GENERAL BOARD OF HEALTH.

MEDICAL COUNCIL.

APPENDIX TO REPORT

OF THE

COMMITTEE FOR SCIENTIFIC INQUIRIES

IN RELATION TO

THE CHOLERA-EPIDEMIC

OF 1854.

Presented to both Houses of Parliament by Her Majesty's Command.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

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No. I.

Report upon the Meteorology of London, in relation to the Cholera-Epidemic of 1853–4. By Mr. Glaisher.

SIR, Lewisham, March 8, 1855.

IN the Report upon the Meteorology of London, and its relation to the epidemic of Cholera, which I have the honour to submit to you, I have endeavoured to carry out the different investigations you considered desirable, as sketched in your several letters to me.

The Observations were made by the gentlemen whose names appear in the Report; their reduction and formation into Tables, and the drawing of the Diagrams, were performed under the superintendence of Mr. William Richardson, the Assistant Secretary of the British Meteorological Society. All these duties were performed with care and ability.

I have the honour to be, Sir,

Your obedient servant,

JAMES GLAISHER.

Subjects of Investigation.

The determination of Atmospheric Pressure over the Metropolitan Districts.

The Maximum Temperature by Day.

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The Mean Temperature of the Air.

The Mean Temperature of the Thames Water.

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The Amount and Distribution of Electricity.

The Fall of Rain.

The Direction, Force, and Velocity of the Wind.

The Comparison of the Meteorological Phenomena for London compared with those simultaneously observed at some towns in the country, and,

The Investigation into the Meteorology of the years 1832, 1849, and 1854 in relation to Cholera in the Metropolitan Districts.

An accurate determination of these elements was found essential to the prosecution of the inquiry, and it subsequently proved desirable to institute a careful comparison of each subject with its average values from a long series of years.

NAMES and POSITIONS OF METEOROLOGICAL STATIONS, and NAMES of OBSERVERS.

Name of Station.	Latitude.	Longitude.	Approx. Height above Sea.	Names of the Observers.
	° ′	° ′	Feet.	
Crystal Palace, Sydenham	51. 27 N.	0. 4 W.	300 ?	Under the superintendence of George Grove, Esq., secretary.
Lewisham - - -	51. 28	0. 1 W.	82	W. Richardson, Esq., Assistant Secretary, British Meteorological Society.
Royal Observatory -	51. 28	0. 0	159	The Astronomer Royal.
Bexley Heath - -	51. 28	0. 10 E.	210	Flaxman Spurrell, Esq., M.R.C.S.
Brixton Road - -	51. 28	0. 6 W.	350	Francis Boyle Garty, Esq., M.R.C.S.
Camberwell - - -	51. 28	0. 5	15	William Searle, Esq.
Battersea - - -	51. 29	0. 10	15	James Griffin, Esq.
Dreadnought Hospital Ship - - -	51. 29	0. 1	20	Captain Sanders, R.N.
*Bermondsey - -	51. 29	. .	0	—— Martin, Esq.
Millbank Prison - -	51. 29	0. 8	15	Mr. R. J. Gould, under the superintendence of Dr. Baly.
Consumption Hospital, Brompton - - -	51. 29	0. 10	20	Vertue Edwards, Esq., M.R.C.S.
General Board of Health, Whitehall.	51. 30	0. 7	20	J. F. Campbell, Esq., and John C. Hailes, Esq.
St. Thomas' Hospital -	51. 30	0. 5	60	R. D. Thomson, Esq.; M.D.; F.R.S., L. & E.; M.B.M.S.
Poplar - - - -	51. 30	0. 0	20	W. J. Bain, Esq., M.D.
Guildhall - - -	51. 30	0. 5	40	Frederick Singleton Knott, Esq.
General Registry Office, Somerset House.	51. 30	0. 7	30	William Clode, Esq., under the Superintendence of the Registrar General.
St. Giles' Workhouse -	51. 30	0. 8	20	William Bennett. Esq., M.D.
Chiswell Street Brewery	51. 30	0. 5	96	Walter Fletcher, Esq.
St. Mary's Hospital -	51. 30	0. 10	126	William Copney, Esq.
Bethnal Green - -	51. 31	0. 3	20	Thomas Austen, Esq.
St. John's Wood - -	51. 31	0. 11	150	George Leach, Esq., President B.M.S.
St. Pancras - -	51. 31	0. 8	40	Charles Worrell, Esq.
Highgate - - -	51. 32	0. 10	420	Dr. Sutherland, Inspector General.
Enfield Vicarage - -	51. 39 N.	0. 5 W.	100	Rev. J. M. Heath, M.A., M.B.M.S.

The instruments consisted of

A Dry Bulb Thermometer,
A Wet Bulb Thermometer,
A Maximum Thermometer,
A Minimum Thermometer,
Moffat's Ozone Test Papers,
Schonbein's Ozone Test Papers, } at all the stations.

An Electrometer in addition at six stations.
A Barometer in addition at seven stations.
A Rain Gauge in addition at nine stations.

The instruments were all previously compared with standards, and their index errors exactly determined, under my own superintendence.

The stations at Sydenham, Lewisham, Greenwich, Bexley, Brixton, St. Thomas's Hospital, Chiswell Street, St. Mary's Hospital, St. John's Wood, and Enfield Vicarage, were already supplied with instruments; Dr. Baly at Millbank, the President of the Board of Health, and the Registrar General, furnished themselves with instruments for this inquiry, and the instruments were furnished by the Board of Health to Camberwell, Battersea, Dreadnought Hospital Ship, Bermondsey,* Brompton, Poplar, Guildhall, St. Giles, Bethnal Green, St. Pancras, and Highgate.

Plan of Observations.

To obtain a tolerable approximation to the laws of the distribution of temperature, humidity, &c., within a few weeks, it was essential that every precaution should be adopted to ensure the most perfect comparability of results. To this end the instruments selected were uniformly good, and were placed for the most part by myself at each station, in the best position the observer could command; personal instructions were given with regard to instruments and the method of recording observations, and were repeated till the observer had acquired the power of observing with accuracy.

It was desirable that the plan of observation should be the least onerous to give the required information. A plan of simultaneous observations I found to be incompatible with the various avocations of my corps of observers. For the same reason I was forced to content myself in some cases with one set of observations daily, but for the most part I succeeded in obtaining two, and in a few cases as many as three sets daily. The following Table shows the times of observation at the several stations.

Name of Station.	Times of Observation.
Crystal Palace - - -	9 a.m. and 3 p.m.
Lewisham - - - -	9 a.m. and 3 p.m.
Royal Observatory - - -	9 a.m. noon, 3 and 9 p.m.
Bexley Heath - - -	9 a.m. and 9 p.m.
Brixton Road - - -	11 a.m.
Camberwell - - - -	9 a.m. and 3 p.m.
Battersea - - - -	9 a.m. and 3 p.m.
Dreadnought Hospital Ship - -	9 a.m. 3 and 9 p.m.

* No observation was received from this most important station. I much regret that Mr. Martin did not signify to me his reluctance or inability to discharge the duties of an observer. I should have then taken steps to secure observations from this particular locality.

Name of Station.	Times of Observation.
Millbank Prison - - -	9 a.m. and 4 p.m.
Consumption Hospital, Brompton -	9 a.m. and 3 p.m.
General Board of Health, Whitehall -	10 a.m. and 4 p.m.
St. Thomas' Hospital - -	11 a.m. and 3 p.m.
Poplar - - - -	9 a.m. and 5 p.m.
Guildhall - - - -	11 a.m. and 4 p.m.
General Registry Office, Somerset House - - - -	11 a.m. and 3 p.m.
St. Giles' Workhouse - - -	10 a.m. and 3 p.m.
Chiswell Street Brewery - -	9 a.m. and 3 p.m.
St. Mary's Hospital - - -	9 a.m. and 3 p.m.
Bethnal Green - - -	9 a.m. and 3 p.m.
St. John's Wood - - -	9 a.m. and 5 p.m.
St. Pancras - - - -	9 a.m. and 3 p.m.
Highgate - - - -	9 a.m. and 3 p.m.
Enfield Vicarage - - -	9 a.m.

Reduction of the Observations.

At the end of each week the observations were forwarded to me. The first step in their reduction was the examination of every reading in comparison with all others taken at about the same time; the second was the application of index errors; corrections for diurnal range; and all necessary corrections and calculations to deduce the mean daily value of each element of investigation. The weekly means of the daily values were next taken, and the following Tables formed.

I will now proceed to discuss the results of each element separately.

Atmospheric Pressure.

Table I. contains the weekly means of the observed readings of the barometer, corrected for capillarity, index errors, diurnal range, and reduced to the temperature of 32°.

TABLE I.—Weekly Means of Atmospheric Pressure.

Name of Station.	Week ending: July 8	July 15	July 22	July 29	August 5	August 12	August 19	August 26	September 2	September 9	September 16	September 23	September 30	October 7	October 14	October 21	October 28	November 4	November 11	November 18	November 25	December 2	December 9	December 16	December 23	December 30
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Lewisham - -	29·698	29·780	30·035	30·079	29·792	29·926	29·888	29·935	30·281	33·250	29·924	30·028	30·161	29·801	30·105	29·595	29·575	30·175	30·183	29·549	29·481	29·601	29·743	29·963	29·694	30·037
Royal Observatory	29·618	29·702	29·954	29·990	29·701	29·846	29·813	29·915	30·212	30·166	29·857	29·972	30·076	29·710	30·036	29·504	29·517	30·101	30·114	29·467	29·397	29·519	29·631	29·868	29·594	29·963
Bexley Heath -	..	..	..	..	..	..	..	..	30·145	30·103	29·795	29·893	30·015	29·636	29·967	29·419	29·450	30·057	30·014	29·370	..	..	..	..	29·565	29·910
Brixton Road -	..	..	..	..	..	..	..	..	30·044	29·929	29·968	29·775	29·939	29 552	29·910	29·377	29·422	30·002	30·057	29·310	29·328	..	..	..	..	..
St. Thomas' Hosp.	29·692	29·777	30·031	30·081	29·783	29·930	29·858	30·004	30·299	30·246	29·932	30·038	30·184	29·813	30·154	29·584	29·615	30·230	30·198	29·570	29·511	29·676	29·758	29·987	29·723	30·106
St. Mary's Hosp. -	29·625	29·703	29·984	30·007	29·727	29·881	29·841	29·943	30·205	30·194	29·840	29·981	30·120	29·735	30·051	29·532	29·525	30·128	30·152	29·472	29·418	29·536	29·668	29·895	29·625	29·976
St. John's Wood -	29·585	29·680	29·932	29·971	29·683	29·825	29·794	29·895	30·210	30·163	29·809	..	..	..	..	..	..	..	..	29·446	29·376	29·497	29·629	29·848	29·582	29·937
Enfield Vicarage -	29·649	29·721	29·981	30·036	29·731	29·894	..	29·903	..	..	29·954	29·965	30·121	29·751	30·055	29·555	29·601	30·141	30·133	29·495	..	29·528	29·676	29·880	29·592	29·965

By applying the correction for elevation, the next Table is formed.

TABLE II.—Weekly Means of Barometric Pressure corrected and reduced to Mean Sea-level.

Name of Station.	Week ending: July 8	July 15	July 22	July 29	August 5	August 12	August 19	August 26	September 2	September 9	September 16	September 23	September 30	October 7	October 14	October 21	October 28	November 4	November 11	November 18	November 25	December 2	December 9	December 16	December 23	December 30
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Lewisham - -	29·790	29·872	30·127	30·171	29·884	30·018	29·980	30·077	30·373	30·342	30·016	30·120	30·253	29·893	30·197	29·687	29·667	30·267	30·275	29·641	29·573	29·693	29·835	30·055	29·786	30·129
Royal Observatory	29·796	29·880	30·132	30·168	29·879	30·024	29·991	30·093	30·390	30·344	30·035	20·150	30·254	29·880	30·274	29·682	29·695	30·279	30·292	29·645	29·575	29·697	29·809	30·046	29·774	30·141
Bexley Heath -	..	..	..	..	..	..	..	..	30·381	30·339	30·031	30·129	30·251	29·872	30·203	29·655	29·686	30·293	30·280	29·606	..	..	..	..	29·801	30·146
St. Thomas' Hosp.	29·759	29·844	30·098	30·148	29·850	29·997	29·925	30·071	30·366	30·313	29·999	30·105	30·251	29·889	30·221	29·651	29·682	30·307	30·275	29·647	29·588	29·743	29·825	30·054	29·790	30·178
St. Mary's Hosp. -	29·766	29·844	30·125	30·132	29·868	30·022	29·982	30·084	30·346	30·335	29·990	30·122	30·261	29·876	30·192	29·672	29·666	30·260	30·293	29·613	29·559	29·677	29·809	30·030	29·766	30·117
St. John's Wood -	29·753	29·848	30·110	30·139	29·851	29·993	29·962	30·063	30·378	30·331	29·977	..	..	..	..	..	..	..	..	29·614	29·544	99·665	29·797	30·016	29·750	30·105
Enfield Vicarage -	29·752	29·833	30·093	30·148	29·843	30·006	..	30·015	..	..	30·006	30·077	30·233	29·863	30·167	29·667	29·713	30·253	30·245	29·607	..	29·640	29·788	29·992	29·702	30·077
Means - -	29·760	29·853	30·114	30·151	29·864	30·010	29·968	30·067	30·371	30·335	30·014	30·115	30·250	29·878	30·108	29·652	29·685	30·275	30·275	29·625	29·568	29·680	29·810	30·029	29·767	30·125

The numbers in the lower line show the weekly pressure of the atmosphere over the metropolitan districts at the level of the sea. They are not remarkable till the second week in August: the pressure then exceeded 30 inches, and, with the exception of a slight defect (0·032 in.) in the following week, it exceeded 30 inches in each succeeding week till the end of September. The pressure during the first and second weeks in September was remarkably high, exceeding 30½ inches in both weeks; it decreased in the third week, and increased in both of the following weeks. It was low in the last two weeks in October, very high in the first two weeks in November, low in the last two weeks, and afterwards variable.

By comparing the numbers at the several stations, it will be seen, as might have been expected over so small a space as the metropolis, that the atmosphere has been evenly distributed. It will, therefore, be necessary to trace the successive maxima and minima of atmospheric pressure from one station only. They are recorded in the following Table.

TABLE III.—Showing the successive Maxima and Minima Readings of the Barometer in London, at the Level of the Sea.

Month, Day, and Hour.	Readings of Barometer; successive Maxima and Minima.	Difference between successive Readings.	
		Increase.	Decrease.
1854:	in.	in.	in.
July 1 - 9 a.m. -	29·927		
2 - 11 a.m. -	30·015	·088	
4 - 3 p.m. -	29·620		·395
8 - noon -	29·830	·210	
9 - 1 p.m. -	29·787		·043
10 - 9 p.m. -	29·977	·190	
12 - 9 a.m. -	29·855		·122
13 - noon -	29·906	·051	
14 - 3 p.m. -	29·790		·116
16 - 11 a.m. -	30·148	·358	
18 - 3 p.m. -	30·010		·138
22 - 9 a.m. -	30·272	·262	
25 - noon -	30·100		·172
28 - 9 a.m. -	30·260	·160	
31 - 9 p.m. -	29·702		·558
Aug. 6 - 11 p.m -	30·150	·448	
10 - 3 p.m. -	29·845		·305
11 - 9 p.m. -	30·027	·182	
14 - 9 a.m. -	29·792		·235
18 - 9 p.m. -	30·215	·423	
21 - 9 p.m. -	29·810		·405
23 - 9 a.m. -	30·195	·385	
24 - 3 p.m. -	29·956		·239
28 - 9 a.m. -	30·515	·559	
30 - 9 p.m. -	30·187		·328
Sept. 3 - 9 a.m. -	30·448	·261	

Table III.—Successive Maxima and Minima Readings, &c.—*cont.*

Month, Day, and Hour.	Readings of Barometer; successive Maxima and Minima.	Difference between successive Readings.	
		Increase.	Decrease.
1854:	in.	in.	in.
Sept. 3 - 9 a.m. -	30·448		
4 - 3 p.m. -	30·370		·078
5 - noon -	30·503	·133	
9 - 3 p.m. -	30·228		·275
10 - 9 a.m. -	30·285	·057	
14 - 9 a.m. -	29·765		·520
15 - 9 a.m. -	30·033	·268	
16 - 9 p.m. -	29·858		·175
18 - noon -	30·190	·332	
20 - noon -	29·980		·210
22 - 9 a.m. -	30·398	·418	
24 - 1 p.m. -	30·107		·291
26 - 9 a.m. -	30·440	·333	
29 - 3 p.m. -	30·147		·293
Oct. 1 - 10 a.m. -	30·276	·129	
3 - 9 a.m. -	29·805		·471
3 - 9 p.m. -	29·970	·165	
5 - 3 p.m. -	29·570		·400
7 - 9 p.m. -	30·138	·568	
9 - 9 a.m. -	29·760		·378
13 - 9 a.m. -	30·615	·855	
18 - 9 a.m. -	29·282		1·333
19 - noon -	29·842	·560	
20 - 3 p.m. -	29·420		·422
21 - 9 p.m. -	29·687	·267	
25 - 3 p.m. -	29·047		·640
27 - 9 p.m. -	30·406	1·359	
29 - 10 a.m. -	30·182		·224
29 - 9 p.m. -	30·352	·170	
31 - 9 a.m. -	30·125		·227
Nov. 1 - 9 p.m. -	30·462	·337	
5 - 10 a.m. -	30·063		·399
7 - noon -	30·590	·527	
11 - 9 a.m. -	30·079		·511
12 - 3 p.m. -	30·310	·231	
16 - 9 a.m. -	29·058		1·252
20 - 9 a.m. -	30·215	1·157	
22 - 3 p.m. -	28·988		1·227
27 - 9 p.m. -	30·110	1·122	
29 - 9 p.m. -	29·259		·851
30 - 9 a.m. -	29·584	·325	
30 - 9 p.m. -	29·250		·334
Dec. 2 - 9 p.m. -	30·087	·837	
3 - 9 p.m. -	29·832		·255
4 - noon -	30·113	·281	
5 - 9 p.m. -	29·385		·728

Table III.—Successive Maxima and Minima Readings, &c.—*cont.*

Month, Day, and Hour.	Readings of Barometer; successive Maxima and Minima.	Difference between successive Readings.	
		Increase.	Decrease.
1854:	in.	in.	in.
Dec. 5 - 9 p.m. -	29·385	·863	
7 - 9 p.m. -	30·248		·750
9 - 9 a.m. -	29·498	·624	
10 - 10 p.m. -	30·122		·148
11 - 9 p.m. -	29·974	·296	
13 - 9 a.m. -	30·270		·272
14 - 3 p.m. -	29·998	·095	
14 - 9 p.m. -	30·093		·309
16 - 9 a.m. -	29·784	·235	
17 - 10 a.m. -	30·019		·982
18 - 9 a.m. -	29·037	·774	
19 - noon -	29·818		·350
20 - 9 a.m. -	29·461	·726	
21 - 9 a.m. -	30·187		·449
22 - 9 p.m. -	29·738	·245	
23 - 9 a.m. -	29·983		·323
25 - 11 a.m. -	29·660	·897	
29 - 9 p.m. -	30·557		

The numbers in the second column of this Table give the reading of the barometer on the passage of the anterior and posterior troughs, as well as the crest of every wave of air that passed over the metropolis from July to December; the numbers in the third column show the difference of readings between the passage of the anterior trough and the crest, and those in the last, the difference between the crest and posterior trough. The difference between the numbers in the first column shows the rapidity of the motion of the wave.

In considering the observations, nothing very peculiar presents itself till towards the end of August, till which time a number of small waves only had passed. The readings were remarkable from the end of August till September 10, indicating a dense atmosphere. On August 28, September 3, and September 5, the crest of three waves passed over London, and the pressure was about 30½ inches at each transit. Another remarkable instance of continuous high readings took place between September 22 and October 1. In October, the maximum pressure during the period took place, viz., 30·615 inches. The anterior trough of this wave passed on the 9th, the crest on the 13th, and the posterior trough on the 18th; at the latter time, the barometer reading was 1·333 inches less than on the passage of the crest. Between October 25 and 27 the most rapid change of reading within the period of observation took place, amounting to 1·359 inches within 2¼ days.

From November 12 to the end of the month large variations of reading were more continuous than at any other time; and in December the variations of pressure were frequent, but not to large amounts.

The most remarkable waves within the period of observation were those which took place in November, the crests of which passed on the 12th, 20th, and 27th; the readings were 30·31 inches, 30·21 inches, and 30·11 inches respectively; each successive maximum being smaller than the preceding. The trough of these waves passed on the 16th, 22d, and 29th; the readings were 29·06 inches, 28·99 inches (which was the lowest reading within the period of observation), and 29·26 inches successively.

It is now necessary to compare the observed pressure with its normal value. For this purpose I have several series of observations, all agreeing with each other, but two only which extend so far back as 1841, viz., those of George Leach, Esq., and the Royal Observatory, Greenwich. The following Table shows the mean monthly return for a period of 14 years as determined from these stations:—

TABLE IV.—MEAN MONTHLY READING of the BAROMETER at LONDON, at the Level of the Sea, from the Year 1841 to 1854.

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1841	29·875	29·870	29·957	29·904	29·904	29·974	29·889	29·941	29·797	29·609	29·845	29·747
1842	30·074	30·050	29·920	30·087	29·955	30·074	29·993	30·042	29·888	30·022	29·772	30·180
1843	29·845	29·646	29·931	29·860	29·837	29·873	29·999	29·992	30·190	29·777	29·891	30·418
1844	30·064	29·671	29·883	30·173	30·118	29·987	29·926	29·850	30·054	29·735	29·863	30·058
1845	29·877	30·013	29·968	29·869	29·885	29·947	29·942	29·902	29·974	30·020	29·748	29·831
1846	29·844	30·022	29·828	29·762	29·952	30·039	29·930	29·950	29·997	29·689	29·994	29·870
1847	29·941	29·955	30·055	29·826	29·937	29·878	30·097	30·049	29·998	29·976	30·078	29·951
1848	29·989	29·690	29·678	29·762	30·099	29·815	30·009	29·905	30·005	29·819	29·958	29·980
1849	29·944	30·279	30·088	29·690	29·939	30·041	29·962	30·014	29·940	29·917	29·916	29·968
1850	30·027	30·001	30·212	29·767	29·887	30·059	29·962	29·960	30·103	29·854	29·901	30·087
1851	29·815	30·064	29·773	29·899	30·064	30·068	29·881	30·063	30·198	29·899	29·954	30·308
1852	29·762	30·030	30·180	30·118	29·959	29·733	30·030	29·822	29·912	29·860	29·638	29·754
1853	29·743	29·698	29·953	29·883	29·927	29·902	29·901	29·966	30·006	29·731	30·014	29·977
Means -	29·908	29·922	29·956	29·892	29·959	29·961	29·963	29·958	30·005	29·839	29·898	30·010
1854 - -	29·791	30·214	30·359	30·158	29·840	29·908	29·980	30·062	30·204	29·897	29·901	29·941
Diff. from average	− 0·117	+ 0·292	+ 0·403	+ 0·266	− 0·119	− 0·053	+ 0·017	+ 0·104	+ 0·199	+ 0·058	+ 0·003	− 0·069

The sign − implies below the average, and the sign + denotes above the average.

The numbers in the lowest line show the monthly difference of atmospheric pressure from the average in the year 1854. From them we learn that the pressure was in defect in January, May, June, and December; was near its average value in July and November, when it was slightly in excess; it was in excess in all the remaining months.

In February the excess was large, and the reading was greater than in any February in the series, except 1849. In March the excess was very large, and the reading exceeds that of any March in the above series.

In April the excess was large, and the reading was exceeded in one instance only, viz., in April 1844. In August the excess was large, but there are three instances in the Table with readings of nearly the same value, viz., in 1842, 1849, and 1851.

In September the excess was large, and the reading exceeded that of September in the series.

The mean reading for the year 1854 was 30·021 inches, exceeding the average by 0·082 inches.

Temperature of the Air.

The thermometers employed in determining the temperature and humidity of the air were made by Messrs. Negretti and Zambra, and, as before stated, were all carefully compared with standards, and their errors determined.

The mean daily temperature of the air was found from the mean of the observations of the dry-bulb thermometer, corrected for diurnal range;* and a second mean was found from the readings of the maximum and minimum thermometers, also corrected by a quantity given in the same paper. The adopted mean temperature for each day was then determined by combining these two values, and giving them weights proportional to the number of observations from which they respectively derived.

The mean of these was taken weekly; their results are shown in the annexed Table.

* The quantities required to perform these corrections will be found in a paper by myself, published in the "Philosophical Transactions," Part I. 1848.

TABLE V.—Weekly Mean Temperature of the Air.

Name of Station.	Week ending																									
	July				August				September					October				November				December				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	..	..	..	..	..	..	..	..	..	..	59·9	55·4	54·6	54·1	50·2	45·1	44·5	48·9	41·8	40·6	35·8	..	41·9	44·0	..	37·3
Lewisham	58·0	56·1	63·8	66·3	59·9	60·4	59·7	61·4	65·0	60·6	60·4	57·3	55·5	54·8	51·7	46·9	45·4	50·2	42·3	41·2	36·6	39·1	42·0	41·9	40·0	40·1
Royal Observatory	56·9	56·4	63·2	64·9	58·5	60·1	59·9	61·2	65·1	59·2	60·7	57·1	55·2	53·6	50·9	46·5	44·9	49·7	42·2	40·9	36·5	38·4	42·2	42·8	40·5	39·8
Bexley Heath	..	..	..	..	..	..	..	..	63·6	57·6	59·8	58·6	55·2	55·3	51·6	47·1	45·3	49·3	41·9	42·2	36·4	42·0	42·7	43·1	41·7	39·4
Brixton Road	..	..	..	..	..	..	..	..	67·3	61·3	64·5	57·2	58·2	55·0	52·4	46·2	46·4	50·4	44·5	43·0	37·5	..	..	..	..	..
Camberwell	..	..	..	..	..	..	..	..	..	..	61·1	57·0	54·6	54·6	52·5	47·0	46·5	49·6	43·3	..	..	43·0	42·8	43·7	39·0	..
Battersea	..	..	..	..	..	..	..	..	..	..	..	60·9	55·0	54·7	53·3	46·1	43·2	47·0	41·3	41·1	36·0	40·0	..	..	..	..
Dreadnought	59·0	58·6	65·1	65·4	58·6	62·0	59·7	61·1	..	59·6	61·1	60·8	56·0	56·0	53·4	50·3	49·1	53·3	47·2	45·2	41·9	41·6	43·4	45·6	43·6	41·0
Millbank	..	..	..	..	..	..	..	..	..	..	..	59·9	55·5	54·8	52·2	47·2	45·9	50·1	43·7	42·4	38·1	39·1	44·4	43·3	41·8	40·5
Brompton	..	..	..	..	..	..	..	..	..	..	..	56·8	54·1	51·6	51·4	47·1	44·5	48·9	43·1	42·3	38·0	38·6	43·5	44·1	43·7	..
Board of Health	..	..	..	..	..	..	..	..	..	60·9	61·3	59·1	54·8	54·8	52·0	46·6	44·5	49·8	43·0	42·7	37·7	39·8	42·5	44·0	41·3	38·3
St. Thomas' Hosp.	57·8	56·6	65·6	67·7	59·8	59·6	62·0	62·8	64·4	60·7	61·2	58·2	56·0	54·1	51·9	46·9	45·5	50·7	43·6	42·2	38·0	38·9	43·5	42·8	41·2	40·6
Poplar	..	..	..	..	..	..	..	..	..	..	63·0	59·3	51·4	54·6	51·8	46·7	45·3	48·8	42·8	42·0	37·8	38·7	41·6	44·4	40·3	39·8
Guildhall	..	..	..	..	..	..	..	..	..	..	..	..	54·0	56·3	53·2	47·5	46·0	49·8	44·5	43·4	37·5	40·1	..	..	..	..
Somerset House	..	..	..	..	..	..	..	..	..	..	62·7	56·6	55·1	55·4	52·6	48·7	45·6	51·5	44·5	43·1	37·5	39·7	44·2	43·8	41·1	41·4
St. Giles	..	..	..	..	..	..	..	..	..	..	..	57·9	56·5	55·8	53·4	47·2	45·6	54·1	43·4	43·0	..	..	..	..	..	..
Chiswell Street	..	..	..	..	..	..	..	..	68·0	63·5	63·1	59·0	58·0	..	54·5	49·8	48·1	51·4	..	..	..	..	..	..	..	..
St. Mary's Hosp.	57·1	57·2	61·2	68·0	58·8	61·2	59·4	60·9	65·5	62·8	61·7	57·8	57·8	56·1	53·0	47·6	46·0	51·9	43·5	42·5	37·9	39·0	43·8	43·4	41·1	41·2
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	58·7	56·4	56·0	52·4	47·2	45·5	50·9	42·9	42·3	37·3	39·9	43·4	45·3	..	..
St. John's Wood	57·8	56·1	62·9	65·3	57·8	60·2	58·9	60·0	64·4	60·7	59·4	..	..	..	..	..	..	..	..	41·0	36·5	37·5	41·8	41·7	39·9	38·6
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	54·7	52·8	53·8	50·6	46·7	42·2	50·0	44·7	42·9	..	..	..	..	..	..
Highgate	..	..	..	..	..	..	..	..	..	..	60·4	58·7	58·3	55·2	53·1	47·0	46·7	49·9	43·0	40·6	36·3	37·9	42·2	42·4	..	39·3
Enfield Vicarage	58·3	56·4	61·3	64·9	60·1	58·0	..	60·3	..	..	55·4	58·4	52·4	53·0	50·7	45·0	45·3	46·0	41·4	40·4	..	38·1	41·4	40·3	38·5	38·2
Means	57·8	56·8	63·3	66·1	59·1	60·2	59·9	61·1	65·4	60·7	61·0	58·1	55·5	54·0	52·2	47·1	45·5	50·3	43·5	42·8	37·5	39·6	42·7	43·3	41·0	39·7
Mean temperature as found from:— Sydenham, Lewisham, Bexley Heath, Royal Observ., St. John's Wood, St. Pancras, Highgate, Enfield	57·7	56·2	62·8	65·8	59·1	59·7	59·5	60·7	64·5	59·5	59·4	57·2	54·9	54·3	51·3	46·3	44·9	49·1	42·8	41·2	36·3	38·9	42·1	42·4	40·2	39·0

The numbers in this Table show the weekly distribution of temperature over the Metropolis. In the last line but one, are given the mean results of all the stations; they show the temperature in each week of the Metropolitan districts.

By comparing the individual results with these values, it will be seen that generally the temperature at the central stations has been somewhat higher, and those at the outlying stations somewhat lower than the mean.

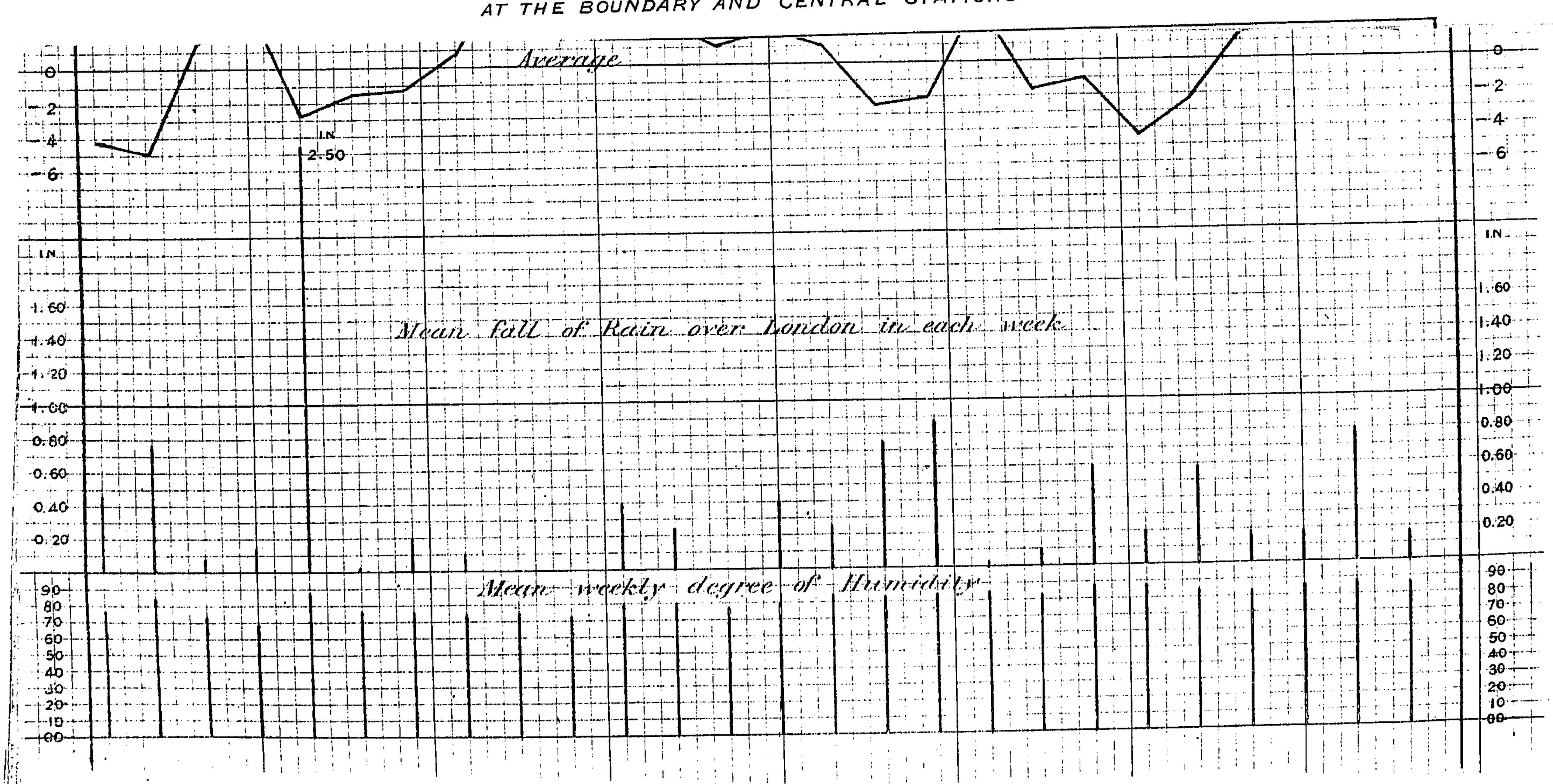
In the last line of this Table are given the mean results of those stations situated both north and south of London, and which I found to agree well with each other. They may be considered as the mean weekly temperature of the Metropolitan districts, free from the effects of the river Thames and all Metropolitan influences. The result of this comparison is shown in the following Table:—

TABLE VI.—Showing the Excess of Temperature at the Central Stations over the Means at the Boundary Stations.

Name of Station.	Week ending																									
	July				August				September					October				November				December				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Brixton Road	..	..	..	..	..	..	..	..	+2·8	+1·8	+5·1	0·0	+3·3	+0·7	+1·1	−0·1	+1·5	+1·3	+1·7	+1·8	+1·2	..	..	..	..	..
Camberwell	..	..	..	..	..	..	..	..	..	..	+1·7	−0·2	−0·3	+0·3	+1·2	+0·7	+1·6	+0·5	+0·5	..	..	+4·1	+0·7	+1·3	−1·2	..
Battersea	..	..	..	..	..	..	..	..	..	..	..	+3·7	+0·1	+0·4	+2·0	−0·2	−1·7	−2·1	−1·5	−0·1	−0·3	+1·1	..	..	..	..
Dreadnought	+1·3	+2·4	+2·3	−0·4	−0·5	+2·3	+0·2	+0·4	..	+0·1	+1·7	+3·6	+1·1	+1·7	+2·1	+4·0	+4·2	+4·2	+4·4	+4·0	+5·6	+2·7	+1·3	+3·2	+3 4	+2·0
Millbank	..	..	..	..	..	..	..	..	..	..	..	+2·7	+0·6	+0·5	+0·9	+0·9	+1·0	+1·0	+0·9	+1·2	+1·8	+0·2	+2·3	+0·9	+1·6	+1·5
Brompton	..	..	..	..	..	..	..	..	..	..	..	−0·4	−0·8	+0·3	+0·1	+0·8	−0·4	−0·2	+0·3	+1·1	+1·7	−0·3	+1·4	+1·7	+3·5	..
Board of Health	..	..	..	..	..	..	..	..	..	+1·4	+1·9	+1·9	−0·1	+0·5	−0·7	+0·3	−0·4	+0·7	+0·2	+1·5	+1·4	+0·9	+0·4	+1·6	+1·1	−0.7
St. Thomas' Hosp.	+0·1	+0·4	+2·8	+1·9	+0·7	−0·1	+2·5	+2·1	−0·1	+1·2	+1·8	+1·0	+1·1	−0·2	+0·6	+0·6	+0·6	+1·6	+0·8	+1·0	+1·7	0·0	+1·4	+0·4	+1·0	+1·6
Poplar	..	..	..	..	..	..	..	..	..	..	+3·6	+2·1	−0·5	+0·3	+0·5	+0·4	+0·4	−0·3	0·0	+0·8	+1·5	−0·2	−0·5	+2·0	+0·1	+0·8
Guildhall	..	..	..	..	..	..	..	..	..	..	..	..	−0·9	+2·0	+1·9	+1·2	+1·1	+0·7	+1·7	+2·2	+1·2	+1·2	..	..	..	..
Somerset House	..	..	..	..	..	..	..	..	..	..	+3·3	−0·6	−0·2	+1·1	+1·3	+2·4	+0·7	+2·4	+1·7	+1·9	+1·2	+0·8	+2·1	+1·4	+0·9	+2·4
St. Giles'	..	..	..	..	..	..	..	..	..	..	..	+0·7	+1·6	+1·5	+2·1	+0·9	+0·7	+5·0	+0·6	+1·8	..	..	..	..	..	..
Chiswell Street	..	..	..	..	..	..	..	..	+3·5	+4·0	+4·0	+1·8	+3·1	..	+3·2	+3·5	+3·2	+2·3	..	..	..	..	..	..	..	..
St. Mary's Hosp.	−0·6	+1·0	−1·6	+2·2	−0·3	+1·5	−0·1	+0·2	+1·0	+3·3	+2·3	+0·6	+2·9	+1·8	+1·7	+1·3	+1·6	+2·8	+0·7	+1·3	+1·6	+0·1	+1·7	+1·0	+0·9	+2·2
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	+1·5	+1·5	+1·7	+1·1	+0·9	+0·6	+1·8	+0·1	+1·1	+1·0	..	..	..	..	..
Means	+0·3	+1·3	+1·2	+1·2	0·0	+1·2	+0·9	+0·9	+1·8	+2·0	+2·8	+1·3	+0·8	+0·8	+1·3	+1·2	+0·9	+1·4	+0·9	+1·5	+1·7	+1·0	+1·2	+1·5	+1·3	+1·4

DIAGRAM REPRESENTING LONDON WEEKLY METEOROLOGICAL PHENOMENA

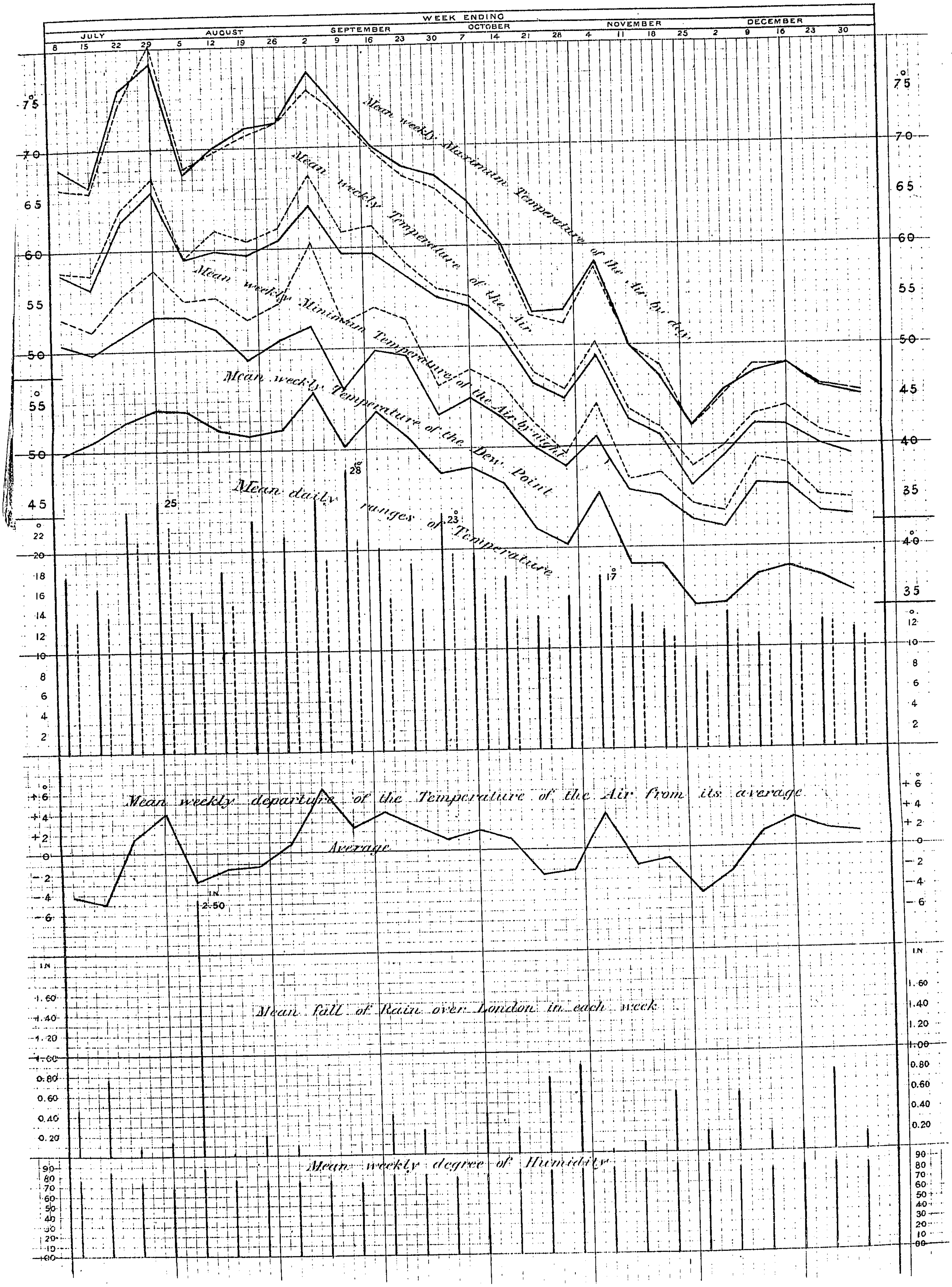
AT THE BOUNDARY AND CENTRAL STATIONS.



The black line indicates the boundary stations and the dotted line the central stations.

DIAGRAM REPRESENTING LONDON WEEKLY METEOROLOGICAL PHENOMENA

AT THE BOUNDARY AND CENTRAL STATIONS.



The black line indicates the boundary stations and the dotted line the central stations.

