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LOS ALAMOS SCIENTIFIC LABORATORY

OF THE UNIVERSITY OF CALIFORNIA ○ LOS ALAMOS NEW MEXICO

BETA-GAMMA RADIOACTIVITY IN ENVIRONMENTAL AIR AT LOS ALAMOS, NEW MEXICO, FOR 1962

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OF THE UNIVERSITY OF CALIFORNIA LOS ALAMOS NEW MEXICO

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BETA-GAMMA RADIOACTIVITY IN ENVIRONMENTAL AIR AT LOS ALAMOS, NEW MEXICO, FOR 1962

by

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ABSTRACT

The report is a continuation of work reported in the Los Alamos section of "Radioactive Fallout Data Collected from Eleven Atomic Energy Installations for 1958", LAMS-2397 (Nov., Dec. of 1958 and all of 1959), LAMS-2499 (for 1960), and LAMS-2702 (for 1961). The beta activities were not identified. However, since the measurements were made in the same manner, the values are relative to one another.

The monthly average "per day" graphs show, in general, higher trends this year than last due to continued testing. These higher values tended to obscure the usual Spring and Fall peaks.

Introduction

As a part of the environmental monitoring program at Los Alamos, the measurements of air particulate radioactivity, activity in precipitation and gamma background are made periodically. The sampling station is located on the roof of the Administration Building, SM-43. The samplers are on the highest part of the building -- a flat gravel covered surface, 65 feet above ground level.

Daily samples were collected throughout 1962. The first three quarters were about a factor of 100 higher than during the first three quarters of 1961. The fourth quarter appeared about the same as the fourth quarter of 1961. The continued atmospheric testing is felt to be the cause of the continued high level of activities found.

Gamma Background

Gamma background surveys are made daily. The readings are made at approximately 0900 when the air sampler filter is changed. The measurements are made with a G-M survey meter with the probe held 3 feet above the surface of the roof.

Beta Activity of Particulate Matter in Air

Airborne radioactive particulate matter is collected on 4-inch-diameter filters (MSA catalog number CR 17651). The sampling rate is 46 M^3/hr. Air samples are ordinarily collected for 24 hour intervals during the work week and weekend samples are collected for a 72 hour 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 over-all efficiency for Sr^{90} - Y^{90} of 44 percent. Results are reported in terms of microcuries per cubic centimeter of air.

The filters are also counted 10 minutes after removal from the sampler, but these results have not been included in this report.

Beta Activity of Particulate Matter in Rain

Collection is made in an oversized rain collector which delivers one liter of water for each 0.1 inch of precipitation. The collector has a cross section of approximately 0.4 meter.

Even during relatively dry periods it was found that this arrangement collected activity. So, by the simple expedient of washing down the sides of the collector each

time a sample is collected with about 1 liter of distilled water, and collecting the wash water, a suitable sample could be obtained. These "wash" samples as well as any precipitation samples are reduced in volume, then dry-plated on 1-inch stainless planchets. These are then counted in a counter employing an end window Geiger tube with a window thickness of 1.9 mg/cm^2. The counting efficiency was determined by comparison with a Tracerlab standard of radiolead, which emits 1.17 Mev beta particles. Results are reported in μμc per square meter at time counted.

Samples are taken daily on work days, except during periods when weekly samples were taken due to insufficient activity. The activity collected is washed with 1 liter of water for collection of the sample, usually between 0800 and 0900 on the day of collection. When precipitation occurs, the wash is added to the collected precipitation and treated the same way.

Results Reported

The results reported herein continue the measurements reported in LAMS-2397, LAMS-2499, and LAMS-2702. These results are shown in Figs. 2 and 3, and precipitation for the year is shown in Fig. 1. Table I summarizes the year's data. Average "per day" values for air collection are

weighted for sample periods of more than one day. Average "per day" values for the rain gauge collection are the total activity collected during the month divided by the number of days.

JANUARY 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
Dec. 29 (1961)	Jan. 2	<0.05	22.77×10^{-12}*	199	0	Jan. 2	1202	195.7
Jan. 2	Jan. 3	<0.05	7.29×10^{-12}	257	0	Jan. 3	1339	305.8
Jan. 3	Jan. 4	0.04	6.61×10^{-12}	123**	trace	Jan. 4	1222	174.5
Jan. 4	Jan. 5	0.05	5.74×10^{-12}	1044	trace	Jan. 5	1306	1078.6
Jan. 5	Jan. 8	0.04	11.37×10^{-12}	138	0	Jan. 8	1130	186.4
Jan. 8	Jan. 9		2.67×10^{-12}**	241	trace	Jan. 9	1317	317.9
Jan. 9	Jan. 10		4.95×10^{-12}	481	trace	Jan. 10	1213	597.3
Jan. 10	Jan. 11	0.04	6.18×10^{-12}	597	0	Jan. 11	1155	691.7
Jan. 11	Jan. 12	<0.05	6.69×10^{-12}	434	0	Jan. 12	1227	525.4
Jan. 12	Jan. 15	0.03	19.77×10^{-12}	2049	0.06	Jan. 15	1310	2350.1
Jan. 15	Jan. 16	0.03	9.89×10^{-12}	179	0	Jan. 16	1133	224.8
Jan. 16	Jan. 17	0.04	10.45×10^{-12}	168	0	Jan. 17	1123	180.2
Jan. 17	Jan. 18	0.04	12.87×10^{-12}	349	trace	Jan. 18	1133	425.2
Jan. 18	Jan. 19	0.04	8.92×10^{-12}	180	0	Jan. 19	1315	225.3
Jan. 19	Jan. 22	0.04	15.36×10^{-12}	751	0.15	Jan. 22	1226	857.3
Jan. 22	Jan. 23	0.04	3.87×10^{-12}	2692	0.03	Jan. 23	1225	3118.3
Jan. 23	Jan. 24	0.04	3.34×10^{-12}	346	trace	Jan. 24	1143	295.6
Jan. 24	Jan. 25	0.03	4.20×10^{-12}	3018	0.76	Jan. 25	1630	3703.3
Jan. 25	Jan. 26	0.04	3.90×10^{-12}	10653*	0.35	Jan. 26	1536	12181.3
Jan. 26	Jan. 29	0.03	17.97×10^{-12}	352	0	Jan. 29	1133	389.6
Jan. 29	Jan. 30	0.03	4.36×10^{-12}	391	0	Jan. 30	1146	495.1
Jan. 30	Jan. 31	0.05	4.63×10^{-12}	236	0	Jan. 31	1201	255.2
$\bar{X}$			6.25×10^{-12}	802.52	0.045			
* Maximum			22.77×10^{-12}	10653				
** Minimum			2.67×10^{-12}	123				
Total				24878	1.41			

