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Beta Radioactivity in Environmental Air and Precipitation at Los Alamos, New Mexico, for 1966

by

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BETA RADIOACTIVITY IN ENVIRONMENTAL AIR AND PRECIPITATION AT LOS ALAMOS, NEW MEXICO, FOR 1966

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ABSTRACT

Beta activity of particulate matter in both air and precipitation for 1966 are reported for Los Alamos, New Mexico. The decline in activities that began in the last half of 1963 continued until the middle of 1966. Increases in May, November, and December can perhaps be attributed to the Chinese atmospheric tests.

INTRODUCTION

Measurement of beta activity of particulate matter in both air and precipitation is part of the environmental monitoring program at Los Alamos. The sampling station is located at TA-50, about 1-3/4 miles southeast of the Administration Building of the Los Alamos Scientific Laboratory. The samplers are on the roof of the building. Daily samples are collected.

The results reported here continue the measurements reported in Radioactive Fallout Data, 1958, G. M. Dunning, editor, U.S. Atomic Energy Commission, U.S. Government Printing Office, Washington (March 1959); LAMS-2397 (November and December of 1958 and all of 1959); LAMS-2499 (1960); LAMS-2702 (1961); LAMS-2870 (1962); LAMS-3071 (1963); LA-3245-MS (1964); and LA-3516-MS (1965).

BETA ACTIVITY OF PARTICULATE MATTER IN AIR

Airborne radioactive particulate matter is collected on 4-in.-diam filters (MSA catalog number CR 17651). The sampling rate has been reduced from the previous 46 m^3/hr to 25.5 m^3/hr due to the addition of an activated charcoal filter behind the MSA filter. Air samples are ordinarily collected for 24-hr intervals during the work week, and weekend samples are collected for a 72-hr period. Filters are changed at approximately 0900.

The filter papers are counted for beta activity 7 days after collection in a thin-window gas (methane) flow proportional counter, with an overall efficiency for ^{90}Sr - ^{90}Y of 50%. In September of 1966, a large chamber was added to the Sharp Widebeta Counting System that permits the counting of these air samples in the same geometry as the precipitation samples. The efficiency for ^{90}Sr - ^{90}Y remains the same as in the older counter.

The filters are also counted 10 min, 5 hr, and 24 hr after removal, but these results have not been included.

BETA ACTIVITY OF PARTICULATE MATTER IN PRECIPITATION

An oversized precipitation collector delivers 1 liter of water for each 0.1 in.

of precipitation. The collector has a cross section of approximately 0.4 m^2.

Even during relatively dry periods this arrangement collects activity. By washing down the collector, with about 1 liter of distilled water, a suitable sample is obtained. These "wash" samples as well as any precipitation samples are reduced in volume, dry-plated on 1-in.-diam stainless steel planchets, and counted in a Sharp Widebeta Counting System, employing a gas flow, proportional, alpha and beta chamber. A cosmic ray umbrella with coincidence count cancel provides a low background for the system. The counting efficiency is determined by comparison with a Tracerlab standard of radiolead, which emits 1.17 MeV beta particles.

Samples are taken daily on work days. The precipitation collector is washed with 1 liter of water usually between 0800 and 0900 on the day of collection. When precipitation occurs, the wash is added to the collected precipitation.

RESULTS

Precipitation for 1965, 1966, and the average for a 31-year period is shown in Fig. 1. The average "per day" activity for 1965 and 1966 is presented in Figs. 2 and 3. Average per day values for air collected are weighted for sample periods of more than 1 day. Average per day values for the precipitation collection are the total activity collected during the month divided by the number of days. Table I summarizes the year's data.

Beta activities, presented in the monthly tabulations, are not identified; however, the measurements were made in the same manner as in previous years, making these results comparable to those presented in the earlier reports.

The decline in activities that began in the last half of 1963 continued until the middle of 1966. Increases in May, November, and December may perhaps be attributed to the Chinese atmospheric tests.

TABLE I

Summary 1966

Precipitation		17.48 in.
Air Samples	$\bar{X}$/sample	0.15×10^{-12} μCi/cc
5/19-5/20	Maximum	4.64×10^{-12} "
1/31-2/1	Minimum	0.00×10^{-12} "
Precipitation Samples	Total	43,566 μμCi/m^2
	$\bar{X}$/day	119 "
5/19-5/20	Maximum	4,195 "
1/7-1/10 1/31-2/2 9/21-9/23 10/12-10-14 11/21-11/22 12/13-12/14	Minimum	0 "

JANUARY 1966

Collection date Start	Collection date Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Beta activity counted 7 days after collection: Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
Dec. 30 (1965)	Jan. 3	0.01×10^{-12}**	(64)254	0.01	Jan. 3	1400	261.0
Jan. 3	Jan. 4	0.05×10^{-12}	2	0	Jan. 4	1400	14.8
Jan. 4	Jan. 5	0.04×10^{-12}	10	0	Jan. 5	1400	15.7
Jan. 5	Jan. 6	0.04×10^{-12}	10	0	Jan. 6	1400	16.0
Jan. 6	Jan. 7	0.04×10^{-12}	8	0	Jan. 7	1400	16.6
Jan. 7	Jan. 10	0.03×10^{-12}	(0)0**	0	Jan. 10	1400	5.7
Jan. 10	Jan. 11	0.07×10^{-12}	1	0	Jan. 11	1400	9.0
Jan. 11	Jan. 12	0.09×10^{-12}*	1	0	Jan. 12	1400	13.3
Jan. 12	Jan. 13	0.02×10^{-12}	9	trace	Jan. 13	1400	27.3
Jan. 13	Jan. 14	0.06×10^{-12}	5	0	Jan. 14	1400	20.6
Jan. 14	Jan. 17	0.04×10^{-12}	(5)16	trace	Jan. 17	1400	33.7
Jan. 17	Jan. 18	0.05×10^{-12}	6	0.34	Jan. 18	1400	20.9
Jan. 18	Jan. 19	0.04×10^{-12}	126*	0.01	Jan. 19	1400	210.4
Jan. 19	Jan. 20	0.06×10^{-12}	39	trace	Jan. 20	1400	36.9
Jan. 20	Jan. 21	0.04×10^{-12}	22	0.03	Jan. 21	1400	72.8
Jan. 21	Jan. 24	0.04×10^{-12}	(11)33	trace	Jan. 24	1400	32.9
Jan. 24	Jan. 25	0.04×10^{-12}	3	0	Jan. 25	1400	12.8
Jan. 25	Jan. 26	0.06×10^{-12}	11	0	Jan. 26	1400	17.6
Jan. 26	Jan. 27	0.06×10^{-12}	15	0	Jan. 27	1400	26.7
Jan. 27	Jan. 28	0.08×10^{-12}	13	0	Jan. 28	1400	14.1
Jan. 28	Jan. 31	0.08×10^{-12}	(2)6	trace	Jan. 31	1400	15.3
$\bar{X}$ "per day"		0.05×10^{-12}	19	0.014			
* Maximum		0.09×10^{-12}	126	0.34			
** Minimum		0.01×10^{-12}	0	0			
Total		10.4×10^{-12}	590	0.44			

