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The Geophysical Observatory

Meteorological and Seismological Departments

UNDER THE DIRECTION OF

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AND
GEORGE E. RUEPPEL, S. J.

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PART I.

Meteorology

Meteorology in St. Louis University.

SCOPE OF THE WORK.

The propriety of establishing a Meteorological Observatory as a department of a University may not be so obvious as to require no word of justification. If our universities seek to promote the material welfare of the world by subsidizing and operating laboratories for research in agriculture, electricity, biology, medicine and a score of other sciences, why not, on the same plea, assume a like attitude toward the study of the weather? True, other sciences enable us to get in more direct contact with the forces of nature and to make them the servants of our necessities and pleasures, while the meteorologist, after all his probing into the laws governing the phenomena of our atmosphere, may be able to do little more than foresee weather conditions at a comfortable distance, without being able to offer further protection. Thus stated, the advantages offered may not seem worth the effort; but they assume tremendous proportions when measured in terms of property saved, health and lives preserved. If such be the nature and extent of the advantage to be gained, there should be no hesitation in giving meteorology its proper relation to the other sciences now fostered in our universities.

This position gains strength from the fact that meteorologists themselves, at least in this country, look to the universities for assistance in solving their larger problems. At the Peoria Convention of Weather Bureau Officials, Professor Cleveland Abbe said: "We have also to wish that the professors and special mathematical students interested in meteorology shall have their attention directed specifically to some of our problems; for instance, the mathematical expressions for the action of the wind on a plane surface. . . . But there are still grander problems for the mathematicians of the universities. I refer to the motions of the atmosphere and the attendant temperature and rainfall."

Some experts, such as Professor Langley, have been lending their assistance in this way. The truest response to Professor Abbe's suggestion, however, assumes the shape of liberal endowments, for the purpose of putting the work on a safe and independent footing. A

gift of this sort has furnished this observatory with its preliminary equipment, and it is only with the help of similar gifts that the research work, for which it was principally established, can be carried on.

In recent years the teaching of meteorology has been taken up, in one way or another, by a very large number of High Schools, Colleges and Universities, and in some places even by the Primary Schools. The extent to which it is adopted and the methods employed differ so widely, however, that it may be well to state here what attitude St. Louis University has assumed.

The proper time to introduce the youth of this country to the elements of meteorology is evidently the High School period. In the three High Schools of St. Louis University elementary meteorology is an elective, with Tarr as a text book. In the College of Arts and Sciences and in the School of Philosophy and Science, meteorology is taught only indirectly, the respective professors of the various courses in physics being permitted to use their own judgment as to the extent to which the application to this science of the principles of mechanics, heat, molecular physics, electricity and magnetism should be enlarged upon. This conservative attitude is dictated chiefly by a familiar circumstance, local as well as general. The average student interested in science is bent on investing the capital of his talents in projects that give promise of big dividends. From this point of view, meteorology as a profession offers no strong temptation. For the Weather Bureau service—by which alone at present, in the absence of endowed positions at our universities, any inducements are offered—admittedly does not bear comparison in point of remuneration with other occupations open to the prospective engineer or physicist.

The alternative, suggested by Professor Abbe on the occasion mentioned above as a means of making the most of this very actual condition, viz., to induce our students to take up some special meteorological problems as a side issue, is put into practice at St. Louis University in the following manner:

This observatory has a definite number of assistant positions which are open to capable applicants. Whilst incumbents are expected to do the routine work, and to be at the general disposal of the officials in charge, they are supplied with all books and equipment necessary to obtain a thorough knowledge of the principles of the science, are permitted to do observational work, and are given individual direction in their efforts. They are kept in close touch with recent

developments, especially with the research work at the observatory. No fee is demanded. At present eight students, mostly interns, are availing themselves of these opportunities to a greater or less extent. This same method is followed in the Department of Seismology, and it may be mentioned here that the majority of the assistants lend their help in both departments.

Whatever greater good may come of this method, this much is assured, that a large number of capable minds will have become sufficiently interested and experienced in the science to contribute, to the extent of their opportunities, some of the "bricks and mortar" of which the much desired result will eventually be built up.

This observatory heartily seconds the efforts made by the U. S. Weather Bureau officials to familiarize the general public with the main working principles of meteorology, and thereby to eradicate old superstitions and prejudices.

LOCATION OF OBSERVATORY.

Latitude: $38^{\circ} 38' 17''$ north.

Longitude: $90^{\circ} 13' 58''.5$ west.

Elevation: 578 ft. above sea level.

Wind Vane: 94 ft. above ground.

Anemometer: 96 ft. above ground.

Top of Rain Gauge: 80 ft. above ground.

Floor of Thermometer Shelter: 10 ft. above roof and 86 ft. above ground.

Explanation to Meteorological Summaries.

Atmospheric Pressure in inches reduced to mean sea level.

Mean Temperature: the mean of three daily observations.

Mean Vapor Pressure and Mean Relative Humidity: the mean of the three daily readings of the various thermometers reduced according to the method used by the U. S. Weather Bureau.

Signs used for Miscellaneous Phenomena: The International Meteorological Symbols.

The official day ends with 7:00 P. M., except for wind velocity and direction, which end at 12:00 midnight.

Equipment.

The present equipment of the observatory consists of the following instruments:

- 1.) Fortin Barometer.
- 2.) Barograph, Richard Bros. pattern.
- 3.) Thermograph, Richard Bros. pattern.
- 4.) Maximum and Minimum Thermometers.
- 5.) Whirling Psychrometer.
- 6.) Hygrograph.
- 7.) Thermograph.
- 8.) Tipping Bucket Rain Gauge.
- 9.) Snow Gauge.
- 10.) Electrical Sunshine Recorder.
- 11.) Jordan's Photographic Sunshine Recorder.
- 12.) Wind Vane.
- 13.) Anemometer (Robinson).
- 14.) Meteorograph (Quadruple Register).
- 15.) Ceraunograph (Lightning Recorder).
- 16.) Ceraunophone.
- 17.) Thermostatic and Temperature Alarm.
- 18.) Ground Thermometers.
- 19.) Several Standard Thermometers.
- 20.) Electograph.

The instruments are of standard make and of United States Weather Bureau patterns.

THE WEATHER OF 1912.

For the first 13 days of the year the minimum temperature averaged lower than for any recorded period of similar duration. For those thirteen days the average minimum temperature was 1.8° , while the mean temperature for the same period was 9° above zero. For 16 consecutive days the mercury remained below the freezing point. The lowest temperature reached during the month was -16° , and the highest 57° . On the 21st the thermometer rose 32 degrees, the greatest range of temperature for any single day. The total snowfall of 19 inches was unusually heavy, while the ground temperature (five feet below the surface) reached its absolute minimum since observations were first taken; a remarkable fall of 7° in the month indicated

how deeply the cold had penetrated the ground. The long continued low temperature of the first sixteen days made this month the coldest January in more than half a century. As a result, the Mississippi River was frozen over by the 9th and was in that condition at the end of the month.

February, 1912.

The excessive weather conditions of the preceding month continued into February, making it one of the most severe on record. The thermometer ranged from 60° to -9°, while the mean temperature for the month stood at 29°, or 5° below the normal, and 11° below the mean of the same month in the preceding year. The precipitation for the month was likewise far in excess of the normal; the total amount of unmelted snow was 34 inches, or twice as great as that recorded for February, 1911. On the 20th and 21st a record snowstorm occurred, when the gauge showed 25 inches in the 24 hour period. Of the 29 days only 7 showed a perfect sunshine record, while the average daily sunshine was 41%. During the month six solar halos were observed. A gale of 48 miles an hour on the 21st marked the maximum wind velocity for the month.

March, 1912.

The abnormal conditions of the year were continued during this month, which has the distinction of being the snowiest and rainiest March during 75 years. There were 8 clear days, an average daily sunshine of 40% and a mean temperature of 36°. This, with the single exception of March, 1906, with a mean temperature of 34°, was likewise the coldest March since 1843. Precipitation occurred on 18 days, a total of 5.43 inches, 2 inches above the normal. A remarkable feature was a succession of severe snowstorms. On the 16th an agreeable change to mild and balmy weather gave promise of Spring. On Sunday, the 17th, about 50,000 people visited the parks, and the severe Winter seemed to be over at last. But on the following Sunday, the 24th, all promises of Spring were broken by another extraordinary weather freak of this abnormal year. This was a record-breaking snowfall of 15 inches in about 10 hours. This unseasonable blizzard crippled the car service and rendered the roads unpassable to automobiles. The melting of the snow at the end of the month brought with it damaging floods on the lower Mississippi, accompanied by loss of life and property. Cold and moisture in the soil hampered farming operations, and all crops were unusually backward.

April, 1912.

April was ushered in by moderately high temperatures, causing a decided improvement in weather conditions. The total precipitation for the month, 7.66, was again above the normal, and only twice exceeded in April since 1831. A torrential rain on the 14th was accompanied by hail, and pedestrians were forced to cross street corners in six inches of water. Another severe rain on the 25th, accompanied by a high wind, which reached a maximum of 70 miles an hour, caused considerable damage in and around St. Louis. Trees were uprooted, houses unroofed, and plate-glass windows were shattered. During 12 hours the precipitation totalled 2.50 inches. Cyclones and tornadoes south of Missouri gave evidence of the wide area of this disturbance. There were 14 clear days and 56% average daily sunshine.