From the prevalence of + signs in this Table, it will be seen that London temperature has been higher than that of the country, and, by reference to the numbers, that the greatest excesses have occurred during the first three weeks in September. The mean excesses for the three months ending November 25 were,—

Brixton	1°·7
Camberwell	0·7
Battersea	0·0
Dreadnought	3·1
Millbank	1·2
Brompton	0·3
Board of Health	0·8
St. Thomas's Hospital	0·9
Poplar	0·8
Guildhall	1·2
Somerset House	1·5
St. Giles	1·8
Chiswell Street	3·2
St. Mary's Hospital	1·7
Bethnal Green	1·1

The greatest of these, 3·1° and 3·2°, took place at the Dreadnought Hospital Ship and at Chiswell Street. The mean of all for the month of September, October, and November, was 1·5°.

Some part of these excesses, however, are due to difference of elevation. The mean height of the boundary stations is about 200 feet, whilst that of the central stations is about 25 feet. We have therefore to lessen all the above excesses for the difference of level at the rate of 0·1° for every difference of 29 feet, or by 0·6° to determine the true excess of London temperature over that of the country. The numbers in the lower line of Table VI. show the weekly excess of London temperature, uncorrected for difference of elevation. The mean of all is 1·2°, and, corrected for difference of level, becomes 0·6°, which is the whole effect of all local causes in London to raise its mean temperature.*

Next in order of inquiry is the comparison of the observed temperatures with their normal values. The absolute mean daily temperatures are known at Greenwich from a series of observations made during 38 years. The daily mean temperatures from July 1

* This result is in accordance with that found by me in discussing London temperature in comparison with that of the country, in a paper published in the "Philosophical Transactions," Part XI., for 1850. In this paper I came to the conclusion "that those parts of London situate near the river Thames are somewhat warmer upon the whole year than the country, but that those parts of London which are situated at some distance from the river do not enjoy higher temperature than those due to their latitudes.

to December 30, deduced from that series, are given in the following Table:—

TABLE VII.—AVERAGE MEAN DAILY TEMPERATURE of the AIR at GREENWICH.

Days of the Month.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°
1	61·8	62·2	58·9	53·3	46·3	41·7
2	62·0	62·2	58·7	53·1	46·1	41·6
3	62·1	62·1	58·5	52·8	45·9	41·5
4	62·2	62·1	58·4	52·6	45·7	41·4
5	62·3	62·1	58·2	52·4	45·4	41·2
6	62·2	62·0	58·0	52·2	45·2	41·1
7	62·1	62·0	57·9	52·0	44·9	41·0
8	62·0	61·9	57·7	51·7	44·7	40·8
9	61·9	61·8	57·5	51·5	44·5	40·7
10	61·8	61·7	57·4	51·2	44·2	40·6
11	61·8	61·7	57·2	51·0	44·0	40·5
12	61·9	61·6	57·0	50·8	43·7	40·3
13	62·0	61·4	56·8	50·6	43·4	40·2
14	62·1	61·3	56·7	50·4	43·2	40·0
15	62·1	61·2	56·5	50·2	42·9	39·8
16	62·1	61·1	56·3	50·0	42·7	39·6
17	62·1	61·0	56·1	49·7	42·5	39·4
18	62·0	60·8	55·9	49·5	42·4	39·2
19	61·9	60·7	55·7	49·2	42·2	39·1
20	61·9	60·6	55·5	49·0	42·0	38·9
21	61·8	60·4	55·4	48·8	41·9	38·7
22	61·8	60·3	55·2	48·7	41·8	38·5
23	61·8	60·2	55·0	48·4	41·7	38·4
24	61·9	60·0	54·8	48·2	41·6	38·2
25	61·9	59·9	54·7	47.9	41·7	38·0
26	62·0	58·8	54·4	47·7	41·8	37·8
27	62·1	59·6	54·2	47·5	41·9	37·6
28	62·2	59·5	54·0	47·2	41·9	37·4
29	62·2	59·3	52·7	46·9	41·9	37·2
30	62·2	59·2	53·5	46·7	41·8	37·0
31	62·2	59·0		46·5		36·7

As before stated, the mean temperature of every day was determined for every station, and compared with the normal temperature for the same day, found from the numbers in the preceding Table, by the application of a correction for difference of elevation at the rate of 1° for a difference of elevation of 290 feet, and in this way the departure of the temperature from the average on every day for every station was found. The results of the weekly means of these numbers are contained in the following Table:—

TABLE VIII.—WEEKLY MEAN of AIR TEMPERATURE, DIFFERENCE from AVERAGE of WEEK.

NAME OF STATION.	WEEK ENDING																						
	JULY				AUGUST				SEPTEMBER					OCTOBER				NOVEMBER				DECEMBER				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	..	..	..	..	..	..	..	..	..	..	+3·5	−0·5	+0·9	+2·0	−0·4	−3·9	−2·9	+3·1	−2·4	−1·9	−5·5	..	+1·3	+4·4	..	+0·2
Lewisham	−4·7	−5·9	+1·9	+4·3	−2·3	−1·4	−1·4	+1·2	+5·9	+2·6	+3·6	+1·8	+1·3	+2·2	+0·7	−2·6	−2·5	+3·9	−2·4	−1·8	−5·2	−2·7	+0·9	+1·8	+1·1	+2·5
Royal Observatory	−5·1	−5·5	+1·3	+2·9	−3·2	−1·7	−1·2	+1·1	+5·9	+1·1	+3·8	+1·5	+1·0	+1·0	−0·1	−3·0	−3·1	+3·4	−2·5	−2·1	−5·3	−3·4	+1·1	+2·7	+1·6	+2·2
Bexley Heath	..	..	..	..	..	..	..	..	+4·6	+0·1	+3·4	+3·6	+1·5	+3·2	+1·1	−2·8	−2·2	+3·5	−2·6	−0·6	−5·2	+0·4	+1·8	+3·2	+3·0	+2·0
Brixton Road	..	..	..	..	..	..	..	..	+8·8	+4·2	+8·4	+2·4	+4·8	+4·3	+2·2	−1·4	−1·9	+4·2	+0·5	+0·7	−3·6	..	..	..	..	..
Camberwell	..	..	..	..	..	..	..	..	..	..	+3·9	+1·2	+0·1	+1·5	+1·0	−2·9	−1·9	+2·7	−1·9	..	..	+0·7	+1·2	+3·1	−0·4	..
Battersea	..	..	..	..	..	..	..	..	..	..	..	+5·3	+1·1	+1·6	+1·9	−3·7	−4·4	+0·3	−3·9	−2·4	−6·3	−2·3	..	..	..	..
Dreadnought	−3·5	−3·7	+2·8	+3·0	−4·0	−0·2	−1·8	+0·4	..	+1·1	+3·7	+4·9	+1·4	+3·0	+1·8	+0·5	+0·5	+6·4	+2·0	+1·7	−0·4	−0·7	+1·8	+5·0	+4·2	+2·9
Millbank	..	..	..	..	..	..	..	..	..	..	..	+3·8	+0·9	+1·6	+0·7	−2·7	+2·4	+3·2	−1·5	−1·1	−4·2	−3·2	+2·8	+2·7	+2·4	+2·4
Brompton	..	..	..	..	..	..	..	..	..	..	..	+0·9	−0·5	+1·5	+0·1	−2·8	−3·8	+2·1	−2·1	−1·2	−4·3	−3·7	+1·8	+3·5	+4·3	..
Board of Health	..	..	..	..	..	..	..	..	..	+2·3	+3·9	+2·2	+0·3	+1·7	+0·6	−2·9	−3·8	+3·1	−2·2	−0·8	−4·5	−2·5	+0·9	+3·4	+1·9	+0·2
St. Thomas' Hosp.	−4·6	−5·6	+3·4	+5·4	−2·7	−2·5	−0·6	+2·3	+5·2	+2·2	+3·9	+2·2	+0·7	+0·9	+0·5	−2·9	−2·8	+3·7	−1·4	−1·1	−4·1	−3·2	+2·1	+2·4	+2·0	−2·7
Poplar	..	..	..	..	..	..	..	..	..	..	+5·7	+4·8	−0·1	+0·8	+0·3	−3·2	−3·3	+1·9	−2·4	−1·5	−4·5	−3·6	0·0	+3·8	+0·9	+1·7
Guildhall	..	..	..	..	..	..	..	..	..	..	..	..	−0·6	+3·3	+1·8	−2·3	−2·3	+3·0	−0·7	−0·1	−4·8	−2·2	..	..	..	..
Somerset House	..	..	..	..	..	..	..	..	..	..	+5·7	+4·7	+0·9	+2·3	+1·2	−2·4	−2·6	+4·8	−0·7	−0·4	−4·8	−2·6	+2·6	+3·2	+1·7	+3·3
St. Giles'	..	..	..	..	..	..	..	..	..	..	..	+2·1	+2·0	+2·8	+0·9	−2·6	−2·6	+3·9	−1·8	−0·5	..	..	..	..	..	..
Chiswell Street	..	..	..	..	..	..	..	..	+8·7	+5·3	+4·7	+4·1	+3·6	..	+3·5	0·0	+0·1	+5·6	..	..	..	..	..	..	..	..
St. Mary's Hospital	−5·1	−4·8	−0·8	+5.9	−3·5	−0·7	−1·8	+0·6	+6·2	+4·5	+4·7	+2·2	+3·5	+3·3	+1·9	−2·0	−2·0	+5·4	−1·8	−0·6	−4·0	−2·9	+2·6	+3·2	+2·1	+3·5
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	+2·6	+1·8	+3·1	+0·8	−2·7	−2·5	+4·2	−2·3	−1·2	−5·0	−2·4	+1·8	+4·7	..	..
St. John's Wood	−4·3	−3·8	+1·0	+3·3	−4·4	−1·6	−2·2	−0·2	+5·3	+1·2	+3·8	..	..	..	..	..	..	..	..	−2·0	−5·3	−4·3	+0·7	+1·6	+1·0	+1·0
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	+0·2	−1·8	+0·2	−0·9	−3·2	−3·1	+3·2	−0·5	−0·6	..	..	..	..	..	..
Highgate	..	..	..	..	..	..	..	..	..	..	+4·4	+4·0	+5·0	+3·5	+3·0	−0·7	−0·3	+4·5	−0·7	−1·4	−4·5	−2·9	+2·1	+3·3	..	+2·7
Enfield Vicarage	−4·3	−5·8	−0·8	+3·7	−2·3	−4·0	..	−0·1	..	..	−1·6	+2·7	−2·0	+0·2	−0·5	−4·7	−2·8	..	−3·5	−2·8	..	−3·9	+0·1	0·0	−0·6	+0·4
Means	−4·5	−5·0	+1·3	+4·1	−3·2	−1·7	−1·3	+0·7	+6·3	+2·5	+4·1	+2·7	+1·2	+2·1	+1·0	−2·5	−2·2	+3·6	−1·7	−1·0	−4·5	−2·5	+1·5	+3·1	+1·8	+1·6

The numbers in this Table show the weekly departure from the normal temperature of the week at all stations. In analysing them, the first fact worthy of note is that, for the most part, all stations in the same week have been in excess, or all in defect; the next remarkable fact is, that these departures from the averages are not equal in amount. The greatest difference in these respects took place within the first three weeks in September. For instance, the excess of temperature in the first week at St. Thomas's Hospital was 5·2°; at Chiswell Street and Brixton it was $8\frac{3}{4}$°; the next week the mean temperature at Bexley Heath was that of its average, whilst other stations were in excess from 2° to 5°. In the following week the mean temperature at Enfield was $1\frac{1}{2}$° below its average, whilst at other stations it varied to nearly 6° above; at Brixton it seemed to be as large as 8°, but the instruments at this station had been placed too near the surface of the soil, and some suspicion reigns over the results up to this time. They were subsequently removed to a better position. Similar differences are shown week by week, showing the operation of local causes to affect the temperature of particular districts.

The mean results for the different stations for the thirteen weeks ending November 25, are as follows.—

At Sydenham	was	0·7 in defect.
„ Lewisham	„	0·5 in excess.
„ Royal Observatory	„	0·1 in excess.
„ Bexley Heath	„	0·5 in excess.
„ Brixton	„	2·6 in excess.
„ Camberwell	„	0·4 in excess.
„ Battersea	„	1·0 in defect.
„ Dreadnought Hospital Ship	„	2·2 in excess.
„ Milbank	„	0·3 in excess.
„ Brompton	„	1·0 in defect.
„ Board of Health	„	0·0
„ St. Thomas's Hospital	„	0·5 in excess.
„ Poplar	„	0·1 in defect.
„ Guildhall	„	0·3 in defect.
„ Somerset House	„	0·8 in excess.
„ St. Giles's	„	0·5 in excess.
„ Chiswell Street	„	4·0 in excess.
„ St. Mary's Hospital	„	1·6 in excess.
„ Bethnal Green	„	0·1 in defect.
„ St. Pancras	„	0·7 in defect.
„ Highgate	„	1·5 in excess.
„ Enfield	„	1·7 in defect.

The numbers in the lowest line of Table VIII. show the mean departure of the temperature of the Metropolitan districts in each week from its average. From them we learn that the temperature was in defect, with the exception of the two weeks ending July 22 and 29, till August 19; then in excess till October 14; in defect in the two following weeks; in excess in the week ending November; in defect till December 2, and afterwards in excess. The most continuous excesses were, therefore, in the seven weeks ending October 14, and the largest excess of temperature took place in the week ending September 2.

It remains now to compare the monthly temperature, as observed throughout the year, with the mean monthly temperature at one of the stations, as deduced from the mean of several years. For this purpose I have used the series of observations taken at the Royal Observatory, Greenwich. The results are contained in the following Table:—

TABLE IX.—MONTHLY TEMPERATURE of the AIR at the Royal Observatory, Greenwich (1841 to 1854).

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°	°	°	°	°	°	°
1841	33·6	35·3	46·2	47·0	56·8	56·4	57·8	60·5	58·1	48·8	42·7	40·5
1842	32·9	40·8	44·9	45·2	53·2	62·9	60·2	65·4	56·4	45·4	42·8	45·0
1843	39·9	36·0	42·9	47·1	52·2	56·3	60·9	62·1	59·5	48·0	43·8	43·9
1844	39·1	35·2	41·5	51·7	52·9	60·7	61·4	57·7	56·9	49·5	44·0	33·0
1845	38·3	32·7	35·2	46·3	49·4	60·7	59·8	57·3	53·6	50·2	45·8	41·7
1846	43·7	43·9	43·3	47·1	54·6	65·3	64·5	63·2	60·1	50·5	46·0	32·9
1847	35·1	35·4	41·0	45·3	56·4	58·0	65·4	62·1	54·3	52·9	46·9	42·8
1848	34·6	43·4	43·8	47·6	59·7	58·5	61·5	58·5	55·8	51·6	43·8	44·0
1849	40·1	43·2	42·5	43·2	54·0	57·9	62·1	62·9	58·8	51·1	44·1	39·1
1850	33·7	44·7	39·9	48·5	51·3	60·8	62·2	60·2	56·4	47·0	46·5	40·6
1851	42·9	40·1	42·6	44·7	50·9	58·9	60·1	62·3	56·9	52·6	37·9	40·4
1852	42·0	40·8	41·3	45·9	51·5	56·1	66·6	62·1	56·8	47·9	48·9	47·6
1853	42·4	33·3	38·5	45·2	52·0	58·2	60·3	60·0	55·3	50·9	42·1	34·0
Means -	38·3	38·8	41·8	46·5	53·4	59·3	61·3	61·1	56·8	49·7	44·3	40·4
1854 -	39·0	39·5	43·8	48·4	50·9	55·7	60·3	60·9	58·1	49·4	40·5	41·3
Excess of Temp. in 1854 -	+ 0·7	+ 0·7	+ 2·0	+ 1·9	− 2·5	− 3·6	− 1·5	− 0·2	+ 1·3	− 0·3	− 3·8	+ 0·9

The lowest line but two gives the mean monthly temperature from 13 years ending 1853. The lowest line but one gives the mean monthly temperature of 1854; and the lowest line of all gives the monthly departure of temperature in 1854 from the mean of the preceding 13 years. From these it appears that the temperature was in excess till April, and in September and December, and in defect in all the remaining months. The summer was cold. The mean yearly temperature for the 13 years ending 1853, was 49·4°, and of 1854 was 49·0°. The investigation of the mean temperature of the several Metropolitan districts, exhibit up to this point very little variation of temperature, as compared each with the other, and we may fairly come to the conclusion that the actual temperature of the air has exercised no very decided influence over the disease, which has been so partial in its operation, devastating entire districts and passing nearly harmlessly by others, which, according to the above results, have shared the same temperature; considering, however, that the amount of daily range of temperature exercises a more active influence on the health of the people than the mean temperature of the air, I have regarded this part of the investigation as highly important to the present inquiry.

The diurnal range of temperature is given by the results derived from self-registering maximum and minimum thermometers. The maximum thermometer employed is that patented by Negretti and Zambra; in this instrument there is no index of steel, which is therefore free from the entanglement and frequent derangements to which the ordinary maximum thermometers are liable. In the series of observations no blanks occur as arising from failure of action, although in several cases it was placed in the hands of gentlemen previously unaccustomed to the use of such instruments. Confidence may be placed in the results, which are given in the following Table:—

TABLE X.—WEEKLY MEANS of DAILY MAXIMUM TEMPERATURE.

NAME OF STATION.	WEEK ENDING																									
	JULY				AUGUST				SEPTEMBER					OCTOBER				NOVEMBER				DECEMBER				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	..	..	..	..	..	..	..	..	..	..	69·4	63·8	63·2	62·4	57·5	51·2	51·0	56·3	47·6	46·5	40·5	..	46·5	48·8	..	42·4
Lewisham	68·7	66·4	77·6	80·2	67·1	71·3	72·7	74·0	78·7	76·3	72·3	67·3	70·2	65·3	60·6	54·0	54·5	59·6	50·0	47·0	42·2	45·2	47·4	49·2	45·3	44·9
Royal Observatory	68·5	67·2	76·9	79·9	68·4	72·5	72·3	74·2	79·8	76·1	73·5	68·4	70·3	65·5	61·2	54·2	55·1	60·2	50·5	47·5	42·7	44·8	47·4	48·9	46·8	45·3
Bexley Heath	..	..	..	..	..	..	..	..	74·2	69·6	66·6	70·4	69·3	67·4	62·8	53·7	54·4	60·3	50·2	49·3	43·2	48·0	49·3	49·0	47·8	46·1
Camberwell	..	..	..	..	..	..	..	..	..	..	71·9	69·2	68·8	66·6	63·3	54·1	55·2	59·7	52·1	..	..	48·8	48·3	48·7	46·9	..
Dreadnought	..	..	..	..	..	..	..	..	..	..	70·9	70·3	67·5	63·5	61·3	..	..	..	..	..	..	..	..	..	..	..
Millbank	..	..	..	..	..	..	..	..	..	..	..	63·6	65·4	62·9	59·0	52·4	52·1	58·1	50·7	47·5	42·0	44·8	48·6	47·6	48·8	45·6
Brompton	..	..	..	..	..	..	..	..	..	..	..	64·5	64·1	61·0	57·8	52·4	50·6	55·0	49·2	46·8	41·7	44·7	46·8	48·0	..	..
Board of Health	..	..	..	..	..	..	..	..	..	..	67·2	66·9	63·3	62·1	59·6	52·3	50·6	56·6	47·7	47·1	41·0	45·5	46·7	47·5	45·3	42·4
St. Thomas' Hosp.	66·8	65·4	76·8	79·8	68·6	67·1	71·7	72·5	74·6	70·5	69·0	66·6	63·1	61·4	..	52·6	52·1	57·7	49·0	46·9	41·8	43·9	48·1	48·0	47·5	47·4
Poplar	..	..	..	..	..	..	..	..	..	..	..	68·0	60·5	63·3	..	..	..	..	..	..	..	..	..	..	..	..
Somerset House	..	..	..	..	..	..	..	..	..	..	70·0	65·2	64·4	64·6	60·0	53·8	53·3	58·1	51·6	50·4	42·2	46·9	49·7	49·2	48·0	..
St. Giles	..	..	..	..	..	..	..	..	..	..	..	67·6	64·6	64·0	60·2	53·5	52·2	58·4	49·9	49·3	..	..	..	..	..	..
Chiswell street	..	..	..	..	..	..	..	..	76·6	73·0	69·4	67·9	65·3	..	60·7	53·9	53·4	59·4	..	..	..	..	..	..	..	..
St. Mary's Hosp.	65·7	66·0	76·0	80·8	67·7	72·3	70·9	72·6	..	70·5	72·4	67·1	71·3	65·2	62·1	54·2	54·6	60·2	50·5	47·1	42·6	45·5	48·2	48·4	47·1	46·4
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	67·8	68·7	..	59·9	52·3	51·4	58·0	50·5	47·9	41·9	45·6	48·6	48·5	..	..
St. John's Wood	67·6	66·6	76·2	77·5	66·6	71·1	71·1	71·9	77·2	72·3	70·8	..	..	..	..	..	..	..	..	47·1	41·8	45·5	47·3	48·0	46·8	45·5
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	65·6	62·7	63·7	58·3	52·2	51·7	56·3	49·7	47·4	..	..	..	..	..	..
Highgate	..	..	..	..	..	..	..	..	..	..	69·1	71·4	69·6	65·5	62·5	56·9	57·3	60·0	51·1	46·5	41·9	46·0	48·5	47·9	..	46·9
Enfield Vicarage	67·9	65·1	72·3	76·5	67·8	65·5	..	70·1	..	..	67·9	66·9	63·7	63·7	58·9	51·1	50·3	55·1	49·1	45·6	..	43·4	45·1	45·1	44·1	43·1
Means	67·5	66·1	76·0	79·1	67·7	70·0	71·7	72·6	76·8	73·5	70·1	67·3	66·4	63·8	60·8	53·3	53·0	58·2	50·1	47·4	41·9	45·6	47·8	48·2	46·8	45·1
Means as found from— Sydenham, Lewisham, Bexley Heath, Royal Observ., St. John's Wood, St. Pancras, Highgate, Enfield	68·2	63.9	75·7	78·5	67·5	70·1	72·0	72·5	77·5	73·6	69·9	67·7	67·0	64·5	60·3	53·3	53·5	58·3	49·8	46·7	41·8	45·5	47·4	48·1	46·0	44·8

In glancing at the numbers in this Table we perceive that for the most part the temperature at the central stations, has not risen so high during the day as at the outlying stations. The results from Camberwell in this instance, and in all others, show that this station is beyond the influence of the thick atmosphere of London, and that it has enjoyed its full share of high day temperature.

In the last two lines of the Table are given the mean results for all stations, and those derived from the suburban stations only. By comparing the results at the several stations with the numbers in the lower line, it is easy to determine the amount of deficiency of maximum day temperature at the central stations. The results of this comparison are shown in the following Table:—

TABLE XI.—Showing the Defect of London High Day Temperature.

Name of Station.	July 8	July 15	July 22	July 29	August 5	August 12	August 19	August 26	September 2	September 9	September 16	September 23	September 30
	°	°	°	°	°	°	°	°	°	°	°	°	°
Dreadnought	..	..	..	..	..	..	..	..	..	..	+1·0	+2·6	+0·5
Millbank	..	..	..	..	..	..	..	..	..	..	..	−4·1	−1·6
Brompton	..	..	..	..	..	..	..	..	..	..	..	−3·2	−2·9
Board of Health	..	..	..	..	..	..	..	..	..	..	−2·7	−0·8	−3·7
St. Thomas' Hosp.	−1·4	−0·9	−0·9	+1·3	+1·1	−3·0	−0·3	0·0	−2·9	−3·1	−0·9	−1·1	−3·9
Poplar	..	..	..	..	..	..	..	..	..	..	..	+0·3	−0·5
Somerset House	..	..	..	..	..	..	..	..	..	..	+0·1	−2·5	−2·6
St. Giles	..	..	..	..	..	..	..	..	..	..	..	−0·1	−2·4
Chiswell Street	..	..	..	..	..	..	..	..	−0·9	−0·6	−0·5	+0·2	−1·7
St. Mary's Hosp.	−2·5	−0·3	+0·3	+2·3	+0·2	+2·2	−1·1	+0·1	..	+2·9	+2·5	−0·6	+4·3
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	+0·1	+1·7
Means	−2·0	−0·6	−0·3	+1·8	+0·6	−0·4	−0·7	0·0	−1·9	−0·3	−0·1	−0·8	−1·2

Name of Station.	October 7	October 14	October 21	October 28	November 4	November 11	November 18	November 25	December 2	December 9	December 16	December 23	December 30
	°	°	°	°	°	°	°	°	°	°	°	°	°
Dreadnought	−1·0	+1·0	..	..	..	..	..	..	..	..	..	..	..
Millbank	−1·6	−1·3	−0·9	−1·4	−0·2	+0·9	+0·8	+0·2	−0·7	+1·2	−0·5	+2·8	+0·8
Brompton	−3·5	−2·5	−0·9	−2·9	−3·3	−0·6	+0·1	−0·1	−0·8	−0·6	−0·1	..	..
Board of Health	−2·4	−0·7	−1·0	−2·9	−1·7	−2·1	+0·4	−0·8	0·0	−0·7	−0·6	−0·7	−2·4
St. Thomas' Hosp.	−3·1	..	−0·7	−1·4	−0·6	−0·8	+0·2	0·0	−1·6	+0·7	−0·1	+1·5	+2·6
Poplar	−1·2	..	..	..	..	..	..	..	..	..	..	..	..
Somerset House	+0·1	−0·3	+0·5	−0·2	−0·2	+1·8	+3·7	+0·4	+1·4	+2·3	+1·1	+2·0	..
St. Giles	−0·5	−0·1	+0·2	−1·3	+0·1	+0·1	+2·6	..	..	..	..	..	..
Chiswell Street	..	+0·4	+0·6	−0·1	+1·1	..	..	..	..	..	..	..	..
St. Mary's Hosp.	+0·7	+1·8	+0·9	+1·1	+1·9	+0·7	+0·4	+0·8	0·0	+0·8	+0·3	+1·1	+1·6
Bethnal Green	..	−0·4	−1·0	−2·1	−0·3	+0·7	+1·2	+0·1	+0·1	+1·2	+0·4	..	..
Means	−1·4	−0·2	−0·3	−1·2	−0·4	+0·1	+1·3	+0·1	−0·2	+0·7	+0·1	+1·3	+0·6

The signs + and − respectively signify above or below the high day temperature of the suburban districts.

From the preponderance of − over + signs, contained in this Table, it appears that the high day temperature of London has generally been below that of the surrounding districts; nor is this remarkable, the sun's rays having first to penetrate the thick atmosphere which generally overhangs all large towns and cities, but more particularly London, and for this reason the duration of high day temperature is shorter than in the country*. The deficiency, as shown in the foregoing Table, is somewhat less than might have been expected, considering the amount of watery vapour and miscellaneous exhalations which require to be dispersed by the sun light and heat of the day, particularly following cloudy and calm nights, when the atmosphere would necessarily be surcharged with vapour.

The next Table contains the results derived from the minimum thermometers.

* During the months of September and October J. Campbell, Esq., of the Board of Health, kindly furnished me with pieces of black ribbon which he had placed daily in the focus of a spherical lens, at the Board of Health, and which, whenever the sun shone, was marked by a burnt line, or on partially clear days by a series of holes. The duration and time of sunshine was thus shown by this ingenious contrivance of Mr. Campbell's, and would have been highly valuable in this investigation had a similar apparatus been simultaneously in action in the suburban districts.

TABLE XII.—WEEKLY MEANS of NIGHTLY MINIMUM TEMPERATURE.

Name of Station.	Week ending																									
	July				August				September					October				November				December				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	..	..	..	..	..	..	..	..	..	..	53·2	50·3	47·5	48·1	44·0	40·0	38·6	43·1	34·6	35·2	33·1	..	36·1	38·0	..	31·8
Lewisham	51·1	50·1	51·9	53·5	53·8	53·0	49·0	50·7	51·3	45·7	48·2	49·6	42·1	44·5	42·9	41·2	37·0	39·0	34·0	34·3	32·4	32·7	36·2	35·0	33·7	33·9
Royal Observatory	50·8	49·9	52·0	52·1	53·3	52·9	49·9	51·7	53·0	45·2	49·6	49·6	42·8	45·2	43·5	41·7	37·2	41·6	35·9	34·9	32·7	33·7	36·0	37·4	35·6	35·4
Bexley Heath	..	..	..	..	..	..	..	..	51·6	44·7	50·4	51·4	43·7	44·3	44·4	41·3	37·3	41·1	33·5	36·0	31·5	33·5	37·0	35·6	33·2	34·3
Brixton Road	..	..	..	..	..	..	..	..	51·0	46·7	56·5	49·9	41·0	46·0	42·6	40·4	34·3	42·0	34·2	37·7	30·8	..	..	..	..	..
Camberwell	..	..	..	..	..	..	..	..	..	..	50·9	48·6	40·6	43·6	43·9	40·5	36·3	38·5	35·9	..	..	34·8	34·6	36·1	32·2	..
Dreadnought	..	..	..	..	..	..	..	..	..	..	52·6	52·1	44·6	48·2	47·1	44·4	42·1	45·4	39·2	..	..	..	..	..	..	..
Millbank	..	..	..	..	..	..	..	..	..	..	..	52·2	46·6	47·4	45·3	42·2	38·9	43·2	36·0	37·0	35·1	32·6	41·1	37·9	..	34·6
Brompton	..	..	..	..	..	..	..	..	..	..	..	52·9	44·6	49·3	45·4	42·4	37·7	43·1	35·7	37·9	34·6	34·1	37·7	38·9	35·4	..
Board of Health	..	..	..	..	..	..	..	..	..	..	54·4	53·0	46·6	46·7	46·0	42·5	38·8	42·9	37·5	37·8	34·9	34·5	37·7	39·4	35·3	33·2
St. Thomas' Hosp.	53·2	52·3	56·6	58·3	55·1	55·4	54·1	56·3	58·8	52·3	55·2	52·4	44·8	48·5	46·3	42·5	39·9	43·6	37·5	36·7	34·2	34·0	38·3	37·5	34·9	34·0
Poplar	..	..	..	..	..	..	..	..	..	..	55·3	52·7	45·5	46·8	..	..	..	..	..	..	..	..	..	..	..	..
Somerset House	..	..	..	..	..	..	..	..	..	..	..	51·4	46·9	48·0	46·8	41·8	39·8	44·8	37·7	38·0	34·4	34·0	38·9	38·2	33·5	36·1
St. Giles	..	..	..	..	..	..	..	..	..	..	..	53·0	49·7	49·0	48·8	42·8	39·8	45·3	37·3	38·5	..	..	..	..	..	..
Chiswell Street	..	..	..	..	..	..	..	..	62·0	54·6	57·0	53·2	50·4	..	49·3	44·7	41·0	47·6	..	..	..	..	..	..	..	..
St. Mary's Hosp.	53·5	52·1	54·5	57·4	54·7	55·0	51·9	52·9	..	51·1	53·4	53·0	46·3	46·7	44·9	41·9	39·1	44·3	35·6	37·7	35·2	33·1	39·0	37·9	34·8	35·5
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	53·2	43·7	..	44·9	41·0	37·2	42·2	34·8	35·5	33·1	33·9	37·2	38·8	..	..
St. John's Wood	49·8	49·5	50·8	54·0	52·8	51·8	47·8	49·6	53·8	47·9	49·4	..	..	..	..	..	..	..	..	34·9	32·5	29·7	35·6	35·2	31·7	31·4
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	44·1	39·9	39·9	38·3	39·3	42·0	43·7	39·1	37·4	..	..	..	..	..	..
Highgate	..	..	..	..	..	..	..	..	..	..	51·9	49·5	46·6	48·6	45·0	40·0	37·7	41·5	34·2	35·2	32·3	30·4	35·5	35·2	..	32·0
Enfield Vicarage	50·9	49·8	51·1	54·7	54·6	51·2	..	52·6	..	..	45·1	50·6	41·2	43·9	42·6	37·3	..	36·6	32·9	33·8	..	29·6	35·9	34·0	31·6	31·4
Means	51·5	50·6	52·8	55·0	54·0	53·2	50·5	52·3	54·5	48·5	51·9	50·7	44·9	46·4	44·8	41·5	38·6	42·6	36·2	36·5	33·6	32·2	37·1	37·0	33·8	33·6
Means as found from— Sydenham, Lewisham, Royal Observ., Bexley Heath, St. John's Wood, St. Pancras, Highgate, Enfield	50·6	49·8	51·5	53·6	53·6	52·2	48·9	51·1	52·4	45·9	49·7	49·3	43·4	44·9	43·0	40·1	38·1	40·9	35·6	35·1	32·7	32·0	36·1	35·9	33·5	33·1

An inspection of the numbers in this Table shows that at the central stations the night temperatures have been much higher than at the boundary stations. The numbers in the lower line but one, show the mean lowest temperatures of night over the Metropolitan districts, and those in the lowest line of all, the mean night temperature of the stations beyond the influence of London. By comparing the numbers at the central stations with those in the lowest line, the excess of the night temperature of London at the various stations will be found. The results of this comparison are shown in the next Table.

TABLE XIII.—SHOWING the EXCESS of LONDON LOW NIGHT TEMPERATURE.

NAME OF STATION.	WEEK ENDING																									
	JULY				AUGUST				SEPTEMBER					OCTOBER				NOVEMBER				DECEMBER				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Dreadnought -	..	..	..	..	..	..	..	..	..	..	+2·9	+2·8	+1·2	+3·3	+4·1	+4·3	+4·0	+4·5	+3·6	..	..	..	..	..	..	..
Millbank - -	..	..	..	..	..	..	..	..	..	..	..	+2·9	+3·2	+2·5	+2·3	+2·1	+0·8	+2·3	+0·4	+1·9	+2·4	+0·6	+5·0	+2·0	..	+1·5
Brompton - -	..	..	..	..	..	..	..	..	..	..	..	+3·6	+1·2	+4·4	+2·4	+2·3	−0·4	+2·2	+0·1	+2·8	+1·9	+2·1	+1·6	+3·0	+1·9	..
Board of Health -	..	..	..	..	..	..	..	..	..	..	+4·7	+3·7	+3·2	+1·8	+3·0	+2·4	+0·7	+2·0	+1·9	+2·7	+2·2	+2·5	+1·6	+3·5	+1·8	+0·1
St. Thomas' Hosp.	+2·6	+2·5	+5·1	+4·7	+1·5	+3·2	+5·2	+5·2	+6·4	+6·4	+5·5	+3·1	+1·4	+3·6	+3·3	+2·4	+1·8	+2·7	+1·9	+1·6	+1·5	+2·0	+2·2	+1·6	+1·4	+0·9
Poplar - - -	..	..	..	..	..	..	..	..	..	..	+5·6	+3·4	+2·1	+1·9	..	..	..	..	..	..	..	..	..	..	..	..
Somerset House -	..	..	..	..	..	..	..	..	..	..	..	+3·1	+3·5	+3·1	+3·8	+1·7	+1·7	+3·9	+2·1	+2·9	+1·7	+2·0	+2·8	+2·3	0·0	+3·0
St. Giles - -	..	..	..	..	..	..	..	..	..	..	..	+3·7	+6·3	+4·1	+5·8	+2·7	+1·7	+4·4	+1·7	+3·4	..	..	..	..	..	..
Chiswell Street -	..	..	..	..	..	..	..	..	+9·6	+8·7	+7·3	+3·9	+7·0	..	+6·3	+4·6	+2·9	+0·7	..	..	..	..	..	..	..	..
St. Mary's Hosp. -	+2·9	+2·3	+3·0	+3·8	+1·1	+2·8	+3·0	+1·8	..	+5·2	+3·7	+3·7	+2 9	+1·8	+1·9	+1·8	+1·0	+3·4	0·0	+2·6	+2·5	+1·1	+2·9	+2·0	+1·3	+2·4
Bethnal Green -	..	..	..	..	..	..	..	..	..	..	..	+3·9	+0·3	..	+1·9	+0·9	−0·9	+0·3	−0·8	+0·4	+0·4	+1·9	+1·1	+2·9	..	..
Means - -	+2·7	+2·4	+4·0	+4·2	+1·3	+3·0	+4·1	+3·5	+8·0	+6·8	+4·3	+3·4	+2·9	+2·9	+3·5	+2·5	+1·3	+3·2	+1·2	+2·2	+1·6	+1·7	+2·5	+2·5	+1·5	+1·6

From the numbers in this Table it will be seen that London night temperature has been high in every week, that it exceeded that of the suburban districts in September, by quantities ranging from 3° to 8°. The mean excess in each week is shown in the lower line. The mean for the 26 weeks ending December 30, is 3°, showing the average excess of minimum night temperature in London over that of the country.

I have thus determined by actual observation and comparison the excess of night temperature of London over the country and surrounding districts. An equally full determination of the diurnal range of temperature is required. The amount of range was determined daily, and the mean of each week was taken and checked by taking the difference between the numbers in Table X. and in Table XII. The results are contained in the following Table :—

TABLE XIV.—Weekly Means of Daily Range of Temperature.

Name of Station.	Week Ending: July				August				September					October				November				December				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	..	..	..	..	..	..	..	..	..	..	16·2	13·5	15·7	14·3	13·5	11·2	12·4	13·2	13·0	11·3	7·4	..	10·4	10·8	..	10·6
Lewisham	17·6	16·3	25·7	26·7	13·3	18·3	23·7	23·3	27·4	30·6	25·0	17·7	28·1	20·8	17·7	12·8	17·5	20·0	16·0	12·7	9·8	12·5	11·2	14·2	11·6	11·0
Bexley Heath	..	..	..	..	..	..	..	..	22·6	24·9	16·2	19·0	27·6	23·1	18·4	12·4	17·1	19·2	16·7	13·3	11·7	14·5	12·3	13·4	14·6	11·8
Camberwell	..	..	..	..	..	..	..	..	..	..	21·0	20·6	28·2	23·0	19·4	13·6	18·9	21·2	16·2	..	..	14·0	13·7	12·6	14·7	—
Dreadnought	..	..	..	..	..	..	..	..	..	..	18·3	18·2	22·9	15·3	14·2	—	—	—	—	—	—	—	—	—	—	—
Millbank	..	..	..	..	..	..	..	..	..	..	..	11·4	18·8	15·5	13·7	10·2	13·2	14·9	14·7	10·5	6·9	12·2	7·5	9·7	..	11·0
Brompton	..	..	..	..	..	..	..	..	..	..	..	11·6	19·5	11·7	12·4	10·0	12·9	11·9	13·5	10·9	7·1	10·6	9·1	9·1	—	—
Board of Health	..	..	..	..	..	..	..	..	..	..	12·8	13·9	16·7	15·4	13·6	10·0	12·1	13·7	10·2	9·3	6·1	11·0	9·0	8·1	10·0	8·2
St. Thomas's Hosp.	13·6	13·1	20·2	21·5	13·5	11·7	17·6	16·2	23·8	18·2	13·8	14·2	18·3	12·9	..	10·1	12·2	14·1	11·5	10·2	7·6	9·9	9·8	10·5	12·6	13·4
Poplar	..	..	..	..	..	..	..	..	..	..	..	15·3	21·0	16·5	—	—	—	—	—	—	—	—	—	—	—	—
Somerset House	..	..	..	..	..	..	..	..	..	..	..	13·8	17·5	16·6	13·2	12·0	13·5	13·3	13·9	12·4	7·8	12·9	10·8	11·0	14·5	—
St. Giles	..	..	..	..	..	..	..	..	..	..	..	14·6	14·9	15·0	11·4	10·7	12·4	13·1	12·6	10·8	—	—	—	—	—	—
Chiswell Street	..	..	..	..	..	..	..	..	14·6	18·4	12·4	14·7	14·9	..	11·4	9·2	11·6	11·8	—	—	—	—	—	—	—	—
St. Mary's Hosp.	12·2	13·9	21·5	23·4	13·0	17·3	19·0	19·7	..	25·4	19·0	14·1	25·0	18·5	17·2	12·3	15·5	15·9	14·9	9·4	7·4	12·4	9·2	10·5	12·3	10·9
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	14·6	25·0	..	15·0	12·2	14·2	15·8	15·7	12·4	8·8	11·6	11·4	9·7	—	—
St. John's Wood	17·8	17·1	25·4	23·5	13·8	19·3	23·3	22·3	23·4	24·4	21·4	..	..	..	..	..	..	..	..	12·2	9·3	15·8	11·7	12·8	15·1	14·1
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	21·5	22·8	23·8	20·0	12·7	9·7	12·6	10·6	10·0	—	—	—	—	—	—
Highgate	..	..	..	..	..	..	..	..	..	..	17·2	21·9	23·0	16·9	17·5	16·9	19·6	18·5	16·7	11·3	9·6	15·6	13·0	12·7	..	14·9
Royal Observatory	17·7	17·3	24·9	27·8	15·1	19·6	22·4	22·5	26·8	30·9	23·9	18·8	27·5	18·3	17·7	12·5	17·9	18·6	14·6	12·6	10·0	11·1	11·4	11·5	11·2	9·9
Enfield Vicarage	17·0	15·3	21·2	21·8	13·2	14·3	..	17·5	..	..	22·8	16·3	22·5	19·8	16·3	13·8	..	18·5	16·2	11·8	..	13·8	9·2	11·1	12·5	12·7
Means	16·0	15·5	23·1	24·1	13·7	16·8	21·0	20·2	23·1	24·7	18·4	16·1	21·6	19·4	15·4	11·9	14·4	15·7	13·0	11·4	8·3	12·7	10·6	11·2	12·9	11·7
Means as found from:— Sydenham, Lewisham, Royal Observ., Bexley Heath, St. John's Wood, St. Pancras, Highgate, Enfield	17·6	16·5	24·2	24·9	13·9	17·9	23·1	21·4	25·1	27·7	20·2	18·4	23·6	19·6	17·3	13·2	15·4	17·2	14·2	11·6	9·1	13·5	11·2	12·3	12·5	11·8

The results contained in this Table possess great interest in connexion with the climate of London; we learn from them, that in every week the range of temperature within twenty-four hours, has been from 2° to 10° less than the range in the country. Till September 2, the stations are all outlying, but in this week the results from Chiswell Street are included, and exhibit a range the half only of the other stations; in the weeks from September 9, the results are from a greater number of stations, and the same general fact of much smaller range at the central stations are shown week by week. To determine its amount, the difference between the individual numbers and those in the last line of the Table are shown as follows:—

TABLE XV.—SHOWING the LESS DAILY RANGE of TEMPERATURE in LONDON.

