health and safety laboratory

STRONTIUM PROGRAM

QUARTERLY SUMMARY REPORT

November 19, 1958

UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

HASL-51

HEALTH AND SAFETY LABORATORY

STRONTIUM PROGRAM

Quarterly Summary Report

Prepared by

Edward P. Hardy, Jr.
and
Stanley Klein
Analytical Branch

November 19, 1958

UNITED STATES ATOMIC ENERGY COMMISSION
New York Operations Office

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Abstract

This report up-dates certain sections of HASL-42, "Environmental Contamination from Weapon Tests". In particular, the levels of Strontium-90 in fallout, milk, tap water, air, and soil are included for data available up to November 1, 1958.

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Introduction

Quarterly summary reports are prepared by the Health and Safety Laboratory (HASL) with the objective of presenting a current picture of the Strontium Program. With these reports, it is hoped that investigators actively interested in the program will be better able to relate their own work to that of others. Thus we urge other investigators to send recent results of their work to the Health and Safety Laboratory for publication in succeeding summaries. No attempt is made to interpret the data in these reports.

This report also up-dates HASL-42, "Environmental Contamination from Weapon Tests", in particular Part 1 - "Fallout Monitoring and Documentation".

The data presented herein are routinely reported by the Analytical Branch of the Health and Safety Laboratory and four contractor laboratories - Nuclear Science and Engineering Corporation, Isotopes, Incorporated, Radiochemistry, Incorporated, and Tracerlab, Incorporated. In this issue U. S. Naval Research Laboratory data also appears. Omission of one phase of the program in a given quarterly period indicates that insufficient information has accrued to justify its inclusion in a given issue.

Please note that data presented in these summaries are subject to revision and that changes in format may occur because of the dynamic nature of the program.

Fallout Monitoring and Documentation

1. Deposition

The two important features of deposition are the total accumulated fallout and the fallout rate. The measurement of fallout rate requires collection over relatively short periods, usually on the order of one month, and radiochemical measurement for Sr^{90}. The stainless steel open vessel or pot, when exposed continuously, collects both dry fallout and material carried down by precipitation. The material carried down by individual rainfalls is also monitored to obtain meteorological information as to the probable atmospheric source of fallout. Such short term collections may also be analyzed for shorter-lived isotopes to estimate the approximate age of the radioactive debris.

The radiochemical analysis of soils allows direct measurement of fallout accumulated since the start of testing.

1.1 Pot Fallout Collections for Radiostrontium

1.11 New York City

The New York City collection pot (exposed surface 0.82 ft^2) is maintained on the roof of the Health and Safety Laboratory building. The following are the conditions of collection and analysis:

1. Samples were collected weekly from February 1954 through December 1956.
2. Since January 1957, samples have been collected monthly.
3. Duplicate pots have been exposed since July 1956.
4. Samples have been collected at the end of a calendar period regardless of whether this coincided with the end of a period during which precipitation occurred.

Recent results of New York City fallout, not appearing in HASL-42, "Environmental Contamination from Weapon Tests" are summarized in Table 1. The cumulative data are graphically illustrated in Figure 1.

Normally the error term represents the maximum standard error of counting but when more than two samples are analyzed for the same period, the standard error of the mean is shown and used to compute the cumulative error term.

TABLE 1

STRONTIUM 90 IN NEW YORK CITY FALLOUT

(Monthly Pot Collections)

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90}*	Precipitation (inches)
2-1-54	12-31-57	---	39.27 ± 0.75	--	--
1958					
	January	1.20 ± 0.05 1.37 ± 0.05	40.52 ± 0.75	21 17	4.58
	February	1.23 ± 0.07	41.75 ± 0.75	13	5.09
	March	0.94 ± 0.07 0.84 ± 0.07	42.64 ± 0.75	16 18	4.96
	April	1.52 ± 0.42(1)	44.17 ± 0.86	10.5 ± 6(2)	6.22
	May	2.70 ± 0.07 2.57 ± 0.06	46.80 ± 0.86	11 10	
	June	1.84 ± 0.06 1.67 ± 0.05	48.55 ± 0.86	11 12	
	July	1.58 ± 0.29(3)	50.13 ± 0.91	28 ± 5(4)	
	August	0.60 ± 0.05(1)	50.73 ± 0.91	38 ± 7(5)	
	September				
	October				
	November				
	December				

* At midpoint of collection period.

(1) The mean and standard error of four analyses.

(2) See Footnote 1. Only two of four samples were analyzed for Sr^{89}. Therefore this term represents an average ratio and standard deviation of two Sr^{89}/Sr^{90} ratios.

(3) The mean and standard error of three analyses.

(4) Represents an average ratio and standard deviation of three Sr^{89}/Sr^{90} ratios.

(5) Represents an average ratio and standard deviation of four Sr^{89}/Sr^{90} ratios.

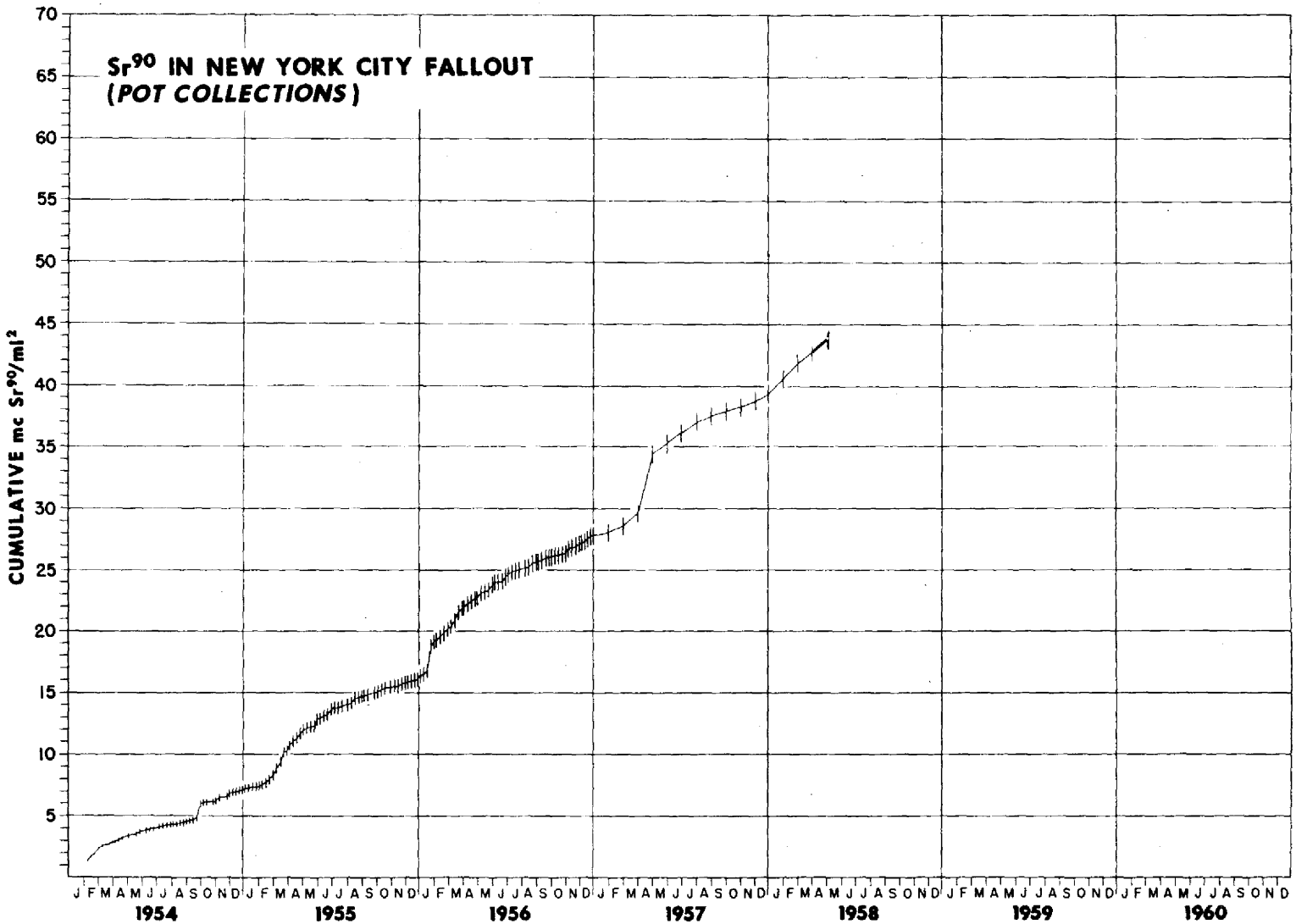

Sr90 IN NEW YORK CITY FALLOUT
(POT COLLECTIONS)
CUMULATIVE mc Sr90/mi2
70
65
60
55
50
45
40
35
30
25
20
15
10
5
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956
1957
1958
1959
1960

FIGURE 1

1.12 Other Continental United States Sites

Monthly fallout collectors are maintained at other sites within the continental United States. Exposed surfaces of the collectors are 0.82 ft^2 except at Lemont, Illinois (0.75 ft^2) and Richmond, California (4.91 ft^2).

Table 2 up-dates data for monthly collections appearing in HASL-42, "Environmental Contamination from Weapon Tests".

The Sr^{89}/Sr^{90} ratios have been extrapolated to the midpoint of the collection period.

Explanation of Error Terms in Table 2

(1) The error term in the column "mc Sr^{90}/mi^2" is the standard error of counting.

(2) The "average mc Sr^{90}/mi^2" column is computed from either the standard error of duplicate analyses or the standard error of counting, whichever is greater. This column appears only when duplicate collections are made at a site.

(3) The larger error term (or always the counting error where only one analysis has been made) is then used to compute the cumulative error.

TABLE 2

Sr^{90} IN FALLOUT AT OTHER UNITED STATES MONITORING SITES

(Monthly Pot Collections)

Alabama, Birmingham

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957				
April to November	---	5.05 ± 0.12	--	--
December	0.40 ± 0.02	5.45 ± 0.12	18	4.01
1958				
January	0.66 ± 0.03	6.11 ± 0.12	17	
February	0.24 ± 0.01	6.35 ± 0.13	12	
March	0.38 ± 0.02	6.73 ± 0.13	16	
April	1.67 ± 0.00	8.40 ± 0.13	14	
May	1.17 ± 0.05	9.56 ± 0.14	15	
June	0.65 ± 0.04	10.21 ± 0.14	29	
July				
August				
September				
October				
November				
December				

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

California, Richmond

	Collection Period	mc Sr^{90}/mi^2	Average mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1958						
	March 20 to April 3	4.47 ± 0.07 3.00 ± 0.05	3.74 ± 1.04	3.74 ± 1.04	20 25	6.64
	April 3 to April 30	0.38 ± 0.01 0.36 ± 0.01	0.37 ± 0.01	4.11 ± 1.04	16 11	2.57
	May	0.33 ± 0.01 0.42 ± 0.01	0.37 ± 0.06	4.48 ± 1.04	20 16	0.80
	June	0.21 ± 0.00 0.12 ± 0.00	0.17 ± 0.06	4.65 ± 1.05	6 12	0.47
	July					
	August					
	September					
	October					
	November					
	December					

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

California, West Los Angeles

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1956 1957	December to November	---	4.74 ± 0.09	--	--
	December	0.20 ± 0.01	4.94 ± 0.10	20	2.10
1958	January	0.44 ± 0.02	5.37 ± 0.10	14	
	February	0.90 ± 0.05	6.28 ± 0.11	11	
	March	1.30 ± 0.08	7.58 ± 0.13	24	
	April	1.50 ± 0.00	9.08 ± 0.13	9	
	May	0.05 ± 0.03	9.13 ± 0.14	33	
	June				
	July				
	August				
	September				
	October				
	November				
	December				

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

Illinois, Lemont

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
December 1956 to December 19, 1957	---	5.94 ± 0.07	--	--
1958				
January and February	0.30 ± 0.00	6.24 ± 0.07	9	
March				
April	0.57 ± 0.05		19	
May	0.79 ± 0.03		17	
June				
July				
August				
September				
October				
November				
December				

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

New Jersey, Westwood

	Collection Period	mc Sr^{90}/mi^2	Average mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90}	Precipitation (inches)
1957						
	August to December	---	---	4.78 ± 0.45	--	
1958						
	January	1.15 ± 0.02 1.91 ± 0.02	1.53 ± 0.54	6.31 ± 0.71	-- --	
	February	0.46 ± 0.01 1.00 ± 0.02	0.73 ± 0.39	7.04 ± 0.81	-- --	
	March	0.99 ± 0.02 1.02 ± 0.02	1.02 ± 0.04	8.06 ± 0.81	-- --	
	April					
	May					
	June					
	July					
	August					
	September					
	October					
	November					
	December					

TABLE 2 - Cont'd.

Pennsylvania, Pittsburgh

Collection Period	mc Sr^{90}/mi^2	Average mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957					
July 3 to December 31	---	---	2.07 ± 0.21	--	--
1958					
January	0.57 ± 0.03 0.57 ± 0.03	0.57 ± 0.03	2.64 ± 0.21	7 7	
February	0.29 ± 0.02 0.33 ± 0.03	0.31 ± 0.03	2.95 ± 0.21	12 12	
March	0.41 ± 0.02 0.42 ± 0.02	0.41 ± 0.02	3.36 ± 0.21	12 12	
April	1.20 ± 0.09 0.54 ± 0.54	0.87 ± 0.47	4.23 ± 0.50	15 13	
May	0.76 ± 0.04 0.73 ± 0.04	0.75 ± 0.04	4.98 ± 0.51	11 13	
June	2.28 ± 0.14 2.15 ± 0.12	2.21 ± 0.14	7.19 ± 0.52	1 17	
July					
August					
September					
October					
November					
December					

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

Oklahoma, Tulsa

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1958					
	January	0.35 ± 0.02	0.35 ± 0.02	19	
	February	0.40 ± 0.02	0.75 ± 0.03	9	
	March	2.29 ± 0.06	3.04 ± 0.07	17	
	April 1 to May 5	2.84 ± 0.15	5.88 ± 0.16	21	
	May 5 to June 1	2.22 ± 0.67	8.10 ± 0.69	11	
	July				
	August				
	September				
	October				
	November				
	December				

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

South Dakota, Vermillion

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957					
	April to December	---	9.18 ± 0.19	--	--
1958					
	January	0.08 ± 0.01	9.26 ± 0.19	17	
	February	0.38 ± 0.02	9.64 ± 0.19	13	
	March	0.20 ± 0.01	9.84 ± 0.19	13	
	April	2.54 ± 1.00	12.38 ± 0.19	12	
	May	2.28 ± 0.06	14.66 ± 0.21	12	
	June				
	July				
	August				
	September				
	October				
	November				
	December				

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

Utah, Salt Lake City

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1956	December to	---	13.06 ± 0.19	--	--
1957	December				
1958					
	January	0.70 ± 0.05	13.76 ± 0.19	14	
	February	1.10 ± 0.04	14.86 ± 0.20	11	
	March	1.47 ± 0.08	16.33 ± 0.22	29	
	April	2.10 ± 0.05	18.43 ± 0.22	12	
	May	1.30 ± 0.06	19.73 ± 0.23	9	
	June				
	July				
	August				
	September				
	October				
	November				
	December				

* Values extrapolated to midpoint of collection period.

TABLE 2 - Cont'd.

Washington, Seattle

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1958					
	April 18 to April 30	0.51 ± 0.01	0.51 ± 0.01	15	
	May	2.12 ± 0.06	2.63 ± 0.06	6	
	June				
	July				
	August				
	September				
	October				
	November				
	December				

* Values extrapolated to midpoint of collection period.

1.13 Sites Outside Continental United States

Monthly fallout collection pots (exposed surface 0.82 ft^2) are maintained at stations outside the continental United States.

Table 3 up-dates pot data appearing in HASL-42, "Environmental Contamination from Weapon Tests".

The Sr^{89}/Sr^{90} ratios are for the midpoint of the collection period.

The error term represents the standard error of counting.

TABLE 3

OUTSIDE CONTINENTAL UNITED STATES FALLOUT MONITORING SITES
(Monthly Pot Collections)

Austria, Klagenfurt

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957	August to November	---	1.81 ± 0.06	--	--
	December	0.09 ± 0.02	1.90 ± 0.06	27	
1958	January	0.13 ± 0.01	2.03 ± 0.06	25	
	February	0.17 ± 0.02	2.20 ± 0.07	10	
	March	1.15 ± 0.05	3.35 ± 0.08	29	
	April	1.26 ± 0.06	4.61 ± 0.11	18	
	May				
	June				
	July				
	August				
	September				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Austria, Vienna

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957	June to November	---	4.03 ± 0.11	--	--
	December	0.11 ± 0.01	4.14 ± 0.11	22	
1958	January	0.16 ± 0.01	4.30 ± 0.11	25	
	February	0.27 ± 0.02	4.57 ± 0.11	14	
	March	0.35 ± 0.01	4.92 ± 0.11	15	
	April	0.71 ± 0.05	5.63 ± 0.12	18	
	May				
	June				
	July				
	August				
	September				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Brazil, Rio de Janeiro

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90}	Precipitation (inches)
1956 September to 1957 February	---	0.50 ± 0.07	--	--
1957 March 1 to April 5	0.10 ± 0.02	0.60 ± 0.07		
April 5 to May 1	0.14 ± 0.02	0.74 ± 0.08		
June	0.00 ± 0.02	0.74 ± 0.08		
July	0.03 ± 0.02	0.77 ± 0.08		
August	0.39 ± 0.04	1.16 ± 0.09		

TABLE 3 - Cont'd.

