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THE RAINFALL OF THE DRAINAGE AREA OF NEW ORLEANS, LA.

By F. S. SHIELDS, Secretary of the Drainage Commission. Dated New Orleans, La., January 31, 1905.

I beg to transmit copy of the record of precipitation at the various rain-gage stations connected with the Drainage Department of the Sewerage and Water Board of the city of New Orleans, La.

I trust this record will be of some service, as the records are very carefully kept by means of up-to-date gages and by careful compilation of the information obtained therefrom. We conceive that this record is more comprehensive for the entire city than that of any one station, due to the fact that the increase in area covered by the various gages gives a more accurate basis on which to make calculations.

As the seasonal meteorological conditions during the past few years have shown great variations (the total rainfall of 36.62 inches in 1899, 64.1 inches in 1900, 37.93 inches in 1902, and again 50.71 inches in 1903), the tables should be of great interest to those who take note of such matters.

The Drainage Commission, from the date of its inauguration, established six rain gages, one at the Dublin Station, back of Carrollton, another at Audubon Park, one known as the "Jefferson," on Napoleon avenue, another at City Hall, another in Algiers, and another at London avenue, in the lower portion of the city. Daily reports are received from these rain gages, from which Table 1 is compiled. The locations of these gages are shown on the accompanying chart, fig. 1, by small black square dots and distances from the