FEBRUARY 1966

Collection date Start	Collection date Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Beta activity counted 7 days after collection: Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
Jan. 31	Feb. 1	0.00×10^{-12}**	0**	trace	Feb. 1	1400	14.6
Feb. 1	Feb. 2	0.03×10^{-12}	0**	0.01	Feb. 2	1400	17.8
Feb. 2	Feb. 3	0.09×10^{-12}*	25	0	Feb. 3	1400	14.3
Feb. 3	Feb. 4	0.02×10^{-12}	15	0	Feb. 4	1400	9.6
Feb. 4	Feb. 7	0.07×10^{-12}	(2)6	0.05	Feb. 7	1400	22.1
Feb. 7	Feb. 8	0.02×10^{-12}	174*	0.80	Feb. 8	1400	456.0
Feb. 8	Feb. 9	0.04×10^{-12}	7	trace	Feb. 9	1400	0
Feb. 9	Feb. 10	0.06×10^{-12}	5	trace	Feb. 10	1400	0
Feb. 10	Feb. 11	0.05×10^{-12}	32	0.01	Feb. 11	1400	102.6
Feb. 11	Feb. 14	0.07×10^{-12}	(29)86	0.03	Feb. 14	1400	139.6
Feb. 14	Feb. 15	0.05×10^{-12}	1	trace	Feb. 15	1400	159.3
Feb. 15	Feb. 16	0.09×10^{-12}*	12	0	Feb. 16	1400	17.4
Feb. 16	Feb. 17	0.07×10^{-12}	31	0	Feb. 17	1400	24.9
Feb. 17	Feb. 18	0.08×10^{-12}	5	0	Feb. 18	1400	27.3
Feb. 18	Feb. 21	0.07×10^{-12}	(1)2	0.10	Feb. 21	1400	11.0
Feb. 21	Feb. 23	0.04×10^{-12}	(64)127	trace	Feb. 23	1400	324.4
Feb. 23	Feb. 24	0.02×10^{-12}	7	0	Feb. 24	1400	17.3
Feb. 24	Feb. 25	0.06×10^{-12}	2	0.09	Feb. 25	1400	12.5
Feb. 25	Feb. 28	0.08×10^{-12}	(10)31	0	Feb. 28	1400	38.5
$\bar{X}$ "per day"		0.05×10^{-12}	20	0.04			
* Maximum		0.09×10^{-12}	174	0.80			
** Minimum		0.00×10^{-12}	0	0			
Total		10.1×10^{-12}	568	1.14			

MARCH 1966

Collection date Start	Collection date Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Beta activity counted 7 days after collection: Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
Feb. 28	Mar. 1	0.07×10^{-12}	8	0	Mar. 1	1400	12.2
Mar. 1	Mar. 2	0.09×10^{-12}	28	0	Mar. 2	1400	81.1
Mar. 2	Mar. 3	0.08×10^{-12}	7	0	Mar. 3	1400	29.8
Mar. 3	Mar. 4	0.08×10^{-12}	5	0	Mar. 4	1400	13.7
Mar. 4	Mar. 7	0.07×10^{-12}	(3)8	0	Mar. 7	1400	7.2
Mar. 7	Mar. 8	0.11×10^{-12}	4	0	Mar. 8	1400	11.4
Mar. 8	Mar. 9	0.05×10^{-12}**	2	0	Mar. 9	1400	7.7
Mar. 9	Mar. 10	0.05×10^{-12}**	< 1**	0	Mar. 10	1400	12.0
Mar. 10	Mar. 14	0.08×10^{-12}	(4)16	trace	Mar. 14	1400	27.5
Mar. 14	Mar. 15	0.09×10^{-12}	10	0	Mar. 15	1400	40.4
Mar. 15	Mar. 16	0.07×10^{-12}	6	0	Mar. 16	1400	34.6
Mar. 16	Mar. 17	0.08×10^{-12}	3	0	Mar. 17	1400	33.7
Mar. 17	Mar. 18	0.06×10^{-12}	5	0	Mar. 18	1400	23.3
Mar. 18	Mar. 21	0.06×10^{-12}	(1)4	0	Mar. 21	1400	315.3
Mar. 21	Mar. 22	0.09×10^{-12}	3	0	Mar. 22	1400	45.1
Mar. 22	Mar. 23	0.13×10^{-12}*	5	0	Mar. 23	1400	39.3
Mar. 23	Mar. 24	0.11×10^{-12}	5	0	Mar. 24	1400	57.2
Mar. 24	Mar. 25	0.13×10^{-12}*	8	0	Mar. 25	1400	33.8
Mar. 25	Mar. 28	0.06×10^{-12}	(50)150	trace	Mar. 28	1400	197.3
Mar. 28	Mar. 29	0.05×10^{-12}**	319*	0.04	Mar. 29	1400	504.4
Mar. 29	Mar. 30	0.05×10^{-12}**	53	0.01	Mar. 30	1400	113.3
Mar. 30	Mar. 31	0.11×10^{-12}	3	0	Mar. 31	1400	17.1
$\bar{X}$ "per day"		0.08×10^{-12}	21	0.003			
* Maximum		0.13×10^{-12}	319	0.04			
** Minimum		0.05×10^{-12}	< 1	0			
Total		17.5×10^{-12}	653	0.07			