Columbia, Bogota

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957					
	August to September	---	0.04 ± 0.01	--	--
	October	≤0.01	0.05 ± 0.01		
	November	Sample not available			
	December	≤0.01	0.06 ± 0.02		
1958					
	January	0.04 ± 0.01	0.10 ± 0.02	12	
	February	0.04 ± 0.01	0.14 ± 0.02	15	
	March	0.12 ± 0.01	0.26 ± 0.02	4	
	April	0.03 ± 0.02	0.29 ± 0.03	33	
	May				
	June				
	July				
	August				
	September				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Hawaii, Oahu (Coconut Island, A.E.C. Laboratory)

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
June 1957 to January 6, 1958	---	4.82 ± 0.14	--	--
1958 to February 3	0.32 ± 0.02	5.14 ± 0.14	15	
to March 3	0.95 ± 0.05	6.09 ± 0.15	10	
to April 1	1.68 ± 0.09	7.77 ± 0.17	15	
April	1.98 ± 0.12	9.75 ± 0.21	18	
May				
June				
July				
August				
September				
October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Hawaii, Oahu (Coconut Island, Weather Station)

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
July 1957 to January 6, 1958	---	3.93 ± 0.02	--	--
1958 to February 3	0.22 ± 0.01	4.15 ± 0.02	15	
to March 3	0.70 ± 0.05	4.85 ± 0.05	9	
to April 1	1.65 ± 0.08	6.50 ± 0.10	14	
May	0.90 ± 0.02	7.40 ± 0.10	18	
June				
July				
August				
September				
October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Hawaii, Oahu (University of Hawaii, Gartley Hall)

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
June 1957 to January 6, 1958	---	2.81 ± 0.10	--	--
1958 to February 3	0.71 ± 0.03	3.52 ± 0.10	15	
to March 3	0.36 ± 0.02	3.88 ± 0.11	11	
to April 2	1.33 ± 0.08	5.21 ± 0.13	21	
May				
June				
July				
August				
September				
October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Japan, Hiroshima

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
August 1956 to December 1957	---	5.80 ± 0.12	--	--
1958				
January	0.24 ± 0.04	6.04 ± 0.13	23	
February	0.25 ± 0.01	6.29 ± 0.13	20	
March	0.92 ± 0.06	7.21 ± 0.14	11	
April	3.37 ± 0.02	10.58 ± 0.14	10	
May	1.06 ± 0.06	11.64 ± 0.15	14	
June				
July				
August				
September				
October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Japan, Nagasaki

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
August 1956 to December 1957	---	7.90 ± 0.15	--	--
1958				
January	0.60 ± 0.05	8.50 ± 0.16	16	
February	0.55 ± 0.03	9.05 ± 0.16	9	
March	1.13 ± 0.06	10.18 ± 0.17	14	
April	2.52 ± 0.07	12.70 ± 0.19	15	
May	1.75 ± 0.06	14.45 ± 0.20	4	
June				
July				
August				
September				
October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Kenya, Kikuyu

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957					
	January to December	---	1.30 ± 0.07	--	--
1958					
	January	0.03 ± 0.01	1.33 ± 0.07	22	
	February	0.14 ± 0.03	1.47 ± 0.08	12	
	March	0.22 ± 0.01	1.69 ± 0.08	5	
	April				
	May	0.90 ± 0.05			
	June				
	July				
	August				
	September				
	October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Pakistan, Karachi

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1958					
	February	0.02 ± 0.01	0.02 ± 0.01	45	
	March	0.07 ± 0.00	0.09 ± 0.01	40	
	April				
	May				
	June				
	July				
	August				
	September				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

South Rhodesia, Salisbury

Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90}	Precipitation (inches)
November 1956 to May 1957	---	0.58 ± 0.06	--	--
1957				
June to October	Samples not collected			
November	0.11 ± 0.01	0.11 ± 0.01		
December	0.10 ± 0.02	0.21 ± 0.02		
1958				
January	0.10 ± 0.01	0.31 ± 0.02	4	
February	0.04 ± 0.01	0.35 ± 0.02	5	
March	0.02 ± 0.01	0.37 ± 0.03	8	
April				
May	0.55 ± 0.04			
June				
July				
August				
September				
October				

TABLE 3 - Cont'd.

Taiwan, Tainan

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1958					
	January	0.03 ± 0.01	0.03 ± 0.01	27	
	February	0.07 ± 0.01	0.10 ± 0.01	12	
	March	0.19 ± 0.02	0.29 ± 0.02	10	
	April	0.05 ± 0.00	0.34 ± 0.02	12	
	May				
	June				
	July				
	August				
	September				

Taiwan, Taipei

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90}	Precipitation (inches)
1958					
	February	0.15 ± 0.01	0.15 ± 0.01	9	
	March	0.10 ± 0.01	0.25 ± 0.01	14	
	April	0.57 ± 0.01	0.82 ± 0.02	11	
	May				
	June				
	July				
	August				
	September				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Taiwan, Taitung

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1958					
	April	0.22 ± 0.01	0.22 ± 0.01	10	
	May				
	June				
	July				
	August				
	September				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Thailand, Bangkok

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957					
	March to November	---	0.38 ± 0.04	--	--
	December	Sample not collected			
1958					
	January	0.12 ± 0.01	0.50 ± 0.04	8	
	February	Sample lost in transit			
	March	0.04 ± 0.00	0.54 ± 0.04	5	
	March 1 to April 7	0.04 ± 0.03	0.58 ± 0.05	44	
	April 7 to May 4				
	May 4 to June 4	0.05 ± 0.03		17	
	June				
	July				
	August				
	September				
	October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Union of South Africa, Durban

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957					
	June to December	----	1.27 ± 0.05	--	--
1958					
	January	0.02 ± 0.01	1.29 ± 0.05		
	February	0.18 ± 0.01	1.47 ± 0.05	12	
	March	0.09 ± 0.01	1.56 ± 0.05	3	
	April				
	May	0.91 ± 0.05			
	June				
	July				
	August				
	September				
	October				

* Values extrapolated to midpoint of collection period.

TABLE 3 - Cont'd.

Union of South Africa, Pretoria

	Collection Period	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Precipitation (inches)
1957					
	July to November	---	0.87 ± 0.03	--	--
	December	0.12 ± 0.01	0.99 ± 0.03		
1958					
	January	0.10 ± 0.01	1.09 ± 0.03	19	
	February	0.06 ± 0.01	1.15 ± 0.03	4	
	March	0.11 ± 0.00	1.26 ± 0.03	3	
	April	0.17 ± 0.06	1.43 ± 0.07	3	
	May	0.49 ± 0.04	1.92 ± 0.08		
	June				
	July				
	August				
	September				
	October				

* Values extrapolated to midpoint of collection period.

1.2 Precipitation Collections for Radiostrontium and Radiobarium

In precipitation collections, two collectors are simultaneously exposed during dry and rainy weather. The collection period terminates immediately after a precipitation or after a week of no rainfall.

1.21 Pittsburgh, Pennsylvania

Since February 1955, precipitation collections have been made by Nuclear Science and Engineering Corporation in galvanized tubs (exposed surface 2.58 ft^2 per tub).

Table 4 up-dates the Pittsburgh precipitation data in HASL-42, "Environmental Contamination from Weapon Tests". Figure 2 graphically illustrates the cumulative Sr^{90} fallout. The error terms represent the standard error of counting.

Until February 1957, the contents of the two tubs were combined resulting in one analysis for the collection period. Since February 1957, the contents of each tub have been analyzed separately.

Precipitation values were obtained from the United States Weather Bureau until June 19, 1957. Since then, precipitation has been measured by Nuclear Science and Engineering personnel using a Fisher # 1-242-5 United States Weather Bureau type rain gauge.

TABLE [illegible]

STRONTIUM-90 IN PATTERSON, PENNSYLVANIA FALLOUT

(Precipitation Collections)

Collection Period from	to	mc Sr^{89}/sq. mi.	mc Sr^{90}/sq. mi.	mc Sr^{90}/liter	Sr^{89}/Sr^{90}	Ba^{140}/Sr^{90}	remarks: in inches
12-29-57	1-2-58	0.031 ± 0.006 0.032 ± 0.004	35.2 ± 0.[illegible]	1.[illegible] ± 0.3 1.0 ± 1.1	9.7 9.4	2.4 1.2	[illegible]
1-2-58	1-3-[illegible]	0.036 ± 0.007 0.006 ± 0.002	33.36 ± 0.[illegible]	---			[illegible]
1-3-58	1-8-58	0.011 ± 0.003 0.015 ± 0.003	23.90 ± 0.[illegible]	10.4 ± 1.8 11.5 ± 2.0	11 13	7.9 10	0.[illegible]
1-8-58	1-16-58	0.069 ± 0.006 0.056 ± 0.004	25.97 ± 0.[illegible]	1.74 ± 0.14 1.51 ± 0.10	15 15		[illegible]
1-16-58	1-18-58	0.022 ± 0.004 ≤0.008	23.98 ± 0.[illegible]	18 ± 5 ≤9	9.6	3.8	0.[illegible]
1-18-58	1-23-58	0.148 ± 0.008 0.[illegible] ± 0.008	24.[illegible] ± 0.[illegible]	2.[illegible] ± 0.6 12.7 ± 0.8	13 15	1.2 0.6	0.48
1-23-58	1-26-58	0.239 ± 0.011 0.201 ± 0.011	24.35 ± 0.27	23.0 ± 0.5 9.3 ± 0.5	12 15	1.2 1.4	0.30
1-26-58	1-28-58	0.09[illegible] ± 0.002 0.[illegible] ± 0.004	24.3[illegible] ± 0.[illegible]	[illegible].0 ± 0.6 [illegible].4 ± 1.0	14 14	3.1 2.7	[illegible]
1-28-58	1-31-58	0.[illegible]30 ± 0.003 0.[illegible]38 ± 0.002	24.[illegible] ± 0.[illegible]	25.8 ± 2.1 27.5 ± 2.0	13 13	1.7	[illegible]
1-31-58	2-3-58	0.083 ± 0.008 0.121 ± 0.002	24.4[illegible] ± 0.[illegible]	[illegible].7 ± 1.2 [illegible] ± 0.8	7.6 8.2	1.9	[illegible]
2-3-58	2-6-58	0.206 ± 0.005 0.075 ± 0.004	24.52 ± 0.[illegible]	[illegible].0 ± 1.6 32.[illegible] ± 1.8	12 11	1.0 0.9	[illegible]
2-6-58	2-9-58	0.105 ± 0.005 0.115 ± 0.006	24.63 ± 0.27	[illegible].2 ± 2.[illegible] 23.8 ± 0.7	13 9.7	0.6	0.[illegible]
2-9-58	2-17-58	0.028 ± 0.006 0.031 ± 0.002	24.[illegible] ± 0.[illegible]	[illegible] ± 0.3 [illegible] ± 0.3	10 20		[illegible]
2-17-58	2-24-58	0.[illegible] ± 0.001 0.[illegible] ± 0.005	24.[illegible] ± 0.[illegible]	--- ---	8.5 8.8		[illegible]
2-24-58	2-27-58	0.[illegible] ± 0.[illegible] 0.[illegible] ± 0.002	24.[illegible] ± 0.[illegible]	[illegible].9 ± 0.8 [illegible].9 ± 0.5	13 12		[illegible]
2-27-58	3-[illegible]-58	0.[illegible] ± 0.[illegible] 0.[illegible] ± 0.[illegible]	24.[illegible] ± 0.[illegible]	[illegible].[illegible] ± 2.[illegible] [illegible].3 ± 0.[illegible]	12 12		[illegible]

* Values not corrected to elapsed sampling period.

TABLE 4 - Cont'd.

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	d/m Sr^{90}/liter	Sr^{89}/Sr^{90} *	Ba^{140}/Sr^{90} *	Precipitation in inches
3-1-58	3-10-58	0.033 ± 0.003 0.020 ± 0.003	24.82 ± 0.17	--- ---	8.8 8.5		dry
3-10-58	3-15-58	0.166 ± 0.012 0.145 ± 0.014	24.97 ± 0.17	10.5 ± 0.7 8.7 ± 0.8	10 11	1.1 1.1	0.45
3-15-58	3-18-58	0.018 ± 0.003 0.014 ± 0.004	24.99 ± 0.17	9.7 ± 1.4 6.8 ± 1.7	7.2 11	1.7 5.3	0.12
3-18-58	3-22-58	0.098 ± 0.005 0.096 ± 0.005	25.08 ± 0.17	11.7 ± 0.6 11.0 ± 0.6	8.7 9.6	5.2 8.4	0.42
3-22-58	3-26-58	0.150 ± 0.008 0.150 ± 0.008	25.23 ± 0.17	8.8 ± 0.5 8.8 ± 0.5	9.1 10	4.7 5.0	0.70
3-26-58	4-2-58	0.050 ± 0.003 0.053 ± 0.004	25.29 ± 0.17	--- ---	18 24	30 27	
4-2-58	4-6-58	0.093 ± 0.005 0.068 ± 0.004	25.37 ± 0.17	43 ± 2 37 ± 2	13 14	17 19	
4-6-58	4-8-58	0.34 ± 0.02 0.33 ± 0.02	25.71 ± 0.17	122 ± 7 121 ± 7	15 16	18 18	
4-8-58	4-12-58	0.50 ± 0.03 0.52 ± 0.03	26.22 ± 0.17	27.0 ± 1.3 27.9 ± 1.4	14 12	12 11	
4-12-58	4-19-58	0.012 ± 0.002 0.014 ± 0.002	26.23 ± 0.17	--- ---	16 10	67 30	
4-19-58	4-22-58	0.288 ± 0.021 0.219 ± 0.011	26.48 ± 0.17	23.3 ± 1.8 19.4 ± 1.0	12 16	7.7 11	
4-22-58	4-24-58	0.031 ± 0.003 0.033 ± 0.004	26.52 ± 0.17	--- ---	11 11	8.6 6.3	
4-24-58	4-28-58	0.206 ± 0.012 0.209 ± 0.012	26.72 ± 0.17	11.1 ± 0.6 11.5 ± 0.6	11 12	5.7 6.8	
4-28-58	4-29-58	0.35 ± 0.02 0.38 ± 0.02	27.09 ± 0.18	18.1 ± 2.0 19.6 ± 2.0	13 10	4.2 3.7	
4-29-58	5-4-58	0.34 ± 0.02 0.40 ± 0.02	27.46 ± 0.18	10.7 ± 0.6 11.3 ± 0.6	12 11		1.50
5-4-58	5-5-58	0.092 ± 0.006 0.086 ± 0.005	27.55 ± 0.18	20.9 ± 1.4 18.5 ± 1.0	13 14		0.20
5-5-58	5-8-58	0.42 ± 0.02 0.41 ± 0.02	27.96 ± 0.18	18.2 ± 1.0 17.7 ± 0.9	16 15		1.09

* Values extrapolated to midpoint of sampling period.

TABLE 4 - Cont'd.

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	d/m Sr^{90}/liter	Sr^{89}/Sr^{90} *	Ba^{140}/Sr^{90} *	Precipitation in inches
5-8-58	5-10-58	0.195 ± 0.015 0.185 ± 0.012	28.15 ± 0.18	91 ± 7 79 ± 5	12 14		0.23
5-10-58	5-13-58	0.024 ± 0.002 0.013 ± 0.002	28.17 ± 0.18	--- ---	14 18		dry
5-13-58	5-17-58	0.42 ± 0.02 0.33 ± 0.02	28.55 ± 0.18	270 ± 15 268 ± 15	10 11		0.21
5-17-58	5-19-58	0.195 ± 0.015 0.151 ± 0.012	28.72 ± 0.18	--- ---	10 12		trace
5-19-58	5-24-58	0.41 ± 0.02 0.40 ± 0.04	29.12 ± 0.18	283 ± 15 279 ± 30	10 10		0.23
5-24-58	5-28-58	0.151 ± 0.010 0.199 ± 0.015	29.30 ± 0.18	12.4 ± 0.8 16.0 ± 1.2	13 10	6.0 2.5	0.41
5-28-58	6-2-58	0.253 ± 0.015 0.224 ± 0.025	29.54 ± 0.19	12.3 ± 0.7 10.5 ± 1.1	20 16	13 21	0.72
6-2-58	6-6-58	0.061 ± 0.009 0.043 ± 0.008	29.59 ± 0.19	20.7 ± 3.0 14.8 ± 2.5	22 21	16	0.10
6-6-58	6-10-58	0.079 ± 0.006 lost	29.67 ± 0.19	24.3 ± 1.8	14	29	0.11
6-10-58	6-13-58	0.127 ± 0.010 0.131 ± 0.010	29.80 ± 0.19	19.4 ± 1.5 20.1 ± 1.5	19 19		0.22
6-13-58	6-19-58	0.224 ± 0.018 0.244 ± 0.021	30.03 ± 0.19	10.8 ± 0.7 11.7 ± 0.9	9.2 11	12 12	0.70
6-19-58	6-20-58	0.210 ± 0.010 0.188 ± 0.010	30.23 ± 0.19	10.9 ± 0.5 9.7 ± 0.5	12 13	5.0 3.7	0.65
6-20-58	6-22-58	0.175 ± 0.010 0.194 ± 0.015	30.41 ± 0.19	37.0 ± 1.9 41.1 ± 2.6	12 9.9	<2.8 <1.5	0.16
6-22-58	6-23-58	0.106 ± 0.006 0.148 ± 0.010	30.54 ± 0.19	29.9 ± 1.6 41.1 ± 2.7	9.4 8.7	3.3 <1.4	0.12
6-23-58	6-24-58	0.062 ± 0.003 0.080 ± 0.006	30.61 ± 0.19	17.5 ± 0.8 22.5 ± 1.4	8.9 8.0	<4.8 <3.8	0.05
6-24-58	6-26-58	0.114 ± 0.006 0.117 ± 0.007	30.73 ± 0.19	22.7 ± 1.2 23.4 ± 1.5	19 22	23 20	0.17
6-26-58	7-3-58	0.019 ± 0.003 0.026 ± 0.003	30.75 ± 0.19	--- ---	12 13	<5.3 6.1	dry

* Values extrapolated to midpoint of sampling period.

TABLE 4 - Cont'd.

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	d/m Sr^{90}/liter	Sr^{89}/Sr^{90} *	Ba^{140}/Sr^{90} *	Precipitation in inches
7-3-58	7-7-58	0.296 ± 0.030 0.292 ± 0.020	31.04 ± 0.19	8.7 ± 0.9 8.6 ± 0.6	23 28	35 38	1.15
7-7-58	7-8-58	0.013 ± 0.002 0.016 ± 0.003	31.06 ± 0.19	22.5 ± 4.2 27.5 ± 4.2	21 22	<9.2 38	0.02
7-12-58	7-14-58	0.097 ± 0.007 0.076 ± 0.006		11.7 ± 0.9 9.2 ± 0.7	43 53	63 80	0.28
7-14-58	7-15-58	0.132 ± 0.007 0.111 ± 0.006		5.7 ± 0.3 4.8 ± 0.3	43 56	48 80	0.78
7-15-58	7-16-58	0.056 ± 0.004 0.058 ± 0.003		6.6 ± 0.5 6.8 ± 0.3	80 67	127 126	0.29
7-22-58	7-23-58	0.055 ± 0.003 0.060 ± 0.003		5.3 ± 0.3 5.8 ± 0.3	58 52	65 60	0.35
7-23-58	7-24-58	0.150 ± 0.008 0.180 ± 0.010		12.7 ± 0.6 15.3 ± 0.7	28 24	17 20	0.40
7-24-58	7-25-58	0.026 ± 0.003 0.019 ± 0.002		30.0 ± 2.8 21.7 ± 2.2	22 23	13 21	0.03
7-25-58	7-29-58	0.173 ± 0.010 0.159 ± 0.008		4.2 ± 0.2 3.8 ± 0.2	66 70	66 80	1.40
7-30-58	7-31-58	0.205 ± 0.010 0.189 ± 0.010		6.1 ± 0.3 5.7 ± 0.3	35 31	29 36	1.13
7-31-58	8-1-58	0.041 ± 0.003 0.039 ± 0.003		3.8 ± 0.3 3.5 ± 0.3	62 62	58 74	0.37
8-1-58	8-3-58	0.149 ± 0.007 0.131 ± 0.007		2.7 ± 0.1 2.4 ± 0.1	37 42	32 36	1.88

* Values extrapolated to midpoint of sampling period.