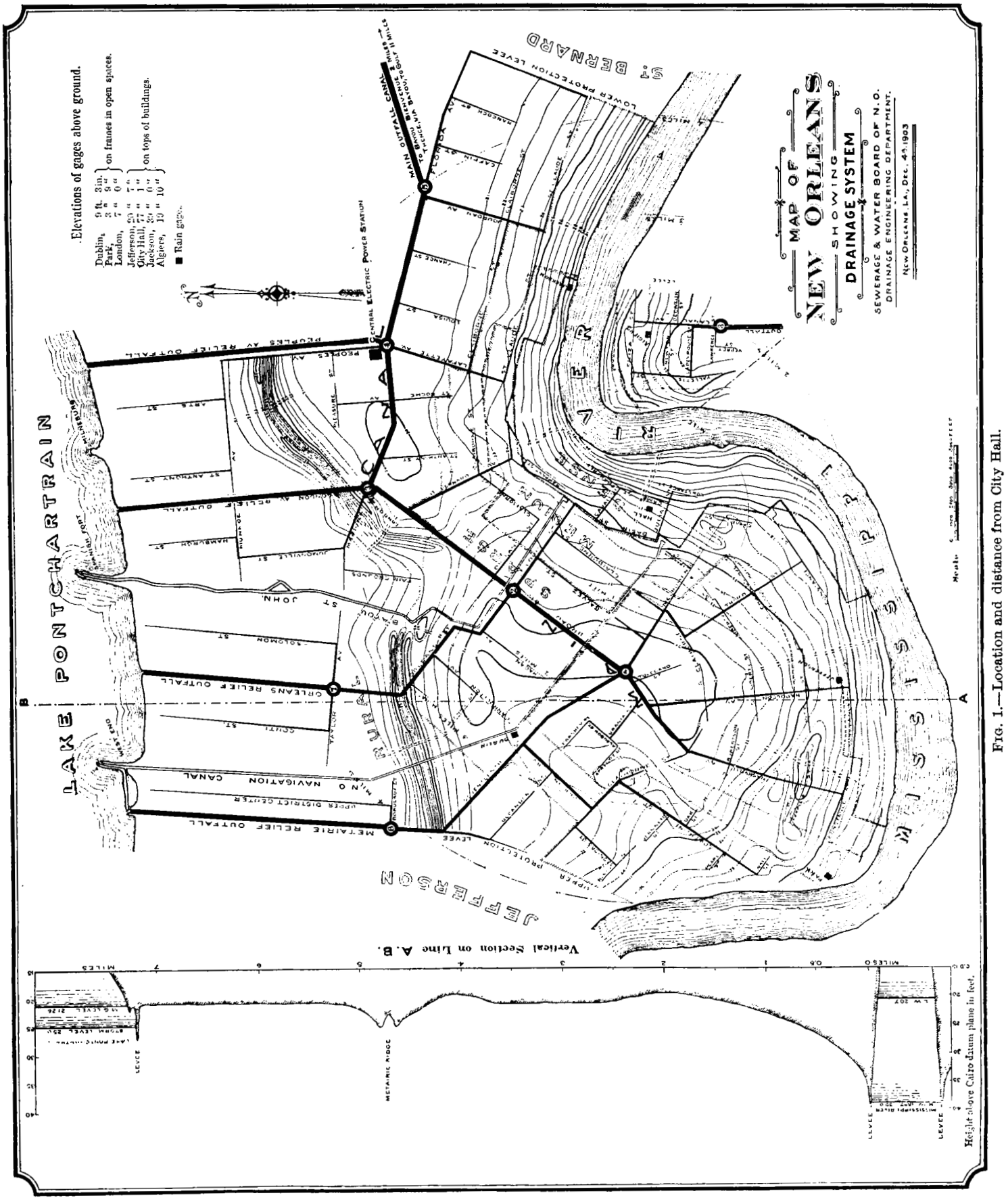

FIG. 1.—Location and distance from City Hall.

City Hall are shown by heavy black circles. As shown in Table 2, the average of these six stations gives the authentic rainfall of each month for the city.

TABLE 1.—1895.

Months.	Dublin.	Park.	Jefferson.	Hall.	Jackson.	London.
January	7.83	7.90	7.29	7.56	7.08	8.22
February	4.71	4.71	4.22	4.35	4.75	4.73
March	3.78	3.78	3.51	3.47	3.64	3.65
April	2.75	2.56	1.97	2.46	2.68	2.45
May	9.83	11.77	11.62	9.04	9.47	10.52
June	12.14	11.40	12.33	8.35	8.04	7.68
July	6.78	6.88	8.08	7.24	6.67	6.14
August	6.07	6.35	7.31	5.73	8.96	8.25
September	1.97	2.82	2.52	1.96	2.15	1.53
October	1.29	1.42	1.21	1.22	1.53	1.23
November	0.59	1.25	0.69	0.74	1.07	0.90
December	5.25	5.47	4.84	4.49	4.28	4.44

1896.

January	2.44	2.68	2.68	2.64	2.15	2.51
February	3.23	2.93	3.02	2.82	3.49	2.95
March	4.38	5.77	6.61	5.24	5.60	4.06
April	2.41	2.51	3.20	4.65	3.26	3.48
May	2.89	1.55	2.91	2.54	2.40	6.37
June	7.22	10.43	8.12	9.01	12.13	10.28
July	3.17	4.33	4.20	3.29	3.13	3.25
August	5.00	3.17	4.04	3.32	3.72	5.02
September	7.30	4.20	5.62	5.38	5.21	7.11
October	6.08	6.76	6.43	5.89	7.17	7.78
November	3.66	4.33	4.05	2.98	3.07	4.33
December	3.82	3.65	3.49	3.70	3.03	4.04

1897.

January	2.35	2.59	2.24	1.07	1.66	2.43
February	5.06	5.67	4.86	4.94	4.84	5.20
March	5.81	6.04	5.42	5.25	4.74	5.03
April	5.06	5.46	5.31	6.03	5.88	5.66
May	0.95	1.02	0.72	0.22	0.20	0.36
June	6.85	7.56	5.95	5.17	4.63	7.12
July	6.53	2.88	5.85	5.51	3.03	6.62
August	4.41	3.36	2.72	2.80	2.73	5.31
September	4.45	3.45	2.75	3.73	5.09	3.64
October	4.24	3.67	3.60	3.36	3.47	4.25
November	3.28	3.04	3.01	3.76	3.22	3.01
December	5.55	5.36	5.31	4.82	4.18	5.30

1898.

January	2.18	2.24	2.01	1.91	1.59	2.06
February	8.42	8.40	7.01	6.70	5.98	7.27
March	1.20	1.56	1.50	1.01	0.78	1.35
April	3.20	3.50	3.46	3.04	3.10	2.93
May	0.00	0.02	0.17	0.00	0.28	0.65
June	5.09	4.32	3.00	4.52	2.33	2.11
July	7.60	5.89	7.09	4.67	2.97	5.98
August	5.59	7.13	5.92	5.79	3.09	5.39
September	15.88	18.16	16.40	16.73	11.94	16.97
October	1.65	1.93	1.98	1.21	1.17	1.09
November	6.70	7.14	6.80	6.03	4.71	6.56
December	2.92	3.40	3.43	2.96	2.59	3.05

1899.