May, 1912.

A few meteorological eccentricities were displayed by May, otherwise the month's weather was normal. The mercury reached its highest, 89°, on the 23d, and the lowest, 44°, on the 18th, while the mean temperature was 3° above the normal. There were 19 clear days and 70% of sunshine; six consecutive days were without a trace of clouds. Precipitation was slightly above normal, more than half of the total amount was confined to 2 days; while on the 28th 1.64 inches of rain fell in six hours, fully half of it within five minutes. Moderate temperatures marked the first week; cool weather the second, and excessive dryness the third; while the fourth and last week saw the temperature well above the normal.

June, 1912.

The most remarkable feature of this month was the heavy rain, the fourth heaviest for June in 75 years. Almost 9 inches were recorded, as against 1.79 for June, 1911. On June 16th the total precipitation reached 3.98 inches within 24 hours; 3.07 inches within one hour and twenty minutes. The analyzed record follows:

5 min. 0.14 in.	25 min. 1.18 in.	45 min. 2.28 in.
10 min. 0.41 in.	30 min. 1.30 in.	50 min. 2.50 in.
15 min. 0.72 in.	35 min. 1.58 in.	60 min. 2.95 in.
20 min. 0.99 in.	40 min. 1.98 in.	80 min. 3.07 in.

This downpour was accompanied by heavy thunderstorms; more than 100 buildings were struck by lightning. The Mississippi rose

more than 3 feet in 24 hours. Basements all over the city were flooded, sewers were blown up and much damage was done, especially to the new Kingshighway Viaduct, sixty feet of which was washed away, the loss amounting to more than \$10,000. The mean temperature for the month was 5° below the normal, and ranged between 51° on the 8th and 89° on the 26th. The month showed 12 clear days, and an average daily sunshine of 61%.

July, 1912.

With the month of July the year approached for the first time to normal weather conditions. The temperature ranged from 64° on the 16th and 19th to 96° on the 24th. This range was somewhat less than that recorded for 1911, which had shown a minimum of 56° and a maximum of 101°. The contrast in precipitation between these same months was, however, very marked. July, 1912, recorded 6.22 in. The corresponding month in 1911 had totalled but 0.74 in. A phenomenal downpour occurred on the 14th, when 3.17 were registered within the space of two hours. Of this quantity 1.97 in. fell in twenty-five minutes and 2.91 in. in one hour, the greatest amount ever recorded in one hour in St. Louis. The prevailing wind was from the South, and recorded a total for the month of 5003 miles. The greatest velocity was reached on the 10th, when the anemometer recorded 60 miles an hour from the Northwest. This high wind, accompanied with rain and electrical disturbances, did much damage in the city and terrified those who habitually see in every unusual storm a repetition of the cyclone of 1896. A drop of 16° in temperature within 10 minutes was one of the features of this storm; another was the highly localized nature of the precipitation. While more than an inch of rain fell in the West End and 0.56 in the downtown districts, the southern portion of the city was almost dry. The ground temperature showed an increase of 6° and reached the annual maximum. Of 11 thunderstorms during the month one was attended by hail. The sunshine record showed 15 clear, 9 partly cloudy and 7 cloudy days, while the mean relative humidity of 70° was unusually high for this season of the year.

August, 1912.

While the mean temperature for August was about normal, the first week of the month exhibited a continued persistence of low temperature. The fourth recorded the lowest minimum for that day

since 1842, and the morning of the 5th was the coolest ever recorded for early August. The second week marked a slow return to seasonable temperature, although the average remained subnormal, and on only one day during the first half of the month did the mercury reach 90°. During the latter half of this month conditions were restored to normal, and the maximum, 96°, was reached on the 28th. The total precipitation, 2.68 in., was the lowest for any month since January, and 0.46 was the greatest amount recorded for any 24 hour period. The prevailing wind shifted to the West, with a mileage of 4945, while the highest velocity was reached on the 25th, when a current from the Southeast reached 42 miles an hour. The sunshine record of 235 hours gave a daily average of 60%, with 14 clear, 8 partly cloudy and 9 cloudy days. Twelve thunderstorms passed over St. Louis during the month.

September, 1912.

The hot weather of later August continued unabated well into the first half of September, reaching its culmination on the 6th with a maximum of 97°, the highest in the year. On the 12th the long awaited relief occurred, and a marked contrast is shown by the exceptionally cool weather which continued throughout the remainder of the month. The minimum, 43°, on the 26th, is the lowest ever recorded for that day. While the mean temperature for the month was 4° lower than that of the same period of 1911, it was slightly higher than the normal. Practically no rain fell in St. Louis during the first half of the month, but some heavy downpours occurred during the latter portion. Thus, on the 17th, one inch fell in 12 hours, and on the 20th and 21st 1.30 in. fell in 20 hours. The total for the month, however, was but 2.61, fully 4.50 in. less than that recorded for September, 1911. The sunshine record shows 19 clear days and an average for the month of 68%. Fog and thunderstorms occurred on 6 and 5 days; respectively. The prevailing winds from the Southeast reached a total of 4257, with a maximum velocity on the 20th of 42 miles.

October, 1912.

October showed no unusual weather conditions. The mean temperature of 62°, 4° above normal, ranged from 86° on the 6th to 36° on the 23d, when the first light frost of the season was recorded. Fifteen clear, 8 cloudy and 8 partly cloudy days gave 66% of sun-

shine. Five thunderstorms furnished 2.46 in. of rain, a trifle above normal. On the last day of the month occurred the heaviest precipitation, 1.46 in. during 13 hours. The prevailing wind from the Southeast reached a total mileage of 5295, an average hourly velocity of 7 miles.

November, 1912.

During November an ideal "Indian Summer" prevailed, with an average daily sunshine of 62% and 14 clear days. No precipitation was recorded during the second half of the month, the total, 1.71 in., fell during the first twelve days, and of this amount 1.48 in. fell during the 24 hour period from the 5th to the 6th. The first killing frost of the season occurred on Nov. 2, and a trace of snow during the afternoon of the first. Only one thunderstorm occurred, lasting about ten minutes. This month was the mildest November since 1904; its predecessor of 1911 had produced the most severe change in temperature on record—a fall of 64° in 24 hours. 77°, the highest temperature, was reached on the 10th, and 25°, the lowest, on the 25th. The mean temperature for the month was 47°, 3° above the normal. 6529 miles of wind were registered, giving for the month an average hourly velocity of 9 miles. The prevailing direction was from the Southeast.

December, 1912.

December, 1912, ranks as the mildest winter month experienced in St. Louis. There were ten days of 100% sunshine; the temperature was confined within moderate ranges, and precipitations were of short duration. Only .10 in. of snow was recorded, as against 5 in. for December, 1911, while the total precipitation of .59 in. was far below the normal for the month of 2.23 in. This low precipitation was exceeded but three times in 75 years. The thermometer reached its maximum of 65° on the 5th, a minimum of 12° on the 12th, and recorded a mean 4° above the normal. The mean relative humidity of 54° was the lowest of the year. 7271 miles of wind were recorded, and a maximum velocity of 50 miles an hour on the second. The sunshine register showed 16 clear, 4 partly cloudy and 11 cloudy days. No thunderstorms were recorded.

