[redacted]

[redacted]

HASL-28

510353

A0849

health and safety laboratory

STRONTIUM PROGRAM

SUMMARY REPORT FOR MARCH 1958

UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

[redacted]

Enclosed is a copy of the sixth of a series of monthly reports on the Strontium Program issued by the Health and Safety Laboratory.

At the time of issuance of HASL-23, Strontium Program Summary Report for February 1958, through error "OFFICIAL USE ONLY" was not indicated on the front and back covers. Will you kindly stamp this classification on the covers to fulfill security regulations.

[redacted]

HASL-28

HEALTH AND SAFETY LABORATORY

STRONTIUM PROGRAM

Summary Report for March 1958

Prepared by

Edward P. Hardy, Jr.
Analytical Branch

UNITED STATES ATOMIC ENERGY COMMISSION

New York Operations Office

[redacted]

[redacted]

A.E.C. DISTRIBUTION

Libby, Dr. Willard F.	-	Commissioner
Potts, Dr. J. Calvin	-	Special Assistant to Dr. Libby
Dunham, Dr. C. L.	-	Division of Biology and Medicine
Starbird, Brig. Gen. A. D.	-	Division of Military Application
Eisenbud, Mr. Merril	-	New York Operations Office
Lough, Dr. S. Allan	-	New York Operations Office
Brandt, Dr. Alva E.	-	New York Operations Office
Claus, Dr. Walter D.	-	Division of Biology and Medicine
Deihl, Mr. George	-	New York Operations Office
Dunning, Dr. Gordon	-	Division of Biology and Medicine
Harley, Dr. John H.	-	New York Operations Office
Holland, Dr. Joshua	-	Division of Biology and Medicine
Hollister, Mr. Hal L.	-	Division of Biology and Medicine
Pearson, Dr. Paul	-	Division of Biology and Medicine
Reitemier, Dr. Robert	-	Division of Biology and Medicine
Western, Dr. Forrest	-	Division of Biology and Medicine
Whitney, Mr. Ira B.	-	New York Operations Office
Wolfe, Dr. John N.	-	Division of Biology and Medicine

[redacted]

[redacted]

DISTRIBUTION OUTSIDE A. E. C.

Alexander, Dr. Lyle T.	-	United States Department of Agriculture
Anderson, [illegible]	-	Los Alamos Scientific Laboratory
Ballou, Dr. Nathan	-	Naval Radiological Defense Laboratory
Brues, Dr. Austin M.	-	Argonne National Laboratory
Comar, Dr. C. L.	-	Cornell University
Cowan, Dr. George A.	-	Los Alamos Scientific Laboratory
Jones, Dr. Hardin	-	University of California
Kramish, Dr. Arnold	-	Rand Corporation
Kruger, Dr. Paul	-	Nuclear Science and Engineering Corporation
Kulp, Dr. J. Lawrence	-	Columbia University
Langham, Dr. Wright	-	Los Alamos Scientific Laboratory
Larson, Dr. K. H.	-	University of California
MacDonald, Dr. Norman	-	University of California at Los Angeles
Machta, Dr. Lester	-	United States Weather Bureau
Marinelli, Dr. L. D.	-	Argonne National Laboratory
Martell, Dr. Edward A.	-	Air Force Cambridge Research Center
Menzel, Dr. Ronald G.	-	United States Department of Agriculture
Neuman, Dr. William	-	University of Rochester
Northrop, Dr. Doyle L.	-	USAF, Office of Atomic Energy
Overstreet, Dr. Roy	-	University of California
Revelle, Dr. Roger	-	Scripps Institution of Oceanography
Schrodt, Lt. Ariel	-	Walter Reed Army Medical Center
Street, Dr. Kenneth	-	University of California Radiation Laboratory
Suess, Dr. Hans A.	-	Scripps Institution of Oceanography
Tompkins, Dr. Paul	-	Naval Radiological Defense Laboratory
Turekian, Dr. Karl K.	-	Yale University
Turkevich, Dr. John	-	Princeton University
Volchok, Dr. Herbert L.	-	Isotopes, Incorporated
Zigman, Dr. Paul E.	-	Naval Radiological Defense Laboratory

[redacted]

Abstract

Strontium 90 levels in fallout, milk, vegetation, and tap water are summarized for data available up to February 28, 1958. Original data submitted during the month of February are included as an appendix.

TABLE OF CONTENTS

	PAGE
1. Introduction	8 & 9
2. Strontium 90 in Fallout Collected in Pots and Tubs	10
2.10 New York City	11
2.20 Pittsburgh	14
2.30 Chicago	18
2.40 Other United States Monitoring Sites	21
2.50 Monitoring Sites Outside Continental United States	26
3. Strontium 90 in Milk	36
3.10 New York	37
3.11 Strontium 90 in Powdered Milk from Perry, New York	37
3.12 Strontium 90 in Liquid Milk from New York City	40
3.20 Strontium 90 in Milk from Other United States Locations	43
4. Strontium 90 in New York City Tap Water	47
5. Appendix	50
5.10 Strontium Original Data Reported for February 1958	51
5.11 Pot Fallout - Monthly Collections	51
5.12 Pittsburgh Fallout - Galvanized Tub Collections (Gross β Activity, Ba^{140}, Sr^{89}, Sr^{90})	54
5.13 Chicago Fallout - Galvanized Tub Collections (Sr^{89}, Sr^{90})	55
5.14 Human Bone	56
5.15 Tap Water	63
5.16 Precipitation Samples - Mt. Washington Observatory	64

LIST OF TABLES

TABLE	DESCRIPTION	PAGE
1	Strontium 90 in New York City Fallout (pot collection)	12
2	Strontium 90 in Pittsburgh Fallout (tub collection)	15
3	Strontium 90 in Pittsburgh Fallout (pot collection)	17
4	Strontium 90 in Chicago Fallout (tub collection)	19
5	Strontium 90 in Fallout at Other United States Monitoring Sites (pot collection)	22-25
6	Strontium 90 in Fallout Monitoring Sites Outside Continental United States (pot collection)	27-35
7	Monthly Strontium 90 Levels in Powdered Milk from Perry, New York	38
8	Monthly Strontium 90 Levels in Liquid Milk from New York City	41
9	Monthly Strontium 90 Levels in Powdered Milk from Other United States Locations	44
10	Strontium 90 in New York City Tap Water	48

LIST OF FIGURES

Figure	Description	Page
1	Strontium 90 in New York City Fallout (pot collection)	13
	Rate of Accumulation and Total Accumulation for the sampling period.	
2	Strontium 90 in Pittsburgh Fallout (tub collection)	16
	Rate of Accumulation and Total Accumulation for the sampling period.	
3	Strontium 90 in Chicago Fallout (tub collection)	20
	Rate of Accumulation and Total Accumulation for the sampling period.	
4	Monthly Strontium 90 Levels in Powdered Milk from Perry, New York.	39
5	Monthly Strontium 90 Levels in Liquid Milk from New York City.	42
6	Monthly Strontium 90 Levels in Powdered Milk from Columbus, Wisconsin.	45
7	Monthly Strontium 90 Levels in Powdered Milk from Mandan, North Dakota.	46
8	Strontium 90 in New York City Tap Water.	49

1. INTRODUCTION

This is the sixth monthly summary report prepared by the Health and Safety Laboratory with the objective of presenting a current picture of the status of the Strontium Program. Through this medium, it is hoped that investigators who are actively interested in the program will be better able to relate their own work to that being done by others. It is hoped further that investigators other than those whose data have been presented thus far will participate in this summary report by sending recent results of their work to the Health and Safety Laboratory for incorporation in succeeding issues. There is no intention in these monthly summary reports to attempt an interpretation of the data, nor is it intended that these data be used in publication unless permission is granted by the investigator concerned.

The analyses reported in this series represent results obtained on samples collected over various periods of time. Usually the periods involved will not exceed one month, but in the soils program, for example, the period may be one year. Omission of one phase of the program in a given month may be taken to indicate that insufficient information has accrued to justify its inclusion in a given issue.

In the appendix of this report, the data obtained during the month are reported in original form. This will represent the corrected compilation of data issued previously on the first of the month.

The data included in this month summary report were reported by the Analytical Branch of the Health and Safety Laboratory, Nuclear Science and Engineering Corporation, and Isotopes, Incorporated.

It is important to point out that all data presented in these summary reports are subject to revision. It is merely intended that information as it becomes available through the Health and Safety Laboratory be transmitted as soon as possible to those interested groups directly or indirectly involved in the Sunshine Program. It is quite possible that changes in data or presentation will occur as a result of reanalysis or re-evaluation. As a result, specific sections of preceeding monthly summary reports may become obsolete within a very short period of time.

2. Strontium 90 in Fallout Collected in Pots and Tubs

Data are presented to show the amount of Strontium 90 in fallout at sampling stations within and outside the United States. Most of the collections were made using high-walled stainless steel pots (0.82 ft^2 exposed surface area). At Pittsburgh and Chicago, collections have been made in galvanized tubs, the areas of which are given later.

There are wide variations in the times at which fallout collection was begun at these sites and since the pot collector program will gradually expand, this situation will continue. However, in addition to reporting values for each collection period, the data have been summed from the initial collection at those sites where continuous sampling has been carried out. In this manner the total fallout over a selected time interval can be compared from site to site.