APRIL 1966

Collection date Start	Collection date Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Beta activity counted 7 days after collection: Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
Mar. 31	Apr. 1	0.09×10^{-12}	2	0	Apr. 1	1400	4.9
Apr. 1	Apr. 4	0.10×10^{-12}	(1)3	0	Apr. 4	1400	32.3
Apr. 4	Apr. 5	0.09×10^{-12}	14	0	Apr. 5	1400	13.5
Apr. 5	Apr. 6	0.12×10^{-12}	6	0	Apr. 6	1400	16.8
Apr. 6	Apr. 7	0.08×10^{-12}	1**	0	Apr. 7	1400	16.1
Apr. 7	Apr. 8	0.09×10^{-12}	4	0	Apr. 8	1400	45.9
Apr. 8	Apr. 11	0.07×10^{-12}	(2)5	0	Apr. 11	1400	44.3
Apr. 11	Apr. 12	0.09×10^{-12}	7	0	Apr. 12	1400	62.2
Apr. 12	Apr. 13	0.09×10^{-12}	9	trace	Apr. 13	1400	39.9
Apr. 13	Apr. 14	0.06×10^{-12}	41	trace	Apr. 14	1400	107.9
Apr. 14	Apr. 15	0.04×10^{-12}**	14	0	Apr. 15	1400	36.7
Apr. 15	Apr. 18	0.08×10^{-12}	(12)36	0	Apr. 18	1400	40.3
Apr. 18	Apr. 19	0.10×10^{-12}	42*	0.03	Apr. 19	1400	59.4
Apr. 19	Apr. 20	0.11×10^{-12}	11	0	Apr. 20	1400	36.1
Apr. 20	Apr. 21	0.14×10^{-12}*	5	0	Apr. 21	1400	25.7
Apr. 21	Apr. 22	0.13×10^{-12}	8	trace	Apr. 22	1400	31.9
Apr. 22	Apr. 25	0.09×10^{-12}	(8)25	trace	Apr. 25	1400	39.1
Apr. 25	Apr. 26	0.10×10^{-12}	21	trace	Apr. 26	1400	71.5
Apr. 26	Apr. 27	0.08×10^{-12}	15	0	Apr. 27	1400	52.1
Apr. 27	Apr. 28	0.13×10^{-12}	12	0	Apr. 28	1400	96.2
Apr. 28	Apr. 29	0.07×10^{-12}	2	0	Apr. 29	1400	23.4
$\bar{X}$ "per day"		0.09×10^{-12}	9.4	0.003			
* Maximum		0.14×10^{-12}	42	0.03			
** Minimum		0.04×10^{-12}	1	0			
Total		19.5×10^{-12}	233	0.08			

MAY 1966

Collection date Start	Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
Apr. 29	May 2	0.06×10^{-12}	(7)21	trace	May 2	1400	74.0
May 2	May 3	0.06×10^{-12}	3	0	May 3	1400	19.2
May 3	May 4	0.09×10^{-12}	3	0	May 4	1400	10.9
May 4	May 5	0.08×10^{-12}	1**	0	May 5	1400	13.3
May 5	May 6	0.05×10^{-12}	3	0	May 6	1400	15.7
May 6	May 9	0.05×10^{-12}	(7)22	trace	May 9	1400	82.3
May 9	May 10	0.04×10^{-12}**	6	trace	May 10	1400	32.9
May 10	May 11	0.12×10^{-12}	7	trace	May 11	1400	40.1
May 11	May 12	0.05×10^{-12}	8	trace	May 12	1400	41.2
May 12	May 13	0.14×10^{-12}	17	0	May 13	1400	42.4
May 13	May 16	0.09×10^{-12}	(40)121	trace	May 16	1400	308.3
May 16	May 17	0.62×10^{-12}	11	0	May 17	1400	42.8
May 17	May 18	1.55×10^{-12}	6	0	May 18	1400	39.6
May 18	May 19	0.68×10^{-12}	489	0	May 19	1400	880.8
May 19	May 20	4.64×10^{-12}*	4195*	trace	May 20	1400	8854.7
May 20	May 23	2.52×10^{-12}	(1323)3970	0	May 23	1400	6086.9
May 23	May 24	2.33×10^{-12}	338	0.01	May 24	1400	4907.8
May 24	May 25	0.99×10^{-12}	542	0	May 25	1400	814.9
May 25	May 26	3.16×10^{-12}	3907	trace	May 26	1400	5913.2
May 26	May 27	0.75×10^{-12}	1563	0.30	May 27	1400	2502.3
May 27	May 31	0.56×10^{-12}	(1512)4535	0.15	May 31	1400	5749.8
$\bar{X}$ "per day"		0.89×10^{-12}	637.7	0.017			
* Maximum		4.64×10^{-12}	4195	0.30			
** Minimum		0.04×10^{-12}	1	0			
Total		15.63×10^{-12}	19768	0.54			