JANUARY 1912.													
Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain In Inches.	Melted Snow In Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	30.19	24	30	14	.0772	.60	.00	.00	.45	P.Cl.	SE	148	☽ ⊕
2	30.14	26	30	22	.1060	.78	.00	.00	.20	Cloudy	N	180	☽ ⊕
3	30.18	17	24	9	.0534	.61	.00	.00	.85	Clear	N	180	☽ ⊕
4	30.31	12	20	9	.0386	.55	.00	.00	1.00	Clear	W	382	☽ ⊕
5	30.48	5	13	2	.0273	.51	.00	.00	1.00	Clear	NW	293	☽ ⊕
6	30.39	-1	2	-4	.0233	.65	.00	.72	.25	Cloudy	N	224	☽ ⊕
7	30.34	-8	-1	-16	.0164	.60	.00	.00	.07	Cloudy	SE	228	☽ ⊕
8	29.77	8	12	-2	.0428	.74	.00	.18	.17	Cloudy	W	293	☽ ⊕
9	30.11	15	26	4	.0469	.57	.00	.00	.88	Clear	W	216	☽ ⊕
10	30.18	9	17	4	.0405	.71	.00	.00	.62	P.Cl.	N	185	☽ ⊕
11	30.30	4	9	-1	.0361	.79	.00	.67	.00	Cloudy	N	332	☽ ⊕
12	30.64	-5	0	-9	.0219	.76	.00	.34	1.00	Clear	N	293	☽ ⊕
13	30.36	5	13	-9	.0312	.63	.00	.00	.55	P.Cl.	SE	191	☽ ⊕
14	30.16	20	23	12	.0811	.78	.00	.01	.00	Cloudy	NW	220	☽ ⊕
15	30.48	0	21	-5	.0236	.61	.00	T	1.00	Clear	NW	300	C.W.
16	30.13	12	19	-2	.0400	.58	.00	.00	.40	P.Cl.	SE	307	☽ ⊕
17	29.78	41	44	19	.2090	.80	.00	.00	.00	Cloudy	SE	310	☽ ⊕
18	29.97	29	49	25	.1310	.84	.32	.03	.00	Cloudy	N	302	☽ ⊕
19	30.35	14	26	9	.0521	.67	.00	.00	1.00	Clear	NW	196	☽ ⊕
20	30.27	27	32	15	.1001	.68	.00	T	.72	Clear	W	261	☽ ⊕
21	30.24	37	51	19	.1153	.58	.00	.00	.87	Clear	W	170	☽ ⊕
22	30.01	48	57	38	.1850	.57	.00	.00	.77	Clear	W	201	☽ ⊕
23	30.01	45	52	36	.1980	.69	.00	.00	.82	Clear	W	160	☽ ⊕
24	30.10	33	45	30	.1138	.61	.00	.00	.21	Cloudy	N	123	☽ ⊕
25	29.91	31	34	28	.1300	.75	.00	.00	.00	Cloudy	SE	192	☽ ⊕
26	29.67	38	47	28	.1723	.77	.00	.00	.87	Clear	W	173	☽ ⊕
27	29.90	32	42	31	.1383	.76	.00	.00	.01	Cloudy	E	189	☽ ⊕
28	29.72	35	39	32	.1773	.87	.00	.00	.00	Cloudy	SE	266	☽ ⊕
29	29.95	27	36	22	.0931	.64	.00	.00	.03	Cloudy	NW	325	☽ ⊕
30	30.08	25	30	20	.0777	.60	.00	T	.50	P.Cl.	NW	284	☽ ⊕
31	30.04	31	41	19	.1173	.69	.00	.00	.33	P.Cl.	W	190	☽ ⊕
	30.13	20 ^s	28 ^s	13	.0873	.68	.32	1.95	.47		W	7314	

FEBRUARY 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in Inches.	Melted Snow in Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	30.00	26	40	23	.0850	.62	.00	.02	.23	Cloudy	NW	481	
2	30.08	15	23	7	.0404	.53	.00	T	.87	Clear	NW	258	D
3	30.08	10	21	2	.0524	.74	.00	.84	.25	Cloudy	NW	374	
4	30.39	6	16	-9	.0305	.60	.00	.00	.84	Clear	W	291	C. W. ⊕
5	30.33	13	16	10	.0567	.80	.00	T	.26	Cloudy	NW	260	
6	30.30	18	22	14	.0708	.76	.00	.01	.00	Cloudy	W	176	
7	30.09	23	28	19	.0816	.69	.00	.00	.43	P. Cl.	W	213	□'
8	30.20	20	24	17	.0622	.60	.00	.00	.05	Cloudy	NW	176	
9	30.17	15	22	9	.0420	.52	.00	.00	.64	P. Cl.	N	203	⊕
10	30.03	18	27	5	.0519	.56	.00	.00	.70	Clear	SE	163	≡'
11	29.89	33	42	23	.1053	.56	.00	T	.14	Cloudy	NW	208	≡'
12	30.26	25	35	20	.0886	.66	.00	.00	.40	P. Cl.	NW	166	
13	30.32	27	33	18	.1046	.73	.00	.00	.33	P. Cl.	SE	152	⊕
14	30.22	35	41	29	.1323	.65	.00	.00	.31	P. Cl.	N	126	
15	30.01	38	46	29	.1650	.74	.00	.00	.75	Clear	NW	78	⊕
16	29.82	43	52	32	.1790	.68	.00	.00	.70	P. Cl.	W	99	
17	29.69	47	55	36	.1800	.58	.00	.00	.50	P. Cl.	SE	155	
18	29.71	50	60	36	.1820	.56	T	.00	.60	P. Cl.	W	139	
19	29.88	42	46	40	.2040	.76	.00	.00	.06	Cloudy	N	154	
20	29.97	31	40	29	.1430	.82	T	1.00	.00	Cloudy	N	245	□' ≡'
21	29.60	25	29	24	.1150	.87	.00	1.55	.00	Cloudy	NW	514	Blizzard
22	30.09	26	34	18	.0833	.62	.00	.00	1.00	Clear	W	263	
23	30.02	39	46	26	.1216	.54	.00	.00	.51	P. Cl.	SE	256	⊕
24	30.00	42	48	36	.1850	.70	.18	.00	.06	Cloudy	SE	144	≡' ≡'
25	29.90	38	45	36	.2040	.90	.30	.00	.00	Cloudy	E	173	≡' □'
26	29.64	30	39	25	.1400	.80	.68	T	.00	Cloudy	NW	349	
27	30.06	27	36	18	.0890	.62	.00	.00	1.00	Clear	W	171	
28	30.21	30	34	28	.1034	.64	.00	.00	.11	Cloudy	N	174	□' ⊕ D
29	30.39	25	32	21	.0819	.64	.00	T	.88	Clear	NW	201	
	30.08	28 ²	35 ⁶	21 ⁴	.1096	.67	1.16	3.42	.41		NW	6362	

MARCH 1912

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in Inches.	Melted Snow in Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	30.62	24	30	17	.0754	.60	.00	.00	.75	Clear	N	131	
2	30.49	20	29	18	.0874	.85	.00	.62	.00	Cloudy	E	171	
3	30.32	27	31	20	.1084	.76	.00	.13	.43	P. Cl.	N	151	⊕
4	30.44	26	30	18	.0905	.68	.00	.00	.24	Cloudy	N	152	
5	30.46	25	30	18	.0875	.68	.00	T	.30	Cloudy	N	212	Distant ⚡
6	30.22	28	36	16	.0986	.66	.00	.00	.68	P. Cl.	E	111	≡' ≡'
7	30.04	34	35	29	.1790	.92	.03	.20	.00	Cloudy	E	88	≡' all day
8	30.13	32	36	29	.1480	.83	.01	.01	.00	Cloudy	N	250	
9	30.38	24	29	18	.0592	.50	.00	.03	1.00	Clear	NW	219	
10	30.30	25	30	18	.0673	.51	.00	.00	.11	Cloudy	SE	140	
11	29.82	32	35	25	.1720	.93	.01	.80	.00	Cloudy	SE	250	≡' ≡'
12	29.87	33	36	31	.1550	.82	.04	T	.00	Cloudy	N	256	≡' ≡' Δ
13	30.09	30	36	21	.1064	.66	.00	.00	.46	P. Cl.	NW	134	≡' ≡' Δ
14	29.75	39	42	33	.2040	.85	.17	.00	.00	Cloudy	SE	239	≡' ≡' Δ
15	29.93	30	41	28	.1280	.78	.01	T	.16	Cloudy	NW	309	
16	30.20	37	45	26	.1470	.67	.00	.00	.91	Clear	SE	274	⊕
17	30.02	53	65	39	.2140	.54	.00	.00	.85	Clear	SE	314	⊕
18	30.10	49	59	34	.2030	.61	.00	.00	.80	Clear	SE	192	□' ≡' ≡'
19	29.80	59	73	46	.3576	.72	T	.00	.62	P. Cl.	S	156	□' ≡' ≡' Δ
20	29.91	36	57	33	.1833	.87	.15	.00	.00	Cloudy	E	164	□' Δ
21	30.24	26	35	25	.1046	.75	.40	T	.00	Cloudy	NW	326	
22	30.41	28	33	21	.1020	.67	.00	.00	.73	Clear	E	156	⊕
23	30.02	35	37	30	.1617	.80	.00	.05	.03	Cloudy	NE	141	Δ
24	29.91	32	36	28	.1366	.79	.00	1.53	.20	Cloudy	N	375	Blizzard
25	30.04	35	47	20	.1323	.66	.00	.00	.90	Clear	SE	156	≡' □' ≡'
26	29.98	44	52	38	.1873	.64	.00	.00	1.00	Clear	W	167	⊕
27	29.96	42	47	35	.2267	.86	.07	.00	.03	Cloudy	NE	97	
28	29.60	46	49	40	.2960	.94	.49	.00	.00	Rain'g	NE	148	≡' ≡' ⚡
29	29.75	51	60	41	.2333	.65	.68	.00	.63	P. Cl.	N	216	
30	30.09	54	68	37	.2937	.71	.00	.00	.61	P. Cl.	SE	232	
31	30.03	64	75	53	.3007	.52	.00	.00	.65	P. Cl.	S	163	⊕
	30.09	36	43 ⁴	28 ⁶	.1628	.72	2.06	3.37	.40		N	6090	⊕