Rainfall data will be included in these summaries as they become available.

2.10 New York City

The high-walled stainless steel pot is maintained on the roof of the building housing the Health and Safety Laboratory. 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.

A summary of the most recent results is given in Table 1. A complete listing of data available since February 1954 was given in the first summary report (HASL-1). The error term accompanying each result is one standard deviation due to the error in counting. The cumulative data are presented graphically in Figure 1.

TABLE 1

Sr^{90} IN NEW YORK CITY FALLOUT

(High-walled Stainless Steel Pot Collection)

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
1-31-57	2-8-57	0.56 ± 0.03	28.52 ± 0.73	2.50
		0.49 ± 0.03		
2-28-57	3-31-57	1.01 ± 0.013	29.56 ± 0.73	2.05
		1.06 ± 0.013		
3-31-57	4-30-57	6.66 ± 0.22	34.37 ± 0.74	4.51
		2.95 ± 0.016		
4-30-57	5-31-57	0.95 ± 0.04	35.30 ± 0.74	3.67
		0.93 ± 0.04		
5-31-57	6-28-57	0.78 ± 0.04	36.12 ± 0.74	1.66
		0.86 ± 0.06		
6-28-57	8-1-57	1.22 ± 0.05	36.96 ± 0.74	1.66
		0.46 ± 0.03		
8-1-57	8-31-57	lost	37.82 ± 0.74	2.87
		0.853 ± 0.029		
9-1-57	9-31-57	0.354 ± 0.021	38.23 ± 0.74	
		0.476 ± 0.024		
10-1-57	10-31-57	1.589 ± 0.089	39.73 ± 0.75	
		1.402 ± 0.075		
11-1-57	11-31-57	0.847 ± 0.054	40.58 ± 0.75	
		lost		
12-1-57	12-31-57	2.339 ± 0.087	42.86 ± 0.76	
		2.229 ± 0.142		

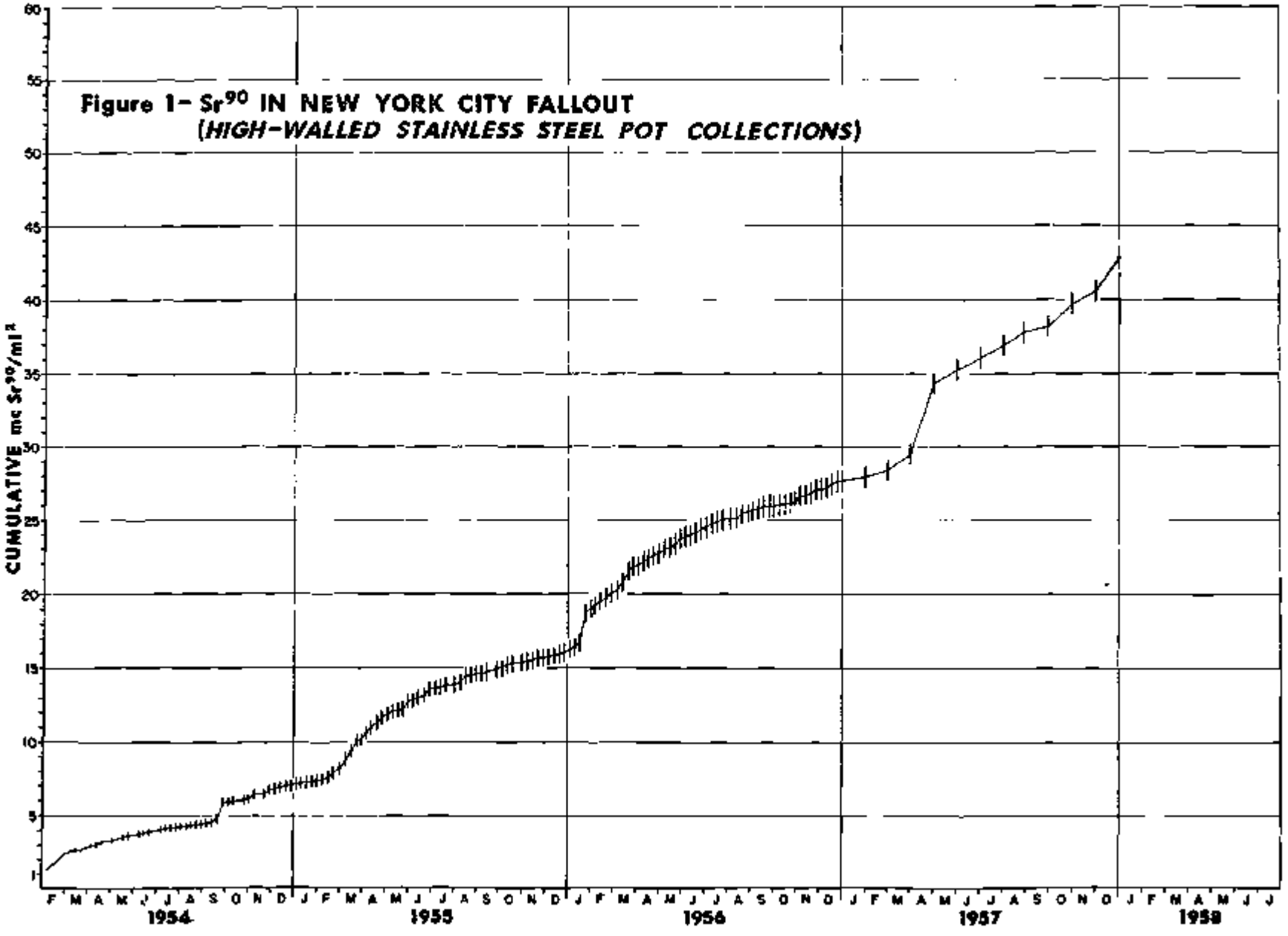


Figure 1- Sr^{90} IN NEW YORK CITY FALLOUT
(HIGH-WALLED STAINLESS STEEL POT COLLECTIONS)

2.20 Pittsburgh

Since the end of February 1955, rainwater and other forms of precipitation have been collected by Nuclear Science and Engineering Corporation in galvanized tubs. The following are the conditions of collection and analysis:

1. The tubs are exposed continuously during dry and rainy weather, but collections are made immediately following a period of precipitation.
2. The exposed surface area per tub measures 2.58 square feet and two tubs are exposed simultaneously.
3. Until February 1957, the contents of the two tubs were combined and one analysis reported for the collection period.
4. Since February 1957, the contents of each tub have been analyzed separately.
5. The values for precipitation in inches were obtained from the United States Weather Bureau up until the collection period beginning 6-19-57. From this point on, rainfall measurements have been made by Nuclear Science and Engineering personnel using a Fisher #1-242-5 United States Weather Bureau type rain gauge.

A summary of the most recent results is given in Table 2. A complete listing of data available since February 1955 was given in the first summary report (HASL-1). The error term accompanying each result is one standard deviation due to the error in counting. The specific activity in d/m Sr^{90} per liter of water collected is also reported. The cumulative data are presented graphically in Figure 2.

Beginning July 1957, monthly fallout collections in high-walled stainless steel pots have been carried out at Nuclear Science and Engineering. This data is tabulated in Table 3 and the error term is again one standard deviation due to the error in counting.

TABLE 2

Sr^{90} IN PITTSBURGH FALLOUT

(Galvanized Tub Collections)

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	d/m Sr^{90}/liter	Precipitation in inches
11-3-57	11-5-57	0.019 ± 0.002 0.033 ± 0.004	23.06 ± 0.17	2.6 ± 0.3 4.6 ± 0.5	0.29 0.29
11-5-57	11-8-57	0.032 ± 0.002 0.029 ± 0.005	23.09 ± 0.17	4.9 ± 0.3 4.4 ± 0.8	0.29 0.28
11-8-57	11-13-57	0.022 ± 0.003 0.026 ± 0.003	23.12 ± 0.17	3.2 ± 0.4 4.1 ± 0.4	0.20 0.20
11-13-57	11-18-57	0.031 ± 0.004 0.036 ± 0.003	23.15 ± 0.17	3.1 ± 0.4 3.4 ± 0.3	0.57 0.57
11-18-57	11-19-57	0.033 ± 0.003 lost	23.18 ± 0.17	1.8 ± 0.15	0.69 0.69
11-19-57	11-26-57	0.020 ± 0.002 0.034 ± 0.002	23.21 ± 0.17	--- ---	dry dry
11-26-57	12-1-57	0.024 ± 0.003 0.019 ± 0.002	23.23 ± 0.17	11.9 ± 1.8 9.5 ± 1.0	0.13 0.13
12-1-57	12-4-57	0.058 ± 0.003 0.054 ± 0.005	23.29 ± 0.17	6.4 ± 0.4 6.3 ± 0.6	0.26 0.26
12-4-57	12-8-57	0.135 ± 0.012 0.129 ± 0.007	23.44 ± 0.17	4.3 ± 0.4 4.3 ± 0.2	1.11 1.11
12-8-57	12-9-57	0.029 ± 0.002 0.025 ± 0.002	23.49 ± 0.17	10.7 ± 0.8 9.2 ± 0.6	0.11 0.11
12-9-57	12-13-57	0.007 ± 0.002 0.008 ± 0.004	23.50 ± 0.17	--- ---	-- --
12-13-57	12-16-57	0.042 ± 0.005 0.038 ± 0.003	23.54 ± 0.17	--- ---	0.04 0.04
12-16-57	12-18-57	0.049 ± 0.003 0.042 ± 0.003	23.59 ± 0.17	2.85 ± 0.20 2.45 ± 0.20	0.61 0.61
12-18-57	12-19-57	0.029 ± 0.003 0.035 ± 0.004	23.62 ± 0.17	9.5 ± 1.0 10.9 ± 1.1	0.15 0.15
12-19-57	12-21-57	0.131 ± 0.010 0.115 ± 0.006	23.74 ± 0.17	4.1 ± 0.3 3.5 ± 0.2	1.22 1.22