JUNE 1966

Collection date Start	Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
May 31	June 1	0.23×10^{-12}	4003*	0.09	June 1	1400	5333.3
June 1	June 2	0.20×10^{-12}	1113	0	June 2	1400	1306.7
June 2	June 3	0.62×10^{-12}*	95	0	June 3	1400	160.7
June 3	June 6	0.55×10^{-12}	(17)50	0	June 6	1400	85.5
June 6	June 7	0.57×10^{-12}	104	0	June 7	1400	136.1
June 7	June 8	0.57×10^{-12}	40	0	June 8	1400	97.0
June 8	June 9	0.24×10^{-12}	99	trace	June 9	1400	167.5
June 9	June 10	0.25×10^{-12}	2273	0.65	June 10	1400	4066.1
June 10	June 13	0.31×10^{-12}	(356)1067	0.05	June 13	1400	1200.6
June 13	June 14	0.16×10^{-12}	73	0	June 14	1400	91.3
June 14	June 15	0.20×10^{-12}	74	trace	June 15	1400	110.5
June 15	June 16	0.15×10^{-12}	123	trace	June 16	1400	292.1
June 16	June 17	0.08×10^{-12}**	403	0.03	June 17	1400	571.9
June 17	June 20	0.17×10^{-12}	(38)115	0.05	June 20	1400	472.5
June 20	June 21	0.16×10^{-12}	1062	0.29	June 21	1400	1320.8
June 21	June 22	0.31×10^{-12}	1036	0	June 22	1400	1423.9
June 22	June 23	0.17×10^{-12}	37	0	June 23	1400	46.5
June 23	June 24	0.26×10^{-12}	70	0	June 24	1400	91.1
June 24	June 27	0.12×10^{-12}	796	0.45	June 27	1400	1506.2
June 27	June 28	0.09×10^{-12}	256	0.19	June 28	1400	503.2
June 28	June 29	0.11×10^{-12}	17**	trace	June 29	1400	29.7
June 29	June 30	0.11×10^{-12}	283	0.08	June 30	1400	501.4
$\bar{X}$ "per day"		0.25×10^{-12}	443.0	0.057			
* Maximum		0.62×10^{-12}	4003	0.98			
** Minimum		0.08×10^{-12}	17	0			
Total		5.61×10^{-12}	13289	2.87			

JULY 1966

Collection date Start	Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
June 30	July 1	0.10×10^{-12}*	509*	0.18	July 1	1400	1205.5
July 1	July 5	0.09×10^{-12}	(10)42	0.03	July 5	1400	61.2
July 5	July 6	0.04×10^{-12}	241	0	July 6	1400	148.0
July 6	July 7	0.08×10^{-12}	139	trace	July 7	1400	204.7
July 7	July 8	0.06×10^{-12}	42	trace	July 8	1400	113.2
July 8	July 11	0.05×10^{-12}	(223)669	0.21	July 11	1400	1440.0
July 11	July 12	0.01×10^{-12}**	195	0.17	July 12	1400	409.3
July 12	July 13	0.05×10^{-12}	205	trace	July 13	1400	268.1
July 13	July 14	0.06×10^{-12}	77	0.09	July 14	1400	147.4
July 14	July 15	0.03×10^{-12}	47	0.01	July 15	1400	79.2
July 15	July 18	0.05×10^{-12}	(47)141	0	July 18	1400	248.1
July 18	July 19	0.08×10^{-12}	56	0.67	July 19	1400	109.9
July 19	July 20	0.06×10^{-12}	217	0.14	July 20	1400	552.1
July 20	July 21	0.06×10^{-12}	10**	0	July 21	1400	22.6
July 21	July 22	0.01×10^{-12}**	13	0.67	July 22	1400	20.5
July 22	July 25	0.03×10^{-12}	(51)153	0.35	July 25	1400	213.8
July 25	July 26	0.03×10^{-12}	12	0	July 26	1400	29.6
July 26	July 27	NO RECORD	24	0	July 27	1400	52.3
July 27	July 28	0.06×10^{-12}	131	0.60	July 28	1400	635.2
July 28	July 29	0.02×10^{-12}	105	0.92	July 29	1400	398.3
July 29	Aug. 1	0.04×10^{-12}	(20)59	0.04	Aug. 3	1400	68.1
$\bar{x}$ "per day"		0.05×10^{-12}	102.9	0.16			
* Maximum		0.10×10^{-12}	509	0.94			
** Minimum		0.01×10^{-12}	10	0			
Total		0.97×10^{-12}	3087	5.01			

AUGUST 1966

Collection date Start	Stop	Beta activity counted 7 days after collection: Airborne (μCi/cc)	Precipitation Collector (μμCi/m²)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity (μμCi/m²)
Aug. 1	Aug. 2	0.01×10^{-12}**	238	1.29	Aug. 2	1400	1644.6
Aug. 2	Aug. 3	0.01×10^{-12}**	9	0.51	Aug. 3	1400	20.3
Aug. 3	Aug. 4	0.01×10^{-12}**	72	0.02	Aug. 4	1400	163.1
Aug. 4	Aug. 5	0.02×10^{-12}	63	0.06	Aug. 5	1400	16.5
Aug. 5	Aug. 8	0.01×10^{-12}**	(14)42	0.12	Aug. 8	1400	65.6
Aug. 8	Aug. 9	0.04×10^{-12}	236	0.42	Aug. 9	1400	51.2
Aug. 9	Aug. 10	0.05×10^{-12}*	146	0.11	Aug. 10	1400	734.4
Aug. 10	Aug. 11	0.03×10^{-12}	104	0.64	Aug. 11	1400	103.8
Aug. 11	Aug. 12	0.03×10^{-12}	433*	0.30	Aug. 12	1400	1452.8
Aug. 12	Aug. 15	0.03×10^{-12}	(62)187	0.15	Aug. 15	1400	377.9
Aug. 15	Aug. 16	0.05×10^{-12}	26	trace	Aug. 16	1400	32.6
Aug. 16	Aug. 17	0.03×10^{-12}	253	0.15	Aug. 17	1400	791.7
Aug. 17	Aug. 18	0.04×10^{-12}	80	0.18	Aug. 18	1400	162.6
Aug. 18	Aug. 19	0.04×10^{-12}	17	0.10	Aug. 19	1400	37.0
Aug. 19	Aug. 22	0.02×10^{-12}	(48)144	0	Aug. 22	1400	281.6
Aug. 22	Aug. 23	0.01×10^{-12}**	9	0.18	Aug. 23	1400	14.4
Aug. 23	Aug. 24	0.02×10^{-12}	95	0.13	Aug. 24	1400	528.3
Aug. 24	Aug. 25	0.03×10^{-12}	21	trace	Aug. 25	1400	44.9
Aug. 25	Aug. 26	0.05×10^{-12}	5**	0	Aug. 26	1400	9.7
Aug. 26	Aug. 29	0.03×10^{-12}	(11)32	trace	Aug. 29	1400	59.4
Aug. 29	Aug. 30	0.04×10^{-12}	8	0	Aug. 30	1400	17.8
Aug. 30	Aug. 31	0.03×10^{-12}	33	0.01	Aug. 31	1400	35.6
$\bar{x}$ "per day"		0.03×10^{-12}	73	0.14			
* Maximum		0.06×10^{-12}	433	1.29			
** Minimum		0.01×10^{-12}	5	0			
Total		0.64×10^{-12}	2253	4.36			