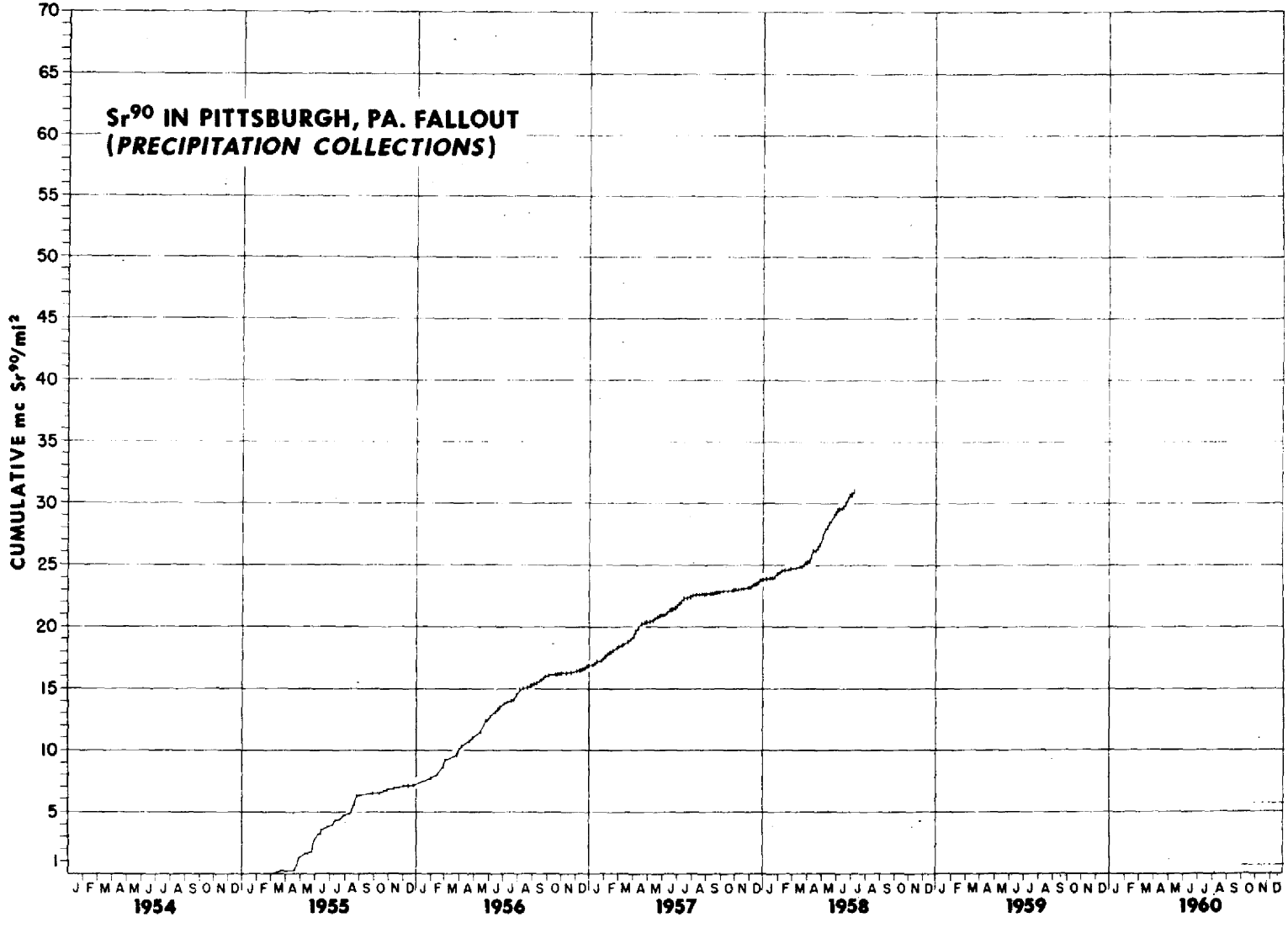

Sr90 IN PITTSBURGH, PA. FALLOUT
(PRECIPITATION COLLECTIONS)
CUMULATIVE mc Sr90/mi2
70
65
60
55
50
45
40
35
30
25
20
15
10
5
1
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956
1957
1958
1959
1960

FIGURE 2

1.22 Westwood, New Jersey

Since February 1958, precipitation collections have been made by Isotopes, Inc. in polyethylene tubs (exposed surface 2.58 ft^2).

Precipitation data for Westwood, New Jersey is summarized in Table 5. Figure 3 graphically illustrates the cumulative Sr^{90} fallout.

TABLE 5

STRONTIUM 90 IN WESTWOOD, NEW JERSEY FALLOUT

(Precipitation Collections)

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative** mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Ba^{140}/Sr^{90} *	Precipitation in inches
2-4-58	2-10-58	0.013 ± 0.002 0.049 ± 0.002	0.031 ± 0.025	8.5 9.0	5.8 6.0	
2-10-58	2-17-58	0.015 ± 0.002 0.007 ± 0.002	0.042 ± 0.026	1.6 1.3		
2-17-58	2-25-58	0.005 ± 0.002 0.012 ± 0.002	0.050 ± 0.026	<4.0 2.0	-- 1.5	
2-25-58	2-28-58	0.256 ± 0.011 0.439 ± 0.006	0.398 ± 0.133	17 13	1.9 0.8	
2-28-58	3-1-58	0.010 ± 0.002 0.002 ± 0.002	0.404 ± 0.133	8.0 --	2.7 --	
3-1-58	3-3-58	0.026 ± 0.003 0.064 ± 0.002	0.449 ± 0.136	10 11	1.8 0.9	
3-3-58	3-4-58	0.033 ± 0.009	0.482 ± 0.136	16	1.0	
3-4-58	3-10-58	0.010 ± 0.002 0.002 ± 0.002	0.488 ± 0.136	1.3 --	-- --	
3-10-58	3-15-58	0.230 ± 0.009 0.285 ± 0.011	0.746 ± 0.141	12 12	3.7 15	
3-15-58	3-20-58	0.055 ± 0.005 0.078 ± 0.003	0.812 ± 0.142	8.2 11	9.7 8.5	
3-20-58	3-21-58	0.117 ± 0.003 0.085 ± 0.003	0.913 ± 0.144	12 14	10 9.1	
3-21-58	3-22-58	0.005 ± 0.002 0.002 ± 0.002	0.916 ± 0.144	7.2 --	3.0 --	
3-22-58	3-25-58	0.026 ± 0.002 0.025 ± 0.004	0.942 ± 0.144	17 16	10 18	
3-25-58	3-27-58	0.113 ± 0.003 0.128 ± 0.003	1.062 ± 0.145	16 17	-- 11	
3-27-58	3-31-58	0.071 ± 0.002 0.085 ± 0.003	1.140 ± 0.145	22 25	24 20	
3-31-58	4-1-58	0.023 ± 0.003 0.029 ± 0.003	1.166 ± 0.145	40 37	78 53	
4-1-58	4-7-58	0.444 ± 0.015 0.421 ± 0.015	1.599 ± 0.146	30 29	37 48	
4-7-58	4-8-58	0.011 ± 0.002 0.020 ± 0.002	1.614 ± 0.146	142 41	270 59	
4-8-58	4-14-58	0.446 ± 0.055 0.212 ± 0.004	1.944 ± 0.221	25 34	36 9.8	

* Values extrapolated to midpoint of sampling period.

** Error term represents either the standard deviation of duplicate analyses or the counting error, whichever is greater. Where only one analysis has been made, the counting error is used.

TABLE 5 - Cont'd.

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative** mc Sr^{90}/mi^2	Sr^{89}/Sr^{90}*	Ba^{140}/Sr^{90}*	Precipitation in inches
4-14-58	4-21-58	0.069 ± 0.008 0.034 ± 0.003	1.995 ± 0.222	12 32	15 60	
4-21-58	4-22-58	0.009 ± 0.003 0.032 ± 0.004	2.015 ± 0.223	23 8.0	49 8.2	
4-22-58	4-24-58	0.168 ± 0.005 0.282 ± 0.007	2.240 ± 0.237	17 11	6.8 3.9	
4-24-58	4-28-58	0.327 ± 0.008 0.201 ± 0.006	2.504 ± 0.253	17 23	 11	
4-28-58	4-29-58	0.036 ± 0.004 0.058 ± 0.004	2.552 ± 0.254	9.0 4.3	8.9 2.8	
4-29-58	4-30-58	0.216 ± 0.006 0.158 ± 0.005	2.738 ± 0.257	21 21	8.0 8.4	
4-30-58	5-5-58	0.308 ± 0.006 0.272 ± 0.010	3.028 ± 0.258	15 16	7.8 8.8	
5-5-58	5-6-58	0.045 ± 0.017 0.296 ± 0.049	3.199 ± 0.313	15 15	29 5.7	
5-6-58	5-8-58	0.281 ± 0.005 0.174 ± 0.005	3.426 ± 0.320	17 18	5.1 7.4	
5-8-58	5-12-58	0.200 ± 0.011 0.279 ± 0.006	3.666 ± 0.327	15 20	3.1 7.1	
5-12-58	5-16-58	0.612 ± 0.008 0.564 ± 0.007	4.254 ± 0.329	16 11	3.8 2.8	
5-16-58	5-19-58	0.070 ± 0.004 0.073 ± 0.004	4.326 ± 0.329	12 9.3	2.7 3.1	
5-19-58	5-20-58	0.100 ± 0.004 0.079 ± 0.004	4.415 ± 0.329	15 17	4.6 5.3	
5-20-58	5-21-58	0.127 ± 0.005 0.119 ± 0.004	4.538 ± 0.329	10 9.6	2.7 2.1	
5-21-58	5-23-58	0.142 ± 0.009 0.127 ± 0.010	4.672 ± 0.329	9.5 14	2.4 2.0	
5-23-58	5-26-58	0.729 ± 0.012 0.682 ± 0.011	5.378 ± 0.331	2.7 3.1	2.0 2.4	
5-26-58	5-29-58	0.079 ± 0.008 0.092 ± 0.008	5.464 ± 0.331	2.9 2.9	3.0 3.5	
5-29-58	6-3-58	0.024 ± 0.004 0.025 ± 0.006	5.488 ± 0.331	5.4 5.1	13 12	
6-3-58	6-10-58	0.168 ± 0.014 0.277 ± 0.014	5.710 ± 0.340	14 8.0	21 10	0.12

* Values extrapolated to midpoint of sampling period.

** Error term represents either the standard deviation of duplicate analyses or the counting error, whichever is greater. Where only one analysis has been made, the counting error is used.

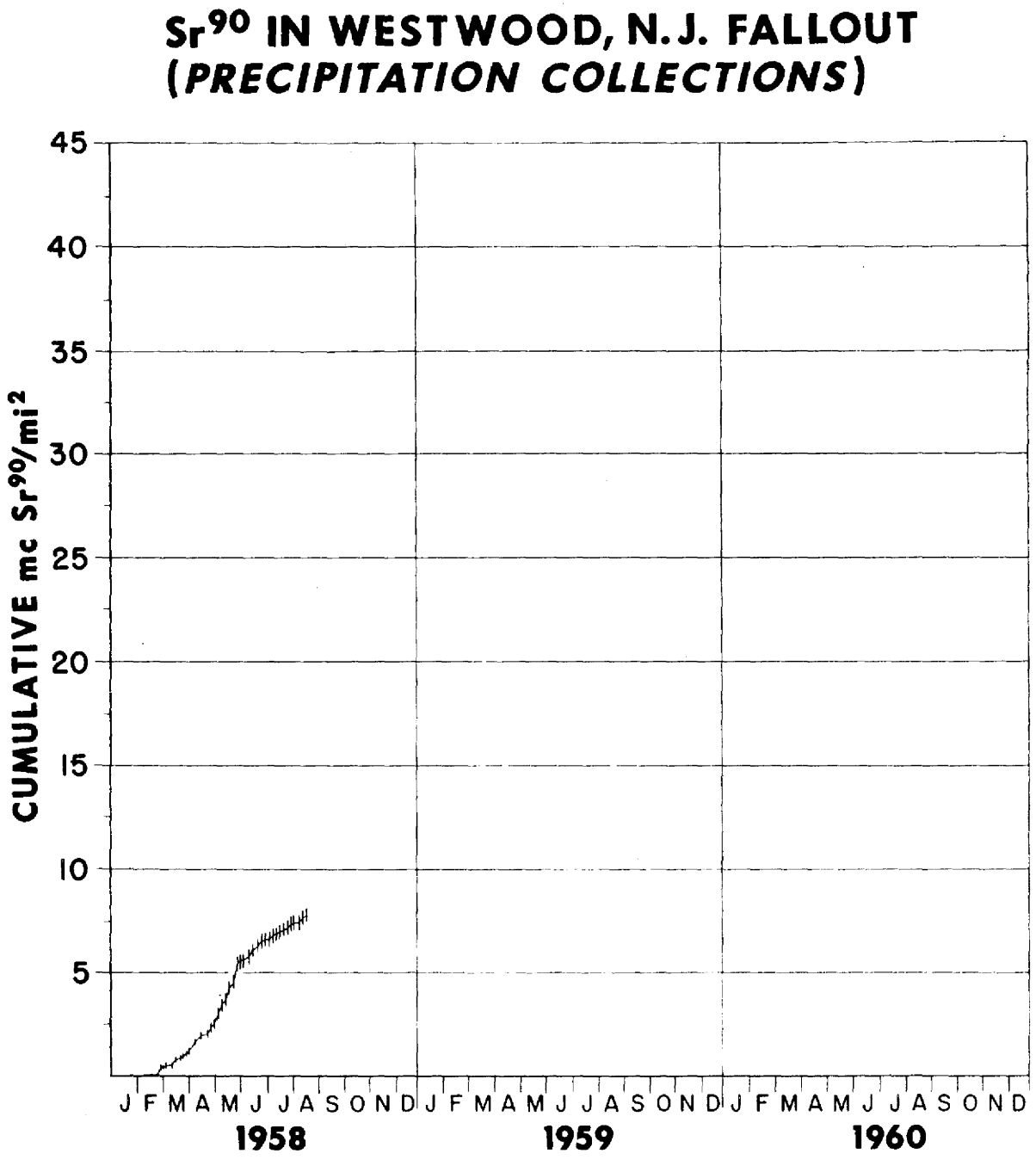
TABLE 5 - Cont'd.

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative** mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Ba^{140}/Sr^{90} *	Precipitation in inches
6-10-58	6-11-58	0.133 ± 0.012 0.124 ± 0.023	5.839 ± 0.340	23 22	12 15	0.19
6-11-58	6-12-58	0.040 ± 0.006 0.068 ± 0.005	5.893 ± 0.340	26 16	18 12	0.045
6-12-58	6-14-58	0.143 ± 0.003 0.138 ± 0.014	6.034 ± 0.340	20 23	19 16	0.45
6-14-58	6-19-58	0.181 ± 0.015 0.263 ± 0.013	6.256 ± 0.345	4.9 5.8	2.5 1.8	0.68
6-19-58	6-23-58	0.151 ± 0.003 0.194 ± 0.003	6.428 ± 0.347	14 11	3.8 2.9	0.72
6-23-58	6-27-58	0.103 ± 0.005 0.118 ± 0.003	6.538 ± 0.347	24 21	21 24	0.50
6-27-58	7-3-58	0.021 ± 0.002 0.009 ± 0.009	6.552 ± 0.347	23	40	0.00
7-3-58	7-7-58	0.211 ± 0.004 0.138 ± 0.009	6.727 ± 0.351	31 36	56 61	0.92
7-7-58	7-9-58	0.074 ± 0.009 0.041 ± 0.009	6.784 ± 0.351	39 55	102 168	0.58
7-9-58	7-14-58	0.135 ± 0.005 0.145 ± 0.012	6.924 ± 0.352	46 34	81 84	0.23
7-14-58	7-16-58	0.121 ± 0.010 0.080 ± 0.004	7.025 ± 0.352	40 58	60 83	0.23
7-16-58	7-17-58	0.035 ± 0.003 0.024 ± 0.002	7.054 ± 0.353	34 51	58 71	0.15
7-17-58	7-23-58	0.042 ± 0.003 0.053 ± 0.004	7.102 ± 0.353	52 38	95 67	0.09
7-23-58	7-29-58	0.192 ± 0.004 0.216 ± 0.004	7.308 ± 0.355	58 52	88 79	0.82
7-29-58	8-1-58	0.038 ± 0.002 0.032 ± 0.002	7.342 ± 0.355	37 38	59 48	0.17
8-1-58	8-8-58	0.015 ± 0.003 0.009 ± 0.009	7.354 ± 0.353	11	33	0.00
8-8-58	8-11-58	0.281 ± 0.005 0.246 ± 0.006	7.618 ± 0.354	21 21	11 12	1.08
8-11-58	8-13-58	0.072 ± 0.003 0.077 ± 0.009	7.692 ± 0.354	45 43	37 30	0.22
8-13-58	8-15-58	0.051 ± 0.002 0.050 ± 0.003	7.742 ± 0.354	37 39	28 27	0.045

* Values extrapolated to midpoint of sampling period.

** Error term represents either the standard deviation of duplicate analyses or the counting error, whichever is greater. Where only one analysis has been made, the counting error is used.

FIGURE 3


Sr90 IN WESTWOOD, N.J. FALLOUT
(PRECIPITATION COLLECTIONS)
CUMULATIVE mc Sr90/mi2
45
40
35
30
25
20
15
10
5
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1958
1959
1960

1.23 Richmond, California

Since March 1958, precipitation collections have been made by Tracerlab, Inc. in stainless steel tubs (exposed surface 4.91 ft^2).

Precipitation data for Richmond, California is summarized in Table 6. Figure 4 graphically illustrates the cumulative Sr^{90} fallout.