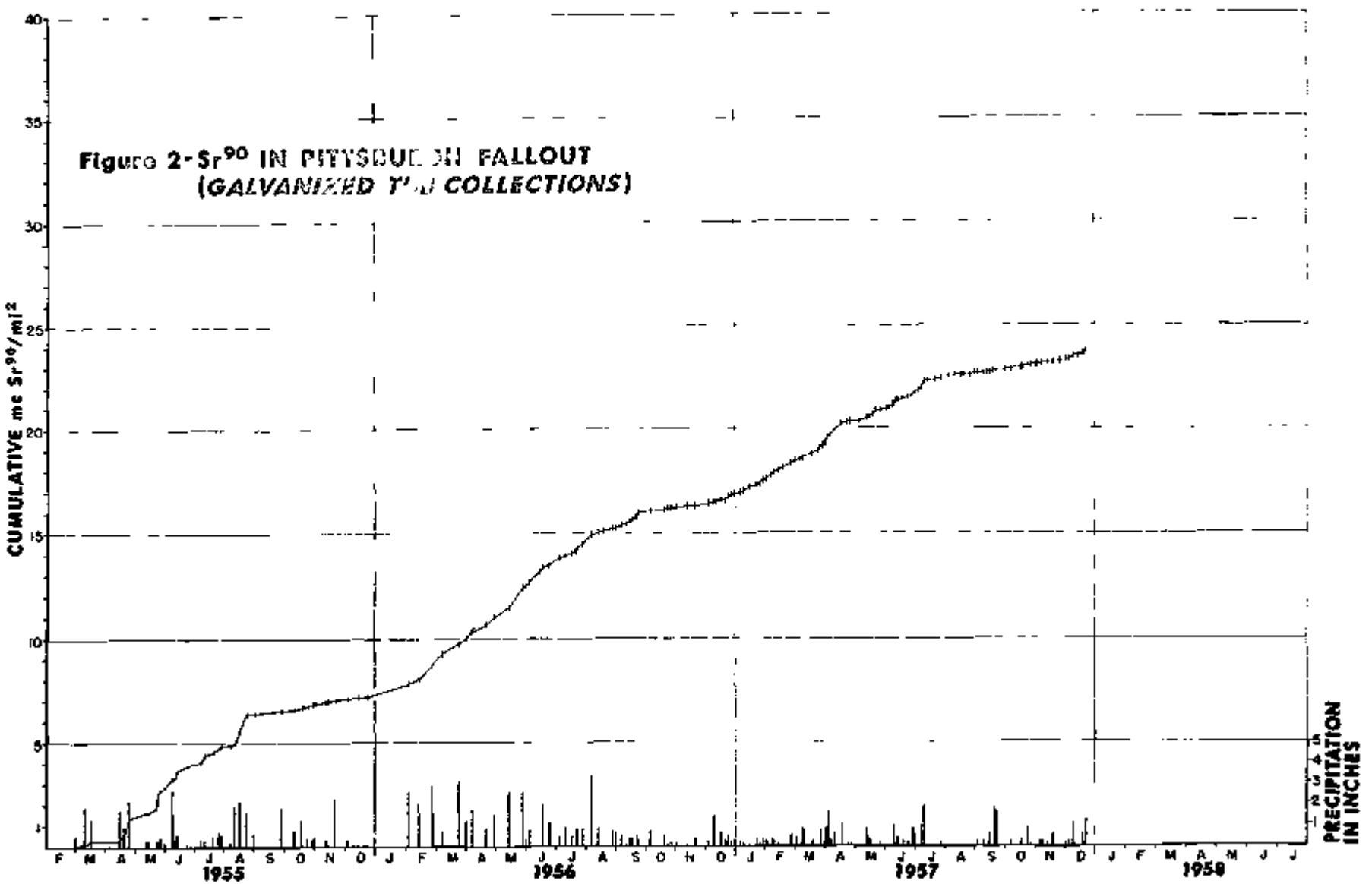


Figure 2-Sr^{90} IN PITTSBURGH FALLOUT
(GALVANIZED TUB COLLECTIONS)

TABLE 3

Sr^{90} IN PITTSBURGH FALLOUT

(High-walled Stainless Steel Pot Collections)

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
7-3-57	7-31-57	0.76 ± 0.05	0.75 ± 0.05	4.51
		0.74 ± 0.05		
7-31-57	9-3-57	0.139 ± 0.013	0.886 ± 0.075	0.49
		0.132 ± 0.012		
9-3-57	10-1-57	0.110 ± 0.008	1.020 ± 0.081	4.62
		0.158 ± 0.011		
10-1-57	11-1-57	0.244 ± 0.012	1.256 ± 0.082	1.94
		0.288 ± 0.014		
11-1-57	12-1-57	0.38 ± 0.02	1.501 ± 0.085	2.17
		0.110 ± 0.008		
12-1-57	1-1-58	0.57 ± 0.03	2.041 ± 0.090	
		0.51 ± 0.03		

2.30 Chicago

Since December of 1956, a new series of fallout collections have been conducted by the University of Chicago. The following are the conditions of collection and analysis:

1. The tubs are exposed continuously during dry and rainy weather.
2. Collections are made following the periods of precipitation.
3. The exposed surface area measures 3.1 square feet.
4. The washings are sent to Nuclear Science and Engineering Corporation for radiochemical analysis.

A summary of results is given in Table 4. The error term accompanying each result is one standard deviation due to the error in counting. During the periods 9-16-57 to 9-30-57 and 10-28-57 to 11-11-57, the sample collections were lost and no correction has been made in the cumulative figure. The cumulative data are presented graphically in Figure 4. During those periods in which samples were lost, a dotted line has been used to connect the points on the graph.

TABLE 4

Sr^{90} IN CHICAGO FALLOUT

(Galvanized Tub Collection)

Collection Period from	to	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	d/m Sr^{90}/liter	Precipitation in inches
6-10-57	6-24-57	0.367 ± 0.012	4.504 ± 0.063	35 ± 2	1.94
6-24-57	7-8-57	0.291 ± 0.015	4.795 ± 0.065	61 ± 3	1.63
7-8-57	7-22-57	1.20 ± 0.07	5.995 ± 0.096	18.3 ± 1.0	5.62
7-22-57	8-5-57	0.320 ± 0.036	6.315 ± 0.102	4.2 ± 0.5	3.95
8-5-57	8-19-57	0.235 ± 0.012	6.550 ± 0.102	5.8 ± 0.3	2.60
8-19-57	9-3-57	0.130 ± 0.007	6.680 ± 0.102	12.5 ± 0.6	1.15
9-3-57	9-16-57	0.054 ± 0.004	6.734 ± 0.103	7.5 ± 0.5	0.53
9-16-57	9-30-57	Sample lost on route to Pittsburgh			
9-30-57	10-15-57	0.016 ± 0.002	6.758 ± 0.110	---	
10-15-57	10-28-57	0.69(1)	7.446 ± 0.110	3.4 ± 0.2	
10-28-57	11-11-57	≈0.0025(2)	---	---	
11-11-57	11-25-57	0.70(1)	8.146 ± 0.110	5.8 ± 3.0	
11-25-57	12-9-57	0.047 ± 0.003	8.193 ± 0.110	---	
12-9-57	12-23-57	0.144 ± 0.009	8.337 ± 0.110	9.5 ± 0.6	
12-23-57	1-6-58	0.56(1)	8.897 ± 0.110	20.2 ± 1.2	

(1) Calculated from measured specific activity and total volume of sample collected.

(2) Winds upset collector November 8, 1957; sample consists of residue only in distilled water.