January	2.36	2.68	3.03	2.78	2.17	2.65
February	3.88	3.92	3.83	3.53	1.50	3.90
March	3.06	3.08	2.88	3.00	2.10	3.24
April	1.93	1.90	1.30	1.75	1.46	1.96
May	0.09	0.05	0.54	0.20	0.00	0.02
June	11.12	12.40	9.85	8.50	4.57	11.31
July	6.46	6.94	5.62	5.46	2.49	7.25
August	3.26	1.94	3.32	2.42	*2.64	4.46
September	0.29	0.32	0.49	0.36	*0.44	0.44
October	1.67	1.84	1.44	0.99	*1.48	3.05
November	2.31	2.25	2.10	1.79	*1.85	1.79
December	3.15	4.00	3.74	3.17	*3.56	2.96

* Algiers from August 1.

1900.

January	3.58	3.58	3.78	3.81	4.48	4.05
February	6.04	6.27	6.17	5.54	6.11	5.83
March	5.11	4.92	3.87	4.20	4.47	4.42
April	13.23	12.96	11.69	11.06	12.59	12.23
May	3.62	3.97	3.38	3.07	3.23	3.00
June	7.30	7.33	6.32	5.54	7.41	6.80
July	9.92	8.21	9.22	6.79	7.78	8.61
August	6.69	5.00	4.23	4.63	4.71	4.62
September	2.33	3.84	3.32	3.49	4.80	4.01
October	1.99	1.96	2.27	2.81	3.66	2.52
November	1.61	1.63	1.12	0.98	0.92	1.41
December	6.09	6.77	7.36	6.07	6.22	6.16

1901.

Months.	Dublin.	Park.	Jefferson.	Hall.	Algiers.	London.
January	3.06	3.83	3.33	3.06	3.30	3.39
February	5.45	5.84	6.49	5.13	5.90	5.52
March	4.40	3.41	3.17	3.52	4.17	4.17
April	8.63	8.43	7.37	6.95	6.98	8.13
May	2.69	1.06	0.47	0.80	1.32	4.44
June	2.81	3.14	3.60	3.80	5.09	2.94
July	9.20	8.74	9.15	8.73	10.43	10.28
August	3.47	6.84	4.24	4.88	5.53	5.01
September	3.48	3.96	3.24	3.36	2.57	2.80
October	3.63	2.83	3.29	3.0	3.39	3.31
November	3.16	2.66	2.11	2.19	2.36	2.72
December	4.60	4.91	4.00	3.99	4.90	4.83

1902.

January	0.41	0.76	1.06	0.85	0.71	0.68
February	3.37	3.47	3.92	3.32	3.59	3.44
March	4.30	4.16	4.07	3.53	3.13	4.13
April	3.25	3.57	3.48	3.43	3.38	3.37
May	2.23	1.35	1.54	1.63	1.53	3.98
June	1.56	1.26	1.31	1.45	1.30	0.37
July	1.91	1.75	2.65	3.69	2.56	2.50
August	4.65	3.24	3.75	2.84	2.43	2.34
September	6.94	6.12	5.28	6.12	4.50	6.65
October	2.73	2.60	1.87	1.83	2.68	2.54
November	3.43	3.33	3.21	3.23	3.39	2.89
December	5.40	6.52	6.19	5.12	5.78	5.94

1903.

January	3.95	4.20	4.09	3.70	4.12	3.60
February	10.44	10.33	9.44	9.21	9.45	10.02
March	14.73	8.96	7.90	12.59	12.76	13.68
April	0.45	0.82	0.79	0.88	0.64	0.38
May	1.19	1.87	1.76	1.05	1.04	1.35
June	3.40	4.51	3.95	3.60	4.43	3.77
July	5.23	5.09	5.98	6.08	7.97	9.05
August	9.19	5.83	4.92	7.23	4.32	3.24
September	4.01	1.23	2.11	2.92	2.31	2.27
October	0.42	0.38	0.43	0.91	0.98	0.47
November	0.29	0.24	0.15	0.12	0.28	0.17
December	3.79	3.90	3.61	3.10	3.14	3.96

1904.