TABLE 6

STRONTIUM 90 IN RICHMOND, CALIFORNIA FALLOUT

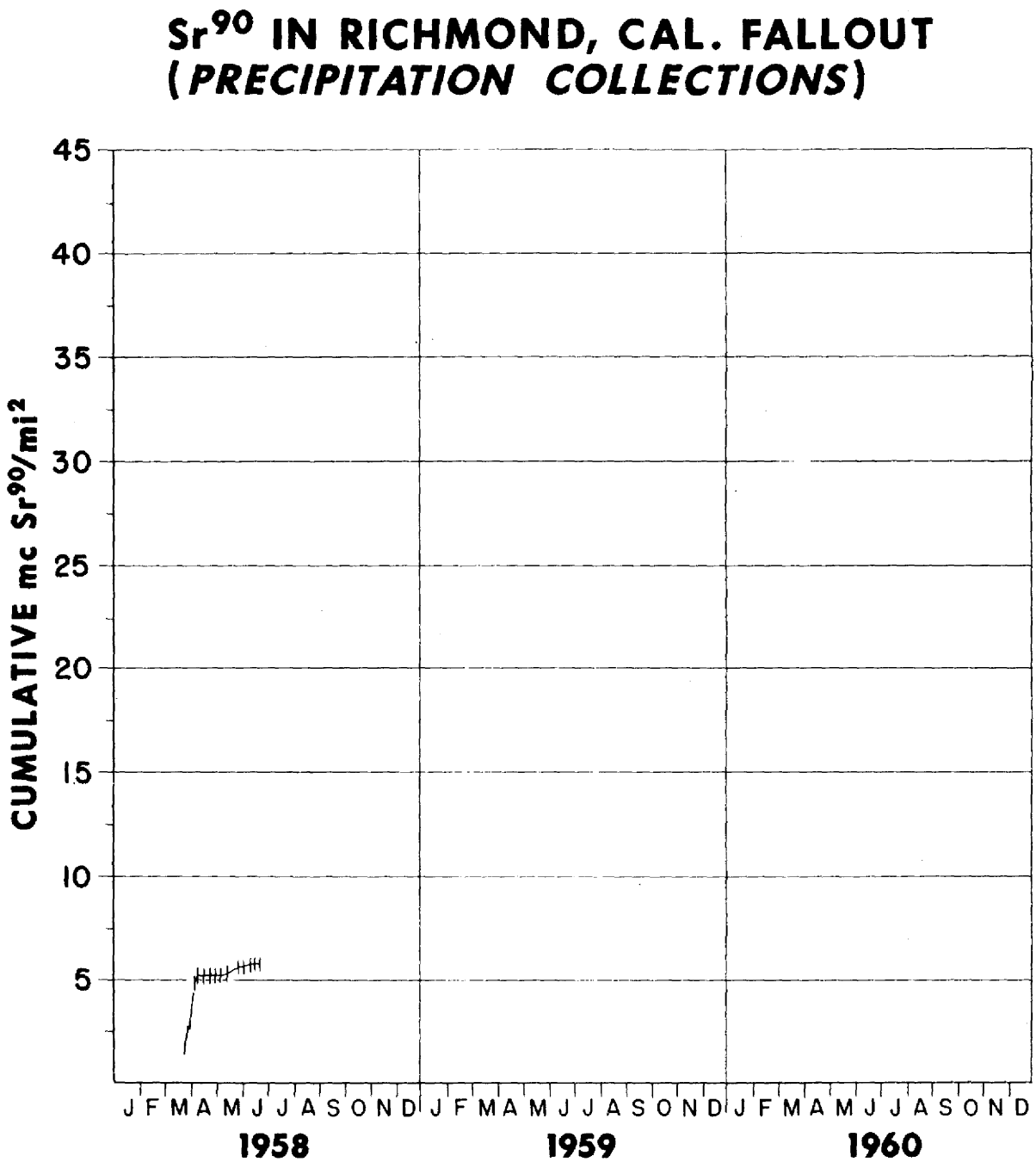
(Precipitation Collections)

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative** mc Sr^{90}/mi^2	Sr^{89}/Sr^{90} *	Ba^{140}/Sr^{90} *	Precipitation in inches
3-20-58	3-21-58	2.655 ± 0.188 0.539 ± 0.012	1.597 ± 0.265	11 16	76 94	1.16
3-21-58	3-24-58	0.882 ± 0.019 0.831 ± 0.016	2.453 ± 0.268	16 23	152 245	2.45
3-24-58	3-26-58	0.0881 ± 0.0048 0.0936 ± 0.0051	2.544 ± 0.271	21 21	74 78	0.06
3-26-58	3-28-58	0.2085 ± 0.0096 0.351 ± 0.012	2.824 ± 0.289	14 8.5	57 42	0.40
3-28-58	4-1-58	0.920 ± 0.018 1.117 ± 0.023	3.842 ± 0.311	27 26	77 69	2.58
4-1-58	4-4-58	1.012 ± 0.018 0.900 ± 0.016	4.798 ± 0.331	7.0 19	32 33	1.84
4-4-58	4-7-58	0.386 ± 0.008 0.351 ± 0.007	5.166 ± 0.332	12 15	26 40	0.73
4-7-58	4-14-58	0.0070 ± 0.0005 0.0079 ± 0.0006	5.173 ± 0.332	12 15	54 106	0
4-14-58	4-21-58	0.0027 ± 0.0002 0.0038 ± 0.0003	5.176 ± 0.332	16 11	74 45	0
4-21-58	4-28-58	0.0035 ± 0.0004 0.0042 ± 0.0003	5.180 ± 0.332	12 11	34 64	0
4-28-58	5-5-58	0.0051 ± 0.0002 0.0038 ± 0.0002	5.185 ± 0.332	10 10	18 18	0
5-5-58	5-12-58	0.062 ± 0.002 0.065 ± 0.003	5.249 ± 0.332	12 11	4.2 4.2	0
5-19-58	5-24-58	0.266 ± 0.005 0.353 ± 0.010	5.559 ± 0.337	25 17	23 21	0
5-24-58	6-1-58	0.020 ± 0.001 0.014 ± 0.001	5.576 ± 0.337	4.1 5.8	3.3 5.4	0.80
6-2-58	6-9-58	0.092 ± 0.002 0.095 ± 0.002	5.670 ± 0.337	11 12	3.2 3.3	0.43
6-9-58	6-13-58	0.039 ± 0.001 0.072 ± 0.002	5.726 ± 0.338	9.6 4.9	5.4 2.5	0.04
6-13-58	6-20-58	0.010 ± 0.001 0.014 ± 0.001	5.738 ± 0.338	14 12	10 7.8	0
6-20-58	6-24-58	0.010 ± 0.001 0.010 ± 0.001	5.748 ± 0.338	9.7 13	16	0

* Values extrapolated to midpoint of sampling period.

** Error term represents either the standard deviation of duplicate analyses or the counting error, whichever is greater. Where only one analysis has been made, the counting error is used.

FIGURE 4


Sr90 IN RICHMOND, CAL. FALLOUT
(PRECIPITATION COLLECTIONS)
CUMULATIVE mc Sr90/mi2
45
40
35
30
25
20
15
10
5
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1958
1959
1960

1.3 Sr^{90} in Soil

1.31 Post Plumbob Soil Samples Collected in California, Nevada and Utah.

The Sr^{90} results of twelve soil samples from near the Nevada test site are listed in the table below. These samples were collected after the Plumbob series by Dr. Kermit Larson and analyzed at HASL by the HCl extraction method.

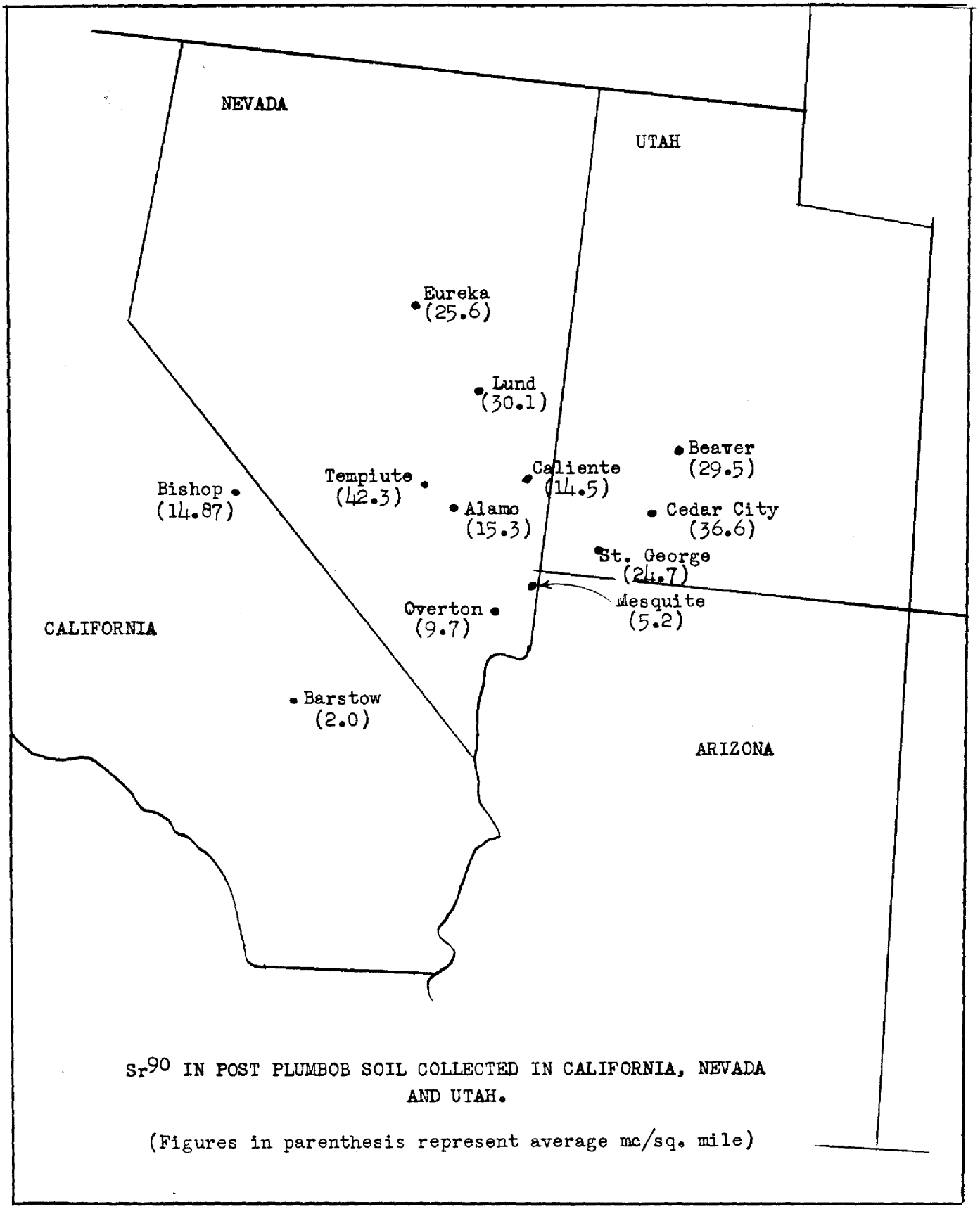
A map on the next page shows the Sr^{90} levels for each location.

TABLE 7

Sr^{90} IN POST PLUMBOB SOIL COLLECTED IN CALIFORNIA, NEVADA AND UTAH

HASL #	Depth	Location	mc/mi^2
7906 A	0-6"	Barstow, California	1.31 ± 0.79
7906 B			2.60 ± 0.71
7907 A	0-6"	Bishop, California	16.25 ± 1.58
7907 B			13.48 ± 1.35
7908 A	0-6"	Alamo, Nevada	15.25 ± 1.03
7908 B			lost
7909 A	0-6"	Caliente, Nevada	14.54 ± 0.91
7909 B			14.53 ± 0.95
7910 A	0-2"	Eureka, Nevada	25.41 ± 0.59
7910 B			25.89 ± 0.64
7911 A	0-2"	Tempiute, Nevada	42.48 ± 0.92
7911 B			42.14 ± 0.91
7912 A	0-6"	Lund, Nevada	31.53 ± 1.45
7912 B			29.59 ± 1.64
7913 A	0-6"	Mesquite, Nevada	4.88 ± 0.72
7913 B			5.49 ± 0.77
7914 A	0-6"	Overton, Nevada	8.82 ± 0.88
7914 B			10.58 ± 0.90
7915 A	0-6"	Beaver, Utah	30.06 ± 1.50
7915 B			29.02 ± 1.51
7916 A	0-6"	Cedar City, Utah	34.22 ± 1.42
7916 B			37.98 ± 1.49
7917 A	0-6"	St. George, Utah	23.92 ± 1.23
7917 B			25.56 ± 1.26

FIGURE 5



Sr^{90} IN POST PLUMBOB SOIL COLLECTED IN CALIFORNIA, NEVADA AND UTAH.

(Figures in parenthesis represent average mc/sq. mile)

2. Air

2.1 Surface Air

2.11 Radiochemical Analyses of Composite Monthly Air Filter Collections by the U. S. Naval Research Laboratory.

TABLE 8

RADIOCHEMICAL ANALYSES OF COMPOSITE MONTHLY AIR-FILTER COLLECTIONS**
(United States Naval Research Laboratory)

Month	Rainfall Days	Rainfall mm.	d/m/100 S.C.M. Gross β-	Ce^{141}*	Sr^{89}*	Y^{91}*	Ce^{144}	Sr^{90}	Cs^{137}	Pb^{210}	Activity Ratios Sr^{90}/Gross β-	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
	Moosonee, Ontario Lat. 51° 16'N Long. 80° 39'W Elev. 10 m.												
Nov. 1957	18	182	130	25	7.8	19	8.5	0.48	0.92	0.81	0.0037	15	1.9
Dec. 1957	18	59	120	28	7.4	19	9.3	0.82	1.3	-	0.0068	9.0	1.6
	Washington, D.C. Lat. 38° 50'N Long. 76° 57'W Elev. 88m.												
May 1957	4	22	400	59	39	47	31	1.8	6.5	3.3	0.0045	22	3.6
June 1957	11	76	500	110	42	62	29	1.8	6.2	2.7	0.0036	22	3.4
July 1957	5	24	670	100	45	45	33	1.9	5.4	2.7	0.0028	23	2.8
Aug. 1957	5	59	800	89	44	71	31	1.7	6.1	-	0.0021	26	3.6
Oct. 1957	6	64	670	140	64	76	25	1.5	3.8	3.2	0.0022	41	2.5
Nov. 1957	14	63	270	42	19	36	19	1.1	1.4	1.3	0.0041	18	1.3
Dec. 1957	12	133	310	24	24	46	27	1.3	2.6	2.1	0.0042	18	2.0
	Miami, Fla. Lat. 25° 49'N Long. 80° 17'W Elev. 4 m.												
July 1957	15	276	590	58	49	56	24	1.2	2.4	1.9	0.0020	40	2.0
Aug. 1957	17	339	380	55	29	45	14	0.57	1.0	-	0.0015	52	1.8
Oct. 1957	11	184	1170	220	78	100	36	1.5	2.2	1.7	0.0013	51	1.5
Nov. 1957	3	47	300	32	7.9	40	21	0.51	1.7	0.27	0.0017	15	3.3
Dec. 1957	10	63	340	50	29	65	31	1.1	2.2	0.90	0.0032	28	2.0
	San Juan, P.R. Lat. 18° 26'N Long. 66° 00'W Elev. 21 m.												
July 1957	14	130	380	95	30	84	28	1.1	2.3	0.90	0.0029	27	2.1
Aug. 1957	19	184	300	57	31	44	14	0.65	1.5	-	0.0022	48	2.3
Sept. 1957	19	112	680	140	45	55	17	0.73	1.3	-	0.0011	62	1.8
Oct. 1957	17	202	220	33	19	23	9.0	0.47	0.87	0.57	0.0021	39	1.9
Nov. 1957	21	130	110	13	8.1	16	7.8	0.71	0.64	0.09	0.0065	11	0.90

* Extrapolated to the middle of the collection period

** This data was submitted by the U.S. Naval Research Laboratory for inclusion in HASL reports. This information will also appear in a formal NRL report now in preparation.

TABLE 8 - Cont'd.

Month	Rainfall Days	Rainfall mm.	d/m/100 S.C.M. Gross β-	Ce^{141}*	Sr^{89}*	Y^{91}*	Ce^{144}	Sr^{90}	Cs^{137}	Pb^{210}	Activity Ratios Sr^{90}/Gross β-	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
	Miraflores, P.C.Z. Lat. 9° 00'N Long. 79° 35'W Elev. 10 m.												
July 1957	19	202	180	17	12	23	8.7	0.92	1.3	2.5	0.0051	13	1.4
Aug. 1957	22	301	110	13	11	15	7.1	0.31	0.71	-	0.0028	35	2.3
Sept. 1957	15	301	50	10	2.5	8.0	2.7	0.13	0.23	-	0.0026	19	1.8
Oct. 1957	19	372	25	0.63	1.9	2.9	1.6	0.092	0.13	-	0.0037	20	1.4
Nov. 1957	22	104	78	12	3.6	3.3	1.5	0.24	0.63	0.62	0.0031	15	2.6
Dec. 1957	5	7	160	22	14	23	8.9	0.61	1.2	-	0.0038	22	2.0
	Bogota, Colombia Lat. 4° 37'N Long. 74° 04'W Elev. 2640 m.												
Aug. 1957	17	80	68	6.9	4.9	5.3	4.4	0.15	0.29	-	0.0033	33	2.0
Sept. 1957	10	74	49	4.4	4.4	5.5	3.1	0.14	0.31	-	0.0029	30	2.2
Oct. 1957	21	141	55	3.0	1.3	2.9	1.9	0.095	0.20	-	0.0043	13	2.0
Dec. 1957	5	34	97	10.4	6.1	9.6	6.6	0.30	0.49	-	0.0063	20	1.6
	Quito, Ecuador Lat. 0° 13'S Long. 78° 30'W Elev. 2818 m.												
Sept. 1957	1	27	31	9	5.7	17	5.6	0.15	0.22	-	0.0048	38	1.5
Oct. 1957	4	15	18	1.9	0.82	1.8	1.3	0.066	0.27	0.69	0.0055	12	4.1
Nov. 1957	1	10	14	1.2	0.8	15	5.8	0.12	0.51	0.52	0.0019	55	4.3
	Lima, Peru. Lat. 12° 06'S Long. 77° 01'W Elev. 134 m.												
Dec. 1957	4	4	23	2.9	5.3	3.2	2.6	0.24	0.59	-	0.0100	22	2.5
	Huancayo, Peru Lat. 12° 07'S Long. 75° 20'W Elev. 3353 m.												
Oct. 1957	13	74	32	0.0	2.8	5.1	3.9	0.23	0.53	-	0.0072	12	2.3
Nov. 1957	11	69	150	4.8	13	22	5.2	0.42	0.87	-	0.0028	31	2.1
Dec. 1957	21	9	25	2.2	3.1	4.1	1.5	0.20	0.49	-	0.0071	16	2.5

* Extrapolated to the middle of the collection period

TABLE 8 - Cont'd.