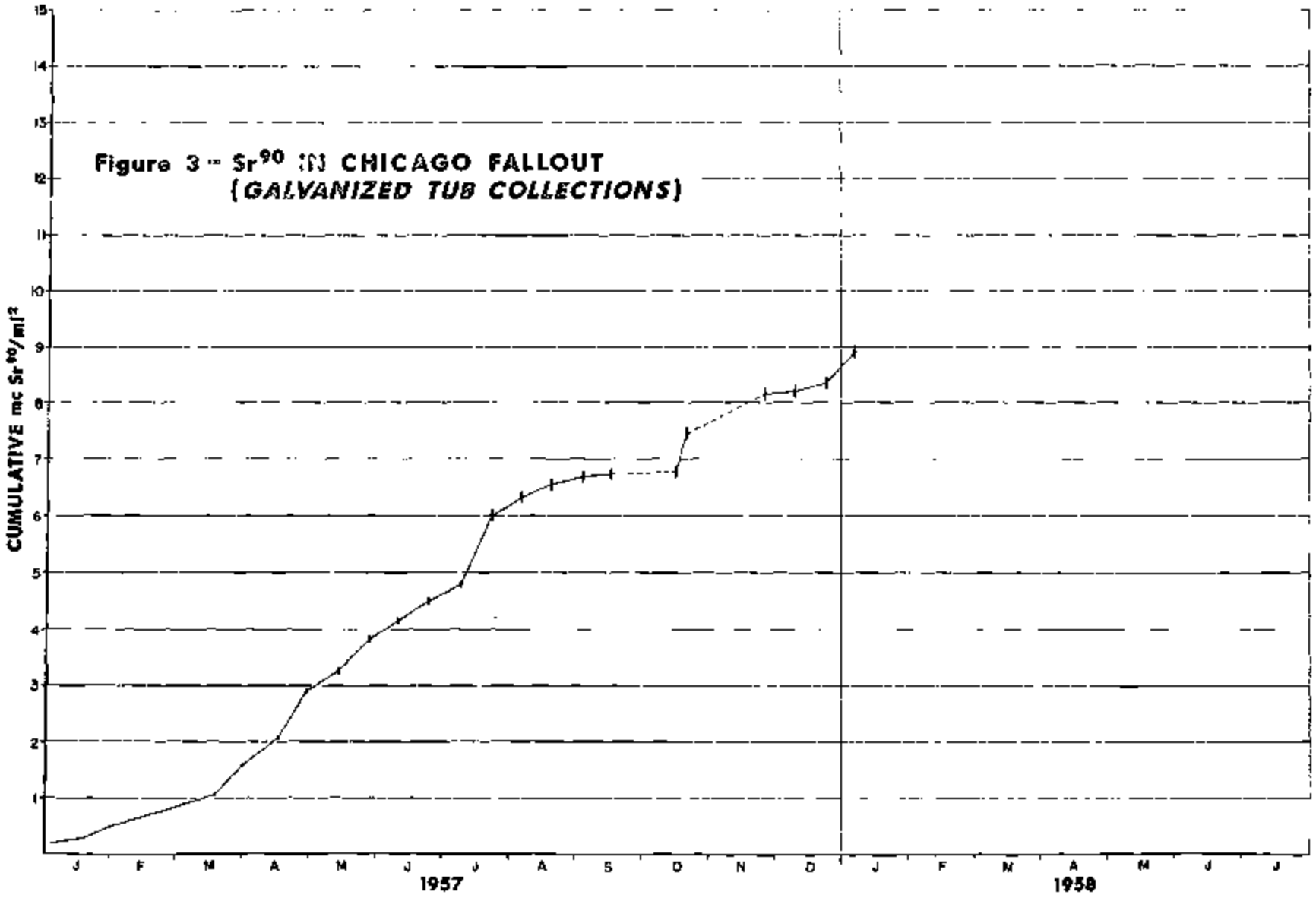


Figure 3 – Sr^{90} IN CHICAGO FALLOUT
(*GALVANIZED TUB COLLECTIONS*)

2.40 Other United States Monitoring Sites

The high-walled stainless steel pots have been sent to seven additional sites within the continental United States for monthly collections of fallout. The washings are sent to HASL which in turn are sent to the contractors for analyses. Sampling at all stations did not begin at the same time. The data accumulated to date are presented in Table 5.

TABLE 5

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

(High-walled Stainless Steel Pot Collections)

Lemont, Illinois

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
December 1956	0.14 ± 0.02	0.14 ± 0.02	1.26
January 1957	0.30 ± 0.02	0.44 ± 0.03	2.06
February 1957	0.27 ± 0.01	0.71 ± 0.03	1.77
March 1957	0.47 ± 0.04	1.18 ± 0.05	1.98
April 1957	1.15 ± 0.01	2.33 ± 0.05	6.09
May 1957	0.27 ± 0.02	2.60 ± 0.06	3.21
June 1957	0.48 ± 0.03	3.08 ± 0.06	5.94
July 1957	1.567 ± 0.012	4.649 ± 0.064	8.98
August 1957	0.747 ± 0.008	5.396 ± 0.065	5.36
9/2 to 10/7/57	0.123 ± 0.010	5.519 ± 0.065	1.08
10/ to 11/11/57	0.218 ± 0.013	5.737 ± 0.067	
11/11 to 12/19/57	in process		

Birmingham, Alabama

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
April 1957	0.83 ± 0.02	0.83 ± 0.02	5.41
May 1957	0.39 ± 0.03	1.22 ± 0.04	2.96
June 1957	0.950 ± 0.061	2.170 ± 0.071	7.70
July 1957	0.799 ± 0.088	2.969 ± 0.093	2.62
August 1957	1.103 ± 0.061	4.072 ± 0.112	4.19
September 1957	0.421 ± 0.043	4.493 ± 0.120	9.59
October 1957	0.342 ± 0.018	4.835 ± 0.121	
November 1957	0.221 ± 0.017	5.050 ± 0.122	
December 1957	in process		
January 1958	in process		
February 1958	in process		

TABLE 5-Cont'd.

Salt Lake City, Utah

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
December 1956	0.31 ± 0.02	0.31 ± 0.02	1.67
January 1957	0.8 ± 0.1	1.11 ± 0.10	1.37
February 1957	0.83 ± 0.04	1.94 ± 0.11	0.72
March 1957	2.39 ± 0.09	4.33 ± 0.14	2.18
April 1957	2.30 ± 0.01	6.63 ± 0.14	3.24
May 1957	0.81 ± 0.03	7.44 ± 0.14	3.37
June 1957	1.61 ± 0.061	9.05 ± 0.16	1.47
July 1957	0.941 ± 0.093	9.991 ± 0.187	0.31
August 1957	1.277 ± 0.015	11.268 ± 0.187	1.69
September 1957	0.150 ± 0.015	11.418 ± 0.187	0.33
October 1957	0.590 ± 0.029	12.008 ± 0.187	
November 1957	0.409 ± 0.023	12.417 ± 0.187	
December 1957	in process		
January 1958	in process		
February 1958	in process		

Vermillion, South Dakota

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
April 1957	0.51 ± 0.01	0.51 ± 0.01	1.35
May 1957	1.74 ± 0.05	2.25 ± 0.05	4.17
June 1957	1.01 ± 0.05	3.26 ± 0.07	2.37
July 1957	2.803 ± 0.138	6.063 ± 0.154	4.29
August 1957	1.106 ± 0.014	7.169 ± 0.155	1.62
September 1957	0.873 ± 0.077	8.042 ± 0.173	3.14
October 1957	0.934 ± 0.061	8.976 ± 0.183	1.67
November 1957	0.142 ± 0.009	9.118 ± 0.183	
December 1957	in process		
January 1958	in process		
February 1958	in process		

TABLE 5-Cont'd.

West Los Angeles, California

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
December 1956	0.15 ± 0.02	0.15 ± 0.02	0.49
January 1957	0.99 ± 0.04	1.14 ± 0.05	3.88
February 1957	0.76 ± 0.01	1.90 ± 0.05	1.94
March 1957	0.09 ± 0.01	1.99 ± 0.05	0.95
April 1957	0.84 ± 0.01	2.83 ± 0.05	1.33
May 1957	0.24 ± 0.02	3.07 ± 0.05	0.27
June 1957	0.121 ± 0.044	3.191 ± 0.068	0.06
July 1957	0.919 ± 0.061	4.110 ± 0.091	0.03
August 1957	0.054 ± 0.009	4.164 ± 0.092	T
September 1957	0.043 ± 0.004	4.207 ± 0.094	0
October 1957	0.262 ± 0.014	4.469 ± 0.094	
November 1957	in process		
December 1957	in process		
January 1958	in process		

Coral Gables, Florida

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
April 1957	0.53 ± 0.01	0.53 ± 0.01	5.04
May 1957	0.496 ± 0.034	1.026 ± 0.035	10.11
6/4/57 to 7/12/57	0.561 ± 0.024	1.587 ± 0.042	5.82
7/12/57 to 8/6/57	1.511 ± 0.011	3.098 ± 0.044	8.54
8/6/57 to 9/6/57	0.753 ± 0.031	3.851 ± 0.054	13.62
9/6/57 to 10/6/57	0.521 ± 0.029	4.372 ± 0.061	6.27
10/6/57 to 11/6/57	0.408 ± 0.020	4.708 ± 0.064	3.98
11/6/57 to 12/6/57	in process		
12/6/57 to 1/6/58	in process		
1/6/58 to 2/6/58	in process		
2/6/58 to 3/6/58	in process		

TABLE 5-Cont'd.

Westwood, New Jersey

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
August 1957	1.310 ± 0.011 0.900 ± 0.009	1.105 ± 0.009	
September 1957	1.067 ± 0.013 1.288 ± 0.013	2.282 ± 0.016	
October 1957	0.948 ± 0.009 0.663 ± 0.010	3.088 ± 0.018	
November 1957	0.597 ± 0.012 0.506 ± 0.010	3.640 ± 0.023	

Tulsa, Oklahoma

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
January 1958	in process		

2.50 Monitoring Sites Outside Continental United States

The high-walled stainless steel pots have also been sent to thirteen locations outside continental United States for monthly collections of fallout. Again the washings are sent to HASL which, in turn, are sent to the contractors for analyses. The data available at the present time are summarized in Table 6.