APRIL 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in Inches.	Melted Snow in Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Direction of Wind.	Total Mileage.	Miscellaneous Phenomena.
1	29.75	52	69	45	.3710	.94	.12		.00	Cloudy	SE	196	III
2	29.83	46	54	34	.1797	.62	.83	T	.40	P.Cl.	NW	279	
3	30.17	49	59	37	.1963	.57	.00		.83	Clear	SE	134	
4	30.12	64	75	48	.2307	.45	.00		.85	Clear	SE	233	⊕
5	29.91	69	79	59	.3043	.44	.00		.85	Clear	SE	310	
6	29.78	64	72	56	.3990	.67	.57		.08	Cloudy	S	325	⊗
7	30.28	47	59	39	.1343	.44	.00		1.00	Clear	NW	297	
8	30.29	54	62	41	.1780	.45	.00		1.00	Clear	SE	173	
9	30.00	61	72	46	.1890	.37	T		.60	P.Cl.	SW	169	
10	29.94	62	69	50	.2993	.57	.00		.93	Clear	SE	125	III
11	29.87	69	77	55	.3927	.58	.00		.92	Clear	SE	147	III
12	29.77	60	73	58	.4740	.88	1.29		.17	Cloudy	SE	164	⊗ 11:54AM
13	29.61	66	70	58	.5253	.83	.05		.51	P.Cl.	SE	309	
14	29.60	70	81	56	.2040	.31	.60		1.00	Clear	S	212	⊗ Δ 10:30PM
15	29.87	64	74	57	.2810	.47	.00		1.00	Clear	W	164	⊕
16	29.98	51	66	47	.2960	.79	.09		.30	Cloudy	N	236	
17	29.76	39	52	38	.2253	.93	.86		.00	Cloudy	NW	325	⊗ 9:10PM
18	29.92	46	54	35	.2063	.69	.00		.20	Cloudy	NW	247	
19	30.04	50	56	41	.2400	.67	.04		.17	Cloudy	E	76	III D²
20	29.89	58	67	47	.3517	.73	.00		.72	Clear	SE	263	⊕ ⊕
21	29.59	66	74	55	.4733	.74	.08		.51	P.Cl.	S	364	⊗ 2AM & 6PM
22	29.91	50	69	44	.2577	.72	T		.39	P.Cl.	NW	347	
23	30.21	58	68	44	.2470	.54	.00		.85	Clear	N	114	
24	30.21	65	76	52	.2733	.47	.00		.96	Clear	W	130	⊕ ⊕
25	30.09	59	71	54	.3663	.74	.53		.10	Cloudy	SE	432	⊗ 4:30PM
26	29.85	63	77	54	.4493	.79	1.96		.54	P.Cl.	SE	318	⊗ Δ ⊕
27	30.19	59	69	51	.2973	.60	.00		.90	Clear	NE	198	⊕ ⊕ ⊕
28	29.71	62	70	52	.5017	.87	.57		.00	Cloudy	SE	238	⊗ 2:45AM
29	29.75	48	63	46	.2963	.89	.07		.00	Cloudy	NW	250	III
30	29.95	54	61	46	.3203	.76	T		.92	Clear	SE	299	D
	29.93	57 ^s	68 ^o	48 ^o	.3053	65%	7.66	T	.56		SE	7002	

MAY 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in Inches.	Melted Snow in Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	29.88	66	78	52	.4917	.76	.01		.54	P.Cl.	SE	274	⊗ D
2	29.84	77	85	63	.5263	.59	.00		1.00	Clear	SE	216	
3	29.84	74	81	65	.5823	.69	.00		.71	Clear	SE	205	
4	29.74	75	82	66	.6140	.71	.00		.95	Clear	SE	250	
5	29.75	74	82	67	.4973	.63	.00		.85	Clear	W	129	⊗
6	29.79	75	84	67	.6537	.76	.00		.45	P.Cl.	SE	157	⊗
7	29.80	73	81	62	.4933	.62	.00		.92	Clear	NW	146	⊗
8	29.75	73	82	63	.4040	.51	.00		.92	Clear	NE	165	⊗
9	29.82	72	79	60	.3653	.46	.00		1.00	Clear	NW	127	⊗
10	29.68	70	77	60	.4933	.67	T		.57	P.Cl.	SE	387	⊗ 8PM
11	29.40	61	74	58	.4713	.87	2.06		.08	Cloudy	SE	233	⊗ 3 in all
12	29.89	52	60	49	.2983	.79	.40		.02	Cloudy	NW	337	
13	30.19	58	67	44	.2950	.63	.00		.88	Clear	NW	97	⊗ ⊕ -02 in all.
14	30.04	59	65	52	.2840	.57	.00		.80	Clear	W	130	
15	29.73	55	63	52	.3003	.71	.03		.17	Cloudy	S	153	
16	29.76	52	58	44	.2980	.79	.04		.32	Cloudy	NW	308	
17	30.08	60	69	48	.2893	.56	.00		1.00	Clear	W	193	
18	30.11	69	79	52	.4140	.58	.00		1.00	Clear	S	191	
19	30.07	76	85	62	.5110	.59	.00		1.00	Clear	S	225	
20	29.94	77	85	67	.4717	.52	.00		1.00	Clear	S	304	
21	29.89	77	86	66	.4730	.55	.00		1.00	Clear	S	226	⊕ ⊕
22	29.80	79	87	67	.5893	.61	.00		1.00	Clear	SE	340	
23	29.81	80	89	71	.5887	.58	.00		.90	Clear	S	267	⊕
24	29.96	74	83	69	.6103	.73	.07		.27	Cloudy	N	141	⊗ 3A, 7:30PM.
25	30.02	74	80	66	.5770	.70	.05		.47	P.Cl.	E	133	
26	29.93	77	84	69	.6993	.76	T		.65	P.Cl.	SE	220	⊗ 2PM, SW
27	29.62	80	88	68	.5553	.55	.00		.80	Clear	S	365	⊕
28	29.49	71	82	62	.5303	.72	1.64		.50	P.Cl.	S	265	⊗ 1:15AM
29	29.82	65	74	62	.5000	.81	.00		.25	Cloudy	N	240	
30	30.06	63	70	52	.4457	.77	.00		.72	Clear	SE	135	
31	30.00	71	78	60	.5070	.68	.00		1.00	Clear	SE	200	⊕
	29.85	69 ^r	78 ^o	60 ^o	.4784	66%	4.30	.00	70%		SE	6759	

JUNE 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in Inches.	Melted Snow In Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	29.89	75	87	66	.6117	.71	.04		.57	P.Cl.	SE	217	☀
2	29.94	69	77	58	.4653	.67	.00		1.00	Clear	W	203	☀
3	29.92	77	86	62	.5000	.56	.00		1.00	Clear	S	143	☀
4	30.06	71	82	61	.4153	.58	T		.90	Clear	W	190	☀
5	29.98	71	77	60	.4957	.64	.13		.35	Cloudy	SE	177	☀
6	30.08	70	74	64	.4337	.61	1.06		.81	Clear	N	246	
7	30.20	66	72	55	.3307	.54	.00		.95	Clear	N	197	
8	30.21	62	69	51	.2267	.51	.00		.57	P.Cl.	E	126	
9	30.21	67	70	60	.3437	.53	T		.34	Cloudy	E	182	
10	30.17	73	80	65	.4313	.52	.00		.65	P.Cl.	SE	221	
11	30.10	75	83	64	.4180	.48	.00		1.00	Clear	SE	161	
12	29.94	79	87	65	.5093	.52	.00		.96	Clear	SE	134	
13	29.72	74	82	69	.6053	.71	.04		.21	Cloudy	SE	174	
14	29.52	73	80	67	.6120	.77	1.77		.21	Cloudy	S	203	☀
15	29.52	76	83	63	.7397	.84	.97		.59	P.Cl.	SE	211	☀
16	29.74	71	80	66	.7203	.96	3.98		.00	Cloudy	S	203	☀ all day
17	29.99	61	69	59	.5010	.94	.50		.03	Cloudy	N	174	☀ d.n.
18	30.00	59	61	56	.4540	.91	.23		.00	Cloudy	N	187	
19	30.03	64	70	55	.4220	.71	.14		.66	P.Cl.	NW	204	
20	30.00	71	79	58	.4667	.62	.00		.96	Clear	N	242	
21	30.06	71	78	61	.5000	.67	T		.60	P.Cl.	N	109	
22	30.17	70	78	58	.3890	.55	.00		.93	Clear	E	92	
23	30.13	74	81	61	.4343	.55	.00		1.00	Clear	N	108	
24	30.05	76	84	64	.4820	.56	.00		.90	Clear	N	63	
25	29.95	75	86	66	.5980	.70	.00		.41	P.Cl.	N	105	
26	29.90	79	89	67	.6250	.66	.00		.81	Clear	S	83	☀ ² D ² ☀
27	29.91	76	86	69	.6030	.69	.01		.42	P.Cl.	SE	94	☀ 5:30PM
28	29.99	78	83	68	.6257	.66	T		.72	Clear	SE	140	☀ 12:50PM
29	30.02	75	83	70	.6533	.78	.01		.40	P.Cl.	SE	123	☀ 4:50PM
30	29.98	77	82	69	.6460	.70	.00		.60	P.Cl.	SE	133	
	29.98	72°	79°	62°	.5086	66%	8.88	.00	62%		SE	4845	

