal Company in reference to the works to be done by them at Limehouse and Ratcliff, viz. :—

Temporary road to be continued from Risbie's Rope Walk into Horse-ferry Road.

Mill Place and Tytes Alley to be stopped up.

Plans of bridge and levels of road over new entrance have been approved.

The paving, lighting, drainage, &c., and other works in connection with the formation of the temporary roads, are to be done at the expense of the Company.

BILLS IN PARLIAMENT.

Plans and sections have been deposited at the Offices of the Board, and notices have been given of the intention of the promoters to apply to Parliament for the following powers :—

THAMES SUBWAYS.—To construct a subway under the River Thames, commencing from a warehouse on the south side of High Street, Wapping, and terminating in a wharf on the north side of Bermondsey Wall; to raise money by shares and borrowing; to compensate persons having rights of ferry; and for other purposes.

CHARTERED GAS.—For the purchase of lands, and construction of New Gas Works and road thereto; manufacture and sale of gas, &c.; to lay gas mains through East India Road and Commercial Road; and to alter levels of Commercial Road, E., where that road is carried by means of bridges over Regent's Canal and River Lea, and for other purposes.

METROPOLIS GAS.—For the amendment of Metropolitan Gas Act, 1860, and the local and personal Acts relating to the supply of gas in the metropolis and adjacent districts; reducing rates, &c., of Gas Companies; regulating future price, purity, &c., of gas; for purchasing the land and works of the Ratcliff Gas Light and Coke Company, and for other purposes.

CHOLERA.

In consequence of the appearance of Cholera in the month of July, 1866, an Order of the Privy Council, dated 21st July, 1866, was made in pursuance of the "Diseases Prevention Act, 1855," and the duty devolved upon the District Boards to take measures to prevent the spread of the disease, and for alleviating it.

The order having been by mistake forwarded to the Board of Guardians, instead of to this Board, a delay of about two days was occasioned, but immediately on the receipt by the Board of the order, viz., on the 25th July, arrangements were made for carrying out the provisions contained therein.

On the 27th July an agreement was entered into with the Trustees of Wapping for the hire of the Wapping Workhouse, to be used as a hospital during the prevalence of the epidemic in the district.

The place was forthwith thoroughly cleansed and prepared for the reception of patients.

An arrangement was made with the vestry of the parish of St. George-in-the-East for the accommodation of not more than 50 patients at one time from that parish in the hospital.

The sum of £250 was received from the parish of St. George as their contribution towards the expenses incurred at the hospital.

The sum of £210 was paid by the Board to the Trustees of Wapping for the use of the workhouse.

During the epidemic the courts and alleys in the district were thoroughly cleansed and limewashed, and the sewers throughout the district were deodorized during the same period.

A medical staff was appointed, and a house-to-house visitation continued as long as was necessary. Medicines were supplied gratis to all applicants.

I am, Gentlemen,

Your most obedient Servant,

CHARLES DUNCH,

Surveyor of the Board.

BOARD OF WORKS

FOR THE

LIMEHOUSE DISTRICT.

SPECIAL REPORT by Mr. ORTON, Medical Officer of Health, upon the CHOLERA EPIDEMIC of 1866.

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FOR THE

LIMEHOUSE DISTRICT.

SPECIAL REPORT by Mr. ORTON, Medical Officer of Health, upon the CHOLERA EPIDEMIC of 1866.

TO THE

LIMEHOUSE BOARD OF WORKS.

GENTLEMEN,

At the close of June and early part of July, from the unusual state of the weather, the excessive heat, in connexion with almost a stagnation of the atmosphere, little or no wind for days together, and the more than usual depression generally felt by a summer temperature, I was led to expect as the result, from experience of previous years, an epidemic of fever. But on the outbreak of Cholera in its stead, and finding it more especially selecting the fever haunts for its victims, I was strongly disposed to watch it, as of course in a limited sense, a substitutionary or vicarious disease, modified by circumstances which I was unable to apprehend. Then the Register General's views became known touching the epidemic, the suggestion of the foul water poison as the cause, conveyed through the mains of the East London Company at Old Ford. At the time this hypothesis was plausible, seemed almost conclusive, and I, among the rest, living in the very heart of the cholera field, was inclined to acquiesce. But facts daily become more prominent. I hesitated, paused again and again, until at length I was convinced that the water had little or nothing to do with the Cholera. Then a difficulty arose on a point of decorum, in withstanding the opinion of the Register General, whose courtesy to the medical profession has at all times been gratefully appreciated. There was yet another difficulty in the way—either to fall in with the general opinion, for terror had made all unanimous, or stifle the expression of my own convictions. The terms on which I hold my office under the Metropolis Local Management Act marked out the line of duty. The 123rd Section, defining the vocations of the medical officer, says he is "to take cognizance of the existence of contagious or epidemic diseases, and to point out the most efficient mode of checking and preventing such diseases." In this spirit I have already communicated some information to the Registrar General, and availing myself of a further invitation, I will indirectly now point to some facts of a practical character.

It is impossible to overlook the classes more likely to be affected by the water hypothesis, equally as it is of the estimation in which it is commonly received. I have already said, and to this I adhere, that nineteen out of twenty of the adults who have perished were not water-drinkers even occasionally, except in the ordinary cooking of their food. Then again, those who have been water-drinkers, teetotallers especially, have been pre-eminently exempt. The City of London Temperance Society, at the head of which is the Chamberlain, Mr. Scott, informs me, through their Secretary, that out of several hundreds, a large body of whom live in the Tower Hamlets, only three, one man and two women, and those under exceptional circumstances, have died from the commencement of the epidemic. I am acquainted with numbers of families, some with filtration, others without, who have gone on drinking water all the season without almost a single case of diarrhœa. The Sons of Phœnix, a Total Abstinence Society, all living within the limits of the East London water, numbering 1,250 besides their families, have lost only two of the fraternity from the Cholera. The United Phœnix, another society of 1,400 members, have only lost three males and two females. At a brass-founder's in the Back-road, a number of men are employed, an occupation inducing great thirst, and I am credibly informed that each man during the summer was in the habit daily of drinking a gallon of water on the average, without a single case of diarrhœa occurring. At 14, Love Lane, Ratcliff, the mother, husband, and sister died, who were not drinkers of water, but practised moderation. The five children escaped altogether from an attack of diarrhœa, while, to use her own words, they were doing nothing else but "drinking water all the summer and all day long."* Let me add, pretty generally amongst all classes the theory of the water poison is repudiated, especially among the poor, who have chiefly felt the shock; and this opinion is very commonly shared by professional men.

I have already expressed an opinion that the great local nuisances have probably had their part quite as much as the water, and much more, in the production of Cholera. The Lea Cut and Regent's Canal were intolerable during the hot weather in June, when on one day the thermometer was 165 degrees in the sun. Then look at the Bow Creek, into which was pumping all this time the sewage of 70,000 inhabitants, including Stratford, West Ham, and all about Victoria Dock. And am I to be told that such abominations

* Many such cases are found.

have had nothing to do in bringing about an epidemic? Then add to the list the numerous factories on Bow-common, and more or less throughout the eastern district, the comparatively stagnant water in the docks, as well as that charged with organic matter in and about the poorer dwellings at a low elevation, in some cases only two feet above, and vast numbers many feet actually below, Trinity high-water mark, and there is to be found an aggregate of filth, I believe I am not wrong in saying, not to be equalled by all the rest of the metropolis. At this time the Thames at Greenwich was 68 degrees, so that from a large tidal stream to stagnant water like the canals, it was probably here at 80 degs. of heat. It is a fact that organic matter in water at 60 degs. undergoes a fermentation, poisonous gases are thrown off, and deadly vapours, so that it would require slight calculation to estimate the influence of the heat on these masses of liquid filth, continuing for days together, and then conveyed exactly in a line with the cholera field. The records of medical science afford plenty of cases in illustration. The outbreak of choleraic diarrhœa, attended with many deaths, at the Carlisle Lunatic Asylum, as related by Dr. Clouston, is a case in point. Here the sewage of this institution had been thrown over a heavy, clayey land in the neighbourhood, and a favouring wind did the mischief. It was found when the wind was away from the asylum the disease was at once relieved; and then again, when in an opposite direction, disease and death increased.

It is a fact, that within 200 yards of the Regent's Canal, in the Limehouse district *alone*, 200 deaths have taken place. A consequently low elevation may however, in part account for this.

I have been informed by many intelligent persons, since these views have been made known, that at this very time, and for some days in succession, they felt a burning choking sensation in the throat mouth and nostrils, never before experienced, provocative of cough, sneezing, and urgent desire to expectorate.

Now, if we look at the map and see the river in the south, the Bow Creek in the east, and Sir George Duckett's Canal in the north, there is to be seen the area of mischief. And it is very remarkable, allowing for the action of the excessive heat in the production of cholera miasm, acted upon by a primary atmospheric influence, that the east and north-east wind following, would exactly convey this poison where the epidemic was mostly felt,

and over the field of the East London water supply. Stratford, West Ham, and Victoria Docks are in the rear, where the mortality was great, but then they lie low, and the poisonous contamination would be otherwise rapidly experienced by the process of diffusion, so close upon their borders.

It may be asked, why did not this mischief go south—across the water? This was no doubt prevented by the influence of the tidal currents and the river breezes. The Thames in its sanitary agency is little appreciated. I regard it in relation to zymotic disease, apart from other considerations, as the grand conservancy of public health. It is rare to find a case of fever on its banks at any time, and scarcely ever a death. Not one death from cholera or diarrhœa occurred on the water's edge from the eastern verge of Limehouse to the extremity of Wapping, the distance of a mile and a-half, during the late epidemic.

Again, in restricting it to one part of London, it is only in common with the visitation of epidemics, particularly cholera. In India it will take one side of a bazaar, skipping the other for a time, one side of a river, and so on. In the cattle plague, the same wandering character was observed; one county, not the next, one parish, missing another. In the vegetable world the same strange things occur. Any one acquainted with agriculture will have noticed the potatoe disease cutting a field diagonally, one-half untouched; turnips and other crops in the same way,

Everything, both preceding and succeeding, the recent outbreak of Cholera at the East End, shows it to have been an importation, atmospheric principally, following in the track of its influence for some time felt on the Continent, and not unlikely to have been accelerated by the free communication of the shipping with the towns on the Coast and that of the Port of London. But the water theory, while inconsistent in itself, takes no account of the cases of Cholera occurring in London *before* the "explosion"—as it has been termed—actually occurred. A man and his wife died from this disease at 12, Priory Street, Bromley, in the centre of all this poisonous effluvium, on the 27th of June, just 14 days before the first in Limehouse. Then Hammersmith, several miles in the West, on the 29th of June loses a man from Cholera. Then in St. Luke's Workhouse, on the 9th of July, supplied by New River Water, a man dies brought from Hoxton New Town, having also the same water supply. On the 12th of July a woman died in

London Wall, and on the 13th a man at Camberwell. So that it appears tolerably certain the Cholera poison was in existence in London, in all quarters, several days before the alleged "explosion" from Old Ford.

There were certain predisposing causes, no doubt, operating largely on those who experienced the early onslaught. Amongst the well-to-do classes may be enumerated intemperance, excesses generally, long fasting, and depressing causes commonly of body and mind; while in addition, among the poorer portion of the community, may be reckoned scanty and improper food, filthiness, and frequently neglected ventilation and drainage. In the second week in July the sanitary condition of the Limehouse District was good, as it had for some months been from 15 to 20 per cent. below the average on the last 3 years. But at that same hour death was standing ready. The first three cases occurred at Nos. 72 and 73, North Street, on the 11th and 13th of July; and thereupon, whatever the sources of mischief may turn out to be, were rapidly brought into action, the pestilence came down like a hurricane, swept away these classes, taking a north-easterly direction.

The deaths from Cholera alone in this district have amounted to 515 to the 27th of October.

The origin of this epidemic is unknown; its travels are equally a mystery. The water poison theory will not explain it, and our sanitary experience is taxed in vain in an endeavour to trace out the positive causes of its special localistion.

It may be interesting to make a general comparison of the Eastern Districts using the condemned water, to see how far that will help us in our enquiry, for the 10 weeks ending the 1st of September, including their respective deaths from Cholera and Diarrhœa, in that period :—

Elevation above Trinity High Water Mark.	Feet.	Persons to an acre.	Average House Rental.	Poor Rate, parts in 1,000 on the Rental.	Deaths from Cholera and Diarrhœa.	Deaths in each 10,000 persons.
Bethnal Green	38	145	£9	·136	688	62
Mile End	21	118	£20	*·066	545	67
St. George's-in-East	21	196	£32	·080	459	96
Poplar and Bow ...	8	34	£44	·060	929	93
Limehouse District .	21	97	£20	·066	668	118

* I suspect there is an error in this quotation of the Registrar General's Report, in placing the Mile End and Limehouse District Rental on an equality.

Now Bethnal Green is notorious for poverty, overcrowding, and fever, and yet this badly-conditioned district comes out first amongst all in its escape from Cholera. Mile End is next in its immunity, a fact wholly to be explained in the estimation of some probably from two to three thousand good houses having sprung up there of late years. St. George's has a fearful mortality, but then its overcrowding is great, it exceeds even that of Bethnal Green. But Poplar and Bow District has the least overcrowding of all; where one person is found there, nearly 3 are found in Limehouse, 3½ in Mile End, and more than 4 in Bethnal Green, and approaching 6 in St. George's-in-the-East. When Poplar, then, is seen with the fewest persons to an acre, the highest rental, and the lowest poor rate, having 93 deaths in each 10,000 persons, half as many more than Bethnal Green, it is too obvious to waste a moment about it, there must be other causes at work in this field of destruction besides sewage water, and the River Lea. St. George's has 96 deaths in 10,000 persons, but a trifle exceeding that of Poplar, and fully one-third more deaths than Bethnal Green. But the Limehouse District tops all; it has lost 118 persons from Cholera and Diarrhœa, according to the same estimate, since the outbreak in July; a district closely watched over, in which 2,000 houses have come under my personal inspection during the past year, up to July, resulting in many hundred different forms of sanitary reparation.

The action of a poison—a water poison or what not—is uniform over a community; it treats all alike under like conditions. But this Old Ford water acts capriciously; it skips about in finding victims; here its devastations are heavy, but there passes by multitudes untouched. Poisons, as a rule, lay low more readily the weak, the poor, the half-starved, and the destitute; but these classes in the Cholera epidemic have stood the shock well, they have come foremost out of the fray. It has crushed the scanty population, it has passed by the overcrowded, spared the poor, laid low the rich, terrible in the houses of a wealthier district, merciful in those of the impoverished, scarcely felt on a hill, while awfully destructive in a valley.

But the water hypothesis is still held to be correct, because the mortality is said to have been co-extensive with the water supply. Now how can this arise? According to the Lancet Commissioner's investigations for the fortnight ending the 13th of August, there were 3 deaths in St. Botolph's,

Whitechapel, in houses supplied by the East London Company, but 19 in houses supplied by the New River. In one of the Haggerstone sub-districts, belonging to Shoreditch, in the same time 12 deaths fell within the water supply of the New River, and only 2 in that of the East London. In the only 19 houses supplied by the New River in the western extremity of Wapping, the mortality was considerably larger than in any other part of the parish. In South Hackney, for six weeks ending 25th of August, the deaths in houses supplied by East London Water was 13 in 10,000 persons, but at that part of West Hackney supplied by the New River, 5½ persons died in the same number. Haggerstone East lost 4½ in 10,000 from the East London, while Haggerstone West has 7 deaths in the same estimate from the New River Company.*

It is too contradictory and inconsistent, with these facts before us, to talk about the mortality in the outset being co-extensive with the water supply from Old Ford.

But the whole hypothesis is beginning to present itself in so extraordinary a character that I am very much inclined to question even its practicability. And here I will venture to say that if a suit of law had been going on, depending upon some theory or unusual speculation, in which almost a national interest had been aroused, the knotty points would have all been settled long ago. The peculiarity of this case is that in a panic-stricken public it has almost shut out discussion.