NAME OF STATION.	WEEK ENDING																									
	JULY				AUGUST				SEPTEMBER					OCTOBER				NOVEMBER				DECEMBER				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Dreadnought	..	..	..	..	..	..	..	..	..	..	−1·9	−0·2	−0·7	−4·3	−3·1	..	..	..	..	..	..	..	..	..	..	..
Millbank	..	..	..	..	..	..	..	..	..	..	..	−7·0	−4·8	−4·1	3·6	−3·0	−2·2	−2·2	+0·5	−1·1	−2·2	−1·3	−3·7	−2·6	..	−0·8
Brompton	..	..	..	..	..	..	..	..	..	..	..	−6·8	−4·1	−7·9	−4·9	−3·2	−2·5	−5·2	−0·7	−0·7	−2·0	−2·9	−2·1	−3·2	..	..
Board of Health	..	..	..	..	..	..	..	..	..	..	−7·4	−4·5	−6·9	−4·2	−3·7	−3·2	−3·3	−3·4	−4·0	−2·3	−3·0	−2·5	−2·2	−4·2	−2·5	−3·6
St. Thomas' Hosp.	−4·0	−3·4	−4·0	−3·4	−0·4	−6·2	−5·5	−5·2	− 1·3	−0·5	−6·4	−4·2	−5·3	−6·7	..	−3·1	−3·2	−3·0	−2·7	−1·4	−1·5	−3·6	−1·4	−1·8	+0·1	+1·6
Poplar	..	..	..	..	..	..	..	..	..	..	..	−3·1	−2·6	−3·1	..	..	..	..	..	..	..	..	..	..	..	..
Somerset House	..	..	..	..	..	..	..	..	..	..	..	−4·6	−6·1	−3·0	−4·1	−1·2	−1·9	−3·8	−0·3	+0·8	−1·3	−0·6	−0·4	−1·3	+2·0	..
St. Giles	..	..	..	..	..	..	..	..	..	..	..	−3·8	−8·7	−4·6	−5·9	−2·5	−3·0	−4·0	−1·6	−0·8	..	..	..	..	..	..
Chiswell Street	..	..	..	..	..	..	..	..	−10·5	−9·3	−7·8	−3·7	−8·7	..	−5·9	−4·0	−3·8	−5·3	..	..	..	..	..	..	..	..
St. Mary's Hosp.	−5·4	−2·6	−2·7	−1·5	−0·9	−0·6	−4·1	−1·7	..	−2·3	−1·2	−4·3	+1·4	−1·1	−0·1	−0·9	+0·1	−1·2	+0·7	−2·2	−1·7	−1·1	−2·0	−1·8	−0·2	−0·9
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	−3·8	+1·4	..	−2·3	−1·0	−1·3	−1·3	+1·5	+0·8	−0·3	−1·9	+0·2	−2·6	..	..
Means	−4·7	−3·0	−3·4	−2·5	−0·7	−3·4	−4·8	−3·5	− 5·9	−7·0	−5·0	−4·2	−4·1	−4·3	−4·5	−2·4	−2·3	−3·3	−0·8	−0·7	−1·7	−2·0	−1·7	−2·5	−0·2	−0·9

The prevalence of − over + signs in this Table establishes the fact of less daily range of temperature in London than in the country, and the numbers show that this deficiency is at times very great. The largest numbers appear in the several weeks in September. The numbers in the lower line show the mean less daily range of temperature in each week in London. The mean for the twenty-six ending December 30, is 3·1°.

It would be interesting to compare daily the minima readings and daily ranges of temperature at the river side and central stations with those at the boundary stations; but to exhibit such here in detail, would occupy more space than can be devoted to the investigation.

In a special inquiry, however, of this nature, it is necessary to enter somewhat more fully into results which exhibit large local irregularities, in preference to those in which small differences alone are found to exist.

In looking over Tables X. and XII., it will be seen that the results from St. Thomas's Hospital are in close agreement with those at the central stations, and this station has the advantage of continuous results. Confining ourselves, therefore, to this as the representative of the central stations, and of Lewisham as the representative of the boundary stations, we have the results shown on the following Table:—

TABLE XVI.—Showing the Lowest Temperature of the Air for every Day from July to Dec. 31, and the Daily Ranges of Temperature at Lewisham and St. Thomas's Hospital for the same Period.

1851. — Month and Date.	Temperature of the Air. Lowest at Night. Lewisham.	Temperature of the Air. Lowest at Night. St. Thomas's Hospital.	Excess at St. Thomas's Hospital.	Range of Temperature in the Day. Lewisham.	Range of Temperature in the Day. St. Thomas's Hospital.	Excess at St. Thomas's Hospital.	General Remarks. Boundary Stations.	General Remarks. Central Stations.
July 1	51°·5	53°·0	+ 1°·5	11°·5	9°·2	− 2°·3	Overcast all day; frequent rain	Misty; rain overcast.
2	50·0	52·5	+ 2·5	19·6	11·0	− 8·6	Sky almost covered with cloud	Overcast; light showers.
3	54·5	55·7	+ 1·2	17·4	10·8	− 6·6	Rain in morning; sky cloudy	Misty showers of rain; partially overcast.
4	56·0	57·6	+ 1·6	16·2	14·9	− 1·3	Sky cloudy in morning; rain in afternoon	Sky overcast; showers of rain in afternoon.
5	49·8	51·9	+ 2·1	18·1	17·4	− 0·7	Partially cloudy in morning; showers in afternoon	Partially overcast; showers.
6	50·3	52·4	+ 2·1	15·6	15·9	+ 0·3	Sky cloudy all day; occasional rain	Overcast; occasional rain.
7	44·9	50·2	+ 5·3	21·2	15·9	− 5·3	Morning overcast; afternoon partially cloudy; rain	Overcast in morning; light rain.
8	51·9	51·9	0·0	15·6	9·7	− 5·9	Sky nearly covered with cloud; showers in morning	Thick rain in morning; afternoon overcast.
9	47·8	51·8	+ 4·0	19·2	17·7	− 1·5	Overcast: lightning, thunder, and showers in afternoon	Morning slightly overcast; rain in afternoon.
10	48·9	54·2	+ 5·3	21·0	16·1	− 4·9	Overcast all day; rain frequently	Clear sky in morning; showers.
11	50·5	49·8	− 0·7	15·6	13·9	− 1·7	Morning overcast; afternoon cloudy and hazy	Misty in morning; afternoon overcast.
12	50·4	51·8	+ 1·4	6·8	3·1	− 3·7	Overcast all day; occasional rain	Morning overcast; heavy rain.
13	48·7	50·8	+ 2·1	19·1	9·7	− 9·4	Morning overcast; afternoon partially cloudy	Overcast all the day.
14	50·0	52·5	+ 2·5	15·2	13·7	− 1·5	Overcast all day; frequent mizzling rain	Misty rain all day.
15	54·3	55·4	+ 1·1	17·2	8·3	− 8·9	Morning overcast; afternoon fine; showers	Morning partially overcast; heavy rain.
16	51·0	54·3	+ 3·3	25·0	18·2	− 6·8	A fine day; sky tolerably clear	Partially overcast.
17	54·2	56·0	+ 1·8	17·2	14·1	− 3·1	Overcast till noon; light clouds in afternoon	Morning overcast; light rain in afternoon.
18	53·1	56·1	+ 3·0	21·8	20·9	− 0·9	A fine day; sky free from cloud	Sky clear all day.
19	50·9	55·2	+ 4·3	26·1	23·1	− 3·0	Cloudy, but fine day; evening cloudless	Partially overcast.
20	52·0	57·4	+ 5·4	25·8	18·8	− 7·0	Fine day; sky partially covered	Morning clear, afterwards sky overcast.
21	50·4	57·3	+ 6·9	31·2	15·5	−15·7	Thick haze in morning, fine, sky clear	Clear sky all day.
22	51·9	59·6	+ 7·7	32·4	25·9	− 6·5	Very fine day; cloudless	Clear sky all day.
23	51·0	61·4	+10·4	38·0	25·6	−12·4	The sky was clear throughout the day	Sky free from cloud.
24	54·3	61·8	+ 7·5	29·7	23·9	− 5·8	Morning clear; afternoon partially cloudy	Sky clear all the day.
25	58·9	63·6	+ 4·7	29·9	23·3	− 6·6	A fine day; clear sky	Clear sky in morning; afternoon hazy.
26	58·2	60·3	+ 2·1	17·5	16·9	− 0·6	Sky clear till noon; cloudy in afternoon	Morning overcast; hazy; heavy rain.
27	55·9	56·2	+ 0·3	16·6	8·6	− 8·0	Overcast all day; rain at night	Overcast all day; rain at night.
28	52·5	54·0	+ 1·5	21·0	12·9	− 8·1	Sky partially cloudy; night clear	Partially overcast all day.
29	43·4	50·9	+ 7·5	34·4	19·1	−15·3	Hazy; cloudy; evening clear	Sky nearly overcast; rain.
30	56·3	58·0	+ 1·7	25·3	13·3	−12·0	Fine; sky partially cloudy	Overcast: thunderstorm in afternoon.
31	58·0	60·8	+ 2·8	18·1	15·9	− 2·2	Morning overcast; afternoon partially clear	Showers; overcast in morning; afternoon rain.
Means -	52·0	55·3	+ 3·3	21·2	15·6	− 5·6		
August 1	58·1	55·4	− 2·7	11·3	17·8	+ 6·5	Morning overcast; afternoon partially cloudy; rain	Morning partially overcast; rain.
2	49·2	53·4	+ 4·2	21·3	17·9	− 3·4	Morning fine; afternoon overcast; rain	Slightly overcast; rain.
3	54·5	55·1	+ 0·6	4·5	8·1	+ 3·6	Overcast all day: occasional rain	Rain; thunder.
4	49·3	50·8	+ 1·5	5·7	8·0	+ 2·3	Overcast; drizzling rain generally	Continued rain all day and during night.
5	51·5	51·9	+ 0·4	6·5	4·0	− 2·5	Overcast all day; rain	Overcast all day.
6	51·2	51·6	+ 0·4	17·2	5·9	−11·3	Morning overcast: afternoon fine and clear	Morning overcast: afternoon partially cloudy.
7	54·5	53·9	− 0·6	12·1	10·2	− 1·9	Fine; sky overcast till evening	Sky overcast all day.
8	49·2	53·1	+ 3·9	23·5	12·1	−11·4	A fine day; sky partially cloudy	Fine; sky partially overcast.
9	51·4	55·9	+ 4·5	18·6	13·0	− 5·6	Alternately overcast and clear; fine day	Partially cloudy; light showers.
10	55·0	57·8	+ 2·8	20·5	12·1	− 8·4	Overcast till noon; clear afterwards; fine	Sky partially overcast all day.
11	52·5	55·8	+ 3·3	23·1	15·7	− 7·4	Morning cloudless; partially cloudy afterwards	Sky clear in morning; afternoon partially cloudy.
12	57·3	59·8	+ 2·5	12·9	12·5	− 0·4	Overcast till afternoon; clear after; fine day	Partially cloudy all day.
13	51·5	56·5	+ 5·0	29·0	15·7	−13·3	Fine day; sky partially cloudy	Morning foggy; sky tolerably clear.
14	56·7	62·2	+ 5·5	20·4	15·9	− 4·5	Cloudy all day; evening clear; fine	Sky partially overcast.
15	50·4	55·0	+ 4·6	19·4	13·3	− 6·1	Partially cloudy till noon; rain	Morning clear; afterwards overcast and stormy.
16	48·0	52·9	+ 4·9	21·0	17·3	− 3·7	Overcast till afternoon; misty	Clear sky; afterwards cloudy.
17	45·0	50·0	+ 5·0	20·2	17·6	− 2·6	Morning fine but hazy; occasional rain	Sky partially overcast; showers.
18	43·2	48·6	+ 5·4	25·8	15·6	−10·2	Morning overcast; afterwards clear and fine	Sky partially overcast all day.
19	48·2	53·8	+ 5·6	29·9	17·7	−12·2	Sky partially covered with cloud	Fine day; light clouds.
20	56·0	58·8	+ 2·8	22·5	16·7	− 5·8	Light rain during morning; evening clear	Morning overcast and showery; afterwards cloudy.
21	53·9	56·9	+ 3·0	22·1	17·9	− 4·2	Dull day; sky partially covered	Overcast all day; light showers.
22	50·0	53·5	+ 3·5	22·5	16·0	− 6·5	Few clouds till evening, when clear	Morning partially overcast.
23	47·0	52·0	+ 5·0	25·0	19·8	− 5·2	Morning clear; a moderately fine day	Overcast all day: rain in evening.
24	54·0	56·8	+ 2·8	18·5	14·5	− 4·0	Sky partially covered; clear night	Morning nearly clear sky; afterwards partially overcast.
25	51·0	54·4	+ 3·4	20·0	19·9	− 0·1	Sky partially cloudy; evening clear; misty	Fine; nearly cloudless all day.
26	43·0	51·4	+ 8·4	32·5	18·9	−13·6	Misty atmosphere; sky tolerably clear	Sky partially overcast all day.
27	52·0	59·9	+ 7·9	24·0	11·1	−12·9	Mist till 10h: cloudy but fine all day	Partially overcast.
28	60·5	65·8	+ 5·3	22·5	8·2	−14·3	Cloudy: a fine day	Fair day; lightning during night.
29	51·0	56·4	+ 5·4	31·8	21·1	−10·7	A very fine day; cloudless	Few clouds; thick hazy fog in evening.
30	51·5	60·4	+ 8·9	31·7	15·9	−15·8	Cloudless; a very fine day	Very fine day.
31	53·5	62·1	+ 8·6	20·5	18·3	− 2·2	Cloudy but fine; hazy	Overcast; hazy.
Means -	51·7	55·5	+ 3·8	20·5	14·5	− 6·0		
Sept. 1	44·2	50·7	+ 6·5	29·0	22·2	− 6·8	Fine day; almost cloudless; hazy	Fine day; hazy.
2	44·5	51·0	+ 6·5	32·3	19·0	−13·3	Fine day; few clouds; hazy	Fine; hazy; fog in the distance.
3	43·3	52·0	+ 8·7	36·7	18·1	−18·6	Fog in morning; day very fine	Fog in morning; a fine day, but hazy.
4	45·1	51·5	+ 6·4	37·1	21·5	−15·6	Thick fog in morning; very fine day	Fog in morning; hazy horizon during the day.
5	44·9	50·5	+ 5·6	26·3	23·7	− 2·6	Fog in morning; a few clouds; clear at night	Sky generally overcast; thick atmosphere.
6	41·2	51·2	+ 7·0	32·4	19·0	−13·4	Very fine day; cloudless sky	Morning overcast, but fine in afternoon.
7	44·1	53·3	+ 9·2	35·0	17·1	−17·9	A few clouds; fine day; hazy	Fog in morning: afternoon overcast: hazy.
8	48·3	51·6	+ 3·3	22·4	20·4	− 2·0	Fine day; partially cloudy sky; horizon visible 12 to 14 miles.	Clear atmosphere; a fine day.
9	49·8	52·9	+ 3·1	24·2	11·0	−13·2	A fine day; sky tolerably clear; haze; horizon invisible	Fog; light rain; partially overcast.
10	40·5	49·3	+ 8·8	29·7	15·2	−14·5	Cloudy sky; hazy all day; horizon hazy	Sky cloudy; fair and fine.
11	40·1	47·9	+ 7·8	33·8	15·9	−17·9	Fog till noon; sky clear; haze	Morning foggy; fine day; sky cloudless.
12	37·9	47·0	+ 9·1	43·7	24·5	−19·2	Morning foggy; atmosphere hazy; few clouds; objects invisible half a mile off.	Fog; sky cloudless.
13	52·8	61·8	+ 9·0	19·1	14·1	− 5·0	Overcast all day; light rain occasionally; haze on ground half a mile distant.	Overcast; hazy; rain.
14	54·0	59·9	+ 5·9	18.9	10·0	− 8·9	Overcast and hazy; rain; objects visible 3 or 4 miles distant	Overcast; thick and hazy; showers.
15	53·3	54·3	+ 1·0	18.3	13·9	− 4·4	Overcast all day; atmosphere oppressive; rain; hazy beyond a mile distant.	Cloudy; air oppressive; showers.

TABLE XVI.—Showing the Lowest Temperature of the Air for every Day from July 1 to December 31, &c.—*cont.*

1854. — Month and Day.	Temperature of the Air. Lowest at Night. Lewisham.	Temperature of the Air. Lowest at Night. St. Thomas's Hospital.	Excess at St Thomas's Hospital.	Range of Temperature in the Day. Lewisham.	Range of Temperature in the Day. St. Thomas's Hospital.	Excess at St. Thomas's Hospital.	General Remarks. Boundary Stations.	General Remarks. Central Stations.
Sept. 16	59°·1	61°·0	+ 1°·9	13°·0	9°·1	− 3°·9	Partially cloudy; thin rain at intervals; horizon invisible a mile off.	Overcast; mizzling rain at intervals.
17	53·0	56·2	+ 3·2	21·0	15·3	− 5·7	Cloudy, with partial sunshine	Partially overcast all day.
18	50·6	53·2	+ 2·6	18·0	17·7	− 0·3	Cloudy sky; hazy	Morning fine; afternoon overcast; showers.
19	58·5	57·4	− 1·1	12·5	10·1	− 2·4	Slight sunshine; cloudy, but fine; fog; objects invisible beyond a mile.	Morning overcast; afternoon cloudy; rain.
20	50·0	52·3	+ 2·3	21·0	15·9	− 5·1	Overcast, with occasional sunshine; rain	Overcast; rain.
21	46·0	48·2	+ 2·2	17·4	16·1	− 1·3	Sunshine; sky cloudy; fine: slight haze on landscape visible at 5 or 6 miles distant.	Cloudless, afterwards overcast; showers.
22	40·6	45·1	+ 4·5	20·6	16·5	− 4·1	Sky clear; slight haze; evening clear	Morning cloudless and hazy; showers.
23	48·7	49·6	+ 0·9	13·4	9·4	− 4·0	Overcast all day; haze prevalent	Overcast all day; showers.
24	51·0	53·2	− 0·8	15·5	10·3	− 5·2	A few clouds; hazy in distance; showers	Sky generally clear; fair day.
25	42·8	46·4	+ 3·6	20·4	20·6	+ 0·2	Sunshine; almost cloudless; distance hazy	Haze in morning; sky tolerably clear.
26	39·6	46·4	+ 6·8	28·6	10·4	−18·2	Sunshine; few clouds; haze prevalent	Thick fog in morning and afternoon; cloudless.
27	40·0	46·7	+ 6·7	32·6	15·5	−17·1	Fog till 10; cloudless all day; haze over distance	Fog prevalent; cloudless all day.
28	41·4	48·6	+ 7·2	31·6	17·4	−14·2	Thin fog in morning; cloudless; haze prevalent	Fog in morning; cloudless.
29	37·2	45·7	+ 8·5	35·2	19·9	−15·3	Cloudless; haze prevalent all day	Cloudless; fog and haze prevalent.
30	39·8	46·5	+ 6·7	32·4	14·1	−18·3	Foggy; sky cloudless; distance hazy	Fog and haze prevalent; cloudless.
Means	46·3	51·5	+ 5·2	25·6	16·0	− 9·6		
October 1	40·2	49·0	+ 8·8	27·0	13·8	−13·2	Dense white fog, afternoon clear; haze	Foggy; afternoon clear.
2	39·0	45·0	+ 6·0	33·2	13·5	−19·7	Fog prevalent, evening clear; haze	Fog in morning; afternoon cloudless.
3	41·9	48·1	+ 3·2	20·2	12·7	− 7·5	Sunshine; cloudless; white haze	Cloudy morning; afternoon partially cloudy.
4	38·6	45·0	+ 6·4	24·4	15·8	− 8·6	Partially cloudy day; misty	Cloudy day, but fine.
5	49·4	52·7	+ 3·3	21·0	11·3	− 9·7	Sunshine; a fine day; sky cloudy	Fair day: afternoon cloudy.
6	51·9	53·0	+ 1·1	7·1	4·5	− 2·6	Haze; drizzling rain all day	Overcast and rain.
7	46·7	46·5	− 0·2	13·2	11·0	− 2·2	Sky covered with cloud	Fair; partially overcast.
8	47·5	47·5	0·0	15·3	9·4	− 5·9	Sunshine; fine day; sky overcast during evening	Fine day; sky clear.
9	52·1	52·1	0·0	16·9	5·9	−11·0	Overcast all day; hazy	Partially overcast; haze prevalent.
10	47·8	50·4	+ 2·6	17·3	10·8	− 6·5	Cloudy, with partial sunshine; hazy	Foggy; light clouds.
11	52·1	50·5	− 1·6	8·4	8·5	+ 0·1	Sunshine; sky nearly cloudless	Fair; clear sky in afternoon.
12	36·5	43·0	+ 6·5	23·5	16·4	− 7·1	Sky cloudless all day	Clear sky; slight haze; foggy.
13	32·7	37·0	+ 4·3	19·8	17·9	− 1·9	Morning foggy and overcast; evening clear	Foggy; sky nearly clear; hazy.
14	37·6	43·4	+ 5·8	16·4	8·6	− 7·8	Overcast all day; fog in evening	Thick haze prevalent; fog.
15	48·5	48·5	0·0	5·2	5·5	+ 0·3	Sky overcast; dull and misty	Fog; sky overcast; showers.

1854. — Month and Day.	Temperature of the Air. Lowest at Night. Lewisham.	Temperature of the Air. Lowest at Night. St. Thomas's Hospital.	Excess at St Thomas's Hospital.	Range of Temperature in the Day. Lewisham.	Range of Temperature in the Day. St. Thomas's Hospital.	Excess at St. Thomas's Hospital.	General Remarks. Boundary Stations.	General Remarks. Central Stations.
16	43·5	43·0	− 0·5	10·5	10·2	− 0·3	Morning clear; afternoon light clouds	Partially overcast; haze.
17	33·1	38·5	+ 5·4	21·1	14·0	− 7·1	Overcast and damp all day	Overcast all day; showers.
18	43·8	43·2	− 0·6	8·4	8·2	− 0·2	Overcast all day; foggy	Cloudy; slight rain; thick haze.
19	36·7	37·9	+ 1·2	14·8	13·1	− 1·7	A fine day; sunshine; nearly cloudless	Fair; sky partially cloudy.
20	40·6	43·3	+ 2·7	16·3	9·8	− 6·5	Day clear; thin haze: few clouds	Partially overcast; sunshine; showers.
21	43·3	43·2	− 0·1	13·0	9·8	− 3·2	A fine day; few clouds	Fine day: cloudy; slight haze.
22	47·3	47·0	− 0·3	11·8	7·5	− 4·3	Sunshine; a bright day; partially cloudy	Cloudy all day; showers.
23	37·0	42·9	+ 5·9	20·1	12·9	− 7·2	Sunshine till noon; hail and rain in afternoon	Overcast; rain; haze.
24	36·0	37·4	+ 1·4	19·0	15·7	− 3·3	Morning fine and clear; haze and rain afterwards	Morning clear; rain and slight haze.
25	39·6	40·9	+ 1·3	8·2	10·0	+ 1·8	Overcast all day; haze and rain	Morning foggy; rain in afternoon.
26	34·7	36·3	+ 1·6	19·4	11·1	− 8·3	Sunshine; rain in afternoon; hazy	Morning clear; showers in afternoon.
27	29·7	34·0	+ 4·3	28·0	14·5	−13·5	Very fine day; sky bright and clear	Morning foggy; afternoon clear; thick haze.
28	34·4	41·0	+ 6·6	18·1	13·5	− 4.6	Sunshine; few clouds; white haze	Light clouds in morning; overcast afterwards.
29	34·5	39·5	+ 5·0	24·6	14·5	−10·1	A fine day; few clouds in evening	Morning clear; few clouds in afternoon.
30	39·1	44·1	+ 5·0	27·2	9·9	−17·3	Fog in morning; a fine day; clear sky	Thin fog in morning; a fine day.
31	46·0	49·2	+ 3·2	21·2	11·8	− 9·4	Fine and bright all day; haze	Few clouds all day; slight haze.
Means	41·4	44·3	+ 2·9	18·0	11·4	− 6·6		
Nov. 1	37·0	44·6	+ 7·6	25·1	19·1	− 6·0	Cloudless all day; haze and mist in evening	Morning foggy; fine: evening hazy.
2	41·3	45·1	+ 3·8	17·7	17·3	− 0·4	Overcast and fog in morning; haze and mist	Fog and haze in morning; partially overcast.
3	39·3	44·3	+ 5·0	12·2	10·3	− 1·9	Clear; sunshine; haze prevalent	Fine day; few light clouds.
4	35·6	38·3	+ 2·7	16·4	12·3	− 4·1	Sky partially covered; haze and thin rain	Hazy and cloudy all day; rain in evening.
5	40·5	43·5	+ 3·0	16·0	11·0	− 5·0	Cloudy all day; hazy	Morning overcast; afternoon clear.
6	36·0	40·1	+ 4·1	16·5	14·2	− 2·3	Sky clear all day; fog at night	Fine day; sky clear; hazy.
7	31·0	35·8	+ 4·8	19·5	13·4	− 6·1	Sky partially covered; fog and haze prevalent	Fog in morning; overcast.
8	35·2	38·1	+ 2·9	15·3	8·7	− 6·6	Sky cloudy; fog and haze prevalent	Overcast and hazy all day.
9	34·4	35·1	+ 0·7	10·6	9·4	− 1·2	Clear sky; sunshine; rain in afternoon	Very fine day; few clouds.
10	27·5	29·5	+ 2·0	18·5	14·0	− 4·5	Sky generally overcast all day	Overcast all day; light fog and haze.
11	33·3	36·5	+ 3·2	15·7	13·0	− 2·7	Cloudy sky; sunshine; rain in evening	Overcast; thick atmosphere; haze.
12	35·5	—	—	10·7	—	—	Haze in morning; afternoon clear	Haze prevalent; fine, but cloudy.
13	28·9	32·0	+ 3·1	19·1	12·3	− 6·8	Cloudy all day; afternoon misty	Fog in morning, afternoon clear.
14	35·0	38·1	+ 3·1	7·2	8·8	+ 1·6	Fog in morning; cloudy; rain	Sky overcast; rain.
15	31·9	33·3	+ 1·4	20·1	13·9	− 6·2	Overcast, and fog during morning; rain	Overcast all day; rain.
16	37·0	40·2	+ 3·2	15·0	7·8	− 7·2	Overcast all day; rain and fog prevalent	Mist; sky partially covered; slight rain.
17	33·8	37·3	+ 3·5	12·7	10·9	− 1·8	Sky overcast; rain	Fog in morning; overcast; rain.
18	38·3	39·1	+ 0·8	5·9	7·4	+ 1·5	Sky partially cloudy all day	Cloudy during morning; afternoon fine.
19	34·5	36·6	+ 2·1	8·7	6·9	− 1·8	Morning cloudy; afternoon sunshine, fine	Haze prevalent all day.
20	34·7	35·0	+ 0·3	7·5	8·3	+ 0·8	Overcast all day; rain and sleet at noon	Fine day; haze prevalent.
21	35·4	36·1	+ 0·7	8·8	5·5	− 3·3	Overcast all day: rain occasionally	Sky partially covered; rain in afternoon.
22	33·2	35·1	+ 1·9	10·8	8·4	− 2·4	Clear till 10; overcast afterwards	Fine day; haze.
23	30·4	32·0	+ 1·6	7·1	8·8	+ 1·7	Sunshine till 11; fog and sky overcast afterwards	Overcast; fog and haze.
24	27·5	32·1	+ 4·6	15·7	7·1	− 8·6	Overcast all the day; mist falling	Fine; haze; rain.
25	31·4	32·5	+ 1·1	9·6	8·0	− 1·6	Overcast all day; occasional slight rain; haze	Overcast all day; haze; rain.
26	30·2	29·9	− 0·3	9·2	10·2	+ 1·0	Fine till noon; overcast afterwards	Morning very fine; afternoon partially overcast.
27	26·5	27·8	+ 1·3	13·8	9·4	− 4·4	Cloudless; fog prevalent all day; snow in afternoon	Fog and hoar frost; snow in afternoon.
28	26·6	28·9	+ 2·3	11·4	11·6	+ 0·2	Overcast all the day; rain in evening	Overcast all day; rain in afternoon.
29	39·0	37·6	− 1·4	10·0	9·4	− 0·6	Morning clear; afternoon cloudy and rain	Morning nearly cloudless; high wind.
30	33·8	39·5	+ 5·7	10·2	8·5	− 1·7	Morning cloudless; rain in afternoon; fog	Morning nearly cloudless; afternoon overcast.
Means	33·3	36·7	+3·4	14·2	10·3	− 3·9		

TABLE XVI.—Showing the Lowest Temperature of the Air for every Day from July 1 to December 31, &c.—*cont.*

1854. — Month and Day.		Temperature of the Air. Lowest at Night. Lewisham.	Temperature of the Air. Lowest at Night. St. Thomas's Hospital.	Excess at St. Thomas's Hospital.	Range of Temperature in the Day. Lewisham.	Range of Temperature in the Day. St. Thomas's Hospital.	Excess at St. Thomas's Hospital.	General Remarks. Boundary Stations.	General Remarks. Central Stations.
Dec.	1	38°·7	38°·4	− 0°·3	12°·3	10°·2	− 2°·1	Morning cloudless; afternoon cloudy	Partially overcast all day; mist.
	2	34·3	35·6	+ 1·3	10·7	10·2	− 0·5	Fine day; partially cloudy; faint sunshine	Partially overcast all day; clear.
	3	37·2	37·1	− 0·1	12·6	9·9	− 2·7	Overcast till evening, clear afterwards	Partially overcast; clear.
	4	41·7	41·3	− 0·4	8·5	7·3	− 1·2	A fine day; cloudless till evening	Partially overcast; clear and bright.
	5	41·5	46·0	+ 4·5	8·5	4·2	− 4·3	Sky partially cloudy all day	Morning clear; afternoon overcast, and rain.
	6	34·3	35·6	+ 1·3	11·2	15·6	+ 4·4	A fine day; amount of cloud variable	Sky partially overcast; morning clear; afternoon hazy.
	7	31·8	34·5	− 0·3	7·2	10·1	+ 2·9	Sky mostly cloudless; thick haze prevalent	Clear sky; and haze prevalent all day.
	8	28·5	32·4	+ 3·9	21·0	13·6	− 7·4	Sky cloudy all day; rain	Overcast, and mist all day.
	9	35·3	40·8	+ 5·5	9·7	8·5	− 1·2	Morning cloudy; afternoon clear; haze	Light clouds; mist; afternoon clear; haze in distance.
	10	30·0	31·2	+ 1·2	10·0	12·4	+ 2·4	Clear; sky cloudless; haze at a distance	Light clouds all day; mist and haze.
	11	24·5	27.5	+ 3·0	20·4	11·0	− 9·4	Day cloudless; evening overcast; haze	Morning, clear sky and hoar frost; afternoon, overcast.
	12	27·6	35·2	+ 7·6	17·9	9·4	− 8·5	A fine day; sky cloudless; haze in distance	Very fine day; clear sky; mist.
	13	34·7	35·2	+ 0·5	17·3	10·4	− 6·9	A dull day; sky overcast; haze in distance	Morning foggy; afternoon overcast; mist and haze.
	14	45·6	41·3	− 4·3	9·2	13·0	+ 3·8	Overcast till evening; clear afterwards: haze	Overcast; haze prevalent.
	15	44·5	48·3	+ 3·8	9·5	7·1	− 2·4	A fine day; sky partially cloudy; haze prevalent	Sky partially cloudy; morning clear and bright.
	16	38·0	43·8	+ 5·8	15·0	10·8	− 4·2	Cloudy sky; haze prevalent; evening clear	Partially overcast; mist; and haze.
	17	31·0	34·5	+ 3·5	13·0	14·5	+ 1·5	Sky clear till noon; overcast afterwards	Morning fine; afternoon cloudy.
	18	32·8	37·2	+ 4·4	12·0	10·8	− 1·2	Morning overcast and showery: afternoon cloudy	Rain in morning; afternoon fine; haze.
	19	31·8	31·6	− 0·2	10·2	9·8	− 0·4	Morning clear; afternoon cloudy, and thin fog	Fine day; partially overcast; haze.
	20	34·1	32·7	− 1·4	8·9	10·7	+ 1·8	Morning overcast and rain; evening nearly cloudless	Overcast all day; rain.
	21	28·0	31·2	+ 3·2	14·5	13·4	− 1·1	Sky overcast; frequent showers of rain	Foggy: overcast all day; rain.
	22	41·0	36·2	− 4·8	13·2	17·2	+ 4·0	Sky overcast throughout the day; strong wind	Overcast throughout the day; mist and haze.
	23	37·0	40·8	+ 3·8	9·4	13·2	+ 3·8	Sky partially cloudy all day; rain in evening	Fine day; partially overcast; haze.
	24	35·0	36·0	+ 1·0	11·0	18·1	+ 7·1	Sky covered with cloud all day; distance hazy	Foggy; cloudy all day; mist.
	25	40·0	39·0	− 1·0	14·5	15·3	+ 0·8	Sky overcast all day; showery; distance clear	Cloudy and dull; rain.
	26	37·2	36·3	− 0·9	8·1	17·8	+ 9·7	Sky nearly clear all day; haze in distance	Very fine day; clear and bright; few clouds.
	27	34·0	33·3	− 0·7	10·4	12·2	+ 1·8	Sky partially cloudy; evening overcast	Fine day; partially cloudy; haze.
	28	30·5	30·2	− 0·3	7·0	10·6	+ 3·6	Sky generally clear all day; thin haze prevailed	Fine day; light clouds; slight fog and haze.
	29	27·5	29·4	+ 1·9	13·0	8·8	− 4·2	Sky overcast; mist and haze	Foggy; sky cloudy; haze.
	30	33·2	33·9	+ 0·7	13·2	11·2	− 2·0	Sky partially cloudy; mist and haze	Sky overcast all day; thick haze.
	31	35·0	31·4	− 0·6	12·5	12·1	− 0·4	Cloudy day; showers; haze in distance	Morning overcast and haze; rain in afternoon.
Means		34·8	36·1	+ 1·3	12·0	11·6	− 0·4		

The numbers in the second and third columns of this Table give the lowest temperatures of the air every day at Lewisham and at St. Thomas's Hospital, and the numbers in the fourth column exhibit the difference between the numbers in the two preceding columns, affixing the sign + when the temperature at St. Thomas's Hospital was the higher of the two. An inspection of the numbers in the third column will show that the night temperature of London has been almost always above that of the country. At times these excesses have amounted to 7°, 8°, 9°, and 10°. These large differences have occurred when the sky has been cloudless, with a hazy or misty atmosphere, with little or no wind, and when objects at the outlying stations have been seen at considerable distances, whilst near objects at the central stations have been obscure and ill-defined, clearly showing the effect of the city on the overhanging atmosphere, dimming its transparency, and creating around itself an atmosphere of comparative warmth and impurity. At times these differences have been small, and have mostly taken place when the sky has been overcast and rain falling.

The periods when the greatest excesses of night temperature occurred, were from August 26 to September 14, and from September 26 to October 4. These periods were both distinguished by a stagnant atmosphere, with prevalence of haze and frequent fog. The mean excess in the former period was 7°, and in the latter was 6·7°.

The numbers in the fifth and sixth columns give the daily range of temperature at Lewisham and St. Thomas's Hospital. The numbers in the last column exhibit the difference of daily range on every day at the two places, the sign − being affixed to those numbers when the range in London has been less than in the country. An inspection of the numbers in the last column will show that, with very few exceptions, the sign − is affixed, showing that the range of daily temperature in London has been almost always smaller than that of the country. At times the daily range has been the half only of that in the country, and at times the difference has amounted to 15° and 20°; at such times the air has been calm, with a thick atmosphere; fog, mist, or haze has been prevalent.

The most continuous large defects of daily range took place from August 26 to September 11, and from September 26 to October 4. In the former period the diurnal range of temperature at Lewisham was 32·5°, and at St. Thomas's Hospital was 17·5°; and in the latter period was at Lewisham 31·2°, and at St. Thomas's Hospital 14·9°.

In these particulars London climate differs greatly from that of the country. The condition of a low day temperature, of a high night temperature, and of a small range of daily temperature, are those favourable to the prevention and cure of pulmonary complaints. London climate would, therefore, seem to include these conditions; but then, on the other hand, it is necessary they should be accompanied by a pure atmosphere.

It remains now only to compare the monthly diurnal range in 1854 with its *normal* amount at one station. The following Table contains the results of the observations at Greenwich since the year 1841.

TABLE XVII.—MONTHLY RANGE of TEMPERATURE at the ROYAL OBSERVATORY, GREENWICH, for the YEARS 1841 to 1854.

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°		°	°	°	°	°
1841	11·1	9·1	17·5	16·5	21·3	18·8	15·6	16·3	16·0	11·7	10·7	9·4
1842	6·4	10·4	10·9	16·1	16·7	22·2	17·7	20·3	12·8	13·2	7·9	8·2
1843	7·9	7·5	12·4	15·4	14·7	15·2	15·6	16·4	17·4	12·8	10·2	6·6
1844	8·7	10·5	12·1	21·0	18·6	19·9	16·2	15·4	15·3	12·4	7·4	5·4
1845	6·4	8·7	11·1	16·8	14·2	18·2	14·8	14·9	15·6	13·3	10·9	9·9
1846	7·7	8·3	12·7	13·1	16·6	22·5	17·5	15·5	18·0	10·4	8·0	10·3
1847	8·8	11·6	16·0	18·3	21·2	19·4	23·3	21·0	18·7	14·0	11·4	9·7
1848	8·3	10·7	14·3	16·7	30·5	17·7	22·5	18·5	20·9	16·5	15·7	12·7
1849	10·8	12·9	13·8	16·0	16·3	20·6	22·6	20·2	17·5	15·1	11·7	9·1
1850	8·5	11·6	16·4	16·0	18·9	26·0	20·0	18·6	17·1	14·2	11·4	8·7
1851	10·0	13·2	12·1	16·2	19·6	22·1	20·1	20·0	20·6	13·0	11·9	8·0
1852	11·4	12·2	18·6	24·0	18·6	17·1	24·9	17·9	17·4	14·6	10·4	9·7
1853	10·1	10·1	16·1	14·2	21·2	18·7	17·1	19·1	18·0	15·2	11·5	9·3
Means -	8·2	10·5	14·2	16·9	19·1	19·8	17·5	18·0	17·3	13·6	10·7	9·0
1854 -	10·8	13·6	19·2	23·7	21·3	19·2	21·6	20·7	25·7	17·5	12·7	11·0
Excess in 1854 -	+ 2·6	+ 3·1	+ 5·0	+ 6·8	+ 2·2	− 0·6	+ 4·1	+ 2·7	+ 8·4	+ 3·9	+ 2·0	+ 2·0

The numbers in the lowest line but two give the mean monthly diurnal range for the preceding 13 years; the lowest line but one gives the observed daily range in 1854; and the lower line of all gives the abnormal values for 1854. These are all, with one exception, affected with the + sign, the month of June forming the exception. The whole year seems to be remarkable in this respect. The months whose daily ranges have been the greatest are March and April, and September the greatest of all. The mean yearly daily range for the 13 years ending 1853 was 14·6°, and for the year 1854 was 18·1°, being 3·5° above the average.

Temperature of the Thames Water.

Thus far I have proceeded in strict conformity with the rules applying to meteorological investigation; but as, during the progress of my work, I have found it intimately linked with a number of influences in operation to produce the abnormal condition which each Table exhibits, to a more or less extent, as existing in London and its suburbs, I have felt myself bound to ascertain as much as possible the nature of these influences, and to connect them all in my power with the main object of my report. I hope, therefore, that so doing I may not be considered to transgress the precise limits of my own share of this most important and onerous investigation.

As air is the receptacle for all vapours and impurities arising from evaporation and exhalation, it is necessary, before proceeding farther in this inquiry, to investigate the temperature of the Thames water, which presents a large evaporating surface, giving off vapour day and night in immense quantities.

As the river will be found to exercise an important, and, unfortunately, a most baneful influence upon London meteorology, I propose in the following discussion to avail myself of a series of observations which have been made by Captain Sanders, R.N. since the year 1846.*

His instruments consist of a maximum thermometer, as patented by Negretti and Zambra, and a minimum thermometer of Rutherford's construction. These instruments are placed in a perforated trunk, fixed to the side of the "Dreadnought" Hospital ship, lying off Greenwich, at the depth of two feet below the surface of the water. The diurnal range of the temperature of the water is small, and its temperature is well determined by one set of observations daily. The results from 9 years are contained in the following Table:—

* See Greenwich Observations.

TABLE XVIII.—MEAN MONTHLY TEMPERATURES of the WATER of the THAMES.

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°	°	°	°	°	°	°
1846	43·2	43·9	47·3	50·5	58·6	71·9	66·7	67·5	64·1	53·5	46·8	36·3
1847	36·3	38·1	41·8	46·7	57·8	63·7	68·6	65·3	56·8	53·2	47·6	42·0
1848	35·4	41·1	..	50·6	61·8	63·1	65·5	62·5	59·1	52·2	..	42·2
1849	40·6	43·4	44·9	46·3	57·3	64·3	67·0	63·8	60·0	51·2	45·6	38·6
1850	32·4	41·3	41·2	48·4	54·3	63·7	64·6	63·2	57·9	49·3	46·0	39·1
1851	41·2	40·2	41·7	49·8	54·5	61·9	65·5	66·5	60·0	55·0	42·3	42·1
1852	40·7	41·3	41·9	48·2	54·8	59·3	66·0	62·4	57·7	49·4	48·2	45·5
1853	42·5	37·6	40·4	48·4	55·1	61·3	63·7	63·6	58·2	53·1	45·5	38·5
1854	38·2	41·6	45·5	52·2	54·9	59·1	64·1	64·1	62·9	54·1	45·5	41·7
Means -	38·9	40·9	43·1	49·0	56·6	63·2	65·7	64·3	59·6	52·1	46·0	40·5
Excess above Air Temp. of the same year -	− 0·3	+ 0·5	+ 1·2	+ 2·8	+ 3·1	+ 4·3	+ 3·1	+ 2·9	+ 2·7	+ 1·4	+ 0·1	+ 0·4

In the last two lines of this Table are given the mean results for each month, and the excess of the temperature of the water above that of the air, in the same period of nine years. We learn from them that the temperature of the water has been higher than that of the air in every month except January. The excess is 0·5° in February, increasing to 4·3° in June, decreasing to 3·1° in July, continuing about this value till September; is 1·4° in October, and less than 0·5° in the remaining two months.

The mean excess in the months from April to September is 3·3, and 0·6° in the remaining month.

The *normal* temperature of the water of the Thames for the entire year from these results is 51·7°. By taking the difference between this result and the monthly means, the law of *annual variation* of Thames water temperature is found to be as follows:—

January, −12·8°; February, −10·8°; March, −8·6°; April, −2·7°; May, +4·9°; June, +11·5°; July, +14·0°; August, +12·6°; September, +7·9°; October, +0·4°; November, −0·7°; December, −11·2°.

The observations of 1854 may be discussed as follows:—

The mean temperature of the water of the Thames for the year 1854 was 52·0°, exceeding the average by 0·3°. By taking the difference between the mean for the entire year, and that of each month, the variation for the year 1854 is found as follows:—

January, −13·8°; February, −10·4°; March, −6·5°; April, +0·2°; May, +2·9°; June, +7·1°; July, +12·1°; August, +12·1°; September, +10·9°; October, +2·9°; November, −6·5°; and December, −10·3°.

By comparing these numbers with the law of diurnal variation, we shall see that they depart from that law, particularly in March, April, June, September, and October.

The excess of the temperature of the Thames water in the year 1854, above that of the superincumbent air, was as follows:—

January, −0·8°; February, +2·1°; March, +1·7°; April, +3·8°; May, +4·0°; June, +3·4°; July, +3·8°; August, +3·2°; September, +4·8°; October, +4·6°; November, + 5·0°; and December, +0·4°.

By the comparison of these numbers with those in the lower line of the preceding Table, it will be seen that the relation between the temperatures of the water and air in 1854 has not been the same as the averages. The excesses were a little smaller in June, July, and August; they were larger in February, March, and April, and very much larger in the months of September, October, and November. The heating effect, therefore, of the water upon the air in these months in the year 1854 must have been much greater than usual.

The temperature of the water of the Thames being in excess of the temperature of the air, accounts in a great measure for the high night temperature of London already noticed. In the same manner as the thick atmosphere of the Metropolis by day, opposes a screen to the full influence of light and heat, it is equally obvious that the air at night must have it raised by contact with the water, which the foregoing Tables have shown to be at a higher temperature. Of the baneful effects of the Thames water and its adjacent marshes upon the climate and health of London I will endeavour to convey an idea as I proceed, with as much minuteness as may be consistent with a report devoted to other subjects of inquiry, and I shall be able to show distinctly that the impurities with which the river is at present charged, through an imperfect and much to be regretted sanatory arrangement, have chiefly to answer for the atmosphere of death and disease with which certain districts of the metropolis are invested, and which can only be removed by the cessation of the obnoxious influences.