JULY 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain In Inches.	Melted Snow In Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	29.96	73	81	69	.6763	.82	.05		.50	P.Cl.	SE	180	☀ 12:40PM
2	30.01	76	83	69	.7660	.84	.52		.14	Cloudy	S	197	
3	30.03	72	83	69	.6923	.88	.27		.07	Cloudy	SE	168	☀ 4:00PM
4	29.92	85	92	70	.8010	.69	.00		.88	Clear	S	122	
5	29.93	86	92	75	.7403	.62	.00		.73	Clear	W	110	
6	29.94	79	89	74	.7580	.78	.00		.20	Cloudy	SE	106	T and ☀
7	29.96	79	88	70	.7403	.75	.25		.64	P.Cl.	S	133	☀ 12:15PM
8	29.95	83	92	73	.7667	.69	.00		.88	Clear	S	158	
9	29.95	85	91	75	.7750	.66	.00		.82	Clear	S	188	
10	29.93	77	87	66	.7853	.85	.55		.14	Cloudy	S	168	☀ 4:00PM Δ ²
11	29.92	80	87	67	.6687	.68	.01		.73	P.Cl.	W	87	
12	29.86	81	87	72	.8397	.79	.36		.20	Cloudy	S	122	☀ 9:40AM
13	29.88	86	94	75	.8497	.70	.00		.80	Clear	S	186	Distant ☀
14	29.95	85	94	68	.8497	.72	3.17		.80	Clear	S	151	☀ 2AM
15	29.98	83	89	77	.8303	.74	.00		.70	P.Cl.	N	168	☀ 2PM.
16	30.02	76	84	64	.6270	.69	.00		.40	P.Cl.	N	142	
17	29.99	79	88	69	.7760	.78	.98		.45	P.Cl.	N	118	☀ 2:15AM
18	30.03	79	86	72	.6863	.71	.00		.96	Clear	N	196	
19	30.12	73	79	64	.4890	.62	.00		.85	Clear	E	173	
20	29.93	81	89	66	.7320	.69	.00		.93	Clear	S	199	
21	29.92	82	88	78	.8760	.80	.06		.30	Cloudy	W	191	☀
22	30.04	79	87	72	.8153	.81	.00		.20	Cloudy	SE	163	
23	29.91	87	95	77	.8483	.67	.00		.97	Clear	S	177	
24	29.81	89	96	80	.8500	.63	.00		1.00	Clear	W	232	
25	29.88	83	90	77	.6690	.60	.00		.76	Clear	N	201	
26	29.97	79	86	70	.5683	.58	.00		1.00	Clear	N	128	
27	30.00	78	86	67	.5633	.58	.00		1.00	Clear	SE	139	
28	29.87	83	93	71	.7030	.62	.00		.63	P.Cl.	W	183	☀
29	29.86	80	86	73	.5950	.59	.00		.98	Clear	NW	196	
30	29.84	80	89	67	.6050	.60	.00		.35	P.Cl.	W	154	
31	29.86	76	84	67	.4600	.53	.00		.63	P.Cl.	NW	167	
	29.95	80°	88°	71°	.7227	70%	6.22		63%		S	5003	

AUGUST 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in inches.	Melted Snow in Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	29.92	74	82	66	.5120	.64	T		.40	P.Cl.	N	137	
2	29.99	73	80	64	.4220	.54	T		.47	P.Cl.	N	139	
3	30.09	65	74	56	.3660	.61	.55		.81	Clear	N	140	Lowest since 1842
4	30.17	65	73	55	.3647	.61	.00		.68	P.Cl.	NE	116	
5	30.13	68	75	58	.4127	.60	.00		.71	P.Cl.	SE	135	Coolest 5th on record.
6	30.00	74	81	62	.5130	.63	T		.40	P.Cl.	SE	193	7:45 PM
7	29.89	73	80	65	.6730	.82	.12		.14	Cloudy	S	110	7:45 PM
8	29.81	72	78	68	.6923	.88	.25		.22	Cloudy	S	129	7:45 PM
9	29.78	71	79	64	.5843	.78	.02		.26	Cloudy	W	174	7:45 PM
10	29.79	68	80	61	.5060	.67	T		.28	Cloudy	W	222	7:45 PM
11	29.79	80	89	67	.6197	.61	.00		.86	Clear	W	111	7:45 PM
12	29.86	75	84	69	.6780	.83	.43		.12	Cloudy	S	165	7:45 PM
13	30.00	81	93	73	.7320	.72	T		.74	Clear	W	205	7:45 PM
14	30.07	77	84	69	.6553	.72	.20		.37	Cloudy	W	97	7:45 PM
15	30.01	77	81	71	.6553	.72	.00		.19	Cloudy	SE	99	7:45 PM
16	29.98	78	86	69	.6897	.75	T		.48	P.Cl.	SE	88	7:45 PM
17	29.97	83	92	74	.8020	.71	T		.80	Clear	S	113	7:45 PM
18	29.94	85	93	75	.7490	.63	.00		.90	Clear	W	158	7:45 PM
19	29.87	86	94	77	.7580	.63	.00		.71	Clear	S	181	7:45 PM
20	29.90	79	88	75	.7490	.76	.18		.15	Cloudy	W	162	7:45 PM
21	29.83	78	84	71	.6933	.74	.25		.33	Cloudy	W	170	7:45 PM
22	29.70	76	87	65	.5430	.63	T		.80	Clear	W	215	7:45 PM
23	29.85	76	85	64	.4953	.57	.00		1.00	Clear	S	158	7:45 PM
24	29.84	82	92	71	.5453	.51	.00		1.00	Clear	S	219	7:45 PM
25	29.78	83	90	72	.6933	.62	.21		.56	P.Cl.	S	247	7:45 PM
26	29.82	82	90	65	.6600	.61	.46		.80	Clear	N	153	7:45 PM
27	30.00	74	87	67	.4880	.60	.00		1.00	Clear	SE	178	7:45 PM
28	29.79	86	96	69	.7320	.60	.00		1.00	Clear	SW	227	7:45 PM
29	29.83	83	93	73	.7260	.64	.01		.60	P.Cl.	S	144	7:45 PM
30	29.86	84	92	74	.7323	.64	.00		.69	P.Cl.	S	167	7:45 PM
31	29.88	86	94	78	.7070	.58	.00		.86	P.Cl.	S	193	7:45 PM
	29.91	77°	85°	68°	.6167	66%	2.68		60%		W	4945	

SEPTEMBER 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in inches.	Melted Snow in Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	29.89	86	95	76	.6690	.55	.00		.98	Clear	S	205	
2	29.93	83	94	76	.7160	.64	T		.73	Clear	S	151	7:15 PM
3	29.95	86	93	75	.7403	.63	.00		.75	Clear	SW	101	7:15 PM
4	29.95	87	95	76	.6853	.56	.00		.98	Clear	S	119	7:15 PM
5	29.98	87	96	77	.5917	.48	.00		1.00	Clear	S	103	7:15 PM
6	29.95	88	97	77	.5653	.45	.00		.89	Clear	S	76	7:15 PM
7	29.86	85	96	74	.5980	.52	.00		.62	P.Cl.	N	68	7:15 PM
8	29.78	86	96	74	.5630	.49	.00		1.00	Clear	SE	132	7:15 PM
9	29.87	85	93	76	.6343	.55	.00		.83	Clear	SE	167	7:15 PM
10	29.96	87	95	74	.5520	.48	.00		.77	Clear	SE	98	7:15 PM
11	30.04	80	90	73	.5957	.59	.00		1.00	Clear	N	196	7:15 PM
12	30.05	71	80	62	.2820	.38	.00		.78	Clear	NE	108	7:15 PM
13	29.82	72	80	61	.3840	.51	T		.52	P.Cl.	SE	107	7:15 PM
14	29.84	77	85	68	.5890	.65	.17		.24	Cloudy	SE	142	7:15 PM
15	29.99	72	77	69	.6390	.81	.06		.15	Cloudy	NW	143	7:15 PM
16	30.01	71	78	65	.5750	.76	.00		.20	Cloudy	NW	120	7:15 PM
17	29.84	62	72	61	.5117	.92	1.06		.00	Cloudy	NW	115	7:15 PM
18	29.86	59	64	55	.3200	.66	.00		.50	P.Cl.	W	217	7:15 PM
19	29.91	63	73	48	.3073	.56	.00		1.00	Clear	W	192	7:15 PM
20	29.84	68	75	60	.5067	.72	.10		.26	Cloudy	S	206	7:15 PM
21	29.92	57	71	54	.4270	.92	1.20		.00	Cloudy	W	126	7:15 PM
22	29.94	65	73	55	.3137	.58	.00		1.00	Clear	W	94	7:15 PM
23	29.92	66	73	53	.2487	.52	.00		1.00	Clear	E	126	7:15 PM
24	29.81	67	76	55	.4340	.66	.00		1.00	Clear	SE	200	7:15 PM
25	29.97	59	71	53	.3830	.76	.02		.27	Cloudy	N	263	7:15 PM
26	30.21	53	60	42	.2933	.58	.00		1.00	Clear	N	109	7:15 PM
27	30.21	59	67	47	.2170	.46	.00		1.00	Clear	E	128	7:15 PM
28	30.18	61	70	50	.2717	.54	.00		.95	Clear	N	150	7:15 PM
29	30.36	51	60	45	.2537	.69	.00		.02	Cloudy	N	198	7:15 PM
30	30.24	53	62	42	.2063	.52	.00		.83	Clear	W	97	7:15 PM
	29.97	71°	80°	62°	.4691	61%	2.61	0.00	68%		SE	4257	