The charge against the Company consists, in an emergency, of distributing foul water from two old uncovered reservoirs at Old Ford.

It is nothing to the point to say that gentlemen sitting on the bench of justice, of unspotted private life, with their officials, having protested that the water from the suspected reservoirs at Old Ford has not been used, and that the subordinate *employees* are all ready to a man to come forward, if required, on oath, to declare that the sluice has not been opened for such purpose for the last 2 years. I will regard all this as merely uttered in a commercial spirit, and the vows of the men as simply the obsequieousness of dependants due to authority.

But, supposing again the whole is a conspiracy to serve a commercial corporation, at the risk of the public health, that from the Chairman downwards the secret has been kept; that the fifty men, or whatever may be the

* For the 6 weeks ending October, 250 deaths from Cholera happened in the Eastern Districts of London, and 258 in the South.

number, are ready at bidding to commit perjury, that the leakage from the Lea Cut has taken place, that the foul water has been distributed, and that the poison has been sent forth to the public.

A difficulty at once arises touching the chemical character of the water. Dr. Frankland finds it to contain, on the 1st of July, 1.40 grain in reduced numbers, to make it square with the estimate of another analyst, or nearly one and a-half grain of organic matter in the imperial gallon. Dr. Letheby's investigation, on the contrary, ·40 of a grain, or less than one-third of the result of Dr. Frankland. Here are the results of Dr. Letheby's experiments for 6 months—in April, 1866, ·40, not half a grain; May, ·40; June, ·40; July, ·40; August, ·56; September, ·39. So that it is worthy of remark that while the water, at the time of the Cholera "explosion" in July, was, in the opinion of one Professor, unusually bad—never worse—a point on which of course great stress has been laid; yet, according to the experiments of another equally distinguished Chemist, at the same time, it was never better. If the waters had been identical, the results would have corresponded. Dr. Letheby took his sample from the main that supplies the London Hospital and that part of Whitechapel. My enquiries have not elicited the precise locality of the other experiment, the Professor best knows where.

We are very properly informed, at the same time, that the water may be extremely poisonous, and yet not in any way to be detected by the most delicate Chemical Analysis. Farther, in order to put the public on their guard, they are informed, so deadly is the Choleraic poison in some cases in the water, that even boiling it will not destroy the germs of the organism productive of the disease.

But we pass on. Let us now watch it, teeming with all these perils, to its destination. It acts like no other poison: it appears influenced by a kind of barometical pressure; it seeks a low level for victims; and at an altitude is all but powerless for destruction. There is graduated scale of death about it. From 2 to 10 feet elevation above Trinity High Water Mark it kills 103; at 10 to 20 feet, 106; from 20 to 40 feet, 67; from 40 to 60 feet, 17; at 76 feet, only 4 as at Stamford Hill; while at 2 feet, as in the district of St. John's, in St. George's-in-the-East, 200 it slays in each 10,000 persons.

It was sought to explain the Stamford Hill immunity by supposing that gravitation had to do with it, and that the particles of Choleraic matter be-

came deposited possibly—an objection which with some might have weight; but this could hardly apply to the subtle poison which baffles the most delicate analysis, when propelled, moreover, by the "magnificent engine" spoken of on its ascent of 76 feet. It has, however, since been discovered that Stamford Hill is supplied by a reservoir actually 20 feet higher than the town itself, so that with the full charge of the poison equally as at St. John's District, it is powerless here to kill more than 4 in 10,000 persons.

But I will not take extreme cases, but come down from the hill to the plain, and have it tested on a perfect equality. In Bower Street, Ratcliff, consisting of 30 houses, there have been 8 deaths; in Havering Street, on the same level, the same number of houses, built in precisely the same style, and inhabited by the same class of persons, there has been no death. In William Street, about 30 houses near at hand, there have been 12 deaths; in Bath Street, exactly the same in structure and the character of the people, only one child has died. And of many other like cases may it be affirmed in Ratcliff. In Limehouse the same anomalies are found. In Northey Street, and round about, many deaths took place. Within 100 yards is the establishment for pauper children of the district. Into this institution was brought one child, before the Hospital at Wapping was started, suffering from Choleraic Diarrhœa, and within 14 hours died. There was another long-ailing consumptive child, an inmate, suffered—a common thing in such cases—from Diarrhœa, who drank no water, only wine, and died. It was registered "Diarrhœa." In other respects the health was never better. It is a fact beyond dispute that out of 400 children in the establishment who had free access, and were drinking water all day long, that there was not even one case of common Diarrhœa.

In corroboration of the water hypothesis, some stress has been laid on the good result of an interview for the 1st August between the Engineer and the Authorities at Somerset House, for that immediately afterwards the Cholera began to decline.

Of course. There was no mystery about this. It was all in the natural order of things. It wanted no desperate efforts of the hydraulic engineer to stop the Cholera; this was already set in action by another Hand, on another and a very different scale—*by the operations of nature.* Now, I have had some years' experience in sanitary matters, and watching the bear-

ing of zymotic disease; and I have always found, without any laboured attempt at research into the unknown for an explanation, whenever an epidemic has raged along with a continuous special state of the weather, it has at all times been relieved—occasionally become almost extinct, as with the force and certainty of a general law—on the occurrence of *an opposite atmospheric condition.* So now, what I had been looking for, hoping for, hourly and for days in succession, took place. For the week ending the 4th of August the pestilence was at its height; there were 1,040 deaths from Cholera and Diarrhœa for the seven days. But on that same day the wind shifts; a lighter atmosphere was noticed; people breathed more freely; *rain fell.* The type of the disease was instantly changed, and the deaths at once declined. At the end of the next week—the 11th—still a favourable wind S.W. and N.W., and more rain, the mortality still lessening. In this way the weather lasted week after week till the end of September, brisk winds, chieflp south-west, plenty of rain, resulting in a decline of deaths from a weekly roll of 1,041 in the commencement of August down to 73.

These were the arrangements set on foot to stay the plague, powers quite sufficient in themselves, so that any co-operation on the part of the officials was altogether superfluous, or any engineering dexterity from the works at Old Ford.

I openly announced this change as a certainty on the stated conditions, before the Sanitary Committee the last week of July.

Now, whatever dispute there may be about the origin of the Cholera, and its relation to the water supply, there can be none as to the localities where it has found victims. In the parish of Limehouse there are 9 streets with 100 deaths; in Ratcliff 7 with upwards of 60. One character runs through the whole of them, as a rule, like Eastfield Street, North Street, and Northey Street, Limehouse, and William Street, Ratcliff. They are either built over slush and filth, or the flooring and joists rest on the earth itself, or but a very few inches above it. These are the places *where always has come fever*, just as they have lately been *in turn* the fatal resorts of Cholera.

In Burdett Road, Limehouse, there is a group of well-built houses, about four hundred in number, which have suffered *very little* from the late epidemics. A short quarter of a mile off eastward is another group of about 120

small four-roomed houses, occupied by mechanics and the better class of labourers, in full work, suffering no privations, but where the Cholera was fearfully disproportionate on the population. Ask about the general health as I have done, and the houses, and hear the same story from the whole—"Never been well since coming in, and the children always ailing, and my husband says he feels more refreshed when he comes from his work than after he gets up in the morning. And then everything spoils; meat put into a cupboard is musty in a night, one can keep nothing. Clothing becomes damaged, the drugget rots in a month, boots and shoes, and even the beds we lie on, are mildewed in a week."

These are all new houses, built with the usual twelve-inch foundation for the walls, but in all the insterspace the earth remains untouched, or next to it, on which the flooring rests, sometimes with a slight ventilation, more commonly none.

A half mile off, a few years ago, there were some acres of gravel pits. The gravel had gone to the parishes round about for road-making, the sand for building purposes, the mould for extemporising gardens. The large pit was then filled up on invitation of the owner, with the aid of the scavenger and others, with all the slush and filth of a large circle of contributors. When this fund of abominations became consolidated, it was built over in the usual style. They were soon occupied by tenants and lodgers. Now this site during the epidemic has been a great slaughter-field; the mortality was shocking.

These, and such as these, are the Cholera fields, and not dirt and filth so much as is commonly believed, within and round about the house, but *under it*. There are thousands of such houses built about London. Besides the Limehouse district there are West Ham, Stratford, Victoria Docks, Plaistow, Poplar, and the Isle of Dogs, where the Cholera was fearfully felt, full of them. There are hundreds of such houses now building, all within the circle of the pestilence and of death; and when I see, as I have often seen, the robust mechanic enter with his young family, to seek a home, I know well it is only to find, as it were, a sepulchre. The Building Act is at fault for all this: a house may be built anywhere, as it has been said, even on a dunghill; while observing the line of frontage, the party-walls, and a few other niceties of the law. A short while ago the demolition of a

gasometer took place in the East of London, when the black earth, saturated with all the poisonous abominations arising from the manufacturing processes, was carted away to fill up a vacuum, robbed of its gravel and sand in the usual way, over which has been built a large public school. It was by the merest accident, within the last twelvemonths, Mr. Ellis, the Vestry Clerk, informs me that it came to the knowledge of the Hackney Board of the plans laid out for a "genteel family residence," as it is termed, on the spot where were deposited the remains of two cows that had died from the Cattle Plague. But built over filth, or on the bare earth, it is much the same; it is equally over organic matter, only in another form, and under certain conditions, gives rise to deadly exhalations. Elevation has shown a difference, a marked difference, in the ravages of Cholera, but it refers principally to the badly-built, not to the well-built houses. In Bromley, at a low elevation, the mortality has been heavy—in Bromley Union,* little or none; in Poplar, a fearful slaughter—in Poplar Workhouse, no death; in Limehouse, very numerous deaths—in Limehouse Establishment of 400 children, as already stated, not one.

Every link in the water theory, as it is touched, thus drops to pieces. The suggestion of the atmosphere, in its travels easterly as the primary agent in connection with a special localisation, is supported throughout by a chain of consistent and co-operating facts. The poison or miasm hangs about the lowest levels, and then revels in death. The water *drinking* poison has been mistaken for the water *exhaling* poison. At Amiens, in France, where a large mortality from Cholera took place, the water was perfectly pure; and Dr. Druitt could trace nearly all of it from the foul exhalations of organic matter in various forms. The atmospheric theory explains everything. It tells how the parts north of Victoria Park, on which emphasis has been laid, escaped so well; how Mile End got well off; and how Bethnal Green above all should have the smallest amount of mortality—because the poisonous wave, as a glance at the map will show, from the congregated filth, aided by the north east wind, would wholly pass by the greater parts of these districts, except allowing for the spray arising from occasional variation of the wind, and from the ordinary diffusion. The atmospheric theory also, from the low, swampy, Cholera habits, tells why there has been a gradation of death, and at once affords an explanation of the comparative exemption of Bethnal

* There were 4 deaths from Cholera in Bromley Union, in bed-ridden women for years, whose average ages were 75 years. This arose from an inmate going to visit a Cholera patient at Shadwell.

Green, at a higher elevation, and all but complete omission of Stamford Hill. The whole of London is deeply indebted to the Registrar General for arousing public attention to the state of the water. It is impossible to read the Report of Mr. Knight, the surveyor of Mile End, on the pollution of the water we drink, without starting, and who has certainly exhibited a masterly hand in discriptive powers in his exploring voyage down the Lea. But all the rivers are more or less in the same state about London and throughout England; and it is somewhat surprising the towns escape so well. By a happy provision of nature, however, water has a wonderful property of purification in itself, so that when charged with filth at no great distance, it is well to know how little organic matter can be detected, on a chemical analysis, by the time it reaches the source of supply. Then those bushels of bi-valves thrown up in cleansing the mains occasionly, or in the event of a fire, and the eels establishing a blockade to the tank and butt, are unmistakeable evidence of the necessity for a *thorough* filtration. The supply again should be constant; its deficiency has long been a crying evil; the complaint should not arise from the short time it is *let on*: it ought *never* to be turned *off*. By this mode of supply I believe there would be no waste, no more water consumed. The conclusion I arrived at from the whole report, is involved in the following propositions:—

1. That all rivers, docks, canals, and other deposits of water, should be kept as rigidly free as possible from pollution; and all factories, yards, and works of every description engaged in operations on animal matter, or giving rise to offensive effluvia, should be at once abolished, as standing perils in certain atmospheric conditions, to the health of the localities.

2. That the Building Act calls for revision, under which there is a demand for a clause by which no new house should be held as habitable unless certified by a Sanitary Authority.

3. Wholly demolish certain streets, courts, and alleys as incapable of sanitary repair, and unfit for habitation.

4. In houses of another class, but with defective structure, already pointed but, make it imperative on the owner to place a layer of concrete under the floor (a perfectly practicable thing) or other impermeable composition, to secure the inmates from pestilential and other dangerous exhalations of the earth.

This concludes my Report on the Cholera. It may possibly create some surprise that I have not dwelt more on the specialities of the Limehouse District. It was scarcely necessary. The interest has greater proportions. It is in a large sweep of districts that the facts and the force of the enquiry can only be fairly presented. An objection may also be made to the character of the practical suggestions. I can only say they are not the recommendations of the hour, springing up with the pestilence, they have weighed with me for years, and become irrevocably confirmed by recent events.

I have the honour to be,

GENTLEMEN,

Your most obedient Servant,

THOMAS ORTON,

Medical Officer to the Limehouse Board of Works.

November, 1866.

BOARD OF WORKS

FOR THE

LIMEHOUSE DISTRICT.

REPORT of the MEDICAL OFFICER OF HEALTH for the Year ending Lady-day, 1867; with supplementary and conclusive remarks on the Cholera Epidemic in the East of London.

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PREFACE.

Some apology seems necessary for the late period in bringing out this Report; but while bearing in mind the authorities I had to consult, and the advanced season of their appearance, it was scarcely possible to avoid delay; and my plea, then, in relation to a question so vitally affecting the interests of the East of London, will be the somewhat hacknied one in official life, "the exigencies of the public service."

It is felt that an objection may be made by prim formality to the display of a vein almost approaching personality. This was not altogether unavoidable. The opinions and statements controverted are so closely identified with the individuals, that it has been found a difficulty to exercise a just and legitimate criticism in one respect, without the semblance presented of a collision in another. The gentlemen, so highly distinguished in the scientific world upon whom I have seen it necessary to animadvert, will readily apprehend this position in the performance of a public duty, and as perfectly consistent with that allegiance due to personal worth and official distinction, than whom none would be more ready at all times to exhibit than myself.

An objection may be made to the style as not sufficiently *grave* for a public document. If so, it may be observed that I have not aimed at this characteristic. While reminded of my duties to the Board and the public, the Act of Parliament places it within reach of every ratepayer, at the price of twopence; so that we have to study the taste of our readers in conveying sanitary knowledge, in order that it shall be read. I shall, therefore, consider *gravity* as only another term for *dullness*, but by an endeavour to *popularize* the Report its publicity and usefulness will be increased, the thing I shall always seek to promote.

T. O.

TO THE

LIMEHOUSE BOARD OF WORKS.

GENTLEMEN,

A memorable year has been 1866 for an excessive mortality. This is wholly attributable to the outbreak of Cholera, principally in the months of July, August, and September; and which told with terrible effect in the Limehouse District. I have already made a special report on the epidemic. I shall supplement it by some further remarks in their place, in the meantime confining myself to the sanitary history of the twelve months.

Premising that I am unable to give the number of births with precision, as the returns during the Cholera season were withheld, and on application since, I am informed that they are "now out of print."

The deaths for the year ending Lady-day, 1867, were 1,833—920 males and 913 females. The mortality for the same period in 1866 was 1,217, so that where 2 died in 1865-6, 3 perished in 1866-7.