FEBRUARY 1962

Collection Date Start	Collection Date Stop	Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection: Airborne μc/cc	Beta activity counted 7 days after collection: Rain gauge μμc/M²	Precipitation (inches)	Early count - Rain gauge: Date of count	Early count - Rain gauge: Time of count	Early count - Rain gauge: Beta activity μμc/M²
Jan. 31	Feb. 1	0.04	4.07×10^{-12}	327	0	Feb. 1	1121	366.7
Feb. 1	Feb. 2	0.04	3.36×10^{-12}	289	0	Feb. 2	1146	348.6
Feb. 2	Feb. 5	0.04	13.17×10^{-12}	131	0	Feb. 5	1122	168.8
Feb. 5	Feb. 6	0.04	7.05×10^{-12}	122	0	Feb. 6	1132	150.4
Feb. 6	Feb. 7	0.05	5.30×10^{-12}	99**	0	Feb. 7	1235	139.0
Feb. 7	Feb. 8	0.05	5.77×10^{-12}	483	0.01	Feb. 8	1145	600.6
Feb. 8	Feb. 9	0.05	1.71×10^{-12}**	549	0.04	Feb. 9	1624	584.7
Feb. 9	Feb. 12	0.04	6.12×10^{-12}	135	0	Feb. 12	1117	161.9
Feb. 12	Feb. 13	0.03	2.13×10^{-12}	1071	0.06*	Feb. 13	1213	1186.6
Feb. 13	Feb. 14	0.03	6.56×10^{-12}	684	0.01	Feb. 14	1148	903.3
Feb. 14	Feb. 15	<0.05	4.97×10^{-12}	196	0	Feb. 15	1121	214.3
Feb. 15	Feb. 16	<0.05	3.28×10^{-12}	681	0	Feb. 16	1317	878.4
Feb. 16	Feb. 19	0.04	8.56×10^{-12}	767	0	Feb. 19	1125	1077.4
Feb. 19	Feb. 20	0.04	5.45×10^{-12}	266	0	Feb. 20	1123	303.7
Feb. 20	Feb. 21	<0.05	5.87×10^{-12}	427	trace	Feb. 21	1112	483.7
Feb. 21	Feb. 23	0.05	10.12×10^{-12}	243	0	Feb. 23	1243	264.0
Feb. 23	Feb. 26		15.17×10^{-12}*	417	trace	Feb. 26	1430	404.8
Feb. 26	Feb. 27	0.03	5.02×10^{-12}	1319	0.05	Feb. 27	1410	1454.6
Feb. 27	Feb. 28	<0.05	5.67×10^{-12}	1359*	0.02	Feb. 28	1257	1530.8
$\bar{X}$			4.07×10^{-12}	341.6	0.0075			
* Maximum			15.17×10^{-12}	1359	0.06			
** Minimum			1.71×10^{-12}	99	0			
Total				9569	0.21			

MARCH 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
Feb. 28	Mar. 1	<0.05	8.03×10^{-12}	923	0	Mar. 1	1305	1061.1
Mar. 1	Mar. 2	0.03	5.42×10^{-12}	305	0	Mar. 2	1400	467.0
Mar. 2	Mar. 5	0.04	13.22×10^{-12}	313	0	Mar. 5	1313	388.9
Mar. 5	Mar. 6	0.04	4.46×10^{-12}	1089	0	Mar. 6	1135	1124.8
Mar. 6	Mar. 7	<0.05	5.29×10^{-12}	375	trace	Mar. 7	1110	763.4
Mar. 7	Mar. 8	0.04	6.14×10^{-12}	1455	0.88*	Mar. 8	1155	1799.6
Mar. 8	Mar. 9	<0.05	10.51×10^{-12}	376	0	Mar. 9	1300	396.9
Mar. 9	Mar. 12	0.03	16.40×10^{-12}*	1625	0.15	Mar. 12	--	1870.5
Mar. 12	Mar. 13	<0.03	4.97×10^{-12}	1742	0.14	Mar. 13	1545	1987.4
Mar. 13	Mar. 14	<0.03	3.23×10^{-12}	2199*	0	Mar. 14	1230	2460.1
Mar. 14	Mar. 15	<0.03	5.11×10^{-12}	366	0	Mar. 15	1059	376.6
Mar. 15	Mar. 16	<0.05	4.73×10^{-12}	480	0	Mar. 16	1144	496.4
Mar. 16	Mar. 19	0.03	16.35×10^{-12}	150	0	Mar. 19	1428	95.3
Mar. 19	Mar. 20	0.03	5.79×10^{-12}	818	trace	Mar. 20	1125	938.7
Mar. 20	Mar. 21	0.03	4.01×10^{-12}	200	trace	Mar. 21	1404	265.3
Mar. 21	Mar. 22	0.04	3.61×10^{-12}	126**	trace	Mar. 22	1030	132.9
Mar. 22	Mar. 23	<0.05	3.05×10^{-12} **	250	0	Mar. 23	1244	335.5
Mar. 23	Mar. 26	0.03	12.43×10^{-12}	807	0.04	Mar. 26	1352	955.9
Mar. 26	Mar. 27	0.04	3.10×10^{-12}	190	0	Mar. 27	1006	246.9
Mar. 27	Mar. 28	0.05	4.81×10^{-12}	142	0	Mar. 28	1319	139.3
Mar. 28	Mar. 29	0.05	5.07×10^{-12}	143	0	Mar. 29	0944	144.0
Mar. 29	Mar. 30	<0.05	5.23×10^{-12}	2007	0	Mar. 30	1300	242.1
$\bar{X}$			5.03×10^{-12}	536	0.041			
* Maximum			16.40×10^{-12}	2199	0.88			
** Minimum			3.05×10^{-12}	126	0			
Total				16081	1.24			