Date	Rainfall Days	Rainfall mm	Gross β-	Ce^{141*}	Sr^{89*}	Y^{91*}	Ce^{144}	Sr^{90}	Cs^{137}	Pb^{210}	Activity Ratios Sr^{90}/Gross β-	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
					d/m/100 S.C.M.								
[illegible] Chacaltaya, Bolivia Lat. 17° [illegible]'S Long. [illegible]° [illegible]'W Elev. 5220 m.													
Sept. [illegible]	[illegible]	10	130	[illegible]	13	23	14	0.70	1.1	-	0.0054	[illegible]	[illegible]
Oct. [illegible]	[illegible]	[illegible]	[illegible]	[illegible].9	[illegible].3	[illegible]	5.1	0.38	0.[illegible]	-	0.00[illegible]	12	[illegible]
Nov. [illegible]	[illegible]	[illegible]	[illegible]	27	[illegible]	[illegible]	[illegible]	[illegible]	1.3	0.73	0.003[illegible]	[illegible]	[illegible]
Dec. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.3	[illegible]	[illegible]	0.33	[illegible]	0.92	[illegible]	[illegible]	[illegible]
Antofagasta, Chile Lat. 23° [illegible]'S Long. 70° [illegible]'W Elev. [illegible] m.													
Dec. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Santiago, Chile Lat. [illegible]° [illegible]'S Long. [illegible]° [illegible]'W Elev. [illegible] m.													
Dec. [illegible]	-	N.R.	32	[illegible]	2.[illegible]	12	[illegible]	0.5[illegible]	1.[illegible]	-	[illegible]	[illegible]	[illegible]
[illegible] T.H. Lat. 2[illegible]° [illegible]'N Long. [illegible]° [illegible]'W Elev. [illegible] m.													
Apr. [illegible]	N.R.	[illegible]	[illegible]	-	12	2[illegible]	19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May [illegible]	N.R.	[illegible]	130	[illegible]	11	19	[illegible]	[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
June [illegible]	N.R.	[illegible]	[illegible]	[illegible]	1[illegible]	[illegible]	17	1.1	2.1	[illegible]	[illegible]	[illegible]	[illegible]
July [illegible]	N.R.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20	0.90	1.[illegible]	-	0.0033	[illegible]	[illegible]
Aug. [illegible]	N.R.	[illegible]	100	[illegible]	12	19	[illegible]	0.48	0.9[illegible]	-	[illegible]	[illegible]	[illegible]
Oct. [illegible]	N.R.	[illegible]	[illegible]	[illegible]	21	30	12	0.41	1.3	[illegible]	[illegible]	[illegible]	[illegible]
Nov. [illegible]	N.R.	[illegible]	130	[illegible]	9.2	[illegible]	7.3	0.44	0.57	[illegible]	[illegible]	21	[illegible]
Dec. [illegible]	N.R.	30	110	[illegible]	17	34	17	1.0	1.2	-	[illegible]	[illegible]	1.2
Mauna Loa, T.H. Lat. 19° 2[illegible]'N Long. 155° 3[illegible]'W Elev. 3394 m.													
[illegible]	N.R.	[illegible]	[illegible]	33	[illegible]	2[illegible]	11	0.92	1.2	[illegible]	[illegible]	20	[illegible]
Nov. [illegible]	N.R.	[illegible]	[illegible]	[illegible]	2[illegible]	[illegible]	24	1.3	2.5	0.3[illegible]	0.00[illegible]	22	[illegible]
Dec. [illegible]	N.R.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2[illegible]	1.[illegible]	[illegible]	-	0.00[illegible]2	23	[illegible]

N.R. [illegible]

* [illegible] middle of the collection period

TABLE 8 - Cont'd.

Month	Rainfall Days	mm.	d/m/100 S.C.M. Gross β-	Ce^{141}*	Sr^{89}*	Y^{91}*	Ce^{144}	Sr^{90}	Cs^{137}	Pb^{210}	Activity Ratios Sr^{90}/Gross β-	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
	Subic Bay, P.I.		Lat. 14° 49'N		Long. 120° 17'E		Elev. 18 m.						
July 1957	N.R.	N.R.	31	7.4	3.2	4.5	2.1	0.20	0.26	0.35	0.0065	16	1.3
Aug. 1957	N.R.	N.R.	32	6.7	3.5	5.6	2.5	0.10	0.22	-	0.0031	35	2.2
Sept. 1957	N.R.	N.R.	57	4.9	5.1	9.5	5.1	0.31	0.68	-	0.0054	16	2.2
Oct. 1957	N.R.	N.R.	43	13	6.7	8.4	3.9	0.16	0.38	-	0.0037	42	2.4
Nov. 1957	N.R.	N.R.	80	20	8.8	16	7.1	0.39	0.73	-	0.0049	23	1.9
Dec. 1957	N.R.	N.R.	38	1.9	4.1	7.4	3.5	0.20	0.37	-	0.0053	21	1.9

N.R. Not Reported
* Extrapolated to the middle of the collection period

2.2 High Altitude Sampling

A series of high altitude samples have been taken for radiochemical analysis starting late in 1956. The samples are carried to altitude by balloons and an attempt is made to obtain total volumes of approximately 1,000 standard cubic feet. Four sampling sites are used: Minneapolis, Minnesota (changed to Sioux City, Iowa in August 1958); San Angelo, Texas; the Panama Canal Zone; and Sao Paulo, Brazil. An attempt is made at each location to obtain a sample monthly at each of four nominal altitudes. In addition to the difficulty of controlling sample flights at altitude for the required length of time, a number of samples are not recoverable or are otherwise lost. Therefore, fewer than 16 samples per month are usually available. The detailed data on completed samples taken from November 1956 through June 1958 are given in Table 9.

All the completed data are presented in this report since several corrections and recalculations have been made due to inter-laboratory calibrations. Therefore the Cs^{137}, Ce^{144} and Cs^{137}/Sr^{90} ratio will not correspond to previously published data.

TABLE 9

November 1956

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	Ba^{140} C-date	Ba^{140} d/m/sample	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	4666	1992	11-6-56	65	67	S	3716	3-11-57	15,320 ± 960	4.12 ± 0.26	6-20-57	≤ 0.8 ≤ 0.9	607	680	421	638	62.2	10.2	6.77
	4702	1995	11-9-56	90	93.3	S	1020	1-19-57	9,680 ± 1,795	9.49 ± 1.76	1-25-57	32.8 ± 2.2	--	821 ± 5.7	52.4 ± 6.57	1287	31.3 ± 4.12	41.4	1.66
	4848	2001	11-17-56	50	47/44.5	32.3[1]	8572	3-7-57	13,500 ± 990	1.57 ± 0.12	8-12-57	≤ 0.8 ≤ 0.9	361	315	92.5	165	22.3	7.4	4.15
Texas	4880	T-147	11-30-56	50	49.2	53.3[2]	7255	3-11-57	9,790 ± 1,080	1.35 ± 0.15	6-20-57	≤ 1.9 ≤ 0.8	136	165	24.2	268	12.4	21.6	2.11
	4881	T-148	11-30-56	90	94	S	834	1-19-57	1,186 ± 572	1.42 ± 0.68	1-25-57	19.9 ± 1.6	--	254 ± 10	92.8 ± 7.79	491	28.9 ± 4.55	16.9	3.21
Southern Hemisphere	4902	S-128	11-25-56	90	90.5	S	4.80	1-19-57	746 ± 615	1.55 ± 1.28	1-25-57	12.6 ± 1.6	--	338 ± 14	161 ± 15	383	41.9 ± 9	4.38	9.12
	4903	S-130	11-26-56	65	65.7	S	3330	1-19-57	6,135 ± 1,292	1.84 ± 0.39	1-25-57	45.3 ± 2.4	--	363 ± 1.9	157 ± 4.1	621	38.9 ± 1.77	16	4.0

1. Stratospheric Sample.

2. Tropospheric Sample.

Cont'd.

December 1956

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	Ba^{140} C-date	Ba^{140} d/m/sample	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	4901	2011	12-8-56	50	51	30.0[1]	7894	3-11-57	22,600 ± 1,330	2.86 ± 0.17	6-20-57	≤1.2 ≤1.1	312	305	137	485	30.3	16.0	4.52
	4997	2031	12-19-56	65	66/66.5	S	6665	3-7-57	15,200 ± 1,040	2.28 ± 0.16	--	--	306	530	108.9	384	35.6	10.8	3.06
Texas	4991	T-154	12-14-56	80	83.2/66.8	S	2029	1-19-57	2,353 ± 507	1.26 ± 0.25	1-25-57	21.0 ± 1.6	--	137 ± 4.1	76.4 ± 4.1	186	33.4 ± 2.21	5.58	2.29
	4992	T-156	12-16-56	65	68/66.9	S	3616	3-11-57	18,160 ± 900	5.02 ± 0.25	6-20-57 6-24-57	≤2.0 ≤1.6	475	682	243	804	52	15.5	4.67
	5023	T-159	12-21-56	50	49.5/48	44.3[1]	7928	3-8-57	2,300 ± 730	0.29 ± 0.09	--	--	45.6	60.1	10.83	83	1.64	50.6	6.60
Panama	5000	P-132	12-1-56	65	70	S	3069	3-11-57	29,000 ±12,700	9.45 ± 4.14	5-28-57	≤1.3 ≤1.2	834	2043	242	3646	189	19.3	1.28
Southern Hemisphere	5022	B-138	12-21-56	80	87/70.5	S	1426	3-11-57	2,420 ± 820	1.7 ± 0.58	5-28-57	≤0.7 ≤1.2	94.3	477	106	≤72	39.3	≤1.83	2.7
	5041	B-144	12-28-56	90	89.9	S	969	1-19-57	648 ± 514	0.67 ± 0.53	1-25-57	17.0 ± 1.5	--	123 ± 7.2	56.9 ± 8.3	82.3	6.91 ± 4.23	11.9	8.2
	5042	B-145	12-29-56	50	47.5	51.7[2]	8399	3-11-57	1,410 ± 650	0.17 ± 0.08	5-28-57	≤0.8 ≤1.4	3.03	15.3	11.89	≤11	0.77	14.3	15.6
	5043	B-146	12-30-56	80	80.5	S	1701	1-19-57	5,572 ± 1,682	3.28 ± 0.99	1-29-57	239 ± 5	--	115 ± 5.0	121 ± 5.8	--	--	--	--

1. Stratospheric Sample.

2. Tropospheric Sample.

Cont'd.

January 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	Ba^{140} C-date	Ba^{140} d/m/sample	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	5134	2051	1-16-57	50	46/43	32[1]	11952	3-22-57	31,790 ± 990	2.66 ± 0.08	6-20-57 6-24-57	≤1.4 ≤5.2	389	561	37	244	24.8	9.83	1.49
Texas	5172	T-165	1-17-57	90	105/106.5	S	850	3-22-57	≤650	≤0.76	6-20-57 6-24-57	≤1.4 ≤1.4	106	58.6	11.93	≤393	7.65	≤51	1.56
	5173	T-167	1-18-57	65	65	36.8[1]	3857	3-22-57	34,150 ± 1,400	8.85 ± 0.36	--	--	863	3780	354	--	--	--	--
Panama	5232	P-145	1-21-57	65	65	53.1[1]	3459	3-25-57	2,930 ± 850	0.85 ±	7-10-57	≤1.9 ≤1.8	93.1	116.7	6.99	--	--	--	--
Southern Hemisphere	5279	S-152	1-31-57	65	65	53.1[1]	3343	3-22-57	613 ± 790	0.18 ± 0.24	7-1-57	≤1.7 ≤0.9	39	190	45.2	55.6	25.9	2.14	1.74

1. Stratospheric Sample.

Cont'd.

February 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	Ba^{140} C-date	Ba^{140} d/m/sample	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	5300	2114	2-13-57	80	79.7/76.0	S	3629	3-22-57	12,300 ± 550	3.39 ± 0.15	7-3-57	≤ 0.8 ≤ 0.9	341	23.7	7.52	61.5	0.83	74.1	9.06
	5321	2130	2-27-57	50	42.5/39	35.3[1]	17499	3-25-57	21,000 ± 1,120	1.20 ± 0.06	--	--	104	222	21.7	75.6	11.7	6.46	1.85
	5322	2128	2-19-57	65	66.9/65.1	S	5444	3-25-57	2,830 ± 850	0.52 ± 0.16	--	--	64.5	139.7	30.0	108	7.26	14.9	4.13
Texas	5293	T-172	2-9-57	90	97.25/98.75	S	772	3-22-57	≤ 520	≤ 0.67	7-3-57	≤ 1.9 ≤ 1.0	120	342	40.4	≤ 276	26.0	≤ 10.6	1.55
	5297	T-174	2-11-57	65	65.5	S	3229	3-22-57	18,275 ± 1,190	5.66 ± 0.37	7-1-57	≤ 1.3 ≤ 1.4	345	1536	77.4	844	136	6.20	0.57
	5319	T-178	2-27-57	50	49.0/49.6	36.0[1]	7320	3-25-57	7,400 ± 970	1.01 ± 0.13	7-22-57	≤ 1.1 ≤ 0.7	61.5	170	18.3	60.8	9.9	6.14	1.85
	5340	T-176	2-25-57	80	85/85.25	S	1776	3-25-57	2,230 ± 750	1.26 ± 0.42	7-22-57	≤ 0.7 ≤ 1.3	60	572	147.6	160	39.7	4.03	3.72
Panama	5280	P-148	2-1-57	90	99/104	S	710	3-22-57	≤ 560	≤ 0.8	--	--	≤ 256	3979	285	--	103000[3]	--	--
	5307	P-150	2-15-57	65	67.2/59.2	53.1[1]	4373	3-22-57	9,470 ± 800	2.16 ± 0.18	7-10-57	≤ 1.1 ≤ 1.0	132	525	36.2	230	38	6.05	0.95
	5435	P-154	2-28-57	80	78	S	2180	3-25-57	8,080 ± 880	3.71 ± 0.40	--	--	227	1042	155.2	3563[3]	35	--	4.43
Southern Hemisphere	5393	B-158	2-21-57	90	89.5	S	843	3-25-57	≤ 640	≤ 0.76	--	--	89.8	91.2	63.8	135	9.49	14.22	6.72
	5394	B-159	2-22-57	65	66	S	2830	3-25-57	1,780 ± 700	0.63 ± 0.25	7-22-57	≤ 1.1 ≤ 0.7	427.0	227	129	109	29.8	3.66	4.33
	5395	B-160	2-23-57	80	92/71.6	S	1121	3-22-57	19,900 ± 590	14.0 ± 0.42	7-31-57	≤ 1.3 ≤ 1.1	<7.0	197	113.1	<335	31	<10.8	3.65

1. Stratospheric Sample.
3. Sample contaminated with cerium and strontium.

Cont'd.

March 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	5448	2151	3-13-57	65	65.7/55	32[1]	8024	4-5-57	12,250 ± 990	2.27 ± 0.12	185	849	137.1	203	69.8	2.91	1.96
	5449	2173	3-19-57	50	49.5/47	31.5[1]	8900	4-5-57	12,050 ± 1,010	1.35 ± 0.11	89.9	264	41.2	99.7	20.4	4.89	2.02
	5470	2182	3-21-57	80	81.5/55	S	4718	4-5-57	11,840 ± 1,470	2.51 ± 0.31	128	618	67.9	362	44.2	8.19	1.54
	5533	2185	3-27-57	90	67.4/98.5	S	2395	5-7-57	3,060 ± 730	1.28 ± 0.30	90.6	312	64.7	≤131	25	≤5.24	2.59
Texas	5440	T-183	3-11-57	80	77.5/78.5	S	2007	3-25-57	922 ± 890	0.46 ± 0.44	116	361	117.3	≤146	28.4	≤5.14	4.13
	5441	T-185	3-12-57	90	94/95	S	1079	4-5-57	860 ± 803	0.8 ± 0.74	179	97.8	66.5	(-859)	6.58	--	10.1
Panama	5437	P-160	3-6-57	80	80.1/81.6	S	1828	3-25-57	2,970 ± 850	1.62 ± 0.46	199	804	107.5	104	46.5	2.24	2.31
	5467	P-162	3-8-57	90	89.2/96.0	S	940	4-5-57	≤830	≤0.88	≤188	38.8	47.3	≤502	≤2.93	171	≥16.1
	5468	P-163	3-9-57	65	64.5/63.1	57.3[1]	3109	4-5-57	6,980 ± 960	2.24 ± 0.31	191	625	77.5	261	47.4	5.93	1.64
Southern Hemisphere	5442	B-162	3-8-57	90	90	S	969	4-5-57	≤560	≤0.58	273	99.0	108.7	≤184	18.3	≤10.0	5.94
	5524	B-166	3-23-57	80	81.5	S	644	5-7-57	≤750	≤1.16	≤234	243	129.0	≤228	20.5	≤11.1	6.29
	5526	B-167	3-23-57	65	66	S	2473	5-7-57	4,780 ± 750	1.93 ± 0.30	≤72.6	267	114.8	≤191	41.0	≤4.66	2.80
	5528	B-171	3-27-57	80	80.8	S	1769	8-26-57	1,680 ± 500	0.95 ± 0.28	172	491	132.2	≤256	32.5	≤7.88	4.07

1. Stratospheric Sample.

Cont'd.