This large mortality will be thus apportioned :—

	Tot. Deaths.	Males.	Females.
Limehouse	874	437	437
Ratcliff	544	274	270
Shadwell	262	134	128
Wapping	153	75	78
	1,833	920	913

Or given for the 4 quarters, the proportions will stand thus :—

	LIMEHOUSE			RATCLIFF.			SHADWELL.			WAPPING.		
	Mal.	Fem	Total.	Mal.	Fem	Total.	Mal.	Fem	Total.	Mal.	Fem	Total.
Quar. at Midsum	76	86	162	56	54	110	21	16	37	16	10	26
„ Michaelmas	197	215	412	132	129	261	64	65	129	35	51	86
„ Christmas..	83	67	150	35	43	78	23	26	49	9	7	16
„ Lady-day ..	81	69	150	51	44	95	26	21	47	15	10	25
	437	437	874	274	270	544	134	128	262	75	78	153

Again, if given for each quarter for the whole of the District, the numbers will be, at

Midsummer	335	Deaths.
Michaelmas	888	„
Christmas	293	„
Lady-day	317	„
Total.....	1,833	„

It will facilitate a better understanding of the mortality by a reference to former years. Taking the Census of 1861, the deaths were, in

1862.....	264	in 10,000 persons.
1863.....	253	„
1864.....	236	„
1865.....	236	„
1866.....	232	„
(To Lady-day) 1867.....	331	„

In the statement for the past year, so little satisfactory, the estimate corrected for the increase of population has not been taken into account, which will make a little difference. But the zymotic increase of mortality in comparison with former seasons will nevertheless make the year 1866-7 very remarkable in sanitary annals.

The number of these deaths presented, was in

1864.....	412 or 74 in 10,000 persons.	
1865.....	350 „ 63	„
1866.....	294 „ 53	„
1867.....	840 „158	„

Placed in their respective parochial divisions, these 7 (usually 6) principal contagious diseases will have this allotment :—

	Small Pox.	Measles.	Scarlatina.	Fever.	Hooping Cough.	Diarrhœa	Cholera.	Total.	
Limehouse	20	17	23	18	13	112	179	382	
Ratcliff	3	10	12	16	16	62	130	249	
Shadwell	7	3	11	7	7	45	41	121	
Wapping.....	—	4	3	1	6	12	62	88	
	30	34	49	42	42	231	412	840	1866–7
	9	12	55	51	94	73	0	294	1865–6

The contrast of this order of deaths with that of the previous year is more than striking. In this place it is hardly necessary to dwell minutely on the peculiarities of this table. It may be observed that Wapping, as will be seen, the water-side division, from the health-giving, the poison-destroying breezes of the Thames, maintains, as usual, the first position, whether in the aggregate or the specialities of these diseases. There is no death from Small-pox ; the solitary death from Fever was that of a patient brought in mistake, and occurred in the Cholera Hospital. Of the 62 deaths under the head of Cholera, 51 were those of persons conveyed there from the various parishes of the district, inclusive of 3 from St. George's-in-the-East. The general result of these deaths, apart from Cholera and Diarrhœa, regarded exceptionally, is 11 per cent. less than in the previous year. The amount of Fever is 20 per cent less—a fact worthy of note. The advanced months of summer were intensely zymotic and unhealthy, so that the lesser amount of this disease tends to confirm my impression at the outbreak of the epidemic, in

regarding it as specially a destroyer among the Fever haunts, and in some way or other as a substitutionary or vicarious disease.

To speak more exactly—in the ordinary course of things there would have been at this time, in all probability, a great accession of Fever, but a special atmospheric poison coming on, gave the sickness another turn, so that large numbers of persons under certain conditions, in its stead were carried off by Cholera.

I will repeat the summary of my views on the epidemic of 1866, in order to be more clearly understood.

1. In consequence of the intensely high temperature in the latter part of June and beginning of July, together with a protracted and unusual calm, I was preparing for an outbreak of Fever, so that when the Cholera set in, baffling all past experience, I was led to watch more closely its course and action.

2. That immediately the water of the East London Company from the works at Old Ford, was charged with being the cause of the "explosion," as it has been called, I was the first Medical Officer of Health to warn the public on this and other matters—a course of proceeding shewing that I was at once ready to adopt the hypothesis, not having any other then presented to me as probable.

3. That in watching the progress of the disease I became quickly satisfied that the alleged foul water had nothing to do with originating or even in exaggerating the epidemic, from which the water drinkers of all classes were markedly exempt; while on the other hand the drinkers of intoxicating liquors, especially the intemperate and others whose powers of life from whatever causes were depreciated, principally became the victims.

4. That the mortality of the Cholera was in an inverse ratio to the altitude, arising from telluric or foul earthy exhalations, but not necessarily so, for where habitations were so built, even at a low elevation as to become comparatively impervious to earthy exhalations, as in the Limehouse Establishment, the Stepney Union at Bromley, and private houses, the destruction by the pestilence was wholly unimportant, while large numbers under other conditions on the same level were dying round about, this rule of mortality everywhere prevailing.

5. That the primary cause of the Cholera was *atmospheric*, originating in the East, and after the lapse of months having traversed the Continent, true to the westerly direction, it found its way to England, when the east end of London terribly felt its shock, resulting in an extraordinary mortality, mainly attributable to masses of filth in various forms, traceable to Docks, Canals, Sewers, &c., and to such a degree *as not to be equalled by all the rest of the metropolis.*

6. That after the evolution of deadly vapours and gases from this accumulated filth in the hot season, during an almost perfect calm for several days, then a continuous wind with slight variations, chiefly N.E., conveyed this poisonous air direct through the heart of the Cholera field, being tolerably co-extensive with that of the East London Water Company's sphere of supply from their Works at Old Ford.

Since these opinions were made public, various theories have been propounded to solve the difficulty of the enquiry, and certain Commissioners under authority in various departments of science bearing on Epidemeology, have given in their reports. Notwithstanding the amount of talent involved in the investigation, which it would be in vain for me to attempt wholly to compass, I am not, I still venture to say, satisfied with the result. I cannot divest myself of an impression—nor am I alone in this—that the enquiry has not been pursued with that freedom from bias, which, with a facile spirit, would have been given to the consideration of a question in abstract science. I seek not to be singular in putting in this demurrer, but to be useful in my vocation; and if any in the higher latitudes of hygiene should look upon the objections of a Medical Officer, to what he conscientiously regards as a fallacy, simply as a superfluous act, then the Office is an unwarrantable tax upon the ratepayers, a fraud upon the public, and the sooner it is swept away the better.

There are two theories still in antagonism. It is right that this matter should be cleared up. We are told "of 5,915 who died from Cholera and Diarrhœa, not less than 4,276 occurred in the Eastern districts." There must, therefore, be something to account for this discrepancy, a line of demarcation so striking as at once to be obvious, and a cause at hand that cannot be questioned. It will not do at this time of day to build up Reports on a

theory, nor to attempt to support that theory by learned, plausible, but fallacious illustrations. Nor will it do to cloud the enquiry in the language of ambiguity, nor to indulge in a negative phraseology in order to tone down difficulties ever and anon as they arise.

Besides, just consider the importance of this enquiry going a little further, *for if the foul water dogma be unfounded*, and it is worthy of remark that all espousing this view, *without exception*, have expressed every now and then doubts, and hesitations, and reservations, on the matter, *then in the event of another Cholera epidemic in* 1868, *we shall be just where we were a year ago, apart from certain sanitary improvements, and the people of the East of London will be as unprotected as they were in* 1866.

It will be not at all out of place, in passing, to advert to a few incidents of almost daily occurrence that turned up and found ready credence at the outbreak. Some of the strangest, wildest notions were for a season prevalent about the water from the Works at Old Ford—the common drinking of which—that of course—had brought on the Cholera. Then when a case happened in any other part of London, especially the fashionable quarter of St. James' or Belgravia, it was clearly traceable to the visit of a friend from Poplar or its neighbourhood. Another was riding on the top of an omnibus from Stratford, and it "turned his blood" as he crossed the River Lea. A third from Camberwell had gone to see a relation at Mile End, and so had drunk the water. A fourth was seized with the pestilence after wearing a new suit of clothes, which, on investigation, were found to have been made by a man living at Limehouse. These and fifty other such stories were published daily, as the rational mode of explaining the transmission of the epidemic.

It came to pass, however, after the lapse of a few days, that the cases multiplied so fast and far away from the influence of the Old Ford water, that it was found necessary to substitute another explanation of the migratory character of Cholera. It was then given out that an "allowance must be made for diffusion," the meaning of which was that the foul water had already done its worst through the mains of the Company in generating the pestilence, but now that the germs had been scattered, something like the spray from a water-mill, or the paddle of a steam-boat, and in this way was "diffused" throughout the metropolis.

But this theory of "diffusion" was in turn also soon doomed to perish. For the "germs" almost immediately were scattered throughout England, the spray flew over Scotland, and the telegraph flashed the tidings of its "diffusion" in Ireland. Now I suppose that at this hour few would be ready to contend that the germs originating in the Old Ford water had in this way carried the pestilence to the remotest parts of the United Kingdom; and then, if confined to the metropolis, one cannot help admiring the discriminating power of the theorist, and the exactitude of science, which are able to mark out the line within which the germ can, and beyond which the germ cannot take action, and call forth the pestilence.

Away from the foul water doctrine, writers on the subject are at sad difference to account for Cholera. Some of the theories may be interesting to notice. The Medical Officer of a neighbouring district, held in high esteem, has been at the trouble to collect some of the latest *discoveries*, which, with his permission, I will jot down as they occur:—

"1. Cholera is caused and propagated by atmospheric influence.

2. The telluric theory, or supposed poisonous exhalations from the earth.

3. Electric and ozonic theory.

4. Emanations from putrid animal matter considered as the cause, and of some other epidemical diseases.

5. The zymotic, or yeast, or fermenting theory, assumes that the Cholera matter taken into the system, is capable, by human intercourse, of leavening the whole of mankind.

6. The animalcule theory, as springing from minute insects analagous to the blight on fruit trees.

7. That each Cholera patient gives off a specific poison like that of Small-pox, attacking those only who are pre-disposed. (This is very good, only it does not say how the first patient becomes seized with the Cholera.)

8. From fungi, arising from the excretions, such as natnralists attribute to cryptogamic plants.

9. Dr. Snow's theory of water polluted with Sewage, &c.

10. Dr. Budd's theory of a living organism of a distinct species of the fungus tube, taken in by swallowing, infinitely multiplying by self-propagation, and in the bowels causing the peculiar flux of Cholera.

11. Dr. Fuller says it is a distinct *materies morbi*—a Cholera germ, of fungoid origin, conveyable from place to place, capable of reproduction.

12. A contagious germ or substance, be it germ or seed, animalcule, or vegetable, or a merely chemical compound."

Now, I have not recorded these diverse theories of Cholera to provoke a smile at our ignorance; on the contrary, I know well that some of these ideas have emanated from the highest Medical intellects of the country, so that if the difference of opinion should appear extraordinary, it only points to the problem yet remaining to be mastered—*What is Cholera?* As these views cannot all be true, neither is it likely that they are all error; but rendering it probable, should a demonstration ever be reached that it will comprise a very limited selection from the whole.—1st, Atmospheric. 2nd, Telluric, or exhalation of local or earthy poison. 3rd, the fitness of the recipient for diseased action.

The foul water poison from Sewage, &c., which no one doubts, I do not speak of in alluding to the character of true Cholera as known in Europe in its travels from the East.

As it is, everything is uncertain. There is little or nothing known of Cholera. Take for instance the investigator who adopts the "germ" theory, and ask what he means by a germ? He, of course, will at once feel at home: he will talk learnedly of what chemistry has done for its development; of the great discoveries in pathology; of the wonderful revelations of the microscope; and conclude, probably, by ending where he began, in answering the querist, by gravely calling it—a *germ.*

Nor is the treatment of the disease much more satisfactory, if a principle is to guide us. *Externally*, ice to the spine has its enthusiasts, by others it is called miserably unsuccessful; then heat is strongly recommended by many, others again tell you to avoid it. *Internally*, cold water is recommended by one; another pronounces it a fatal treatment; calomel and opium are infallible with some; they are regarded as poisonous by others; carbon (charcoal) is esteemed an unfailing antiseptic by some admirers; "worse than inert," starts up the opponent; "there is too much in the system already." Astringents have their advocates on the one hand, while on the other they are loudly condemned as nothing better than quackery. Castor Oil has been

trumpeted forth by one—to be denounced in its use, by a second, as amounting to little better than unjustifiable homicide.

With all these perplexities of practical men, along with that of many others from all civilized nations, whose experience has been gained in all quarters of the globe, ere venturing on the expression of their opinions—it is almost too much to be called upon at length to take for granted all that is found in a "Blue Book" on Cholera, and the Cholera "explosion" at the East End of London, without note or comment from merely official authority, for the statements to pass unchallenged, and for the conclusions ro receive an acquiescence as inevitable and indisputable.

I am very well aware it has been said that the Cholera "explosion" question has been settled by some four or five, or (is it?) six independent authorities. But nothing can be considered for a moment "settled," so long as it remains a subject of controverted medicine. Nor does the pompous term "authority" help matters a jot; the sort of benefits that have come upon the world from this influence are pretty well known; the evils flowing from it in medicine few can tell. Now, what after all is an "authority?" In the present restricted medical sense it means some one gentlemen, who, from his personal or relative position, or both (with time to spare) is appointed to make an enquiry into the origin, character, and course of the late epidemic, having special reference to its aggravation in the East of London. According to this definition, instead of 4, or 5 or 6, the term "authority" might just as correctly, in point of competency, be applied to 4, or 5 or 6 hundreds in the metropolis.

Their combination of action, and the unity of result go for nothing. A pestilence comes, thousands are dead and dying. There is great terror on all sides. The public must be appeased—a cause must be assigned—appearances favor it—the theory is plausible. Authorities A. and B, are agreed; C. is in exact response to A.; D. in no way differs from B.; E. has the points of all, and occupies the same space as A., B., C., and D. It follows that authorities A., B., C., D., and E. are so far equal, and agree with one another.

In thus stating the position of parties prominently interested in the investigation, I would by no means be supposed to intend anything offensive; but besides, in a professional light, it will not fail to be looked at by men of

the world, with an inkling of common sense. Let me add, that had I been gifted with the talents adequate to the scientific enterprise, and had had the honor of being one of the authorities, I can scarcely see, making allowance for nature's frailties, how I could have avoided certain conventional snares. Or again, if any other five gentlemen were to be selected as a *second* Commission of Enquiry—from the West end of course—endowed with a stoical and inflexible sense of duty, thinking it only decorous at the outset to disclaim any, the very remotest knowledge of the East of London, in exploring the River Lea and its tributaries, except from the guidance of the pocket compass; and yet anon there would turn up, I venture to say, such a reference to antecedents, such a comparing of notes, such an outflow of amenities, and all that sort of thing, that it is ten to one before they had well recovered their heads, their heels would be found exactly in the rut of their predecessors.

How far this influence might have been set at naught, had five gentlemen from the Imperial Academy of Medicine, for instance, been deputed, or others, owing no fealty for their official possessions, I am not prepared to say; but among the curious it may serve very well for conjecture.

The opinions on the late epidemic since my Report of 1866, which have assumed a public importance, having the impress of authority, have been those of Capt. Tyler, R.E., on behalf of the Board of Trade; Mr. J. N. Radcliffe, from the Privy Council; and Mr. Simon, the Medical Officer of the Privy Council, whose commentaries are the closing and official authority.

After the outburst of Cholera, and the authorities had denounced the Old Ford water first as the exciting, and subsequently as its aggravating cause, the public very reasonably took alarm, and memorialized the Board of Trade for an enquiry, basing their application on three principal allegations—

1. That the water was bad.
2. That it was deficient in quantity.
3. That it was mainly the cause of the "explosion."

The enquiry on behalf of the memorialists, in the form of an Association, was conducted by an enterprising attorney, Mr. Price, fully alive to the interests of the public health and other benevolent considerations, and it would be doing them great injustice to deny that solid service was afforded to the

community by the establishment of the first and second charges, after a protracted investigation.

