ANALYSIS OF THE PRECIPITATION OF RAIN AND SNOW AT MOUNT VERNON, IOWA

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[Cornell College, Mount Vernon, Iowa, July 21, 1927]

For the past 17 years Cornell has been keeping an analysis of all the rain and snow which was precipitated here. Some of the results were published in the Chemical News, some in other periodicals of a scientific nature. Some of the references for this work done in previous years are:

Chemical News, Volume III, page 61.
Chemical News, Volume 119, page 49.

The water was collected in granite pans set on a house top in town. The town is small, with no factories. The smoke which might influence the results comes only from the residence heating plants. There are a great many trees in the town and on the campus. In the fall the leaves were troublesome in contaminating the sample. The first six samples were collected and saved, in ordinary gallon bottles, until the college opened in the fall, the 15th of September.

The method used in making the tests was taken from the Standard Methods of Water Analysis, sixth edition, published by the American Public Health Association. The chloride tests were not started until the thirteenth sample. It was found, from testing a sample of pure, chloride-free distilled water, that it was necessary to deduct from the reading 3.55 parts per million to allow for the formation of the color. It took $AgNO_3$ equivalent to this amount to make the change visible. The distillation method for free and albuminoid ammonias was used; for nitrates, the phenosulphonic acid method. All of the samples were colorless, except several in the fall, when the ammonias were high. The results of this work are given in the table below. All of the values therein are in parts per million parts of the sample.

Dr. Nicholas Knight, professor of chemistry at Cornell College, has been of invaluable assistance in this work.

TABLE 1.—*Rain and snow at Mount Vernon, Iowa*

Sample	Date of precipitation	Amount	Rain or snow	Lightning	Nitrates	Nitrites	Free ammonia	Albuminoid ammonia	Sulphates	Chlorine as chlorides
	1926									
1	June 10	0.20	R.	-------	6.000	-------	0.04	1.180	24.653	-------
2	11	0.5	R.	-------	0.8	0.0010	1.60	0.024	4.450	-------
3	13	0.9	R.	-------	0.400	0.0010	0.11	0.040	5.145	-------
4	17	0.25	R.	-------	0.400	0.0005	0.01	0.400	16.435	-------
5	21	0.5	R.	-------	1.200	0.0015	0.00	0.380	9.947	-------
6	July 1	0.25	R.	-------	0.800	0.0000	0.00	0.000	3.43	-------
7	Sept. 19	2.00	R.	-------	0.040	0.0030	0.05	0.020	3.43	-------
8	22	0.65	R.	-------	0.030	0.0040	0.36	0.030	10.29	-------
9	Oct. 1	0.5	R.	Yes	0.010	0.0200	0.26	0.380	0.000	-------
10	4	0.3	R.	Yes	0.020	0.0075	0.30	0.900	5.145	-------
11	5	0.1	R.	No	0.120	0.0070	0.10	0.400	0.000	-------
12	19	0.15	R.	No	0.200	0.0200	0.00	0.000	0.000	-------
13	23	0.2	R.	No	0.010	0.0070	0.24	0.100	0.000	1.36
14	Nov. 3	0.1	R. & S.	No	-------	0.0000	0.72	2.200	0.000	-------
15	9	0.5	R.	No	0.080	0.0060	0.22	0.360	6.890	2.13
16	12	0.5	R.	No	0.010	0.0040	0.03	0.400	5.480	1.42
17	14	1.0	R.	No	0.005	0.0030	0.04	0.320	8.540	0.00
18	16	12.0	S.	No	0.020	0.0005	0.04	0.030	0.000	0.71
19	26	2.85	R.	Yes	0.060	0.0015	0.64	0.000	0.000	0.00
20	Dec. 6	2.0	S.	No	0.140	0.0060	-------	-------	-------	17.04
21	7	6.0	S.	No	0.010	0.0015	0.00	0.002	0.000	1.06
22	24	0.25	R.	No	0.200	0.0016	0.80	2.000	49.730	11.36
	1927									
23	Jan. 13	6.00	S.	No	0.020	0.0070	0.10	0.180	-------	120.7
24	19	3.0	S.	No	0.140	0.0100	-------	-------	-------	77.39
25	Feb. 5	0.8	R.	No	0.140	0.0080	0.24	0.020	-------	0.00
26	14	6.0	S.	No	-------	0.0020	-------	-------	0.000	0.00
27	24	3.0	R.	No	0.100	0.0080	0.72	0.020	0.000	1.42
28	25	2.0	S.	No	0.700	0.0080	-------	-------	-------	3.60
29	Mar. 5	0.2	R.	No	0.160	0.0300	0.80	0.320	-------	4.61
30	11	0.85	R.	No	0.030	0.0050	0.36	0.400	-------	0.00
31	16	0.4	R.	Yes	0.100	0.0060	0.20	0.136	0.000	12.07
32	21	1.0	R.	No	0.020	0.0005	0.36	0.020	-------	0.00
33	23	0.25	R.	No	0.140	0.0160	0.20	0.000	-------	0.00