SEPTEMBER 1966

Collection date Start	Stop	Beta activity counted 7 days after collection: Airborne ($\mu Ci/cc$)	Precipitation Collector ($\mu\mu Ci/m^2$)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity ($\mu\mu Ci/m^2$)
Aug. 31	Sept. 1	0.02×10^{-12}	7	0.04	Sept. 1	1400	13.6
Sept. 1	Sept. 2	0.02×10^{-12}	26	trace	Sept. 2	1400	36.5
Sept. 2	Sept. 6	0.02×10^{-12}	(1)3	trace	Sept. 6	1400	20.2
Sept. 6	Sept. 7	0.02×10^{-12}	40	0.10	Sept. 7	1400	103.4
Sept. 7	Sept. 8	0.03×10^{-12}	39	0	Sept. 8	1400	70.0
Sept. 8	Sept. 9	0.03×10^{-12}	1	0	Sept. 9	1400	6.4
Sept. 9	Sept. 12	0.03×10^{-12}	(36)143	0.09	Sept. 12	1400	336.8
Sept. 12	Sept. 13	0.03×10^{-12}	10	0	Sept. 13	1400	9.8
Sept. 13	Sept. 14	0.03×10^{-12}	10	trace	Sept. 14	1400	20.5
Sept. 14	Sept. 15	0.02×10^{-12}	54*	0.46	Sept. 15	1400	80.1
Sept. 15	Sept. 16	0.03×10^{-12}	5	0	Sept. 16	1400	14.5
Sept. 16	Sept. 19	0.03×10^{-12}	(4)11	0.06	Sept. 19	1400	18.1
Sept. 19	Sept. 20	0.03×10^{-12}	26	0.22	Sept. 20	1400	44.5
Sept. 20	Sept. 21	0.03×10^{-12}	25	0	Sept. 21	1400	148.5
Sept. 21	Sept. 22	0.03×10^{-12}	0**	0	Sept. 22	1400	15.2
Sept. 22	Sept. 23	0.02×10^{-12}	0**	0	Sept. 23	1400	7.8
Sept. 23	Sept. 26	0.03×10^{-12}	(23)70	0	Sept. 26	1400	107.5
Sept. 26	Sept. 27	0.03×10^{-12}	13	0.06	Sept. 27	1400	88.5
Sept. 27	Sept. 28	0.02×10^{-12}	19	0	Sept. 28	1400	35.5
Sept. 28	Sept. 29	0.03×10^{-12}	19	0	Sept. 29	1400	19.2
Sept. 29	Sept. 30	0.02×10^{-12}	3	0	Sept. 30	1400	14.3
$\bar{X}$ "per day"		0.026×10^{-12}	17.5	0.035			
* Maximum		0.03×10^{-12}	54	0.46			
** Minimum		0.02×10^{-12}	0	0			
Total		0.55	524	1.06			

OCTOBER 1966

Collection date Start	Stop	Beta activity counted 7 days after collection: Airborne ($\mu Ci/cc$)	Precipitation Collector ($\mu\mu Ci/m^2$)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity ($\mu\mu Ci/m^2$)
Sept. 30	Oct. 3	0.02×10^{-12}	(2)6	0	Oct. 3	1400	29.0
Oct. 3	Oct. 4	0.03×10^{-12}	3	0	Oct. 4	1400	28.8
Oct. 4	Oct. 5	0.02×10^{-12}	1	trace	Oct. 5	1400	16.8
Oct. 5	Oct. 6	0.02×10^{-12}	5	0	Oct. 6	1400	21.3
Oct. 6	Oct. 7	0.03×10^{-12}	0**	0	Oct. 7	1400	14.5
Oct. 7	Oct. 10	0.02×10^{-12}	(3)9	0	Oct. 10	1400	19.3
Oct. 10	Oct. 11	0.07×10^{-12}*	3	0	Oct. 11	1400	25.8
Oct. 11	Oct. 12	0.03×10^{-12}	120*	0.08	Oct. 12	1400	268.3
Oct. 12	Oct. 13	0.03×10^{-12}	0	0	Oct. 13	1400	18.2
Oct. 13	Oct. 14	0.04×10^{-12}	0	0	Oct. 14	1400	18.2
Oct. 14	Oct. 17	0.01×10^{-12}**	(112)336	0.38	Oct. 17	1400	4175.5
Oct. 17	Oct. 18	0.05×10^{-12}	43	0	Oct. 18	1400	120.7
Oct. 18	Oct. 19	0.04×10^{-12}	5	0	Oct. 19	1400	72.0
Oct. 19	Oct. 20	0.04×10^{-12}	23	0	Oct. 20	1400	28.0
Oct. 20	Oct. 21	0.02×10^{-12}	5	0	Oct. 21	1400	19.2
Oct. 21	Oct. 24	0.02×10^{-12}	(2)6	0	Oct. 24	1400	19.2
Oct. 24	Oct. 25	0.03×10^{-12}	4	0	Oct. 25	1400	26.2
Oct. 25	Oct. 26	0.04×10^{-12}	3	0	Oct. 26	1400	25.6
Oct. 26	Oct. 27	0.02×10^{-12}	0	0	Oct. 27	1400	22.3
Oct. 27	Oct. 28	0.03×10^{-12}	4	0	Oct. 28	1400	31.9
Oct. 28	Oct. 31	0.03×10^{-12}	(1)3	0	Oct. 31	1400	17.8
$\bar{X}$ "per day"		0.03×10^{-12}	18.7	0.015			
* Maximum		0.07×10^{-12}	120	0.38			
** Minimum		0.01×10^{-12}	0	0			
Total		0.64×10^{-12}	579	0.47			