It is much to be regretted that these should be suffered to arise from the very source of the prosperity and commercial greatness of a city, which it has contributed to render the greatest in the world; whose waters, if suffered to flow undefiled with the sewerage of a vast city, instead of acting as a laboratory for the general diffusion of noxious vapours, would, in their course exercise a healthful and purifying influence.

I will now proceed to discuss the mean daily temperature of the Thames water from July to the end of the year, as shown in the following Table.

TABLE XIX.—MEAN DAILY TEMPERATURE of the WATER of the THAMES.

1854. Month and Day.	Mean Daily Temp.	1854. Month and Day.	Mean Daily Temp.	1854. Month and Day.	Mean Daily Temp.	1854. Month and Day.	Mean Daily Temp.	1854. Month and Day.	Mean Daily Temp.	1854. Month and Day.	Mean Daily Temp.	1854. Month and Day.	Mean Daily Temp.
	°		°		°		°		°		°		°
June 1	57·8	July 1	62·9	Aug. 1	67·3	Sept. 1	64·8	Oct. 1	59·0	Nov. 1	49·3	Dec. 1	41·5
2	58·1	2	62·6	2	66·8	2	63·4	2	58·5	2	49·7	2	41·4
3	57·7	3	63·4	3	65·7	3	66·3	3	58·0	3	49·5	3	41·4
4	57·6	4	63·6	4	65·4	4	65·1	4	58·2	4	49·2	4	41·4
5	57·2	5	63·2	5	63·5	5	65·3	5	57·7	5	49·4	5	41·6
6	56·7	6	62·7	6	62·7	6	65·4	6	57·6	6	48·5	6	41·7
7	56·2	7	62·7	7	62·5	7	64·8	7	57·4	7	48·2	7	41·6
8	55·8	8	62·4	8	62·7	8	65·3	8	57·1	8	47·9	8	41·5
9	55·8	9	62·7	9	62·9	9	64·0	9	57·4	9	47·0	9	41·6
10	56·1	10	62·4	10	63·5	10	63·4	10	56·7	10	46·8	10	41·3
11	56·5	11	62·7	11	63·7	11	63·4	11	56·8	11	46·8	11	41·1
12	57·2	12	62·3	12	63·8	12	63·4	12	56·6	12	46·3	12	41·1
13	57·3	13	62·6	13	64·3	13	63·5	13	56·2	13	46·1	13	41·7
14	57·5	14	62·6	14	65·0	14	63·6	14	55·7	14	45·9	14	41·2
15	57·8	15	62·6	15	64·8	15	63·6	15	55·3	15	45·7	15	42·3
16	58·0	16	62·5	16	64·3	16	63·6	16	54·6	16	45·5	16	42·8
17	58·3	17	62·7	17	64·1	17	63·7	17	56·8	17	45·3	17	42·1
18	59·1	18	64·0	18	63·6	18	63·6	18	53·1	18	44·8	18	41·3
19	59·7	19	64·0	19	64·1	19	64·0	19	52·7	19	44·8	19	41·0
20	59·8	20	64·5	20	64·2	20	64·1	20	52·3	20	43·2	20	41·5
21	59·9	21	65·2	21	64·3	21	64·2	21	52·0	21	44·0	21	41·4
22	60·4	22	65·6	22	64·4	22	63·0	22	51·7	22	43·5	22	41·4
23	61·7	23	67·6	23	64·0	23	62·0	23	51·3	23	43·1	23	41·7
24	61·8	24	68·7	24	63·3	24	61·2	24	51·9	24	42·8	24	42·3
25	63·1	25	69·6	25	63·2	25	60·0	25	50·5	25	42·5	25	42·3
26	63·4	26	69·2	26	62·3	26	59·2	26	50·2	26	42·2	26	42·5
27	63·5	27	68.5	27	62·0	27	58·9	27	50·0	27	41·7	27	42·4
28	63·5	28	67·8	28	63·1	28	59·3	28	48·9	28	41·6	28	42·1
29	63·0	29	67·6	29	64·2	29	59·5	29	49·5	29	41·6	29	42·0
30	62·9	30	67·5	30	65·7	30	59·6	30	49·3	30	41·5	30	41·8
		31	67·2	31	64·3			31	49·0			31	42·0

From this Table we learn that the temperature of the Thames water attained to 60° on June 22, and to 62° and 63° by June 27; it remained nearly stationary at this temperature till after the middle of July, and then increased till it attained the highest in the year, viz. 70° nearly, on the 25th and 26th of July; after this time it

decreased to 62° by the 8th and 9th of August, and varied but little till towards the end of the month, when a singular increase took place, and a second maximum, viz., 66°, occurred at the beginning of September; it then declined gradually, but with some fluctuations, to 60° by the 25th of September, then to 50° by October 27, and to 42° by November 26. After this time to the end of the year there was scarcely any variation of temperature.

The daily range of temperature of the Thames water is about 2°; by decreasing the numbers in the preceding Table by 1°, we shall have the lowest night temperature of the Thames water; and by comparing these numbers with the lowest night temperatures at Lewisham in Table XVI., the difference is determined between the temperature of the water at night and the air in its vicinity just beyond its influence. The results of this calculation are shown in the next Table.

TABLE XX.—Showing the EXCESS of the NIGHT TEMPERATURE of the WATER of the THAMES above the MINIMUM TEMPERATURE of the AIR.

Day of Month.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°
1	+10·4	+ 8·2	+19·6	+17·8	+11·3	+ 1·8
2	+11·6	+16·6	+17·9	+18·5	+ 7·4	+ 6·1
3	+ 7·9	+10·2	+22·0	+12·1	+ 9·2	+ 6·2
4	+ 6·6	+15·1	+19·0	+18·6	+12·6	− 1·3
5	+12·4	+11·0	+19·4	+ 7·3	+ 7·9	− 0·9
6	+11·4	+10·5	+20·2	+ 4·7	+11·5	+ 6·4
7	+16·8	+ 7·0	+19·7	+ 9·7	+16·2	+ 5·8
8	+ 9·5	+12·5	+16·0	+ 8·6	+11·7	+12·0
9	+13·9	+10·5	+14·2	+ 4·3	+11·6	+ 5·3
10	+12·5	+ 7·5	+21·9	+ 7·9	+18·3	+10·3
11	+11·2	+10·2	+22·3	+ 3·7	+12·5	+15·6
12	+10·9	+ 5·5	+24·5	+19·1	+ 9·8	+12·5
13	+12·9	+11·8	+ 9·7	+22·5	+16·2	+ 6·0
14	+11·6	+ 7·3	+ 8·6	+17·1	+ 9·9	− 5·4
15	+ 7·3	+12·6	+ 9·3	+ 5·8	+12·8	− 3·2
16	+10·5	+15·3	+ 3·5	+10·1	+ 7·5	+ 3·8
17	+ 7·5	+18·1	+ 9·7	+19·7	+10·5	+10·1
18	+ 9·9	+19·4	+12·0	+ 8·3	+ 5·5	+ 7·5
19	+12·1	+14·9	+ 4·5	+15·0	+ 9·3	+ 8·2
20	+11·5	+17·2	+13·1	+10·7	+ 7·5	+ 6·4
21	+13·8	+ 9·4	+17·2	+ 7·7	+ 7·6	+12·4
22	+12·7	+13·4	+21·4	+ 3·4	+10·3	− 0·6
23	+15·6	+16·0	+12·3	+13·3	+11 7	+ 3·7
24	+13·4	+ 8·3	+ 6·2	+14·9	+14·3	+ 6·3
25	+ 9·7	+11·2	+16·2	+ 9·9	+10·1	+ 1·3
26	+10·0	+18·3	+18·6	+14·5	+11·0	+ 4·3
27	+11·6	+ 9·0	+17·9	+19·3	+14·2	+ 7·4
28	+14·3	+ 1·6	+16·9	+13·5	+14·0	+10·6
29	+23·2	+12·2	+21·3	+14·0	+ 1·6	+13·5
30	+10·2	+13·2	+18·8	+ 9·2	+ 6·7	+ 7·6
31	+ 8·2	+ 9·8		+ 2·0		+ 6·0

It will be observed that the numbers in this Table are frequently very large, so large indeed that we may infer the water to have been simmering and giving off volumes of vapour, thus, furnishing an explanation of the fact of less daily range of temperature in London and the frequent prevalence of fog and mist, which, in connexion with the marshes, are very sufficiently accounted for over the city and its environs.

It appears that the most continuously large excesses took place between August 15 and September 12, when during this period of 28 consecutive nights, the average excess was 16·3°; and again, within the period beginning September 20 and ending October 4, the mean excess was 16·5°.

Within these periods the whole area of the Thames must have been giving off incessant and vast volumes of vapour, which, unsustained by air, because of the great difference of temperature, hovered over the city, thickening the atmosphere and exercising an influence most inimical to the health of the Metropolis.

Humidity of the Air.

The following Tables give the results of the dry and wet-bulb thermometers; the observations with these instruments were exclusively made during the day. Table XXI. contains the weekly means of the temperatures of evaporation at the several stations; Table XXII. those of the dew point; and Table XXIII. contains the tension of vapour. These several results were calculated from my hygrometrical Tables.

TABLE XXI.—Weekly Mean Temperatures of Evaporation.

Name of Station.	Week ending																									
	July				August				September					October				November				December				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	..	..	..	..	..	..	..	..	..	..	57·6	52·7	51·3	51·1	48·6	43·5	42·7	47·1	38·9	39·0	35·3	..	39·8	42·0	..	35·3
Lewisham	54·1	53·9	56·2	59·1	56·8	56·4	54·7	56·2	59·0	55·5	56·9	54·7	51·6	50·2	49·3	44·9	43·3	47·4	40·9	40·1	35·4	37·3	40·1	40·2	38·7	38·7
Royal Observatory	53·6	53·9	57·4	58·8	56·7	56·7	55·1	55·7	59·0	54·0	57·0	53·8	51·2	51·0	49·3	44·6	42·4	47·3	40·7	39·4	35·4	36·6	40·3	41·0	39·2	38·2
Bexley Heath	..	..	..	..	..	..	..	..	59·0	53·1	55·8	55·1	51·2	52·2	49·6	44·3	42·7	47·4	40·4	40·7	35·4	40·0	40·6	41·0	39·4	37·4
Brixton Road	..	..	..	..	..	..	..	..	58·1	53·9	57·7	52·2	52·6	50·7	49·0	43·0	43·0	48·2	40·7	41·2	35·7	..	..	..	..	..
Camberwell	..	..	..	..	..	..	..	..	..	..	57·9	54·4	50·3	51·3	49·9	45·0	43·8	47·6	41·2	..	..	40·5	39·8	40·7	38·0	..
Dreadnought	..	..	..	..	..	..	..	..	..	..	59·1	48·5	..	54·6	52·2	47·3	46·1	50·3	44·5	43·4	39·9	..	..	..	..	..
Millbank	..	..	..	..	..	..	..	..	..	..	..	54·9	50·9	50·6	49·0	45·8	43·3	47·6	41·3	40·4	36·2	36·3	41·6	40·7	39·5	37·3
Brompton	..	..	..	..	..	..	..	..	..	..	..	53·1	49·9	50·9	48·3	44·2	42·3	46·7	41·2	40·4	36·3	36·0	41·2	41·6	41·6	..
Board of Health	..	..	..	..	..	..	..	..	..	53·9	55·8	54·7	51·1	51·3	48·4	43·7	42·6	47·2	40·9	41·6	37·4	37·4	39·2	41·2	38·7	36·0
St. Thomas' Hosp.	53·6	54·9	57·8	59·3	56·7	56·1	56·0	57·7	57·9	53·7	57·1	54·3	51·1	50·9	49·2	44·8	42·2	47·9	41·0	40·6	36·0	37·3	41·6	41·0	40·2	39·8
Poplar	..	..	..	..	..	..	..	..	..	..	58·4	56·3	51·6	51·8	50·4	44·5	43·1	47·5	41·6	41·0	37·4	37·7	40·4	43·6	39·7	39·0
Guildhall	..	..	..	..	..	..	..	..	..	..	..	..	51·3	52·7	50·0	44·5	43·7	48·1	41·5	42·0	36·5	38·0	..	..	..	..
Somerset House	..	..	..	..	..	..	..	..	..	..	58·5	51·3	50·8	50·6	48·3	43·3	43·1	47·9	41·6	41·4	35·5	36·8	40·6	40·8	39·0	39·9
St. Giles	..	..	..	..	..	..	..	..	..	..	..	54·4	52·9	53·6	51·8	46·3	44·8	49·9	42·3	..	..	..	..	..	..	..
Chiswell Street	..	..	..	..	..	..	..	..	63·7	58·3	58·3	56·6	53·8	..	51·5	45·5	44·6	50·0	..	..	..	..	..	..	..	..
St. Mary's Hosp.	52·8	53·7	59·6	60·2	56·4	56·1	54·7	56·0	59·5	53·5	57·9	54·7	54·3	51·6	49·0	44·6	43·4	48·6	41·0	40·2	36·2	36·8	41·0	41·1	39·4	39·3
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	51·3	50·6	51·3	47·6	44·0	42·7	47·9	39·8	40·3	35·7	37·7	40·0	42·6	..	..
St. John's Wood	52·6	53·4	57·3	58·7	56·3	56·1	54·2	55·2	59·7	54·4	56·2	..	..	..	..	..	..	..	..	39·2	35·0	35·5	39·6	39·6	38·0	37·1
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	53·4	48·7	49·5	47·0	43·3	43·4	47·7	41·2	40·8	..	..	..	..	..	..
Highgate	..	..	..	..	..	..	..	..	..	..	57·1	54·9	52·6	51·7	50·0	46·5	44·2	47·8	41·3	39·4	35·5	36·3	40·7	40·7	..	38·2
Enfield Vicarage	53·0	52·2	54·1	57·0	55·4	52·6	..	54·4	..	..	50·1	53·4	48·0	50·0	47·8	42·5	42·6	44·8	39·3	38·5	..	35·7	38·9	39·3	36·8	35·5
Means	53·3	53·7	56·1	58·9	56·4	55·7	54·9	55·9	58·2	54·5	56·0	53·6	52·3	51·9	49·3	44·6	43·3	47·9	41·2	40·5	36·3	37·2	40·3	41·1	39·1	37·8

TABLE XXII.—WEEKLY MEAN TEMPERATURES of the DEW POINT.

NAME OF STATION.	WEEK ENDING July 8	July 15	July 22	July 29	August 5	August 12	August 19	August 26	September 2	September 9	September 16	September 23	September 30
	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	..	..	..	..	..	..	..	..	..	..	55·7	52·1	48·2
Lewisham	50·8	51·5	51·0	54·6	54·4	53·2	50·6	52·4	55·0	51·5	54·3	[illegible]·3	47·9
Royal Observatory	51·6	51·6	53·4	54·5	55·1	54·0	51·2	51·8	58·4	50·1	53·8	50·9	47·2
Bexley Heath	..	..	..	..	..	..	..	..	56·2	49·0	52·7	52·1	47·4
Brixton Road	..	..	..	..	..	..	..	..	52·6	48·3	52·3	47·8	47·8
Camberwell	..	..	..	..	..	..	..	..	..	..	55·6	52·0	46·2
Dreadnought	..	..	..	..	..	..	..	..	..	..	57·6	56·7	..
Millbank	..	..	..	..	..	..	..	..	..	..	..	51·0	46·7
Brompton	..	..	..	..	..	..	..	..	..	..	..	49·1	45·9
Board of Health	..	..	..	..	..	..	..	..	..	48·6	51·6	50·9	47·6
St. Thomas' Hosp.	50·0	53·5	53·0	54·8	54·1	51·6	54·0	54·0	53·3	48·2	53·8	51·0	46·6
Poplar	..	..	..	..	..	..	..	..	..	..	55·7	53·8	49·0
Guildhall	..	..	..	..	..	..	..	..	..	..	..	..	49·0
Somerset House	..	..	..	..	..	..	..	..	..	..	55·5	46·6	46·5
St. Giles	..	..	..	..	..	..	..	..	..	..	..	51·5	49·7
Chiswell Street	..	..	..	..	..	..	..	..	61·6	54·7	54·9	54·6	50·1
St. Mary's Hosp.	48·8	50·7	58·5	55·9	54·4	52·0	50·9	52·2	55·8	52·0	55·1	52·0	51·3
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	45·1	45·3
St. John's Wood	48·0	50·9	53·4	54·5	55·1	52·7	51·2	51·4	56·6	49·5	53·5	..	..
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	52·2	44·5
Highgate	..	..	..	..	..	..	..	..	..	..	54·5	51·8	47·7
Enfield Vicarage	48·5	48·5	48·5	52·1	51·5	49·8	..	49·7	..	..	45·0	49·1	43·5
Means	49·6	51·1	53·0	54·4	54·1	52·2	51·6	51·9	55·8	50·2	53·8	51·1	47·4

NAME OF STATION.	October 7	October 14	October 21	October 28	November 4	November 11	November 18	November 25	December 2	December 9	December 16	December 23	December 30
	°	°	°	°	°	°	°	°	°	°	°	°	°
Sydenham	48·2	46·7	41·3	40·4	45·1	35·1	36·8	34·5	..	37·0	..	39·4	32·2
Lewisham	45·8	46·8	42·6	40·6	44·3	39·0	38·5	33·6	34·6	37·4	37·9	36·8	36·6
Royal Observatory	48·1	47·6	42·3	39·1	44·7	38·6	37·5	33·7	34·0	37·7	38·5	37·3	35·9
Bexley Heath	49·3	47·5	40·7	39·3	45·2	38·3	38·5	33·8	37·0	37·7	38·3	36·3	34·5
Brixton Road	46·4	45·5	39·0	38·8	45·8	35·5	38·8	33·0	..	..	..	..	..
Camberwell	48·2	47·4	42·6	40·4	45·3	38·4	..	..	37·0	35·7	36·7	36·5	..
Dreadnought	53·3	51·0	44·0	42·5	47·3	41·2	41·1	37·1	..	..	..	..	..
Millbank	46·6	45·7	44·2	40·1	44·8	38·1	37·6	33·3	32·1	38·8	37·1	36·4	32·7
Brompton	47·6	45·0	40·5	39·5	44·2	38·5	37·6	33·7	32·2	38·2	38·1	38·8	..
Board of Health	48·0	44·6	40·0	40·2	44·3	38·1	40·1	37·0	33·9	34·8	37·5	35·0	32·6
St. Thomas' Hosp.	48·0	46·5	42·4	42·5	45·0	37·5	38·3	33·0	35·1	39·1	38·6	38·8	38·7
Poplar	49·2	48·9	41·8	40·2	46·0	40·0	39·6	36·8	36·3	38·8	42·6	38·8	37·8
Guildhall	49·4	46·8	40·8	40·2	46·1	37·5	40·1	35·0	35·0	..	..	..	..
Somerset House	46·1	43·9	37·0	39·8	44·2	37·9	39·1	32·4	32·6	36·0	36·8	36·1	38·0
St. Giles	51·6	50·2	45·3	43·7	46·0	40·9	..	..	..	..	..	..	..
Chiswell Street	..	48·6	40·7	40·3	48·5	..	..	..	..	..	..	..	..
St. Mary's Hosp.	47·3	45·0	41·0	40·1	45·2	37·6	37·0	33·7	33·6	37·3	36·7	36·9	36·6
Bethnal Green	47·0	42·6	40·1	39·1	44·8	35·7	37·5	33·3	34·6	35·4	39·3	..	..
St. John's Wood	..	..	..	..	..	..	36·7	32·7	32·4	36·6	36·5	35·3	34·8
St. Pancras	45·3	43·1	39·0	41·1	45·2	36·7	38·1	..	..	..	.	..	..
Highgate	48·4	47·0	44·9	41·1	45·6	39·0	37·6	35·5	34·0	38·5	38·3	..	36·5
Enfield Vicarage	47·0	44·7	39·3	39·1	42·8	36·4	35·7	..	32·0	35·6	37·9	34·2	31·4
Means	48·0	46·4	41·4	40·4	45·4	38·1	38·2	34·3	34·3	37·2	38·0	36·9	35·5

TABLE XXIII.—WEEKLY MEANS of ELASTIC FORCE of VAPOUR.

NAME OF STATION.	WEEK ENDING July 8	July 15	July 22	July 29	August 5	August 12	August 19	August 26	September 2	September 9	September 16	September 23	September 30
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Sydenham	..	..	..	..	..	..	..	..	..	..	·457	·402	·350
Lewisham	·383	·394	·386	·437	·434	·417	·383	·402	·445	·394	·432	·404	·347
Royal Observatory	·367	·396	·417	·443	·445	·427	·370	·393	·444	·406	·430	·384	·341
Bexley Heath	..	..	..	..	..	..	..	..	·456	·360	·408	·400	·341
Brixton Road	..	..	..	..	..	..	..	..	·410	·354	·415	·346	·346
Camberwell	..	..	..	..	..	..	..	..	..	..	·451	·400	·326
Dreadnought	..	..	..	..	..	..	..	..	..	..	·480	·470	..
Millbank	..	..	..	..	..	..	..	..	..	..	..	·386	·334
Brompton	..	..	..	..	..	..	..	..	..	..	..	·370	·325
Board of Health	..	..	..	..	..	..	..	..	..	·356	·395	·386	·343
St. Thomas' Hosp.	·373	·420	·413	·437	·431	·394	·427	·428	·424	·352	·425	·386	·332
Poplar	..	..	..	..	..	..	..	..	..	..	·469	·425	·360
Guildhall	..	..	..	..	..	..	..	..	..	..	..	..	·357
Somerset House	..	..	..	..	..	..	..	..	..	..	·448	·331	·331
St. Giles'	..	..	..	..	..	..	..	..	..	..	..	·393	·370
Chiswell Street	..	..	..	..	..	..	..	..	·542	·348	·439	·436	·374
St. Mary's Hosp.	·358	·380	·496	·457	·433	·400	·385	·402	·453	·400	·442	·400	·390
Bethnal Green	..	..	..	..	..	..	..	..	..	..	..	·316	·318
St. John's Wood	·349	·383	·418	·435	·442	·410	·390	·391	·466	·367	·426	..	..
St. Pancras	..	..	..	..	..	..	..	..	..	..	..	·402	·308
Highgate	..	..	..	..	..	..	..	..	..	..	·442	·398	·345
Enfield Vicarage	·355	·353	·355	·400	·393	·370	..	·370	..	..	·315	·363	·298
Means	·368	·388	·441	·434	·420	·402	·394	·398	·455	·371	·425	·388	·342

NAME OF STATION.	October 7	October 14	October 21	October 28	November 4	November 11	November 18	November 25	December 2	December 9	December 16	December 23	December 30
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Sydenham	·350	·334	·276	·268	·316	·222	·236	·218	..	·238	·260	..	·200
Lewisham	·322	·335	·289	·270	·307	·256	·251	·211	·220	·242	·245	·237	·235
Royal Observatory	·354	·345	·286	·253	·311	·251	·240	·200	·214	·244	·251	·241	230
Bexley Heath	·364	·343	·271	·258	·317	·250	·251	·213	·240	·243	·248	·231	·218
Brixton Road	·331	·320	·255	·253	·323	·227	·254	·205	..	..	..	..	..
Camberwell	·350	·341	·290	·268	·318	·250	..	..	·238	·227	·235	·234	..
Dreadnought	·418	·386	·304	·288	·341	·275	·274	·210	..	..	..	..	..
Millbank	·332	·322	·305	·265	·312	·247	·244	·209	·200	·248	·238	·232	·205
Brompton	·342	·315	·270	·260	·302	·251	·244	·212	·201	·248	·248	·253	..
Board of Health	·348	·310	·264	·267	·308	·247	·265	·238	·213	·220	·242	·223	·204
St. Thomas' Hosp.	·348	·331	·287	·280	·314	·242	·249	·207	·222	·258	·250	·254	·252
Poplar	·361	·364	·282	·267	·324	·263	·261	·236	·232	·253	·289	·253	·245
Guildhall	·364	·335	·276	·270	·327	·243	·266	·222	·222	..	..	..	..
Somerset House	·326	·362	·237	·262	·406	·244	·255	·202	·206	·227	·238	·230	·246
St. Giles'	·394	·376	·317	·300	·325	·272	..	..	..	..	..	..	..
Chiswell Street	..	·355	·272	·267	·360	..	..	..	..	..	..	..	..
St. Mary's Hosp.	·340	·315	·273	·265	·316	·244	·239	·212	·211	·240	·235	·236	·235
Bethnal Green	·336	·293	·265	·256	·312	·227	·242	·206	·217	·225	·256	..	..
St. John's Wood	..	..	..	..	..	..	·235	·204	·201	·234	·233	·225	·220
St. Pancras	·319	·294	·256	·276	·316	·236	·247	..	..	..	..	..	..
Highgate	·352	·336	·313	·275	·320	·255	·244	·215	·214	·251	·249	..	·235
Enfield Vicarage	·337	·310	·258	·256	·289	·232	·229	..	·200	·226	·245	·216	·195
Means	·349	·330	·280	·268	·310	·247	·250	·215	·216	·239	·248	·236	·225

The lower line of each of these Tables gives the mean value in each week for the Metropolitan districts, and by comparing them with the numbers in the bodies of the Tables the differences will be found to be small and to follow no order, thus showing that the water mixed with the air during the hours of the day has been equally diffused throughout every district. The next Table contains the mean monthly temperatures of evaporation and dew point in 1854, compared with their mean values.

TABLE XXIV.—Showing the Monthly Difference of the Temperatures of Evaporation, Dew Point, and Elastic Force of Vapour in the Year 1854.

Months.	Temperature of Evaporation.			Temperature of Dew Point.			Tension of Vapour.		
	Average	In the year 1854.	Excess in 1854.	Average	In the year 1854.	Excess in 1854.	Average	In the year 1854.	Excess in the year 1854.
	°	°	°	°	°	°	in.	in.	in.
January - -	37·3	38·0	+0·7	35·2	36·1	+0·9	0·224	0·234	+0·010
February - -	37·3	37·5	+0·2	34·8	33·6	−1·2	0·223	0·218	−0·005
March -	41·1	40·9	−0·2	35·7	37·4	+1·7	0·229	0·236	+0·007
April - -	43·6	45·0	+1·4	40·3	41·1	+0·8	0·268	0·274	+0·006
May - -	49·6	48·6	−1·0	46·1	45·9	−0·2	0·329	0·327	−0·002
June - -	54·3	52·7	−1·6	51·2	50·0	−1·2	0·389	0·371	−0·018
July - -	57·4	56·2	−1·2	54·3	53·6	−0·7	0·438	0·413	−0·025
August - -	57·4	56·5	−0·9	54·5	53·3	−1·2	0·437	0·416	−0·021
September -	53·9	53·9	0·0	51·3	50·4	−0·9	0·392	0·375	−0·017
October - -	47·7	47·1	−0·6	45·4	44·5	−0·9	0·321	0·309	−0·012
November - -	42·7	39·4	−3·3	40·7	37·9	−2·8	0·273	0·245	−0·028
December - -	39·0	39·6	+0·6	36·9	37·0	+0·1	0·240	0·240	0·000

The prevalence of — signs in the 4th and last columns, in all except the winter months, show that there was less water in the air than usual, particularly in the month of November.

The following Table contains the weekly value of the relative humidity; the state of complete saturation being represented by 100:—

TABLE XXV.—Weekly Means of Humidity of the Air.

Name of Station.	Week ending: July 8	July 15	July 22	July 29	August 5	August 12	August 19	August 26	September 2	September 9	September 16	September 23	September 30	October 7	October 14	October 21	October 28	November 4	November 11	November 18	November 25	December 2	December 9	December 16	December 23	December 30
Sydenham - -	..	..	..	..	..	..	..	..	..	..	87	90	80	82	88	88	87	88	78	88	96	..	84	85	..	84
Lewisham - -	78	86	65	68	83	79	74	74	72	74	81	85	77	74	85	86	85	82	88	92	90	85	85	87	90	89
Royal Observatory	78	85	72	72	90	82	71	72	72	73	80	81	77	84	89	87	80	84	88	88	90	85	85	86	90	88
Bexley Heath -	..	..	..	..	..	..	..	..	80	75	79	81	77	82	87	81	82	87	88	88	91	85	84	84	88	84
Brixton Road -	..	..	..	..	..	..	..	..	63	65	69	73	71	74	79	80	77	86	74	86	85	..	..	..	..	..
Camberwell - -	..	..	..	..	..	..	..	..	..	..	83	83	75	80	84	86	82	87	84	..	..	82	78	79	92	..
Dreadnought -	..	..	..	..	..	..	..	..	..	..	89	90	..	91	92	81	80	82	82	88	85	..	..	..	..	..
Millbank - -	..	..	..	..	..	..	..	..	..	..	..	74	74	76	80	90	82	81	83	85	85	78	80	81	83	78
Brompton - -	..	..	..	..	..	..	..	..	..	..	..	77	76	78	81	80	84	85	85	86	86	80	88	82	85	..
Board of Health -	..	..	..	..	..	..	..	..	..	66	73	76	77	79	78	80	86	83	84	92	97	80	76	80	81	82
St. Giles - -	..	..	..	..	..	..	..	..	..	..	..	80	80	87	90	94	95	77	91	..	..	..	..	..	..	..
St. Thomas' Hosp.	77	90	66	65	83	70	75	75	70	66	79	76	73	81	83	86	91	82	81	87	84	87	86	86	92	94
Poplar - - -	..	..	..	..	..	..	..	..	..	..	81	83	83	83	91	85	84	91	91	92	97	92	91	94	96	93
Guildhall - -	..	..	..	..	..	..	..	..	..	..	..	..	83	79	80	80	84	88	79	89	92	83	..	..	..	..
Somerset House -	..	..	..	..	..	..	..	..	..	..	79	71	75	83	74	67	82	78	80	87	84	76	75	79	84	81
Chiswell Street -	..	..	..	..	..	..	..	..	80	74	76	86	77	..	82	73	77	91	..	..	..	..	..	..	..	..
St. Mary's Hosp. -	76	80	91	67	87	74	75	75	72	70	80	83	81	75	88	80	82	80	82	83	86	83	80	77	87	86
Bethnal Green -	..	..	..	..	..	..	..	..	..	..	..	63	60	74	73	78	81	81	77	86	86	85	76	81	..	..
St. John's Wood -	72	84	73	70	91	78	75	75	77	60	83	..	..	..	..	..	..	..	..	86	88	84	84	84	85	88
St. Pancras - -	..	..	..	..	..	..	..	..	..	..	..	92	76	75	77	77	87	84	76	84	..	..	..	..	..	..
Highgate - -	..	..	..	..	..	..	..	..	..	..	83	79	70	79	81	90	83	86	87	91	93	87	88	87	..	91
Enfield Vicarage -	72	76	65	65	75	76	..	70	..	..	71	73	74	81	82	82	82	90	84	86	..	81	83	92	80	79
Means - -	75	84	72	68	85	76	74	73	73	72	80	80	76	80	83	82	83	84	83	88	88	83	83	84	87	86

It would seem therefore that the distribution of humidity has been very irregular, and few general results can be drawn from the foregoing numbers. Its distribution is generally under the influence of local circumstances, and has been in great measure influenced by the proximity of the River Thames. The most humid station, as might be expected, is the Dreadnought Hospital Ship, but the least humid is scarcely to be determined. Those of Highgate and Enfield might have been so considered had they not in some few weeks exceeded in humidity the mean of all others. The following Table contains the mean monthly humidity compared with the humidity of the year 1854:—

TABLE XXVI.—Showing the Monthly Difference of the Humidity of the Air from the Average, for the Year 1854.

Months.	Humidity of the Air (Complete Saturation = 1000.)		Excess in the Year 1854 above the Average.
	Average.	Mean in the Year 1854.	
January - -	885	917	+32
February - -	872	843	−29
March -	825	795	−30
April	802	775	−27
May - -	780	850	+70
June - -	758	825	+67
July - -	788	783	− 5
August - -	810	771	−39
September -	827	770	−57
October - -	862	846	−16
November -	885	916	+31
December -	889	872	−17

From the numbers in the last column, it seems that January, May, June, and November, were more humid than the average, and that the remaining months were less so than usual.

The following Table contains the weight of vapour in a cubic foot of air in every week, and the next Table the monthly values.

TABLE XXVII.—Weekly Mean Weight of Vapour in a Cubic Foot of Air.

Week ending

Name of Station.	July 8	July 15	July 22	July 29	August 5	August 12	August 19	August 26	September 2	September 9	September 16	September 23	September 30
	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.
Sydenham - -	..	..	..	..	..	..	..	..	..	..	5·4	4·2	4·0
Lewisham - -	4·3	4·5	4·3	4·9	4·9	4·7	4·3	4·5	4·9	4·4	4·8	4·6	3·9
Royal Observatory	4·3	4·5	4·7	4·9	5·0	4·8	4·4	4·4	4·9	4·2	4·8	4·3	3·9
Bexley Heath -	..	..	..	..	..	..	..	..	5·2	4·1	4·6	4·5	3·9
Brixton Road -	..	..	..	..	..	..	..	..	5·1	4·0	4·6	3·9	3·9
Camberwell - -	..	..	..	..	..	..	..	..	..	..	5·0	4·5	3·7
Dreadnought -	..	..	..	..	..	..	..	..	..	..	5·4	5·3	..
Millbank - -	..	..	..	..	..	..	..	..	..	..	..	4·3	3·8
Brompton - -	..	..	..	..	..	..	..	..	..	..	..	4·2	3·7
Board of Health -	..	..	..	..	..	..	..	..	..	4·0	4·4	4·3	3·9
St. Thomas' Hosp.	4·2	4·7	4·6	4·8	4·8	4·7	4·4	4·8	4·7	4·9	4·8	4·3	3·8
Poplar - - -	..	..	..	..	..	..	..	..	..	..	5·2	4·8	4·1
Guildhall - -	..	..	..	..	..	..	..	..	..	..	..	..	4·0
Somerset House -	..	..	..	..	..	..	..	..	..	..	5·0	3·8	3·8
St. Giles - -	..	..	..	..	..	..	..	..	..	..	..	4·4	4·2
Chiswell Street -	..	..	..	..	..	..	..	..	6·2	4·9	4·9	4·9	4·3
St. Mary's Hosp. -	4·1	4·3	5·5	5·0	4·9	4·5	4·3	4·5	5·0	4·5	5·0	4·5	4·4
Bethnal Green -	..	..	..	..	..	..	..	..	..	..	..	3·6	3·6
St. John's Wood -	4·0	4·3	4·7	4·8	5·0	4·6	4·3	4·4	5·2	4·1	4·8	..	..
St. Pancras - -	..	..	..	..	..	..	..	..	..	..	..	4·5	3·5
Highgate - -	..	..	..	..	..	..	..	..	..	..	5·0	4·5	3·9
Enfield Vicarage -	4·0	4·0	4·0	4·4	4·3	4·0	..	4·2	..	..	3·6	4·1	3·4
Means - -	4·1	4·4	4·6	4·8	4·8	4·5	4·3	4·5	5·2	4·2	4·8	4·4	3·9

Name of Station.	October 7	October 14	October 21	October 28	November 4	November 11	November 18	November 25	December 2	December 9	December 16	December 23	December 30
	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.
Sydenham - -	4·0	3·8	3·2	3·1	3·6	2·6	2·8	2·6	..	2·8	3·0	..	2·4
Lewisham - -	3·7	3·8	3·3	3·1	3·5	3·0	2·9	3·0	2·5	2·8	2·9	2·7	2·7
Royal Observatory	4·0	3·9	3·3	3·0	3·6	2·9	2·8	2·5	2·5	2·8	2·9	2·8	2·7
Bexley Heath -	4·1	3·9	3·1	3·0	3·6	2·9	2·9	2·5	2·8	2·8	2·9	2·7	2·5
Brixton Road -	3·8	3·7	2·9	2·9	3·7	2·6	2·9	2·4	..	..	..	..	..
Camberwell - -	4·0	3·9	3·3	3·1	3·7	2·9	..	..	2·8	2·6	2·7	2·7	..
Dreadnought -	4·7	4·4	3·5	3·3	3·9	3·2	3·2	2·8	..	..	..	..	..
Millbank - -	3·8	3·7	3·5	3·1	3·5	2·9	2·8	2·4	2·3	2·9	2·8	2·7	2·4
Brompton - -	3·9	3·6	3·1	3·0	3·5	2·9	2·8	2·5	2·4	2·9	2·9	2·9	..
Board of Health -	4·0	3·5	3·1	3·1	3·5	2·8	3·1	2·8	2·5	2·6	2·8	2·6	2·4
St. Thomas' Hosp.	3·9	3·8	3·3	3·4	3·6	2·8	2·9	2·4	2·6	3·0	2·9	3·0	2·9
Poplar - - -	4·1	4·1	3·2	3·1	3·7	3·1	3·0	2·8	2·7	3·0	3·3	3·0	2·9
Guildhall - -	4·2	3·8	3·2	3·1	3·8	2·8	3·1	2·6	2·6	..	..	..	..
Somerset House -	3·7	3·5	2·7	3·0	3·5	2·8	3·0	2·4	2·4	2·7	2·7	2·7	2·6
St. Giles - -	4·5	4·3	3·6	3·5	3·7	3·2	..	..	..	..	..	..	..
Chiswell Street -	..	4·0	3·1	3·1	4·0	..	..	..	..	..	..	..	..
St. Mary's Hosp. -	3·8	3·6	3·1	3·1	3·6	2·8	2·8	2·5	2·5	2·8	2·7	2·6	2·7
Bethnal Green -	3·8	3·4	3·1	3·0	3·6	2·6	2·8	2·4	2·6	2·6	3·0	..	..
St. John's Wood -	..	..	..	..	..	..	2·7	2·4	2·4	2·7	2·7	2·6	2·6
St. Pancras - -	3·6	3·4	3·0	3·2	3·6	2·7	2·9	..	..	..	..	..	..
Highgate - -	4·0	3·8	3·6	3·2	3·7	3·0	2·9	2·5	2·5	2·9	2·9	..	2·7
Enfield Vicarage -	3·8	3·4	3·0	3·0	3·3	2·7	1·6	..	2·3	2·6	2·9	2·5	2·3
Means - -	4·0	3·8	3·2	3·1	3·6	2·8	2·8	2·6	2·5	2·8	2·9	2·7	2·6

TABLE XXVIII.—Showing the Monthly Difference from the Average of the Weight of Vapour in a Cubic Foot of Air.

Months.	Weight of Vapour in a Cubic Foot of Air.		
	Mean.	In the Year 1854.	Excess in 1854.
	grs.	grs.	grs.
January - -	2·6	2·7	+ 0·1
February - -	2·6	2·6	0·0
March - -	2·7	2·8	+ 0·1
April - -	3·1	3·1	0·0
May - -	3·7	3·7	0·0
June - -	4·3	4·2	— 0·1
July - -	4·9	4·6	— 0·3
August - -	4·9	4·7	— 0·2
September -	4·4	4·3	— 0·1
October - -	3·7	3·6	— 0·1
November -	3·1	2·9	— 0·2
December -	2·8	2·8	0·0

From this Table it seems that from June to November there was $\frac{1}{20}$th less water in the air than the average for these months.

The next Table shows the mean monthly weight of a cubic foot of air under the mean temperature, humidity, and pressure.

TABLE XXIX.—Showing the Monthly Difference from the Average of the Weight of a Cubic Foot of Air in the Year 1854.

Months.	Mean Weight of a Cubic Foot of Air.		Excess in 1854 above the Mean.
	Average.	In the Year 1854.	
	grs.	grs.	grs.
January - -	549	546	— 3
February - -	549	554	+ 5
March - -	547	551	+ 4
April - -	540	542	+ 2
May - -	533	534	+ 1
June - -	526	529	+ 3
July - -	524	525	+ 1
August - -	524	526	+ 2
September -	530	532	+ 2
October - -	535	536	+ 1
November -	542	547	+ 5
December -	550	546	— 4

From this Table it seems that the atmosphere has been more than usually dense in every month excepting January and December.

Direction of the Wind.

The direction of the wind has been observed either by the motion of the clouds or by means of a vane. At some stations I was obliged to dispense with observations from the unfavourable position of the Observer for recording them with accuracy. At the Royal Observatory, Greenwich, the direction of the wind is recorded continually by means of Osler's and Whewell's self-registering anemometers, and the results are published weekly in the Report of the Registrar-General. The following Tables give the mean direction of the wind, as observed at the several stations during the periods of their continuance:—

TABLE XXX.—Showing the General Direction of the Wind at the several Stations.

1854. — Period of Continuance.	General Direction of the Wind.															
	Sydenham.	Lewisham.	Royal Observatory.	Bexley Heath.	Brixton Road.	Camberwell.	Millbank Prison.	Brompton.	Board of Health.	St. Thomas's Hospital.	Poplar.	St. Mary's Hospital.	Bethnal Green.	St. John's Wood.	St. Pancras.	Highgate.
July 1 to July 6	..	S.W.	S.W.	..	..	..	..	..	..	S.W.	..	S.W.	..	S.W.	..	..
„ 7 to „ 11	..	N.N.E.	N.E.	..	..	..	..	..	..	S.E. & S.W.	..	E. & S.W.	..	N.E.	..	..
„ 12 to „ 22	..	W.S.W.	S.W.	..	..	..	..	..	..	W. & S.W.	..	W. & S.W.	..	S.W. & N.W.	..	..
„ 23 to „ 29	..	E.N.E.	N.E.	..	..	..	..	..	..	N.E.	..	N.E.	..	N.E.	..	..
„ 30 to Aug. 2	..	S.W.	S.W.	..	..	..	..	..	..	S.W.	..	S.W.	..	S.W.	..	..
Aug. 3 to „ 8	..	N.N.E.	N.	..	..	..	..	..	..	N.W.	..	N.N.E.	..	N.E.	..	..
„ 9 to „ 24	..	S.W.	S.W.	..	..	..	..	..	..	W.S.W.	..	W.	..	S.W.	..	..
„ 25 to Sept. 11	..	N.E.	N.E.	N.E.	N.E.	..	..	..	..	N.W. & N.E.	..	N.E.	..	N.E.	..	N.E.
Sept. 12 to „ 26	..	W.S.W.	W.S.W.	W.S.W.	W.S.W.	W.S.W.	W.	W.N.W.	S.W.	W.	W.S.W.	W.S.W.	W.	..	N.W.	S.W.
„ 27 to Oct. 2	E. & W.	E.S.E.	E.S.E.	S.E.	N.E	E.	S.E. & S.W.	S.E. & S.W.	S.E.	S.W & S.E.	E.	E.S.E.	S.E. & S.W.	..	S.E.	E. & N.W.
Oct. 3 to „ 6	W.	S.W.	S.W.	S.W.	S.W.	W.S.W.	S.W.	W.	S.W.	S.W.	W.	W.	W.	..	W.	S.W.
„ 7 to „ 10	S.E. & N.E.	E.N.E.	E.N.E. & W.S.W	E.N.E.	N.W.	E.N.E.	E.N.E.	W.S.W.	N.W. & S.W.	E.S.E. & W.	E.N.E.	E. & W.	N.E. & S.E.	..	N.E. & W.	N.E.
„ 11 to Nov. 12	W.	S.S.W.	S.W.	W.	W.N.W.	W.	N.W. & S.W.	N.W. & W.	W.	S.W. & N.W.	S.W. & N.W.	S.W. & N.W.	S.W. & W.	..	N.W. & S.W.	N.W. & S.W.
Nov. 13 to „ 16	S.E.	S.E.	S.E.	S.E.	S.E.	..	S.E.	S.	S.S.E.	S.E.	S.E.	S.E.	S.	S.E.	..	S.E.
„ 17 to „ 20	N.E.	N.E.	N.E.	N.N.E.	N.E.	..	N.E.	E.S.E.	N.E.	N.E.	N.N.E.	E.N.E.	N.N.E.	N.E.	..	N.E.
„ 21 to „ 23	S.E. & W.	S.W.	S.W.	S.W.	..	..	S.W.	N.N.W.	S.W.	var.	S.W.	W.N.W.	W.N.W.	S.W.	..	..
„ 24 to „ 26	N.N.W.	N.	N.	N.	..	..	N.	N.N.E.	N.N.E.	N.	N.E.	N.N.E.	N.	N.N.E.	..	N.N.W.
„ 27 to Dec. 31	W.S.W.	W.S.W.	W.S.W.	W.S.W.	..	..	W.S.W.	N.W.	S.W.	W.S.W.	W.S.W.	W.S.W.	W.S.W.	W. & S.W.	..	S.W.

