

showed none present. The average of the other tests was 1.43 parts per million. The highest was 1.8 parts per million on May 17, 1921.

The total nitrogen which fell, in all forms, was 3.28178 pounds per acre. This was divided as follows: As nitric acid, 5.74 per cent; as nitrous acid, 0.511 per cent; as ammonia, 93.73 per cent.

Grateful acknowledgment is made of the kind assistance and suggestions of Dr. N. Knight in carrying out this work.³

TABLE 1.—Chemical contents of rain and snow at Mount Vernon, Iowa (pounds per acre).

[X means "not tested."]

Date.	Precipitation.	Ni-trates.	Ni-rites.	Free am-monia.	Albu-minoid am-monia.	SO ₂	SO ₃	Cl
1920.								
Aug. 13	0.35	X	X	0.00357	0.02857	None.	X	X
Aug. 20	0.02177	0.00021	0.00021	.11975	.00726	None.	X	0.51529
Sept. 23	.20	.01724	.00018	.02540	.01829	None.	X	.16103
Sept. 26	.12	.02177	.00060	.01851	.01300	1.7962	X	.19321
Oct. 15	.06	.00544	.00007	X	X	1.0478	X	.07239
Oct. 15	.30	.03742	.00020	.05443	.04218	3.6742	X	.23814
Oct. 19	.05	.00454	X	X	X	X	X	X
Oct. 19	.30	.00513	.00007	.04627	.01905	X	X	.23814
Oct. 20	.85	.02311	.00044	.17690	.01622	X	X	X
Nov. 1	.05	.00170	.00003	X	X	X	X	X
Nov. 1	.95	.00404	.00150	.00033	.04309	17.4520	X	1.52980
Nov. 8	.16	.01451	X	X	X	2.6490	X	X
Nov. 14	.06	.00136	None.	X	X	.93895	X	.11975
Nov. 27	.32	.00726	.00015	.15241	.03806	3.9917	X	.63837
Nov. 30	.05	.00227	.00005	X	X	2.0979	X	.14062
Dec. 3	.05	.01361	.00007	.05931	.05443	6.5318	X	X
Dec. 13	.55	.04950	.01247	.00499	.24948	13.0977	X	1.32220
Dec. 22	.32	.02303	.00004	.01452	.05225	10.8864	X	.51503
Dec. 25	.50	.03402	.01134	.02717	.04082	10.4328	X	1.20200
1921.								
Jan. 4	.05	.01134	.00001	X	X	1.5309	X	.56360
Jan. 13	.32	.00726	.00004	.00290	.1814	X	X	.05887
Jan. 25	.16	.01996	X	.0508	.01452	X	0.2141	.57698
Feb. 8	.10	.01588	.00014	.01814	.01593	X	.00079	.36081
Feb. 22	.30	.01814	None.	.07258	.02177	6.82226	X	.72122
Mar. 5	.10	X	X	.03175	X	3.2886	X	.32206
Mar. 7	.12	.01225	.00019	.02286	.00435	2.2045	X	.19323
Mar. 14	3.00	Trace.	.00368	Trace.	.13908	61.2360	.0340	7.21224
Mar. 24	.06	.00476	.00014	X	X	1.1975	X	.14424
Mar. 29	.05	.00397	.00010	X	X	.0007	X	.08051
Apr. 6	.20	Trace.	.00014	.01814	.00717	2.4494	X	.04411
Apr. 6	.50	None.	.00034	.00007	None.	11.2293	X	.39690
Apr. 8	.05	Trace.	.00007	.00295	.04128	X	X	.51597
Apr. 14	.25	.01985	.00028	.03175	.02268	4.9494	None.	.40257
Apr. 15	1.75	.00992	.00119	.02381	.01588	37.7055	X	2.10357
Apr. 17	1.00	None.	.00227	.00227	Trace.	13.6080	X	1.61028
Apr. 21	.25	.01134	.00011	.02381	.00340	X	X	1.20771
Apr. 23	.05	.00284	X	X	X	X	X	X
Apr. 20	.60	.00680	.00027	.03810	.04899	.2722	None.	.72122
Apr. 27	.75	.01701	Trace.	.01021	.00377	23.1336	None.	1.00305
May 1	.45	.00510	.00020	.03014	None.	3.7322	None.	.72483
May 10	1.10	X	None.	.02994	.00998	10.2287	None.	1.77131
May 7	.05	.00397	.00125	X	X	.39890	X	.12020
May 11	.55	.00624	.00082	.04491	.00499	10.1040	None.	X
May 17	.40	.03629	.00272	X	X	26.7624	.1633	2.34057
May 27	.45	.03572	.00122	.12247	.11022	9.6657	.0123	1.08184
May 31	.40	Trace.	.00045	.02903	.02177	6.8040	None.	.31752
June 1	1.50	X	X	.05226	.01361	10.2280	X	1.19070
Total	20.97	.60126	.03985	1.45045	1.16022	327.0619	.4906	34.43179

Twelve inches of snow have been taken to equal 1 inch of rain.