TABLE 6

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

(High-walled Stainless Steel Pot Collections)

Oahu, Hawaii

AEC Lab (Coconut Island)

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
October 1956	0.83 ± 0.03		5.65
November 1956	5.46 ± 0.08		6.56
December 1956	0.48 ± 0.03		4.15
January 1957	176.2 ± 2.83		15.19
February 1957	5.87 ± 0.50		5.07
March 1957	1.44 ± 0.06		1.60
April 1957	18.6 ± 0.27		4.75
May 1957	1.75 ± 0.05		1.10
June 1957	0.720 ± 0.031	0.720 ± 0.031	0.32
July 1957	1.364 ± 0.107	2.084 ± 0.111	2.10
August 1957	0.303 ± 0.021	2.378 ± 0.113	1.57
September 1957	0.274 ± 0.023	2.661 ± 0.116	1.54
October 1957	0.368 ± 0.023	3.029 ± 0.118	
10/31/57 to 12/3/57	1.18 ± 0.06	4.209 ± 0.132	6.37
12/4/57 to 1/6/58	in process		
1/6/58 to 2/3/58	in process		
2/3/58 to 3/3/58	in process		

Oahu, Hawaii

Main Lab (Coconut Island)

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
October 1956	1.98 ± 0.05		5.65
November 1956	0.75 ± 0.03		6.56
December 1956	0.36 ± 0.03		4.15
January 1957	60.68 ± 0.48		15.19
February 1957	10.52 ± 0.65		5.07
March 1957	no sample collected		1.60
April 1957	no sample collected		4.75
May 1957	no sample collected		1.10
June 1957	no sample collected		0.32

TABLE 6-Cont'd.

Oahu, Hawaii

Weather Station (Coconut Island)

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation of inches
July 1957	0.477 ± 0.011	0.477 ± 0.011	2.10
August 1957	0.156 ± 0.008	0.633 ± 0.014	1.57
September 1957	0.188 ± 0.011	0.821 ± 0.017	1.54
October 1957	0.406 ± 0.038	1.277 ± 0.041	
10/31/57 to 12/3/57	0.897 ± 0.043	2.106 ± 0.060	6.37
12/4/57 to 1/6/58	in process		
1/6/58 to 2/3/58	in process		
2/3/58 to 3/3/58	in process		

Oahu, Hawaii

Gartley Hall, University of Hawaii, Honolulu

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
June 1957	0.582 ± 0.077	0.582 ± 0.077	0.83
July 1957	0.420 ± 0.032	1.002 ± 0.084	1.62
August 1957	0.306 ± 0.034	1.308 ± 0.090	3.09
September 1957	0.159 ± 0.014	1.467 ± 0.090	0.62
October 1957	0.126 ± 0.009	1.593 ± 0.091	
11/1/57 to 12/3/57	0.643 ± 0.031	2.236 ± 0.097	4.87
12/4/57 to 1/6/58	in process		
1/6/58 to 2/3/58	in process		
2/3/58 to 3/3/58	in process		

Note: Pot sampling was terminated at the Main Laboratory on Coconut Island June of 1957 and a new site, located at the Weather Station on the same island, was set up the following month.

TABLE 6-Cont'd.

Karachi, Pakistan

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
January 1957	0.08 ± 0.02	0.08 ± 0.02	0
February 1957	sample not collected		0
March 1957	0.08 ± 0.01		--
April 1957	sample not collected		0.39
May 1957	sample not collected		0
June 1957	sample not collected		0
July 1957	sample not collected		0.04
August 1957	sample not collected		0.16
September 1957	sample not collected		0
October 1957	sample not collected		0
November 1957	sample not collected		
December 1957	sample not collected		
January 1958	sample not received		

Bangkok, Thailand

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
March 1957	0.05 ± 0.01	0.05 ± 0.01	1.95
April 1957	0.13 ± 0.02	0.18 ± 0.02	5.85
May 1957	0.037 ± 0.020	0.217 ± 0.030	1.56
June 1957	0.016 ± 0.016	0.233 ± 0.034	9.36
July 1957	0.022 ± 0.007	0.255 ± 0.034	6.63
August 1957	0.039 ± 0.004	0.294 ± 0.035	11.70
September 1957	0.066 ± 0.008	0.360 ± 0.036	17.55
October 1957	in process		16.38
November 1957	in process		
December 1957	sample not collected		0
January 1958	in process		

Note 1: Samples were not collected at Karachi from April through December 1957 due to lack of personnel to handle the operation.

Note 2: The sample was not collected at Bangkok at the end of December 1957 since there was no rainfall during this month. Personnel at this collecting station have been asked however to collect these samples even during dry periods.

TABLE 6-Cont'd.

Nagasaki, Japan

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
August 1956	0.34 ± 0.02	0.34 ± 0.02	17.43
September 1956	0.17 ± 0.02	0.51 ± 0.03	16.07
October 1956	0.2 ± 0.02	0.71 ± 0.04	3.59
November 1956	0.08 ± 0.02	0.79 ± 0.04	1.44
December 1956	0.22 ± 0.02	1.01 ± 0.04	1.37
January 1957	1.01 ± 0.02	2.02 ± 0.05	3.94
February 1957	0.17 ± 0.05	2.19 ± 0.05	3.28
March 1957	0.38 ± 0.03	2.57 ± 0.06	1.40
April 1957	1.98 ± 0.02	4.55 ± 0.06	11.27
May 1957	0.720 ± 0.031	5.270 ± 0.068	6.44
June 1957	0.271 ± 0.038	5.541 ± 0.079	10.18
July 1957	1.072 ± 0.122	6.613 ± 0.145	28.67
August 1957	0.457 ± 0.007	7.070 ± 0.145	11.35
September 1957	0.260 ± 0.012	7.330 ± 0.145	14.74
October 1957	0.206 ± 0.018	7.536 ± 0.148	2.11
November 1957	0.193 ± 0.012	7.729 ± 0.148	
December 1957	in process		
January 1958	in process		

TABLE 6-Cont'd.

Hiroshima, Japan

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
August 1956	0.50 ± 0.03	0.50 ± 0.03	11.93
September 1956	lost		9.83
October 1956	0.27 ± 0.03	0.77 ± 0.04	3.51
November 1956	0.11 ± 0.02	0.88 ± 0.05	1.64
December 1956	0.06 ± 0.02	0.94 ± 0.05	0.23
January 1957	0.29 ± 0.01	1.23 ± 0.05	2.15
February 1957	0.53 ± 0.01	1.76 ± 0.05	2.26
March 1957	0.23 ± 0.01	1.99 ± 0.05	1.29
April 1957	1.12 ± 0.01	3.11 ± 0.06	11.00
May 1957	0.567 ± 0.077	3.677 ± 0.094	6.44
June 1957	0.493 ± 0.036	4.170 ± 0.110	10.22
July 1957	0.817 ± 0.017	4.987 ± 0.111	21.10
August 1957	0.047 ± 0.009	5.034 ± 0.112	4.48
September 1957	0.277 ± 0.015	5.311 ± 0.113	10.92
October 1957	lost at the collecting station		2.07
November 1957	0.135 ± 0.012	5.446 ± 0.114	
December 1957	in process		
January 1958	in process		

TABLE 6-Cont'd.

Rio de Janeiro, Brazil

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
September 1956	0.12 ± 0.02	0.12 ± 0.02	1.95
October 1956	0.21 ± 0.06	0.33 ± 0.06	3.12
November 1956	0.06 ± 0.01	0.39 ± 0.06	3.51
December 1956	0.02 ± 0.02	0.41 ± 0.07	3.51
January 1957	0.04 ± 0.01	0.45 ± 0.07	2.73
February 1957	0.05 ± 0.01	0.50 ± 0.07	5.07
March 1957	sample not received		7.41
April 1957	sample not received		
May 1957	sample not received		
June 1957	sample not received		
July 1957	sample not received		
August 1957	sample not received		
September 1957	sample not received		3.12
October 1957	sample not received		
November 1957	sample not received		
December 1957	sample not received		
January 1958	sample not received		

Bogota, Columbia

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
August 1957	0.018 ± 0.006	0.018 ± 0.006	
September 1957	0.017 ± 0.008	0.035 ± 0.010	
October 1957	in process		
November 1957	sample not received		
December 1957	in process		
January 1958	in process		

TABLE 6-Cont'd.