OCTOBER 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure	Relative Humidity.	Rain in inches,	Melted Snow in inches.	Percentage of sunshine.	Character of Day.	Prevailing Wind, Direction,	Total Mileage.	Miscellaneous Phenomena.
1	30.16	57	68	43	.2380	.55	.00		1.00	Clear	SE	94	D III ² B ²
2	30.09	62	72	48	.2747	.55	.00		1.00	Clear	SE	142	D ² B ²
3	29.88	68	79	55	.3567	.53	.01		.60	P.Cl.	W	155	
4	29.96	69	79	56	.3763	.57	.00		1.00	Clear	SE	113	D III ² B ²
5	30.06	74	85	60	.4230	.54	.00		1.00	Clear	SE	177	D III ² B ²
6	30.02	76	86	63	.5300	.60	.00		1.00	Clear	S	157	D ² B ²
7	30.13	58	79	53	.2737	.57	T		.74	P.Cl.	N	232	
8	29.92	61	68	53	.3343	.62	.02		.01	Cloudy	SE	203	
9	29.79	75	85	66	.5973	.69	.16		.57	P.Cl.	S	257	T ₁₀ 10:30AM
10	29.94	73	79	67	.6093	.77	.09		.18	Cloudy	SE	174	T ₄ 4:45AM
11	29.80	75	84	64	.5237	.65	.00		.65	P.Cl.	S	312	T _d distant
12	30.14	55	75	49	.2303	.55	.00		.73	P.Cl.	W	257	
13	30.30	58	68	45	.2256	.51	.00		.54	P.Cl.	W	106	
14	30.27	60	69	46	.1983	.42	.00		.72	Clear	W	78	III ³
15	30.34	62	73	49	.2407	.46	.00		1.00	Clear	N	98	III ¹ D D
16	30.25	61	70	49	.2203	.44	.00		.64	P.Cl.	SE	104	III ¹ D D
17	29.93	61	69	53	.3663	.69	.00		.18	Cloudy	SE	164	III ¹ D D
18	29.77	68	73	61	.5750	.84	.12		.05	Cloudy	SE	175	
19	30.14	55	68	48	.1750	.41	.00		1.00	Clear	NW	166	
20	29.99	56	67	44	.2056	.49	.00		.90	Clear	SE	282	
21	29.84	66	78	50	.4173	.67	.00		.80	Clear	SE	222	III ² D ² D ²
22	30.08	48	70	45	.2033	.61	.60		.52	P.Cl.	NW	328	III ² T _d
23	30.22	47	56	36	.1703	.54	.00		1.00	Clear	N	101	III ¹ T _d
24	30.17	51	59	40	.1850	.51	.00		.95	Clear	SE	119	D III ¹ T _d
25	30.10	56	65	46	.2110	.49	.00		.40	Smoky	W	82	D III ¹ Dense smoke.
26	30.09	60	69	47	.2663	.54	.00		.70	Clear	NW	72	Dense smoke.
27	30.03	63	77	49	.2733	.50	.00		1.00	Clear	SE	130	
28	29.86	64	75	54	.2703	.49	.00		1.00	Clear	SE	239	D
29	29.82	62	72	57	.2997	.52	T		.29	Cloudy	W	246	
30	30.12	49	57	43	.2000	.57	T		.30	Cloudy	N	106	
31	29.79	46	52	43	.2803	.91	1.46		.00	Cloudy	N	186	III ¹
	30.04	62°	71°	51°	.3081	.57%	2.46	.00	66%		SE	5295	

NOVEMBER 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain in inches.	Melted Snow in inches,	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	30.10	39	44	35	.1530	.65	.14	T	.19	Cloudy	NW	275	
2	30.22	36	42	29	.1088	.52	.00		.95	Clear	NW	158	III ⁰ Killing process.
3	30.16	44	54	32	.1413	.52	.00		.50	P.Cl.	SE	245	III ²
4	30.01	55	65	44	.2347	.55	.00		.80	Clear	S	332	
5	30.01	54	57	49	.3737	.90	1.28		.00	Cloudy	SE	238	III ²
6	29.84	54	56	51	.3590	.85	.20		.05	Cloudy	N	202	III ²
7	30.00	49	58	39	.2123	.59	.00		1.00	Clear	N	120	III ² D ²
8	30.13	55	63	45	.1597	.41	.00		1.00	Clear	W	282	III ² D ²
9	30.26	52	61	41	.1463	.41	.00		.75	Clear	SE	189	III ² T _d
10	29.95	65	77	52	.2437	.41	.00		1.00	Clear	S	215	
11	29.88	66	75	57	.3140	.51	.00		.50	P.Cl.	SE	313	
12	29.76	62	72	57	.3583	.61	.09		.50	P.Cl.	SE	329	T _d 5:45
13	29.93	45	59	42	.2113	.72	T		.20	Cloudy	W	327	
14	30.11	40	47	37	.1500	.60	.00		.60	P.Cl.	NW	208	
15	30.30	41	48	31	.1303	.55	.00		.61	P.Cl.	SE	110	III ² T _d
16	30.43	43	54	37	.1713	.62	.00		1.00	Clear	NW	167	III ² T _d
17	30.45	42	52	31	.1293	.53	.00		1.00	Clear	NW	143	III ² T _d
18	30.19	50	62	36	.1310	.39	.00		1.00	Clear	S	159	III ¹ T _d
19	29.97	58	66	46	.1953	.42	.00		1.00	Clear	W	163	III ¹ T _d
20	29.93	60	71	48	.1873	.39	.00		1.00	Clear	SE	205	III ⁰ T _d
21	30.09	52	61	48	.1980	.52	.00		.50	P.Cl.	NW	165	III ² T _d
22	30.08	48	58	36	.1313	.43	.00		.70	Clear	W	128	D T _d
23	29.86	44	53	41	.1317	.46	.00		.30	Cloudy	NW	327	
24	30.14	34	41	27	.1100	.58	.00		.60	P.Cl.	NW	379	
25	30.19	34	42	25	.0865	.45	.00		.01	Cloudy	W	110	III ² T _d
26	30.16	37	43	30	.1124	.56	.00		.57	P.Cl.	NW	232	III ⁰ T _d
27	30.31	32	38	28	.1113	.63	.00		.60	P.Cl.	W	212	
28	30.17	37	47	26	.0897	.45	.00		.95	Clear	SE	205	D Dense smoke.
29	30.15	44	53	35	.1207	.43	.00		.74	Clear	S	178	Dense smoke.
30	30.21	46	51	35	.1797	.59	.00		.00	Cloudy	SE	213	Dense smoke.
	30.10	47°	55°	39°	.1794	65%	1.71	T	62%		SE	6529	

DECEMBER 1912.

Date.	Mean Atmospheric Pressure.	Mean Temperature F°.	Maximum Temperature F°.	Minimum Temperature F°.	Mean Vapor Pressure.	Relative Humidity.	Rain In Inches.	Melted Snow In Inches.	Percentage of Sunshine.	Character of Day.	Prevailing Wind Direction.	Total Mileage.	Miscellaneous Phenomena.
1	29.93	54	59	47	.3116	.74	.19		.26	Cloudy	SE	356	
2	30.06	38	58	36	.1230	.53	.13		.66	P. Cl.	W	335	
3	29.97	42	51	32	.1780	.68	.00		.25	Cloudy	SE	183	
4	29.88	49	54	44	.2230	.64	T		.27	Cloudy	SE	163	
5	29.77	59	65	51	.3796	.79	.01		.17	Cloudy	SE	244	
6	30.35	29	61	24	.0878	.57	.00		.26	Cloudy	W	285	
7	30.13	38	47	28	.0867	.41	.00		1.00	Clear	SW	213	
8	30.30	28	43	21	.0933	.57	.00		.36	P. Cl.	NW	319	
9	30.28	27	36	14	.0491	.39	.00		1.00	Clear	S	190	
10	29.89	42	50	30	.1350	.50	.00		.93	Clear	NW	272	
11	30.25	28	40	25	.0740	.52	.00		.73	Clear	NW	272	
12	30.57	19	25	12	.0377	.39	.00		1.00	Clear	NW	211	
13	30.23	40	50	21	.1006	.42	.00		1.00	Clear	S	204	
14	30.01	44	53	33	.1600	.54	.00		1.00	Clear	S	161	
15	29.91	48	54	40	.1503	.47	.00		1.00	Clear	W	276	
16	29.78	44	49	34	.1683	.60	T		.03	Cloudy	SE	259	
17	29.69	45	52	42	.1653	.57	.24		.92	Clear	W	269	
18	29.95	31	43	31	.1383	.73	T		.00	Cloudy	W	247	
19	29.89	37	45	28	.1167	.55	.00		.66	P. Cl.	W	273	
20	30.12	36	46	33	.0986	.48	.00		.70	Clear	W	270	
21	30.39	34	41	25	.0811	.44	.00		.97	Clear	W	127	
22	30.37	33	39	26	.0856	.46	.00		.32	Cloudy	W	112	
23	30.05	36	41	30	.0960	.48	.00		.00	Cloudy	SE	97	
24	30.02	41	52	26	.0948	.41	.00		1.00	Clear	SW	181	
25	30.07	42	50	33	.1158	.46	.00		1.00	Clear	S	240	
26	30.04	36	43	35	.1523	.66	T	.10	.00	Cloudy	W	254	
27	30.24	29	35	24	.0891	.57	.01		1.00	Clear	W	240	
28	30.03	43	59	31	.1010	.36	.00		1.00	Clear	SE	206	
29	29.80	40	49	37	.1830	.75	.01		.00	Cloudy	SE	282	
30	29.73	41	49	31	.0933	.37	.00		.75	Clear	S	320	
31	29.87	43	46	40	.1250	.46	.00		.32	Cloudy	NW	210	
	30.05	38°	48°	31°	.1320	.54%	0.59	.10	60%		W	7271	

MONTHLY AND ANNUAL METEOROLOGICAL SUMMARY 1912.