These results show that the direction of the wind, as determined at the several stations, are in close accordance with each other.

From them we see that the direction of the wind from July 1 to September 11 was alternately S.W. and N.E.; and out of the 73 days within this interval, the direction is S.W. on 37 days, and N.E. or N.N.E. on 36 days. Its force, however, was much smaller when from the N.E. than from the S.W; but of this I shall treat presently. From September 12 to 26 the general direction was W.S.W.; for 5 days it was mostly S.E.; for 4 days W.S.W.; then light and variable from October 7 to October 10, both days inclusive; and from October 11 it was W., and remained a compound of west till the end of the year.

The following Table shows the number of times out of 100 in which the wind blew at the several stations from each of the eight points of the compass till the end of October. The winds from intermediate points were equally divided between the two adjacent points:—

TABLE XXXI.—Showing the Frequency of the Several Winds.

Name of Station.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
Sydenham - - -	..	11	5	18	..	9	47	10
Lewisham - - -	8	15	4	10	8	33	10	12
Royal Observatory - -	9	15	4	9	7	34	9	13
Bexley Heath - - -	5	13	15	4	10	23	25	5
Brixton Road - - -	5	15	3	4	8	33	3	28
Camberwell - - -	8	6	9	6	2	20	26	23
Battersea - - - -	6	4	4	6	..	18	20	42
Millbank Prison - -	2	5	..	7	7	38	18	33
Brompton - - -	6	2	2	4	2	16	12	42
Board of Health - -	12	9	7	5	2	38	10	14
St. Thomas's Hospital -	6	8	13	6	4	20	16	27
Poplar - - - -	4	13	13	1	1	25	22	21
Chiswell Street - -	14	11	3	10	5	29	6	22
St. Mary's Hospital - -	3	9	11	13	3	22	12	27
Bethnal Green - - -	9	6	4	4	2	28	23	24
St. Pancras - - -	13	11	..	6	..	30	9	31
Highgate - - - -	12	6	1	4	32	10	27	8
Means - - -	8	9	7	7	7	25	17	26

We learn from these numbers that, in the period from August 25 till October 31, the wind blew nearly three times more frequently from between S.W. and N.W. than from the other points of the compass, which were about equal in amount.

On comparing the numbers in the Table, with those in the lower line, denoting the frequency of each wind for the whole district, it will be seen that southerly winds were in excess at Highgate, and north-westerly in defect. I have but little doubt of the accuracy of these observations, having confidence in the Observer and in the geographical position of the station to afford truthful results. Some insight is, therefore, afforded into the inclined currents on the opposite sides of the Metropolis.

At Bexley Heath there is a slight deficiency of N.W. It is like Highgate, an elevated and open district, and the directions are well determined. At Battersea and Brompton there is an excess of the N.W. but both stations are low, and it is likely that the numbers may have been over estimated.

Force of the Wind.

It is difficult to obtain accurate results of this element without adequate instrumental means, which, unfortunately, are very limited. The only small available instrument for this purpose with which I am acquainted is Lind's anemometer, but experience with this instrument has led me to place less value in its indications than in those in which the force of the wind is estimated.

From the observations taken at the Royal Observatory, Greenwich, it is found that the square of the numbers in a scale of nine degrees of estimated wind force corresponds to the pounds pressure on a square foot of surface. The nine degrees of wind force, thus estimated, are as follows:—

A gentle breeze - - - - -	0·3
A light breeze, the air being in sensible motion -	0·5
A brisk or moderate breeze - - - -	0·7
A strong breeze - - - - -	1·0
A hard wind - - - - -	2·0
A moderate gale - - - - -	3·0
A strong gale - - - - -	4·0
A heavy gale - - - - -	5·0
A great storm - - - - -	6·0

The strength or force of the wind is thus estimated and converted into numbers. The following Table shows the weekly results:—

TABLE XXXII.—SHOWING the MEAN ESTIMATED FORCE of the WIND at the SEVERAL STATIONS.

1854. — PERIOD OF CONTINUANCE.	GENERAL FORCE of the WIND.												
	Sydenham.	Lewisham.	Bexley Heath.	Brixton Road.	Camberwell.	Millbank Prison.	Board of Health.	St. Thomas's Hospital.	Poplar.	St. Mary's Hospital.	St. John's Wood.	St. Pancras.	Highgate.
July 1 to July 6 - -	..	1·4	..	..	..	..	..	..	..	..	1·7	..	..
" 7 to " 11 - -	..	0·3	..	..	..	..	..	..	..	..	1·0	..	..
" 12 to " 22 - -	..	1·4	..	..	..	..	..	..	..	..	1·2	..	..
" 23 to " 29 - -	..	0·6	..	..	..	..	..	..	..	..	1·6	..	..
" 30 to Aug. 2 - -	..	1·7	..	..	..	..	..	..	..	..	1·3	..	..
Aug. 3 to " 8 - -	..	1·0	..	..	..	..	..	..	..	..	1·4	..	..
" 9 to " 24 - -	..	1·4	..	..	..	..	..	..	..	..	1·8	..	..
" 25 to Sept. 11 - -	..	0·3	1·4	..	..	..	..	..	..	..	0·2	..	0·4
Sept. 12 to " 26 - -	0·8	1·8	1·8	0·4	0·9	0·4	0·8	0·8	0·5	0·5	..	1·3	0·5
" 27 to Oct. 2 - -	0·4	0·4	0·5	0·5	0·2	0·3	0·4	0·4	0·4	0·5	..	1·0	0·5
Oct. 3 to " 6 - -	0·8	1·8	1·6	0·8	0·4	0·3	0·6	0·5	0·5	0·6	..	1·7	0·4
" 7 to " 10 - -	0·7	1·2	1·0	0·7	0·4	0·3	0·6	0·7	0·5	0·3	..	1·0	0·3
" 11 to Nov. 12 - -	0·6	1·0	1·7	0·6	0·5	0·4	0·5	0·5	0·4	0·4	..	1·7	0·4
Nov. 13 to " 16 - -	0·5	0·5	0·5	0·3	..	0·3	0·7	0·3	0·3	0·6	1·2	..	0·6
" 17 to " 20 - -	0·7	1·1	2·5	0·6	..	0·6	0·8	0·7	0·4	0·6	2·8	..	0·5
" 21 to " 23 - -	0·6	0·5	2·0	0·5	..	0·3	0·4	0·4	0·3	0·6	1·5	..	0·5
" 24 to " 26 - -	0·7	0·5	0·5	..	..	0·4	0·5	0·3	0·2	0·6	1·5	..	0·4
Nov. 27 to Dec. 31 - -	..	0·5	2·0	..	..	0·7	0·7	0·5	0·4	0·6	1·8	..	0·5

We learn from this Table that the differences between the estimated forces of the wind at the extreme south and north stations are small, but that at the intermediate and low stations the estimated force has at all times been much less. It is not, however, to be expected that these results are strictly accurate, from irregularities due to local causes and the unavoidable errors of observation. In order to lessen their influence, the results from Sydenham, Lewisham, Bexley, St. Pancras, and Highgate have been combined in one group, and the results from the remaining stations in another group. The former would show the mean force of the wind at the outlying stations, and the latter at the central stations. These numbers were then converted into pounds pressure on a square foot of surface by the following Table:—

0·25 by estimation,	corresponds to	1 oz.	pressure on	a square foot.
0·50	,,	,,	4 oz.	,,	,,
0·75	,,	,,	9 ozs.	,,	,,
1·00	,,	,,	1 lb.	,,	,,
1·5	,,	,,	$2\frac{1}{4}$ lbs.	,,	,,
2·0	,,	,,	4 lbs.	,,	,,

In this way the next Table was formed.

TABLE XXXIII.—Showing the Mean Force of the Wind by Estimation, and in lbs. Pressure on a Square Foot of Surface, at the Boundary and Central Stations.

1854. — Period.	Mean Force of the Wind				General Direction of the Wind.
	Estimated		In pounds pressure on a square foot of surface.		
	Northern and Southern Stations.	Central Stations.	Northern and Southern Stations.	Central Stations.	
			lbs. oz.	lbs. oz.	
July 1 to July 6 -	1·5	..	2 4	..	S.W.
July 7 to July 11 -	0·7	..	0 8	..	N.N.E.
July 12 to July 22 -	1·3	..	1 8	..	W.S.W
July 23 to July 29 -	1·1	..	1 3	..	N.E.
July 30 to August 2 -	1·5	..	2 4	..	S.W.
August 3 to August 8 -	1·2	..	1 7	..	N.N.E.
August 9 to August 24	1·6	..	2 6	..	S.W.
August 25 to Sept. 11 -	0·8	..	0 10	..	N.E.
Sept. 12 to Sept. 26 -	1·2	0·5	1 7	0 4	W.S W.
Sept. 27 to October 2 -	0·5	0·3	0 4	0 $1\frac{1}{2}$	E.S.E.
October 3 to October 6	1·2	0·5	1 7	0 4	S.W.
October 7 to October 10	0·8	0·4	0 10	0 $2\frac{1}{2}$	E.N.E
October 11 to Nov. 12 -	1·1	0·4	1 3	0 $2\frac{1}{2}$	S.W.
Nov. 13 to Nov. 16 -	0·6	0·5	0 6	0 4	S.E.
Nov. 17 to Nov. 20 -	1·5	0·6	2 4	0 6	N.E.
Nov. 21 to Nov. 23 -	1·0	0·5	1 0	0 4	S.W.
Nov. 24 to Nov. 26 -	0·7	0·4	0 8	0 $2\frac{1}{2}$	N.
Nov. 27 to Dec. 31 -	0·9	0·6	0 13	0 6	W.S.W.

From these results it would appear that the force of the wind has been very much less at the stations of low elevation than over the high and outlying stations. The ratio of estimated force is as $2\frac{1}{2}$ to 1. The difference of force is, however, more clearly shown in the numbers in the third and fourth columns, showing the simultaneous pressure

on a square foot of surface at the two groups of stations. From these it appears that during the windy period following the almost calm weather ending September 11, whilst the average pressure at the boundary stations was 1 lb. 7 ozs., it was only $\frac{1}{4}$ lb. on the same surface at those situated in the heart of London; and similar differences of pressure are shown in the other numbers of this Table. The small pressure thus found to exist at the central stations implies that for the greater number of hours in the night the air must have been in an absolutely calm state, and that in the periods from August 25 to September 11, September 27 to October 2, and from October 7 to November 12, there was an upper but no under current of air.

It is now necessary to compare the velocity of the air in its daily motion during the period under investigation with the average velocity for the same period of the year, as determined from a series of observations.

Velocity of the Air.

The horizontal movement of the air was determined daily by the use of Whewell's anemometer, at the Royal Observatory Greenwich. It has been in use since the year 1845, from which time the daily movement of the air has been ascertained. The following Table shows the average movement of the air, as found from the observations of the years from 1845 to 1853 inclusive.

TABLE XXXIV.—Showing the Average Daily Horizontal Movement of the Air.

Day of Month.	July.	August.	September.	October.	November.	December.
	miles.	miles.	miles.	miles.	miles.	miles.
1	168	67	109	105	108	141
2	121	85	102	98	111	144
3	134	86	81	110	98	116
4	71	102	79	143	117	159
5	98	96	82	122	159	156
6	115	107	71	128	142	167
7	110	106	66	158	171	147
8	107	116	77	134	116	138
9	125	135	86	151	103	138
10	104	101	86	124	107	158
11	76	141	67	92	128	127
12	77	83	100	103	94	109
13	78	103	77	101	83	110
14	109	92	52	108	86	161
15	87	108	86	90	106	183
16	98	93	104	67	152	183
17	98	97	93	134	167	136
18	120	128	95	143	146	133
19	121	140	93	117	152	146
20	118	132	97	124	169	133
21	127	117	119	146	112	109
22	106	74	94	150	157	107
23	94	84	80	146	145	71
24	83	86	66	126	137	71
25	121	123	97	103	163	106
26	111	161	122	89	117	171
27	114	131	115	118	102	101
28	81	98	91	96	131	82
29	89	89	121	84	128	108
30	93	84	123	99	137	106
31	110	81		88		95
Means -	105	105	91	116	128	129

TABLE XXXV.—Showing the Horizontal Movement of the Air.

Days of the Month.	Horizontal Movement of the Air in Miles.								The whole or part of the day calm.
	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	
	miles.	miles.	miles.	miles.	miles.	miles.	miles.	miles.	
July 1	..	..	..	..	15	..	..	..	calm.
2	..	..	..	..	40	..	..	..	calm.
3	..	..	..	..	..	95	..	..	calm.
4	..	..	..	..	..	42	43	..	—
5	..	..	..	..	72	..	73	..	—
6	..	..	..	..	..	45	..	..	—
7	..	..	..	light.	..	..	..	..	calm.
8	..	..	..	..	..	..	..	..	calm.
9	..	..	..	..	..	..	..	..	calm.
10	..	45	..	..	..	..	..	..	—
11	30	30	..	..	..	..	..	..	calm.
12	..	..	..	..	..	..	35	35	—
13	..	..	..	..	..	..	80	..	calm.
14	..	..	..	..	..	135	..	..	
15	..	..	.	..	..	45	..	45	calm.
16	..	..	..	..	..	..	90	..	—
17	..	..	..	..	30	30	..	..	calm.
18	..	..	..	..	..	53	52	..	—
19	..	..	..	..	70	70	..	..	—
20	..	95	..	..	..	..	..	..	—
21	..	..	..	..	..	35	..	..	calm.
22	..	..	..	..	..	65	..	..	calm.
23	..	..	..	..	..	35	..	..	calm.
24	..	..	80	..	..	..	..	..	—
25	..	41	41	..	..	..	..	..	—
26	..	25	..	..	..	..	..	..	calm.
27	..	95	..	..	..	..	..	..	—
28	..	85	..	..	..	..	..	..	—
29	..	..	25	25	..	..	..	..	calm.
30	..	..	..	..	..	120	..	..	—
31	..	..	..	..	..	115	..	..	—
Sums -	30	416	146	25	227	885	373	80	Daily average, 69 miles.
August 1	..	..	..	..	..	60	..	..	—
2	..	..	..	..	..	55	..	55	—
3	..	80	..	..	..	..	..	..	calm.
4	83	..	..	..	..	..	..	82	—
5	50	..	..	..	..	..	..	50	—
6	37	..	..	..	..	..	..	38	calm.
7	10	..	..	..	..	..	..	..	calm.
8	..	25	..	..	..	25	..	..	calm.
9	..	..	..	..	..	40	..	..	calm.
10	..	..	..	..	..	..	..	75	calm.
11	..	..	..	..	..	130	..	..	—
12	..	..	..	..	57	57	..	..	—
13	..	..	..	18	17	..	..	..	calm.
14	..	..	..	..	..	90	..	..	calm.
15	..	..	..	..	..	50	..	..	calm.
16	..	..	..	..	..	60	..	..	calm.
17	..	..	..	..	..	..	30	..	calm.
18	..	..	..	..	..	30	30	..	calm.
19	..	..	..	..	..	125	..	..	—
20	..	..	..	..	28	29	29	..	—
21	..	..	..	..	..	115	..	..	—
22	..	..	..	..	..	70	70	..	—
23	..	..	..	..	..	190	..	..	—
24	..	..	..	..	..	102	103	..	—

Table XXXV.—Showing the Horizontal Movement of the Air—*cont.*

Days of the Month.	Horizontal Movement of the Air in Miles.								The whole or part of the day calm.
	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	
	miles.	miles.	miles.	miles.	miles.	miles.	miles.	miles.	
August 25	20	..	..	..	..	..	20	..	calm.
26	20	..	..	..	..	20	..	20	calm.
27	25	..	..	..	..	..	..	..	calm.
28	40	..	..	..	..	..	..	..	calm.
29	10	..	..	..	..	..	..	..	calm.
30	..	..	..	..	..	50	..	..	calm.
31	..	17	..	..	..	18	..	..	calm.
Sums -	295	122	..	18	102	1316	252	320	Daily average, 78 miles.
September 1	40	..	..	..	..	..	..	..	calm.
2	..	..	23	22	..	..	..	..	calm.
3	..	22	..	23	..	..	..	..	calm.
4	..	60	..	..	..	..	..	..	calm.
5	..	35	..	..	..	..	..	..	calm.
6	..	8	..	..	7	..	..	..	calm.
7	..	10	..	..	..	..	..	..	calm.
8	..	25	..	..	..	..	..	..	calm.
9	..	5	..	..	..	..	..	..	calm.
10	..	..	..	..	..	..	..	..	calm.
11	..	15	..	..	..	..	..	..	calm.
12	..	.	..	70	..	70	..	..	—
13	..	.	..	..	..	150	..	..	—
14	..		..	..	..	65	65	..	—
15	..	.	..	..	..	155	..	..	—
16	..	..	..	..	..	80	80	..	—
17	..	..	..	..	..	170	..	..	—
18	..	..	..	..	..	235	..	..	—
19	..	..	..	..	..	180	..	..	—
20	60	..	..	..	..	60	..	..	—
21	..	..	..	..	..	..	73	72	—
22	..	..	..	..	..	40	40	40	—
23	..	..	..	..	..	47	..	48	—
24	..	..	..	..	..	..	150	..	—
25	..	..	..	..	..	..	17	18	calm.
26	..	..	..	..	..	..	..	..	calm.
27	..	..	17	18	..	..	..	..	calm.
28	..	..	..	..	..	..	..	..	calm.
29	..	..	..	..	..	..	..	..	calm.
30	..	..	..	..	..	..	..	..	calm.
Sums -	100	180	40	133	7	1252	425	178	Average per day, 77 miles.
October 1	..	..	..	..	..	..	..	..	calm.
2	..	..	..	..	..	..	..	..	calm.
3	..	..	..	..	..	45	..	45	—
4	..	..	..	..	..	175	..	..	—
5	..	..	..	..	..	165	..	..	—
6	..	50	..	..	..	50	..	..	calm.
7	..	180	..	..	..	..	..	..	—
8	..	..	60	..	..	..	..	..	—
9	..	..	40	..	..	..	40	..	—
10	..	..	..	..	..	46	47	47	—
11	62	..	..	..	..	63	..	..	—

TABLE XXXV.—Showing the Horizontal Movement of the Air—*cont.*

Days of the Month.	Horizontal Movement of the Air in Miles.								The whole or part of the day calm.
	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	
	miles.	miles.	miles.	miles.	miles.	miles.	miles.	miles.	
October 12	45	..	..	..	..	..	..	..	—
13	..	..	..	..	..	..	..	..	calm.
14	..	..	..	..	..	..	..	..	calm.
15	..	..	..	..	..	..	..	..	calm.
16	15	..	..	..	..	..	..	..	calm.
17	..	150	..	..	..	..	..	..	—
18	..	..	..	..	..	..	..	160	—
19	..	..	..	..	..	78	..	77	—
20	..	..	..	..	..	55	55	..	—
21	..	..	..	..	..	77	..	78	—
22	..	..	..	..	..	53	..	52	—
23	..	..	..	..	..	55	..	55	—
24	..	20	..	..	..	20	..	..	calm.
25	..	90	..	..	..	..	..	..	calm.
26	..	..	..	..	..	10	..	..	calm.
27	..	..	..	..	30	30	..	..	calm.
28	..	..	..	55	..	..	..	..	calm.
29	..	..	..	16	17	17	..	..	calm.
30	..	..	..	70	..	..	..	..	—
31	..	..	..	25	..	25	..	..	calm.
Sums -	122	490	100	166	47	964	142	514	Average per day, 82 miles.
November 1	..	..	..	..	7	8	..	..	calm.
2	..	..	..	52	53	..	..	..	—
3	..	..	..	..	..	38	38	39	—
4	..	..	..	..	..	140	..	..	calm.
5	..	..	..	..	..	25	25	25	—
6	30	..	..	..	..	..	30	..	—
7	..	..	..	..	..	90	..	..	—
8	..	..	..	..	..	125	..	..	—
9	52	..	..	..	..	..	..	53	—
10	..	..	..	..	..	145	..	..	—
11	26	..	..	..	..	27	..	27	—
12	25	..	..	..	..	..	..	..	—
13	..	..	..	75	75	..	..	..	—
14	..	..	..	95	..	..	..	..	calm.
15	..	..	..	32	..	31	..	..	—
16	..	..	..	15	..	..	..	..	—
17	62	63	..	..	..	..	..	..	—
18	..	165	..	..	..	..	..	..	—
19	..	135	..	..	..	..	..	..	—
20	..	65	..	..	..	..	..	..	—
21	..	..	..	..	..	150	..	..	—
22	..	..	..	..	..	30	30	..	—
23	..	18	..	..	..	18	..	..	—
24	100	..	..	..	..	..	..	..	—
25	115	..	..	..	..	..	..	..	—
26	10	..	..	..	..	..	..	..	—
27	..	..	..	..	..	85	..	..	—
28	..	..	..	..	..	255	..	..	—
29	..	..	..	..	..	135	..	..	—
30	..	..	..	..	..	155	..	..	—
Sums -	420	446	..	269	135	1457	123	134	Average per day, 86 miles.

TABLE XXXV.—Showing the Horizontal Movement of the Air—*cont.*

Days of the Month.	Horizontal Movement of the Air in Miles.								The whole or part of the day calm.
	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	
	miles.	miles.	miles.	miles.	miles.	miles.	miles.	miles.	
December 1	..	..	..	..	..	..	185	..	—
2	..	..	..	..	..	80	80	..	—
3	..	..	..	..	..	137	138	..	—
4	..	..	..	..	..	145	145	..	—
5	..	..	..	..	..	245	..	..	—
6	..	..	..	..	..	83	82	..	—
7	62	..	..	..	..	..	63	..	—
8	..	..	..	..	..	165	..	..	—
9	..	..	..	..	..	..	113	112	—
10	48	47	..	..	..	..	..	..	—
11	..	..	..	..	..	160	..	..	—
12	..	..	..	..	..	75	75	..	—
13	..	..	..	..	..	265	..	..	—
14	..	..	..	..	..	290	..	..	—
15	..	..	..	..	..	163	162	..	—
16	..	..	..	..	..	83	..	82	—
17	..	..	..	..	..	78	77	..	—
18	122	..	..	..	..	123	..	..	—
19	35	..	..	..	..	35	..	35	—
20	70	..	..	..	..	..	..	70	—
21	..	..	..	..	..	105	105	..	—
22	..	..	..	..	..	125	125	..	—
23	..	..	..	..	..	40	..	40	—
24	..	..	..	..	..	..	230	..	—
25	..	..	..	..	..	110	110	..	—
26	..	..	..	..	..	113	112	..	—
27	..	..	..	..	..	..	80	..	—
28	22	..	..	..	..	..	23	..	—
29	..	..	..	..	..	52	53	..	—
30	..	..	..	..	..	42	43	..	—
31	..	..	..	..	..	..	300	..	—
Sums -	359	47	..	..	..	2714	2301	339	Average per day, 186 miles.

The directions of the wind from day to day are shown in these Tables, as well as the horizontal movement of the air in miles. The figures in the lower lines show the number of miles the air has moved in each direction, referred to eight points of the Azimuthal Circle, and the average number of miles daily, independently of direction. By comparing the latter with those in the lower lines of Table XXXIV., it will be seen that in July, the daily motion of the air was less than its average by 36 miles; in August by 27; in September by 14; in October by 34; in November by 42. In December its velocity was greater by 57 miles daily. In July a calm was noted on 16 days; in August on 19 days; in September on 17 days; in October on 13 days; in November on 3 days, and none in December. Thus, out of the 123 days, from July 1 to October 31, a calm was noted on 65 days, or one half of the whole number. The exceptions to this oppressive state were, on July 3, 6, 19, and 26; August 12, 14, 15, 23, 24; September 12 to September 24, October 5, 7, 8, 11, 17, 18, 19, 20, 23, 24, and 28. In July the greatest pressure on the surface of a square foot was 2 lbs. in one instance; in August of 5 lbs. on the 24th; in September of 7 lbs. on the 24th; and in October of 10 lbs. on the 18th.

In each month the sum of the velocities is the greatest with the S.W. wind; the next in order, in July, was N.E.; in August N.W.; in September and October W.; in November N.N.E.; and in December N.N.W.

By resolving the sum of the horizontal movements of the air for each of the compound directions of the wind into two component forces, by multiplying each force by the cosine of the angle which its direction makes with the cardinal, the following results are obtained:—

1854. — Months.	Direction of the Wind.			
	N.	E.	S.	W.
July - -	376	448	871	1,121
August -	627	99	1,032	1,457
September -	358	274	994	1,437
October -	831	564	846	1,187
November -	830	505	1,355	1,248
December -	552	31	1,919	4,460

From these numbers it appears that in—

July	the S. horizontal movement exceeded the N. by	495 Miles;	and the W. exceeded the E. by	673 Miles.
Aug.	"	405 "	"	1,358 "
Sept.	"	636 "	"	1,163 "
Oct.	"	15 "	"	623 "
Nov.	"	525 "	"	743 "
Dec.	"	1,367 "	"	4,129 "

By taking the means of the numbers in Table XXXV. corresponding to the period during the continuance of each wind, and also those observed within the same periods, the next Table is formed, showing the relative horizontal movement of the air, as compared with its mean value.

TABLE XXXVI.—Showing the COMPARISON of the AVERAGE with the daily observed HORIZONTAL MOVEMENT of the AIR.

1854. — Period of Continuance.	General Direction of Wind.	Daily Horizontal Movement of the Air.	
		Observed.	Daily Difference from Average.
		miles.	miles.
July 1 to July 6 - -	S.W.	71	— 47
" 7 " 11 - -	N.N.E.	35	— 83
" 12 " 23 - -	W.S.W.	88	— 16
" 24 " 29 - -	N.E.	65	— 34
" 30 to Aug. 2 - -	S.W.	101	+ 12
Aug. 3 " 8 - -	N.N.E.	80	— 22
" 9 " 24 - -	S.W.	96	— 11
" 25 to Sept. 11 - -	N.E.	31	— 62
Sept. 12 " 26 - -	W.S.W.	132	+ 40
" 27 - - -	E.S.E.	35	— 80
" 28 to Oct. 2 - -	Calm.	0	—136
Oct. 3 " 6 - -	S.W.	132	+ 7
" 7 " 10 - -	E.N.E.	115	— 27
" 11 to Nov. 12 - -	S.W.	83	— 31
Nov. 13 " 16 - -	S.E.	81	— 26
" 17 " 20 - -	N.E.	122	— 37
" 21 " 23 - -	S.W.	82	— 56
" 24 " 26 - -	N.	75	— 64
" 27 to Dec. 31 - -	W.S.W.	154	+ 26

The sign — denotes below the average, and + above the average.

From the numbers in this Table it will be seen that the velocity of the air has been much less than usual. From July 1 to September 11, with the exception of the four days between July 30 and August 2, it was moving with a diminished rate, and at times its velocity was very small, particularly in the period from August 25 to September 11, when its velocity was one-third only of its average; and in that of September 27 to October 2, when its velocity was only one-fourth part of its average for those days. These periods were the calmest within the series, and it is found in the preceding section that, although there was a slight upper current at high places, there was none at low; at the latter there was a dead calm, and the air was stagnant.

Electricity.

Till the end of September instruments for the observation of atmospheric electricity could not be obtained. At this time delicate and sensitive electrometers, made by Watkins and Hill, were supplied to six stations. Unfortunately one of them became deranged, and was not again in order till the end of November. The following Tables give the results for every day.

TABLE XXXVII.—SHOWING the ELECTRICITY of the ATMOSPHERE at the several STATIONS.

TABLE XXXVII.—Showing the Electricity of the Atmosphere at the several Stations—*cont.*

MONTH AND DAY.	Lewisham.	Millbank.	Board of Health, White-hall.	St. Thomas's Hospital.	Poplar.	St. Mary's Hospital.	Highgate.
September 1	var. P.	—	—	—	—	—	—
2	var. P.	—	—	—	—	—	—
3	mod. P.	—	—	—	—	—	—
4	mod. P.	—	—	—	—	—	—
5	mod. P.	—	—	—	—	—	—
6	mod. P.	—	—	—	—	—	—
7	mod. P.	—	—	—	—	—	—
8	mod. P.	—	—	—	—	—	—
9	mod. P.	—	—	—	—	—	—
10	mod. P.	—	—	—	—	—	—
11	mod. P.	—	—	—	—	—	—
12	slight P.	—	—	—	—	—	—
13	0	—	—	—	—	—	—
14	0	—	—	—	—	—	—
15	mod. P.	—	—	—	—	—	—
16	mod. P.	—	—	—	—	—	—
17	var. P.	—	—	—	—	—	—
18	mod. P.	—	—	—	—	—	—
19	0	—	—	—	—	—	—
20	mod. P.	—	—	—	—	—	—
21	var. P.	—	—	—	—	—	—
22	mod. P.	—	—	—	—	—	—
23	slight P.	—	—	—	—	—	—
24	var. P.	—	—	—	—	—	—
25	mod. P.	—	—	—	—	—	—
26	var. P.	—	—	—	—	—	—
27	mod. P.	—	—	—	—	—	—
28	var. P.	—	0·1 N.	—	—	—	P.
29	var. P.	—	0·2 P.	—	—	—	P.
30	str. P.	—	0·1 P.	—	—	—	P.
October 1	var. P.	—	—	—	—	0	P.
2	str. P.	—	0·25 P.	1·0 P.	—	0·5 P.	P.
3	var. P.	—	0·05 N. 0·2 P.	0·5 P.	—	0	P.
4	mod. P.	—	0·1 N.	0·7 P.	—	0	P.
5	weak P.	—	0·05 N. 0·2 P.	0	—	0	P.
6	str. P.N.	—	0·05 N. 0·2 P.	0	—	0.1 N.	P.
7	str. P.	—	0·05 P.	1·4 P.	—	0	P.
8	mod. P.	—	—	0	—	0·25 P.	P.
9	str. P.	—	0·1 P.	0·4 P.	—	0	str. P.
10	str. P.	—	0·2 P.	0·5 P.	—	0	P.
11	var. P.	—	0·15 P.	0·9 P.	—	0	P.
12	str. P.	—	0·1 P.	1·5 P.	—	0	N.
13	str. P.	—	0·1 P.	1·2 P.	—	1·0 P.	P.
14	str. P.	—	0	0·6 P.	—	0	N.
15	weak P.	—	—	0	—	0	feeble N.
16	mod. P.	—	0·75 P.	0·2 P.	—	0	N.
17	mod. N.	—	0·05 P.	1·0 P.	—	0	N.
18	mod. P.	—	—	0·2 P.	—	slight N.	N.
19	str. P.	—	0·2 P.	0·7 N.	—	0	..
20	weak P.	—	0·15 P.	0·2 P.	—	slight N.	P.
21	str. P.	—	0·1 P.	1·7 P.	—	slight P.	P.
22	0	—	—	0·3 P.	—	slight P.	0
23	mod. P.	—	0·1 P.	1·3 P.	—	1·0 P.	P.
24	str. P.N.	—	0·1 P.	1·0 P.	—	1·0 P.	P.
25	str. N.	—	—	0	—	0	P.
26	mod. N.P.	str. P.	0·2 P.	0·1 P.	—	0·5 P.	P.
27	var. P.	mod. N.	0·17 P.	0·2 P.	—	1·5 P.	P.
28	str. P.	mod. N.	0·05 P.	1·1 P.	—	0	var. P.
29	str. P.	mod. P.N.	—	0·4 P.	—	0	P.
30	mod. P.	mod. N.P.	0·07 P.	0·9 P.	—	0	P.
31	str. P.	mod. P.	0·1 P.	1·4 P.	—	0	P.
November 1	str. P.	mod. P.	0·15 P.	0	—	0	P.
2	weak. P.	mod. P.	0·07 P.	0	—	0	P.
3	var. P.	mod. P.	0	1·0 P.	—	0	P.
4	str. P.	mod. P. str. N.	0·02 P.	0·2 N.	—	0	0
5	var. P.	str. P.	—	0·5 P.	—	0·5 P.	0
6	mod. P.	str. P.	0·10 P.	1·1 P.	—	0	0
7	str. P.	mod. P.	0·10 P.	0·9 P.	—	str. P.	P.
8	str. P.	str. P.	0·10 P.	0·1 P.	—	0	0
9	str. N.P.	mod. P.	0·07 P.	0·7 P.	—	0·25 P.	0
10	weak P.	gen. N. mod. P.	0·05 P.	0·7 P.	—	0	0
11	0	mod. P. str. N.	0·05 P.	0·8 P.	—	0	0
12	0	mod. P.N.	—	0·7 P.	—	0	0
13	mod. P.	mod. P.	0·05 P.	0	—	0	P.
14	str. N.P.	mod. P. str. N.	0·05 N.	0·2 P.	—	0	0
15	str. N.P.	mod. N.P.	0·05 N. 1·5 P.	0	—	v. str. P.	N.
16	str. N.P.	str. P.	0·22 P.	0	—	v. str. P.	P.
17	str. N.P.	str. P.	0·06 P.	0	—	0	0
18	mod. P.	—	0·03 P.	0·5 P.	—	0	0
19	mod. P.	—	—	0·8 P.	—	0	0
20	var. P.	—	0·12 P.	0·7 P.	—	..	0
21	mod. P.	str. N.	0·15 P. 0·40 N.	0·4 P.	—	0·75 P.	P.
22	str. P.	str. P.	0·22 P.	0	—	v. str. P.	P.
23	str. P.	mod. P.	0·2 P.	0	—	0·75 P.	0
24	str. P.	str. P.	0·12 P.	0	—	0·5 P.	0
25	var. P.	mod. P.	0·01 P.	0	—	0	0
26	str. P.	mod. P.	—	0·3 P.	—	0·5 P.	var. P.
27	str. P.	mod. N.P.	0·3 P.	0·1 P.	—	1 P.	P.
28	str. P.	mod. P.	0·07 P.	0	—	0·5 P.	P.
29	mod. P.N.	mod. P. str. N.	0·12 P.	0	—	0·75 P.	P.
30	mod. P.	mod. P.	0·07 P.	0·7 P.	—	0·5 P.	P.
December 1	weak P.	mod. P. slight N.	0·07 P.	0.2 P.	—	slight P.	N.
2	weak P.	mod. P.	0·10 P.	1·1 P.	—	0	N.
3	weak P.	mod. P.	—	0·4 P.	mod. N.	0·25 P.	P.
4	mod. P.	mod. P. str. N.	0·1 P.	0·9 P.	mod. N.	0	0
5	mod. P.	mod. P. str. N.	0·07 P.	0·7 P.	P.	weak P.	P.
6	mod. P.	str. P.	0·15 P.	0·5 P.	str. N.	0·25 P.	P.
7	str. P.	str. P.N.	0·17 P.	1·4 P.	mod. N.	0·5 P.	var.
8	mod. P.	str. P.	0·05 P.	0·1 P.	mod. N.	0	P.
9	mod. P.	mod. N. str. P.	0·07 P.	0·2 P.	mod. N.	0	var.
10	str. P.	str. P.	—	0·6 P.	mod. N.	—	—
11	str. P.	str. N.P.	0·22 P.	1·5 P.	mod. N.	—	—
12	str. P.	str. P.N.	0·25 P.	0·1 P.	mod. N.	—	—
13	mod. P.	str. P.	0·17 P.	0·1 P.	mod. N.	—	—
14	0	slight P.	0·0	0·0	mod. N.	—	—
15	0	str. P.	0·05 P.	1·0 P.	mod. N.	—	—
16	mod. P.	slight N. str. P.	0·02 P.	0·9 P.	—	—	—
17	mod. P.	str. N.	—	0·2 P.	N.	—	—
18	mod. P.	slight P.	0·10 P.	0	N.	—	—
19	mod. P.	str. P.	0·15 P.	2·4 P.	N.	—	—
20	mod. P.	mod. P. str. N.	0·05 P.	0	N.	—	—
21	mod. P.	str. N. slight P.	0·07 P.	0	N.	—	—
22	mod. P.	str. P.	0·02 P.	0	N.	—	—
23	mod. P.	str. P.	0·15 P.	0·2 P.	N.	—	—
24	mod. P.	str. N.	—	0·3 P.	N.	—	P.
25	mod. P.	str. P.	—	0	N.	—	0
26	mod. P.	str. P.N.	0·12 P.	0·4 P.	N.	—	P.
27	mod. P.	str. N.	0·12 P.	0·5 P.	N.	—	0
28	mod. P.	str. N.	0·20 P.	0·8 P.	N.	—	0
29	mod. P.	str. N.	0·25 P.	0·3 P.	N.	—	0
30	mod. P.	str. P.	0·10 P.	0	N.	—	P.
31	mod. P.	str. N.	—	0·1 P.	—	—	var.

From these Tables we learn that at Lewisham in September positive electricity was present on 27 days, and on three days not at all. In October it was positive on 28 days, negative on 2 days, both positive and negative on 3 days, and on one day none at all. In November positive electricity was present on 22 days; both positive and negative on 6 days, and none at all on 2 days. In December positive on 29 days, and none on 2 days. Then out of 122 days, from September 1 to December 31, common positive electricity was shown on 103 days, negative on 2 days; both negative and positive on 9 days, and on 8 days none was shown. Its strength was moderate and weak in September; frequently strong from the 6th of October till the beginning of December, and moderate and weak throughout this month.

At the Board of Health observations were began on September 28; and from this time to the end of the year, positive electricity was noted on 70 days, and negative on 7 days; on three days none at all. At Millbank Prison observations were began on October 26, and positive electricity was noted on 55 days, negative on 31, and none on three days.

At St. Thomas's Hospital positive electricity was noted in October on 24 days, negative on 1 day, and none on 5 days; in November positive electricity on 17 days, negative on 1 day, and none on 12 days; in December positive on 25 days, and none on 6 days. Thus out of 92 days, from October 1, positive electricity was noted on 66 days, negative on 2 days, and none at all on 23 days.

At St. Mary's Hospital the observations began on October 1, and ceased on December 9; within this interval on 28 days positive electricity was noted, on 3 days negative electricity, and on 36 no electricity at all.

At Highgate the observations began on October 1, and with the exception from December 10 to December 23, continued to the end of the year. Positive electricity was noted 44 times, negative 9 times; on 23 days the instrument was unaffected.

It is desirable to direct some attention to those days on which negative electricity was noticed at some stations and positive at others. On October 3, 4, and 5, negative electricity was noticed at the Board of Health; on the 6th negative electricity was shown at the low stations and positive at the high; on the 12th, 14th, 15th, and 16th, negative electricity was noticed at Highgate, and positive at other stations; on the 17th negative at Lewisham and Highgate, and positive at intermediate stations; on the 18th positive at south stations and negative at north; on the 20th negative at St. Mary's Hospital and positive elsewhere; from the 27th to the 30th negative at Millbank Prison. On November 4th the electricity was positive and negative at the different stations, and variable in strength; on the 21st it was negative at Millbank and the Board of Health. In December it was negative at Highgate on the 1st and 2d, and was frequently negative at Millbank Prison, and almost always negative at Poplar during the month. With these exceptions, the observations of atmospheric electricity taken at the several stations were in close accordance with each other, both in kind and in tension.

Ozone.

I rejoice that the persevering spirit of inquiry which distinguishes the present age should have added another meteorological element of investigation to the preceeding, one too, which if somewhat verging upon the field of chemical inquiry, promises to be a subtle and important agent in aid of this research into the nature and extent of meteorological influences upon the rise and progress of cholera. That these influences are great it is not possible to doubt, and equally impossible it is to believe that uncombined with others they are sufficient to account for the sudden and formidable growth of a disease, which in a few weeks from hitherto unexplained causes rises with giant strides into a devastating power, more formidable than any our country has yet known, and which with even greater rapidity has subsided, to be renewed, when we know not, unless a series of investigations like the present shall reveal to us the conditions of its rise and progress. The conjoining here a link of inquiry from a field so fraught with importance to the entire investigation as that of chemistry, I consider greatly in aid of this inquiry, and purpose to discuss the ozone observations at my command with the utmost rigour.

Ozone, first discovered by Dr. Schonbein in 1848, has since that date in England been sedulously investigated by Dr. Moffat. This indefatigable observer considers it to exercise an important influence on the animal economy, and believes that it may be found a means of materially inducing or modifying diseased actions, in which opinion he is supported by Dr. Schonbein.

In order to investigate the daily developments of this agent in the atmosphere during the epidemic of cholera, strips of test paper, as purchased from Mr. Cox at Peckham, and which he assured me he had received direct from Professor Schonbein's agent, were distributed to all the metropolitan stations; and other test papers, prepared by Dr. Moffat himself, were similarly distributed. The directions for noting the presence and measuring the amount of ozone are very simple, being the free exposure to the atmosphere (protected from rain and the direct rays of the sun) of a small strip of dry paper, previously saturated with a solution of starch and chemically pure iodide of potassium. The discoloration of this paper on exposure, to brown, or when immersed in water, to purple, attests the presence of ozone, and the degree of discoloration its intensity and amount, these changes in the paper are caused by the iodine being set free, through its power of oxidising the potassium of the iodide.

In the course of the observations, a test paper of each kind was exposed in the morning and evening daily at every station. It was found that the papers prepared by Dr. Moffat, were more sensitive than those of Dr. Schonbein, and accordingly indicated the presence of ozone when none was indicated by those of Schonbein. The following results are therefore based entirely on Moffat's papers.

From August 24 till September 4 there was no ozone at any station near the metropolis, and very little at any station over the country; a little was shown on September 5, and from this time afterwards was exhibited generally. It was most abundant on September 24, October 7, 8, 11, 18, 25, November 19, 20, 24, 25, and 26.

The following Table shows the mean amount in each week, the greatest intensity being represented by 10.

TABLE XXXVIII.—Weekly Amount of Ozone at the Different Stations.