NOVEMBER 1966

Collection date Start	Collection date Stop	Beta activity counted 7 days after collection: Airborne ($\mu Ci/cc$)	Beta activity counted 7 days after collection: Precipitation Collector ($\mu\mu Ci/m^2$)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity ($\mu\mu Ci/m^2$)
Oct. 31	Nov. 1	0.04×10^{-12}**	6	0	Nov. 1	1400	27.6
Nov. 1	Nov. 2	0.04×10^{-12}**	16	0	Nov. 2	1400	37.2
Nov. 2	Nov. 3	0.06×10^{-12}	21	0	Nov. 3	1400	39.2
Nov. 3	Nov. 4	0.04×10^{-12}**	4	0	Nov. 4	1400	39.0
Nov. 4	Nov. 7	0.04×10^{-12}**	(2)5	trace	Nov. 7	1400	44.9
Nov. 7	Nov. 8	0.06×10^{-12}	49	0.15	Nov. 8	1400	173.1
Nov. 8	Nov. 9	0.18×10^{-12}	790*	0.33	Nov. 9	1400	1721.0
Nov. 9	Nov. 10	0.16×10^{-12}	203	0	Nov. 10	1400	329.2
Nov. 10	Nov. 11	0.17×10^{-12}	4	0	Nov. 11	1400	33.6
Nov. 11	Nov. 14	0.24×10^{-12}	(3)9	0	Nov. 14	1400	20.7
Nov. 14	Nov. 15	0.18×10^{-12}	2	0	Nov. 15	1400	15.5
Nov. 15	Nov. 16	0.13×10^{-12}	2	0	Nov. 16	1400	31.2
Nov. 16	Nov. 17	0.07×10^{-12}	11	0	Nov. 17	1400	26.8
Nov. 17	Nov. 18	0.05×10^{-12}	16	0	Nov. 18	1400	39.6
Nov. 18	Nov. 21	0.06×10^{-12}	5	trace	Nov. 21	1400	23.0
Nov. 21	Nov. 22	0.08×10^{-12}	0**	0	Nov. 22	1400	17.1
Nov. 22	Nov. 23	0.05×10^{-12}	4	0	Nov. 23	1400	16.1
Nov. 23	Nov. 28	1.00×10^{-12}*	(7)33	0	Nov. 28	1400	40.6
Nov. 28	Nov. 29	0.10×10^{-12}	6	0	Nov. 29	1400	20.7
Nov. 29	Nov. 30	0.04×10^{-12}**	3	0	Nov. 30	1400	18.3
$\bar{X}$ "per day"		0.14×10^{-12}	40.2	0.017			
* Maximum		1.00×10^{-12}	790	0.33			
** Minimum		0.04×10^{-12}	0	0			
Total		2.79×10^{-12}	1207	0.50			

DECEMBER 1966

Collection date Start	Collection date Stop	Beta activity counted 7 days after collection: Airborne ($\mu Ci/cc$)	Beta activity counted 7 days after collection: Precipitation Collector ($\mu\mu Ci/m^2$)	Precipitation (in.)	Early count - - Precipitation Collector: Date of count	Time of count	Beta activity ($\mu\mu Ci/m^2$)
Nov. 30	Dec. 1	0.04×10^{-12}	3	0	Dec. 1	1400	16.0
Dec. 1	Dec. 2	0.05×10^{-12}	2	0	Dec. 2	1400	22.2
Dec. 2	Dec. 5	0.03×10^{-12}	(3)8	0.10	Dec. 5	1400	89.3
Dec. 5	Dec. 6	0.03×10^{-12}	33	0.20	Dec. 6	1400	63.1
Dec. 6	Dec. 7	0.03×10^{-12}	110	0.51	Dec. 7	1400	834.9
Dec. 7	Dec. 8	0.03×10^{-12}	33	0	Dec. 8	1400	16.8
Dec. 8	Dec. 9	0.04×10^{-12}	9	trace	Dec. 9	1400	12.7
Dec. 9	Dec. 12	0.06×10^{-12}	(1)2	0	Dec. 12	1400	12.4
Dec. 12	Dec. 13	0.04×10^{-12}	9	0	Dec. 13	1400	11.5
Dec. 13	Dec. 14	0.04×10^{-12}	0**	0	Dec. 14	1400	8.4
Dec. 14	Dec. 15	0.09×10^{-12}	25	0	Dec. 15	1400	23.6
Dec. 15	Dec. 16	0.04×10^{-12}	13	0	Dec. 16	1400	25.9
Dec. 16	Dec. 19	0.04×10^{-12}	(2)6	0	Dec. 19	1400	13.4
Dec. 19	Dec. 20	0.04×10^{-12}	2	0	Dec. 20	1400	11.8
Dec. 20	Dec. 21	0.05×10^{-12}	2	0	Dec. 21	1400	14.5
Dec. 21	Dec. 22	0.02×10^{-12}**	0	0	Dec. 22	1400	12.4
Dec. 22	Dec. 23	0.14×10^{-12}*	63	0	Dec. 23	1400	19.1
Dec. 23	Dec. 27	0.06×10^{-12}	(70)281	0.57	Dec. 27	1400	7961.4
Dec. 27	Dec. 28	0.05×10^{-12}	176*	trace	Dec. 28	1400	147.2
Dec. 28	Dec. 29	0.03×10^{-12}	0	0	Dec. 29	1400	12.2
Dec. 29	Dec. 30	0.04×10^{-12}	46	0	Dec. 30	1400	135.3
$\bar{X}$ "per day"		0.05×10^{-12}	24.[illegible]	0.045			
* Maximum		0.14×10^{-12}	176	0.57			
** Minimum		0.02×10^{-12}	0	0			
Total		0.99×10^{-12}	760	1.40			