	ATMOSPHERIC PRESSURE.			TEMPERATURE			MOISTURE			WIND			WEATHER			MISCELLANEOUS PHENOMENA.													
	Mean	Highest	Lowest	Maximum	Minimum	Monthly Mean	Mean Vapor Pressure	Relative Humidity	Rain and Snow	Snow (unmelted).	Prevailing Direction	Total Mileage	Mean Hourly Velocity	Hours of Sunshine	Average Daily Sunshine	Number of Clear Days	Number of Partly Cloudy Days	Number of Cloudy Days	Hail	Thunderstorms	Solar Halos	Lunar Halos	Fog	Heavy Frost	Killing Frost	Date			
JANUARY	30.13	30.65	29.62	51°	-13	28.5	1.020	68%	2.27	19.5	W	7311	10	129	47%	12	11	5	0	0	2	3	1	2	8	0	0		
FEBRUARY	30.08	30.48	29.88	60	-9	35.6	21.4	28.2	4.58	84.2	NW	6382	9	180	41	7	9	13	0	0	0	0	4	1	0	0	0		
MARCH	30.09	30.64	29.43	75	16	43.4	28.6	36.0	5.43	93.7	N	6080	8	133	40	8	7	16	2	1	3	2	8	4	0	0	0		
APRIL	29.93	30.39	29.49	81	34	56.0	48.0	57.5	6.66	T	SE	7002	10	188	56	14	6	10	7	2	5	2	0	5	0	0	0	0	
MAY	29.88	30.21	29.36	89	44	78.0	60.0	69.7	8.88	100.0	SE	6759	9	283	62	19	6	6	5	0	1	0	0	0	0	0	0	0	
JUNE	29.98	30.26	29.50	89	51	79.3	62.5	72.0	8.88	100.0	SE	4845	7	270	62	12	13	5	9	0	0	0	1	0	0	0	0	0	
JULY	29.95	30.19	29.72	86	64	88.0	71.0	80.0	8.22	100.0	W	5003	7	288	63	15	9	7	11	0	0	0	0	0	0	0	0	0	
AUGUST	29.91	30.19	29.67	86	55	85.7	68.0	77.0	6.22	100.0	W	4945	7	235	60	14	8	9	12	0	0	2	0	0	0	0	0	0	
SEPTEMBER	29.87	30.38	29.16	91	42	80.0	62.0	71.0	2.61	100.0	SE	4881	8	254	68	13	8	8	5	0	0	0	6	0	0	0	0	0	
OCTOBER	30.04	30.34	29.71	86	36	72.0	51.0	62.0	2.46	100.0	SE	5286	7	227	66	15	8	8	5	0	0	0	1	0	0	0	0	0	
NOVEMBER	30.10	30.54	29.70	77	25	55.6	39.0	47.3	1.81	T	SE	6529	9	184	62	14	9	7	1	0	0	0	7	6	1	2	0	0	
DECEMBER	30.05	30.63	29.56	85	12	48.0	31.0	38.6	0.58	100.1	W	7271	10	171	82	16	4	11	0	0	0	0	5	0	0	0	0	0	
ANNUAL	30.05	30.65	29.36	97	-16	63.5	48.0	55.0	0.340	65%	49-49	87.5	SE	71672	8	2483	58	165	96	105	57	4	17	9	3	50	20	1	Nov. 2.

Note: MAXIMA AND MINIMA ARE IN ITALICS

PART II.

Seismology

**Jesuit Seismological Service Record of the Earthquake
Station, St. Louis University.**

ST. LOUIS, MO., U. S. A.

LATITUDE: 38° 38' 17" N. TIME: Mean Greenwich, midnight
LONGITUDE: 90° 13' 58".5 or to midnight.
6^h. 0^m. 55^s.9 W. Gr. INSTRUMENT: Wiechert 80 kg., as-
ALTITUDE: 160.36 m. tatic, horizontal pendulum.

NOMENCLATURE: International.

The symbols used in the following records are those of the *International Nomenclature*, which is identical with that given by us in the December Bulletin of the University (1911).

SYMBOLS.

CHARACTER OF THE EARTHQUAKE.

I = noticeable, II = striking, III = violent.
d = (terrae motus domesticus) = local earthquake (felt at station).
v = (terrae motus vicinus) = nearby earthquake (less than 1000 km.).
r = (terrae motus remotus) = distant earthquake (1000-5000 km.).
u = (terrae motus ultimus) = very distant earthquake (more than 5000 km.).

PHASES:

P = (undae primae) = first preliminary tremors (longitudinal waves through the earth's interior.)

PR_n = P waves reflected n times at the earth's surface.

S = (undae secundae) = second preliminary tremors (transverse waves through the earth's interior).

SR_n = S waves reflected n times at the earth's surface.

PS = transformed waves, i. e., waves which, in their reflection at the earth's surface, have been changed from longitudinal to transverse, or vice versa.

L = (undae longae) = long or "Rayleigh" waves (first phase of main or principal portion—surface waves).

M = (undae maximae) = greatest motion in the main or principal portion (complicated surface waves).

C = (cauda) after-shocks or trailers.

F = (finis) = end of visible motion.

NATURE OF THE MOTION:

i = (impetus) = sudden impulse.

e = (emersio) = gradual development (beginning uncertain).

T = period = time of complete vibration to and fro.

A = amplitude of earth motion—reckoned from the line of rest

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and measured in microns ($\mu = \frac{\quad}{1000}$ mm).

E or N attached to a symbol refers it to the E-W or N-S component.

EARTHQUAKE RECORDS FOR 1912.							
DATE	CHARACTER	PHASE	TIME	PERIOD T	AMPLITUDE		REMARKS.
					A _E	A _N	
Jan. 4	I	i F	h. m. 16:05.3 18:22	∅	μ	μ	S-P=6 ^m .18 ^{sec} . Δ=4580km. From data furnished by Graz, Hamburg, Mobile, Ottawa and Saint Louis, φ = 88°6N λ = 148°8 W
Jan. 31	II.	iP S L M _E M _N C _{1E} C _{2E} F	20:19.5 20:25.8 20:30.6 20:35 20:35.2 20:42 20:45.1 21:47	3 T _E = 6 T _N = 6.9	5 6	4 5	
Mar. 11	Ir	eP S M _{1E} M _{1N} M _{2E} M _{2N} M _{3N} M _{3E} F	10:27.5 10:30.9 10:33.9 10:33.9 10:35.8 10:36.1 10:37 10:37.6 11:28	10 8 10.1 10.1 7.8 8	28 23 32 67 28 20.		S-P = 3 ^m .28 ^{sec} . Δ = 2050km.
May 6	II	e ?L _N ?L _E M _N M _E F	19:08.5 19:15.4 19:15.5 19:27.9 19:27.9 20:21	15 11	51	126	The first part of the record is too indefinite to allow of phase analysis.

DATE	CHARACTER	PHASE	TIME	PERIOD T	AMPLITUDE		REMARKS
					A _E	A _N	
May 23	II	e _E e _N L _E ?L _N M _E M _N F	h. m. 2:44.9 2:46.5 3:19.9 3:25.7 3:25.2 3:36.5 4:30.	s	μ	μ	
Jun. 7	I	e _N e _E F _E F _N	10:59. 11:00. 11:09. 11:28.	36 28	183	200	
Jun. 7	I	e F	18:42 19:08				
Jun. 8	I	e' F'	7:11.9 7:28				
Jun. 8	IIr	P _N P _E S _E L _N L _E M _E M _N F _N F _E	7:49.9 7:50.4 7:56.9 8:00.4 8:00.6 8:02.9 8:03.2 8:34 8:38	15 15	126	252	(S-P) _E = 6 ^m .30 ^{sec} . Δ = 4780 km. Microseisms during greater part of the day.
Jun. 8	I	e M _N M _E F	9:05.4 9:15.1 9:15.1 9:29.	12 9	9	34	

DATE	CHARACTER	PHASE	TIME	PERIOD T	AMPLITUDE		REMARKS
					A _E	A _N	
Jun. 8	I	e _N	13:15.9	s	μ	μ	
		e _E	13:17.7				
		L	13:23.				
		M _E	13:25.6				
		M _N	13:27.8				
Jun. 9	I	e _N	17:38.8	12	31	49	
		e _E	17:39.9				
		F	17:46.				
Jun. 10	IIu	P	16:14.4	18	114	163	(S-P) _N = 6 ^m .51 ^{sec} . Δ = 5160 km.
		S _N	16:21.2				
		S _E	16:21.3				
		L _E	16:30.6				
		L _N	16:30.7				
		V _N	16:34.3				
		M _E	16:35.6				
		F _E	17:40				
		F _N	17:41				
Jun. 12	I	e	7:26.8	14	16	25	
		L _E	7:31.				
		L _N	7:31.1				
		M _N	7:31.1				
		M _E	7:31.2				
		F _E	7:37.				
		F _N	7:39.				