Name of Station.	Week Ending																
	September				October				November				December				
	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
Sydenham - - -	..	..	..	..	..	3·1	3·7	4·4	6·7	0·7	3·3	..	..	..	..	..	..
Lewisham - - -	0·3	1·4	2·2	0·3	0·7	0·7	0·4	0·7	0·0	0·0	0·0	0·7	1·2	1·3	0·4	1·0	2·1
Bexley Heath - -	2·9	1·5	2·0	1·4	2·9	2·4	2·4	1·0	1·2	0·6	2·1	2·0	1·1	1·7	2·6	2·4	2·9
Brixton Road - -	0·0	0·4	1·0	0·0	0·3	0·0	0·0	0·0	0·0	0·0	0·0	0·0	..	..	..	..	..
Camberwell - -	0·0	0·1	0·0	0·0	0·0	0·0	0·0	0·0	..	..	..	..	..	..	..	..	..
Battersea - - -	0·0	0·0	0·0	0·0	0·6	0·1	0·6	1·9	0·1	0·0	0·0	0·0	0·0	..	..	..	..
Dreadnought - -	0·0	0·0	0·0	0·2	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	..	..	..	..
Millbank - - -	..	..	0·1	0·5	0·7	0·6	0·4	0·6	0·2	1·2	..	..	..	..	..	0·9	0·0
Brompton - - -	..	..	2·8	0·5	1·1	0·4	1·0	0·1	0·4	0·6	0·0	0·0	0·0	..	..	..	..
Board of Health - -	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0
St. Thomas's Hospital -	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0
Poplar - - -	..	..	0·0	0·0	0·4	0·0	0·0	0·0	..	..	..	..	..	..	..	..	..
Somerset House - -	0·0	0·0	0·0	0·0	0·1	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0
St. Mary's Hospital - -	0·0	0·2	2·0	1·0	0·4	0·0	..	..	..	..	..	..	..	..	..	..	..
Bethnal Green - -	..	0·0	0·0	0·0	0·1	0·1	0·1	0·0	0·0	0·0	0·3	0·2	0·0	0·0	..	..	..
St. Pancras - - -	0·0	0·0	0·2	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	..	..	..	..	..
Highgate - - -	0·4	0·9	1·1	1·4	2·1	2·2	2·4	1·5	0·1	0·7	1·1	3·4	1·8	1·3	1·6	..	1·3
Means - - -	0·3	0·3	0·8	0·3	0·6	0·6	0·7	0·7	0·6	0·3	0·5	0·4	0·4	0·6	0·8	0·7	0·9

From this Table we learn that the amount of ozone at all stations of low elevation has been insignificant, and that at many places near the river no trace of it at all has been detected throughout the whole of the cholera period. On the other hand, at places of high elevation, ozone has been shown nearly at all times, and at other and intermediate stations has been shown occasionally. The presence and amount of ozone, from these observations, would seem to be graduated by the elevation, and to increase as we ascend from the lowest to the highest ground.

Rain.

The fall of rain over the metropolis I considered would be sufficiently well determined by having observations made at two stations to the north, and two to the south, with the addition of observations from three or four of the central stations. The next Table gives the results of the rain-fall at these places.

TABLE XXXIX.—WEEKLY RAIN-FALL at the DIFFERENT STATIONS.

NAME OF STATION.	WEEK ENDING																								
	JULY				AUGUST				SEPTEMBER					OCTOBER				NOVEMBER				DECEMBER				
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25	2	9	16	23	30
	in.	in.	in.	in.	in.	in.	in.	in.	in	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Lewisham - -	0·43	0·77	0·06	0·09	2·24	0·02	0·24	0·05	0·00	0·00	0·48	0·33	0·01	0·58	0·09	0·90	1·08	0·00	0·09	0·70	0·24	0·56	0·22	0·11	0·91	0·12
Royal Observatory	0·53	0·87	0·00	0·04	2·72	0·01	0·15	0·13	0·00	0·00	0·45	0·25	0·00	0·45	0·06	0·48	0·80	0·00	0·08	0·62	0·22	0·48	0·21	0·07	0·71	0·14
Brixton Road -	..	..	..	..	..	..	..	..	0·00	0·00	0·40	0·26	0·00	0·46	0·20	0·60	1·34	0·02	0·12	0·54	0·18	..	..	..	..	..
Board of Health -	..	..	..	..	..	..	..	..	0·00	0·00	..	..	..	0·44	0·11	0·66	0·80	0·02	0·11	0·54	0·20	0·53	0·25	0·23	0·85	0·24
St. Thomas' Hosp.	..	..	..	..	..	..	..	..	0·00	0·00	0·40	0·15	0·00	0·40	0·50	0·85	0·70	0·00	0·00	0·70	0·20	0·80	0·25	0·18	0·80	0·19
Chiswell Street -	..	..	..	..	..	..	..	..	0·00	0·00	0·39	0·18	0·00	..	0·13	0·78	0·78	0·02	..	..	..	..	..	..	..	..
St. Mary's Hosp. -	0·45	0·67	0·16	0·22	2·84	0·00	0·20	0·11	0·00	0·00	0·42	0·17	0·00	0·44	0·12	0·86	0·84	0·03	0·12	0·56	0·17	0·46	0·11	0·18	0·84	0·22
St. John's Wood -	0·50	0·78	0·16	0·31	3·09	0·03	0·21	0·12	0·00	0·00	0·38	..	..	..	..	..	..	..	..	0·59	0·21	0·62	0·13	0·23	0·90	0·21
Enfield Vicarage -	0·33	0·80	0·00	0·13	1·77	0·01	0·18	0·07	0·00	0·00	0·37	0·35	0·01	0·50	0·13	0·82	0·66	0·02	0·15	0·65	..	0·52	0·11	0·22	0·68	0·13
Means - -	0·45	0·78	0·08	0·14	2·53	0·01	0·20	0·10	0·00	0·00	0·41	0·24	0·00	0·41	0·17	0·74	0·88	0·01	0·10	0·61	0·20	0·57	0·18	0·17	0·81	0·18

The numbers in the lowest line give the weekly fall of rain over the Metropolis. By comparing the results from each station with these values, it will be seen, that there is, for the most part, a close agreement in the amount of rain-fall; the most remarkable difference is that shown in the week ending August 5, between the two stations of St. John's Wood and Enfield, the former showing an excess above the mean of 0·56 inch, and the latter a deficiency below it of 0·76 inch.

Out of the 136 days, between July 12 and November 25, rain fell on 43 days; it fell plentifully on August 1, 3, and 4; September 13; October 6, 19, 25; and November 16. On August 3, the fall amounted to 1·4 inch; it fell scantily on 18 days, each fall being less than four-hundredths of an inch, and on 7 other days it was less than one-tenth of an inch. In the period from August 24, (on which day rain fell to the depth of 0·02 inch,) till September 12, no rain fell, and none fell between September 23 and October 6. The quantity of rain which fell in September was much below the average. On 93 days out of the 136, ending November 25, no rain at all fell.

It is desirable, before proceeding further with the rain-fall, to know its average amount at one or more stations within the Metropolitan districts, as deduced from the mean of several years. For this purpose, I have two series of observations, the one at St. John's Wood, taken by George Leach, Esq., and the other at the Royal Observatory, Greenwich; the former station is situated to the north and the latter to the south of London, both series extending without interruption over 15 years. The results of these two series are shown in the following Tables.

TABLE XL.—MONTHLY FALL of RAIN at the ROYAL OBSERVATORY, GREENWICH, in Inches, from the Year 1840 to 1854.

YEARS.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1840	2·4	1·2	0·3	0·1	2·1	1·5	1·7	1·1	2·9	1·6	2·9	1·6
1841	2·1	1·3	1·3	1·9	2·1	2·7	3·6	2·2	4·0	6·0	3·7	2·4
1842	1·0	1·1	1·9	0·4	2·1	1·0	3·0	1·8	4·0	1·4	4·2	0·7
1843	1·4	2·4	0·5	1·7	3·8	1·3	2·4	3·6	0·5	4·3	2·3	0·4
1844	2·4	2·3	2·9	0·4	0·4	1·8	2·8	2·0	1·2	4·0	4·3	0·4
1845	2·4	0·9	1·5	0·6	2·2	1·9	1·9	3·1	2·1	1·4	2·4	2·0
1846	2·8	1·5	0·9	3·1	1·5	0·5	1·5	4·0	1·8	5·1	1·5	1·1
1847	1·4	1·4	0·8	1·0	1·4	1·5	0·7	2·0	1·6	2·0	2·0	2·0
1848	1·2	2·6	3·1	3·4	0·4	3·5	2·0	4·3	2·4	3·5	1·2	2·6
1849	1·6	2·2	0·5	2·2	3·9	0·2	2·9	0·5	3·3	2·7	1·5	2·4
1850	1·2	1·3	0·3	2·3	2·4	0·9	2·9	1·9	2·3	1·4	2·5	1·3
1851	2·7	1·2	4·1	2·3	0·8	1·3	4·3	1·5	0·4	1·8	0·6	0·6
1852	3·6	0·9	0·2	0·5	1·9	4·6	2·3	4·4	3·8	3·8	6·0	2·2
1853	2·0	0·9	1·5	3·1	1·6	2·8	6·0	2·2	2·4	4·3	1·5	0·7
1854	1·7	1·0	0·4	0·6	3·3	1·0	1·7	2·9	0·7	2·6	1·4	1·4
Means -	2·0	1·5	1·3	1·6	2·0	1·8	2·6	2·5	2·2	3·0	2·5	1·4

TABLE XLI.—MONTHLY FALL of RAIN at ST. JOHN'S WOOD, in Inches, from the Year 1840 to 1854.

YEARS.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1840	2·9	1·3	0·3	0·3	2·2	1·7	2·0	1·5	2·7	1·3	3·7	0·6
1841	3·1	1·1	1·1	1·7	2·3	2·5	2·6	2·6	3·8	4·7	3·3	2·2
1842	1·0	1·4	2·0	0·3	2·0	2·2	2·1	3·8	3·9	2·0	4·9	0·8
1843	1·3	2·6	0·5	1·9	5·2	1·2	2·2	3·7	2·1	4·2	2·1	0·6
1844	2·3	2·6	2·5	0·4	0·3	1·3	2·9	1·7	1·1	3·9	3·0	0·4
1845	3·2	1·1	1·6	1·0	2·3	1·4	2·4	2·6	1·5	1·5	2·3	3·0
1846	3·4	1·4	1·1	3·7	1·5	1·0	1·6	5·8	1·7	5·4	1·6	1·2
1847	1·3	1·0	0·9	1·1	1·8	1·6	0·8	1·4	1·8	1·9	1·3	1·9
1848	1·1	3·1	3·4	2·8	0·2	3·3	2·2	5·1	2·0	3·4	1·1	2·2
1849	2·6	2·6	0·7	1·9	3·5	0·5	2·9	0·8	2·8	1·2	1·4	1·9
1850	1·0	1·0	0·3	2·6	2·0	1·1	2·6	0·8	2·4	1·7	2·1	1·5
1851	3·5	1·0	4·3	1·6	0·6	1·2	3·7	2·9	0·4	2·1	0·4	0·6
1852	3·5	1·0	0·3	0·8	1·3	5·7	2·5	3·7	3·6	3·9	6·7	2·1
1853	2·7	1·1	1·7	3·1	2·2	2·4	5·2	1·8	2·1	4·3	1·3	0·6
1854	2·3	1·0	0·4	0·4	3·7	1·1	2·7	2·8	0·7	2·4	1·3	1·7
Means -	2·3	1·5	1·4	1·6	2·1	1·5	2·6	2·9	2·2	2·9	2·4	1·4

The numbers in the lowest line in each of these Tables give the mean monthly fall of rain, and by taking these means, we have the mean monthly fall of rain over the Metropolis as follows:—

TABLE XLII.—AVERAGE MONTHLY FALL of RAIN over LONDON

MONTH.	Fall of Rain.
	in.
January - - - - - -	2·15
February - - - - - -	1·50
March - - - - - -	1·35
April - - - - - -	1·60
May - - - - - -	2·05
June - - - - - -	1·65
July - - - - - -	2·60
August - - - - - -	2·70
September - - - - -	2·20
October - - - - - -	2·95
November - - - - -	2·40
December - - - - -	1·40

The sum of these is 24·55 inches, which is the mean yearly rain-fall at London.

The following Table gives the monthly fall of rain in the year 1854 at the Metropolitan stations, from which I received continuous registers.

TABLE XLIII.—MONTHLY FALL of RAIN over LONDON in the Year 1854.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Lewisham - - -	1·7	1·1	0·4	0·7	3·6	1·2	2·1	2·3	0·8	2·6	1·6	1·4
Royal Observatory -	1·7	1·0	0·4	0·6	3·3	1·0	1·7	2·9	0·7	2·6	1·4	1·4
St. Mary's Hospital -	1·3	1·0	0·4	0·3	3·5	1·0	1·9	3·0	0·6	2·3	1·2	1·5
St. John's Wood -	2·3	1·0	0·4	0·4	3·7	1·1	2·7	2·8	0·7	2·4	1·3	1·7
Enfield - - -	2·1	0·9	0·3	0·5	3·3	1·0	1·3	1·8	0·7	2·1	1·2	1·3
Means - -	1·82	0·98	0·38	0·50	3·48	1·06	1·94	2·56	0·70	2·40	1·34	1·46

The numbers in the lowest line give the monthly fall of rain over the Metropolis during the year 1854. By comparing them with the numbers showing the mean monthly fall for London, it will be seen that there has been a deficiency of rain in every month, excepting in May and December.

The fall of rain in the Metropolis in the year 1854, was 18·62 inches, being 5·93 *less* than the average fall for the year.

Clouds.

The amount of cloud was observed at most of the stations, and the results are in close agreement with each other. The results are as follows, an overcast sky being represented by 10 and a cloudless sky by 0, and intermediate states by intermediate numbers:—

In the two weeks ending July 15,	the amount of cloud was	9
In the two weeks ending July 29,	„	5
In the four weeks ending Aug. 26,	„	8
In the two weeks ending Sept. 9,	„	3
In the two weeks ending Sept. 23,	„	6
In the week ending Sept. 30,	„	1½
In the week ending October 7,	„	6
In the week ending October 14,	„	4½
In the week ending October 21,	„	7½
In the week ending October 28,	„	5
In the week ending November 4,	„	3½
In the week ending November 11,	„	6
In the week ending November 18,	„	8½
In the week ending November 25,	„	8
In the week ending December 2,	„	6
In the week ending December 9,	„	5
In the week ending December 16,	„	6
In the week ending December 23,	„	7
In the week ending December 30,	„	5

Comparison of the Meteorology of London, Worcester, Liverpool, Dunino, and Arbroath.

The foregoing section closes the amount of meteorological data I have been able to collect within the prescribed limits of time and place. I am now going to institute a brief comparison of London meteorology with that of Worcester, Liverpool, Dunino, and Arbroath, for the same period. For the means of comparison I am indebted to the observations carried on under my superintendence by some of my best observers, members of the British Meteorological Society; the insufficiency of these observations to supply the required data for this special investigation is to me a matter of regret, and arises from the circumstances that my inquiries hitherto have been directed to the study of meteorology as influencing climate, and scarcely at all to the meteorology of towns, which, as entering into a scheme for eliminating the laws of climate, would vitiate the accuracy of results intended to be of general application. For this reason I have instituted observations upon the outskirts of cities, and as far removed from their influence as possible; but that which is wanting to give value to the present inquiry is a definite knowledge of the meteorological condition of the towns above mentioned, of which I have chosen Worcester and Liverpool as being visited by the Cholera at about the same time as the Metropolis, but to a less degree, and Dunino and Arbroath, as being far north, and enjoying a comparative if not total immunity from the ravages of the Great Devastator.

To obtain the required knowledge, similar observations to those taken in the Metropolis should be instituted in the most considerable of our provincial towns, and more particularly in those where disease and Cholera have been the most rife. We should then ascertain, whether a similarity of meteorological conditions attended a comparative amount of Cholera, and whether, and if so to what extent, similar meteorological influences existing in the Metropolis extended to or found existence in the many populous cities and towns of the United Kingdom.

Having most completely under my daily observation meteorological records, applying to more than one hundred different localities in Great Britain, I am able to estimate with tolerable accuracy the influence of geographical position upon climate, and the amount of abnormal departure due to local and unremovable causes. Had I, in addition, for as many years directed my attention to the meteorology of towns and cities, I should now have been in a position to bring forward a mass of evidence respecting the cause of their comparative insalubrity, and have been enabled to perform more satisfactorily this important part of my inquiry.

It should, however, be borne in mind that meteorological research, involving so much continuous and constant aid, is far too laborious to be taken up without the stimulus of some definite and ulterior object; and the clear elucidating of the meteorological influences at work to cause the insalubrity of towns has until lately promised little repayment to those who would wish their amelioration. I have little hesitation in saying, that were the meteorology of our towns carefully ascertained and collated with that of the Metropolis, and both together with that of the country generally, of which last I have a foundation of many years continuous observations, that in a short time we should be in a condition to elucidate a clear insight into the meteorological causes of Cholera, Influenza, and

many phases of disease which now burst upon us with the suddenness and devastating power of a divine and wrathful visitation.

The conditions most favourable to health in all cases are an average degree of pressure, temperature, and humidity. A departure from these conditions at once tells upon the public health in a degree proportional to the amount of departure. Thus we see that in the country at large, in obedience to the laws of climate, an equal degree of health is not always to be enjoyed, nor an equal degree of mortality to be expected.

The more, therefore, in towns that these conditions are violated, the greater must be the departure from the standard of public health. That this standard is too widely departed from in many of our largest towns, is an undeniable fact, and an inquiry into the causes in operation to produce it is greatly to be desired; the more especially as we are well aware that it is among the lower orders of the population that the greatest mortality occurs, a fact which speakingly proclaims the cause in a great measure to be remedial.

That the main causes of insalubrity arise from the violation of the climatic laws applying to the district, is evidenced by the comparative salubrity of the outskirts of towns, where the natural conditions of the district are nearly always in force excepting when subjected to the impurities and disturbing town influences, which in certain states of the atmosphere diffuse themselves over the environs.

Our first care should be a comparison of the differences existing between the more salubrious parts of the large and least healthy towns and those particular districts which are least so. We should then find the actual amount of departure from the general laws of climate applying to the surrounding country, and ascertain with certainty the particular localities within the city which give rise to the disturbing influences. This comparison has not yet been made, nor can it be, excepting by previously organised arrangement.

I will, therefore, proceed to compare briefly the meteorological phenomena of London with simultaneous phenomena at the places already mentioned, and which are Worcester, Liverpool, Dunino, and Arbroath.

The following are the positions of these places:—

Names of Places.	Latitude.	Longitude.	Height above the level of the sea.	Names of the Observers.
	° ′	° ′		
London - -	51 29	..	..	Various.
Worcester - -	52 15	2 10 W.	125	James D. Baldey, Esq., C.E.
Liverpool - -	53 25	3 0 W.	37	John Hartnup, Esq., F.R.A.S.
Dunino - -	56 16	2 49 W.	309	David Tennant, Esq., M.B.M.S.
Arbroath - -	56 34	2 38 W.	50	Alexander Brown, Esq.

The following are the results of this investigation:—

TABLE XLIV.—Weekly Means of Atmospheric Pressure.

Name of Station.	Week ending July				August				September					October				November			
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in	in.	in.	in.	in.	in.	in.
London - -	29·769	29·853	30·114	30·151	29·864	30·010	29·968	30·067	30·371	30·335	30·014	30·115	30·250	29·878	30·108	29·652	29·685	30·275	30·275	29·625	29·568
Worcester - -	..	..	..	..	..	..	..	..	..	30·216	29·702	29·986	30·135	29·672	30·066	29·407	29·501	30·106	30·101	29·365	29·380
Liverpool - -	29·702	29·886	30·045	30·201	29·895	29·980	29·959	30·019	30·406	30·369	29·912	30·068	30·241	29·870	30·186	29·718	29·602	30·201	30·323	29·636	29·650
Dunino - - -	..	..	..	..	29·552	29·541	29·486	29·478	29·894	29·949	29·380	29·471	29·688	29·367	29·698	29·258	29·077	29·633	29·805	29·323	..
Arbroath - -	29·685	29·885	30·005	30·231	29·918	29·931	29·902	29·872	30·278	30·334	29·779	29·931	30·110	29·746	30·069	29·662	29·487	30·047	30·200	29·729	29·660

The numbers for London are those at the level of the sea, and those at Worcester may be reduced to the same level by increasing them by 0·140 in.; at Liverpool by 0·043 in.; at Dunino by 0·346 in.; and at Arbroath by 0·056 in. Increasing the readings by these amounts, and comparing the results with those of London, it will be found that the numbers at Worcester are in close agreement with those at London, except in the last two weeks, when there would seem to have been less air over Worcester. At Liverpool, till the week ending September 9, there was greater atmospheric pressure over London, excepting in the weeks ending July 8, 22, and August 26. The excesses were large in the weeks ending July 15, 29, August 5, September 2, and 9. In the week ending October 22, the excess of pressure at Liverpool over London was as large as 0·1 in. Taking the results from Dunino and Arbroath, as the representatives of the pressure in Scotland, it seems to have been generally less than in England, and at times to the amount of ¼ of an inch.

TABLE XLV.—Weekly Means of Daily Maximum Temperature.

Name of Station.	Week ending July				August				September					October				November.			
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
London - -	67·5	66·1	76·0	79·1	67·1	70·0	71·7	72·6	76·8	73·5	70·1	67·3	66·4	63·8	60·3	53·3	53·0	58·2	50·1	47·4	41·9
Worcester - -	..	..	..	..	..	..	..	..	..	75·9	74·9	68·4	69·8	62·5	62·6	54·6	53·1	58·3	51·5	47·7	43·4
Liverpool - -	63·1	63·2	69·4	69·6	68·2	67·8	65·0	66·0	70·3	70·4	68·6	63·6	63·0	59·5	59·1	52·7	51·5	56·2	51·7	47·2	43·0
Dunino - .	..	..	..	..	61·0	67·9	66·7	65·7	69·0	68·1	64·7	59·1	60·1	54·1	56·3	49·0	44·9	53·1	48·0	45·0	43·0
Arbroath - -	66·1	67·0	69·6	68·7	65·6	68·4	67·7	67·6	70·1	68·3	66·3	61·0	62·0	55·7	55·4	50·0	47·1	52·9	46·4	45·4	39·

From the numbers in this Table it will be seen that London day temperature was below that in Worcester generally; the greatest difference occurred in the week ending September 16; it was generally above that of Liverpool, amounting in the week ending July 29 to 9½°, but in the following week it was below it by 1·1°. Usually the excess was from 1° to 6° The excesses above the stations in Scotland were from 3° to 10°.

Table XLVI.—Weekly Means of Minimum Temperature of Air.

Name of Station.	Week Ending																	
	July.				August.				September					October				November			
	8	15	22	20	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
London - -	51·5	50·6	52·8	55·0	54·0	53·2	50·5	52·3	54·5	48·5	51·9	50·7	44·9	46·4	44·8	41·5	38·6	42·6	36·2	36·5	33·6
Worcester - -	..	..	..	..	..	..	..	..	..	48·3	50·4	40·1	40 5	41·3	39·9	39·6	35·3	42·4	32·8	35·2	33·9
Liverpool - -	53·4	54·4	55·8	55·9	56·8	57·0	55·3	55·8	55·9	57·2	55·4	54·5	51·4	51·3	47·8	46·3	42·4	47·9	44·1	40·1	35·8
Dunino - -	..	..	..	..	49·6	53·7	49·9	51·3	53·0	53·1	49·4	45·3	46·7	42·0	40·6	39·6	34·4	41·6	36·6	36·7	33·0
Arbroath - -	49·1	49·0	50·7	46·9	50·3	50·1	45·9	48·0	49·6	49·1	47·0	44·4	44·6	40·6	38·1	38·7	30·6	40·4	34·7	37·3	30·6

From the numbers in this Table it will be seen that the night temperatures of London were from 1° to 5° higher than those of Worcester; from 2° to 9° below those of Liverpool; and were usually from 1° to 9° above those in Scotland.

TABLE XLVII.—Weekly Means of Daily Ranges of Temperature.

Name of Station.	Week ending																				
	July				August				September					October				November			
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
London - - -	16·0	15·5	23·1	24·1	13·7	16·8	21·0	20·2	23·1	24·7	18·4	16·1	21·6	19·4	15·4	11·9	14·4	15·7	13·9	11·4	8·3
Worcester - -	..	..	..	..	..	..	..	..	..	27·6	24·5	19·3	29·3	21·2	22·7	15·0	17·8	15·9	18·7	12·5	9·5
Liverpool - -	9·7	8·8	13·6	13·7	11·4	10·8	9·7	10·2	14·4	13·2	13·2	9·1	11·6	8·2	11·3	6·4	9·1	8·3	7·6	7·1	7·2
Dunino - - -	..	..	..	..	11·4	14·2	16·8	14·4	16·0	15·0	15·3	13·8	13·4	12·1	15·7	9·4	10·5	11·5	11·4	8·3	10·0
Arbroath - -	17·0	18·0	18·9	21·8	15·3	18·3	21·8	19·6	20·5	19·2	19·3	16·6	17·4	15·1	17·3	11·3	16·5	12·5	11·7	8·1	8·8

The daily range of temperature in London from these numbers was smaller than at Worcester; very much larger than at Liverpool; and generally larger than at Dunino and Arbroath.

TABLE XLVIII.—Weekly Means of Temperature of Air.

Name of Station.	Week ending																				
	July				August				September					October				November			
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
London - - -	57·8	56·8	63·3	66·1	59·1	60·2	59·9	61·1	65·4	60·7	61·0	58·1	55·5	54·0	52·2	47·1	45·5	50·3	43·5	42·8	37·5
Worcester - -	..	..	..	..	..	..	..	..	..	60·5	61·4	57·0	53·5	51·8	50·2	45·8	42·9	49·9	40·7	41·8	38·3
Liverpool - -	53·6	54·0	60·0	60·2	58·0	59·0	54·8	56·0	60·4	61·0	59·0	53·6	53·3	51·7	52·3	45·5	44·6	50·4	46·0	41·3	37·2
Dunino - - -	..	..	..	..	54·5	59·9	57·2	57·3	59·8	59·4	57·0	51·5	52·3	47·9	48·4	43·7	39·3	46·6	41·7	40·9	37·9
Arbroath - -	56·4	56·9	59·1	57·7	57·7	59·0	56·8	56·7	59·4	58·3	56·2	51·7	52·0	47·0	47·1	43·4	38·3	46·4	39·8	41·7	35·3

From these results it would appear that London was warmer than Worcester in every week, excepting in those ending September 16 and November 25, but the excesses were small; that London was warmer than Liverpool in every week excepting those ending September 9, October 7, and November 4 and 11; the excesses were the greatest till September 2; in the nine weeks ending this day, the average excess was $3\frac{1}{2}°$; and these results also show that London was warmer than Scotland in every week, the weekly excess varying from 1° to 8°.

The following Tables give the hygrometrical results for the same stations. Table XLIX. contains the weekly means of the temperature of the Dew Point; Table L. those of the weight of vapour in a cubic foot of air; and Table LI. the degree of humidity, the state of complete saturation being represented by 100.

TABLE XLIX.—Weekly Means of Temperature of Dew Point.

Name of Station.	Week ending																				
	July				August				September					October				November			
	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28	4	11	18	25
	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
London - - -	49·6	51·1	53·0	54·4	54·1	52·2	51·6	51·9	55·8	50·2	53·8	51·1	47·4	48·0	46·4	41·6	40·4	45·4	38·1	38·2	34·3
Worcester - -	..	..	..	..	..	..	..	..	..	57·7	59·0	54·9	51·1	46·7	47·6	41·6	39·7	46·8	38·9	33·0	35·6
Liverpool -	50·1	50·0	52·2	52·4	52·4	54·3	51·2	52·3	54·1	55·0	54·5	47·7	48·5	44·6	47·3	40·7	39·3	45·8	41·3	37·5	34·7
Dunino - - -	..	..	..	..	50·0	56·0	53·0	51·0	53·6	53·6	51·5	46·5	48·0	44·0	44·6	39·0	36·0	43·4	37·0	37·4	34·0
Arbroath - -	51·4	49·4	53·4	50·7	50·2	51·1	49·2	47·7	51·5	48·6	46·3	41·0	40·6	39·9	43·0	37·7	33·3	39·9	31·5	34·6	29·5

TABLE L.—Weekly Means of Weight of Vapour in a Cubic Foot of Air.

Name of Station.	Week ending: July 8	15	22	29	August 5	12	19	26	September 2	9	16	23	30	October 7	14	21	28	November 4	11	18	25
	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.	gr.
London - - -	4·1	4·4	4·6	4·8	4·8	4·5	4·3	4·5	5·2	4·2	4·8	4·4	3·9	4·0	3·8	3·2	3·1	3·6	2·8	2·8	2·6
Worcester - -	..	..	..	..	..	..	..	..	..	5·4	5·6	5·0	4·4	3·8	3·9	3·2	3·0	3·8	3·0	2·4	2·7
Liverpool - -	4·3	4·2	4·5	4·5	4·6	4·9	4·4	4·5	4·8	4·9	4·9	3·9	4·1	3·5	3·9	3·1	3·0	3·7	3·2	2·8	2·6
Dunino - - -	..	..	..	..	4·3	5·1	4·7	4·4	4·8	4·8	4·4	3·8	4·0	3·5	3·6	3·0	2·7	3·4	2·8	2·8	2·5
Arbroath - -	4·4	4·1	4·7	4·3	4·2	4·3	4·1	3·9	4·2	4·0	3·7	3·1	3·1	3·0	3·4	2·8	2·4	3·0	2·3	2·5	2·2

TABLE LI.—Weekly Means of Degree of Humidity.

Name of Station.	Week ending: July 8	15	22	29	August 5	12	19	26	September 2	9	16	23	30	October 7	14	21	28	November 4	11	18	25
London - - -	75	84	72	68	65	76	74	73	73	72	80	80	76	80	83	82	83	84	83	88	88
Worcester - -	..	..	..	..	..	..	..	..	..	91	92	94	92	84	91	86	89	90	94	73	91
Liverpool - -	89	87	77	77	83	86	87	88	81	82	86	82	86	79	84	85	83	86	85	88	92
Dunino - - -	..	..	..	..	86	80	87	81	81	82	83	85	87	87	89	85	89	90	85	88	87
Arbroath - -	85	77	82	79	78	77	78	74	77	72	72	70	68	78	87	82	84	80	76	78	82

From the numbers in these Tables it appears that the amount of water in the air has been nearly evenly distributed. The largest amount in London was in the week ending September 2, and was larger than at the other stations in this week; the air in London was, however, less humid generally than at the other stations, on account of its higher temperature.

ABLE LII.—Weekly Amount of Rain-Fall.

Name of Station.	Week ending: July 8	15	22	29	August 5	12	19	26	September 2	9	16	23	30	October 7	14	21	28	November 4	11	18	25
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
London - - -	0·45	0·78	0·08	0·14	2·53	0·01	0·20	0·10	0·00	0·00	0·41	0·24	0·00	0·41	0·17	0·74	0·88	0·01	0·10	0·61	0·20
Worcester - -	..	..	..	..	..	..	..	..	0·00	0·00	0·17	0·46	0·09	0·16	0·41	0·85	0·50	0·17	0·26	0·90	0·06
Liverpool - -	1·71	0·46	0·10	0·10	0·46	0·18	1·40	0·46	0·00	0·00	1·11	0·64	0·05	0·07	0·62	0·41	1·16	0·40	0·35	1·04	0·55
Dunino - - -	..	..	..	..	..	0·25	0·35	0·41	0·00	0·02	0·55	0·30	0·15	0·84	0·33	0·36	0·90	0·61	0·30	2·52	0·58
Arbroath - -	0·88	0·26	0·15	0·11	0·00	0·26	0·19	0·52	0·00	0·02	0·44	0·37	0·21	0·38	0·19	0·34	0·67	0·59	0·34	1·80	1·00

It will be seen from this Table, that the greatest diversity has existed in the amount of rain-fall at these stations. In the fortnight ending September 9 no rain seems to have fallen over the country. During the whole time it fell most frequently and most abundantly at Liverpool. Out of the 147 days ending November 25, rain fell at London on 44 days, at Liverpool on 71 days, and at Arbroath on 58 days. At Worcester, out of the 86 days ending November 25, rain fell on 32 days, and at Dunino, out of the 112 days ending November 25, it fell on 43 days; so that rain fell the least frequently in London.

The Wind.

The direction of the wind at the different stations was chiefly S.W.; its estimated strength was nearly the same at the different stations. Its velocity at Liverpool is shown in the following Table:—

TABLE LIII.—Average daily HORIZONTAL MOTION of the AIR at LIVERPOOL OBSERVATORY.

Year.	January.	February.	March.	April.	May.	June.
	miles.	miles.	miles.	miles.	miles.	miles.
1852	460·0	445·6	216·8	223·4	302·0	325·5
1853	366·3	288·2	247·7	408·6	271·0	233·1
1854	368·0	460·7	334·5	307·6	253·3	302·3

Year.	July.	August.	September.	October.	November.	December.
	miles.	miles.	miles.	miles.	miles.	miles.
1852	250·6	255·3	269·2	278·2	303·2	421·5
1853	365·5	256·3	302·0	280·2	236·0	229·6
1854	248·4	273·4	306·1	317·3	332·7	..

These numbers do not agree with those for London in Table XXXIV.; and we draw from them the fact that there has been no deficiency in the velocity of the air at Liverpool, although in London the motion was less than one-half its average.

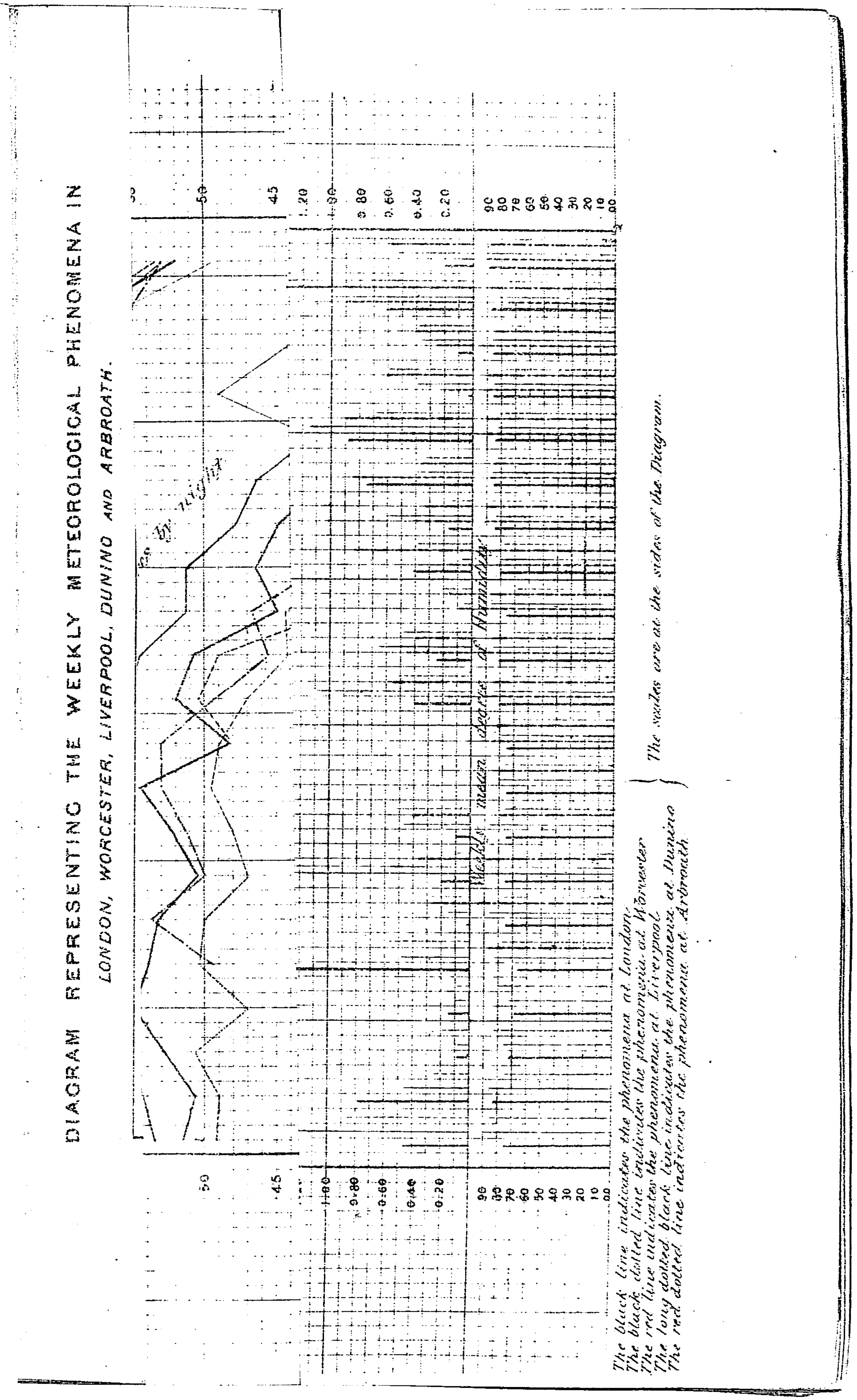
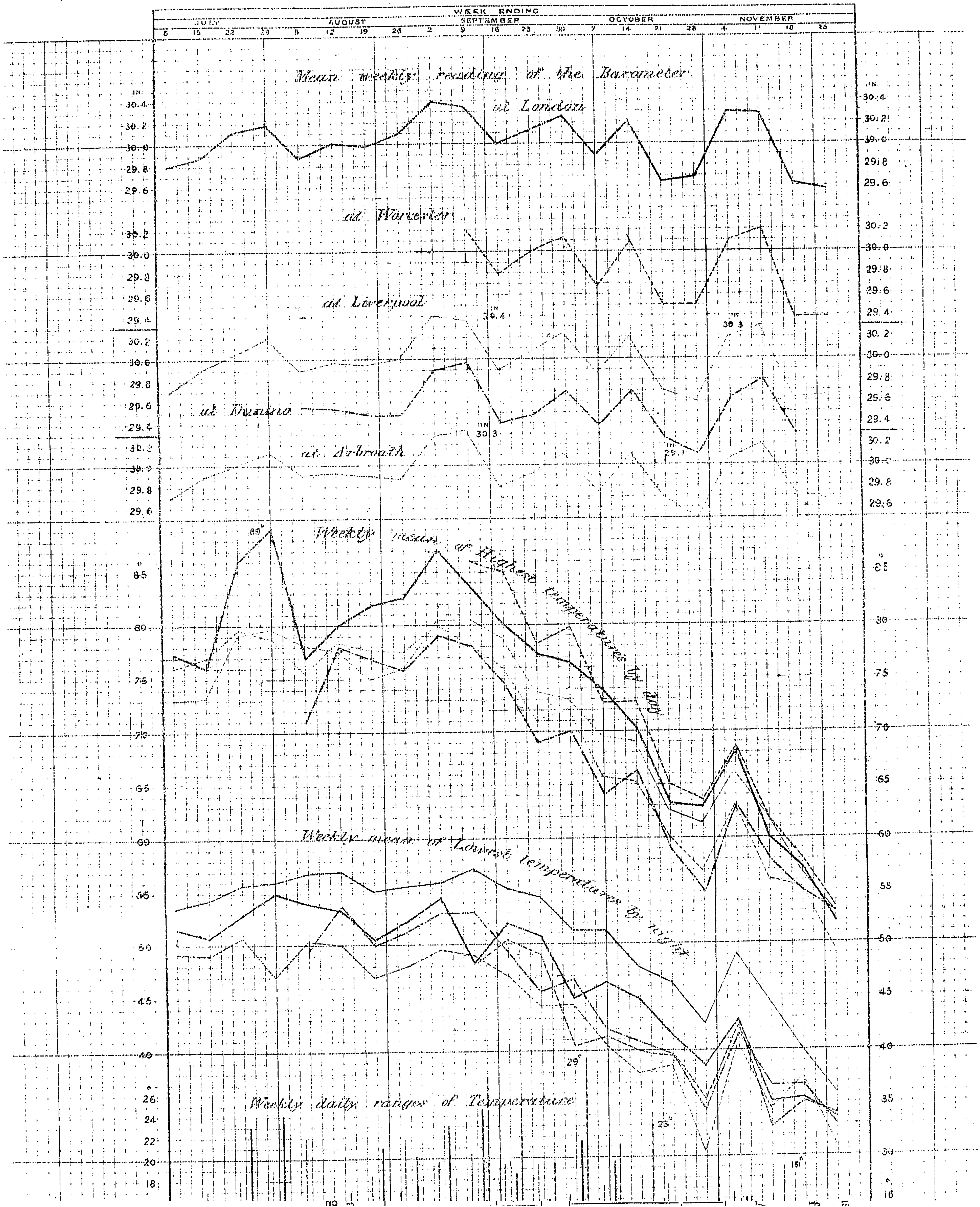
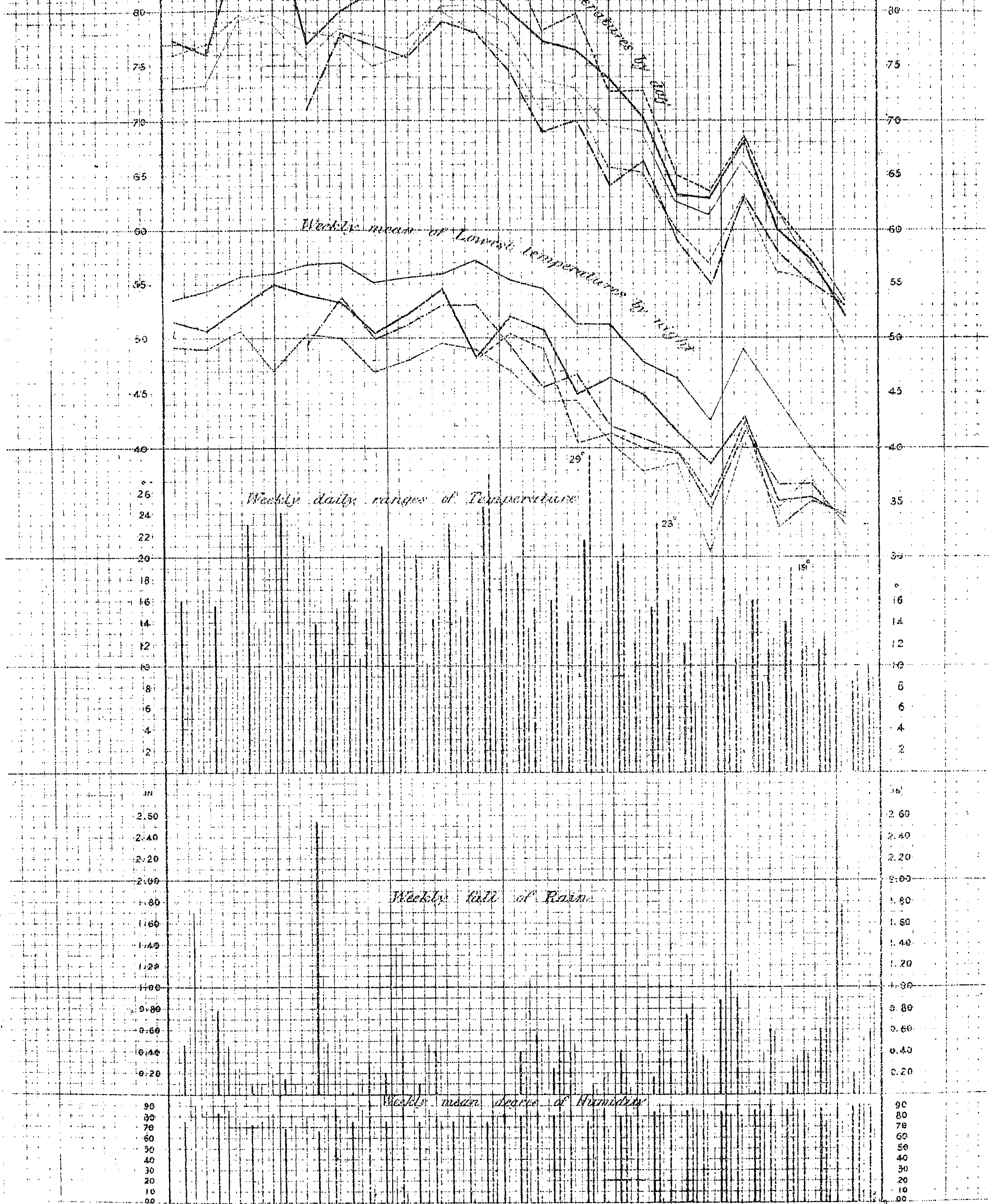


DIAGRAM REPRESENTING THE WEEKLY METEOROLOGICAL PHENOMENA IN

LONDON, WORCESTER, LIVERPOOL, DUNINO AND ARBROATH.