The third chaage, that of the Old Ford water being the principal, if not the sole cause of the Cholera "explosion," was not made clear by the evidence, though the allegation was warmly taken up and conclusively adopted by this distinguished officer of the Royal Engineers. And here, while engaged in hearing evidence on the epidemic, and the causes thereof, it would occur to many to ask the gallant Captain that while so "on duty," whether he would have been any less pleased with his achievements, in having a scientific physician at his elbow, if merely as his assessor, seeing that without some such professional adjutant whatever he might think, say, or do, about the Cholera, would have about as much force as a discourse of his on the plagues of Egypt; and that in this department his competency would be precisely on a par with the influence of a drill sergeant fresh from the regimental school, marching in, certificate in hand, "highly commended?" As it is there is one parallel on record, that of a Field Marshal, as a mark of autocratical favour, who found himself one morning gazetted in one of the learned Universities, to the professorship of Hebrew, Sanskrit, and Japanese literature. It would be a startling announcement, yet quite in keeping, for an M.D., with a sanitary reputation, to be picked out for the investigation of a zymotic outbreak, say, on the coast of Essex, and receiving his instructions thus:—"In aiming to discover the origin of this epidemic, you will not overlook the habits, pursuits, and character of the inhabitants; you will especially have your attention directed to the drainage of the town; the state of the water supply will not fail to call forth your best consideration, and be guardedly precise on the matter of ventilation. This accomplished you will thereupon proceed to report upon the most formidable instrument of modern warfare; in this department of your duty you will carefully avoid being influenced by the experience of practised artillerists as simply resulting from the prejudices of education; particularly that of the Royal Engineers, as calculated to be detrimental to the public service; and in this way assuming a dignified and independent action, you will be better enabled to adjudicate on the numerous claimants for excellence amongst the competitors at Shoeburyness."

That the Commissioner on the *supply*, the *quantity* and the *quality* of

the water, had the fullest confidence in himself also *to settle the Cholera question* was clear enough; when, without any very obvious tribulation of countenance, a mere spectator of the scene was permitted to question a witness whether any person, equally with a medical man, was not competent to speak of the water in connection with the epidemic? Now Captain Tyler shall himself answer this question, and at once serve as an illustration. One eminent scientific witness, walking in at this moment, saw how matters were settled, and beat a retreat; he was not going to be represented as saying what he did not mean, so presently returned with his own *private* reporter, and persistently refused to give evidence, unless he had a sufficient guarantee by this check that it should go forth to the world what he really *said* and *meant*, and not what he did *not* say and did *not* mean.

The contrast between this and another tribunal of enquiry having some bearing on the same business in the House of Lords will bear no comparison. There, there were no pert interruptions; the witness was in the presence of gentlemen; the evidence was given to its close, and no vagaries were permitted from lookers-on, claiming a residence within the parishes of Mile End and Whitechapel.

Now before bringing special facts to the service of the enquiry, it may be as well to hear what two witnesses have to say, whose evidence I have roughly but correctly transcribed from Captain Tyler's Report.

Dr. Letheby, the distinguished Professor of Chemistry, of the London Hospital, said "that he found in the Old Ford water one-third less of organic matter in June, when Cholera broke out, than in the following December, when it had ceased. There was not a single case of disease (Cholera) amongst the fifty residents in the London Hospital, nor did a single case occur among the 400 ordinary patients, though the water was all supplied from Old Ford. At the East London Union Workhouse, with 300 inmates, there was only 1 case of Cholera, brought from a distance. In the City of London, Eastern division, in 161 houses with 1,732 inhabitants, supplied by the Old Ford water, there was but 1 death, the remainder 4,495 houses, with 40,673 inhabitants, had 62 deaths from the New River Company. If the East London Company's water had been charged with poison, it ought to have commenced throughout the area in point of time, duration, and intensity. There was little or no Cholera at Stamford Hill and Clapton,

supplied exclusively from Old Ford. He was of opinion that the water of the East London Company had nothing whatever to do with the appearance or spread of Cholera, but the district in which the Main Drainage had not been completed. There was no difficulty in discovering pollutions in well water, by the amount of the organic matter—by the odour of the water when heated, and by the presence of ammonia. He had sought for similar indications all through the epidemic without finding them. The proportion of ammonia in that water had been quite insignificant."

Dr. Corner, Medical Officer of Mile End, considered that the increase of Cholera in his district was due rather to deficiency of supply than to any defect in the quality of the East London Company's water. He had seen and carefully investigated 100 fatal cases with special reference to the theory that the East London Company's water had been a cause of Cholera, but had "never seen a single reliable fact to support that theory." He had always been able to trace the exciting cause to accumulation of refuse and decomposition of organic matter, and he believed the want of better drainage in the district had a considerable effect in localising the disease. He admitted the Cholera was worse in the East London Company's district than those supplied by other Companies.

My own evidence, as far as I cared to give it, went to the effect already shewn, with the addition—"supposing the water ever so bad, still it was not the cause of the Cholera (explosion.)"

I have a slight complaint to make of the mode of taking down my evidence. Captain Tyler says, speaking of myself, "He found at 14, Love Lane, Ratcliff, 3 of a family, who were not drinkers of water, died, while 5 children (who might be *presumed* to be water-drinkers) escaped even from Diarrhœa." In my Special Report on the epidemic, page 4, placed in the Commissioners' hands, I said, on the authority of the mother, repeated on two several occasions, that while the moderate beer-drinkers perished, the five children, who were "*doing nothing but drinking water all day long*," to use the mother's words, escaped from even Diarrhœa." The "presumption," therefore, of Captain Tyler was not a fair statement of the case, and placed within a parenthesis made the matter *worse*. It was beyond a *presumption;* it was an *authoritative fact,* and ought so to have been represented by one

who was called upon to decide upon the balance of evidence, if he counted upon others to respect his judgment.

In his comments in the Report, as he proceeds, Captain Tyler is in hot haste to talk about "Cholera impurities," "rice-water" secretions, and the "poison" of the Old Ford water, although nothing of the kind has come up in evidence to prove that the suspected water has in any way been so contaminated before distribution to the public, beyond the fact of the pollution of the River Lea, like all the rest of the other sources of London water supply, and with the leakage into the reservoirs.

All this is bad enough, no one can gainsay. But to come to the "poison" in the water, where is the proof of it? Dr. Letheby says there never was evidence of any; taking the water supply during any portion of the epidemic. Dr. Frankland has failed to detect it, chemistry has been useless in analysis, and the microscope a plaything in bringing about its discovery, but still in the water—*There it is.* It is said to be so inscrutable an agent of death as almost, if not quite, to possess an essence beyond the ordinary properties of matter, for that neither fire nor water seems to affect its destructibility. To attempt to drown it by water, as reported, is only to effect its propagation; to boil it is only to keep the poison in abeyance for a short season; while *filtration* through gravel, earth, sand, or animal charcoal, is only to find it break through these impediments with all its pristine vigour, and become as active as ever in the battle of death.

Thus stands the case. If it is not otherwise capable of proof, in no way can it be made so, except from experiment on the living body. This ought to be evidence beyond dispute. Those who *drank the water*, according to the law of all poisons, ought, *as a rule*, to have become affected or perished, while those who did not drink the water should have been exempt. But the *swallowing of the water* is indispensible to bring it to a proof, and settle the question of—*Poison or no poison*?

I have previously brought forward many facts, and in the repetition of two or three, I will also adduce some others bearing on the question, prefacing that I am now speaking of those who drank or drank not the water,

but all of whom lived exclusively within the Old Ford supply.

FACTS.	REMARKS.
1. There were nearly 600 inmates daily in the Stepney Union at Bromley, 6 of whom died.	The master says, "No case occurred here till an infirm woman, on a holiday, visited an affected house at Shadwell. The next day she was seized with Cholera and died. In all we lost 6 cases—4 out of the 6 having been bed-ridden for years. The ages of those who died were 92, 70, 78, 62, 53 and 23 years. The last was a helper in the ward, nursed one who died, became terrified, was attacked, and died in a few hours."
2. With nearly 400 children in the Limehouse Establishment there was no death, not even a case of Diarrhœa.	The Master (Mr. Mosely) was asked if these children all really drank the alleged foul water? "Drink it?" was the reply, "they must drink it, for they have nothing else to drink." And while so conversing, some half-dozen came to the bowl attached to the tap, and gave unmistakeable proof of their having no fear of swallowing poison.
3. In the Ratcliff Gas Works, at Wapping, there were 70 men employed during 1866, having no death from Cholera or Diarrhœa.	The men in such places work at a very high temperature, which, together with the smoke and dust, provoke great thirst; yet this water was the drink, and the only drink that could be tolerated.
4. At Messrs. Parkinson and Salmon's, Biscuit Bakers, Ratcliff, 70 to 80 men and boys were em-	No death from Cholera. There was a little Diarrhœa, if anything less than in previous summers.

ployed, almost exclusively drinking the water.

5. At Messrs. Knights, Soap Makers, Wapping, 150 men and boys employed in 1866.

(This on the authority of Mr. Salmon.)

Beer was principally drunk by the men, but water almost solely in the melting house, from the great heat. There were 4 cases of Diarrhœa recovered, 1 of Cholera fatal in a youth of 18, believed to have *drunk beer.*

6. At Messrs. Richardson and Perry's, Wharfingers, from 50 to 60 men were employed.

Drank both beer and water. One case of Cholera recovered, some slight cases of Diarrhœa, but *none amongst the water-drinkers.*

7. At Messrs. Hodsell's, Metropolitan Wharf, Wapping, 30 men were employed.

Drank both beer and water. A few cases of Diarrhœa, but no more than in 1865.

8. At Messrs. Raphael's. Silver Refiners, Limehouse, 50 men employed.

A few cases of Diarrhœa. No deaths. Water drunk exclusively on the premises.

9. Messrs. Paton and Charles, Candle Factory, Limehouse, 50 employed.

A few cases of Diarrhœa, as usual. No deaths. Nothing but water drunk on the premises.

10. Silver & Co., (Limited) employ 130 men.

A few cases of Diarrhœa. No deaths. The Old Ford water only drunk on the premises.

11. Very numerous also are the cases of private establishments, where the drinking of the Old Ford water all through the summer of 1866, was followed by perfect immunity. I will mention one—that of the house of Mr. Briggs, at Nos. 1 and 2, Albion Terrace, Limehouse, where there were nearly 40 inmates.

The alleged foul water was drunk by nearly the entire number, amongst whom were 20 to 30 young Paraguayans, who were the greatest indulgers in the beverage, *unfiltered* water, resulting in a few cases of Diarrhœa, but not more than in all the preceding summer seasons.

12. A family of 8 persons, at No. 15, Carr Street, Limehouse (name forgotten, and since removed), 5 of whom had Cholera, one dying, within 50 yards of 72, North Street, where the first case occurred in this district.

13. Out of the 140 deaths from Cholera and Diarrhœa for the year 1866, nearly 130 were those of infants, at 1 year and under, in the Cholera months of July, August, and September.

14. Of these same 130 mothers, only 3 died from Cholera and Diarrhœa.

The Inspector, Mr. Hurlock, was with me in making the enquiry. The mother was asked whether she thought the water had brought on the Cholera, and killed the child? "No," was the prompt reply. "She never suffered it, and none of her family was ever known to drink cold water."

Now, Cholera and Diarrhœa Mr. Radcliffe himself admits *in the epidemic* must be regarded as "inter-dependent diseases." And there can be no doubt about it. If I say —who will not say?—that the babies could not have drunk the water, then of course the water could not have killed the babies. I may be met perhaps by some young aspirant brightening up for fame, with the suggestion *that the mothers no doubt poisoned them?*

The mere supposition that even these 3 women died from drinking the water is too extreme for ordinary belief; for if there is any class who expect, demand, and commonly obtain the good things of this world more than another, it is that of women who are suckling their children. It is very hard to believe that even 3 out of these 130 nursing mothers were carried off by Cholera from an indulgence in cold water.

15. Nearly 300, from 20 to 70 years of age, during the epidemic, died from Cholera and Diarrhœa in the Limehouse District.

In making this statement I would appeal to Medical Officers of Health, to medical men generally (those few who publicly committed themselves hastily to the water theory at the outset *excepted*), to Relieving Officers, and to all benevolent agents engaged in the visitation of the sick and poor, whether it does not fall within their knowledge, with all the force of *impressed, indelible truth*, that the immeasurably preponderating bulk of this class of persons of both sexes who perished were not *water drinkers:* but, with the due allowance for moderation, *the rule* was in life *intoxicating drinks, and commonly these to excess?* I know well that one responsive "yes" will come from all quarters.*

In thus prosecuting the enquiry, I have brought under notice the drinking habits of 1,800 persons—men, women, and children, together with infants in arms—in statements upon which dependence may be placed, collected with no little trouble, and involving such facts as cannot fail to enable the *honest* mind to arrive at something like the truth.

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* The drinking habits of the bulk of adults who died from Cholera at first staggered the water theorists. But they surprisingly recovered their equanimity, soon too. Let it not be supposed that the sequel is at all an exaggeration, but a *grave fact*, by way of the elucidation of an anomaly, current in Medical Societies, had the run of our Hospitals, and was believed in by many in our Cholera Infirmaries. It will be best represented possibly by a colloquy, supposing the impersonation of Science, descending into the arena of ordinary mortals, thus—Querist: "How can you account, as I am informed, for the immense majority of drinking people, who eschewed water, dying from the epidemic?"—Science: "Nothing more easy of explanation."—Querist: "Well, really, I remain in gross ignorance."—Science: "Did you ever get drunk (by accident of course) once in your life?"—Querist rubs his hands over his eyes, and hesitates a reply.—Science: "Did you ever suffer from '*hot coppers?*"—Querist is still silent.—Science: "Well, don't you perceive these indulgers in stimulants, after a debauch, found themselves suffering from 'hot coppers,' got up in the night, and emptied the water bottles. That, you see, clears up all"—Querist was dumb with astonishment. So then here are masses of people, of both sexes, who for the best part of their lives have been daily at their potations of "Real Pine Apple," "Cream of the Valley," and "Truman and Hanbury's Entire," finding themselves prostrated at length by a copious draught of cold water from the Works at Old Ford.

The necessary deductions, arising out of these facts, are the following—

1. That the ordinary drinkers of the Old Ford water during the epidemic amongst masses of people, as in factories, &c., or in private establishments, in no way affected them differently from that of previous years.

2. That the drinkers of the alleged foul water, whether in masses, or in families, were singularly exempt from Cholera and Diarrhœa during the summer of 1866.

3. That the drinkers of stimulating liquors, both fermented and spirituous, all other conditions being equal, were pre-eminently the sufferers and victims during and arising from the epidemic.

4. That as numbers who perished drank neither stimulants nor the suspected water (the infants), it follows that the source and cause of the Cholera explosion at the East end of London remains yet unexplored.

Captain Tyler is of a very different opinion. In giving a Table of the daily deaths from Cholera, closing with the 1st of September, at page 15 of his Report, he says—"The conclusion from this Table appeared to be very strong, that the water of the East London Company must be charged with Choleraic poison, and that it was a principal means of disseminating the disease, &c." Very likely—nothing more likely—than that it should "appear" to the mind of a Captain of Engineers that the water was poisonous—that it had caused the Cholera (first of all), subsequently converting it into the Cholera "Explosion," and that this alleged foul water had slain its thousands.

But I am not going to treat this Commissioner unfairly for meddling with matters with which he had no concern, in which he has only exhibited a zeal without knowledge, by assuming a position, if he had learnt to know himself, in which he never would have been placed.