APRIL 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
Mar. 30	Apr. 2	0.05	15.37×10^{-12}	627	trace	Apr. 2	1030	648.7
Apr. 2	Apr. 3	0.05	6.57×10^{-12}	693	0	Apr. 3	1417	786.0
Apr. 3	Apr. 4	0.05	7.33×10^{-12}	378	0	Apr. 4	1341	430.9
Apr. 4	Apr. 5	<0.07	7.71×10^{-12}	3809	0.03	Apr. 5	0942	4132.8
Apr. 5	Apr. 6	<0.07	5.64×10^{-12}	1379	trace	Apr. 6	1241	1470.6
Apr. 6	Apr. 9	0.05	5.11×10^{-12}	1665	0.03	Apr. 9	1417	1795.1
Apr. 9	Apr. 10	0.05	5.17×10^{-12}	640	trace	Apr. 10	1132	796.1
Apr. 10	Apr. 11	0.07	12.28×10^{-12}	550	trace	Apr. 11	1313	617.4
Apr. 11	Apr. 12	<0.07	7.24×10^{-12}	277	0	Apr. 12	1025	297.3
Apr. 12	Apr. 13	<0.07	5.96×10^{-12}	150	0	Apr. 13	1340	257.6
Apr. 13	Apr. 16	0.05	12.16×10^{-12}	142	0	Apr. 16	1605	167.5
Apr. 16	Apr. 17		4.99×10^{-12}	167	0	Apr. 17	1349	347.2
Apr. 17	Apr. 18		5.43×10^{-12}	238	0	Apr. 18	1430	621.5
Apr. 18	Apr. 19		4.90×10^{-12}	280	0	Apr. 19	1155	425.6
Apr. 19	Apr. 20	<0.07	3.80×10^{-12}	126**	0	Apr. 20	1410	156.8**
Apr. 20	Apr. 23		31.05×10^{-12}*	22751*	0.14	Apr. 23	1522	25017.4*
Apr. 23	Apr. 24		6.32×10^{-12}	205	0	Apr. 24	1207	1262.6
Apr. 24	Apr. 25		4.62×10^{-12}	391	0	Apr. 25	1350	460.7
Apr. 25	Apr. 26		4.08×10^{-12}	2149	0.05	Apr. 26	1304	2342.4
Apr. 26	Apr. 27		2.31×10^{-12}**	8950	0.25*	Apr. 27	1350	10309.3
Apr. 27	Apr. 30		13.09×10^{-12}	555	0	Apr. 30	1502	632.4
$\overline{X}$			7.62×10^{-12}	2196	0.026			
* Maximum			31.05×10^{-12}	22751	0.25			
** Minimum			2.31×10^{-12}	126	0			
Total				46122	0.54			

MAY 1962

Collection Date Start	Collection Date Stop	Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection: Airborne μc/cc	Beta activity counted 7 days after collection: Rain gauge μμc/M²	Precipitation (inches)	Early count - Rain gauge: Date of count	Early count - Rain gauge: Time of count	Early count - Rain gauge: Beta activity μμc/M²
Apr. 30	May 1		7.21×10^{-12}	246	0	May 1	1143	269.3
May 1	May 2		5.62×10^{-12}	245	0	May 2	1506	301.7
May 2	May 3		6.46×10^{-12}	302	0	May 3	1216	270.1
May 3	May 4		5.34×10^{-12}	215	0	May 4	1348	282.3
May 4	May 7		14.22×10^{-12}	436	0	May 7	1605	494.6
May 7	May 8		3.56×10^{-12}	369	0	May 8	1239	399.1
May 8	May 9		3.12×10^{-12}	2274	0	May 9	1455	2544.8
May 9	May 10		3.31×10^{-12}	471	0	May 10	1331	599.4
May 10	May 11		7.44×10^{-12}	263	0	May 11	1607	302.7
May 11	May 14		19.93×10^{-12}*	201	0	May 14	1545	220.2
May 14	May 15		7.08×10^{-12}	146**	0	May 15	1314	198.9
May 15	May 16		7.28×10^{-12}	178	0	May 16	1429	205.1
May 16	May 17		6.97×10^{-12}	279	0	May 17	1138	273.0
May 17	May 18		7.40×10^{-12}	151	0	May 18	1528	171.9
May 18	May 21		18.23×10^{-12}	2209	trace	May 21	1610	2959.8
May 21	May 22		7.47×10^{-12}	722	0	May 22	1256	1874.5
May 22	May 23		1.74×10^{-12}**	240	0	May 23	1528	268.9
May 23	May 24		4.43×10^{-12}	3069*	0	May 24	1142	4981.5
May 24	May 25		4.87×10^{-12}	172	0	May 25	1354	184.9
May 25	May 28		11.47×10^{-12}	720	0	May 28	1629	859.6
May 28	May 29		4.28×10^{-12}	2031	0.02*	May 29	1218	2379.7
May 29	May 31		4.69×10^{-12}	781	0	May 31	1419	819.5
$\bar{X}$			5.23×10^{-12}	507.1	0.001			
* Maximum			19.93×10^{-12}	3069	0.02			
** Minimum			1.74×10^{-12}	146	0			
Total				15720	0.03			