April 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	5563	2190	4-8-57	65	65/37	31.1[1]	14211	5-7-57	19,890 ± 1,240	1.4 ± 0.09	54.0	331	44.3	≤53.5	24.8	≤2.16	1.79
	5593	2201	4-15-57	50	47.5	39.5[1]	6180	5-7-57	35,790 ± 1,440	5.79 ± 0.23	183	403	80.8	510	33.5	15.2	2.41
	5594	2203	4-17-57	80	81.5/74.35	S	3731	5-7-57	34,840 ± 1,240	9.34 ± 0.33	372	608	66.8	351	37.5	9.36	1.78
	5560	2217	4-26-57	90	80.4/93.5	S	2347	5-18-57	1,860 ± 590	0.79 ± 0.25	≤53.3	38.8	2.65	(<766)	≤1.56	—	≤1.7
	5685	2218	4-29-57	65	67.6/68	S	3120	6-17-57	17,820 ± 989	5.71 ± 0.32	263	1474	346	(<820)	138	≤5.94	2.51
Texas	5636	T-193	4-17-57	90	89.5	S	2689	5-7-57	1,600 ± 650	0.6 ± 0.24	≤58.6	11.47	7.53	≤56.4	≤1.12	50.3	≤5.72
Panama	5591	P-165	4-8-57	80	76.9/78.4	S	2091	5-18-57	≤580	≤0.28	111	229	9.52*	(246)	≤1.59	—	≤5.99
	5592	P-167	4-12-57	65	61.75/61	56.3[1]	4082	5-7-57	4,300 ± 770	1.05 ± 0.19	75	329	1.72	≤137	27.4	≤5.0	0.06
Southern Hemisphere	5637	B-173	4-9-57	90	90.4	S	894	5-7-57	940 ± 650	1.05 ± 0.73	≤245	102	24.5	(<886)	14.6	<60.7	1.68
	5638	B-175	4-12-57	80	78.6/>90	S	1253	5-7-57	1,390 ± 670	1.11 ± 0.53	≤89	77.2	62.2	(<618)	14.4	—	4.32
	5695	B-178	4-23-57	80	68.5/90	S	1179	5-18-57	1,900 ± 590	1.61 ± 0.50	132	501	52.1	≤569	58.1	≤9.79	0.9
	5696	B-179	4-23-57	65	64	48.0[1]	3340	5-18-57	3,200 ± 640	0.96 ± 0.19	46.8	250	116.7	≤207	44.5	≤4.65	2.62
	5697	B-131	4-25-57	80	78/80.5	S	1561	5-18-57	2,470 ± 370	1.58 ± 0.24	≤103	417	134.9	≤134	42.6	≤3.14	3.17

1. Stratospheric Sample.

( ) Values suspect due to late analysis date.

Cont'd.

May 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	5823	2234	5-11-57	65	62.1/61.7	38.8[1]	5810	6-17-57	15,900 ± 1,100	2.74 ± 0.19	103	680	159	(<448)	58	7.72	2.74
	5876	2240	5-16-57	80	78/78.5	S	3883	6-17-57	1,450 ± 580	0.37 ± 0.15	≤16.7	47.3	22.2	≤97.1	4.78	≤20.3	4.64
	6025	2196	5-27-57	65	62.2/62.9	37.6[1]	6410	7-19-57	12,720 ± 1,100	1.98 ± 0.17	159	494	44.5	≤258	49.5	≤5.21	0.9
	6026	2255	5-27-57	90	72.5/90.4	S	1916	7-19-57	13,400 ± 680	6.99 ± 0.35	846	2133	92.8	<375	78.3	<4.79	1.18
	6039	2213	5-29-57	80	77.2/73.1	S	3952	7-19-57	2,440 ± 930	0.62 ± 0.21	43.5	295	67.7	≤35.2	28.6	≤1.23	2.37
Texas	5694	T-197	5-2-57	80	81.5	S	1945	6-17-57	1,700 ± 640	0.87 ± 0.33	76.6	280	120.7	≤179	19.3	≤3.08	6.25
	5722	T-198	5-3-57	65	66.5	S	1824	6-17-57	4,490 ± 810	2.46 ± 0.44	183	755	176	≤583	58.1	≤10.0	3.03
	5870	T-199	5-10-57	50	48.75	39.1[1]	1915	6-17-57	≤580	≤0.30	≤30	22.7	6.52	≤79	≤1.64	≤48.2	-3.98
	5871	T-200	5-14-57	50	47.5	35.9[1]	2949	6-17-57	≤620	≤0.21	≤35.7	33.4	8.47	(<487)	<2.03	--	-4.17
	5875	T-202	5-17-57	90	98.6/89.5	S	1266	6-17-57	650 ± 550	0.51 ± 0.43	≤65.2	36.2	9.86	(<176)	< 2.76	--	-3.57
	5970	T-203	5-22-57	50	49	42.0[1]	4341	7-19-57	2,130 ± 690	0.49 ± 0.16	134	109.9	25.7	(386)	7.1	--	3.61
Panama	6005	P-176	5-14-57	65	64.5/65.5	55.0[1]	1652	7-19-57	1,640 ± 740	0.99 ± 0.45	174	40.9	27	(<1180)	20.2	--	1.34
Southern Hemisphere	6006	B-185	5-14-57	65	65.3		1796	7-19-57	≤620	≤0.34	≤145	180	49.1	(<277)	32.3	<8.54	1.52
	6009	B-188	5-17-57	80	80/79.1	S	1655	7-17-57	1,030 ± 760	0.62 ± 0.46	<139	39.1	96.6	(<263)	42	<6.26	2.30
	6012	B-191	5-19-57	80	79	S	1733	7-17-57	2,300 ± 780	1.33 ± 0.45	199	473	130.1	<157	42.1	<3.49	3.09

1. Stratospheric Sample.

( ) Values suspect due to late analysis date.

Cont'd.

June 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
											d/m/1000 S.C.F.						
Minneapolis	6331	2222	6-19-57	90	90.1/90.7	S	2283	8-26-57	6,420 ± 760	2.81 ± 0.33	92.4	96.8	14.70	(<380)	3.04	—	4.84
	6334	2235	6-27-57	50	49.6	36.3[1]	10800	8-26-57	12,810 ± 617	1.19 ± 0.057	211	211	20.3	(<258)	17.7	—	1.15
	6335	2236	6-30-57	65	62.3	44.75[1]	7886	8-26-57	11,450 ± 680	1.83 ± 0.086	96.7	555	73.0	(<430)	46.0	—	1.59
Texas	6085	T-205	6-6-57	90	90.9	S	1219	7-19-57	1,320 ± 670	1.08 ± 0.55	≤82.1	37.5	22.5	≤62.1	1.52	≤40.8	14.8
	6102	T-204	6-6-57	90	73.4/89.4	S	1028	7-19-57	1,790 ± 740	1.74 ± 0.72	152	395	125.11	≤81.4	32.1	≤ 2.54	3.9
	6103	T-206	6-7-57	80	79.7/80.1	S	2441	7-19-57	1,440 ± 690	0.59 ± 0.28	43.5	143	42.7	≤22.2	9.69	≤ 2.29	4.41
	6104	T-207	6-11-57	65	66.8/67.6	S	1736	7-19-57	3,440 ± 890	1.98 ± 0.51	163	479	237	≤80.3	52.1	≤ 1.54	4.55
	6203	T-210	6-19-57	80	80.3/81.5	S	1813	8-26-57	3,500 ± 720	1.93 ± 0.4	<120	37.9	17.6	(<165)	6.34	—	2.78
Panama	6105	P-177	6-7-57	80	78.1/79.1	S	1932	8-26-57	≤520	≤0.27	<128	≤12.5	7.66	(<329)	≤1.81	—	4.23
Southern Hemisphere	6175	B-194	6-1-57	90	88.9	S	786	8-26-57	3,790 ± 540	4.82 ± 0.69	<333	968	164	≤248	57.9	≤ 4.28	2.83
	6176	B-195	6-2-57	65	66.2/63.5	53.9[1]	1265	8-26-57	1,410 ± 450	1.11 ± 0.36	412	196	12.58	388	4.47	86.8	2.81
	6177	B-196	6-2-57	90	93.3/95.9	S	1278	8-26-57	2,020 ± 540	1.58 ± 0.42	223	406	148.4	< 421	47.3	8.9	3.16
	6305	B-198	6-13-57	90	93.5	S	949	8-26-57	2,030 ± 460	1.08 ± 0.48	333	138	20.6	(<415)	<3.69	—	≤5.58
	6306	B-199	6-14-57	80	77.1/81.1	S	1788	8-26-57	1,748 ± 540	0.98 ± 0.30	<87	301	25.7	≤160	28.5	≤ 5.61	0.90
	6307	B-200	6-15-57	50	49.3	40.1[1]	1926	8-26-57	1,870 ± 540	0.97 0.28	125	105.5	38.8	(<139)	4.93	28.2	7.87

1. Stratospheric Sample.

( ) Values suspect due to late analysis.

Cont'd.

July 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	6426	2237	7-9-57	90	88.1/88.7	S	1738	8-26-57	1,210 ± 670	0.70 ± 0.38	< 79.2	26.3	18.4	< 99.8	< 1.29	<77.4	=14.3
	6427	2241	7-11-57	50	50.5/50.7	46.3[1]	7174	9-17-57	7,330 ± 860	1.02 ± 0.12	222	250	17.0	112	7.04	15.9	2.41
	6428	2242	7-11-57	65	61.7/62.4	46.3[1]	7720	9-17-57	25,490 ± 1,410	3.30 ± 0.18	74.3	533	108.1	<174	52.4	<3.32	2.06
	6429	2244	7-15-57	80	76.0/76.4	S	4361.7	9-17-57	2,140 ± 690	0.49 ± 0.16	≤28.4	300	64.0	<162	21.8	<7.44	2.94
	6494	2246	7-23-57	65	59.9/61.7	47.3[1]	2145	9-17-57	10,620 ± 800	4.95 ± 0.37	304	1386	363	<390	122	< 3.2	2.98
	6566	2247	7-29-57	90	90.0/90.8	S	2288	9-17-57	≤630	≤0.28	73.2	38.1	8.17	(< 124)	<1.75	--	> 4.67
Texas	6406	T-212	7-7-57	40	87.0/87.4	S	1225	8-26-57	3,320 ± 500	2.71 ± 0.41	343	234	31.4	557	10.6	52.5	2.96
	6408	T-214	7-11-57	80	80.8/81.5	S	1809	8-26-57	3,570 ± 560	1.97 ± 0.31	119	428	198	<332	42.0	7.9	4.71
	6425	T-215	7-13-57	50	48.9	47.0[1]	1890	8-26-57	3,020 ± 480	1.60 ± 0.25	547	373	1.96	(<473)	<2.38	--	=0.82
Southern Hemisphere	6456	S-201	7-7-57	65	64.8/65.5		819	9-23-57	6,810 ± 940	8.32 ± 1.15	716	1380	370	1410	122	11.5	3.03
	6457	S-202	7-10-57	90	92.5/92.7	S	973	9-17-57	≤690	≤0.71	<272	59.5	16.8	(<339)	<1.03	--	=16.3
	6458	S-204	7-10-57	80	78.1/74.4	S	2173	9-17-57	2,600 ± 890	1.20 ± 0.41	<53.9	294	102.6	<126	21.1	< 5.97	4.86
	6459	S-205	7-13-57	50	48.8/48.9	47.9[1]	1899	9-17-57	2,017 ± 630	1.06 ± 0.33	558	293	6.99	<44.3	1.18	< 37.5	5.92

1. Stratospheric Sample.

( ) Values suspect due to late analysis.

Cont'd.

August 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	6605	2248	8-2-57	50	48.6/49.1	45.7[1]	5174	9-17-57	6,062 ± 800	1.17 ± 0.15	220	165	11.90	89.8	3.07	29.2	3.88
	6610	2249	8-5-57	90	89.6/91.5	S	2151	9-17-57	641 ± 570	0.26 ± 0.23	≤45.7	35.4	8.91	<62.3	<1.22	51.0	7.30
	6661	2253	8-10-57	90	88.9	S	2646	9-17-57	≤630	≤0.24	≤27.6	19.7	5.30	(<180)	<1.32	--	4.02
	6695	2256	8-20-57	65	64.0	41.1[1]	12630	9-17-57	20,390 ± 990	1.61 ± 0.08	37.1	462	161	<118	54.2	<2.18	2.97
Texas	6653	T-217	8-6-57	95	94.9	50.6[1]	1660	9-17-57	4,670 ± 690	2.81 ± 0.42	128	483	161	<136	52.1	2.61	3.09
	6654	T-218	8-7-57	90	89.4/91.8	S	1061	9-17-57	3,100 ± 710	2.92 ± 0.67	348	303	33.5	(497)	11.8	--	2.89
Southern Hemisphere	6697	B-207	8-3-57	65	64.0/66.0		1232	9-17-57	1,100 ± 720	0.89 ± 0.58	160	221	122.8	<196	35.7	<5.49	3.44
	6698	B-209	8-5-57	50	49.0		1816	9-23-57	2,080 ± 630	1.14 ± 0.35	310	223	17.2	(<216)	3.73	--	4.61
	6700	B-211	8-8-57	80	79.2/79.8	S	1797	9-17-57	≤540	≤0.30	60.7	11.9	7.8	<77.4	1.11	69.7	7.03
	6701	B-214	8-18-57	90	90.1	S	993	9-17-57	2,390 ± 700	2.41 ± 0.70	≤67.6	156	75.2	<109	17.6	<6.19	4.27

1. Stratospheric Sample.

( ) Values suspect due to late analysis.

Cont'd.

September 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	C-date	Total Activity d/m/sample	d/m/S.C.F.	d/m/1000 S.C.F. Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	6805	2263	9-4-57	50	46.6/45.9	38.9[1]	2258	9-23-57	5,440 ± 770	2.41 ± 0.34	≤24.5	272	400	38.1	<179	28.3	<63.4	1.35
	6827	2265	9-6-57	80	77.5/77.2	S	2917	9-23-57	2,180 ± 820	0.72 ± 0.28	≤108	112	134	55.9	<13.0	13.9	<0.94	4.02
	6849	2268	9-11-57	65	63.2	39.8[1]	3648	9-23-57	6,840 ± 740	1.88 ± 0.20	≤11.4	58.4	510	198	56.9	58.5	0.97	3.38
	6932	2269	9-23-57	65	63.0	32.6[1]	4203	10-4-57	4,470 ± 880	1.06 ± 0.21	≤27.1	54.5	386	124.0	237	42.3	5.61	2.93
Texas	6758	T-221	9-4-57	90	90.1	S	1033	9-23-57	5,030 ± 600	4.87 ± 0.58	≤107	214	139	108.7	≤37.8	20.8	1.82	5.22
	6850	T-222	9-6-57	80	80.5	S	1805	9-23-57	6,330 ± 730	3.51 ± 0.40	≤421	140	139	283	<93.4	53.5	1.74	5.29
	6851	T-223	9-11-57	65	64.7	36.9[1]	1802	9-23-57	5,510 ± 710	3.06 ± 0.39	≤286	197	361	235	< 113	93	< 1.13	3.87
	6914	T-224	9-13-57	50	49.3/50.7	44.0[1]	1654	10-4-57	2,230 ± 640	1.35 ± 0.39	≤112	137	219	92.1	64.9	8.56	7.56	3.75
Southern Hemisphere	6879	B-216	9-6-57	65	64.2		1586	9-26-57	1,800 ± 640	1.13 ± 0.40	≤59.7	84.4	196	94.4	32.5	25.2	1.67	3.75
	6881	B-219	9-11-57	80	80.2	S	2288	9-26-57	930 ± 540	0.41 ± 0.24	≤51.4	≤24.2	26.3	11.9	<33.0	2.56	< 12.8	4.61

1. Stratospheric Sample.

Cont'd.

October 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	6980	2276	10-2-57	50	48.4/49.2		4087	10-9-57	1,220 ± 610	0.30 ± 0.15	10.2	80.6	63.8	7.25	22.4	2.72	8.24	2.66
Texas	6981	T-225	10-1-57	50	49.8	48.5[1]	1604	10-9-57	2,910 ± 660	1.81 ± 0.41	113	183	159	30.4	44.9	2.28	19.7	39.6
	6982	T-226	10-3-57	90	91.25/90.75	S	1062	10-9-57	4,550 ± 790	4.28 ± 0.74	248	185	169	38.2	111	4.66	23.8	8.2
	6996	T-227	10-4-57	80	82.5	S	1585	10-25-57	3,501 ± 110	2.21 ± 0.069	372	147	366	53.2	84.7	16.4	5.16	3.24
	6997	T-228	10-5-57	65	63.5		1955	10-25-57	6,285 ± 120	3.21 ± 0.061	241	171	564	146	186	36.3	5.12	4.02
Southern Hemisphere	7059	B-223	10-8-57	90	89.5	S	856	10-25-57	≤470	≤0.55	<23.8	69.6	32.2	29.2	(<42.3)	<8.34	18.1	12.5
	7060	B-224	10-9-57	80	80.2	S	1832	10-25-57	621 ± 100	0.34 ± 0.054	≤10.5	≤26	45.3	24.3	≤12.3	3.77	≤3.26	6.44
	7063	B-227	10-11-57	65	67.2		1790	10-25-57	925 ± 120	0.52 ± 0.067	12.7	50.9	173	137.7	88.4	22	4.02	6.26

1. Stratospheric Sample.

( ) Values suspect due to late analysis date.

Cont'd.

November 1957

	BASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	7257	2299	11-25-57	80	78.6/79.0	S	806	12-12-57	2,590 ± 810	3.21 ± 1.00	248	247	508	100	343	29.3	11.7	3.43
	7258	2301	11-30-57	65	63.7/64.3		3617	12-12-57	3,780 ± 630	1.04 ± 0.17	73.7	92.8	200	50.5	110	14.6	7.53	3.46
Texas	7234	T-231	11-18-57	80	81.0/80.2	S	5554	11-26-57	3,720 ± 680	0.66 ± 0.12	--	14.3	287	94.1	7.04	25.6	0.28	3.68
	7235	T-232	11-18-57	50	47.5		2420	11-26-57	16,020 ± 900	6.62 ± 0.37	1380	735	548	33.9	139	9.92	14.0	3.42
	7256	T-236	11-27-57	65	66.0/65.5		1770	12-12-57	12,600 ± 870	7.11 ± 0.49	419	584	1520	172	520	45.2	11.5	3.80
	7340	T-235	11-23-57	65	66		1766	1-7-58	44,200 ± 890	25.0 ± 0.50	—	2517	2011	246	2598	74.2	35.0	3.32
Southern Hemisphere	7301	S-231	11-24-57	80	80/79.5	S	1980	12-23-57	841 ± 630	0.42 ± 0.32	<16.9	<11.8	61.8	38.6	<11.5	9.79	1.17	3.95

Cont'd.