I have limited myself, in dealing with this gentleman, to facts which every one may understand. The medical, local, and other remarks will follow in comments on a gentleman who has made this business part of his profession, and who can comprehend the subject. At what College did this Officer of Engineers gain the knowledge to enable him to *settle the Cholera question?* His true walk in life is on lines, amongst curves, gradients, and that kind of lore, making calculations from the laws of forces, and the laws of matter—not affecting to fish out a poison in water where none exists—

which it is admitted Chemistry cannot detect—the microscope cannot reveal —while amongst the thousands *the rule was*, such as otherwise indulged *perished*, and those who drank the water *escaped*. In other respects it must be owned, in this enquiry, he has done service. The *quality* of the water he has shown to be impure; his professional vocation has led him to dive deep, and trace the mischief to its source. The *quantity* also has been proved defective, and in this part of his business he has acquitted himself very meritoriously, when the complaining witnesses have come before him, by adjudicating with a nicety on the fallings-short in supply from the first and second story up to the third pair back. But here his mission ends. When he goes further, and aims at something like *universal genius*, he must be reminded that this attempt is always attended with risk, and that none have succeeded since a predecessor in this line, three centuries or nearly ago—the Admirable Crichton. Captain Tyler has his own peculiar excellencies, for which he has a world-wide reputation. Therewith let him be content, and for the future not trouble himself about pestilences, the causes thereof, and other like matters affecting State-Medicine; for his opinion, he may rest assured, either *pro* or *con*, will have about as much weight with such as really do possess a claim to speak about it, as his affirmative would have in settling that long-vexed question amongst an influential section of the nautical profession, which connects the origin of the Goodwin Sands with the upper portion of a certain ecclesiastical edifice in the County of Kent.

Mr. J. W Radcliffe who has made an elaborate report to the Board of Trade at the suggestion of Mr. Simon, the Medical Officer, is entitled to all consideration and respect. This gentleman is not one who believes himself to be the impersonation of all that is great in science, or any special question in which he may be engaged, but while giving to the public a work of great labour and research, is frank enough to admit that an objection may come with force from an opponent, not always to be met, and who while pressing the point, may be as anxious to perform a public duty as himself. If then I find it necessary in the course of my remarks to differ from this Commissioner, it is with regret; if I aim occasionally at reversing his opinions it only arises from the obligations of truth, and in having from the first, without time for scientific jottings, watched the onset and course of the epidemic; and if I arrive at another conclusion, it springs in a measure from that *local*

knowledge, which one at a distance cannot be supposed to possess, and which with a contentation of facts that cannot be shaken, have conspired to produce but one result.

Mr. Radcliffe begins by tracing the Cholera to its eastern and continental origin—alludes to some sporadic cases in different parts of England—then goes rather fully into the first cases at 14, Priory Street, Bromley. Hedges and his wife, it appears, went to Greenwich Park on the Sunday, and returning, just without the precincts had a pint of ale. On Monday they visited a travelling circus at Stratford, and on the testimony of a son and daughter, who were not very likely to exaggerate, are here said to have had only half-a-pint. The origin of the disease fatal to both, is admitted to be obscure. The Commissioner is of opinion that "they swallowed the poison;" not minding however to say of what kind. But from the habits, &c., of the parties, in this slight sketch, it may be strongly suspected that it was not a *water* poison.

At page 287 he observes "that the history of the outbreak over the metropolis in the succeeding fortnight as already given, shews that Bromley was not the sole centre of the early activity of the poison, but that the epidemic quickly declared itself in several widely-separated districts."

He next enumerates "the conditions influencing the progress and distribution of the outbreak;" in commenting on which, it will be more satisfactory, in every way, to place Mr. Radcliffe's views and mine in parallel columns.

Mr. Radcliffe's Statements.	
METEOROLOGY.	REMARKS.
That temperature and meteorological changes played a very subsidiary part in the great development of the epidemic a very few moments' consideration will shew. So far as predisposing the individual to the disease was concerned, their influence was not limited to any part of the metropolis. So far as exaggerating the noxiousness of	We are in the habit of talking about Meteorology as though in relation to sanitary matters it was really understood. There is everything to learn in this science. The great East District, with the worst reputation for filth, &c., *up to the period of the Cholera explosion*, is frequently more exempt from certain noxious zymotic diseases than

certain localizing causes of the disease, *such as over-crowding, filth, imperfect drainage, &c, these causes were not limited to, neither were they more marked in the East than in several other districts,* as for example Bermondsey and Westminster, in which Cholera early appeared.

ALTITUDE.

Mr. Radcliffe, in affirming Dr. Farr's rule that the deaths from the late epidemic *were in the inverse ratio of the elevations at which people lived,* observes "that a deviation from the rule has been wide, as under 3 feet above Trinity high-water mark the deaths were less than from 3 to 10 feet."

the most favoured of London. To mention just *one* instance, in 1864, it had by far the smallest degree of small-pox, while the Limehouse District, as a portion, had not a case.* This and the like discrepancies can only be explained by applied meteorology, of which, at present, we are in profound ignorance. In relation to *filth,* &c., in all forms, the influence of meteorology is unequivocal and certain; and this action is commensurate with its accumulation. But when Mr. Radcliffe says that the East of London, in point of *filth,* &c., in no way differs from "Bermondsey and Westminster," I avow myself *at once and wholly at issue with him.* The facts justifying this antagonism will be presented in their order.

REMARKS.

A low altitude has doubless much to do with the destructiveness of Cholera, as well as with the exaggeration of almost all other diseases. But in "the explosion" the fatality arose not from the altitude altogether, but along with other disadvantages, more especially from the eminently bad construction of the habitations of the bulk of such as were affected during the epidemic.

* This was one case, that of a child a few days old, in Shadwell. Such strange anomalies as these—and they are not uncommon—can only be explained by differences in the Meteorology, in even so limited an area as the Metropolis.

A group of 3 or 4 hundred fairly-built houses in Burdett Road, Limehouse, comparatively escaped the destroyer; a nest of about 100 more, in an adjoining district—*new houses*—to the north east, a quarter of a mile distant, of a wretched structure, the flooring resting almost on the surface, with little or no ventilation, there on the same altitude the mortality was *startling*. The same rule of death is still more remarkable in the Limehouse Union School, while round about, on the same level, the wail of death was everywhere to be heard. And so of many other localities, it may be said that *altitude* is not of absolute significance, but of the highest *relative* importance.

As to the deviation from this supposed law of altitude, in there being a greater mortality at from 3 to 10 feet than under 3, it turns simply upon the fact that at 3 feet the altitude is commonly next to the water-side, and the river breezes act as a counterpoise to the poisonous agency, whatever poison it may be. At Silver Town and North Woolwich, several feet *below* high water mark, there was little or no Cholera; because (sinking for the moment one point of significance) apart from the large expanse of

SOIL.

"A doctrine has been advanced as to the relationship of the soil and its nature to outbreaks of the malady by Professor Pettenkofer, of Munich, of as great importance practically, if substantiated as Dr. Snow's theory of the propagation of the disease by the drinking water. Professor Pettenkofer maintains that a certain condition of soil is necessary to the development of epidemic Cholera in a locality. This soil, he holds, must be porous and permeable to water and air. It must be charged with organic, especially excrementitious matter". In thus quoting this statement of the Professor's views from Mr. Radcliffe's Report, he proposes his objections, observing that the Cholera "had an obvious relation to houses and not to soils."

water, the inhabitants were partially surrounded by a winding of the Thames, and then the ebb and flow of the tide, and the thorough exposure on all sides to the atmospheric currents, acted fully as a compensation. Houses on the river side are notorious for their exemptions from all zymotic disease.

REMARKS.

There is nothing new to me in the views of Professor Pettenkofer, with the exception of restricting the poison not to the subsoil, but to the subsoil water. As an Officer of Health, I have for years been in the habit of tracing fever principally to the soil, largely impregnated with organic and excrementitious matter; in ordinary, moderate seasons comparatively innoccuous, but which in a *hot summer*, with *no wind* and *no rain*, is certain to become the deadliest source of mischief to the inmates, by the foul exhalations, and in this way engendering pestilence, and intensifying all other diseases.

Mr. Radcliffe says it (the "explosion") had an obvious relation not to soils, but to houses. In my opinion it had all to do with *the houses in connection with the soils* (surface). This union, as a rule, was almost invariable.

DENSITY OF POPULATION.

Mr. Radcliffe observes—"In the recent outbreak, as in previous outbreaks, there was no relation between the density of population, as expressed by a number of persons per acre, and the intensity of prevalence of the disease. In Stepney and Poplar, where the outbreak was most fatal, the packing of the population, thus read, is less than in any other of the East districts."

REMARKS.

Density of population, nevertheless, is—all other conditions being equal—of great consequence in estimating the sanitary state of large towns, and is certain to make itself felt in all epidemics. But when this order of things is reversed, and a scanty population becomes the greatest sufferers, while the most poverty-stricken comparatively escape, it is clear there must be something very peculiar about this Cholera poison that has carried off its thousands. The density in connection with poverty is again worth noticing:—

	Persons to an acre.	Poor rate parts in 1,000 on the rental.	Deaths from Chol. & Diar in each 1 000 persns in 1866
Bethnal Green	145	·136	62
Mile End	118	·066	67
St. Georg.-East	196	·080	96
Poplar & Bow.	34	·060	93
Limehouse Dis.	97	·066	118

But the difficulty about *density*, as well as other matters, may probably be explained when we come to the questions—*What is the poison? Where is it to be found?*

FILTH.

"Mr. Radcliffe says, page 293. "But the East District cannot claim a pre-eminence of filth. In the west of the metropolis and south of the river there are many localities as filthy. *Neither Rotherithe, nor Southwark, nor Bermondsey, nor Westminster can be compared favorably with the east of London.* Yet the three former places suffered in a trifling degree as compared with the latter. Not that filth was altogether inactive. I would imply that its presence was insufficient to explain in any degree the predominance of the epidemic in the east districts. But filth played a part in propagating the disease in certain blind alleys and contracted courts when the disease found admission to them; and it was probably an important agent in the spread of the malady in Blue Anchor Yard, Whitechapel."

REMARKS.

I am utterly amazed at such a statement made on such an authority too; that part of the west of the metropolis and south of the river, are as filthy as the east of London, while Bermondsey, Southwark, & Rotherhithe, are even *worse*. So then, it comes to this, if my comprehension does not mislead me, that after all the talk about the Cholera explosion in connection with the filth of the localities, and all the complaints that have risen up in judgment, the only true type of the kind where it played an important part, was to be found in Blue Anchor Yard, Whitechapel.

I am now constrained in contradistinction to this official statement of the filth of the East *without* facts, to tender for consideration my report *with* facts.

1. The numerous localities at the West end, (Westminster probably,) and Bermondsey, Rotherhithe, and Southwark, in the shape of offensive factories, trades, &c., to which reference is made, which Mr. Radcliffe pits against the East for pre-eminence; even if so far correct are nothing to the point. In my Special Report on the Cholera of 1866, which is quoted in the Blue Book, on this matter by this gen-

tleman, I gave, apart from the hundred blood manure, fish manure, and other factories, a catalogue of the nuisances *peculiar and exclusively belonging to the East*, as contributories to the "explosion" fund, consisting of Docks, Canals, River pollutions, Sewers, &c., and to such a degree *as not to be equalled by all the rest of London.*

Then look at all the North of the Metropolis at this time, great part of the West, part of the centre, so far as the High and middle levels are concerned, and all south of the Thames by the great south level sewer meeting at Crossness, had all the advantage of this efficient mode of drainage. On the contrary, the great bulk of the Cholera explosion field had none of this, but worse still, for the most fatal district during the epidemic—that of Limehouse—served only as poison channels for conveying away the sewage filth of other parishes some 3 miles away.

2. The East has St. Katherine's, the London, the East and West India Docks, with all their immense acreage of comparatively stagnant water, always offensive, and in hot weather not without peril, such as was experienced in June and July, 1866. The Regent's Canal and

Dock may be regarded as a common nuisance at all times—in the summer especially: a person led blind fold down the Commercial Road, would be arrested at the site of offence. Into this Canal, to economise the water, the Company were then pumping backwards, as they have since, some thousand gallons of the Dock water an hour—an engineering feat of filth that by no means lessened the mischief. The Lea Cut close by, nearly meeting at a right angle, goes very far towards filling up the measure of sanitary abominations. When a fashionable Whitebait party, in the season, has come hitherward, how often has the suddenly uplifted handkerchief told its tale of the Canal and the Cut—the meeting of the waters.

3. *The high and middle level* of the great drainage system unite at Old Ford, forming the *Great Northern Outfall* leading to Barking. It is all very well to take away the sewage from the uplands of the north and the wealthy west, and convey it in an opposite direction following the descent of the valley of the Thames, but the East districts have to pay for it in more ways than by taxation. This, along with others on a minor scale, will

have to be looked to, and soon, or the East, from becoming the carrier of poison of not less than 2,000,000 people—a startling fact itself, when the low level sewer shall be completed—will be taxed also in their patience, taxed in their *health*, taxed now and anon by *pestilence*, and heavily by *death*. This main outfall may be said to form the outer parallel of attack in the East of London, flanked by the defective drainage system of the flats of West Ham; the next parallel is the polluted River Lea, well pioneered in its deadliest range by the Lea Cut; the third and last parallel is the Regent's Canal and its tributaries, constituting a force without some adequate counter-poising power, altogether certain in action, and irresistable in their attacks, under the conditions of 1866.

From experiments with the *Anemometer*, I am convinced that the evolution of foul gases is not to be measured by thousands, but by *hundreds of thousands of cubic feet*, from a single ventilator of 12 openings, near the junction at Old Ford, every 24 hours, The rate of *exit* being modified by the *temperature*, the force of the *wind*, and the *varying composition* of the *sewage*, it would be preposterous in me to

make an approach to anything like precision. But in stating the immensity of this influence on the atmosphere round about, extending probably as far as Plaistow, with, it may be in the interspace, from 1 to 200 such ventilators, the emanations from which in *certain conditions* may affect the populations in the rear and front, not unlikely, by diffusion, at as great a distance. These gases, on testing, restored the blue color of reddened litmus paper (from ammonia), blackened lead and silver test papers (from sulphuretted hydrogen. They were very nauseating and offensive to the sense of smell. In favourable weather, no doubt, no appreciable influence may be obvious from these ventilators: in the conditions, as at the end of June and beginning of July, 1866, there will arise *peril*.

The unfinished low level sewers gave in at the time their contributions to the atmospheric poison. Loud complaints had been made of the foul effluvia from this sewer near the Burdett Road. On a representation, doubtless from disbelief of the facts, it was totally denied by the Metropolitan Board of Works. A survey was then made by an official, and sewage—stagnant sewage—3 feet 3 inches in depth,

was found in this sewer, in the very centre of Limehouse, hard by that part of the district where the pestilence told with its deadliest effect, near the junction of the Lea Cut and the Canal, and within a stone's throw of North Street, and others adjacent, where were committed the ravages of Limehouse Fields. This unfinished sewer, choking with filth, from whatever source it came, probably from Poplar, took its course in this condition, right through the centre of the Limehouse District, on either side teeming with pestilence, into Ratcliff Highway.

The Lea Cut, the crowning nuisance of all, runs through Limehouse, its south-western termination emptying itself, by locks, into the Thames; the north-eastern communicating with the Lea or Bow Creek, also by locks, but frequently, that is, as often as the tide will permit, the locks are thrown open, thus Creek and Cut, forming one continuous Canal. Midway between the Thames, into which the Lea runs, and Old Ford, on the east bank, are placed the West Ham pumping works.* Here are two

* Strange misconceptions prevail with regard to the disposal of the sewage from the pumping works of West Ham. Some suppose it passes at once into the Thames; others again that it actually is conveyed by the main outfall to Barking. But the truth is, that little *comparatively* finds its way into the Thames before it has well scoured the Lea Cut and River Lea. In the first place, for 14 days out of every 28, or in the spring tides, and for 4 hours during the 24 the lock at Bromley is thrown wide open, so that the Lea Cut and polluted River Lea form one piece of water. That is for the space of 6 months, yearly there is this *locking* in succession going on, and for 30 complete days and nights

large steam engines for the purpose of pumping the sewage into this River Lea from Canning Town, Victoria Docks, West Ham, Stratford, &c., consisting of from 60 to 70 thousand inhabitants. In this way 160,000 gallons of sewage are poured into the River Lea every hour; or in plainer language—for the fact deserves to be understood—if this quantity were casked, and the butts placed end to end, they would reach from the Bank to Charing Cross, as the result of one hour's exertions. For a fair day's work, of course, this bunging of liquid filth would be in proportion, and after 12 hours' pumping, and then cooped up, the *cortége* of barrelled poison would not stop short of Windsor Castle. But there are two engines, sometimes both hard at it; but what would be the magnitude of this united action in this sewage business, reckoning for "overtime," when matters are pressing, I am not at present prepared to say, nor have I ventured so far in making my calculations.