JUNE 1962

Collection Date Start	Collection Date Stop	Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection: Airborne μc/cc	Beta activity counted 7 days after collection: Rain gauge μμc/M²	Precipitation (inches)	Early count - Rain gauge: Date of count	Early count - Rain gauge: Time of count	Early count - Rain gauge: Beta activity μμc/M²
May 31	June 1		2.79×10^{-12}	2087	trace	June 1	1415	1931.6
June 1	June 4		5.51×10^{-12}	8317*	0.28*	June 4	1510	928.9
June 4	June 5		3.04×10^{-12}	351	0	June 5	1125	359.3
June 5	June 6		3.34×10^{-12}	137	0	June 6	1408	166.9
June 6	June 7		3.94×10^{-12}	191	0	June 7	1328	198.5
June 7	June 8		4.05×10^{-12}	310	0	June 8	1320	111.6
June 8	June 11		9.75×10^{-12}	710	0	June 11	1504	778.4
June 11	June 12		2.32×10^{-12}	423	0	June 12	1419	460.4
June 12	June 13		2.42×10^{-12}	720	0	June 13	1422	848.5
June 13	June 14		2.44×10^{-12}	236	0	June 14	1142	275.4
June 14	June 15		1.82×10^{-12}**	113**	0	June 15	1370	107.5
June 15	June 18		19.27×10^{-12}*	483	0	June 18	1510	590.0
June 18	June 19		6.83×10^{-12}	418	0	June 19	1203	559.7
June 19	June 20	0.03	3.32×10^{-12}	767	0	June 20	1342	966.1
June 20	June 21	0.03	4.67×10^{-12}	341	trace	June 21	1145	411.2
June 21	June 22	0.04	2.84×10^{-12}	310	0	June 22	1400	307.8
June 22	June 25	0.04	6.96×10^{-12}	2417	trace	June 25	1605	3265.7
June 25	June 26	0.04	2.07×10^{-12}	829	trace	June 26	1139	1131.5
June 26	June 27	0.03	2.46×10^{-12}	6654	0.02	June 27	1640	7742.6
June 27	June 28	0.04	1.85×10^{-12}	1056	trace	June 28	1144	1417.0
June 28	June 29	0.04	2.72×10^{-12}	6654	0	June 29	1349	8861.0
$\bar{X}$			4.47×10^{-12}	1118	0.012			
* Maximum			19.27×10^{-12}	8317	0.28			
** Minimum			1.82×10^{-12}	113	0			
Total				33524	0.35			

JULY 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
June 29	July 2	0.05	8.57×10^{-12}	4362	0.09	July 3	1032	5507.5
July 2	July 3	0.03	1.39×10^{-12}	12226	trace	July 3	1554	16712.5
July 3	July 5	0.04	2.96×10^{-12}	20775	0.20	July 5	1437	25499.6
July 5	July 6	0.04	$.93 \times 10^{-12}$	10527	0.30	July 6	1531	13267.9
July 6	July 9	0.04	3.32×10^{-12}	11971	0.28	July 9	1450	15372.5
July 9	July 10	0.04	$.91 \times 10^{-12}$	26247	1.08*	July 10	1430	33761.8
July 10	July 11	0.05	1.97×10^{-12}	2522	0	July 11	1320	3010.0
July 11	July 12	0.04	1.48×10^{-12}	1421	0	July 12	1228	1844.5
July 12	July 13	0.04	$.94 \times 10^{-12}$	5499	trace	July 13	1500	8705.3
July 13	July 16	0.04	12.56×10^{-12}*	2820	0	July 16	1413	3417.3
July 16	July 17	0.04	3.43×10^{-12}	20976*	0.26	July 17	1512	28210.5
July 17	July 18	0.04	2.24×10^{-12}	6653	0.07	July 18	1344	13025.5
July 18	July 19	0.03	2.35×10^{-12}	5905	0.16	July 19	1333	8148.7
July 19	July 20	0.03	1.88×10^{-12}	4321	0.07	July 20	1410	5555.2
July 20	July 23	0.03	4.72×10^{-12}	3367	0.05	July 23	1345	3923.0
July 23	July 24	0.04	1.06×10^{-12}	1192**	0.03	July 24	1255	1617.8
July 24	July 25	0.04	1.07×10^{-12}	2742	0.47	July 25	1455	7047.6
July 25	July 26	0.03	1.49×10^{-12}	6804	0.50	July 26	1243	8100.1
July 26	July 27	0.05	1.61×10^{-12}	8522	0.07	July 27	1357	11580.0
July 27	July 30	0.05	3.96×10^{-12}	10558	0.86	July 30	1408	12886.4
July 30	July 31	0.05	$.89 \times 10^{-12}$**	5618	0.36	July 31	1418	6922.4
$\bar{X}$			2.84×10^{-12}	5646	0.16			
* Maximum			12.56×10^{-12}	20976	1.08			
** Minimum			$.89 \times 10^{-12}$	1192	0			
Total				175028	4.87			

AUGUST 1962

Collection Date Start	Collection Date Stop	Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection: Airborne μc/cc	Beta activity counted 7 days after collection: Rain gauge μμc/M²	Precipitation (inches)	Early count - Rain gauge: Date of count	Early count - Rain gauge: Time of count	Early count - Rain gauge: Beta activity μμc/M²
July 31	Aug. 1	<0.05	1.62×10^{-12}	2013	trace	Aug. 1	1402	2050.3
Aug. 1	Aug. 2	0.05	1.26×10^{-12}	1007	trace	Aug. 2	1407	2820.7
Aug. 2	Aug. 3	0.04	1.62×10^{-12}	3897	0.07	Aug. 3	1400	11867.0
Aug. 3	Aug. 6	<0.05	1.49×10^{-12}	1134	0	Aug. 6	1436	5637.25
Aug. 6	Aug. 7	<0.05	1.44×10^{-12}	448	0	Aug. 7	1400	1340.50
Aug. 7	Aug. 8	<0.05	1.64×10^{-12}	388	0	Aug. 8	1420	1134.00
Aug. 8	Aug. 9	<0.05	1.32×10^{-12}	1272	0	Aug. 9	1308	4165.00
Aug. 9	Aug. 10	<0.05	1.80×10^{-12}	797	0	Aug. 10	1340	2278.00
Aug. 10	Aug. 13	0.04	1.20×10^{-12}	5937*	0.24	Aug. 13	1535	18384.50
Aug. 13	Aug. 14	0.03	$.80 \times 10^{-12}$**	3343	0.02	Aug. 14	1340	10833.50
Aug. 14	Aug. 15	0.04	1.01×10^{-12}	392	0	Aug. 15	1446	1459.50
Aug. 15	Aug. 16	0.04	1.06×10^{-12}	879	0	Aug. 17	0819	2212.00
Aug. 16	Aug. 17	0.04	1.39×10^{-12}	1448	trace	Aug. 17	1454	4019.75
Aug. 17	Aug. 20	0.04	$.81 \times 10^{-12}$	5204	0.55*	Aug. 20	0904	14818.75
Aug. 20	Aug. 21	0.04	$.89 \times 10^{-12}$	1806.9	0.19	Aug. 21	1515	5315.25
Aug. 21	Aug. 22	0.03	$.84 \times 10^{-12}$	2436.1	0.02	Aug. 22	1336	7072.75
Aug. 22	Aug. 23	0.04	1.00×10^{-12}	897.6	0	Aug. 23	1235	2833.50
Aug. 23	Aug. 24	0.04	1.58×10^{-12}	809	0	Aug. 24	1503	2377.75
Aug. 24	Aug. 27	0.03	1.75×10^{-12}	612	0	Aug. 27	1514	1806.50
Aug. 27	Aug. 28	0.04	2.21×10^{-12}	551	0	Aug. 28	1345	1868.75
Aug. 28	Aug. 29	0.04	1.28×10^{-12}	367**	0	Aug. 29	1321	1068.00
Aug. 29	Aug. 30	0.04	2.47×10^{-12}	430	0	Aug. 30	1206	1277.00
Aug. 30	Aug. 31	0.04	3.94×10^{-12}*	884	trace	Aug. 31	1400	2688.25
$\bar{X}$			1.50×10^{-12}	1607	0.047			
* Maximum			3.94×10^{-12}	5937	0.55			
** Minimum			$.80 \times 10^{-12}$	367	0			
Total				36953	1.09			