DATE	CHARACTER	PHASE	TIME	PERIOD T	AMPLITUDE		REMARKS.
					A _E	A _N	
Jun. 12	IIr	iP _N	12:48.8	s	μ	μ	(S-P) _N = 3 ^m .59 ^{sec} . Δ = 2430km.
		eP _E	12:49.				
		iS _N	12:52.7				
		iS _E	12:52.8				
		L _N	12:53.7				
		L _E	12:53.8				
		M _N	12:53.9				
		M _E	12:54.1				
		F	13:33.				
Jun. 18		eE	12:02.2	10	47	103	Microseisms prevail.
		?e	12:25.7				
Jul. 7	IIIu	PE	8:04:52	12	1613	1366	S-P = 5 ^m .53 ^{sec} . Δ = 4175 km. Quake in Alaska.
		P _N	8:05:22				
		PRIN	8:07:08				
		PRIE	8:07:16				
		SE	8:11:09				
		S _N	8:11:15				
		L _E	8:14:57				
		L _N	8:15				
		ME1	8:20:39				
		MN1	8:20:44				
		ME2	8:20:50				
		MN2	8:20:56				
		ME3	8:21:02				
		MN3	8:23:28				
		MN4	8:23:40				
F _N	9:47.						
F _E	10.						

DATE	CHARACTER	PHASE	TIME	PERIOD	AMPLITUDE		REMARKS.
					A _E	A _N	
Jul. 8	IIu	P	h:m:s 22:07:50	s.	μ	μ	S-P = 6 ^m .39sec. Δ = 4990 km.
		S	22:08:29				
		L	22:14:30				
		M _E	22:17:04	11	183		
		M _{N1}	22:17:04	11		150	
		M _{N2}	22:20:04	11		156	
Jul. 21		F	23:10				Reported from Alaska.
			13:30 to				
			14:00				
Jul. 22			15:02 to				
			15:07				
		e _E	9:58				
Jul. 22		e _N	9:58				
		?F	10:06				
Jul. 22	I	e _E	23:49.9				e in local disturbance.
		e _N	23:49.8				
		?N	23:52.9				
Jul. 24.	I _r	e _P N	12:07.7				(S-P) _E = .6 ^m .6sec. (S-P) _N = 6 ^m .13sec. Δ = 4340 km. Reported from Guayaquil Ecuador.
		e _P E	12:07.8				
		i _S E	12:13.9				
		i _P N	12:14.				
		M _E	12:13.9	8	10.		
		M _N	12:14.	4		5	
		?L	12:18.				
F	12:36.						
Jul. 25	I	e _E	23:26.6				Principal disturbance between 0:04 and 0:15. N-S very faint.
		?E	23:36.6				
		L _E	0:04.7	to 24			

Date.	Character.	Phase.	Time	Period T.	Amplitude.		Remarks.
					A _E	A _N	
Aug. 6	I	P	h:m:s 21:29.7	s.	μ	μ	Periods very small.
		S	21:36.6				
		?L	21:40.				
		L	21:46.4				
		C _N	22:06.3				
Aug. 9	IIu	e?E	1:39.9				
		e	1:40.5				
		e?N	1:38.7				
		S _E	1:50.9				
		S _N	1:50.9				
		eL _E	2:03.4	56	410		
		eL _N	2:03.5				
		M _E	2:15.7	23	272		
		M _{N1}	2:18.8	18		135	
		M _{N2}	2:15.	20		126	
Aug. 9	I	F	3:19.7				E-W scarcely anything.
		?eL _N	23:32.5				
Aug. 17	I	S _E	19:40.8				
		L _E	19:50.6	15			
		L _E	20:29.6	20			
		L _E	20:38.1	16			
		F _E	21:11.				
Aug. 18	II _r	P	21:15.6				S-P = 3 ^m .13sec. Δ = 1870 km.
		S	21:18.8				
		iL	21:19.3				
		M _{N1}	21:19.5	6		15	
		M _{N2}	21:21.	6		10	
		M _E	21:21	8	32		
Aug. 19		F	4.00.0				Earthquake reported from 400 miles west of Albuquerque, N.M.
Aug. 31		L	23:04.2	15ca.			

Date.	Character.	Phase.	Time.	Period T.	Amplitude.		Remarks.
					A _E	A _N	
Sep. 1		?S _E ?L _E	h. m. s. 4:10.6 4:35.2	s. 6	μ	μ	
Sep. 10	I	e _E e _N L _N L _E M _N ?F	16:14.7 16:14.7 16:16.9 16:17. 16:18.6 16:35.	10		12	
Sep. 13		L _N	24:13.4	15-18			
Sep. 20		?P _N ?L _N ?F	21:30.2 21:48.9 22:17.	12			
Sep. 29	Iu	eP eS ?eL _E ?eL _N L _N L _E L _N L _E F _N F _E	21:11.2 21:20.8 21:42.3 21:41.1 21:49.4 21:48.5 21:58.1 21:56.5 22:47.1 22:49.3				Δ = 8370 km
Oct. 12	I	?eL ?F	15:53.8 16:43.5				

Date.	Character.	Phase.	Time	Period T.	Amplitude.		Remarks.
					A _E	A _N	
Oct. 18	I	eP S eL M _E M _{N1} M _{N2} ?F	h. m. s. 12:13:42 12:20:36 12:24:30 12:25:32 12:25:32 12:31:10 13:04	s. 16 16 16	μ	μ	S-P = 6 ^m .54 ^{sec} . Δ = 5260 km
Nov. 7	IIu	eP eS eL M _{N1} M _E M _{N2} ?F	7:48.6 7:55.1 7:58.6 8:04.3 8:04.5 8:07.5 8:43				S-P = 6 ^m .30 ^{sec} . Δ = 4830 km.
Nov. 7	I	?eP _E ?L _E ?L _N	16:05.7 16:50.8 16:14.6				
Nov. 7	I	e _N eL _N eL _E ?F _N	16:50.3 16:55.3 16:55.4 17:19.				E-W very slight record.
Nov. 7	I	L ?F _N	17:40.4 18:13.				

Date.	Character.	Phase.	Time.	Period T.	Amplitude.		Remarks.
					A _E	A _N	
Nov. 19	IIr	iP _N	13:59:41	s.	μ	μ	S-P = 3 ^m .53sec. Δ = 2420 km. Mexico.
		eP _E	13:59:42				
		iS _E	14:03:33				
		iS _N	14:03:35				
		M _{E1}	14:03:33	10	25		
		M _{N1}	14:03:44	10		127	
		?L	14:04:41				
		M _{E2}	14:09:55	8	20		
Nov. 22	I	?eL _N	1:10:33				Microseisms prevail especially before midnight 21st inst. Quake reported from Vancouver Island B.C. Time determinations uncertain.
		?eL _E	1:10.7				
		?F _E	1:24.				
Dec. 5	Ir	?eP _N	12:35.9				eP in local disturbance. S-P = 6 ^m .7sec. Δ = 4430 km.
		?eP _E	12:35.9				
		eS	12:42.2				
		eL	12:45.9				
		M _N	12:54.3	18		Imm	
		?C	13:17.2				
		?F _E	13:32.8				
Dec. 5		?eS _N	17:51.1				e in local tremors.
		?eL _E	17:59.6				
		?eL _N	17:59.6				
		?F	18:13				

Date.	Character.	Phase.	Time.	Period T.	Amplitude.		Remarks.
					A _E	A _N	
Dec. 7	I	i	h. m. s. 23:05:28	s.	μ	μ	Microseisms make determinations of P and F impossible. No M in L waves.
		iM _E	23:05:28	5	26		
		iM _N	23:09:18	5		26	
		?L _N	23:09:18				
		?L _E	23:09:25				
Dec. 9	IIr	eP _N	8:37.5				S-P = 4 ^m .11sec. Δ = 2580 km. No P on E-W. eL uncertain.
		eS _N	8:41.7				
		eS _E	8:41.8				
		?L _N	8:43.3				
		?L _E	8:43.1				
		M _{N1}	8:42.2	12		97	
		M _E	8:42.6	8	15		
		M _{N2}	8:51.6	14		85	
		F _N	9:18.8				
F _E	9:28.5						

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