January	2.77	3.21	3.29	3.10	3.65	2.88
February	1.52	1.46	1.63	1.40	1.86	1.68
March	4.09	4.77	4.84	3.72	3.49	3.32
April	2.05	2.18	1.61	1.73	1.61	1.42
May	4.12	3.17	3.09	4.05	4.07	4.45
June	3.75	3.57	3.38	4.61	4.18	3.70
July	5.59	6.36	5.54	6.65	8.61	6.85
August	6.18	5.72	5.72	4.34	6.29	5.18
September	4.31	3.21	2.59	2.93	4.24	3.14
October	0.82	0.54	1.76	1.20	1.42	1.11
November	1.67	1.47	1.43	1.50	1.77	1.76
December	2.63	3.00	2.34	2.08	2.32	2.53

1905.

January	7.37	6.38	6.37	5.73	5.77	6.65
February	4.35	5.25	4.85	4.72	5.09	6.01
March	7.95	7.48	6.59	6.84	7.00	6.93

Table 2 for December shows the total rainfall at each station and the average at all stations, with a mean total for the twelve months, and a comparative showing of the rainfall for December for four years, back to 1900, inclusive. It also gives a comparison of the average total for the past twelve months, 1904, with the average rainfall of the same period for the past ten years.

TABLE 2.—*Record of precipitation at various stations, for month ending at midnight, December 31, 1904.*

Date.	Dublin.	Park.	Jefferson.	Hall.	Algiers	London.
1	0.18	0.20	0.21	0.19	0.22	0.25
2	0.38	0.41	0.49	0.31	0.37	0.21
3	0.02	0.01	0.01	0.01	0.01	.....
4	0.42	0.45	0.44	0.45	0.45	41
6	.....	0.01	.....	.....	.....	.....
9	0.25	0.23	0.15	0.18	0.19	0.31
14	0.07	0.12	0.12	0.04	0.05	0.13
16	0.23	0.19	0.13	0.13	0.13	0.20
25	0.03	0.03	0.03	0.02	.....	0.04
26	.....	.....	.....	0.01	.....	.....
27	1.05	1.35	0.76	0.74	0.90	0.98
Totals	2.63	3.00	2.34	2.08	2.32	2.53

TABLE 3.—*Record of rainfall in New Orleans, La., since establishment of drainage rain gages in 1894.*