SEPTEMBER 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
Aug. 31	Sept. 4	0.04	7.95×10^{-12}	5329*	trace	Sept. 4	1612	7446.5
Sept. 4	Sept. 5	0.04	1.99×10^{-12}	607	0.52*	Sept. 5	1335	723.2
Sept. 5	Sept. 6	0.04	1.54×10^{-12}	4919	trace	Sept. 6	1625	5674.3
Sept. 6	Sept. 7	0.04	1.90×10^{-12}	2562	0.11	Sept. 7	1552	4370.2
Sept. 7	Sept. 10	0.04	10.40×10^{-12} *	5252	0.38	Sept. 10	1552	7364.3
Sept. 10	Sept. 11	0.03	5.82×10^{-12}	582	0	Sept. 11	1155	858.7
Sept. 11	Sept. 12	0.04	2.42×10^{-12}	546	0	Sept. 12	1337	880.1
Sept. 12	Sept. 13	0.04	1.42×10^{-12}	312	0	Sept. 13	1335	503.4
Sept. 13	Sept. 14	0.04	$.88 \times 10^{-12}$	541	0.10	Sept. 14	1251	703.8
Sept. 14	Sept. 17	0.04	1.65×10^{-12}	1821	0.42	Sept. 17	1621	2926.3
Sept. 17	Sept. 18	0.04	$.61 \times 10^{-12}$	1090	0.05	Sept. 18	1307	1420.0
Sept. 18	Sept. 19	0.05	$.61 \times 10^{-12}$	863	0.05	Sept. 19	1349	1220.6
Sept. 19	Sept. 20	0.04	$.67 \times 10^{-12}$	308**	0.02	Sept. 20	1315	579.4
Sept. 20	Sept. 21	0.04	2.45×10^{-12}	759	0.29	Sept. 21	1259	1236.8
Sept. 21	Sept. 24	0.04	1.96×10^{-12}	812	0.35	Sept. 24	1518	994.4
Sept. 24	Sept. 25	0.04	$.66 \times 10^{-12}$	834	0.43	Sept. 25	1612	980.9
Sept. 25	Sept. 26	0.04	1.38×10^{-12}	551	0.06	Sept. 26	1335	618.1
Sept. 26	Sept. 27	0.05	$.95 \times 10^{-12}$	532	trace	Sept. 27	1324	410.2
Sept. 27	Sept. 28	0.04	$.37 \times 10^{-12}$ **	416	0.01	Sept. 28	1321	473.8
Sept. 28	Oct. 1	0.04	6.26×10^{-12}	636	0.03	Oct. 1	1348	822.2
$\bar{X}$			2.59×10^{-12}	975	0.10			
* Maximum			10.40×10^{-12}	5329	0.52			
** Minimum			$.37 \times 10^{-12}$	308	0			
Total				29236	2.85			

OCTOBER 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
Oct. 1	Oct. 2	0.05	4.15×10^{-12}	329	0	Oct. 2	1613	729.8
Oct. 2	Oct. 3	0.04	5.30×10^{-12}	255	0	Oct. 3	1324	567.2
Oct. 3	Oct. 4	0.03	2.92×10^{-12}	251	0	Oct. 4	1317	740.2
Oct. 4	Oct. 5	0.04	$.99 \times 10^{-12}$ **	547	0.16	Oct. 5	1537	663.0
Oct. 5	Oct. 8	0.03	8.87×10^{-12}	836	0	Oct. 8	1318	1015.2
Oct. 8	Oct. 9	0.04	11.10×10^{-12} *	270	0	Oct. 9	1602	356.1
Oct. 9	Oct. 10	0.05	7.35×10^{-12}	461	0	Oct. 10	1326	549.3
Oct. 10	Oct. 11	0.04	4.03×10^{-12}	253	0	Oct. 11	1258	318.3
Oct. 11	Oct. 12	0.04	3.68×10^{-12}	606	0	Oct. 12	1302	721.8
Oct. 12	Oct. 15	0.04	2.40×10^{-12}	2482	0	Oct. 15	1325	4389.7
Oct. 15	Oct. 16	0.04	2.66×10^{-12}	8684*	0.02	Oct. 16	1348	16770.7
Oct. 16	Oct. 17	0.05	3.29×10^{-12}	2213	0.11	Oct. 17	1418	3567.9
Oct. 17	Oct. 18	0.04	2.57×10^{-12}	1603	0.04	Oct. 18	1207	2436.0
Oct. 18	Oct. 19	0.05	1.05×10^{-12}	6045	0.45*	Oct. 19	1400	9436.7
Oct. 19	Oct. 22	0.03	5.68×10^{-12}	1012	0	Oct. 22	1450	1331.6
Oct. 22	Oct. 23	0.04	3.53×10^{-12}	995	0	Oct. 23	1154	2657.8
Oct. 23	Oct. 24		3.79×10^{-12}	270	0	Oct. 24	1423	411.0
Oct. 24	Oct. 25	0.04	6.29×10^{-12}	169**	0	Oct. 25	1227	313.3
Oct. 25	Oct. 26		5.46×10^{-12}	422	0	Oct. 26	1508	601.7
Oct. 26	Oct. 29	0.05	6.62×10^{-12}	305	0	Oct. 29	1706	520.6
Oct. 29	Oct. 30	0.04	6.55×10^{-12}	446	0	Oct. 30	1205	734.9
Oct. 30	Oct. 31	0.04	3.92×10^{-12}	207	0	Oct. 31	1440	316.1
$\bar{X}$			3.30×10^{-12}	925	0.025			
* Maximum			11.10×10^{-12}	8684	0.45			
** Minimum			$.99 \times 10^{-12}$	169	0			
Total				28661	0.78			