On my going to inspect the works there had been a rest from their labours; but, on request, the en-

there is an open, continuous communication. Now 80 to 100 barges, averaging each as many tons, pass through this lock daily, each time causing the loss or waste of 250 tons of water; so that in this way 20,000 tons of foul water, mixed with no small portion of the sewage of 70,000 people, finds a level into the heart of Limehouse every day. This is about 6¼ millions of gallons; so that the Lea gives away far more than it receives; what it has lost in *quality* it bestows in *quantity*, as for every 100 gallons of the neat, unsophisticated sewage poured from the pumping works into the Lea, this river in turn sluices 325 gallons into the Cut.

gine was at once set going. In a brief space, standing on the edge of the river, from an opening, there came belching forth, a thick, muddy, black, putrescent stream, in volume and force enough—literally speaking—to turn the wheel of a large water-mill. It was then low water, so that it would remain for a short time in the full power of its concentration, till, with the returning tide, it was carried up the Lea and down the Lea, and with all its energy for good or for evil, down the Cut, and this twice daily into the heart of Limehouse, as in 1866 when its odours, as they are now, were diffused right and left over the chief part of the Cholera field. This pumping is going on at any time and at all times, tide or no tide, night or day, hot or cold, in the depth of winter, when the thermometer is many degrees below freezing point, or in the full blaze of summer, *when the temperature may be, as it was at the commencement of the epidemic, at* 163° *in the sun.*

It should be known then to all, as well as to Mr. Radcliffe, who speak of the filth of the East as only on a piece with the rest of London (Blue Anchor Yard of course excepted), that in the midst

SEWERAGE.

Mr. Radcliffe says, "at the time of the epidemic the East Districts were less well drained than the whole of the south, and the greater portion of the north-west of London; this arose from the low level sewer of the main drainage not being completed." But this defective drainage, Mr. Radcliffe goes on to say, "was not peculiar to the East Districts. It was a defect of the great slaughter-fields of the epidemic, upwards of 200,000 square yards of surface in the Creek and Lea Cut underwent then, *and do now*, twice dressing with part of the sewage of 70,000 inhabitants every 24 hours. This is hardly the place to speak of the loathing of such as live in the neighbourhood, along the edge of these depositories of this sewage and that of the numerous factories*—of the sickness in the hot season—of the deaths that not unfrequently follow. Ask those living on the banks—question the people of Limehouse, and they shall tell their own story. But for the moment sinking the opinion of others, here *alone*—I say that *here* is to be found an accumulation "*not to be equalled by all the rest of the metropolis.*" I now pass on to the sewerage.

REMARKS.

Here again *local* knowledge steps in to correct grave inaccuracies of statement. This can only be accounted for from the circumstance of exact information not having been sought, or if sought, had not been obtained. Now what are the facts? *This defective drainage is altogether peculiar to the East District.* On the other hand, all those districts abutting on the river,

* At that time, 1866, Poplar had not checked this offensive issue into the Cut.

from which they suffered in common with the City, much of Clerkenwell, the Strand, Westminster, Chelsea, Brompton, part of Kensington, and St. James'.

Moreover, it was a defect exercising no influence east of the River Lea. These considerations preclude the supposition that imperfect drainage from this source could have played any active part in the limitation of the outbreak," &c., &c.

such as the City, the Strand, Westminster, and the rest mentioned by Mr. Radcliffe, had a short drainage and emptied themselves into the Thames *direct*. But the Limehouse District especially, with another or two in a less degree, constituting the very heart of the Cholera field, receive the sewage of the outlying parts of the East of London, comprising not less than probably 400,000 inhabitants.

1. The Limekiln Dock Sewer takes part of the sewage of Whitechapel, the principal part of Mile End, part of Limehouse, then passing down Vincent Street, a fatal Cholera Street, under Carr Street, another street of wailing in the epidemic, down North Street, a street where the first series of deaths occurred, it is then conveyed by a *syphon* beneath the Regents Canal into a point of Mile End. A *syphon*, in sewer language, is half a circle or a half-moon channel entering on one side, emerging on the other, then emptying itself into the continuation of the sewer. In this *syphon*, it will be seen, the current is checked, so that at this very focus of the pestilence, some thousand gallons of sewage are stagnant, and consequently a large deposit of the more solid filth is left for all

time—for all seasons to generate and evolve such gases and deadly vapours, in which pestilence of all kinds delights to revel. Fever has always found a field in its season here, and as to Cholera, has not Mr. Radcliffe himself in his map affixed seven and thirty black spots to shew that for havoc during this plague, there was nothing to come near, *nothing to equal, this part of Limehouse Fields?* The sewer then passes on into Limehouse again, then into Poplar, till it gets to the Lea Cut, near a bridge,* where another *syphon* affords a passage, another check to the stream takes place, and arises another deposit of sewage mud; it then comes round through Poplar, and finally, after receiving the filth of 100 to 150,000 inhabitants, and after a journey of 3 miles, besides taking in the contributions on the way of smaller sewers, forming at least a dozen miles, it finally comes a second time into the Limehouse District, and disgorges its contents into the Limekiln Dock.

2. *The Ratcliff Highway sewer* receives the sewage of another part of Whitechapel, the principal part of St. George's, part of Shadwell, and the greater part of Ratcliff, from a constituency of not less than

"It" bad drainage "was a defect from which they, the East districts, suffered *in common* with the City" and the seven other districts, mentioned by Mr. Radcliffe.—*Vide* his Report.

* Appropriately and parochially known by the name of "Stinkhouse."

150,000 inhabitants; and after winding its way through another fatal footpath of the Cholera field, it becomes disembogued at Ratcliff Cross, another centre of wailing and lamentations during the epidemic.

3. There are two more large sewers emptying themselves at Shadwell and at Wapping, but as I only wish to call attention to the *worst part* of the sewerage of the Limehouse District, I shall omit any further reference to the rest. In doing this, however, it is as well to press a point or two of importance, that is, where these characteristic *black* spots are in the map, indicating the locality where the first fatal cases occurred in North Street and elsewhere, within 200 yards are to be found 8 ventilating shafts of the great Limehouse sewer, and 11 gully gratings, the latter of which, though commonly trapped, yet in dry hot weather, from the great evaporation going on, soon become useless; ventilating shafts and gully gratings alike vomiting forth deadly vapours, gases, and pestilence around in an epidemic season.

4. These two great sewers, after receiving the sewage of from 300 to 400,000 people, the effluvia necessarily accumulating, within

"It" bad drainage "was a defect from which they, the East districts, suffered in common with the City," the Strand, Westminster, Clerkenwell, Brompton, Chelsea, Kensington, and St. James's."—Mr. Radcliffe's Report.

which at every 100 yards of its course, after traversing a circuit of 5 miles, there now happens here what *never* occurs in the City, and the 7 districts which Mr. Radcliffe names; the whole of the poisonous exhalation from other quarters culminate in the Limehouse District in the three great centres of the pestilence—*North Street*, *Ratcliff Cross*, and *Limekiln Dock*.

5. Mr. Radcliffe, in his *apology* for the sewerage, says, moreover, "it was a defect (bad drainage) "exercising no influence *east* of the River Lea." Why the whole of the 70,000 inhabitants, as already noticed, *east* of this limit, a good proportion *below* high-water mark, all about Victoria Docks, West Ham, all Stratford, &c., have no drainage at all unless a pair of engines of 40-horse power were kept in action, and doing the work of the sewers; and not a few, I imagine, will be ready to say, as a substitute for better drainage—"Badly done too."

6. There is another point to remember, of importance too: these great sewers are all *tide-locked*, that is, they are open wide enough at the ebb, but at each returning tide, the valves at the river's edge are closed, so that by this process

"It was a defect, bad drainage, in which the East districts suffered in common with the City, Clerkenwell, &c., &c."—Mr. Radcliffe's Report.

LOCALITY.

"Locality is a vague term including several of the foregoing conditions, each of which is sufficient to an undeterminable extent as bringing about a common result. The influence of locality thus understood was apparent in exaggerating the effect of the outbreak in several restricted districts; but this influence was insufficient to account in any perceptible degree for the peculiar localisation of the disease in the east districts, for which an

twice each day during some hours, there is no *exit whatever for the sewage*, the accumulation of miles is now locked in, "tide-locked," choking with its contents, till another ebb affords another opportunity of another fœtid discharge into the Thames. But what become of the gases all this while? Why they have, obedient to the laws of all gases, found their way into the atmosphere, to make it only many degrees more poisonous. If it be asked—where? follow the outline of these great sewers, beginning in the field of the Cholera explosion, and you will be able to track the fatal march of death from Ratcliff Cross to St. George's and Whitechapel, and from Limehouse, on and on, to Bethnal Green.

REMARKS.

I agree with Mr. Radcliffe that "locality" is a very vague term. A locality on Snowden or Ben Lomond is a very different thing from a locality in a coal or copper mine 300 fathoms down. But a locality with a definite area is easily explored, and all the vagueness soon gives way to facts as they turn up. For instance, without going to Bermondsey and the cinder-sifters for the illustration of a bad locality, take the Eastern District; the alti-

explanation is sought." Mr. Radcliffe in summarily closing this section of locality quotes Dr. William Parker, Medical Officer of Health for Bermondsey, who said that the disease shewed no epidemic activity except in the eastern part of the parish. "In a block of small streets seldom free from fever, or other zymotic disease, and inhabited by poor Irish labourers employed at the Docks and Wharves, whose wives work at cinder sifting, sack sewing, or in glue and size yards, and where the children are much neglected."

tude is known, the density estimated, the soil dug up to ascertain its zymotic condition, the filth in its aggregate is brought to the glare of day, and the sewerage dodged step by step in its windings through the field of the explosion; then the vagueness is at once lost in the palpable and the visible, and the term "locality" becomes full of significance and meaning, so that every one can comprehend it.

I shall say but little more about "locality," nor take the trouble to make any comparison further between the east and the west of London. There are the facts—they cannot be shaken. As to their weight, if doctors differ, let practical men decide.* Such as compare *the sewerage of the East*, especially of the *Limehouse District*, with *the City, the Strand, St. James's*, and the other western river districts, the curt settlement of that may be left to Dr. Letheby and others with official standing. And if one or more point to Bermondsey, Rotherhithe, and Southwark as the equals in *filth*, I will refer the disposal of the matter to every plain-spoken man, to the common-sense class that walk the streets at noonday, apart from the professional opinion of Engineers, Surveyors, &c., whether

* Great rejoicings, I am informed, are in prospect when the low level sewer is finished, as this will then complete the drainage of the north of the river Thames into the main outfall terminating at Barking. But let the inhabitants of the East hold down their heads, and keep aloof, as for a certainty the additional sewage of 500,000 more people, beginning at the City and ending at Hammersmith, will sweep past their doors, and do anything but freshen up the musty courts and alleys on the way.

it be not a sheer pretence of belief in any one *having a knowledge* of the south and the western river districts, to attempt to make any comparison so far between their sanitary condition and that of the East of London in point of *filth* and *sewerage*, or that of any other, or of *all* the other, districts in the metropolis.

There are not less than four large Gas Works of great Companies in the Eastern Districts, two* of which may be said to diffuse their filth, both gaseous and liquid, in the Limehouse District.

Within 200 yards of the Regent's Canal and Dock, in a space of 80 acres, 200 persons perished in the epidemic from Cholera and Diarrhœa. If the same mortality had raged throughout the district, instead of 630 deaths, the correct number, 1,600 would have been the victims from the pestilence, or *very nearly one third* of all who died from the disease in the East of London. Within these 80 acres, form the convergence of this *foul* Canal, *still fouler* Dock, and *foulest of all*, the Limehouse Cut; while within the same space sweeps down the sewage of upwards of half-a-million inhabitants, and finds here a focus for

* The Commercial Gas Works stand out of the District only by the width of a narrow street

WATER SUPPLY.

Mr. Radcliffe says—"There remains for examination the probable influence of the water supply. Not one of the conditions mentioned in the previous sections are believed to be liable to affect the progress of epidemic Cholera; the disease being present will account for very limited fluctuations of the outbreak, or for its localisation in any particular spot, in a restricted degree only; any combination of these is equally inefficacious in explaining that peculiar localisation and fluctuation in the east districts."

"By a process of exclusion the the condition remaining for investigation of the *water* supply is thus freed from the principal sources of disturbance, which might mark its influence upon the outbreak."

an outlet of the accumulated poison.

REMARKS.

We are informed by Mr. Radcliffe that the investigation of the "explosion" question having been now set free from such trifling matters as *filth*, bad *drainage*, and *sewer gases*. which have had little or nothing to do with it, and as he is "thus freed from the principal sources of disturbance" those of *filth*, *drainge*, &c. he is at liberty, seeing the way clearly before him, to enter upon that having an even flow—the *water supply*. What are foul cuts, canals, polluted rivers, and a general receivership for the sewage of hundreds of thousands of inhabitants in the very heart and core of the Cholera mortality, to do with the affair at all? And as to the rest, it is all as simple as reading or *writing* made easy.

On to the water supply.

I shall not attempt to wade through the many pages of Mr. Radcliffe, devoted to this topic in way of comment, I have read the whole with attention, wormed myself into its merit so far that I shall not seek to bring anything further forward to upset the theory of the Cholera explosion, but content me for the moment with the impression that it was *all the work*

of poison from the works at Old Ford. Conceding, for the sake of argument, the force of this hypothesis, in its origin adopted by the Registrar-General, Mr. Simon, and others very distinguished in the world of science, flanked by the gallant and versatile Captain Tyler; yet I would seriously enquire, what have the outbreaks of 1848-9 and 1853-4 south of the Thames to do, by way of analogy, with the explosion in the East in 1866? The Lambeth Company, at that time, was receiving its supply of water—incredible as it may seem, from the Thames itself, near Hungerford Bridge, when the deaths from Cholera were 12·5 per 1,000; while the Southwark and Vauxhall found its resources from a locality, little better, at Battersea, when the mortality was nearly as great, or 11·8. The removal to Thames Ditton, by the Lambeth Company, before the second outbreak in 1853-4 led to a diminution to 3·7 per 1,000. Now this is all very well as shewing that good water is better than bad, which every one knows, and that foul water, contaminated with the sewerage of 2 to 3,000,000 people, is totally unfit for use, and immensely exaggerates a Cholera epidemic. But beyond this all

analogy ends. The Lea, on the other hand, received not the sewage of the metropolis: it certainly, mainly as an inland stream, was polluted by some towns on its banks, especially its tributaries, *like all the rest of the rivers in connection with the water supply about London, and like all the rest of the rivers throughout England.* Its well-known self-purifying property greatly, however, removed this evil by the time it reached Lea Bridge and Old Ford and after the usual filtrations, becoming fit for use, would, and generally did, bear a fair comparison with the other supplies of the metropolis. Dr. Letheby's evidence is sufficient on this point.

This pollution was bad enough, nobody doubts; yet I am told, on good authority, that others about London are at this time many degrees worse, but have passed unnoticed because the epidemic made itself felt chiefly in the East, and there *alone* was attention directed to the sources of supply. This is said, not to defend the water, but to disprove the analogy.

The charge against the Company was first in using water from 2 uncovered reservoirs, unfiltered, in what were regarded *as emergencies*, on two occasions, towards the end of June and beginning of July, and because its chemical character was not so good as that from the covered reservoirs, the ordinary source of supply, the impure water was said to have brought on the Cholera. But when these covered reservoirs subsequently were emptied in February, 1867, there were discovered leakages from a foul source, probably the adjoining Canal, a branch of the Lea, into this water of daily distribution. This was a contamination far worse than that from the uncovered reservoirs, and if in the distribution mischief could arise at all, it would have

been far more probable from this mode of adulteration. The water in these reservoirs had not been let off before for 7 years, so that it is impossible to say how long this pollution from the Canal had been going on. If it had not been discovered, it is clear enough that the disused reservoirs from their two days' service, would have been credited, and wholly credited, with the Cholera "explosion." But *now* things were altered, *now* the lesser source of contamination gives place to the greater, and *now* the leakage in turn becomes charged with all the evils of the "explosion" in the East.