Year and average up to date.	January. Amount.	February. Amount.	February. Total to date.	March. Amount.	March. Total to date.	April. Amount.	April. Total to date.	May. Amount.	May. Total to date.	June. Amount.	June. Total to date.	July. Amount.	July. Total to date.	August. Amount.	August. Total to date.	September. Amount.	September. Total to date.	October. Amount.	October. Total to date.	November. Amount.	November. Total to date.	December. Amount.	December. Total to date.	Annual monthly average.	Year.	Departure from 10-years average—51.55.
1894	2.11	13.27	15.38	4.48	19.86	4.27	24.13	2.36	26.49	4.10	30.59	8.15	38.74	7.46	46.20	1.37	47.57	0.76	48.33	1.19	49.52	1.94	51.46	4.29	1894	— 0.09
1895	7.65	3.76	11.41	3.63	15.04	2.48	17.52	10.38	27.90	10.48	38.88	6.97	45.35	7.32	52.67	2.16	54.83	1.32	56.15	0.88	57.03	4.80	61.83	5.15	1895	+10.28
Aver...	4.88	8.52	13.40	4.05	17.45	3.37	20.82	6.37	27.19	7.29	34.48	7.56	42.04	7.39	49.43	1.77	51.20	1.04	52.24	1.04	53.28	3.77	57.05	4.52	Aver...	+ 2.70
1896	2.52	3.07	5.59	5.27	10.86	3.25	14.11	3.11	17.22	4.61	21.83	3.56	30.39	4.05	34.44	5.80	40.24	6.69	46.93	3.73	50.66	3.59	54.25		1896	
Aver...	4.09	6.70	10.79	4.46	15.25	3.34	18.59	5.23	23.87	8.06	31.93	6.23	38.16	5.60	44.44	3.11	47.55	2.92	50.47	1.93	52.40	3.44	55.84		Aver...	
1897	2.02	5.10	7.12	5.38	12.50	5.57	18.07	0.58	18.65	6.21	24.86	4.90	29.76	3.56	33.32	3.85	37.17	3.76	40.93	3.22	44.15	5.00	49.24	4.10	1897	— 2.31
Aver...	3.57	6.30	9.87	4.69	14.56	3.90	18.46	4.11	22.57	7.60	30.17	5.89	36.06	5.70	41.65	3.30	44.95	3.14	48.09	2.25	50.34	3.85	54.19		Aver...	
1898	2.00	7.30	9.30	1.28	10.58	3.20	13.78	0.10	13.88	3.56	17.39	5.70	23.09	5.48	28.57	16.01	44.58	1.50	46.08	6.32	52.40	3.06	55.46	4.62	1898	+ 3.91
Aver...	3.26	6.50	9.76	4.00	13.76	3.75	17.51	3.31	20.82	6.79	27.61	5.86	33.47	5.57	39.04	5.84	44.88	2.81	47.69	3.06	50.75	3.70	54.45		Aver...	
1899	3.15	3.43	6.58	2.89	9.47	1.68	11.15	0.15	11.30	9.62	20.92	5.70	26.62	3.01	29.63	0.32	29.95	1.69	31.64	2.02	33.66	2.49	36.15	3.05	1899	—14.93
Aver...	3.40	5.99	9.39	3.81	13.20	2.73	15.93	2.73	18.66	7.27	25.93	5.83	31.76	5.16	37.39	4.93	42.32	2.62	44.94	2.69	47.63	3.65	51.28		Aver...	
1900	3.88	5.99	9.87	4.50	14.37	3.38	17.75	3.33	21.08	6.78	27.86	5.42	33.28	4.98	38.26	3.63	41.89	2.53	44.42	1.28	45.70	6.44	52.14	5.34	1900	+12.55
Aver...	3.25	5.72	8.97	3.81	12.78	2.87	15.65	1.79	17.44	7.19	24.63	5.20	29.83	5.12	34.95	4.74	39.69	2.61	42.30	2.66	44.96	4.05	49.01		Aver...	
1901	3.33	3.90	7.23	3.90	11.13	3.56	14.69	3.56	18.25	3.56	21.81	9.42	31.23	4.99	36.22	3.24	39.46	3.25	42.71	2.53	45.24	4.54	49.78	4.50	1901	+ 2.88
Aver...	3.26	3.21	6.47	3.90	10.37	1.73	12.10	2.64	14.74	6.74	21.48	6.61	28.09	5.10	33.19	4.56	37.75	2.69	40.44	2.64	43.08	4.12	47.20		Aver...	
1902	0.75	3.52	4.27	3.39	7.66	5.06	12.72	3.41	16.13	1.21	17.34	2.51	19.85	3.21	23.06	5.93	28.99	2.38	31.37	3.25	34.62	5.83	40.45	3.16	1902	—13.62
Aver...	2.98	5.70	8.68	3.90	12.58	4.88	17.46	2.65	20.11	6.12	26.23	6.15	32.38	4.89	37.27	4.71	41.98	2.65	44.63	2.72	47.35	4.30	51.65		Aver...	
1903	3.94	9.81	13.75	11.77	25.52	0.66	26.18	1.57	27.75	3.94	31.69	6.57	38.06	5.79	43.85	2.47	46.32	0.60	46.92	0.21	47.13	3.58	50.71	4.22	1903	— 0.84
Aver...	3.08	6.10	9.18	4.68	13.86	4.45	18.32	2.53	20.85	5.90	26.75	6.19	32.94	4.98	37.92	4.49	42.41	2.45	44.86	2.46	47.32	4.23	51.55		Aver...	
1904	3.15	1.59	4.74	4.04	8.78	1.77	10.55	3.83	14.38	3.87	18.25	6.60	24.85	5.57	30.42	3.40	33.82	1.14	34.96	1.60	36.56	2.48	39.04	3.25	1904	—12.51
Aver...	3.09	5.69	8.78	4.63	13.40	4.21	17.61	2.64	20.25	5.72	25.98	6.23	32.21	5.04	37.25	4.39	41.64	2.33	43.96	2.38	46.34	4.07	50.41			

TABLE 2.—*Record of precipitation at various stations*—Continued.