NOVEMBER 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
Oct. 31	Nov. 1	0.04	2.67×10^{-12}	193	0	Nov. 1	1334	354.1
Nov. 1	Nov. 2	0.04	2.76×10^{-12}	354	0	Nov. 2	1405	521.2
Nov. 2	Nov. 5	0.05	2.66×10^{-12}	240	0	Nov. 5	1614	126.0
Nov. 5	Nov. 6	0.03	4.15×10^{-12}	97**	0	Nov. 6	1410	134.9
Nov. 6	Nov. 7	0.04	11.97×10^{-12}	398	0	Nov. 7	1439	849.6
Nov. 7	Nov. 8	0.04	15.81×10^{-12}	169	0	Nov. 8	1151	332.7
Nov. 8	Nov. 9	0.05	8.25×10^{-12}	156	0	Nov. 9	1308	184.3
Nov. 9	Nov. 12	0.05	18.66×10^{-12}*	1819	0	Nov. 12	1430	3266.9
Nov. 12	Nov. 13	0.06	12.83×10^{-12}	475	0	Nov. 13	1246	735.9
Nov. 13	Nov. 14	0.05	10.02×10^{-12}	178	0	Nov. 14	1421	314.6
Nov. 14	Nov. 15	0.04	4.34×10^{-12}	1071	0.24	Nov. 15	1400	1361.3
Nov. 15	Nov. 16	0.04	1.62×10^{-12}**	494	0.01	Nov. 16	1340	590.4
Nov. 16	Nov. 19	0.05	4.34×10^{-12}	5996	0.51*	Nov. 19	1448	7765.0
Nov. 19	Nov. 20	0.04	5.31×10^{-12}	8103*	0	Nov. 20	1503	10752.5
Nov. 20	Nov. 21	0.04	1.75×10^{-12}	593	0	Nov. 21	1318	806.6
Nov. 21	Nov. 26	0.05	5.98×10^{-12}	5667	0.11	Nov. 26	1442	7503.4
Nov. 26	Nov. 27	0.05	5.85×10^{-12}	1004	0	Nov. 27	1305	1298.4
Nov. 27	Nov. 28	0.05	5.72×10^{-12}	1476	0	Nov. 28	1348	1809.1
Nov. 28	Nov. 29	0.05	5.41×10^{-12}	1063	0	Nov. 29	1413	1418.4
Nov. 29	Nov. 30	0.05	5.63×10^{-12}	4633	0.22	Nov. 30	1504	6014.1
$\bar{X}$			6.78×10^{-12}	1139	0.036			
* Maximum			18.66×10^{-12}	8103	0.51			
** Minimum			1.62×10^{-12}	97	0			
Total				34179	1.09			

DECEMBER 1962

Collection Date		Gamma mr/hr 3 ft above roof	Beta activity counted 7 days after collection		Precipitation (inches)	Early count - Rain gauge		
Start	Stop		Airborne μc/cc	Rain gauge μμc/M²		Date of count	Time of count	Beta activity μμc/M²
Nov. 30	Dec. 3	0.04	1.48×10^{-12}**	6903	0.11	Dec. 3	1528	8483.3
Dec. 3	Dec. 4	0.06	4.30×10^{-12}	602	0	Dec. 4	1130	822.0
Dec. 4	Dec. 5	0.04	4.92×10^{-12}	426	0	Dec. 5	1326	553.9
Dec. 5	Dec. 6	0.04	5.35×10^{-12}	368	0	Dec. 6	1207	969.7
Dec. 6	Dec. 7	0.05	3.40×10^{-12}	89	0	Dec. 10	0857	119.2
Dec. 7	Dec. 10	0.04	4.66×10^{-12}	297	0	Dec. 10	1347	360.0
Dec. 10	Dec. 11	0.05	4.91×10^{-12}	320	0	Dec. 11	1231	382.0
Dec. 11	Dec. 12	0.04	3.90×10^{-12}	150	0	Dec. 12	1351	195.0
Dec. 12	Dec. 13	0.05	3.67×10^{-12}	166	0	Dec. 13	1144	235.7
Dec. 13	Dec. 14	0.04	3.15×10^{-12}	70**	0	Dec. 14	1318	93.1
Dec. 14	Dec. 17	0.04	3.78×10^{-12}	175	0	Dec. 17	1340	232.0
Dec. 17	Dec. 18	0.05	5.02×10^{-12}	1801	0.12	Dec. 18	1349	2265.3
Dec. 18	Dec. 19	0.04	3.44×10^{-12}	1864	0.07	Dec. 19	1308	2211.6
Dec. 19	Dec. 20	0.05	11.16×10^{-12}	452	0	Dec. 20	1154	599.2
Dec. 20	Dec. 21	0.04	5.65×10^{-12}	286	trace	Dec. 21	1442	304.2
Dec. 21	Dec. 26	0.06	5.69×10^{-12}	13861*	0.6	Dec. 26	1451	16014.1
Dec. 26	Dec. 27	0.04	15.53×10^{-12}*	1574	0	Dec. 27	1338	2343.5
Dec. 27	Dec. 28	0.05	14.24×10^{-12}	1073	0	Dec. 28	1416	1296.1
Dec. 28	Dec. 31	0.04	9.38×10^{-12}	730	0	Dec. 31	1405	786.0
$\bar{X}$			5.98×10^{-12}	1007	0.03			
* Maximum			15.53×10^{-12}	13861	0.6			
** Minimum			1.48×10^{-12}	70	0			
Total				31207	0.90			