Salisbury, South Rhodesia

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
November 1956	0.18 ± 0.02	0.18 ± 0.02	7.41
December 1956	0.12 ± 0.02	0.30 ± 0.03	7.80
January 1957	0.11 ± 0.02	0.41 ± 0.04	5.85
February 1957	0.08 ± 0.01	0.49 ± 0.04	8.97
March 1957	0.05 ± 0.01	0.54 ± 0.04	5.46
April 1957	0.04 ± 0.04	0.58 ± 0.06	1.17
May 1957	sample not collected		0.78
June 1957	sample not collected		0.02
July 1957	sample not collected		0
August 1957	sample not collected		0.39
September 1957	sample not collected		0.39
October 1957	sample not collected		0.78
November 1957	0.109 ± 0.014		
December 1957	in process		
January 1958	in process		

Kikuyu, Kenya

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
January 1957	0.14 ± 0.02	0.14 ± 0.02	9.75
February 1957	0.26 ± 0.01	0.40 ± 0.02	2.34
March 1957	0.03 ± 0.01	0.43 ± 0.02	3.12
April 1957	0.03 ± 0.01	0.46 ± 0.03	7.02
May 1957	0.138 ± 0.023	0.598 ± 0.035	14.82
June 1957	0.187 ± 0.058	0.783 ± 0.068	1.56
July 1957	0.148 ± 0.007	0.933 ± 0.068	0.08
August 1957	0.020 ± 0.004	0.953 ± 0.068	0.20
September 1957	0.038 ± 0.008	0.991 ± 0.069	2.34
October 1957	0.087 ± 0.006	1.078 ± 0.069	1.56
November 1957	in process		
December 1957	in process		
January 1958	in process		

Note: Samples were not collected at Salisbury from May 1957 through October 1957 since there was no rainfall during these months. Personnel at this collecting station have been asked however to collect these samples even during dry periods.

TABLE 6-Cont'd.

Dakar, French West Africa

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
7/28/57 to 8/28/57	0.532 ± 0.013	0.532 ± 0.013	5.20
8/30/57 to 9/30/57	0.244 ± 0.014	0.776 ± 0.019	10.44
October 1957	0.046 ± 0.015	0.822 ± 0.024	
November 1957	sample not received		
December 1957	sample not received		
January 1958	sample not received		

Durban, Union of South Africa

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
June 1957	0.080 ± 0.028	0.080 ± 0.028	0.39
July 1957	<0.012	0.092 ± 0.030	0.39
August 1957	0.096 ± 0.026	0.184 ± 0.040	0.78
September 1957	0.230 ± 0.018	0.414 ± 0.044	4.64
October 1957	0.239 ± 0.014	0.653 ± 0.046	3.51
November 1957	0.325 ± 0.018	0.978 ± 0.049	
December 1957	in process		
January 1958	in process		

Pretoria, Union of South Africa

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
July 1957	0.061 ± 0.004	0.061 ± 0.004	4.29
August 1957	0.074 ± 0.008	0.135 ± 0.009	1.56
September 1957	0.447 ± 0.024	0.582 ± 0.025	4.68
October 1957	0.187 ± 0.015	0.769 ± 0.029	3.12
November 1957	in process		
December 1957	in process		
January 1958	in process		

TABLE 6-Cont'd.

Vienna, Austria

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
June 1957	0.451 ± 0.031	0.451 ± 0.031	0.78
July 1957			
AEC Roof	1.946 ± 0.092	2.397 ± 0.097	5.07
Meteor. St.	0.216 ± 0.012		
August 1957	0.793 ± 0.050	3.190 ± 0.109	2.73
September 1957	0.593 ± 0.031	3.783 ± 0.113	2.34
October 1957	0.026 ± 0.009	3.809 ± 0.114	0
November 1957	in process		
December 1957	in process		
January 1958	in process		

Klagenfurt, Austria

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
August 1957	1.170 ± 0.050	1.170 ± 0.050	3.51
September 1957	0.473 ± 0.024	1.643 ± 0.055	3.90
October 1957	0.078 ± 0.011	1.721 ± 0.056	1.17
November 1957	in process		
December 1957	in process		
January 1958	in process		

Tainan, Taiwan

Collection Month	mc Sr^{90}/mi^2	Cumulative mc Sr^{90}/mi^2	Precipitation in inches
January 1958	in process		

3. Strontium 90 in Milk

Monitoring for strontium 90 levels in milk has been carried out at HASL since early 1954. Powdered milk from Perry, New York and liquid milk purchased in New York City have been analyzed weekly. In 1955, five other areas of the United States, Japan and England were included in the program. No samples have been received from Japan and England since January and April of 1957 respectively. The data is not presented here but can be found in preceeding HASL Strontium Summary Reports.

3.10 New York

3.11 Strontium 90 in Powdered Milk from Perry, New York

Since April 1954, 5-pound cans of powdered milk from a milk powdering plant at Perry, New York have been sent to HASL each week. Until January 1956, analyses on each weekly sample were carried out but since this time, a monthly composite of the weekly samples has been analyzed. A summary of the data reported in units of $\mu\mu c$ Sr^{90}/gram Ca is given in Table 7. The values reported through December 1955 represent monthly averages of the weekly results and the error term, one standard deviation from the mean. Since a monthly composite has been analyzed subsequent to this time, the error term for each result reported in 1956 is one standard deviation due to the error in counting. Beginning in January 1957, replicate analyses have been carried out on the monthly composite, the reported value is an average and the error term represents one standard deviation from the mean.

The data are presented graphically in Figure 4.

TABLE 7

MONTHLY Sr^{90} LEVELS IN POWDERED MILK FROM PERRY, NEW YORK

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1954	April	0.47 ± 0.22
	May	1.2 ± 0.7
	June	1.3 ± 0.8
	July	1.5 ± 1.3
	August	1.2 ± 0.5
	September	1.5 ± 0.4
	October	1.4 ± 0.5
	November	1.1 ± 0.4
	December	0.64 ± 0.34

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1955	January	2.5 ± 2.6
	February	0.77 ± 0.31
	March	0.75 ± 0.31
	April	0.31 ± 0.05
	May	1.9 ± 0.1
	June	2.5 ± 0.1
	July	1.9 ± 0.2
	August	2.0 ± 0.1
	September	1.5 ± 0.1
	October	2.8 ± 0.3
	November	2.5 ± 0.3
	December	3.3 ± 0.2

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1956	January	2.3 ± 0.3
	February	2.0 ± 0.2
	March	2.0 ± 0.3
	April	2.9 ± 0.3
	May	2.8 ± 0.4
	June	3.0 ± 0.7
	July	2.7 ± 0.7
	August	3.1 ± 0.7
	September	4.9 ± 0.6
	October	5.4 ± 0.4
	November	5.6 ± 0.3
	December	3.16 ± 0.30

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1957	January	3.83 ± 0.38
	February	4.02 ± 0.62
	March	3.00 ± 0.06
	April	3.12 ± 0.65
	May	3.91 ± 0.60
	June	4.59 ± 0.62
	July	4.74 ± 0.25
	August	4.25 ± 0.50