Average of all stations (6) for month of December, 1904..... 2.48
Average of all stations east of river (5) for month of Dec. 1904.. .. 2.52
Monthly average of all stations for 1904, 12 months..... 3.25

Average of all stations for the month of December, as compared with averages of past four years.

1904	2.48	0.00
1903	3.58	— 1.10
1902	5.83	— 3.35
1901	4.54	— 2.06
1900	6.44	— 3.96

Average of all stations for the year 1904, as compared with averages of past four years.

1904	39.05	0.00
1903	50.71	— 11.60
1902	37.93	+ 1.12
1901	53.93	— 14.88
1900	64.10	— 25.05

Total rainfall for 1904 as compared with average total of past ten years.

1904.....	39.05	0.00
Ten years average,	51.55	— 12.50

The accompanying record of rainfall, Table 3, is the tabulation of rainfall for the eleven years previous to December 31, 1904.

(1) This record shows the monthly rainfall and total for any given number of months each year, by reading from left to right.

(2) The total rainfall per annum and the average monthly rainfall.

(3) The average rainfall for each month in any given number of years.

(4) The average total in any given number of months in any given number of years.

(5) The average annual rainfall for any given number of years.

(6) The excess or deficit as compared with ten years average, to 1902, inclusive.

CANADIAN SEISMOGRAPHIC RECORDS.

By Prof. R. F. STUPART, Director Canadian Meteorological Service.

During the month of April the seismograph at Toronto showed disturbances on eight days and that at Victoria, B. C., on nine days. Of these disturbances only that on the 4th was pronounced, the others being very small.

The record of the 4th was that of the great earthquake in India, and is well marked on both traces, fig. 1, Toronto, and fig. 2, Victoria, but the movement was greater at Toronto. The preliminary tremors were registered by both instruments at practically the same instant as were also the large waves, but the maximum movement was recorded at Toronto about three minutes earlier than at Victoria. The duration of disturbance as registered at Toronto was $3^h\ 25.8^m$, and at Victoria $3^h\ 26.3^m$.

TABLE 1.—*Register from Toronto, Canada,*

P. T. = preliminary tremors. L. W. = large waves. Time is Greenwich civil time, given in hours, minutes, and decimals of minutes; 0 or 24 H = midnight.
Scale value—one millimeter of displacement of outer end of boom = a tilt of 0.67″.

No.	Date, 1905.	P. T. Commence.	L. W. Commence.	Max.	End.	Max. Amplitude.	Duration.	Remarks.
		h. m.	h. m.	h. m.	h. m.	mm.	h. m.	
570	April 4	1 14.2	1 50.2	1 54.3	4 40.0	4.0	3 25.8	Moderate, India.
571	April 12	3 18.0	.....	.....	3 22.0	0.05	0 4.0	Very slight thickening.
572	April 16	17 32.0	.....	.....	17 39.0	0.1	0 7.0	Do.
573	April 19	13 00.0	.....	.....	14 20.0	0.15	1 20.0	Marked and extended thickening.
574	April 25	17 49.3	.....	.....	17 57.1	0.1	0 7.8	Slight thickening, Persia.
575	April 26	5 51.1	.....	.....	5 58.1	0.1	0 7.0	Do.
576	...do	22 2.3	.....	.....	22 48.0	0.25	0 45.7	Very small, began abruptly.
577	April 28	17 9.5	.....	.....	17 32.7	0.15	0 23.2	Thickening.
578	May 9	6 53.2	.....	6 58.3	7 47.3	0.90	0 54.1	Small, southern Mexico.
579	May 11	17 35.5	.....	.....	18 20.3	0.05	0 44.8	Minute and extended thickening.
580	May 12	3 13.8	.....	.....	3 19.8	0.05	0 6.0	Minute thickening.