TABLE 1.—*Rain and snow at Mount Vernon, Iowa*—Continued

Sample	Date of precipitation	Amount	Rain or snow	Lightning	Nitrates	Nitrites	Free ammonia	Albuminoid ammonia	Sulphates	Chlorine as chlorides
	1927									
34	Apr. 1	0.9	R.	No	0.180	0.0050	0.24	0.001	-------	0.71
35	3	0.2	R.	No	0.300	0.0070	0.40	0.136	-------	0.00
36	4	0.4	R.	No	0.600	0,0030	0.37	0.160	-------	5.68
37	8	0.33	R.	No	0.600	0.0090	0.10	0.000	-------	4.25
38	10	0.18	R.	No	0.300	0.0050	0.22	0.360	-------	0.71
39	13	0.75	R.	No	0.400	0.0040	1.00	0.560	-------	0.00
40	15	0.6	R.	No	0.020	0.0060	0.28	0.020	0.000	4.26
41	18	0.12	R.	No	0.040	0.0080	1.20	0.240	Trace.	0.00
42	19	0.45	R.	No	0.000	0.0040	0.16	0.075	0.000	0.00
43	19	0.6	R.	No	0.010	0.0020	0.16	0.112	0.000	0.00
44	21	0.3	R. & S.	No	0.010	0.0060	0.40	0.320	-------	0.71
45	29	0.4	R.	Yes	0.010	0.0080	0.80	0.320	-------	4.26
46	May 2	0.28	R.	Yes	0.010	0.0080	1.10	0.280	-------	1.42
47	8	1.8	R.	Yes	0.010	0.0030	0.50	0.180	-------	1.40
48	9	0.12	R.	No	0.001	0.0100	-------	-------	-------	0.00
49	13	0.45	R.	Yes	0.060	0.0050	0.56	0.136	-------	0.00
50	17	2.5	R.	Yes	0.010	0.0120	1.20	0.160	-------	0.00
51	18	0.65	R.	Yes	0.050	0.0030	0.56	1.320	-------	1.42
52	22	0.70	R.	No	0.060	0.0040	1.20	0.360	-------	0.00
53	23	0.70	R.	Yes	0.060	0.0020	0.16	0.240	-------	0.00
54	24	0.55	R.	Yes	0.030	0.0050	0.28	0.150	-------	0.00
55	28	0.50	R.	No	0.120	0.0100	1.12	0.280	-------	0.00

TABLE 2.—*Data from Table 1 converted to pounds per acre*

[1 inch of rain over an acre = 226,875.0 pounds. 12 inches of snow = 1 inch of rain]