The black line indicates the phenomena at London.
The black dotted line indicates the phenomena at Worcester
The red line indicates the phenomena at Liverpool
The long dotted black line indicates the phenomena at Dunino
The red dotted line indicates the phenomena at Arbroath

The scales are at the sides of the Diagram.

TABLE LIV.—Showing the Weekly Amount of Ozone at the different Stations.

Names of Stations.	Week ending, 1854. July 8.	July 15.	July 22.	July 29.	August 5.	August 12.	August 19.	August 26.	September 2.	September 9.	September 16.	September 23.	September 30.	October 7.	October 14.	October 21.	October 28.	November 4.	November 11.	November 18.	November 25.	December 2.	December 9.	December 16.	December 23.	December 30.	Names of Observers.	Heights of Stations.
																												feet.
Wakefield - -	0·9	1·3	0·6	2·3	2·9	0·0	0·4	0·7	0·3	0·2	0·4	0·0	..	0·0	0·0	0·2	0·0	0·0	0·0	0·0	0·1	1·5	0·6	0·2	0·1	0·4	W. R. Milner, Esq., M.B.M.S. -	115
Liverpool - -	1·6	1·4	0·1	0·9	2·2	0·9	0·9	1·2	0·7	1·0	0·6	3·0	3·0	1·7	2·5	1·7	1·0	3·0	3·1	0·0	0·3	..	..	..	..	..	John Hartnup, Esq., F.R.A.S. -	37
Hawarden - -	3·0	0·4	1·7	0·4	0·3	1·7	2·0	2·7	0·1	0·0	3·4	6·2	1·6	1·3	1·6	4·0	3·7	6·3	3·0	3·6	1·7	4·7	6·4	6·7	7·1	5·9	Dr. Moffat, M.B.M.S. - -	260
Grantham - -	0·3	1·0	0·0	0·6	1·6	0·7	0·0	0·9	0·0	0·9	1·1	1·9	1·1	1·4	1·4	1·3	0·6	0·1	0·0	0·9	1·6	1·4	2 6	2·7	2·5	2·9	J. W. Jeans, Esq., M.B.M.S. -	190
Norwich - - -	..	..	..	..	1·9	0·8	0·9	0·0	0·8	1·0	1·1	2·1	0·9	1·2	1·4	1·6	1·2	..	..	..	..	..	..	..	..	..	W. Brooke, Esq., M.B.M.S. -	39
Bedford - - -	0·0	0·0	0·0	0·3	1·0	0·9	0·0	0 7	0·0	0·0	0·3	1·1	0·0	0·0	0·3	..	..	..	..	..	..	..	0·3	0·1	0·1	0·1	Dr. Barker, M.B.M.S. - -	100
Hartwell House, Aylesbury - -	6·1	6·0	2·3	4·4	5·5	4·2	3·5	4·6	2·4	4·6	4·7	6·7	3·8	..	..	..	..	..	..	..	..	..	..	..	..	..	Dr. Lee, F.R.S., M.B.M.S. -	250
Swansea - - -	6·3	3·1	5·6	2·6	4·8	1·2	0·4	3·2	0·0	0·0	2·4	5·0	0·8	2·0	2·1	3·0	1·1	2·4	3·1	0·9	1·4	4·3	4·1	5·9	4·3	..	M. Moggridge, Esq., M.R.C.S. -	85
Uckfield - - -	1·9	0·9	1·7	1·2	1·3	0·5	1·1	0·7	1·1	1·8	1·1	1·2	0·6	1·5	1·4	1·4	2·8	2·8	1·5	2·8	1·4	1·3	2·3	1·9	0·4	0·9	C. L. Prince, Esq., M.B.M.S. -	180
Ryde - - -	2·4	1·5	1·5	0·9	2·7	1·2	1·3	0·9	0·0	0·9	3·9	3·1	0·5	2·0	1·6	0·0	1·9	0·5	0·1	0·1	0·0	4·1	4·6	2·4	..	3·4	B. Barrow, Esq., M.B.M.S. -	110
Exeter - - -	2·3	0·3	2·3	1·6	1·4	1·4	1·0	0·9	0·0	0·2	3·6	1·1	1·0	1·1	0·8	0·7	1·1	1·1	1·4	0·5	0·2	1·4	2·2	2·4	1·8	1·1	Dr. Shapter, M.B.M.S. - -	140
Teignmouth - -	3·4	2·3	3·0	0·5	2·2	0·9	2·4	2·7	0·7	1·6	2·9	4·1	1·1	3·1	2·8	4·0	4·3	2·5	3·6	3·2	3·4	4·0	6·2	5·8	5·5	5·2	W. C. Lake, Esq., M.B.M.S. -	70
Guernsey - - -	..	1·0	0·1	0·6	0·3	0·9	0·1	2·9	0·8	2·1	..	..	..	2·6	1·4	2·7	2·6	0·6	1·5	1·4	1·8	2·6	2·4	3·4	5·1	2·9	Dr. Hoskins, F.R.S., M.B.M.S. -	123
Means - - -	2·6	1·6	1·6	1·3	2·2	1·2	1·1	1·7	0·6	1·1	2·1	2·7	1·3	1·5	1·4	1·9	1·8	1·5	1·7	1·3	1·2	2·8	3·2	3·2	3·0	2·7		

By comparison with the numbers in Table XXXVIII., showing the weekly amount of ozone at the several Metropolitan stations, with the numbers in this Table, it will be seen that in London there was a great deficiency of ozone at all stations, even at Highgate and Bexley Heath, as compared with stations of the same elevation in the country.

In both Tables the amount of ozone is shown to be the smallest at the latter end of August and the beginning of September.

At all times the amount of ozone was the greatest at places of the highest elevation, as at Hartwell and Hawarden, and at stations situated near the sea.

By dividing the numbers into two groups, of inland and sea-side stations, and taking the means of the numbers in each group, we find that at the latter stations, at an elevation of 85 feet, the mean amount of ozone was 2·2, and at the inland stations, at an elevation of 85 feet, it was 0·6; of 170 feet was 1·3, and of 255 feet was 3·8. These numbers, therefore, confirm the law indicated by the Metropolitan observations, of the amount of ozone being graduated by the degree of elevation.

Progress of the Cholera in the Metropolitan Districts in the Year 1853.

The first death in London from Cholera, in the year 1853, took place on July 7; and the progress of the disease is shown in the following Table.

TABLE LV.—Showing the Number of Deaths in the Metropolis from Cholera and Diarrhœa, on each Day from July 1 to December 31, 1853, inclusive.

(*Compiled for the Board of Health from the Registers of Deaths in the General Register Office*).

1853. — Day of the Month.	July.		August.		September.		October.		November.		December.	
	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.
1	0	6	0	20	1	21	11	14	15	10	0	10
2	0	7	1	21	4	23	9	14	15	5	4	7
3	0	8	0	13	5	24	10	13	12	7	2	8
4	0	9	1	23	2	20	7	10	22	22	1	1
5	0	7	1	18	0	31	7	13	7	3	4	3
6	0	9	4	25	1	11	6	11	15	10	1	6
7	1	12	7	30	0	16	12	9	13	15	4	7
8	0	5	2	22	2	16	7	7	16	11	1	8
9	0	10	2	27	1	16	10	8	12	2	4	4
10	0	10	2	22	0	23	3	7	19	8	0	4
11	1	9	2	29	3	6	7	7	15	9	0	5
12	0	10	5	25	3	14	7	8	11	4	2	9
13	0	11	2	38	2	10	9	12	10	8	0	9
14	2	12	2	21	4	15	3	7	12	9	1	6
15	1	14	1	24	4	8	8	10	9	4	1	3
16	1	16	0	19	3	11	14	9	4	9	0	7
17	1	14	1	26	6	17	14	11	10	3	3	3
18	0	15	0	22	1	17	16	11	11	10	2	4
19	1	18	1	20	5	11	7	7	9	4	2	1
20	1	12	2	27	5	13	13	11	10	4	1	7
21	1	10	5	31	7	16	9	6	5	3	1	6
22	1	9	3	20	1	11	22	10	6	10	0	5
23	1	16	2	16	3	11	14	7	6	11	1	4
24	0	10	3	19	2	14	10	5	4	4	1	7
25	1	17	3	14	8	13	6	9	4	4	0	10
26	1	15	5	16	9	13	14	10	4	5	1	4
27	2	22	3	21	11	14	14	12	2	8	4	6
28	2	12	2	26	4	18	14	6	2	8	1	8
29	1	19	2	35	6	12	14	5	4	3	0	9
30	0	18	2	28	8	9	11	8	4	5	1	7
31	2	18	1	25			25	6			0	9
Sums	21	380	67	723	111	454	335	283	288	218	43	187

Atmospheric Phenomena in the Year 1853.

The pressure of the atmosphere was nearly that of its average in the months of March, April, August, and September, and, with the exception of that of November, was below it in the remaining months.

The first quarter of the year was subjected to extremes of heat and cold. The spring and summer were cold; and the weather, with the exception of the first half of August, was almost always unsettled. The autumn was cloudy; the atmosphere was thick and hazy. The winter was cold The motion of the air was less than usual. The monthly fall of rain for the year was $4\frac{1}{2}$ inches in excess. The monthly means of the meteorological phenomena for the year 1853 are given in the following Table:—

TABLE LVI.—METEOROLOGICAL TABLE for the YEAR 1853.

1853. — MONTHS.	Mean Reading of Barometer corrected to 32° Fahr., and reduced to the level of the Sea.	Difference from Average, Table IV.	Mean Temperature of Air.	Difference from Average, Table IX.	Mean of Highest Readings by Day.	Mean of Lowest Readings by Night.	Mean Daily Range of Temperature.	Difference from Average, Table XVII.	Amount of Rain.	Difference from Average, Table XLII.	Amount of Cloud.
	in.	in.	°	°	°	°	°	°	in.	in.	
January - - -	29·745	—·163	42·4	+ 4·1	47·6	37·5	10·1	+ 1·9	2·0	— 0·1	8·7
February - -	29·700	—·222	33·3	— 5·5	39·1	29·0	10·1	— 0·4	0·9	— 0·6	9·3
March - - -	29·955	—·001	38·5	— 3·3	47·0	30·9	16·1	+ 1·9	1·5	+ 0·2	7·5
April - - -	29·885	—·007	45·2	— 1·3	54·0	39·8	14·2	— 2·7	3·1	+ 1·5	9·2
May - - -	29·929	—·030	52·0	— 1·4	63·1	41·9	21·2	+ 2·1	1·6	— 0·5	6·6
June - - -	29·904	—·057	58·2	— 1·1	68·9	50·2	18·7	— 1·1	2·8	+ 1·1	8·1
July - - -	29·903	—·060	60·3	— 1·5	70·5	53·4	17·1	— 0·4	6·0	+ 3·4	8·3
August - - -	29·968	+·010	60·0	— 1·1	70·9	51·8	19·1	+ 1·1	2·2	— 0·5	7·7
September - -	30·008	+·003	55·3	— 1·5	65·2	47·2	18·0	+ 0·7	2·4	+ 0·2	6·6
October - - -	29·733	—·106	50·9	+ 1·2	59·7	43·9	15·8	+ 2·2	4·3	+ 1·3	7·8
November - -	30·116	+·218	42·1	— 2·2	47·8	36·3	11·5	+ 0·8	1·5	— 0·9	7·4
December - -	29·979	—·031	34·0	— 6·4	38·8	29·5	9·3	+ 0·3	0·7	— 0·7	7·8
Means - - -	29·902	—·037	47·7	— 1·7	56·0	41·0	15·0	+ 0·5	Sum. 29·0	Sum. + 4·5	8·1

PROGRESS of the CHOLERA in the METROPOLITAN DISTRICTS in the Year 1854.

Progress of the Cholera in the Metropolitan Districts in the year 1854.

The First Death from Cholera took place on January 8 in the year 1854, and the Daily Progress of the Disease throughout the Year is shown in the following Table:—

TABLE LVII.—Showing the NUMBER of DEATHS in the METROPOLIS from CHOLERA and DIARRHŒA, on each day throughout the year 1854. *(Compiled for the Board of Health, from the Register of Deaths in the General Register Office.)*

1854. — Day of the Month.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.	
	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.
1	0	6	0	7	0	6	0	5	0	7	0	4
2	0	3	0	3	0	4	0	7	0	5	0	9
3	0	4	0	2	0	2	1	6	0	6	0	3
4	0	3	0	7	0	2	1	3	0	5	0	8
5	0	3	0	4	0	1	0	3	0	1	0	8
6	0	2	0	4	0	7	0	5	0	3	0	6
7	0	7	0	2	0	4	0	5	0	3	0	4
8	1	4	0	4	0	6	0	3	0	6	1	3
9	0	4	0	7	0	8	0	5	0	5	0	9
10	1	10	1	4	0	9	0	3	0	1	0	7
11	0	4	0	4	0	4	0	6	0	5	0	3
12	1	4	0	1	0	3	0	6	0	3	0	8
13	0	6	0	2	0	4	2	4	0	6	0	3
14	0	6	0	6	0	12	0	8	0	1	0	11
15	0	10	0	9	0	6	0	6	1	7	0	5
16	0	4	0	8	0	4	0	4	0	2	1	8
17	1	9	0	8	0	4	0	6	0	6	1	9
18	1	3	0	3	0	4	0	3	0	3	0	7
19	0	5	0	7	0	6	0	2	1	4	0	1
20	0	7	0	5	0	6	0	5	0	10	0	3
21	0	2	0	5	0	5	0	2	0	6	0	5
22	0	5	0	5	0	4	0	3	0	5	0	8
23	0	5	0	5	0	4	0	4	0	5	0	3
24	0	9	0	7	0	3	0	6	0	5	0	2
25	0	6	1	7	0	5	0	5	0	3	0	8
26	0	3	1	5	0	9	0	6	1	2	0	4
27	0	6	0	3	0	7	0	1	1	3	0	6
28	1	5	0	3	0	3	0	4	0	4	0	4
29	0	6			0	2	0	5	0	6	0	5
30	0	9			0	1	0	7	0	8	0	5
31	1	4			0	9			0	5		
Sums	7	164	3	137	0	154	4	138	4	141	3	169

Day of the Month.	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.	Cholera.	Diarrhœa.
1	0	6	72	31	389	41	70	13	1	9	0	2
2	0	7	74	27	459	36	61	17	2	11	1	5
3	0	8	78	28	329	49	76	13	4	4	0	3
4	0	8	78	29	305	38	53	20	11	7	0	3
5	1	12	101	26	267	47	60	16	3	11	1	2
6	0	7	104	34	259	47	41	26	4	6	1	6
7	1	9	78	28	235	35	37	15	2	7	0	3
8	2	8	107	34	215	34	47	21	1	8	0	2
9	1	6	96	25	259	39	37	24	6	8	0	5
10	0	10	83	31	256	29	38	19	0	5	0	5
11	0	10	105	49	233	52	29	11	0	5	0	10
12	2	8	98	36	246	36	17	18	3	6	0	3
13	1	10	108	33	203	45	24	18	2	7	0	8
14	1	4	116	32	158	30	35	11	2	8	0	2
15	1	11	90	31	208	30	32	17	1	5	0	5
16	4	10	115	33	223	30	19	13	0	6	0	4
17	2	11	125	36	190	29	26	14	1	5	0	5
18	3	16	97	36	179	21	18	21	1	7	0	5
19	7	8	121	24	208	36	25	18	0	2	0	3
20	5	13	118	39	167	25	8	10	2	4	0	5
21	6	9	131	28	142	29	15	10	1	2	0	6
22	6	12	131	39	159	26	13	11	0	3	2	3
23	17	13	131	33	137	30	5	10	2	3	0	5
24	16	17	140	41	129	28	12	9	0	8	0	2
25	24	24	118	29	104	30	3	2	0	5	0	4
26	20	15	100	36	106	26	4	9	0	8	0	0
27	23	11	122	26	90	20	6	10	1	3	0	4
28	27	25	144	41	88	25	5	7	1	3	0	2
29	53	17	137	38	75	20	4	6	1	5	0	1
30	41	26	187	29	66	17	3	8	0	4	0	0
31	44	20	211	40			0	9			0	0
Sums	308	371	3,513	1,022	6,084	990	823	426	52	175	5	113

Atmospheric Phenomena in relation to Cholera in the Metropolitan Districts in the Year 1854.

Having discussed the different meteorological conditions weekly which prevailed during the continuance of Cholera in the Metropolis, it is necessary to trace the progress of the disease weekly in connexion with the meteorology of the period.

From the beginning of the year till the week ending July 8, the mortality from diarrhœa averaged 35 weekly; till this time 21 deaths only had been caused by Cholera, and these were scattered over the 27 weeks from January 1. In the week ending July 15 six cases of death from Cholera and 59 from diarrhœa were registered The weekly progress of the disease was subsequently as follows:—

TABLE LVIII.—Showing the Number of Deaths in the Metropolis from Cholera and Diarrhœa, in each week from July 1 to the end of the Year 1854.

1854. Week ending		Number of Deaths from	
		Cholera.	Diarrhœa.
July	1	0	38
	8	4	59
	15	6	59
	22	33	79
	29	180	122
August	5	488	187
	12	671	237
	19	772	225
	26	869	245
September	2	1,646	251
	9	1,869	289
	16	1,527	252
	23	1,182	206
	30	658	166
October	7	398	120
	14	227	122
	21	143	103
	28	48	58
November	4	25	54
	11	16	50
	18	10	44
	25	5	27
December	2	4	30
	9	2	24
	16	0	37
	23	2	32
	30	0	13

It is desirable to trace the progress of these numbers with each section separately.

The *pressure of the atmosphere*, as shown in Table IV., was in excess in the months of February, March, April; in defect in May and June; and slightly in excess in July. The reading of the barometer became remarkable towards the end of August, and the pressure was more continuously great during the worst period of the disease than at any other time. On reference to Table III. and the notes which follow, it will be seen that the barometer reading was as high as 30½ inches on three different days between August 25 and September 10, and that it exceeded 30 inches during the whole of this period. The reading began to decrease on the 11th, when the disease also began to decline.

The readings declined below 30 inches on the 14th, and continued with but slight variations from 30 inches till after the 20th. The mortality from cholera in the week ending September 16, was 342 less than in the preceding week. On September 22 the reading attained 30·4 inches nearly, and was high till the end of the month. The decrease in the mortality in the week ending September 23 was 345, but was greater in the week ending September 30, the decrease being as large as 524, notwithstanding the still high reading of the barometer. After this time the rate of decline steadily continued till the end of October, after which a few scattered cases only occurred till the end of the year. The reading of the barometer decreased to 29·37 inches by October 5, and increased to 30·6 by the 13th; declined to 29·3 inches by the 18th; after this time the variations of reading were frequent, and at times large in amount. The reading in November was that of the average, but was below it in December.

Temperature of the Air.

Table IX., with following remarks, shows the temperature of each month in the year 1854, and its departure from the average. From January 1 to April 21, with the exception of 16 days, viz., January 1 to January 6, and February 10 to February 19, the mean daily temperature of the air was in excess. The average daily excess of the 101 days ending April 21 was 3·4°; on April 22 a very cold period set in, injuring vegetation and killing many hardy plants, and from this time to July 19, a period of 97 days, the average daily defect of temperature was 3·3°. In Table VIII. the departures of temperature each week, from July 8, at the central Metropolitan stations, are given. During the first two weeks the temperature was between 4 and 5 degrees below the average, but on July 20 it rose above, and on the 25th was 11° in excess; the temperature of the air on this day rose to 90° nearly, and was the hottest in the year. The mean weekly temperature in the 3 weeks ending August 19 was in defect. From August 19 till October 11 the temperature was in excess, averaging for these 54 days 2·6° daily. The greatest excesses were in the week ending September 2, when the average amount for the Metropolitan districts was 6¼°; the number of deaths from Cholera this week were 1,646, and increased to the maximum 1,869 in the following week, the temperature being in excess, varying from 1° at elevated places to 5° at places of low elevation; in the next week, ending September 16, the temperature was in excess, and continued so till the week ending October 14; and the mortality from Cholera declined to 227. The temperature after this time, with the exception of the week ending November 4, was below its average till December.

During the epidemic the mortality was greatest at those places where the temperature was highest. The temperature was the highest in the year, excepting in the week ending July 29, when the mortality was approaching its height, viz., in the week ending September 2.

Maximum Temperature by Day.

Table X. contains the mean weekly highest temperature by day. The maximum for the year, viz., 79·1°, occurred in the last week in July. The mean of the highest temperature by day in the Metropolitan districts, in the month of July, was 72·2°; in August was 70·5°; and in September 71°; showing but little variation in this element in the period of 3 months. It was higher, however, in September than in August. In the week ending September 2, when Cholera was at its height, the day temperature averaged 73·5°, being the highest in the year (excepting only the last week in July). The day temperature, however, in the fatal week ending September 9 descended to 70°, and afterwards declined week by week to 60.°

The greatest difference between the maximum day temperature of consecutive weeks, viz., 7°, took place between the weeks ending October 14 and October 21.

The maximum temperature somewhat follows the course of the disease. The little difference, however, shown in Table XI, between the high day temperatures recorded at both high and low stations is not sufficient to account for the different rate of mortality existing at each.

Minimum Temperature by Night.

Table XII. gives my collected information upon the night temperature of London. The highest night temperature took place in the weeks ending July 29 and September 2, and averaged about 51° in July and August, and 46° in September, at the out-lying stations; whilst at the central stations they were 55°, 56°, and 51° in those months respectively. The excess of night temperature of London is shown in Table XIII. In the several weeks till August 26 the excess varied from 1° to 4°; but in the week ending September 2 it was as large as 8°, and in the following week amounted to 7° nearly; the excess decreased to 4½° and to 3° in the two following weeks. The excess of the night temperature of London was therefore the greatest when the disease was approaching its height, and decreased as the disease declined to 2·5° in the week ending October 21, being about the same amount

as existed before the epidemic broke out. I have no doubt that the excess of night temperature exercised an influence in the progress of the epidemic.

Diurnal Range.

Table XVI. and remarks following give a great deal of information upon the range of temperature and the weather generally during the progress of the epidemic, and for some time after. Table XVII. shows that the daily range has exceeded the average in every month of the year excepting June. Table XV. shows the less daily range at the Metropolitan stations than that due to their geographical position; the weeks distinguished by the greatest departures were those ending September 2 and 9. In the results following Table XVI. the periods most distinguished by large defects of daily range were from August 26 to September 11, during which time the disease attained its height, and again in the calm period from September 26 to October 4. The less daily range at stations of low elevation seems to have exercised an important influence in the progress of the epidemic.

Thames Water and its Temperature.

The waters of the Thames, as first collected in Gloucestershire, are pure, and continue nearly so until they reach Richmond, when they become tainted with every description of impurity, the river as it passes through London being made the recipient of all the sewers and waterclosets of the Metropolis; much of this matter is precipitated in contact with the mud of the river, but much also remains in solution. From this water, therefore, it is not to be expected that pure vapour of water can arise; it is, in fact, tainted with all the refuse matters dissolved in it.

To this great cause of malaria is to be added the wide extent of undrained marsh land which lies to the east of the Metropolis. The heat of the summer acting upon the sodden and decayed vegetation scattered over its surface gives rise to the most pestilential vapours and exhalations; these are in a measure contained within the precincts of the Metropolis, London being bounded on the north, south, and west by hills, which on its northern boundary exceed 420 feet.

To return to temperature. I made a series of experiments on the "Radiation of Heat at Night from the Surface of the Earth," (published in the Philosophical Transactions, part 11, 1847,) and found the temperature of exposed surfaces to be dependent upon the variation of the soil, its vicinity to other soils, its elevation, exposure, difference of level, &c. The temperature of grass, for instance, adjacent to gravel I found to be frequently much lower, so as often to be below the temperature of the dew point, whilst the gravel at the same time was above by many degrees. In like manner the marsh lands to the east of London generate volumes of mist and vapour dependent upon temperature, but from their volume and intensity are less easily dispersed, surcharged as they are with organic matter, and the effluvia of animal and vegetable matter in all stages of decay, and which derive accession from the refuse cast upon the banks of the river, and left by the receding tide upon the mud. The vapours thus generated mix with the atmosphere, and in calm weather are retained in its lower stratum, subjecting the inhabitants within and around their dwellings to their poisonous influence.

The effect of temperature upon the Thames water, in* tainting the surrounding air, is exhibited in the well-known fact that diarrhœa and summer cholera become prevalent after the temperature of the Thames has attained to 60°, and from the fact that as the water declines from this temperature, so also do the above diseases.

By reference to Table XIX. and following remarks, it will be seen that the temperature of the Thames attained to 60° on June 22, and descended below this reading on September 26; that the temperature of the water was 70° towards the end of July, fell to 62° at the beginning of August, and attained a second maximum of 66° at the beginning of September.

Here then, according to the above reasoning, is a cause for the prevalence of disease in general, if not of Cholera, during the period under review; the insalubrity of which was greatly heightened by the weather at the time being close and sultry, and distinguished everywhere by a continued prevalence of mist and haze. During periods of clear calm weather in the Metropolis, that is, when the Londoner sees the sky really blue, and at night when he sees the stars shine brightly, or when the air is in gentle motion, the vapours from the city and river ascend high into the atmosphere, become generally diffused, and escape observation; but during periods of cloudy, misty weather, and particularly during calms and the cold air of nights, the vapour in ascending is condensed into haze, mist, or fog, and kept in contact with the surface of the earth, occupying the lowest districts.

The greater the difference in relation to the temperatures of the air and water, the more dense will be the mist or fog. Table XX. gives these differences, and exhibits in some instances an excess of 20° temperature of the Thames over that of the air. In the remarks following this Table, it will be seen that for 28 nights ending September 12 the average excess exceeded 16·5°.

By reference to the wind sections for this period, it will be seen that the air was calm both by day and night. It was, therefore, charged with the accumulated vapours for this long time, and fatally was their influence manifested during the three weeks when the disease was at its worst, and destroyed 5,834 of the Metropolitan population.

No reasonable doubt can henceforth be entertained as to the pernicious effect of the London fogs during the summer heats, nor of their power, under any favourable combination of unusual heat or general stagnation of the air, to fan into flame the dormant sparks of an epidemic never thoroughly extinguished since its first introduction to English soil.

* See the Registrar-General's Report upon Cholera in England in 1848 and 1849.

Wind.

The first strong wind in the year was on January 3, when from the E.N.E. there were pressures to 4 and 5 lbs. on a square foot of surface. On January 25 the wind blew strongly for a short time from the south, and on the 26th from the S.W. In February, from the 4th to the 9th, the wind blew almost continuously from the west and S.W., with pressures from 3 to 5 lbs.; on the 9th a pressure of 12 lbs. was recorded. The next strong wind was on February 17 from S.W. and W., with pressures varying from 5 to 12 lbs.; and on the 18th and 19th from the N.W., with pressures from 5 lbs. to 10 lbs., and in one instance to 18 lbs. On February 23, 24, and 25 there were pressures of 3 lbs. and 4 lbs. from the S., S.W., and N.N.W.; from March 8 to 11 there were occasional pressures of 3 lbs. from S.W. The next strong wind of any duration was on April 22 and 23 from the N.E., when there were pressures to 5 lbs. and 6 lbs. On April 28 there were pressures to 5 lbs. from the N.; on April 30 there were occasional pressures to 4 lbs. from the S.W. On May 2 there were pressures to 6 lbs. from the S.W. On May 7 and 8 the wind blew strongly from W.S.W., and pressures to 8 lbs. and 10 lbs. were recorded. On June 2 and 3 the wind blew for some time with pressures to 4 lbs. and 5 lbs. from the N.E. On June 10 and 11 the wind blew from the S.W. with pressures to 4 lbs. and 5 lbs. On June 26 there were pressures from the W.S.W. for some hours to 4 lbs. Up, therefore, to the end of June there had been instances of strong wind, though somewhat fewer than usual. Up to this time few deaths from Cholera had occurred, and those were scattered from the commencement of the year. In July there were no strong winds, and 16 days were noticed as nearly or quite calm. In the second week of the month 5 cases of Cholera were reported; in the week ending July 22 the numbers increased to 26, and subsequently to 133 in the last week; whilst the deaths from diarrhœa increased from 27 to 84. In August, by reference to Table XXXV., it will be seen that 6 out of the first 10 days were designated as calm. By the week ending August 12 the number of deaths had increased to no less than 644. On August 11 the air moved more freely from the W.S.W., and on the 12th from the S. and S.W. From the 13th to the 18th, portions of each day were calm; from the 19th the air was in gentle motion till the 23d; and on the 24th there were pressures to 2 lbs. and 3 lbs. for a few hours from the W.S.W. At intervals, when the air was somewhat less stagnant, the rate of increase in the disease was checked, dating from August 12. In the weeks ending August 26 the number of deaths from Cholera was 847. From August 25 to September 11 the air was still, and a dead calm prevailed at all low places. This was the calmest period in the year, and the disease was at its height. The number of deaths from Cholera in the week ending September 9 amounted to 1,869, and from diarrhœa to 289. By reference to the remarks following Table XXX. it will be seen that from July 1 to September 11 the direction of the wind was alternately from S.W. and N.E., and for an equal number of days; but on those days in which it was passing from the latter point it was mostly in gentle motion only. On September 12 the wind blew for a couple of hours with a pressure of 2 lbs. on the square foot, and the air became in motion even in places situated near the alluvial of the Thames. Shortly after the disease began to decline. From September 3 to September 20 the wind blew every day with velocity for some time, and the disease declined rapidly. On September 24 the wind blew strongly for some hours, with pressures varying from 5 lbs. to 7 lbs. on the square foot. This was followed by a calm, extending to October 2; the disease, nevertheless, continued to decline. On October 5 the wind blew for a few hours from the S.W., with a pressure of 3 lbs. During the month of October the wind occasionally passed with some velocity; still there were 12 days partially calm; the disease declined to 25 in the week ending the 4th of November.

In the remarks following Table XXXV. it is shown that out of the 123 days from July 1 to the end of October a calm more or less prevailed on 65 days, which is more than one half of the entire number. After November 16 there was no day on which the air was calm; a few fatal cases of Cholera, however, continued to occur.

By reference to Table XXXVI. and following remarks, it will be seen, that the air was at all times in much less motion at places situated on the alluvial of the river Thames, than where situated on higher ground. In connexion with the progress of the disease, we perceive that at such places the epidemic has been more severe, committing its greatest ravages at Lambeth, Walworth, Bermondsey, Rotherhithe, Deptford, Poplar, &c. At these places and at others similarly circumstanced, the air was stagnant during the period between August 25 and September 11, and was, besides, stagnant on all the 65 days noted as calm, between July 1 and September 11, at the more elevated and healthy stations.

Humidity of the Atmosphere.

Tables XXI. to XXIX. give all the information I have been able to collect upon the humidity of the air: from the observations contained in them, it appears that there was one-twentieth part less water in the air than the average for these months; and in Table XXIX., showing the weight of a cubic foot of air, it would seem that the air was more dense than usual, as the mean weight of a cubic foot of air was 2 grains above the average.

Thunder Storms.

There were but few thunder storms from July to the end of the year. The following are all the instances of electrical disturbances in the atmosphere noted about the Metropolis:—Thunder storms on July 9, 30, and August 3; thunder heard on July 4, 10, 31, August 2, 3, 17, and 19; and lightning seen on July 24, 25, and August 28. There was no instance of thunder or lightning about the Metropolis during the months of September, October, November, and December; in fact, no great electrical disturbance took place from the time of the first outbreak of Cholera in July, and during the continuance of

the disease. Hail was noted on one day only within the same interval of time, viz. on October 23.

So far, therefore, as the electrical observations indicate, in connexion with the much less than the usual number of electrical disturbances, it would seem that there has been a general deficiency in the tension of the common positive electricity prevalent during the period.

Electricity of the Atmosphere.

Table XXXVII. and remarks following contain all my collected information upon the electricity of the atmosphere during the prevalence of Cholera. No observations were made till the disease was at its height; at this time the electricity was positive but weak, and continued so till the end of September. Positive electricity was generally present, with tension somewhat greater than in September, indeed, always, except when rain was falling, in the months of October, November, and December, at stations of moderate elevation. Common atmospheric positive electricity has therefore been as prevalent as usual.

At stations situated nearly on a level with the river Thames, the electricity was generally weaker than at stations of higher elevation, and was more frequently negative.

I much regret that the electrometer observations began too late to afford any decided results. They would, however, seem to show that a deficiency of electricity prevailed during the time when the disease was at its height, and that at low stations, as compared with the higher, a deficiency was likewise to be observed.

Ozone.

By reference to Table XXXVIII. and the remarks following, it will be seen that no ozone was detected at any station near the river, excepting at Battersea and Millbank, where a little was recorded, but at stations of high elevation it was of general occurrence. This may be accounted for by the great amount of organic matter in the atmosphere in low districts, especially in those situated on a level with the Thames. These stations are also distinguished by a stagnancy of the atmosphere, and it remains to be proved whether the total defect of ozone at all the river-side stations is caused by the presence of large quantities of organic matter, decomposed by ozone, itself being simultaneously destroyed; or whether it is owing to the small amount of ozone contained in a small volume of air, which, to obtain a perceptible elimination of iodine, should pass the test papers in larger quantities; the latter supposition, however, is not supported by the observations taken at places where ozone was generally noticed, as at times the paper was less discoloured during the day than during the calm hours of the night.

Upon this subject Dr. Moffatt, in a recent letter addressed to me, says:—

" With regard to the absence of ozone in low places, and places
" where the air is stagnant, I must say that my opinion on this point

" still oscillates, and I am as undecided to-day respecting its absence " under these conditions as I was five years ago. There is no doubt " that a test paper is much sooner tinged in a current of ozoniferous " air, then it is in a calm of the same air; the reason of this is obvious " enough. Ozone, however, is often detected during calms; so it " cannot be owing to the want of currents of air above. The only " time when calms give anything like the amount of colouration pro- " duced by a strong south or south-west current, is when they are " accompanied by continued falls of snow. During such falls I " have seen both Schonbein's and my own papers coloured as high as " 10; this I have attributed to the snow flakes bringing down the " ozone from the cirriferous and ozoniferous regions of the atmo- " sphere. Often during calms cirri are observed hovering in the " higher strata, and then there is no ozone; but when the cirri " come down to the earth's surface in the shape of snow, they bring " the ozoniferous air with them. Again at these times a calm may " prevail, and ozone will be detected without a fall of snow; but " when this is the case, the cirri will be seen moving from S. or " S.W. to N. or N.E., and the ozone in the calm merely precedes " the setting in of a south current, if the barometer reading is " decreasing, and a thaw will soon commence, or if a north current " of the reading increases, in which case the fresh will continue.

" So much for the cause of the absence and presence of ozone " during proper calms; I will now speak of the absence of ozone " in stagnant air. I must first say that I have not the least doubt " that if snow fell in considerable quantity during any calm, that is " to say, if the upper strata of air came to the earth's surface, ozone " would be always detected. The want of ozone in stagnant air " may be accounted for in this way. Ozone is no doubt absorbed " by surrounding objects, or dissipated in some way or other by local " influences, and if the supply, either laterally by current, or from " above by downward motion, be not so rapid as the absorption or " dissipation, it must be in smaller quantities in places where atmo- " spheric currents slowly penetrate, than in localities freely exposed; " or it may not be in appreciable quantities. I am inclined to " believe that fresh and new surfaces destroy ozone. I have " observed that test papers have remained for weeks in a new ozone " test box, without colouration, which papers in an adjacent box were " indicating 3, 6, or 8 for the day. This discrepancy I attributed to " the newly wrought wood. It has been said that ozone is destroyed " by the action of the gases produced during the decomposition of " animal and vegetable offal, and at one time I was inclined to " believe that the outbreaks of Cholera in the neighbourhood of " newly cleaned pits, manure heaps, cesspools, and the like, was the " result of the removal of ozone. Experiment, however, does not " support anything of the kind. I have often placed test papers in a " position exposed to the action of decaying matter, and I have never " seen any difference between them and others placed beyond its " influence. The absence of ozone in low lying localities, where " Cholera has been the most prevalent and fatal, tends to prove that " ozone is a purifying agent."

Ozone papers were freely distributed in the Cholera wards of St. Mary's Hospital; a trace only of discolouration was observed on September 17, 18, and 27, rather more on September 21, 22, and 30; but no trace was noticed at any other time.

Test papers were placed in the different wards of Camberwell workhouse, in the Cholera decks of the Bacchante, and over each deck of the Dreadnought hospital ship, in many instances in close vicinity to the patients, under the direction of Dr. Rooke, and no trace of discolouration was detected in a single instance in any of these situations. In fact, with the exception of the few cases noted at St. Mary's Hospital, every test paper has remained colourless which has been placed in stagnant air, whether enclosed or not.

Haze, fog, mist, were singly or together prevalent, in July, on the 11th, 21st, 25th, 26th, 29th, and in August on the 13th, 16th, 17th, 25th, 26th, 28th, 29th, and 31st. The beginning of September was ushered in with a dense blue mist; in the second week of this month the disease was at its height, and the blue mist was exchanged for a thick atmosphere of fog, which continued with little intermission to the end of the month, at low places prevailing both day and night; the only days exempt were those of the 16th, 17th, and 20th. During all this time the distant country was misty, objects at moderate distances were indistinct, and the sunshine was pale and watery; occasionally, however, the atmosphere was translucent, and at times, in London, the churches and buildings were defined with a remarkable clearness I have seldom witnessed. At the low-lying places the veil of fog and mist might be said never during the whole of September to have been dispersed.

The same kind of weather continued in October, and mist, fog, or haze in or about London was recorded on the 1st, 2d, 3d, 4th, 9th, 10th, 12th, 13th, 14th, 15th, 16th, 18th, 20th, 21st, 23d, 24th, 25th, 26th, 27th, 28th, 31st, or 19 days in November; and on 21 days in December similar notes were made.

Rain.

Tables XXXIX. to XLIII. show that there was a deficiency of rain in every month of the year, except in May and December. Table XXXIX. and remarks following show that from July 1 to November 25, in all 136 days, not a drop of moisture fell on 93 days, and that the amount on 25 other days was very small, so that but little moisture fell on 118 days, including the outbreak, rise, and decline of Cholera. From August 24 to September 12 no rain at all fell, a period, it must be remembered, when the disease was at its worst. Rain to the depth of 0·4 inch fell in the week ending September 16. The rain-fall for the year was deficient by one-fourth of its average.

Drought.

A drought was felt in different parts of the country; the springs were low. The Rev. J. Slatter reports those about Oxford to be

7 feet below their ordinary level. Wells were generally low; many about the country were dried up, and the opportunity was taken very generally of clearing ponds and wells of long accumulated sediment.

I have now to the utmost of my means discussed the meteorological conditions of the period under the influence of Cholera. The results derived from the discussion are as decided, and perhaps more so, than might have been expected from an investigation the first of its kind ever instituted.

In the advent of another visitation of Cholera, a similarly conducted inquiry would tend to prove much which now is either matter of conjecture, or may be, of mere coincidence. With the view of discovering whether any similarity exists between the meteorology of the period just discussed and that of former years when Cholera was prevalent, I have instituted a brief meteorological inquiry with the years 1849 and 1832.

Atmospheric Phenomena in relation to Cholera in the Metropolitan Districts in the Years 1848 *and* 1849.

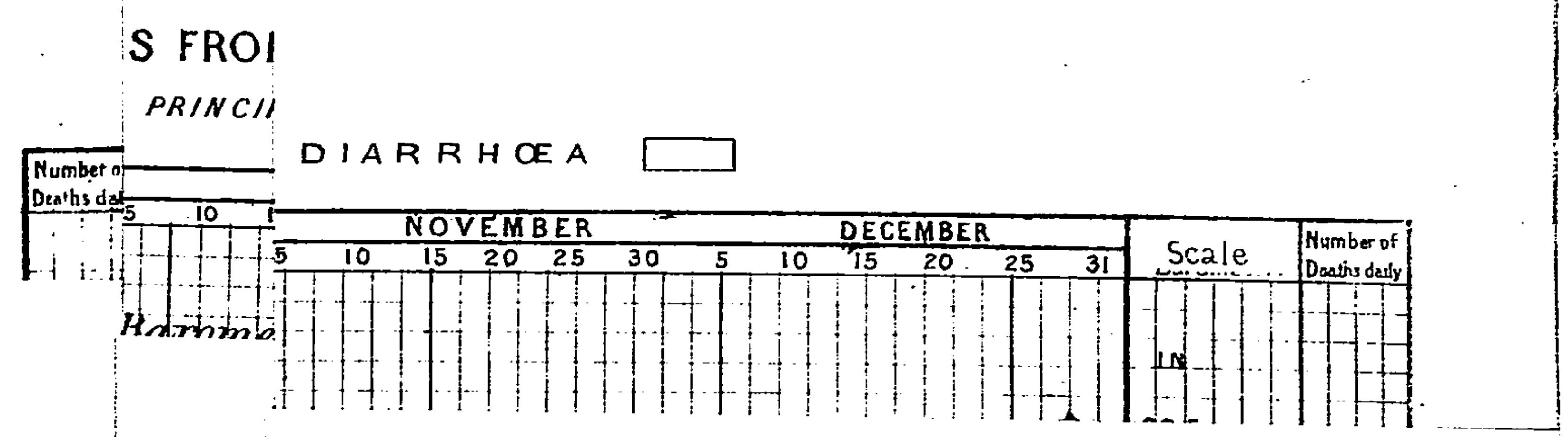
In the week ending October 7, 1848, there were 13 deaths from Cholera; this number increased to 65 and 62 in the weeks ending November 4 and 11 respectively, declined to 20 in the week ending December 2, and averaged 36 weekly from October 1 to the end of the year.

The weather during this period was variable, and the changes of temperature were frequent. The month of November was cold; but those of October and December were warm; the fall of rain was about its average. The amount of electricity in the atmosphere was small, many days together passing without the instruments at Greenwich being at all affected.

The direction of the wind—

From	October 1 to 11	- - was	S.W.
„	October 11 to 20	- - „	N.
„	October 20 to 31	- - „	S.
„	November 1 to 7	- - „	S.W. and N.W.
„	November 7 to 15	- - „	N.
„	November 16 to December 9	- „	S.W.
„	December 9 to 15	- - „	S.
„	December 11 to 31	- - „	N.N.E.