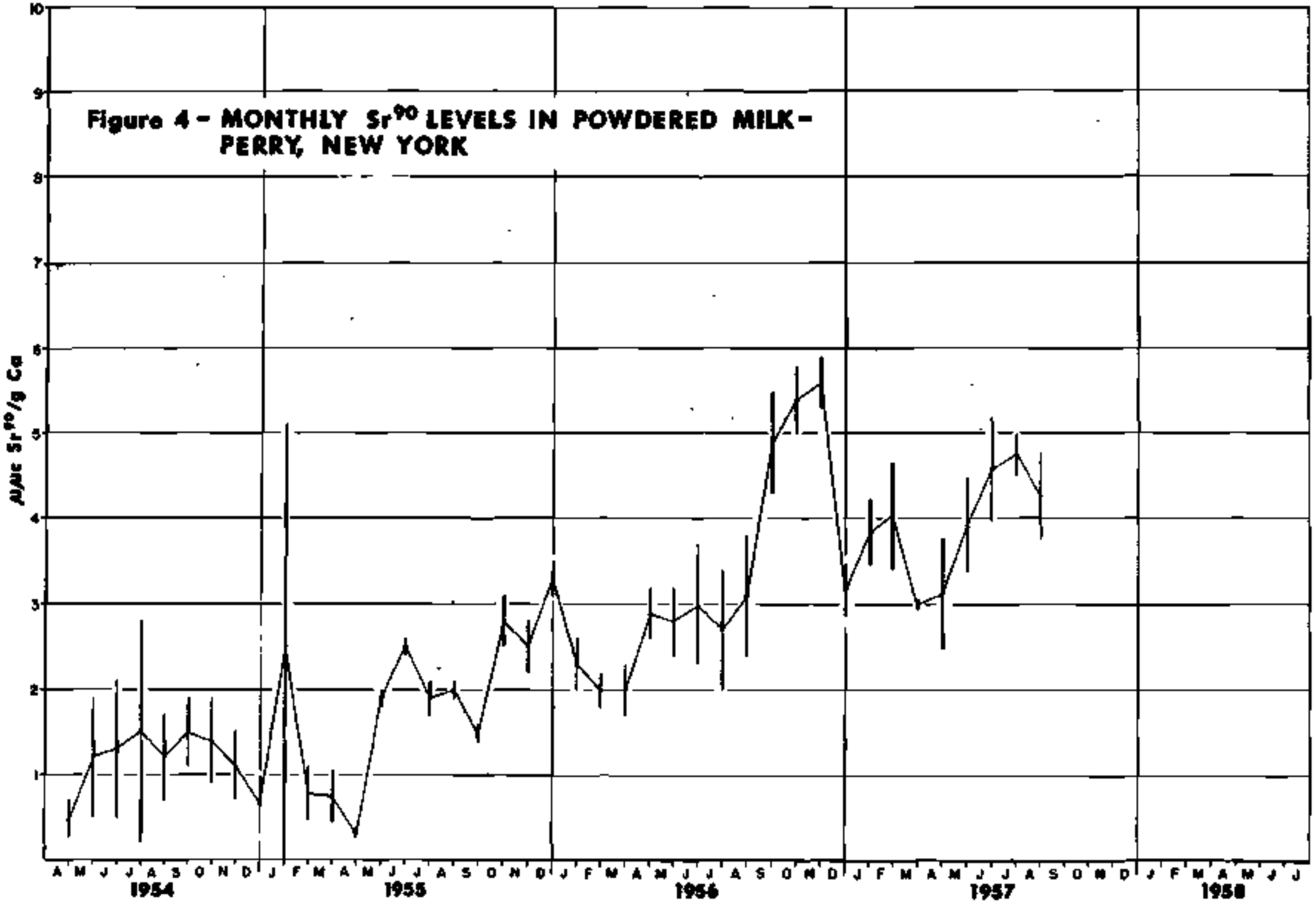


Figure 4 - MONTHLY Sr^{90} LEVELS IN POWDERED MILK - PERRY, NEW YORK

3.12 Strontium 90 in Liquid Milk from New York City

Beginning in June 1954, a quart of liquid milk was purchased daily from a local store near HASL. The labeled brands were varied to avoid sampling milk from a selected area. The samples purchased during the working week were combined and evaporated to dryness prior to ignition. An aliquot of the final ash was analyzed as a weekly sample. Beginning in January 1957, the daily purchasing continued but the samples were combined to form a monthly composite. A summary of the data reported in $\mu\mu c\ Sr^{90}/g$ Ca is given in Table 10. The values reported through May 1956 represent averages of the weekly results for the monthly period and the error term, one standard deviation from the mean. The values given since January 1957 are averages of replicate analyses carried out on one monthly composite and the error term is again one standard deviation from the mean. It will be noted that there is a period (June 1956 through December 1956) when no liquid milk samples were analyzed. Liquid milk monitoring in New York City was resumed after it was discovered that the powdered milk samples which came from Perry, New York did not represent the New York City milkshed.

The data are presented graphically in Figure 5.

TABLE 8

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

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1954	June	0.52 ± 0.41
	July	0.93 ± 0.83
	August	0.64 ± 0.50
	September	2.3 ± 0.3
	October	1.8 ± 0.4
	November	1.7 ± 0.6
	December	1.8 ± 1.5

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1955	January	1.5 ± 0.8
	February	0.89 ± 0.4
	March	1.1 ± 0.2
	April	0.90 ± 0.15
	May	2.4 ± 0.2
	June	3.7 ± 0.2
	July	5.2 ± 0.2
	August	2.4 ± 0.2
	September	3.9 ± 1.5
	October	3.5 ± 0.2
	November	3.6 ± 0.6
	December	3.8 ± 0.4

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1956	January	4.2 ± 0.6
	February	3.7 ± 0.2
	March	3.7 ± 0.3
	April	3.5 ± 0.3
	May	4.2 ± 0.4

Sampling Period Year	Month	μμc Sr^{90}/g Ca
1957	January	3.19 ± 0.36
	February	4.14 ± 0.12
	March	3.78 ± 0.18
	April	3.71 ± 0.73
	May	3.98 ± 0.61
	June	5.56 ± 0.56
	July	6.56 ± 0.45
	August	4.63 ± 0.26

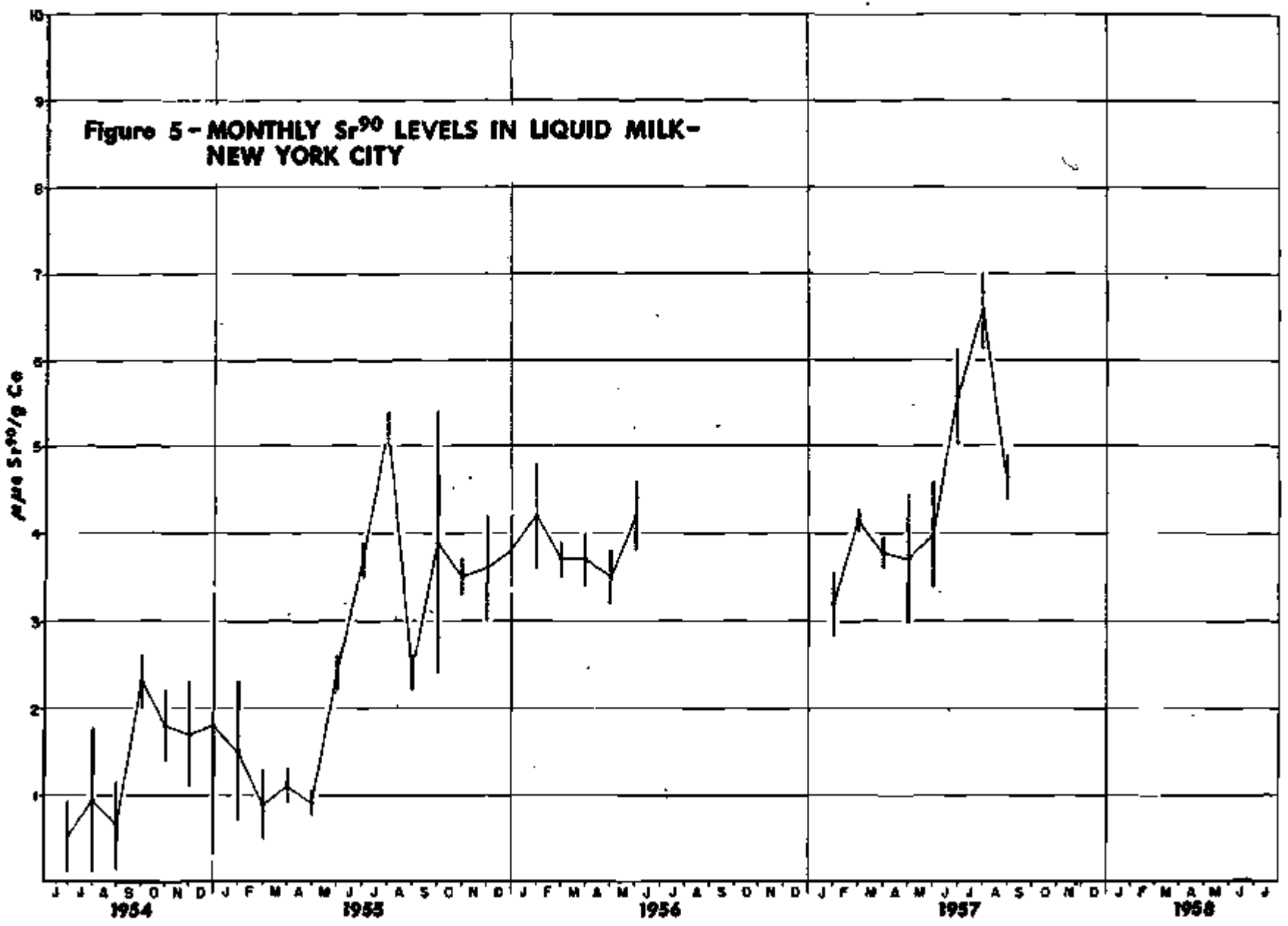


Figure 5 - MONTHLY Sr^{90} LEVELS IN LIQUID MILK - NEW YORK CITY

3.20 Strontium 90 in Powdered Milk from Other United States Locations

Five-pound samples of powdered milk have been received at various times since May 1955 from State College, Mississippi; St. Louis, Missouri; and Portland, Oregon, whenever the milk powdering plants were in operation. Weekly samples have been obtained continuously from milk powdering plants at Columbus, Wisconsin; and Mandan, North Dakota since this time. Whole milk is powdered at all these locations except Mandan, where buttermilk only is processed. The values reported through December 1955 represent monthly averages of the weekly results and the error term, one standard deviation from the mean. The data in $\mu\mu c$ Sr^{90}/g Ca for these five locations are presented in Table 11 and for Columbus, Wisconsin and Mandan, North Dakota, the monthly values are presented graphically in Figures 6 and 7 respectively.