It is possible, even probable, that this leakage had been in operation for one, two, three, four, five, or even six years unknown to the Company. The year 1864 was terrible for drought, all nature felt the privation for months, so that if it could now be shown to a demonstration that the leakage then existed, only three years ago, that fact of itself would go far in ending the "explosion" hypothesis, and we should hear little more of the poisoning from Old Ford. But the "explosion" did not take place in 1864, when there was *no rain* and a *scarcity* of water, but it occurred in 1866, when there was no continuous want of rain, and an abundance of water.

The attempt to mix up the catastrophe in the family at Theydon Bois, in Essex, from drinking well water notoriously contaminated with sewage, has also, like the outbreaks in South London in 1849 and 1854, nothing whatever to do with the "explosion." In that case there was a cause obviously adequate to the mortality; in this there has been nothing shewn of an analagous character commensurate, or at all bearing on the fatality of the pestilence. On the contrary, the facts already adduced, and certified in abundance, go far enough in themselves, as I take it, to wholly ignore the hypothesis, and altogether negative the very shadow of a shade for the assumption. The bringing up the fatal effects following the use of that perpetual Broad Street Pump, in no way improves the theory; *there* was a poison hardly needing proof, *here* is a poison that wholly wants it.

I am obliged to own that far more evidence is required to convince the reflecting portion of the world, than Mr. Radcliffe and others have brought forward, to shew the havoc of this Old Ford water in its travels and that as a rule it poisoned wherever it was tapped. I shall dwell not on the ingenuity of the suggestion in pointing to the further and final poisoning of the water, from the discharges of poor Hedges and his wife being thrown into the drain—

then drawn into the sewer—then flowing into the River Lea—then finding their way by the leakage into the water for daily distribution, because a query would naturally arise,—*How came it after all that Hedges and his wife were first seized with the Cholera?*

But I am flinging aside theories and admitting as a fact that the water *was* poisoned. A thousand strong at once in two institutions fly in the face of it, and give the *dictum* a negative. If a *high* altitude be sought for illustration, there it is at Stamford Hill—4 only dying at the rate of 10,000 persons, at 76 feet *above* Trinity high water mark—the same rule of immunity applying among the residents of Clapton, Wanstead, Snaresbrook, Walthamstow, and Woodford. If a *low* elevation be looked after, you cannot well go lower—8 feet *below* High Water Mark—at Silver Town and North Woolwich, where there was little or no fatality all through the epidemic. If a *middle* level be investigated, at 12 to 18 feet altitude, 600 men and women, as already stated, in the Stepney Union at Bromley escaped, while at the Limehouse School 400 children romped and played, at intervals, all through the summer of 1866, and drank daily, and that many times, from the said poisonous unfiltered water of Old Ford, under no restrictions, without restraint, harmless going their way, *and, to a child*, passed spotless through the pestilence.

The North Woolwich comparative exemption has been referred to a possible supply from Lea Bridge by night in lieu of Old Ford; the two workhouses to a something in the soil, in accordance with the doctrine of Professor Pettenkofer; and Stamford Hill to the supply *divided* between the pure water of Lea Bridge and the foul waters of Old Ford. But the supposition about North Woolwich scarcely requires notice; the statement respecting Stamford Hill,* of course from inaccurate information, *is positively incorrect;* and as to the geological suggestions in connection with the workhouses, I will venture to produce the same *strata* in the midst of the greatest mortality of Limehouse Fields.

It has been said that the theory of the "explosion" is correct because its effects have been co-extensive with the field of the water distribution. But this is not the case; neither the outline nor the area in any way corresponds.

* To make sure about the Stamford Hill immunity, and the suggestion or assumption of a *divided* supply, in company with a Medical friend, one of standing, I lately had an interview with the Hydraulic Engineer at Old Ford. Mr. Greaves assured us that both at and all through the epidemic, as well as for twelve months previously, the Old Ford water, and that alone, had supplied Stamford Hill and other places thereabouts.

Half of the whole field of its distribution is untouched. If streets or sides of streets, serve as an illustration in its behalf, exactly the same demonstration can be put forward in contradiction; and if localities be selected as the scenes of special visitation during the pestilence, then streets after streets, and masses of people abutting in each infected neighbourhood, will be found almost entirely to have escaped. I put aside for the moment the fact of what were the *drinking habits*, which, strange to say, by the advocates of the water dogma, are never sought after within the limits of the contagion, as though a simply a residence was sufficient. If a higher altitude, again, be said to explain the immunity, together with a better class of inhabitants, as at Stamford Hill and round about, this surely cannot apply to the other extreme of the compass, amongst the poor and labouring classes, at the *lowest* elevation, of Silver Town and North Woolwich.

There is just one point in closing which must not be forgotten: the necessity for every doctrine, no matter what, in all its divisions to be consistent in order to be complete. We are told every whole has its parts, and the parts cannot be more or less, but they must be equal. It is indifferent to what this proposition refers—to a mountain, a gnat's wing, or, to diverge for the moment to an abstraction—the consistency of an hypothesis. The division and the aggregation must be equal. For instance, a figure divided into 12 equal parts, say, a black figure, the 12 black parts are requisite to make up the whole figure. Take 11 black parts and 1 white, and the outline may be similar, but the unity is imperfect; the 12 black parts are essential to a perfect whole, and the 11 black parts and 1 white no more go to make up a black, than in the familiar fact that "two blacks don't make a white." And exactly the same unity is required of all the properties of matter, in order to ensure its consistency as a whole. What was *white* yesterday is white to-day, will be to-morrow, and to all time, under the same conditions. Neither can a thing at the same time be hot and cold, bitter and sweet; nor can matter, nor any operation upon matter, be under the same circumstances both fast and slow. So necessary is it to have the consistency of the parts to establish an identity and a whole; and this is equally applicable to the concrete or the abstract, to the black figure or what not, or to the divisions or parts of a doctrine that has startled the learned and astounded the ignorant, in order to prove its completeness as a whole.

By this rule let us put to the test the "explosion" theory. The world has been told that the Old Ford water of distribution was poisoned from two uncovered reservoirs of unfiltered water, on two occasions, at the end of June and beginning of July, 1866, to the extent of 300,000 gallons each time, or the 30th part of each day's consumption, or thereabouts. But 300,000 or only 300 gallons, no matter, if the water was poisoned, it comes to the same thing. Men's minds were mostly set wondering at the time thereat—at least such as were sufficiently at ease under the alarm, to think at all about it—how it was that the effects of this water once poisoned, nay twice, did not promptly subside. But this, it appears, was the difficulty; the water once contaminated so as to bring about the "explosion," the evil influence is long in settling down, and hangs on, and on, and longer still ere it wholly dies away. The Registrar-General, in his Supplementary Report, No. 37, illustrated this by an Algebraic problem, and showed clearly enough, as far as figures could prove, how long about was Cholera water (poisoned) in losing its potency, and with what unreadiness it parted with its malign influence on the people. This problem, beautiful as it was, may be simplified, by supposing an old lady in the enjoyment of a large circle at the tea-table, who, as fast as one cup is poured out, fills up the teapot with fresh water, and so on in this way, cup after cup, to a thorough Johnsonian saturation. And there can be no doubt by this management, that the flavour of the tea, like the poison in the water, would be very considerably protracted beyond the ordinary mode of procedure in the mysteries of tea-making. Once the poison is in the water, one can readily understand, with *the mains at all times tolerably full*, what a work of labour and of time it would be, to get rid wholly of the contamination, and displacing it by fresh water. I am informed on high engineering authority, that promptly to effect this change is "*a practical impossibility.*" The difficulty, therefore, in the elimination, conveyed through the problem, is not less beautiful than correct.

On the 18th of August, 1866, in the Supplementary Report, No. 33, page 362, the Registrar General says:—"The persistence of the epidemic in the East London districts is no proof that the supply of the Company is now worse than that of other Companies, *as its effects on the place, and on the population, only subside slowly.*" Again in No. 37, page 546,—"*how slowly any zymotic poison once introduced is eliminated from the water.*"

So from this it appears we have, like the twelve parts of the black figure, *the slow elimination as an essential part of it, in order to sum up the remaining divisions into a whole and perfect theory.*

Now in the same No. 37, which tells us of the barriers in the way of getting rid of *poisoned* water, on the 15th of September, when the Cholera was subsiding, and people began to breathe a little more freely, it was found there was time to look about, and as it were, to take stock of the past. The hydraulic engineer was called to account—Mr. Greaves. This is best given in the words of authority. "The weekly report was published on Wednesday morning, the 1st of August; on that day the engineer called, and on the day following he published a letter in the daily journals showing that he fully appreciated the importance of the crisis. The supply might have been *changed* on Wednesday morning, but on that day no result appears; the deaths were 170; on Thursday the deaths fell to 155, on Friday to 114, on Saturday to 112, &c." Then follow the comments, thus—"This coincidence between the intervention of Mr. Greaves, and the decisive declension of Cholera in the following week, deserves to be noted. It strengthens the circumstantial inference that a part of the supply between the 8th of July and the 1st of August was drawn from the uncovered reservoirs; but the unclean matter might, of course, have entered the water through other unknown channels."

I can well understand Mr. Greaves going away "a sadder," and after this interview, "a wiser man," as well as "his appreciation of the importance of the crisis," in his letter to the *Times*. But there is one thing about this personage I *cannot* understand, namely, the transformation scene, his going off rebuked and chastened, and stopping the Cholera so far as it declined from 170 deaths to 115 in *two days*. "The supply might have been *changed* on Wednesday, the day of the visit, but no result appears," says the Report, but on Friday, in 48 hours, the mortality had diminished *one third of the total* from the engineering dexterity at the Water works.

I dwell not here for the *total obliquity of the moral sense* implied in this imputation on the operators at the Company's works; I will not harbour so fearful a suggestion, even if I could not see my way clearer, that a man, or a body of educated men, could coolly look on and see a portion of their fel-

low creatures dying around, knowing the while of the power at their command to check the pestilence.*

But now at length we are told it is a very easy thing to purify the water and stop the Cholera : dates and all are given to mark the achievements of only *two days*. All along it has been said to be a *slow* business, but now it is done in *hot haste*. On the 15th of September and 18th of August it is said to be *heavy work*—a wearisome affair, as seen in the tea-pot illustration, this *water cleansing;* on the 1st of August the engineer, after the carpeting, thinks nothing of it, but goes away, and in just two days *Cholera and water, sets all to rights*. Now what is wanted to be known is, if the sage aphorisms, the problem, and all were true on the 18th of August and 15th of September, by what power on earth was the engineer enabled to do the feats he did *in direct contradiction on the 1st of August?*

These things are hard to understand, in fact they are impossible ; an operation which is *essentially slow* in September, under the same conditions could not be *quick* on the 1st of August ; *and if there were nothing else in the way*, there remains no alternative but at once to put aside these inconsistencies and contradictions, as having no part whatever in building up a true theory of the " explosion" in the East of London.

Now what *are* the facts to explain this great change on, and following the 1st of August? *The meteorology itself was changed, and with it all was changed.* The *atmosphere* was softened, the wind was shifted, and from a long month E. and N.E., now veered round to the West ; the temperature fell ; from a drought of weeks in succession, moisture followed ; *and on this 1st of August*, gently at first, but *day by day* afterwards, *rain fell*, till at last there was rain in abundance. See further on this matter in Table 1 of Appendix.

These were the changes, and these alone, that " stayed the plague ;" and but for these, all the engineering craft on the notable 1st of August would have been in vain ; *if* anything had been attempted, *which I wholly disbelieve*, and the mortality would have gone on till Christmas, in spite of all the recondite speculations of the Cholera detectives in the Strand and the West.

In the latter part of July, 1866, in the midst of the epidemic, when mens' hearts were quailing with fear, while earnest in their duty, before the whole Cholera Committee, the following conversation took place, which will be re-

* Of the three Commissions and Committees of Enquiry instituted for the purpose of ascertaining In part the relationship of the water supply to Cholera, not one has attributed it to the water, without including *the filth and nuisances* of the East as largely entering into the chain of causation.—Vide Report of House of Commons, Report on Water Supply, House of Lords, and Report of Metropolitan Board of Works.

membered by the gentlemen into whose hands this Report will fall, and in the words, as closely as I can recollect :—

Chairman. "When will this dreadful scourge slacken? When will it come to an end?"

Medical Officer. "This scourge is primarily atmospheric; and as soon as the wind shifts to the west, south, or south-west, and rain falls, from that hour it will be checked."

Chairman. "Will that make *all* the difference?"

Medical Officer. "That will make *all* the difference. I will stake my reputation, as Medical Officer, that as soon as these changes shall come to pass, immediately the disease and mortality will subside."

What followed is now a matter of Medical history.

We have seen what the East End of London has been during a pestilence in the past; it now remains for all concerned, having authority, to endeavour to guard the future. As an effort in this direction, I beg to submit the following propositions, of a practical character, to your earnest and earliest consideration :—

1. That the water supplied from the works at Old Ford, from the facts adduced, both in point of condition and distribution, may, for years previously, be regarded as identical in character with that in use during the epidemic of 1866; and that there is not the slightest evidence whatever to show that that the use of this water had anything to do with originating, exaggerating, or bringing about what has been called the Cholera "explosion."

2. That it has been shown, beyond a question, that there is to be found in the heart of the Cholera "explosion" field, an amount of organic filth, probably unequalled by all the rest of the metropolis; that it is a fact to be noted, that the highest per centage of mortality occurred in the centre of the convergence of this filth, the Limehouse district; and that, while duly observing the digression of localities from the standard of sanitary laws, as a rule, the *data*, it is considered, are sufficient to show that the meteorlogy played an energetic part in its action on this filth, and in this way intensified or modified the character of the pestilence throughout the East districts.

3. That the great sanitary evils, in a degree peculiar to the East of London, arising from large bodies of polluted water, and of sewage, developed in the form of gases and vapours, are *a source of nuisance and danger*

at all times in the hot season, and are likely to be of *positive peril, under the conditions of* 1866, to the health of upwards of half a million of people; and demand prompt means for their amelioration or abatement.

4. That there are powerful reasons for the impression that the main outfall in the daily evolution of millions of cubit feet of noxious gases, did not fail to take part as a contributor to the enhancement of the pestilence; and that means should be taken to avert future danger, and more efficiently to ventilate the air shafts, or to destroy the exhalations as they arise.

5. That the air shafts of the Metropolitan Board, in the streets of London, as well as those belonging to the several districts, from the accumulated and still increasing amount of sewage, are improperly ventilated; that the gases and vapours become in consequence largely diffused through the atmosphere to the peril of the public health; and *at once* demand such changes as shall render them innocuous, or accomplish their destruction.

6. That it is absolutely necessary that steps should be taken so that the sewage from the West Ham pumping works shall be pumped into the Bow Creek *only at ebb tide*; and failing in this, that means should be adopted, *with the least possible delay*, to have it diverted into the main outfall.

7. That the filth of factories, and sewage, as far as possible, should be rigidly prohibited from passing into the Lea Cut* and Regents Canal, as dangerous to the public health.

Such are the chief suggestions I have thrown out for the consideration of authority, under the fixed impression that some changes of the kind are *absolutely necessary* for the future sanitary well-being of the East of London, especially in relation to the Limehouse District. I know it has been proposed to alter the water-courses as a remedy, and bring the supply from Wales and the North of England. But this will be a costly, while no *substitutionary* service; and if this be all the improvement in the prospective, I little hesitate in saying that Plinlimmon and the lakes of Cumberland may roll down their waters for the comfort of the people of London; but in *all other* respects let there arise the conditions of 1866, and the poor districts of the

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* Of this Lea Cut, of which so much has been said, it may be observed that in the summer of 1864 and since, two men were employed, rowing up and down, and irrigating or deodorising the foul water, by large quantities of lime, involving nearly the outlay on this item of £100, during the season. It was not then ascertained that the West Ham pumping works were polluting the Cut at one end, as fast as we were purifying it at the other.