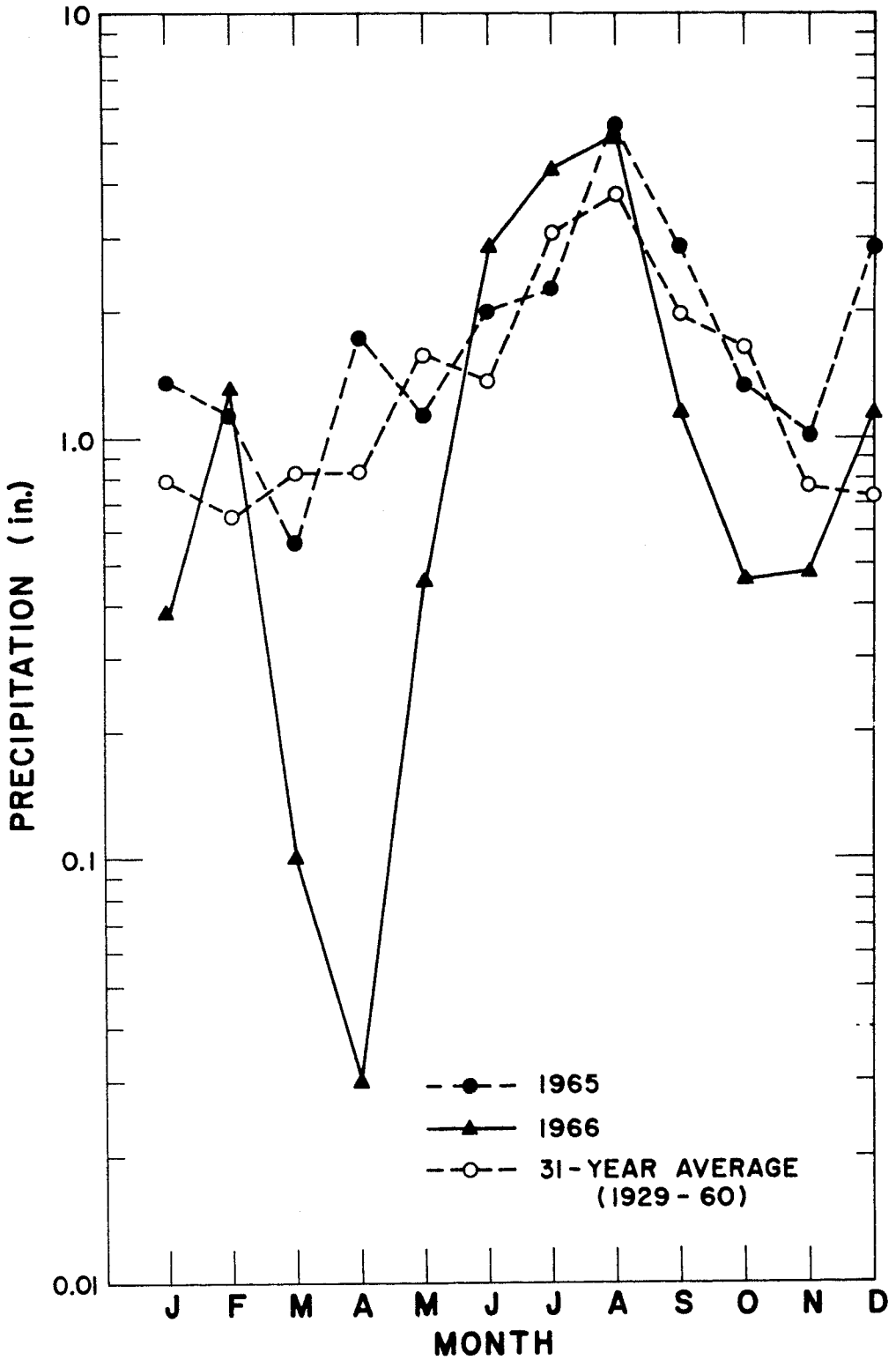

Fig. 1. Total monthly precipitation.