NITROGEN IN THE RAINWATER AT ITHACA, N. Y.¹

By B. D. WILSON.

[Abstract reprinted from *Exp. Station Record*, U. S. Department of Agriculture, vol. 44, No. 9.]

Studies conducted at Cornell University on the amounts of ammoniacal and nitrate nitrogen added to the soil by rain showed that with an average annual rainfall of 29.31 inches, between May 1, 1915, and May 1, 1920, the soil received annually 12.51 pounds of nitrogen to the acre. Of this amount 11.5 pounds was in the form of ammoniacal nitrogen and 1.01 pounds in the form of nitrate nitrogen. The ammoniacal nitrogen fluctuated from month to month and from year to year, while the nitrate nitrogen remained more constant. The amount of total nitrogen in the rainwater was to a large extent dependent

upon the amount of rainfall, a high nitrogen content accompanying a correspondingly high precipitation.

The rainfall during the spring and summer months contained more nitrogen than that falling during the other two seasons. The ammoniacal nitrogen decreased rather suddenly during August and continued low during September and October in spite of heavy rainfalls. This decrease is considered to be probably due to the atmosphere being washed comparatively free of ammonia by previous rains. Electrical discharges did not increase the nitrate nitrogen content of the rainwater to any considerable extent.

The amount of ammoniacal nitrogen brought down in the rain falling at Ithaca, N. Y., is said to be somewhat larger than that reported from many parts of the world, while the nitrate nitrogen content is about the same.

A bibliography of 12 references to the literature of the subject is given.

614.7(41) LONDON SMOKE FOGS.

By J. S. OWENS.

[Abstracted from *The Meteorological Magazine*, London, Mar., 1921, pp. 29-33.]

The Advisory Committee on Atmospheric Pollution has always recognized the fact that the measurement of atmospheric pollution by means of open-topped gages¹—similar to rain gages—gives an incomplete statement of the case because only those particles of dust heavy enough to be precipitated find their way into the gage. Recently, however, a method of measuring the *suspended impurities* over cities has been established. Instruments were installed at the Meteorological Office, South Kensington, at Kew Observatory, and at 47 Victoria Street, Westminster. Continuous records are now available since October, 1920. From these records curves have been drawn showing the amount of suspended matter for each hour over a number of days. This has been done for ordinary week-days (exclusive of Saturdays and Sundays), and for Saturdays and Sundays separately. In drawing the curves the author splits up each group into foggy and non-foggy days.

When more data are available it is hoped a study of the graphs will make it possible to state definitely what proportion of the suspended impurity is due to domestic fires for heating and cooking and what to factory furnaces.

A survey of the curves already drawn shows the atmosphere least polluted between midnight and early morning when all classes of fires are practically dormant. On week days and Saturdays at about 6 a. m., (Sundays at 7 a. m.), a rapid increase in the amount and impurity starts, reaching a maximum about five hours later. About 10 p. m. a rapid fall starts, continuing until midnight when the minimum period sets in.

Referring to the curve for nonfoggy Saturdays, there is no sudden falling off in the amount of smoke after 1 o'clock when most factories close; on the contrary, there is a distinct rise and a very marked peak at 5 o'clock. The inference is clear that since the shutting down of factories does not bring about a marked reduction in the amount of impurity recorded, factory fires are not mainly responsible for the pollution. Thus both the quantity of suspended matter and its distribution point toward the domestic heating and cooking fires as being chiefly responsible.

From the somewhat brief data so far available, the writer ventures the opinion that the values plotted would indicate that domestic fires appear to be responsible for two-thirds of the total smoke in Westminster.—H. L.

³ Cf. Trieschmann, J. E.: Nitrogen and other compounds in rain and snow. Abstract reprinted in *MO. WEATHER REV.*, Nov., 1919, 47: 807.
¹ *Soil Science*, 11 (1921), No. 2, pp. 101-110.

¹ For an account of the amount of solid matter collected in gages, see the *MO. WEATHER REV.*, March, 1921, 49: 159-160, "Atmospheric pollution."