TABLE I

SUMMARY 1962

Precipitation		15.48 in.
Air Samples	$\overline{X}$/sample	4.47×10^{-12} μc/cc
4-20/4-23	Maximum	31.05×10^{-12} "
9-26/9-28	Minimum	0.37×10^{-12} "
Water Samples	Total	481,158 μμc/M^2
	$\overline{X}$/day	1,318 "
7-16/7-17	Maximum	20,976 "
12-13/12-14	Minimum	70 "

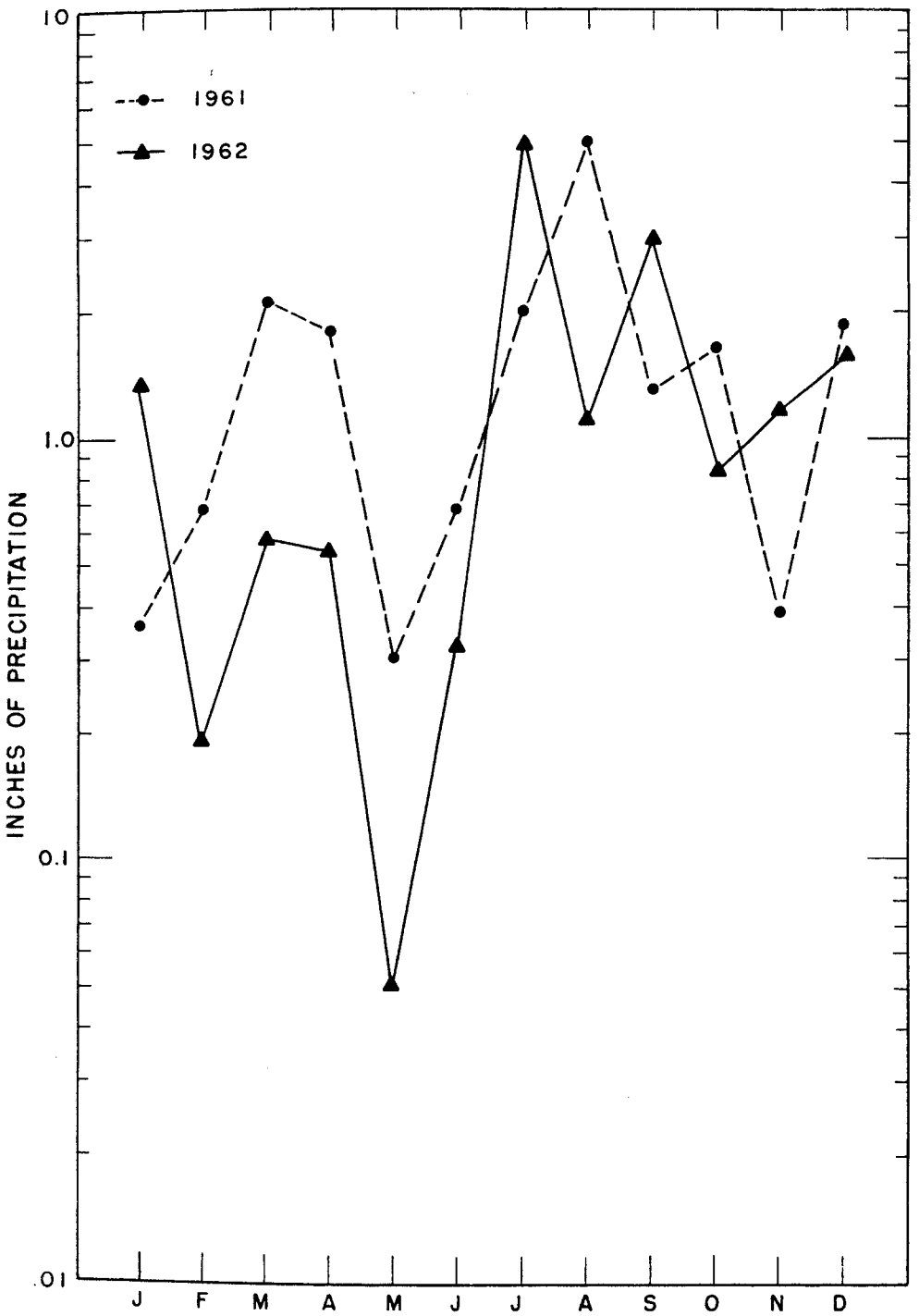

Figure 1

Total Monthly Precipitation

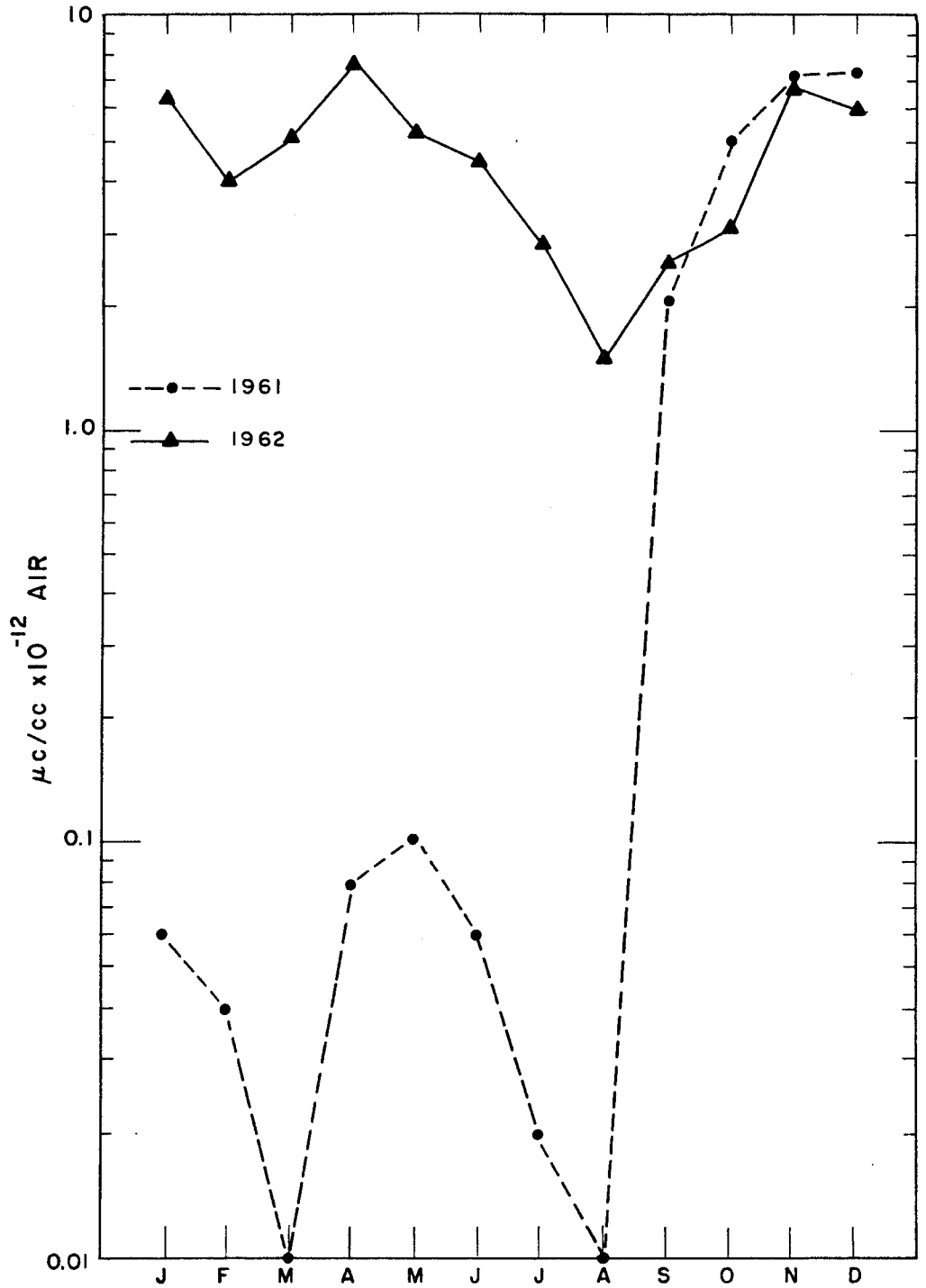

Figure 2

Average "Per Day" Activity Found in Air Filter Samples

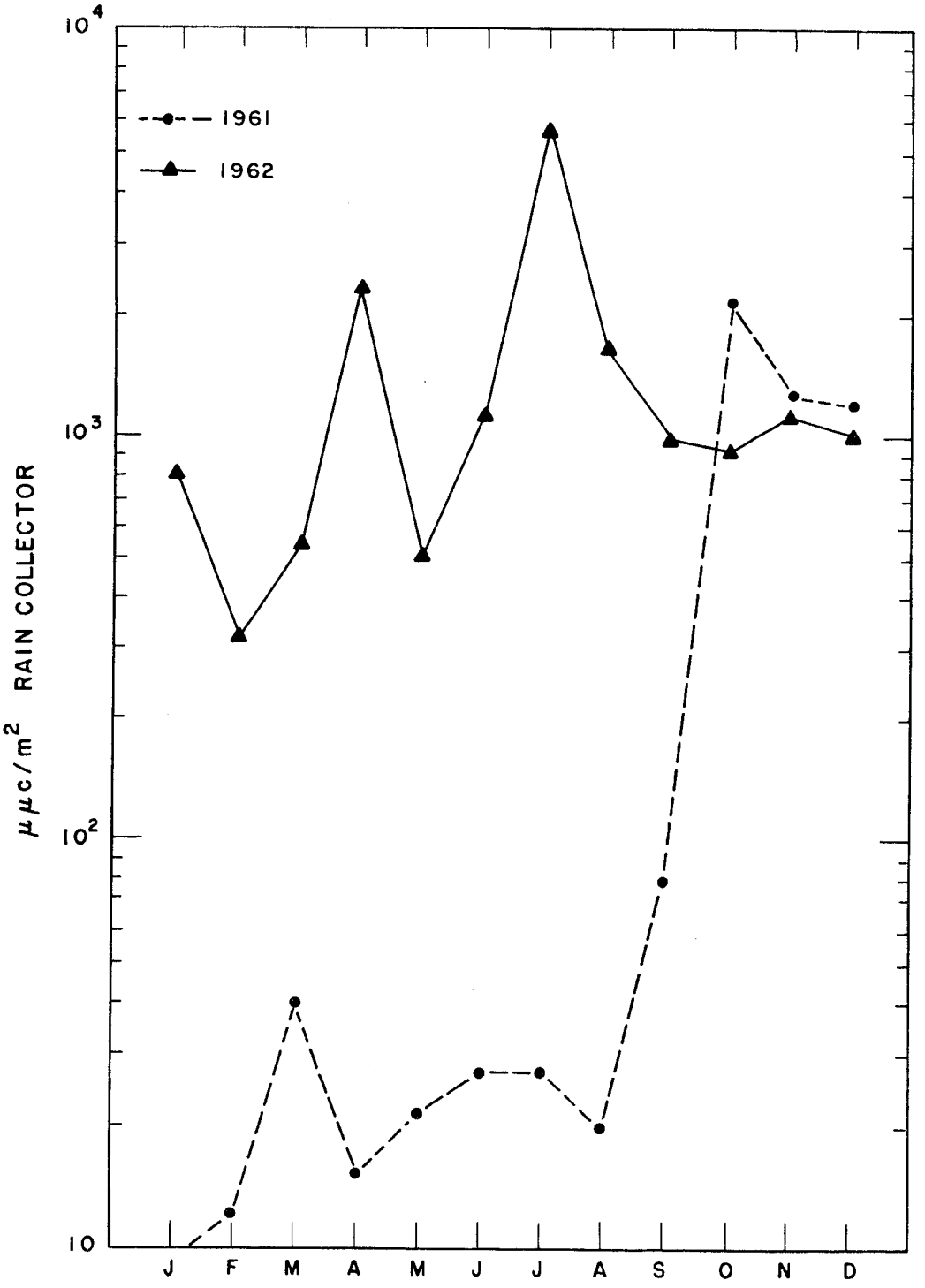

Figure 3

Average "Per Day" Activities Found in Rain Collector Samples