December 1957

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (S.C.F.)	Total Activity C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	7259	2302	12-4-57	50	46.7/47.5		4265	12-12-57	27,570 ± 1,380	6.46 ± 0.32	216	878	838	61.9	393	23.4	16.8	2.64
	7272	2304	12-12-57	80	81.1/81.5	S	1594	1-7-58	14,100 ± 890	8.84 ± 0.56	--	54.9	60.2	15.4	53.8	3.78	14.2	4.07
	7341	2305	12-21-57	65	63.45		3406	1-7-58	28,380 ± 690	8.33 ± 0.20	--	560	799	179	804	55.9	14.4	3.20
	7423	2303	12-19-57	90	88.1/88.6	S	1463	1-16-58	≤790	≤0.54	14.0	36.2	53.0	12.3	70.0	<3.08	>22.7	>3.99
Texas	7289	T-237	12-9-57	90	92.7	S	1001	12-16-57	1,270 ± 640	1.27 ± 0.64	<18.1	172	lost	58	<42.9	<4	10.7	-14.5
	7277	T-238	12-9-57	80	80.4	S	1750	12-16-57	1,400 ± 660	0.80 ± 0.38	21.2	28.9	159	60.7	<61.8	8.77	<7.04	< 6.92
	7278	T-239	12-9-57	50	48.8	48.0[1]	1712	12-16-57	1,270 ± 600	0.74 ± 0.35	<19.8	84.9	86.1	11.7	61.7	3.04	20.3	3.85
	7296	T-242	12-11-57	65	62.4		2085	12-23-57	22,760 ± 3,845	10.9 ± 1.84	234	675	1005	53.2	941	54.7	17.2	0.97
Panama	7288	P-211	12-2-57	90	89.5/88.3	S	1133	12-16-57	650 ± 630	0.57 ± 0.56	<23.4	34.7	317	63.6	265	23	11.5	2.76
	7297	P-212	12-4-57	65	65.9/65.5		1740	12-23-57	20,050 ± 3,020	11.5 ± 1.74	584	138	1404	124	1370	64.1	21.4	1.93
Southern Hemisphere	7424	B-234	12-10-57	80	81.2/80.3	S	1821	1-16-58	≤540	≤0.30	<24.4	<14.8	158	103.6	< 24.8	23.1	<1.07	4.48
	7425	B-236	12-12-57	65	65.5/65.8		1571	1-16-58	≤560	≤0.36	<15.1	31.6	183	71.0	55.9	23.9	2.34	2.97
	7427	B-239	12-14-57	50	51.5/51.2		2744	1-16-58	≤560	≤0.20	<7.1	5.26	2.81	2.00	7.31	1.42	5.15	1.41

1. Stratospheric Sample.

Cont'd.

January 1958

	RASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume S.C.F.	C-date	Total Activity d/m/sample	Total Activity d/m/S.C.F.	d/m/1000 S.C.F. Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	7514	2309	1-10-58	65	64.2		3165	2-1-58	8,439 ± 950	2.66 ± 0.30	83.6	273	513	124	374	39.8	9.4	3.12
	7518	2310	1-12-58	90	90/85.6		1546	2-1-58	947 ± 560	0.61 ± 0.36	<4.51	40.6	169	76.8	27.1	15.9	1.70	4.83
	7554	2311	1-22-58	80	77.7/78.0		1486	4-2-58	1,178 ± 576	0.79 ± 0.38	5300	28.3	146	35.5	20.9	15.2	1.38	2.34
Texas	7492	T-244	1-7-58	80	79.6/81.1		1707	2-1-58	1,200 ± 770	0.70 ± 0.45	<9.95	33.2	124.8	39.5	55.2	7.91	6.98	4.99
	7493	T-245	1-8-58	90	90.1		1139	2-1-58	1,401 ± 710	1.23 ± 0.62	<12.2	84.6	159	54.9	53.5	11.9	<4.5	4.61
	7526	T-248	1-17-58	65	65.1		1049	2-1-58	12,371 ± 740	11.79 ± 0.70	211	1065	1520	224*	1062	72.4	14.7	3.09
Panama	7491	P-216	1-5-58	80	78.9/81.1		1708	2-1-58	1,287 ± 590	0.75 ± 0.34	30.2	61.1	468	22.2	99.1	67.3	1.47	0.33
	7522	P-217	1-13-58	90	89.4/91.3		782	2-1-58	1,294 ± 650	1.65 ± 0.83	<35.3	52.8	270	45.4	<122	26.7	4.57	1.70
South America	7556	B-244	1-8-58	90	90.1/92.0		951	4-2-58	≤466	≥0.49	22000	49.5	55.7	84.6	22.4	2.31	9.68	(36.6)
	7557	B-246	1-10-58	65	64.6/65.2		1622	4-2-58	≤510	≥0.31	2860	48.8	74.4	31.8	28.4	11.6	2.45	2.74

Cont'd.

February 1958

	MASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (ft^3)	Total Activity C-date	Total Activity d/m/sample	Total Activity $d/m/ft^3$	d/m/1000 ft^3 Be^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	7625	2325	2-5-58	80	88.6/90.5	S	1434	5-1-58	511 ± 98	0.22 ± 0.07	3210	73.1	91.3	16.5	88.1	14.3	5.62	1.15
	7624	2326	2-7-58	80	77.6/77.1	S	1317	4-28-58	1,690 ± 120	1.28 ± 0.09	5040	188	342	78.2	60	12.7	4.72	.15
	7643	2327	2-13-58	50	45.5		3947	5-3-58	9,320 ± 220	2.36 ± 0.06	560	855	722	76.0	339	31.2	10.9	2.44
	7663	2329	2-22-58	65	63.3/64.15		5457	4-17-58	1,293 ± 455	0.37 ± 0.13	1470	51.5	184	26.9	37.1	21.7	1.	1.24
[illegible]	7642	2326	2-10-58	80	81.0/74.6	S	1883	5-3-58	1,950 ± 120	1.07 ± 0.06	1910	38.4	443	169	63.8	93	[illegible]	[illegible]
South America	7645	2328	2-7-58	75	65.2/76.8		1454	4-17-58	970 ± 459	0.60 ± 0.31	28700	171	212	118	70.2	25.7	2.73	4.59
	7646	2-251	2-9-58	80	74.8/79.7	S	1936	5-13-58	635 ± 30	0.33 ± 0.02	2920	30.7	93.9	43	28.8	14.9	1.93	2.89
	7647	2-252	2-10-58	80	85.3/89.1	S	1052	4-2-58	≤345	≤0.33	4390	47	32.2	8.27	7.40	4.52	1.64	1.83

Cont'd.

March 1958

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (ft^3)	Total Activity C-date	Total Activity d/m/sample	Total Activity $d/m/ft^3$	d/m/1000 ft^3 Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	7712	2329	3-6-58	50	48.7		5486	3-13-58	12,630 ± 933	2.30 ± 0.17	5.85	198	455	24.8	154	24.4	6.32	1.01
	7713	2330	3-12-58	65	63.4/63.7		3594	5-24-58	5,740 ± 40	1.6 ± 0.01	1360	446	650	105	lost	lost	--	--
	7740	2331	3-20-58	80	78.1/77.4	S	1634	5-13-58	425 ± 27	0.26 ± 0.02	501	48.5	143	38.7	57.5	12.9	4.46	3.01
	7776	2335	3-26-58	90	92.8	S	1294											
Texas	7686	T-255	3-3-58	30	91.3/87.6	S	1490	4-2-58										
	7727	T-257	3-9-58	65	65.1		1854	4-17-58										
Panama	7684	P-229	3-1-58	80	80.5/80.7	S	1758	4-2-58	2,219 ± 608	1.26 ± 0.34	5460	89.7	323	130	78.8	48.1	1.64	2.7
South America	7714	B-255	3-4-58	90	91.4/92.0	S	903											
	7715	B-257	3-6-58	90	88.9/89.5	S	1080	4-17-58	<521	0.48	3540	19.6	53	7.27	28.7	7.55	3.8	0.96
	7716	B-258	3-7-58	80	78.1/79.1	S	2019											

Cont'd.

April 1958

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (ft^3)	Total Activity C-date	Total Activity d/m/sample	Total Activity $d/m/ft^3$	d/m/1000 ft^3 Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	7805	2336	4-7-58	90	90.1	S	1443											
	7806	2337	4-8-58	80	74.4/77.9	S	1502	6-28-58	340 ± 10	0.23 ± 0.007	309	121	172	42.9	61.6	16.5	3.74	2.61
	7807	2338	4-9-58	50	46.5/47.3		3659	6-29-58	7,800 ± 100	2.13 ± 0.03	1410	3960	1420	48.2	571	26.1	21.9	1.85
	7862	2339	4-23-58	65	64.4/64.7		2750	7-11-58	2,370 ± 50	0.86 ± 0.02	194	556	265	138	269	52.9	5.08	2.61
Texas	7793	T-259	4-1-58	90	90.2/90.7	S	1082	6-19-58	480 ± 20	0.44 ± 0.02	536	119	224	55.4	18.6	22.6	0.82	2.45
	7794	T-260	4-2-58	80	79.9	S	1887	6-19-58	168 ± 8	0.089 ± 0.004	44.5	15.9	95.1	30.5	12.9	8.9	1.45	3.42
	7795	T-261	4-3-58	65	64.7		1923	6-27-58	3,270 ± 80	1.70 ± 0.04	91.5	910	321	130	267	35.6	7.48	3.64
	7804	T-263	4-8-58	50	49.4		1780	6-27-58	570 ± 20	0.32 ± 0.01	146	454	186	9.18	68.2	4.3	15.9	2.14
Panama	7826	P-241	4-1-58	90	91.4/93.5	S	920	7-11-58	221 ± 9	0.24 ± 0.01	495	37.9	231	92.9	5.28	47.3	0.11	1.96
	7863	P-244	4-11-58	65	65.0		1892	7-11-58	1,110 ± 20	0.59 ± 0.01	139	563	197	66.9	134	32	4.18	2.09
South America	7808	S-263	4-3-58	65	65.5		1887	6-29-58	151 ± 6	0.08 ± 0.003	230	68.7	67.4	11.5	24.3	5.88	4.13	1.95
	7809	S-265	4-4-58	80	79.1/79.5	S	1968	7-8-58	443 ± 9	0.22 ± 0.004	241	46.4	256	123	23.7	30.5	0.78	4.02
	7810	S-266	4-5-58	90	92.7	S	867	7-8-58	38 ± 6	0.044 ± 0.007	492	36.4	65.5	27.7	1.82	12.3	0.15	2.25

Cont'd.

May 1958

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (ft^3)	Total Activity C-date	Total Activity d/m/sample	Total Activity $d/m/ft^3$	d/m/1000 ft^3 Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137}/Sr^{90}
Minneapolis	8005	2347	5-8-58	50	48.3		3863	8-19-58	8,200	2.12	121	657	571	34.0	257	11.3	22.7	3.01
	8006	2348	5-19-58	90	90.6	S	1506	8-7-58	700	0.46	58.7	41.6	113	29.2	49.8	12.8	3.89	2.28
	8033	2352-2	5-16-58	65	64.5		2481	8-7-58	5,600	2.26	21.4	190	953	86.7	233	54.8	4.25	1.58
	8034	2350	5-15-58	80	77.7	S	1517	8-1-58	750	0.49	<74.6	30.1	35.9	73.2	<21.2	<2.31	9.18	>31.7
Texas	7988	T-266	5-4-58	65	65.4/66.0		1693	6-27-58	4,750	2.80	--	284	665	62.6	279	46.7	5.97	1.34
	7989	T-267	5-5-58	90	92.0/93.0	S	927	6-27-58	400	0.43	--	34.3	35.6	<25.9	<109	5.82	19.4	<4.45
	7990	T-271	5-10-58	50	49.1		1431	6-27-58	4,800	3.35	--	636	675	30.4	249	23.1	10.8	1.32
	8036	T-273	5-19-58	80	79.9/80.3	S	1755	7-25-58	1,100	0.63	33.6	48.9	152	106	<33.0	12.6	<2.62	8.41
Panama	7984	P-245	5-1-58	64	64.1/64.4		1859	6-16-58	4,700	2.53	--	251	597	68.0	<163	40.1	<4.06	1.7
	7985	P-247	5-4-58	90	72.9/94.2	S	1392	6-16-58	2,300	1.65	--	146	422	80.8	<175	40.2	<4.35	2.01
	8031	P-249	5-9-58	80		S	1776	8-7-58	10,400	5.86	282	480	123	146	542	91.8	5.90	1.59
Brazil	8037	B-268	5-9-58	65	64.6	53.7[1]	2065	8-4-58	550	0.27	<41.5	23.2	81.1	28.1	<35.4	5.4	<6.56	5.20
	8038	B-271	5-11-58	90	85.5/88.2	S	1192	8-19-58	350	0.29	<51.2	48.2	46.4	24.9	<40.8	5.16	<7.91	4.83
	8039	B-275	5-17-58	80	78.8/79.4	S	2030	8-6-58	750	0.37	29.4	114	45.0	20.7	<19.5	5.34	<3.65	3.88

1. Stratospheric Sample.

Cont'd.

June 1958

	HASL#	Flight#	Flight Date	Nominal Altitude	Actual Altitude	Tropopause Height	Volume (ft^3)	Total Activity C-date	Total Activity d/m/sample	Total Activity $d/m/ft^3$	d/m/1000 ft^3 Ba^{140}	Zr^{95}	Ce^{144}	Cs^{137}	Sr^{89}	Sr^{90}	Sr^{89}/Sr^{90}	Cs^{137} / Sr^{90}
Minneapolis	8176	2364	6-7-58	90	90.7/91.4	S	1454	7-18-58	1,100	0.76	14.3	37.3	75.4	5.84	<15.3	6.09	<2.51	0.96
	8177	2365	6-11-58	50	46.1		3644	7-17-58	10,950	3.00	63.4	295	548	14.5	332	15.8	21.0	0.92
	8188	2367	6-17-58	80	76.9	S	1576	10-7-58	700	0.44	<8.39	<11.9	85.0	28.8	<26.5	14.5	<1.83	1.99
	8302	2372-4	6-27-58	65	53.5/66.3		3537											
Texas	8098	T-275	6-3-58	80	79.9/80.3	S	1931	7-19-58	1,200	0.62	23.9	26.2	105	51.5	27.8	11.3	2.46	4.56
	8099	T-277	6-5-58	90	88.8/89.5	S	1110	7-18-58	2,550	2.3	140	80.6	lost	39.2	<77.2	18.0	<4.29	2.18
	8175	T-278	6-7-58	65	65.0/65.3		1354	7-8-58	2,500	1.85	45.6	196	291	57.6	224	9.3	24.1	6.19
Panama	8072	P-251	6-2-58	65	64.5/64.8		1821	8-6-58	10,550	5.79	887	700	1160	80.7	1047	42.6	24.6	1.89
	8178	P-252	6-6-58	80	79.5/81.7	S	1766	7-17-58	9,350	5.29	90.9	624	1197	24.2	420	67.4	6.23	0.36
South America	8183	B-277	6-4-58	65	63/64.1	55.216[1]	1860	10-10-58	1,850	0.99	<23.1	120	422	84.1	86.8	30.9	2.81	2.72
	8185	B-279	6-8-58	80	79.1	S	1890	10-11-58	500	0.26	<10.4	<8.52	24.9	15.2	<25.6	4.47	<5.73	3.40
	8187	B-281	6-13-58	80	78.1/78.6	S	1712	10-13-58	300	0.18	<10.9	<11.4	45.7	21.0	<17.3	9.02	<1.92	2.33

1. Stratospheric Sample.

3. Water

3.1 Sr^{90} in Tap Water - New York City

New York City tap water has been analyzed since August 1954. Until the end of November 1956, the sampling period lasted about two weeks during which time an average of 50 liters was collected (3-4 liters per day). Since December 1956, the collections are made over a period of a month and the total volume is about 100 liters. The strontium 90 content in μμc/liter is shown in Table 10 for collections made in 1957 and 1958. Data for collections carried out before 1957 have been presented in HASL-42 entitled "Environmental Contamination from Weapon Tests". Data for all samples analyzed are presented graphically in Figure 6. The error term depicts one standard deviation due to the error in counting.

TABLE 10

Sr^{90} IN NEW YORK CITY TAP WATER

Sampling Period	Sr^{90} μμc/l
January 1957	0.18 ± 0.01
March 1957	0.26 ± 0.004
April 1957	0.18 ± 0.002
May 1957	0.007 ± 0.004
June 1957	0.16 ± 0.01
July 1957	0.235 ± 0.012
August 1957	0.272 ± 0.027
September 1957	0.115 ± 0.008
October 1957	0.051 ± 0.004
November 1957	0.082 ± 0.006
December 1957	0.058 ± 0.004
January 1958	0.20 ± 0.03
February 1958	0.20 ± 0.05
March 1958	0.027 ± 0.004
April 1958	0.028 ± 0.018

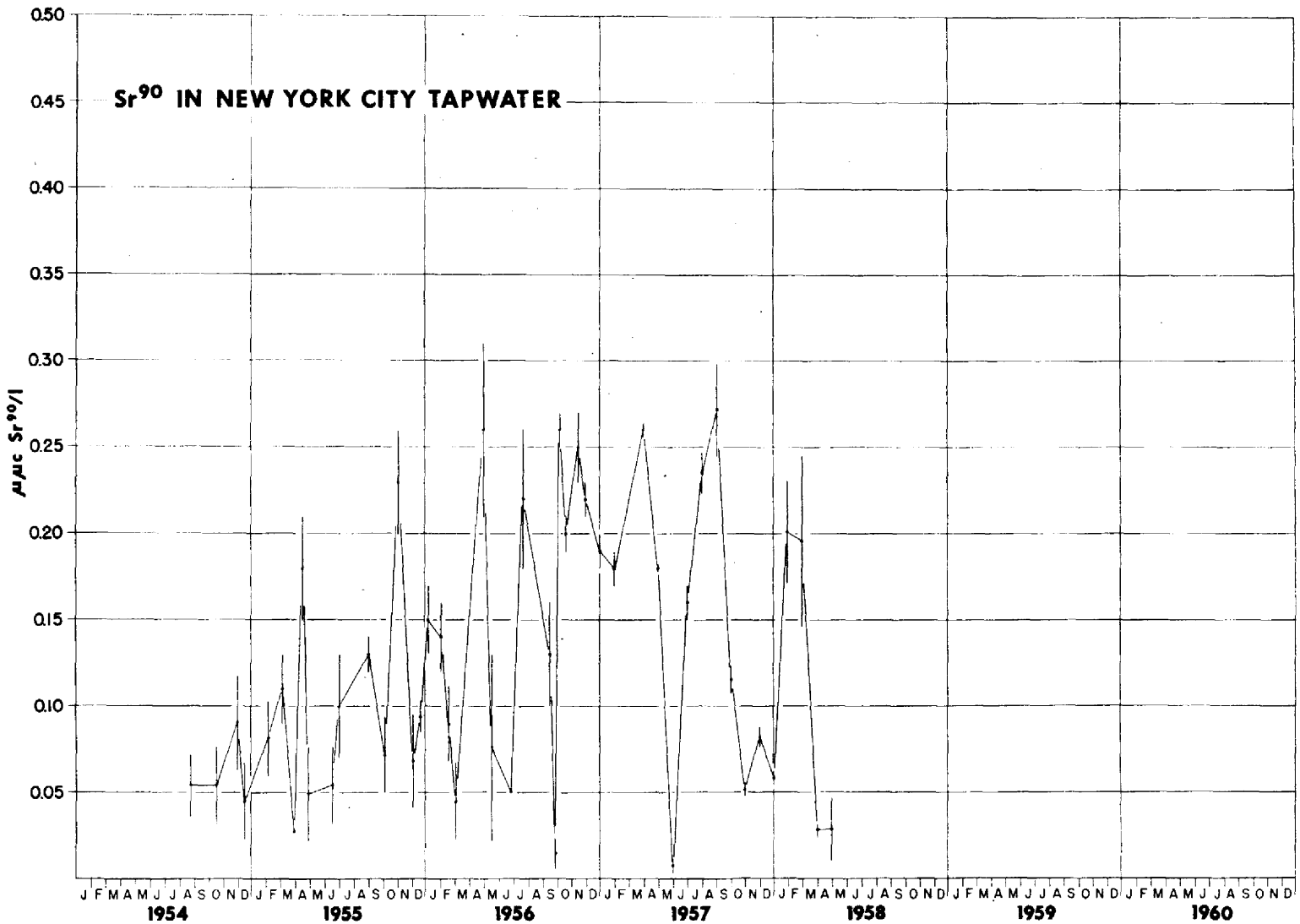

Sr90 IN NEW YORK CITY TAPWATER
μμc Sr90/l
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956
1957
1958
1959
1960

FIGURE 6

4. Uptake of Strontium 90

4.1 Milk

Since early 1954, HASL has monitored milk for strontium 90 activity. Powdered milk from Perry, New York and liquid milk purchased in New York City have been analyzed weekly. In 1955, five additional United States locations and Japan and England were included in the program. Samples have been received from England since April 1957 but now serve cross-checking purposes only since England monitors her own milk. Samples from Japan are received sporadically; samples from State College, Mississippi; St. Louis, Missouri; and Portland, Oregon have not been received since 1956. These latter data can be found in HASL-42, "Environmental Contamination from Weapon Tests".