Number	Amount of precipitation in pounds per acre	Nitrates	Nitrites	Free ammonia	Albuminoid ammonia	Sulphates	Chlorides
1	4.52×10^{4}	270.0×10^{-3}	-------	1.80×10^{-3}	5.31×10^{-2}	1.1070	-------
2	11.30	90.4	1.13×10^{-4}	180.80	0.27	0.5028	-------
3	20.34	81.3	2.03	223.7	0.81	1.0454	-------
4	5.65	22.6	0.28	0.5	2.26	0.9184	-------
5	11.30	135.6	1.69	0.0	4.29	1.1240	-------
6	5.65	45.2	0.00	0.0	0.00	0.1948	-------
7	45.20	18.0	73.56	22.6	0.90	1.5503	-------
8	14.79	4.4	5.88	52.9	0.44	1.4994	-------
9	11.30	1.1	22.60	29.3	4.29	0.0000	-------
10	6.78	1.3	5.02	20.1	6.03	0.3443	-------
11	2.26	2.7	1.58	24.8	0.90	0.0000	-------
12	3.39	6.7	6.78	0.0	0.00	0.0000	-------
13	4.52	0.4	3.16	10.8	0.45	0.0000	0.0614
14	2.26	-------	0.00	16.2	4.97	0.0000	-------
15	11.30	9.0	6.78	24.8	4.06	0.7785	0.2426
16	11.30	1.1	4.52	3.3	4.52	0.6192	0.1604
17	22.60	1.1	6.78	9.0	7.13	1.9300	0.0000
18	22.60	4.5	1.13	9.0	0.67	0.0000	0.1604
19	64.41	38.6	9.66	412.2	0.00	0.0000	0.0000
20	3.76	5.2	2.25	-------	-------	-------	0.6392
21	11.30	1.1	1.69	0.0	0.02	0.0000	0.1197
22	5.65	11.3	0.90	45.2	11.30	2.8100	0.6418
23	11.30	2.26	7.91	11.3	2.03	-------	13.5600
24	5.65	7.91	5.65	-------	-------	-------	4.3725
25	18.08	25.20	14.40	43.20	0.36	-------	0.0000
26	11.30	-------	2.26	-------	-------	0.0000	0.0000
27	77.80	77.80	62.24	560.16	1.55	0.0000	1.0837
28	3.76	26.34	3.008	-------	-------	-------	0.1353
29	4.52	7.23	13.56	36.16	1.44	-------	0.2083
30	19.21	5.76	9.60	69.15	7.68	-------	0.0000
31	9.04	9.04	5.40	18.08	1.17	0.0000	1.0863
32	22.60	4.52	1.13	81.36	0.25	-------	0.0000
33	5.65	7.84	8.96	11.20	0.00	-------	0.0000
34	20.34	36.54	10.15	48.72	0.02	-------	0.1441
35	4.52	13.50	3.15	18.00	0.58	-------	0.0000
36	9.04	54.00	2.70	33.30	1.44	-------	0.5112
37	7.53	45.00	6.75	7.50	7.50	-------	0.3187
38	4.06	12.18	2.30	8.80	1.44	-------	0.0284
39	16.95	67.60	6.76	169.50	9.46	-------	0.0000
40	13.56	2.70	8.10	37.80	0.27	0.0000	0.5751
41	2.71	1.08	2.16	32.40	0.64	Trace.	0.0000
42	10.17	0.00	4.04	16.16	0.75	0.0000	0.0000
43	13.56	1.35	2.70	21.60	1.51	0.0000	0.0000
44	6.78	0.67	4.02	26.68	2.14	-------	0.0475
45	9.04	0.90	7.20	72.00	2.88	-------	0.3834
46	6.32	0.63	5.04	69.30	1.76	-------	0.0894
47	40.68	4.06	12.18	203.00	7.30	-------	0.5684
48	2.71	0.02	2.70	-------	-------	-------	0.0000
49	10.17	6.06	5.05	56.56	1.37	-------	0.0000
50	56.50	5.65	67.80	678.00	9.04	-------	0.0000
51	14.69	7.30	4.38	81.76	19.27	-------	2.0732
52	15.82	9.48	6.32	189.96	5.78	-------	0.0000
53	15.82	9.48	3.16	25.28	3.79	-------	0.0000
54	12.43	3.72	6.20	34.72	1.86	-------	0.0000
55	11.30	13.56	11.30	126.56	3.16	-------	0.0000