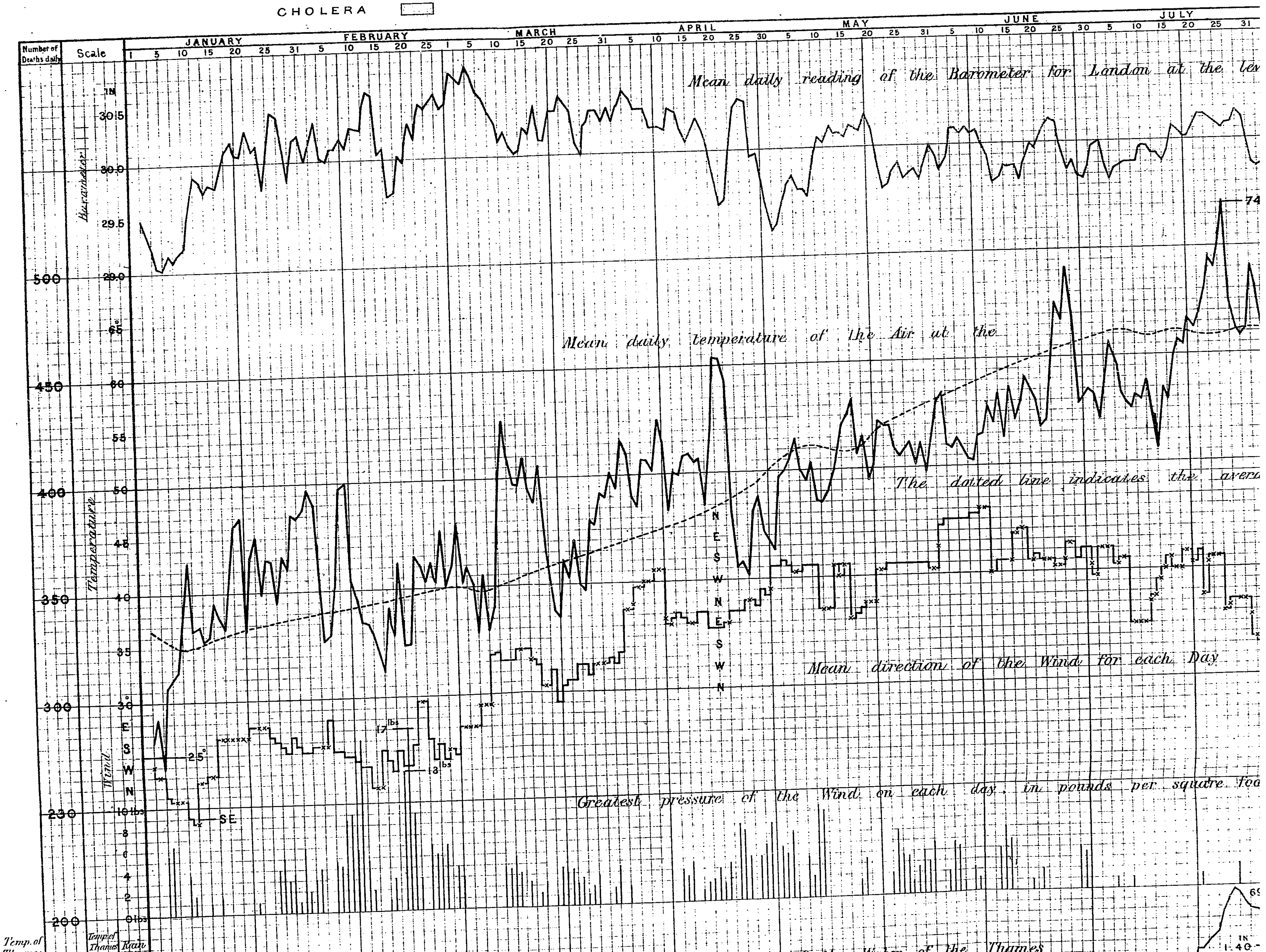
and the air was generally in motion.



LONDON

DIAGRAM REPRESENTING THE DEATHS FROM CHOLERA AND DIARRHŒA ON

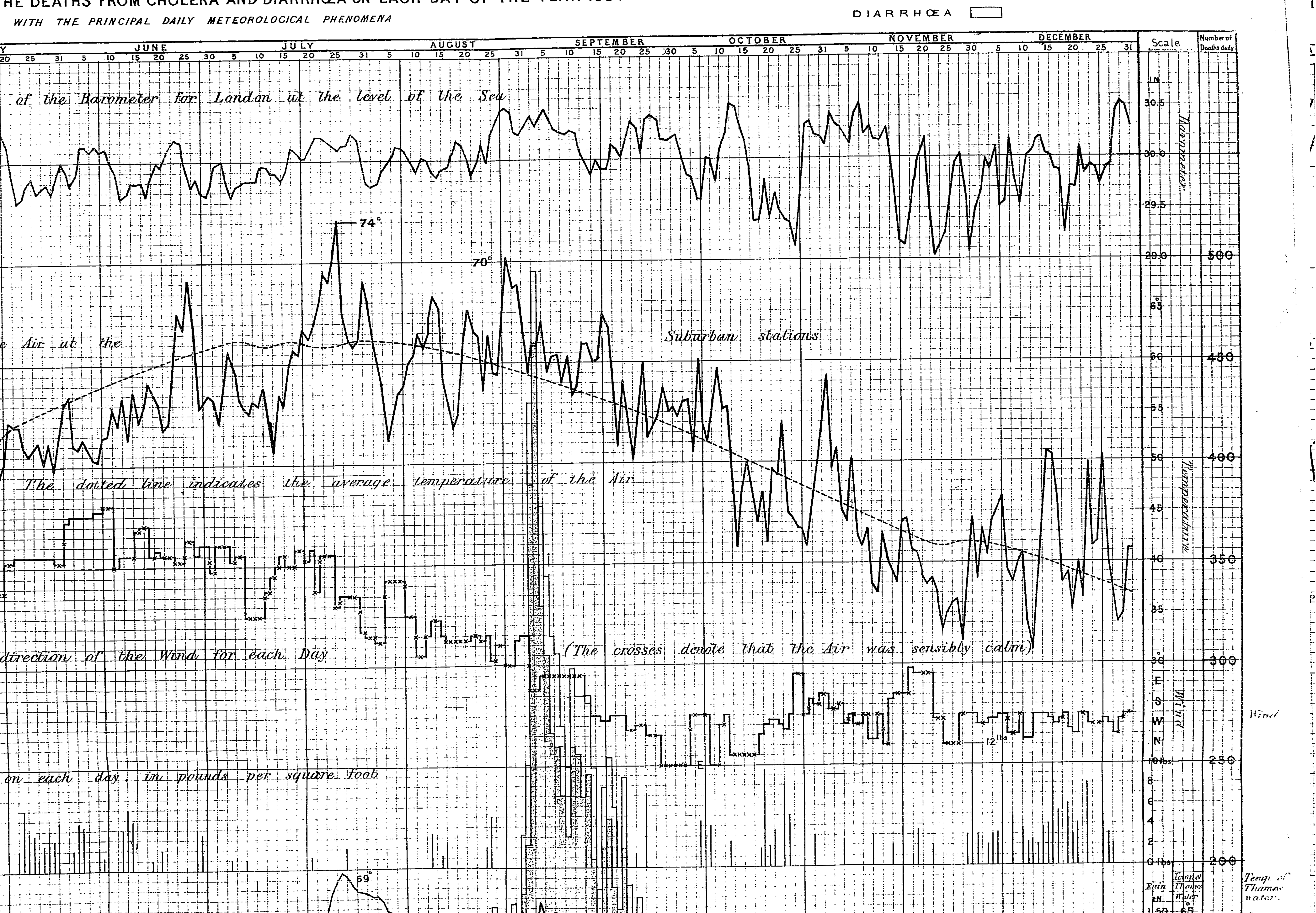
WITH THE PRINCIPAL DAILY METEOROLOGICAL PHENOME

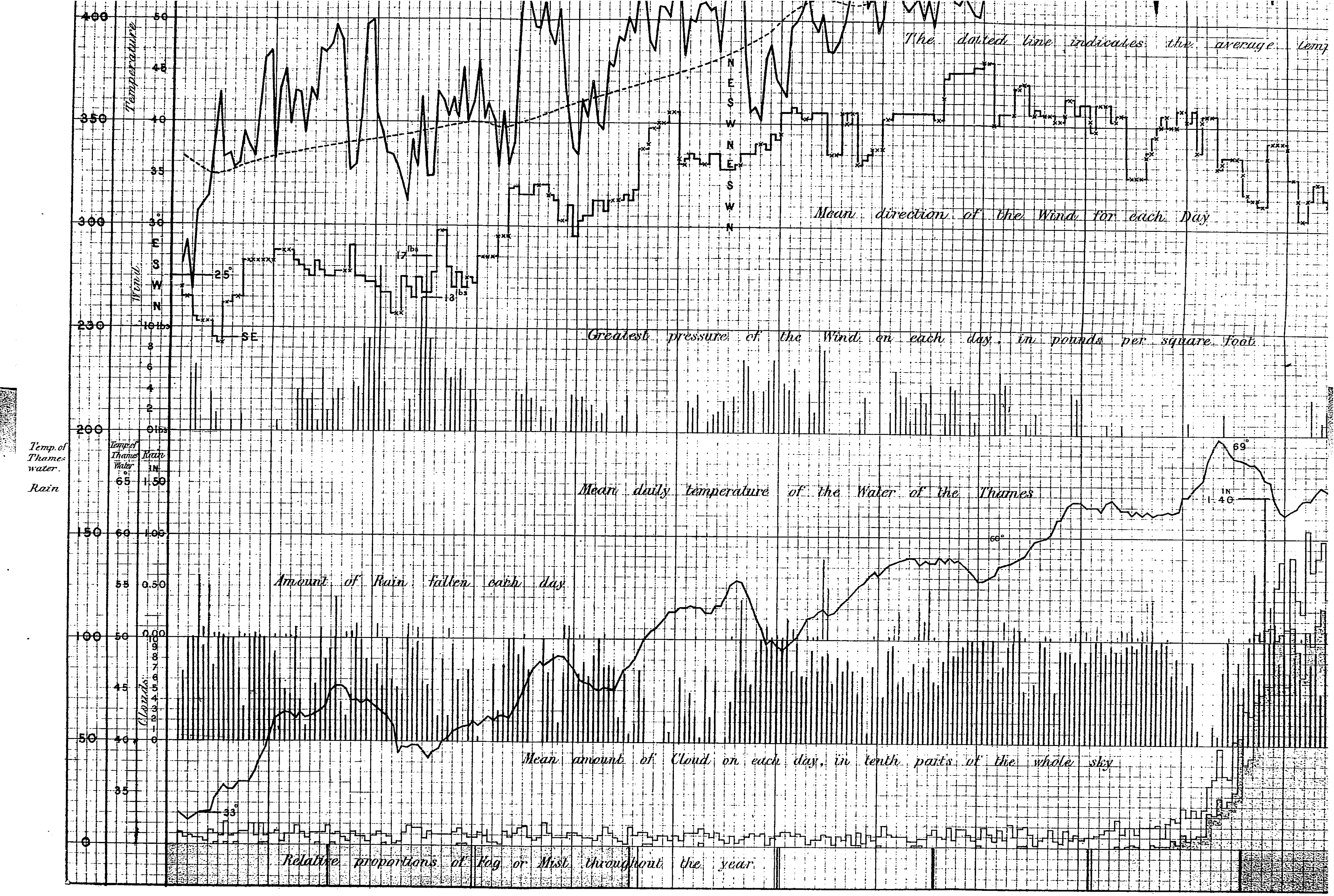


LONDON

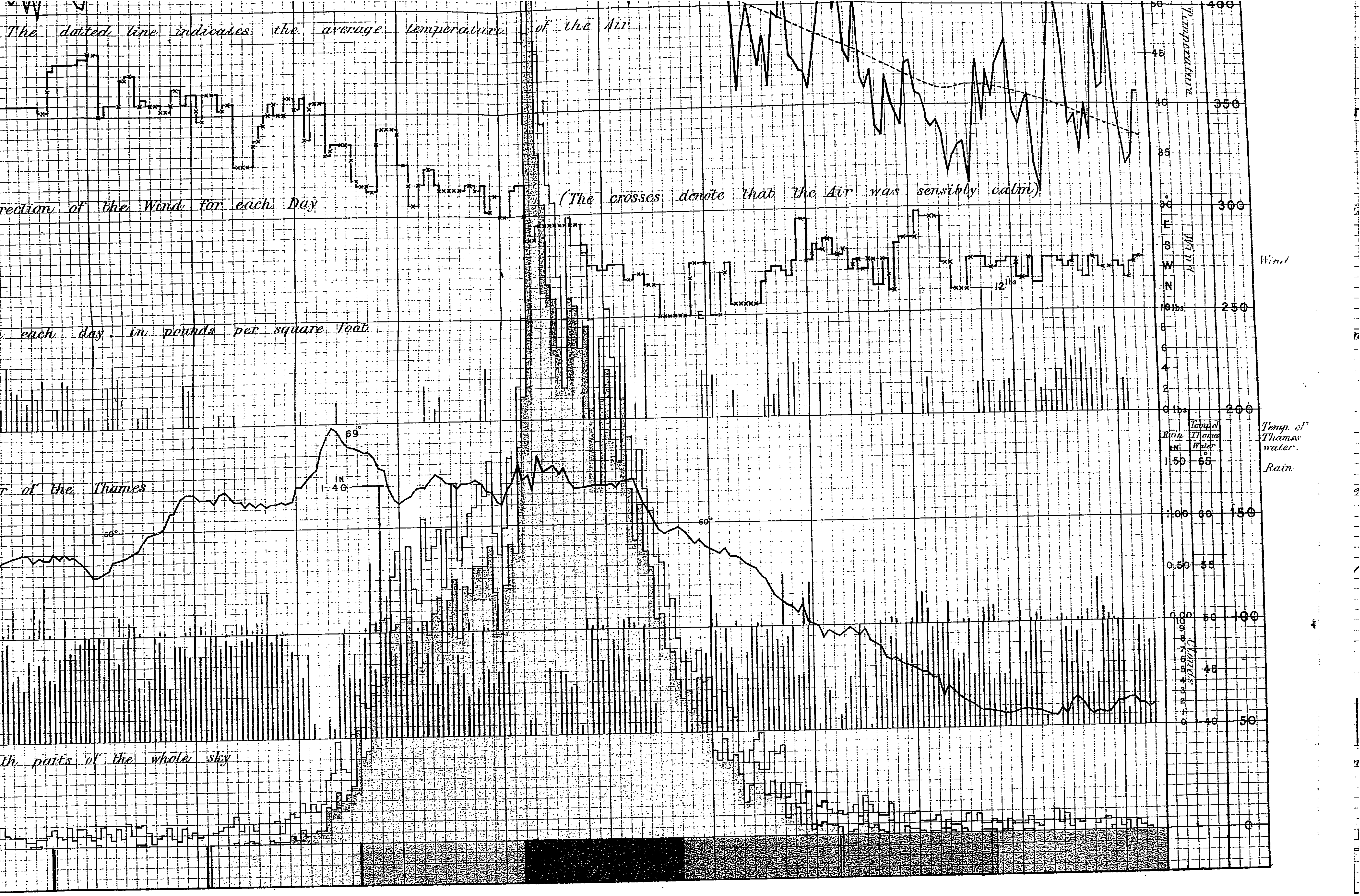
[T]HE DEATHS FROM CHOLERA AND DIARRHŒA ON EACH DAY OF THE YEAR 1854

WITH THE PRINCIPAL DAILY METEOROLOGICAL PHENOMENA





The elevation of the upper line indicates the reading of the barometer.
The dotted line indicates the average daily Temperature; the elevation of the continuous black line above, or its depression below the dotted line indicates the departure of Temperature a
The scale in degrees of Fahrenheit is at the sides of the Diagram.
The elevation of the lower black line indicates the Temperature of the Thames water on every day in the year. The scale in degrees of Fahrenheit is in the middle column at the sides of the D
The elevation of the blue line from the base indicates the number of Deaths from Cholera on every day of the year, and the extent of the yellow line indicates the number of Deaths from Diarr
The shadings at the bottom of the Diagram, indicate, the monthly relative proportion of Fog and Mist throughout the year.



epression below the dotted line indicates the departure of Temperature above or below its daily average.

le in degrees of Fahrenheit is in the middle column at the sides of the Diagram.
d the extent of the yellow line indicates the number of Deaths from Diarrhœa on every day, scale is on each side.
ear.

TABLE LIX.—Meteorological Table for the Year 1849.

1849. — Months.	Reading of Barometer corrected to 32° Fahr. and reduced to the Level of the Sea.	Difference from Average, Table IV.	Mean Temperature of Air.	Difference from Average, Table IX.	Mean of Highest Readings by Day.	Mean of Lowest Readings by Night.	Mean daily Range of Temperature.	Difference from Average, Table XVII.	Amount of Rain.	Difference from Average, Table XLII.	Amount of Cloud.
	in.	in.	°	°	°	°	°	°	in.	in.	
January - - -	29·949	+ ·041	40·1	+ 1·8	45·2	35·7	9·5	+ 1·3	1·6	− 0·5	7·7
February - -	30·284	+ ·362	43·2	+ 4·4	49·4	36·5	12·9	+ 2·4	2·2	+ 0·7	6·2
March - - -	30·093	+ ·137	42·5	+ 0·7	50·1	36·3	13·8	+ 0·4	0·5	− 0·9	7·3
April - - -	29·695	− ·197	43·2	− 3·3	52·5	36·5	16·0	− 0·9	2·2	+ 0·6	7·1
May - - -	29·944	− ·015	54·0	+ 0·6	63·8	46·7	17·1	− 2·0	3·9	+ 1·8	7·7
June - - -	30·046	+ ·085	57·9	− 1·4	69·1	48·5	20·6	+ 0·8	0·2	− 1·5	6·2
July - - -	29·967	+ ·004	62·1	+ 0·3	74·2	51·6	22·6	+ 5·1	2·9	+ 0·3	5·1
August - - -	30·019	+ ·061	62·9	+ 1·8	74·2	54·0	20·2	− 2·2	0·5	− 2·2	7·1
September - -	29·945	− ·060	58·8	+ 2·0	68·7	51·2	17·5	+ 0·2	3·3	+ 1·1	6·9
October - - -	29·922	+ ·083	51·1	+ 1·4	59·2	44·1	15·1	+ 1·5	2·7	− 0·3	6·5
November - -	29·921	+ ·023	44·1	− 0·2	49·8	38·1	11·7	+ 1·0	1·5	− 0·9	6·9
December - -	29·973	− ·037	39·1	− 1·3	43·2	34·1	9·1	+ 0·1	2·4	+ 1·0	7·1
Means - - -	29·980	+ ·041	49·9	+ 0·6	58·3	42·8	15·5	+ 0·6	Sum. 23·9	Sum. − 0·6	6·8

Table LX.—The Progress of the Epidemic in the Year 1849 is shown by the following Table, containing the Number of Deaths from Cholera registered in each Week.

1849. Week ending	Number of Deaths.	1849. Week ending	Number of Deaths.	1849. Week ending	Number of Deaths.
January 6	61	May 5	4	September 1	1,663
13	94	12	3	8	2,026
20	62	19	1	15	1,682
27	45	26	5	22	839
February 3	37	June 2	9	29	434
10	55	9	22	October 6	288
17	49	16	42	13	110
24	40	23	49	20	41
March 3	35	30	124	27	25
10	15	July 7	152	November 3	11
17	9	14	339	10	6
24	10	21	678	17	8
31	4	28	783	24	2
April 7	5	August 4	926	December 1	1
14	2	11	823	8	0
21	1	18	1,230	15	1
28	1	25	1,272	22	1
				29	0

In this year as in 1854, the greatest mortality took place about the beginning of September, but was more fatal in the early months of the year. In the week ending January 6, the number of deaths was 61, and on the following week as many as 94. The epidemic subsided at the end of March. In April and May the mortality was small. The disease broke out again in June, and in the week ending June 30 rose to 124. This high rate of increase continued till the disease attained its maximum 2,026 in the week ending September 8. The next week it began rapidly to decline, and decreased to 839 in the week ending September 22, and to 25 in the week ending October 27; after November 24 but few cases occurred.

The pressure of the atmosphere was above its average in January, and in February was remarkable. The average reading of the barometer from February 1st to the 18th, was 30·56 inches at the level of the sea; on the 11th, the reading was as great as 30·91 inches, a reading likely to occur but once in 30 years. The pressure continued high till about the middle of March. The mortality from Cholera had decreased from 94 in the second week of January, to 37 in the week ending February 3; had increased in the following week, and afterwards declined to 15 in the second week in March. The pressure was below its average from the middle of March, in April, and May, during the subsidence of the disease. In June the disease again broke out, and the pressure was again high, and remained high generally till September 8. The change of readings in August was small. On September 1 it was 29·67 inches, increased slowly till the 7th, when it was 30·22 inches, and turned

to decrease on the 8th. The mortality from June increased to its maximum 2,026 in the week ending September 8. The reading of the barometer declined rapidly on the 9th and 10th; was 29·2 inches almost without variation on the 11th, and still further decreased to 29·05 inches on the 12th; it then increased to 30·56 inches by the 19th, and decreased to 29·78 inches by the 27th; the disease declining rapidly. The pressure of the atmosphere was below its average in September and December, and above in October and November.

Temperature of the Air.

Till the disease declined in the middle of March the temperature was high, with the exception of the first seven days in the year; from January 8 to March 17 the average daily excess of temperature was 6°; within this period the excess exceeded 12° on three days, 13° on 2 days, and 14° on 2 days. From March 18 to June 30 the temperature was low, averaging a defect of 3° daily, which shows the temperature to have been low during the subsidence of the disease. From July 1 to July 17 it was 3° in excess; from July 18 to August 5 was 2° in defect; from August 6 to August 12 was 6° in excess: a few days of rather cold weather followed; from August 20 toSeptember 10 the temperature was in excess, averaging 4° daily, and this period was distinguished by a thick and stagnant atmosphere, the weather, for the most part, being close and oppressive. During this time the epidemic increased to its maximum, after which it rapidly and continuously declined. The temperature was for a few days together above, and a few days together below its average, till November 14, after which it was chiefly in defect to the end of the year.

Direction of the Wind.

	January, February, and March -	chiefly S.W.
	April, May, and June - -	„ N.E.
From	July 1 to July 8 - - -	- S.W. and N.N.
„	July 10 to July 16 - -	- N.E.
„	July 17 to July 31 - -	- S.W.
„	August 1 to August 12 - -	- almost calm.
„	August 12 to August 17 - -	- S.W.
„	August 18 to August 31 - -	- N.W.
„	September 1 to September 10 -	- Calm.
„	September 10 to September 16 -	- S.W.
„	September 17 to September 30 -	- N. and N.E.
„	October 1 to October 16 - -	- N.E.
„	October 17 to November 18 -	- S.W.
„	November 19 to November 30 -	- N.E.
„	December 1 to December 14 -	- N.E. and S.E.
„	December 15 to December 31 -	- S.W. and N.W.

From August 1 to 12 the air was almost calm; from the 12th to the 16th it moved rather quickly, but from the 17th to the end of the month it was frequently calm.

At the beginning of August the sky was frequently cloudy, but at times was clear. During the latter part of the month it was nearly always overcast, and the atmosphere was thick and hazy; at times so thick as to cause a great gloom, London being obscured by a dense fog-like mist, which overhung the city and rendered it invisible from Greenwich. Rain fell on 3 days only, to the amount of 0·4 inch of water.

From September 1 to 10 the air was calm; on September 11 and 12 the whole mass of air at all places was in motion, and the hills at Highgate and Hampstead were seen from Greenwich. The epidemic at this time was at its height, but soon after rapidly declined. From the 15th of September the air was in gentle motion.

During the months of August and September the motion of the air was about one half its usual amount; but this remark is applicable only at places of considerable elevation. At low places the motion was much less, and at many times it occurred that a strong wind was blowing on Blackheath, when at the same time not the slightest movement of the air was perceptible near the Thames: this was particularly the case from August 19 to 24, on the 29th, and from September 1 to 10.

During the outbreak at the beginning of the year the direction of the wind was chiefly S.W., and during its subsidence was mostly N.E. For some time before, and when the mortality was at its height, the air was in a stagnant state at all low places, particularly near the river Thames. The disease began to decline on the whole mass of air becoming in motion.

The temperature of the Thames water attained to 60° on May 24, and declined below this reading on September 14. On June 5 and 6, it was 66°, declined to 61° by the 12th, increased to 62° on the 21st, and to 69° about the middle of July; declined to 62° by the middle of August; increased to 65° by the beginning of September, and declined to 60° by the 13th. It was shortly after the temperature of the water had attained to 60° that the disease broke out a second time, and only declined when the temperature of the water descended below this reading.

TABLE LXI.—Showing the Electricity during the Year 1849.

Days of the Month. 1849.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	0	strong P.N.	0	No observations.	strong P.	mod. P.	0	strong P.	weak P.	strong P.	0	strong P.
2	0	0	0	No observations.	0	strong P.	0	var. P.	0	strong P.	weak P.	0
3	0	mod. P.	strong P.	No observations.	strong P.	0	0	strong P.	var. P.	strong P.	0	0
4	weak N.	mod. P.	mod. P.	No observations.	strong P.	strong P.	0	var. P.	var. P.	strong P.	0	0
5	active P.	mod. P.	mod. P.	No observations.	strong P.	strong P.	mod. P.	weak P.	var. P.	weak P.	strong P.	strong N.
6	weak P.	0	mod. P.	No observations.	0	0	mod. P.	strong P.	0	strong P.	strong P.	mod. P.
7	mod. P.	mod. P.	0	No observations.	0	0	0	strong P.	0	0	0	0
8	strong P.	weak P.	mod. P.	No observations.	0	var. P.	0	0	strong P.	mod. P.	0	strong P.
9	strong P.	mod. P.	0	No observations.	0	0	0	weak P.	var. P.	strong P.	0	strong P.
10	0	0	mod. P.	No observations.	0	0	0	var. P.	mod. P.	strong P.	0	mod. P.
11	0	0	mod. P.	No observations.	0	0	0	weak P.	weak P.	weak P.	0	weak P.
12	strong P.	active P.	weak P.	0	0	0	0	0	var. P.	mod. P.	0	mod. P.
13	0	active P.	0	strong N.	0	strong P.	0	0	weak P.	strong P.	0	mod. P.
14	0	active P.	strong P.	mod. P.	0	var. P.	0	weak P.	var. P.	mod. P.	0	0
15	mod. P.	0	strong P.	var. P.	0	strong P.	0	0	strong P.	strong P.	0	0
16	0	active P.	mod. P.	mod. P.	0	0	0	0	0	var. P.	0	0
17	0	0	0	0	0	0	0	strong N.P.	var. P.	0	0	0
18	0	0	0	0	strong N.	weak P.	0	strong P.	0	0	0	0
19	0	0	0	active N.	0	0	active N.	strong P.	var. P.	0	0	0
20	var. P.	0	0	strong P.	0	mod. P.	strong N.P.	0	strong P.	var. P.	0	0
21	0	0	0	strong P.	0	0	0	strong P.	0	0	0	0
22	strong P.N.	0	0	0	0	var. P.	0	mod. P.	var. P.	0	0	0
23	0	0	weak P.	0	0	strong P.	0	strong P.	0	var. P.	0	0
24	strong P.	strong N.	0	0	strong P.	mod. P.	strong P.N.	var. P.	strong P.	0	var. P.	active P.
25	0	strong P.N.	No observations.	weak P.	0	mod. N.P.	strong N.	mod. P.	var. P.	active N.	strong P.	strong P.
26	strong P.	strong P.	No observations.	0	0	var. P.	strong P.N.	mod. P.	strong P.	0	strong P.	0
27	v.active P.N.	strong P.	No observations.	mod. P.	0	var. P.	0	0	var. P.	0	var. P.	0
28	0	0	No observations.	mod. P.N.	strong P.	strong P.	weak P.	weak P.	weak P.	0	mod. P.	0
29	0		No observations.	strong P.	0	0	var. P.	0	0	0	0	weak P.
30	0		No observations.	var. P.	0	0	weak P.	strong P.	0	0	0	0
31	var. P.		No observations.		0		var. P.	var. P.		0		0

Fog, haze, and mist were not particularly noted till the month of August; they were frequent in August and September, and were noticed on fifty-three days in the quarter ending December 31.

The electricity of the atmosphere was occasionally strong, but for the most part it was weak, and the instruments were unaffected. It was nearly always positive. Thunder storms were rare: they were noticed on July 19, 20, and 26 only. Sheet lightning was seen on August 7, 11, and 20.

This closes my investigation into the meteorology of the year 1849, which exhibits an outline of facts very similar to that of 1854.

Atmospheric Phenomena in relation to Cholera in the Metropolitan Districts in the Year 1832.

My discussion of 1832 will be yet more brief, as my data is comparatively meagre, and the exact progress of the disease is not recorded. The office of the Registrar General has since been founded.

TABLE LXII.—Meteorological Table for the Year 1832.

1832. — Months.	Reading of Barometer corrected to 32° Fahr. and reduced to the Level of the Sea.	Difference from Average, Table IV.	Mean Temperature of Air.	Difference from Average, Table IX.	Mean of Highest Readings by Day.	Mean of Lowest Readings by Night.	Mean daily Range of Temperature.	Difference from Average, Table XVII.	Amount of Rain.	Difference from Average, Table XLII.	Amount of Cloud.
	in.	in.	°	°	°	°	°	°	in.	in.	
January - -	30·051	+ ·143	37·3	— 1·0	40·8	34·5	6·3	— 1·9	1·2	— 1·0	6·7
February- -	30·138	+ ·216	36·9	— 1·9	42·6	34·7	7·9	— 2·6	0·0	— 1·5	5·5
March - -	29·965	+ ·009	40·5	— 1·3	47·7	36·9	10·8	— 3·4	1·4	0·0	6·2
April - -	30·046	+ ·154	47·2	+ 0·7	56·4	42·0	14·4	— 2·5	0·4	— 1·2	4·7
May - -	29·982	+ ·023	51·5	— 1·9	61·6	46·3	15·3	— 3·8	1·5	— 0·5	6·0
June - -	29·893	— ·068	59·2	— 0·1	69·5	55·2	14·3	— 5·5	3·3	+ 1·7	6·8
July - -	30·122	+ ·159	61·2	— 0·6	71·2	56·1	15·1	— 2·4	0·7	— 1·9	5·7
August - -	29·899	— ·059	61·0	— 0·1	71·3	56·8	14·5	— 3·5	3·4	+ 0·7	6·5
September -	30·154	+ ·149	56·6	— 0·2	66·2	51·8	14·4	— 2·9	0·4	— 1·8	4·7
October - -	30·110	+ ·271	51·2	+ 1·5	57·9	48·4	9·5	— 4·1	2·5	— 0·5	6·5
November -	29·912	+ ·014	43·7	— 0·6	49·0	41·9	7·1	— 3·6	1·7	— 0·7	6·6
December -	30·025	+ ·015	42·4	+ 2·0	47·0	39·0	8·0	— 1·0	1·1	— 0·3	6·5
Means - -	30·025	+ ·085	49·1	— 0·3	56·8	45·3	11·5	— 3·2	Sum. 17·6	Sum. — 7·0	6·0

The total number of deaths in London from Cholera in 1832 was 5,275, which is less by far than the aggregate number in the two succeeding visitations. The progress of the epidemic was as follows: —It broke out in the middle of February, and by the middle of May the deaths numbered 994. It then subsided, and broke out again in June, was most fatal in August, and by the end of October the number of deaths amounted to 4,266. It then declined suddenly, and in November and December the number of deaths was 15 only.

Pressure of the Atmosphere.

On January 1st the reading of the barometer was 29·40 inches, which increased to 30·36 inches by the 15th, and was generally above 30 inches, except on the 26th, till the end of the month. The reading declined rapidly on February 1, to 29·26 inches on the 2d, but was as high as 30·60 inches by the 10th. The disease seems at this time to have increased in intensity at places where it had previously been, and to have broken out at fresh places. The pressure continued high for the most part throughout the month. In March the readings varied from 29·40 inches, on the 7th to 30·40 inches on the 10th. On April 4 the reading was 30·64 inches, which was the highest in the year. On April 30 it was 29·36 inches, and was the lowest in the month. In the early part of May the readings were high: the extremes were 30·45 inches on the 10th, and 29·53 inches on the 31st. The pressure was high in March, April, and the first half of May, and the disease declined to its minimum about the middle of May. In June the readings were low at the beginning of the month, and high towards the end; the extremes were 29·54 inches on the 6th, and 30·50 inches on the 30th. The disease re-appeared this month. In July the changes of reading were small; the extremes were 29·78 inches on 7th, and 30·47 inches on the 15th. The pressure for the whole month was in excess. In August the reading on the 2d was 29·89 inches, increased to 30·50 inches on the 11th, decreased to 29·83 inches on the 19th, increased to 30·13 inches on the 20th, decreased to 29·20 inches by the 22d, increased to 30·13 inches on the 24th, and decreased to 21·29 inches by the 28th, which was the lowest reading in the year. The disease at this time was at its height and its turning to decline seems in some measure connected with the low reading of the barometer at the end of the month. On September 4, the reading was 30·34 inches; it decreased to 29·84 inches by the 10th; increased to 30·40 inches by the 12th, and was generally about 30 inches during the remainder of the month. The readings in October were high, but there was nothing remarkable in those of November and December. The pressure of the atmosphere was above its average in every month of the year, excepting June and August.

Temperature of the Air.

The temperature was below its average in every month, excepting in April, October, and December, when it was slightly in excess. The spring was cold and vegetation backward, and it was noticed that no spring-like growing weather took place till towards the end

of May. The summer was cold, and the temperature never reached so high as 80°. The diurnal range of temperature was small in every month.

Clouds.—The sky was for the most part covered with cloud, and there were very few cloudless days in the year; at the same time the number of wholly overcast days was much less than usual. The clearest periods were in April and September, when the sky was less than one-half covered with cloud; the amount of cloud in all the remaining months covered something less than three-fourths of the whole sky.

Rain.—The fall for the year was 17·6 inches, being in deficit one-fourth of the average.

Fog was noticed on January 20, 21; February 22, 23, 25, 27; March 11; October 22; and December 27 and 28.

Haze was recorded on March 27, September 4, and October 20.

Thunder and *lightning* were noted on June 7, August 2; on this day there was a heavy thunder storm; August 3, November 29, and December 2.

Hail fell on June 7 and December 2.

Direction and estimated Strength of the Wind.

Jan. 1 to Jan. 10, N.E.	Estimated strength 0·6	Calm on 3 days.	
Jan. 10 to Feb. 10, S.W.	,, 1·0	,, 7	,,
Feb. 11 to Feb. 29, N.E.	,, 0·5	,, 8	,,
Mar. 1 to Mar. 7, S.	,, 1·8	,, 1	,,
Mar. 8 to Mar. 11, N.E.	,, 0·4	,, 2	,,
Mar. 12 to Mar. 27, S.W.	,, 1·7	,, 0	,,
Mar. 29 to Apr. 14, N.E.	,, 1·3	,, 1	,,
Apr. 16 to Apr. 21, S.W.	,, 1·4	,, 0	,,
Apr. 25 to Apr. 30, N.E.	,, 1·4	,, 0	,,
May 1 to June 6, N.E. and N.W. chiefly	0·9	,, 7	,,
June 6 to June 25, S.W. chiefly	,, 1·0	,, 3	,,
June 26 to July 2, N.	,, 0·5	,, 1	,,
July 3 to July 17, W.S.W.,	,, 1·2	,, 0	,,
July 18 to Aug. 2, N.	,, 1·1	,, 0	,,
Aug. 3 to Sept. 3, S.W.	,, 1·1	,, 3	,,
Sept. 4 to Sept. 7, N.E.	,, 0·6	,, 1	,,
Sept. 8 to Sept. 19, S.W.	,, 1·1	,, 1	,,
Sept. 20 to Sept. 24, S.E. and N.E.	,, 0·7	,, 1	,,
Sept. 25 to Sept. 29, calm	,, 0·0	,, 4	,,
Sept. 30 to Oct. 18, W.S.W.	,, 2·0	,, 0	,,
Oct. 19 to Oct. 28, N.E.	,, 0·8	,, 1	,,
Oct. 29 to Nov. 4, S.W.	,, 1·5	,, 0	,,
Nov. 5 to Nov. 8, N.	,, 1·6	,, 0	,,
Nov. 9 to Nov. 27, S.E.	,, 0·9	,, 3	,,
Nov. 28 to Dec. 27, S.W.	,, 1·2	,, 6	,,
Dec. 27 to Dec. 31, N.E. and S.E.	,, 0·9	,, 0	,,

The direction of the wind during the year was mostly N.E. and S.W. The numbers showing the estimated strength can be considered only as relative; from them it seems that the air was seldom in a calm state; the longest period noted as calm was from September 25 to September 29, and was most freely in motion during the first 18 days in October. During the year 53 days were noticed as being calm.

Conclusion.

The meteorological phenomena in relation to Cholera in the year 1832 furnish us with the means of comparison with the phenomena of 1849 and 1854, in relation to the general pressure of the atmosphere, temperature of the air, direction of the wind, fall of rain, clearness of sky, and frequency of electrical disturbances, but do not furnish other particulars.

Those of 1849 and 1854 furnish the means of satisfactorily comparing the general character of the two seasons.

No observations were made at the central Metropolitan stations in the years 1832 and 1849, and the meteorological phenomena of the outlying stations only admit of strict comparison.

In the year 1832 the barometer reading was high; that of the thermometer was low; and rain was deficient one-fourth of its average in the year. In the summer, when the disease was raging for the first time in England, the barometer was high; the temperature below the average; the quantity of rain small; the direction of the wind N.E. and S.W.; the air not in much motion; the sky partially overcast, and there was a seeming deficiency of electricity.

In the year 1849 the pressure of the atmosphere was great; the temperature high; the sky overcast; the direction of the wind N.E. and S.W.; the atmosphere misty and thick; the velocity of the air less than one-half its average. When the epidemic was at its height a calm prevailed, with a misty thick atmosphere at all places, which was sensibly more dense and torpid in low places; the weather was dull, thick, and oppressive; no rain; temperature of the Thames above 60°; weak positive electricity; no electrical disturbances.

In the year 1854 the pressure of the atmosphere was great; the temperature generally high; sky overcast; direction of the wind N.E. and S.W., and the velocity of the air was less by one-half than its average for some time before; and at the time of the greatest mortality from Cholera, the barometer reading was remarkably high, and the temperature above its average; a thick atmosphere, though at times clear, everywhere prevailed; weak positive electricity; no rain. In low places a dense mist and stagnant air, with a temperature in excess; temperature of the Thames water high; a high night London temperature; a small daily range; an absence of ozone, and no electricity.

The three epidemics were attended with a particular state of atmosphere, characterized by a prevalent mist, thin in high places, dense in low. During the height of the epidemic, in all cases, the reading of the barometer was remarkably high, and the atmosphere thick. In 1849 and 1854, the temperature was above its average, and a total absence of rain, and a stillness of air amounting almost to calm, accompanied the progress of the disease on each occasion. In places near the river, the night temperatures were high, with small diurnal range, a dense torpid mist, and air charged with the many impurities arising from the exhalations of the river and adjoining marshes, a deficiency of electricity, and, as shown in 1854, a total absence of

ozone, most probably destroyed by the decomposition of the organic matter with which the air in these situations is strongly charged.

In 1849 and 1854, the first decline of the disease was marked by a decrease in the readings of the barometer, and in the temperature of air and water; the air, which previously for a long time had continued calm, was succeeded by a strong S.W. wind, which soon dissipated the former stagnant and poisonous atmosphere. In both periods at the end of September, the temperature of the Thames fell below 60°, but in 1854 the barometer again increased, the air became again stagnant, and the decline of the disease was considerably checked. It continued, however, gradually to subside, although the months of November and December were nearly as misty as that of September. By the close of the year diarrhœa and Cholera had subsided, but a high rate of mortality still continued.

The co-existence of Cholera with coincident meteorological phenomena is, to say the least of it, remarkable, so is the stagnant atmosphere prevalent during the time of Cholera in each of the three periods, and which would seem to be a necessary condition to the activity of the disease.

The inimical nature of the influence it exercises upon the public health, I regard as intimately connected with the state of the water and the marshes, which in the preceding pages are shown to be large evaporating surfaces for every description of poisonous exhalations. Impure water and impure air are inseparable, for the impurities of the former will be concentrated into the surrounding atmosphere, and there remain, unless rapidly dispersed under favourable atmospheric conditions.

The agency of the river in fostering diseases is confirmed by the history of Cholera just traced, and which we find to have been most fatal in low situations, and in London in those places on the south side of the Thames which afford an undisturbed lodgment for the reception of the air charged with the poisonous elements from evaporation and exhalation. The effect of a gentle wind is to float this atmosphere to enclosed spots where its malignity becomes concentrated.

This closes a discussion I have endeavoured to make as elaborate as the means and time at my disposal have permitted.

I cannot consider the birth of Cholera attributable solely to atmospheric influences; at the same time, the preceding pages have shown, beyond a doubt, the activity of London climate in accelerating the disease, thereby showing its progress to be intimately connected with meteorological influences.

What other causes are combined with those of meteorology to aid the progress of this formidable epidemic, have yet to be ascertained.

Just as this Report was printed, I received a copy of the Report of the Sanitary Commission on epidemic yellow fever in New Orleans. That part on the relation of meteorological phenomena to cholera and yellow fever, written by Dr. Edward H. Barton, exhibits a rare example of patient research; he having discussed with minuteness all the epidemics of cholera and yellow fever in relation to the meteorology of the district as far back as the meteorological observations are trustworthy, and he points out the meteorological condition during the rise and progress of each epidemic. His results, in many instances, are in close accordance with those I have stated in my Report.

No. II.

Report on the Examination of certain Atmospheres during the Epidemic of Cholera. By Dr. R. D. Thomson.

The facts with which we are acquainted in reference to the condition of the atmosphere, indicate that its main constituents, oxygen and nitrogen, are very stable in their proportions. The mean of experiments made on the composition of the air in various parts of the globe shows that the amount of oxygen by measurement is approximately 21 per cent., and that of the nitrogen 79; but in certain cases within the tropics, the conditions of which have not yet been thoroughly investigated, the quantity of oxygen falls to 20·3 per cent. The influence of this diminution would be slightly to lower the weight of a given bulk of air, a result the reverse of what it is understood was observed during the first introduction of cholera into this country (Prout). No physiological facts seem to indicate that such a slight departure from the normal state of the air would be attended in the human organization with a disease possessing a regular type, nor even would such a consequence be liable to occur during greater irregularities in the atmospheric equilibrium in this direction. The agency of carbonic acid in inducing disease can scarcely be quoted as likely to occur on a great scale in nature, since the diffusive power of this and other gases, so sagaciously discovered by Priestley, and applied by him to explain the respiratory process, always tends to preclude its concentration, except under a limited number of peculiar circumstances. The accumulation of ammonia, another recognized normal constituent of atmospheric air, from the insignificance of its possible amount, could scarcely be quoted as a likely source of disease, however much it might be valued as an indication of the collateral existence of other bodies of organic origin in the air. If this reasoning be admitted, we should be compelled to look for the source of endemic diseases to the vapour of the atmosphere or to organic bodies, either disseminated through the air by the agency of heat or evaporation from inorganic or organic matter placed on the earth's surface. Intermittent fever or ague is one of those diseases which has been thoroughly ascertained to be endemic, and to be dependent on terrestrial causes of a peculiar character. Whether the cause be the nature of the atmosphere in which the human system is immersed or the introduction of a poison into the circulation, is a question open to discussion. The fact that removal from the marshy or intermittent atmosphere to an elevated and dry mountain summit or table land obviates or speedily terminates the morbid accession, affords support to the view which would ascribe the occurrence of the disease to immersion in an atmosphere nearly saturated with vapour, and the consequent inter-