4.11 Monthly Sr^{90} Levels in Powdered Milk from Perry, New York

Since April 1954, 5-pound cans of powdered whole milk have been sent to HASL each week from a milk powdering plant at Perry, New York.

Table 11 summarizes the data in μμc Sr^{90}/gram Ca. The data are graphed in Figure 7. The values through December 1955 represent monthly averages of weekly samples, the error term representing one standard deviation from the mean. The monthly values for the year 1956 represent on analysis and a standard error of counting since the weekly samples were pooled each month. Starting January 1957, the monthly composites have been analyzed in replicate, the values thus being an average and the error term one standard deviation from the mean.

Table 11

Powdered Milk - Perry, New York

1958

Sampling Month	Sr^{90} μμc/g Ca	Sr^{89}/Sr^{90}*
January	3.40 ± 0.37	
February	3.57 ± 0.39	1.3 ± 0.5
March	2.99 ± 0.36	
April	3.03 ± 0.53	6.5 ± 1.9
May	4.98 ± 0.32	4.4 ± 0.4
June		
July		
August		
September		
October		
November		
December		

* Extrapolated to midpoint of sampling period.

Table 11

Powdered Milk - Perry, New York

1958

Sampling Month	Sr^{90} μμc/g Ca	Sr^{89}/Sr^{90}*
January	3.40 ± 0.37	
February	3.57 ± 0.39	1.3 ± 0.5
March	2.99 ± 0.36	
April	3.03 ± 0.53	6.5 ± 1.9
May	4.98 ± 0.32	4.4 ± 0.4
June		
July		
August		
September		
October		
November		
December		

* Extrapolated to midpoint of sampling period.

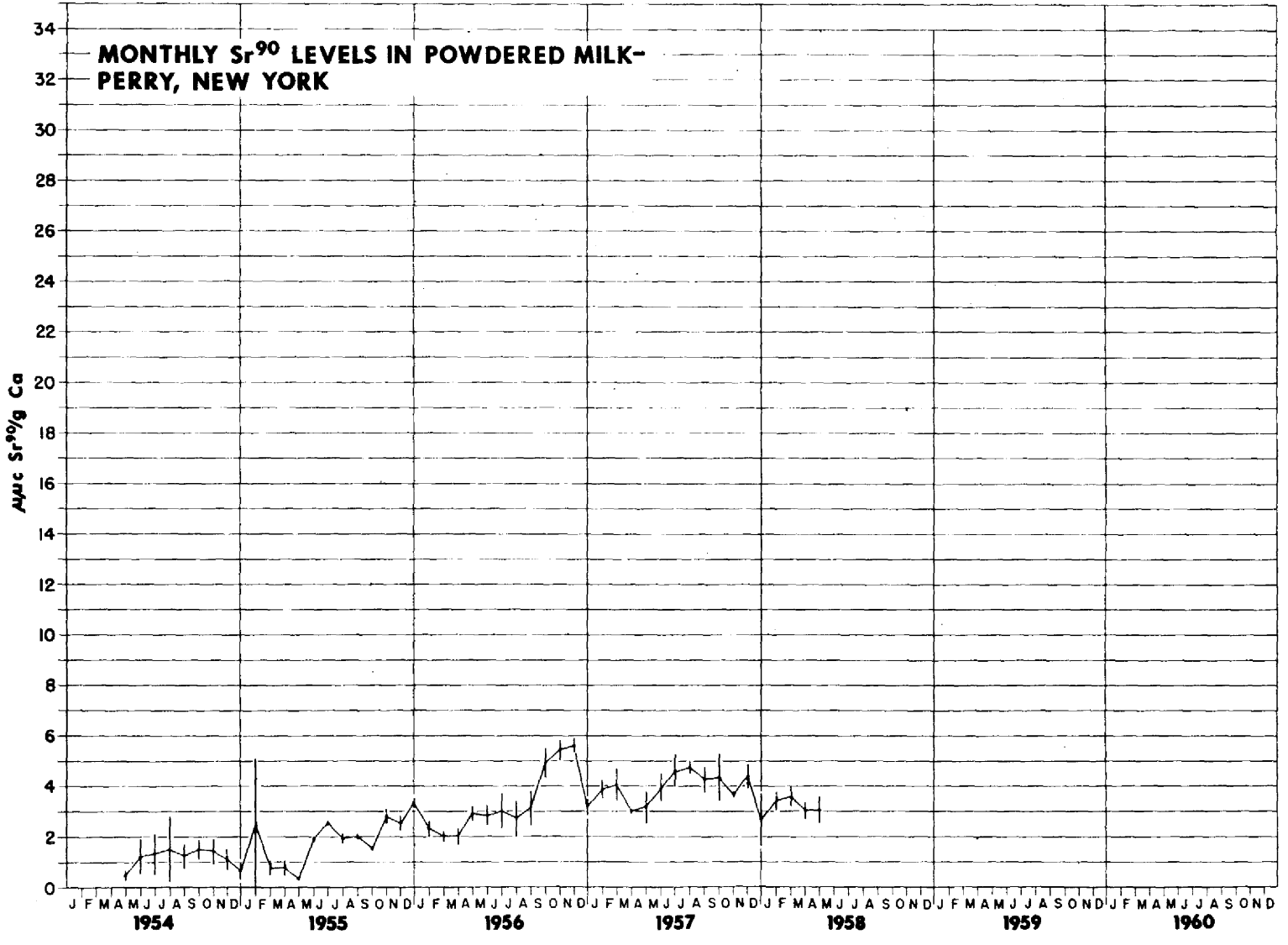

MONTHLY Sr90 LEVELS IN POWDERED MILK-
PERRY, NEW YORK
μμc Sr90/g Ca
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956
1957
1958
1959
1960

FIGURE 7

4.12 Monthly Sr^{90} Levels in Liquid Milk from New York City

Beginning in June 1954, a quart of liquid milk was purchased five days a week from a store near HASL. The labeled brands were varied to avoid sampling milk from particular farms. The daily samples were combined, evaporated to dryness, ashed and analyzed as a weekly sample.

Since January 1957, the daily samples have been combined to form a monthly composite.

Table 12 summarizes data in $\mu\mu c$ Sr^{90}/g Ca. The data are graphed in Figure 8. The values through May 1956 represent monthly averages of weekly analyses. Since January 1957, the values represent averages of replicate analyses made on monthly composites. In both cases, the error term represents one standard deviation from the mean.

From June through December 1956, no liquid milk samples were analyzed. This program was resumed after it was recognized that the powdered milk samples from Perry, New York did not represent the New York City milkshed.

Table 12

Liquid Milk - New York City

1958

Sampling Month	Sr^{90} μμc/g Ca	Sr^{89}/Sr^{90}*
January	3.62 ± 0.37	2.6 ± 0.5
February	3.93 ± 0.38	1.7 ± 0.3
March	3.20 ± 0.27	
April	4.09 ± 0.30	8.1 ± 5.6
May	3.92 ± 0.44	4.6 ± 1.4
June		
July		
August		
September		
October		
November		
December		

* Extrapolated to midpoint of sampling period.

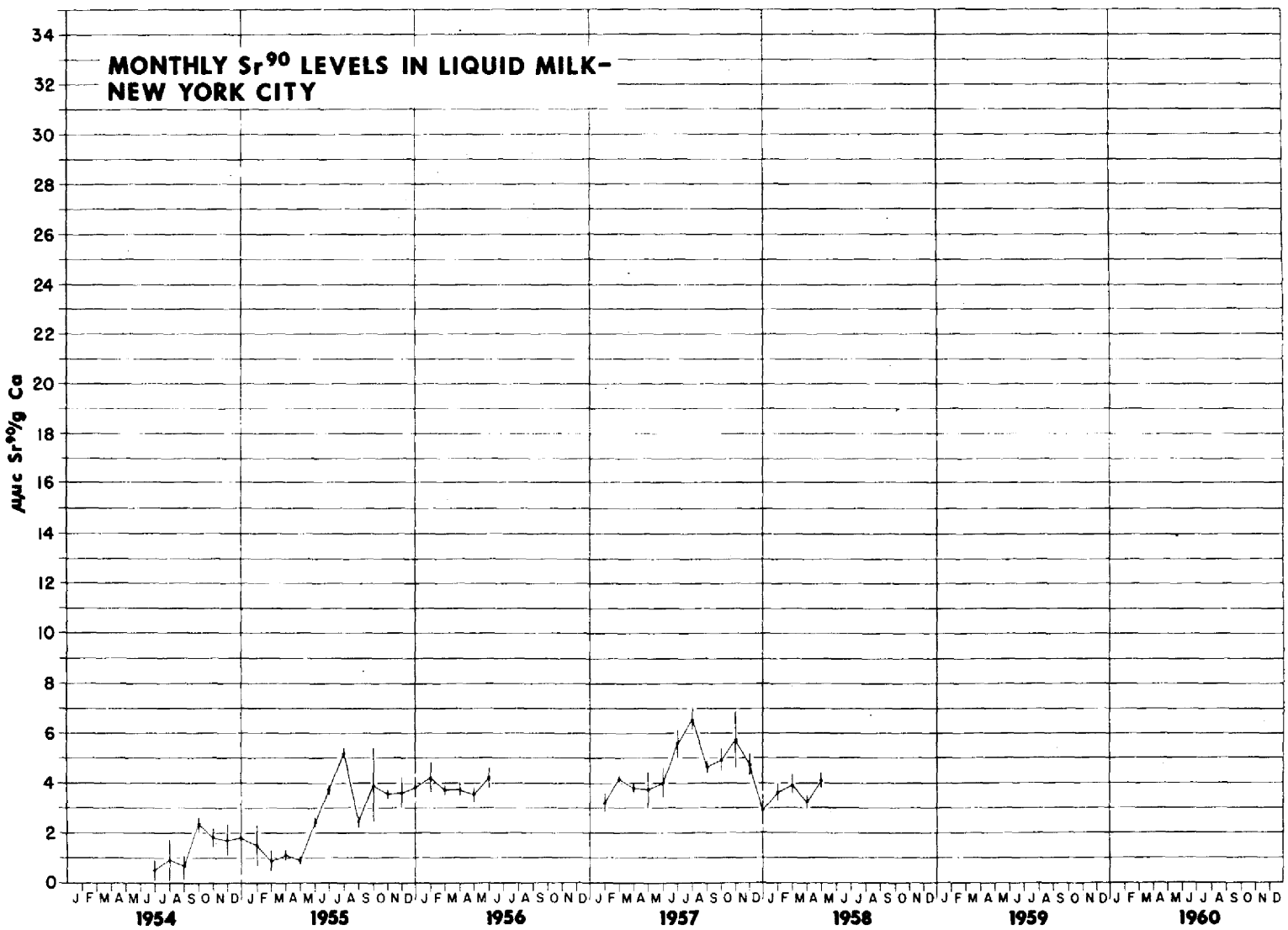

MONTHLY Sr90 LEVELS IN LIQUID MILK-
NEW YORK CITY
μμc Sr90/g Ca
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956
1957
1958
1959
1960

FIGURE 8

4.13 Columbus, Wisconsin and Mandan, North Dakota

Five-pound samples of powdered milk have been obtained weekly from milk powdering plants in Columbus, Wisconsin (powdered whole milk) and Mandan, North Dakota (powdered buttermilk) and composited on a monthly basis.

Table 13 summarizes the data in $\mu\mu c$ Sr^{90}/g Ca. Figures 9 and 10 graphically illustrate the data. The error term is one standard deviation from the mean of replicate analyses.

Table 13

MONTHLY Sr^{90} LEVELS IN POWDERED MILK

FROM COLUMBUS, WISCONSIN AND MANDAN, NORTH DAKOTA

		Columbus, Wisconsin		Mandan, North Dakota (2)	
		Sr^{90}	Sr^{89}/Sr^{90} (1)	Sr^{90}	Sr^{89}/Sr^{90} (1)
1957		μμc/g Ca		μμc/g Ca	
	November	4.36 ± 0.37		29.57 ± 0.26	
	December	4.2 ± 0.2		20.11 ± 0.66	
1958					
	January	4.21 ± 0.42	3.6 ± 0.1	15.24 ± 0.53	7.6 ± 0.8
	February	4.12 ± 0.35	1.4 ± 0.3	16.46 ± 0.63	5.0 ± 1.5
	March	4.00 ± 0.33	0.9 ± 0.1	15.57 ± 0.64	4.3 ± 0.3
	April	4.76 ± 0.44	1.6 ± 1.2	21.65 ± 0.72	4.3 ± 0.3
	May	4.81 ± 0.41	3.6 ± 0.2	21.30 ± 4.34	7.0 ± 2.0
	June				
	July				
	August				
	September				
	October				
	November				

(1) Extrapolated to midpoint of sampling period.
(2) Buttermilk.

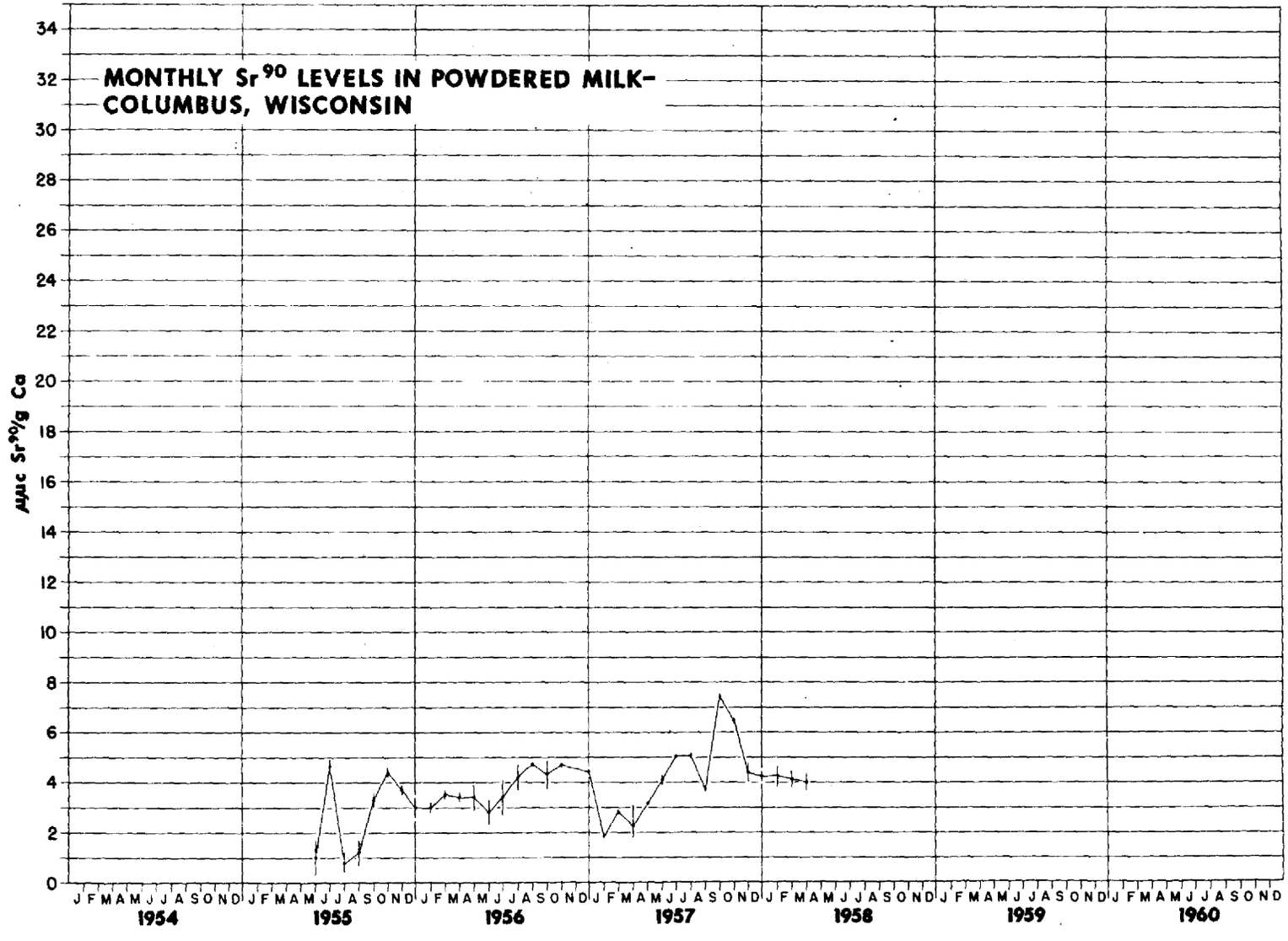

MONTHLY Sr 90 LEVELS IN POWDERED MILK-
COLUMBUS, WISCONSIN
μμc Sr90/g Ca
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956
1957
1958
1959
1960

FIGURE 9

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9. Morris, W. P., et al, "Retention of Radioactive Bone-Seekers", Science 128, No. 3322, 456-461 (August 29, 1958).

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