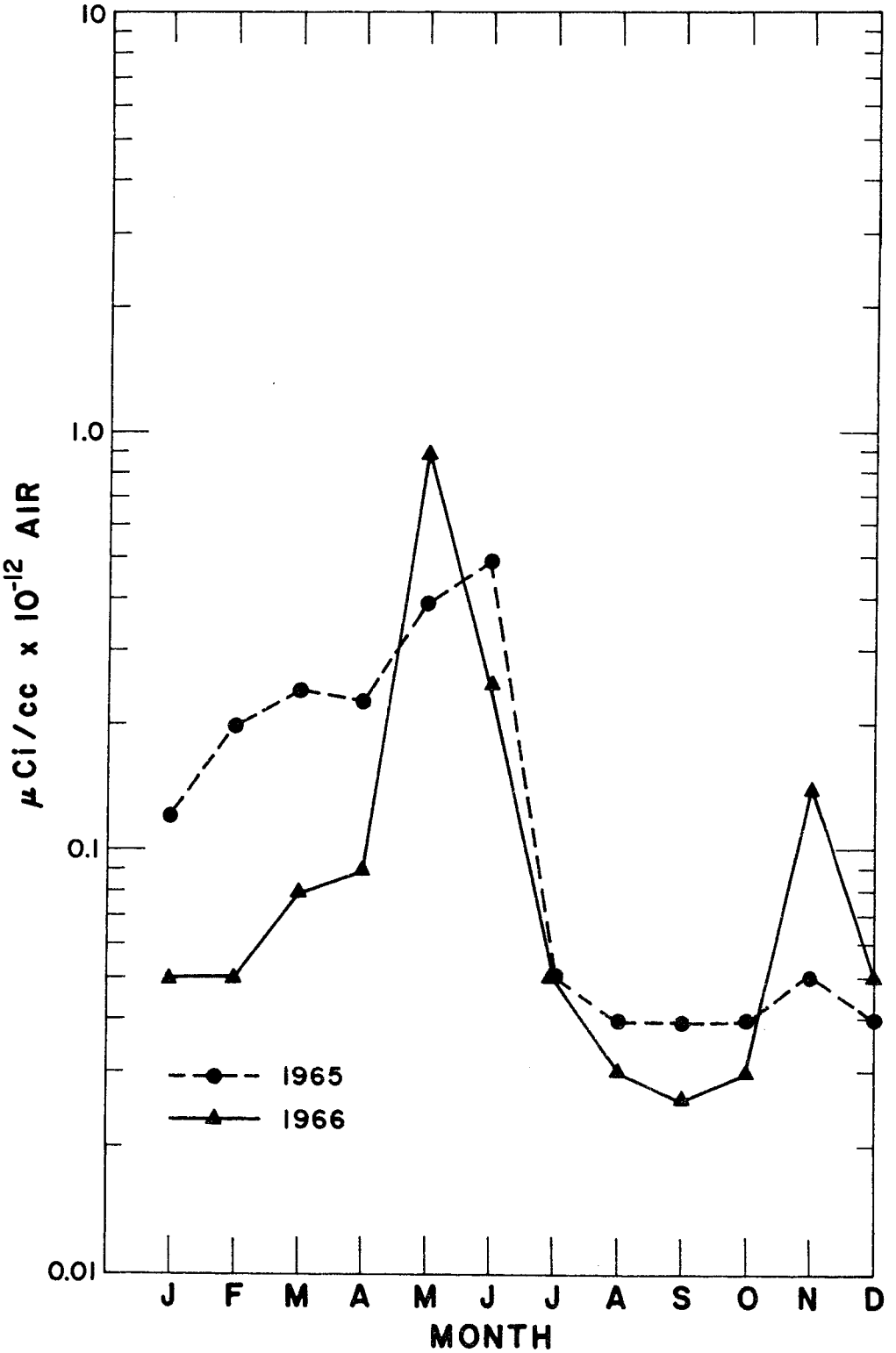

Fig. 2. Average "per day" activity found in air filter samples.

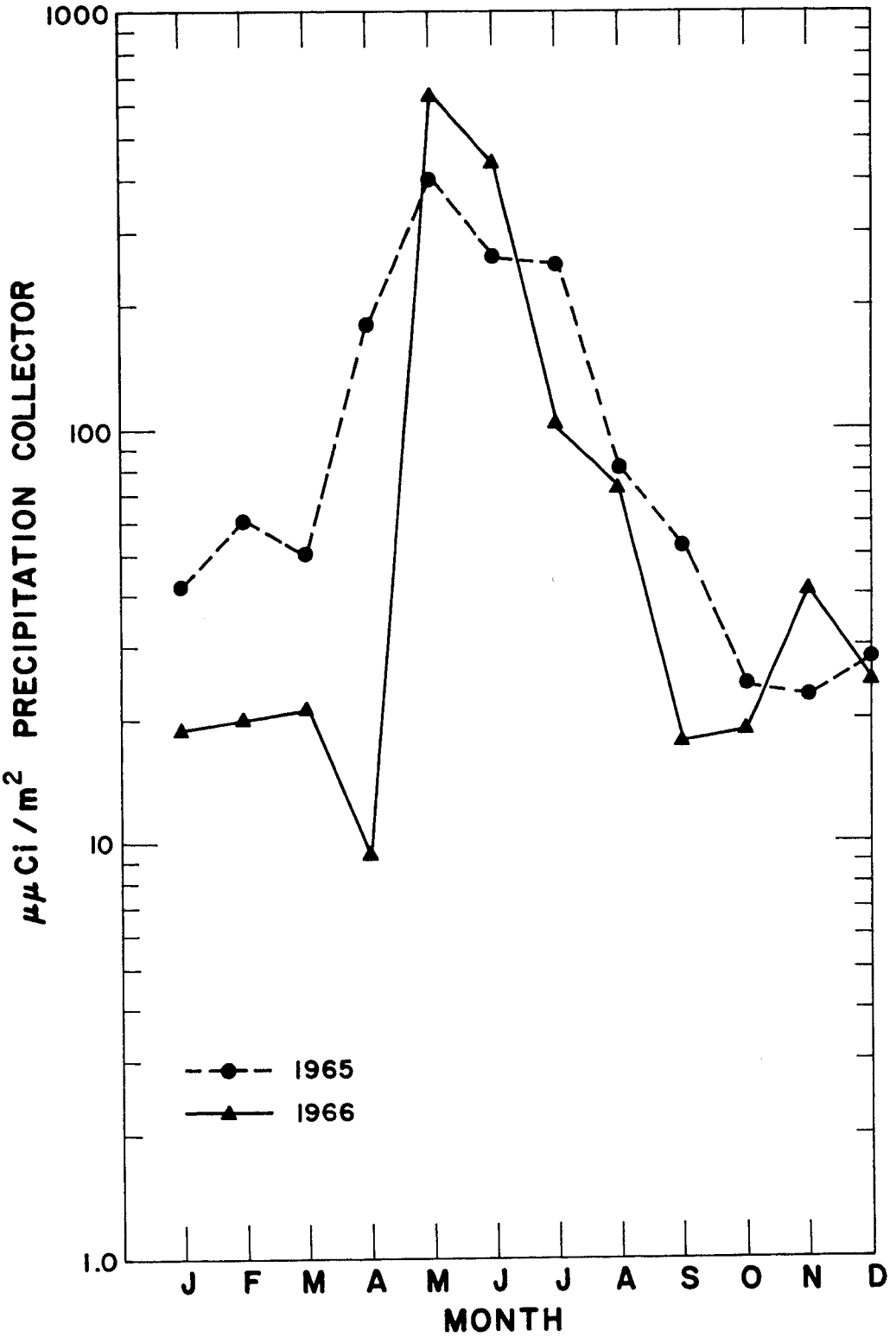

Fig. 3. Average "per day" activity found in precipitation collector samples.