East will be the sufferers from pestilence, in what form precisely no human prescience can foresee.

In reference to the general business of the Medical Officer, the year 1866-7 has not been unattended with useful results. Amongst Nuisances, so important a feature in contemplating this district, I may allude to Messrs. Seaborne's bone-boiling premises at Shadwell as having undergone great improvement by the removal of the more offensive operations to Stratford. It is right still to say that I feel, from representations made, and from personal inspection, that this factory still needs vigilance with the advance of the season.

Mr. Hawkridge's skin-dressing business, long complained of by the respectable portion of the locality, has also had a similar translation, to the great relief of Limehouse.

Messrs. Radloff's cotton oil works, of Bow Common, the centre whither all pursuits of filth do gravitate, as though by common consent, have, after a former legal prosecution, with the threat of another, been wholly abolished.

A complaint was made of the stowage of nearly 400 barrels of petroleum, at Colonial Wharf, 331 and 332, High Street, Wapping, which led me to inspect the premises. I found the oil not inflammable under 100° of Fahrenheit, which so far constituted it no illegal deposit. But the quantity so large, in the midst of so much shipping and merchandise, must be regarded *as dangerous*, and led me, with the sanction of your Committee, to communicate the facts to the Metropolitan Board, from which I had a reply generally in the affirmative, intimating, at the same time, the necessity for an express legislative measure to remedy the evil—of so great a magnitude—at the earliest possible opportunity.

In the ordinary sanitary business, I may speak of the house-to-house inspection during the year, along with the Inspectors. In this way 1,075 houses have fallen under minute examination in Limehouse, Ratcliff, Shadwell and Wapping.

The following are to be reckoned amongst the details of the sanitary reparations of the year's work :—

Houses limewashed	404
Drains and closets cleansed and repaired	279

New drains made	52
Sinks trapped.....	109
Cesspools filled up	48
Do. emptied	59
Repairing of yards.....	215
Water-butts cleansed and re-pitched	409
New butts replacing old.....	125

The adoption of the 35th section of the Sanitary Act by your Board, and of regulations under the sanction of the Secretary of State for carrying it out, are a great advance in hygienic progress. The Limehouse District is one that has not felt the pressure of the defects incidental to an *over-packed* population, so much as the weight of those privations which no legislative enactment can wholly remove, to be found in the lowest grade of industrial life, always more or less present amongst its many other concomitants, *poverty*, but terribly felt, to this hour, among the tens of thousands since the spring of 1866.

But I am well assured that you will, at the earliest opportunity, when the dark cloud, now, and for so long hanging over this district, and the East of London, shall have passed away, put into active operation the regulations, for the advantage of those classes for whom they have been beneficently designed.

The Inspection of the Bakehouses has been made, as usual, and the result communicated, as generally, very satisfactory.

The slaughter-houses and cow-houses have alike fallen under my supervision. This department of my duties has been much abridged by the very stringent provisions found necessary to enforce the check to the cattle disease, which, as you are aware, rather exceptionally, has shown itself in a serious form in one dairy during the last year in the parish of Limehouse. There are many well-wishers for the improved sanitary condition of London, who look forward to the time when both slaughter-houses and dairies will be regarded as out of keeping with the times, and obsolete.

Submitting this exposition of my views on the late epidemic to your consideration, along with a sanitary account of the twelve months,

I have the honor to be,

GENTLEMEN,

Your obedient Servant,

THOMAS ORTON,

Medical Officer.

TABLE I.

Deaths from Cholera and Diarrhœa for the week ending 9th of June, 1866, to the 29th of September, inclusive, with the Meteorology for the same periods.

	Limehouse.	Ratcliff.	Shadwell.	Wapping.	The District.	Highest temperature during any day of week, in the shade.	Lowest temperature during any day of the week.	Average temperature during the whole of the week.	Highest temperature in the Sun during the week.	Average temperature in the Sun during the week.	Average temperature of the water in the Thames at Greenwich	Between average temperature of the week and average temperature of same week for 50 years.	Wind, general direction of, during the week.	Rain, in inches, collected during week.	Wind, mean daily pressure of, during the week, in lbs., from 24 observations.
1866.															
June 9	...	...	...	...	...	84·7	50.7	61·	157·6	128·4	61·6	+ 3·7	South West.	1·48	0·0
" 16	...	...	...	...	...	83·8	47·6	58·5	146·2	124·2	63·4	— 0·2	S.W. & W.S.W.	0·14	0·1
" 23	...	...	...	...	...	79·2	42.2	58·1	153·4	I29·4	60·7	— 1·6	S.W.	1·12	0.3
" 30	...	...	...	...	...	86·5	48·6	66·3	162·2	142·4	65·7	+ 4 8	N.E. & N.N.E.	0·21	0·1
July 7	...	...	...	...	...	70·3	46·4	56·3	147·2	133·4	65·6	— 5·1	S.W. & W.S.W.	1·18	0·1
" 14	4	4	...	...	8	87·2	48·7	68·2	163·9	140·2	65·5	+ 6·3	Variable.	0·00	0·0
" 21	48	14	10	1	73	83·3	47·2	62·2	150.0	130·2	67·0	+ 0·2	N.E. & E.N.E.	0·00	0·0
" 28	78	44	20	4	146	74·4	46·5	59·3	148·7	118·0	64.7	— 2·5	Variable.	0·09	0·0
August 4	72	47	20	16	155	72·8	46·0	58·8	137.0	115·6	62·2	— 3·6	W.W.N.W.	0·51	1·4
" 11	29	31	10	22	92	70·0	48·2	57·7	130.7	118·6	60·1	— 4·4	S.W. & N.W.	0·59	0·8
" 18	20	23	12	10	65	72·2	46.9	58·0	138·0	110·2	60.9	— 3·5	Variable.	0·62	0·7
" 25	9	9	3	5	26	73·4	45·0	61·2	132.8	111·2	61·1	+ 0·5	Variable.	0·32	0·0
Sept. 1	2	4	1	6	13	78·5	46·9	60·2	155·6	122·4	63·6	— 0·5	S.W.	0·73	0·3
" 8	7	7	2	8	25	69·3	53·1	58·5	130·0	108·3	60·9	+ 0.4	S.W.	1·91	1·9
" 15	3	1	11	...	4	70·2	47·4	56·7	135·0	114·4	59·9	— 0·7	S.W.	0·87	1·0
" 22	4	2	1	...	7	66·9	42·4	53·7	124·5	107·4	57·0	— 2·5	S.W.	0·88	1·1
" 29	1	1	1	1	4	71·0	41·3	55·5	123·7	101.2	55·6	+ 0·9	Calm & S.W.	0·23	0·1

+ means *higher*. — means *lower*.

TABLE II.

The Number of Ages, and Causes of Deaths, in the Limehouse District, and the respective Parishes, for the Year ending Lady-day, 1867.

CAUSES OF DEATH.	Under 1 year	5 years and under.	Under 10 years.	20 years.	40 years.	60 years	80 years.	Upwards.	Limehouse.	Ratcliff.	Shadwell.	Wapping.	All Ages.	TOTALS.
I. ZYMOTIC.														
ORDER 1.—MIASMATIC.														Zymotic, 888
Small Pox	13	12	2	2	1	...	...	...	20	3	7	...	30	
Measles	17	17	...	...	...	...	...	...	17	10	3	4	34	
Scarlatina	14	29	1	...	...	...	...	...	19	11	11	3	44	
Diphtheria	4	1	...	...	...	...	...	...	4	1	...	...	5	
Quinsy	...	...	...	...	...	...	...	...	...	...	...	...	...	
Croup	12	8	...	...	...	...	...	...	12	5	3	...	20	
Whooping Cough	20	21	1	...	...	...	...	...	13	16	7	6	42	
Fever	...	3	1	8	11	12	1	...	18	13	4	1	36	
Erysipelas	1	...	1	...	1	...	...	...	3	...	...	...	3	
Carbuncle	...	...	...	...	...	...	1	...	1	...	...	...	1	
Dysentery	...	1	...	...	...	...	...	...	...	...	...	1	1	
Diarrhœa	107	47	14	7	20	24	12	...	112	62	45	12	231	
Cholera	23	61	37	36	134	87	32	2	179	130	41	62	412	
Remittent Fever	5	9	...	...	...	...	...	...	7	3	2	2	14	
Rheumatism	...	...	...	...	1	2	...	...	1	...	2	...	3	
ORDER 2.—ENTHETIC.														
Syphilis	7	1	...	...	...	...	...	...	1	7	...	...	8	
ORDER 3.—DIETETIC.														
Intemperance	...	...	...	...	1	2	1	...	...	4	...	...	4	Constitutional. 287
II. CONSTITUTIONAL.														
ORDER 1.—DIATHETIC.														
Gout...	...	...	...	...	1	...	1	...	2	...	...	...	2	

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I. ZYMOTIC.														
ORDER 1.—MIASMATIC.														Zymotic, 888
Small Pox	13	12	2	2	1	...	...	...	20	3	7	...	30	
Measles	17	17	...	...	...	...	...	...	17	10	3	4	34	
Scarlatina	14	29	1	...	...	...	...	...	19	11	11	3	44	
Diphtheria	4	1	...	...	...	...	...	...	4	1	...	...	5	
Quinsy	...	...	...	...	...	...	...	...	...	...	...	...	...	
Croup	12	8	...	...	...	...	...	...	12	5	3	...	20	
Whooping Cough	20	21	1	...	...	...	...	...	13	16	7	6	42	
Fever	...	3	1	8	11	12	1	...	18	13	4	1	36	
Erysipelas	1	...	1	...	1	...	...	...	3	...	...	...	3	
Carbuncle	...	...	...	...	...	...	1	...	1	...	...	...	1	
Dysentery	...	1	...	...	...	...	...	...	...	...	...	1	1	
Diarrhœa	107	47	14	7	20	24	12	...	112	62	45	12	231	
Cholera	23	61	37	36	134	87	32	2	179	130	41	62	412	
Remittent Fever	5	9	...	...	...	...	...	...	7	3	2	2	14	
Rheumatism	...	...	...	...	1	2	...	...	1	...	2	...	3	
ORDER 2.—ENTHETIC.														
Syphilis	7	1	...	...	...	...	...	...	1	7	...	...	8	
ORDER 3.—DIETETIC.														
Intemperance	...	...	...	...	1	2	1	...	...	4	...	...	4	Constitutional. 287
II. CONSTITUTIONAL.														
ORDER 1.—DIATHETIC.														
Gout	...	...	...	...	1	...	1	...	2	...	...	...	2	
Dropsy	...	1	...	2	3	5	3	1	6	6	2	1	15	
Cancer	...	...	...	...	3	6	5	...	8	5	2	1	14	
Mortification	...	...	...	...	...	...	1	...	...	...	1	...	1	
Abscess or Tumour	...	...	...	...	...	...	1	...	2	...	...	...	2	
Noma	1	...	...	...	...	...	...	...	...	...	1	...	1	
ORDER 2.—TUBERCULAR.														
Scrofula	3	4	2	1	...	1	...	...	6	4	...	...	11	
Tabes Mesenterica	51	15	...	...	...	...	...	...	39	12	9	6	55	
Phthisis (Consumption)	5	15	3	19	64	31	14	...	73	55	17	6	151	
Water on the Brain	16	8	...	...	...	...	...	...	15	5	2	2	24	Local. 456
III. LOCAL.														
ORDER 1.—NERVOUS SYSTEM.														
Cephalitis	4	...	...	1	1	...	...	...	4	1	...	1	6	
Apoplexy	...	...	...	...	3	4	6	2	5	5	2	2	15	
Paralysis (Palsy)	...	...	...	...	...	4	4	3	5	5	1	...	11	
Epilepsy	1	...	...	1	...	...	...	...	2	...	...	...	2	
Convulsions	62	10	1	1	...	...	...	...	41	21	10	2	74	
Brain Disease, &c.	6	7	...	...	...	2	3	2	9	9	2	...	20	
ORDER 2.—ORGANS OF CIRCULATION.														
Pericarditis	...	...	...	...	1	...	...	...	1	...	...	...	1	
Heart Disease, &c.	...	3	1	5	9	17	14	...	22	18	7	2	49	
ORDER 3.—BREATHING ORGANS.														
Laryngitis	...	2	...	...	1	1	...	...	3	...	1	...	4	
Bronchitis	63	14	...	...	12	34	23	5	67	43	25	16	151	
Pleurisy	...	...	...	...	1	1	1	...	1	1	1	...	3	
Inflammation of the Lungs	40	12	...	2	7	...	8	1	36	25	7	2	70	
Lung Disease, &c	4	1	...	...	1	1	2	...	5	5	1	...	9	
ORDER 4.—DIGESTIVE ORGANS.														
Enteritis	1	0	2	1	...	2	...	...	2	3	1	...	6	
Peritonitis	...	...	...	1	1	...	...	...	2	...	...	...	2	
Hepatitis	...	...	...	...	1	...	...	...	...	...	1	...	1	
Jaundice	1	...	...	...	...	1	...	...	1	1	...	...	2	
Liver Disease	...	...	...	4	3	4	1	...	6	3	2	1	12	
Hernia (Rupture)	...	...	...	...	...	...	1	...	1	...	...	...	1	
Ileus	...	...	...	1	...	...	...	...	1	...	...	...	1	
Intussusception	1	...	...	...	2	...	1	...	2	1	...	...	3	
Fistula	...	...	...	...	...	1	...	...	1	...	...	...	1	
Stricture of Esophagus	...	...	1	...	...	2	...	...	2	1	...	...	3	
Stomach Disease, &c.	...	...	1	1	...	2	...	...	1	...	2	2	4	
ORDER 5.—URINARY ORGANS.														
Nephritis	...	1	...	...	...	...	...	...	1	...	...	...	1	
Disease of Bladder	...	...	...	...	...	...	...	...	...	...	...	...	...	
Nephria (Bright's disease)	...	...	...	...	1	...	1	...	...	2	...	...	2	
Kidney Disease, &c.	...	...	...	...	1	...	...	...	...	1	...	...	1	
ORDER 6.—ORGANS OF LOCOMOTION.														
Spinal Disease	...	...	...	...	...	1	...	...	1	...	...	...	1	Developmental. 93
IV. DEVELOPMENTAL.														
ORDER 1.—DISEASES OF CHILDREN.														
Premature Birth	46	1	...	...	..	...	...	...	29	11	3	4	37	
Cyanosis	5	...	...	...	...	...	...	...	...	3	1	1	5	
Teething	2	...	...	...	...	...	...	...	2	...	...	...	2	
ORDER 2.—DISEASES OF ADULTS.														
Paramenia	...	...	...	...	...	2	...	...	1	...	1	...	2	
Retroversion	...	...	...	...	1	...	...	...	1	...	...	...	1	
Childbirth	...	...	...	...	1	...	...	...	...	...	1	...	1	
ORDER 3.—DISEASES OF OLD PEOPLE	...	...	...	...	...	1	23	11	17	11	3	4	...	Violent Deaths. 109
V. VIOLENT DEATHS.														
ORDER 1. ACCIDENTS OR NEGLIGENCE														
Burns and Scalds	1	1	...	...	...	...	...	...	1	1	...	...	2	
Suffocation	15	...	...	...	...	1	...	...	5	7	3	1	16	
Wounds and contusions	...	1	1	...	3	2	1	...	2	1	3	2	9	
Drowning	2	1	2	1	17	11	8	...	9	6	21	6	42	
ORDER 2.—HOMICIDE.														
ORDER 3. MURDER & MANSLAUGHTER	3	...	...	...	...	...	...	...	2	...	8	...	3	
ORDER 4.—SUICIDE.														
Hanging	...	...	...	...	...	1	...	...	1	...	...	...	1	
Wounds	...	...	...	...	...	1	...	...	...	...	...	...	1	
DISEASE AND OTHERWISE.	13	4	...	1	3	12	3	...	25	3	3	...	36	
TOTALS	570	313	69	94	310	278	172	27	374	544	262	153	1833	1,833 Grand Total