TABLE 9

Monthly Sr^{90} Levels in Powdered Milk from Other United States Locations

Results in $\mu\mu c/g$ Ca

		State College Mississippi	St. Louis Missouri	Columbus Wisconsin	Mandan[1] North Dakota	Portland Oregon
1955	January					
	February					
	March					
	April					
	May	5.6 ± 0.2	4.1 ± 0.3	1.0 ± 0.7	7.3 ± 0.3	1.7 ± 0.2
	June	4.7 ± 0.2	4.6 ± 0.3	4.6 ± 0.3	9.2 ± 0.2	2.6 ± 0.3
	July	4.4 ± 0.2	3.9 ± 0.3	0.8 ± 0.4	6.3 ± 0.2	
	August	4.1 ± 0.2		1.2 ± 0.5	5.8 ± 0.3	
	September	3.2 ± 0.2		3.3 ± 0.3	4.7 ± 0.3	
	October			4.4 ± 0.2	6.9 ± 0.4	
	November			3.7 ± 0.2	7.4 ± 0.3	
	December			3.0 ± 0.4	10 ± 0.5	
1956	January			3.0 ± 0.2	3.5 ± 0.2	
	February			3.5 ± 0.2	8.1 ± 0.3	
	March			3.4 ± 0.2	11 ± 1.0	
	April			3.4 ± 0.5	9.6 ± 0.8	5.2 ± 0.3
	May	4.9 ± 0.5		2.8 ± 0.5	17 ± 1.0	6.4 ± 0.3
	June	4.4 ± 0.5		3.4 ± 0.7	8.7 ± 0.6	5.0 ± 0.5
	July	6.1 ± 0.7		4.2 ± 0.5	6.6 ± 0.4	
	August	3.8 ± 0.07		4.7 ± 0.1	8.6 ± 0.8	
	September	4.8 ± 0.2		4.3 ± 0.6	10.7 ± 0.5	
	October			4.7 ± 0.1	8.9 ± 0.4	
	November				5.1 ± 0.6	
	December			4.4 ± 0.1	7.4 ± 0.5	
1957	January			1.85 ± 0.06	4.4 ± 0.2	
	February			2.83 ± 0.07	8.17 ± 0.13	
	March			2.24 ± 0.85	7.38 ± 0.14	
	April			3.15 ± 0.06	6.75 ± 0.15	
	May			4.1 ± 0.2	9.79 ± 0.14	
	June			5.04 ± 0.06	10.91 ± 0.16	
	July			5.05 ± 0.11	17.33 ± 0.24	
	August					
	September					
	October					
	November					
	December					

1) Buttermilk

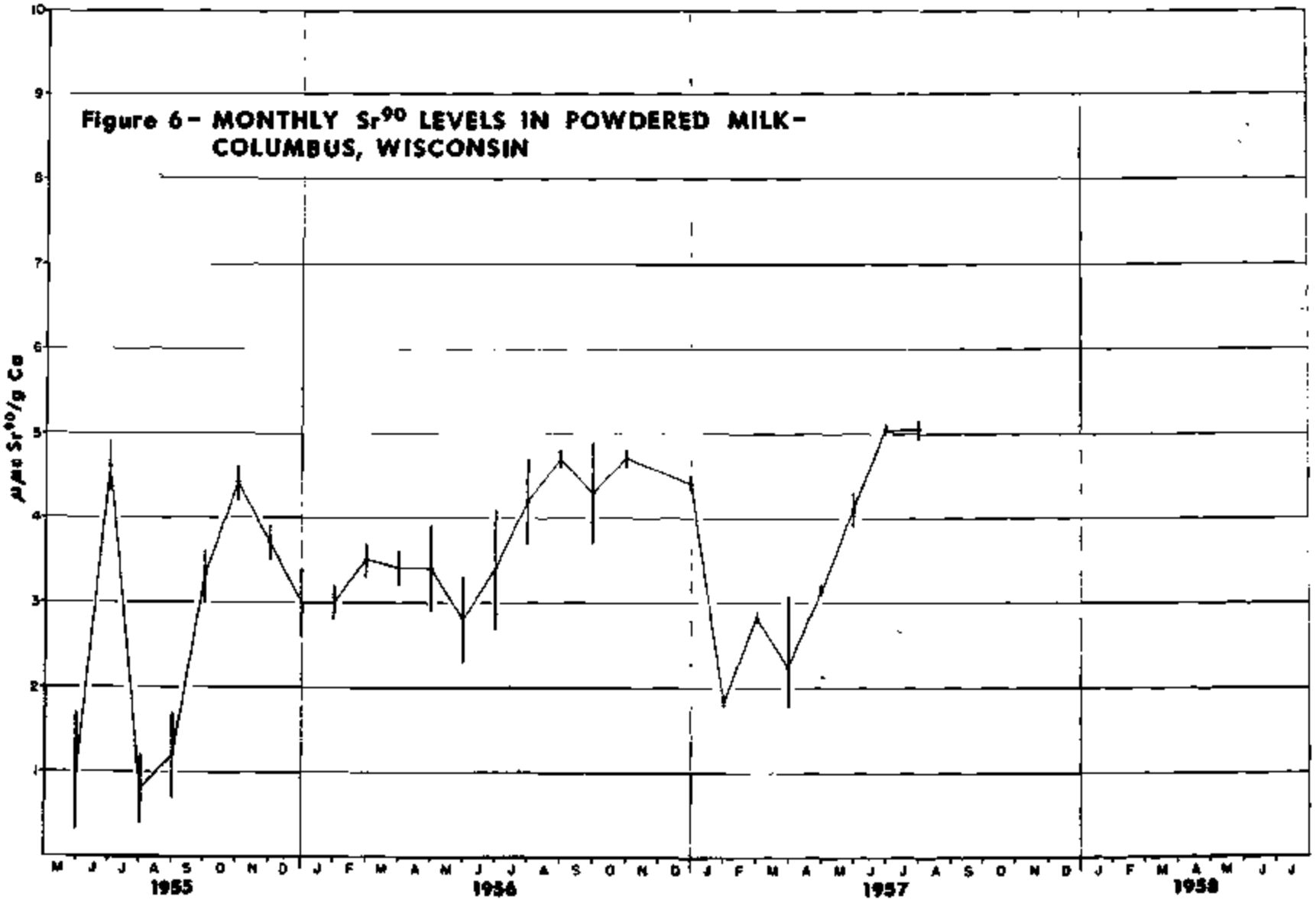
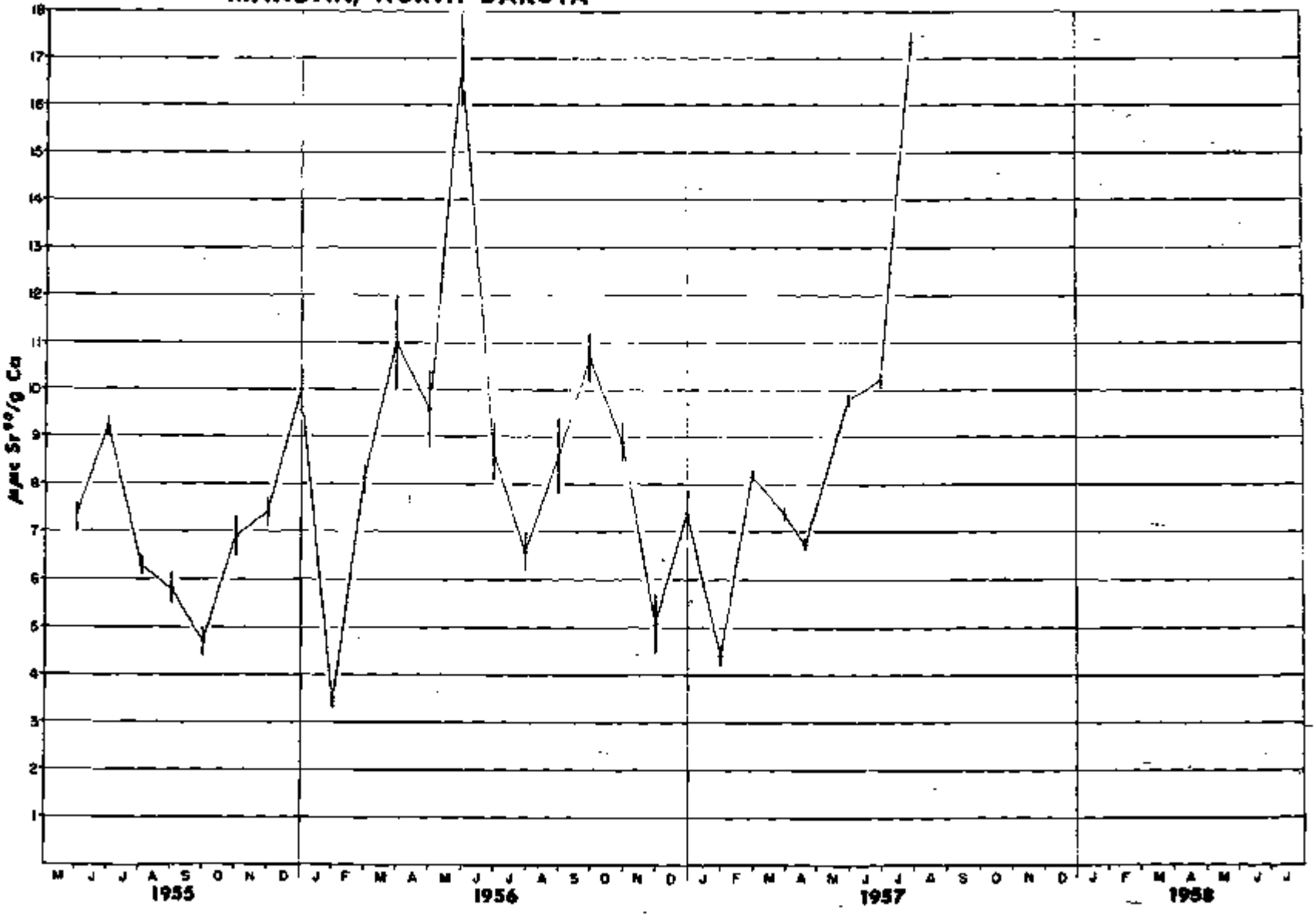


Figure 6 – MONTHLY Sr^{90} LEVELS IN POWDERED MILK – COLUMBUS, WISCONSIN

Figure 7 - MONTHLY Sr^{90} LEVELS IN POWDERED MILK-
MANDAN, NORTH DAKOTA



4. Strontium 90 in New York City Tap Water

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. Data for collections carried out before 1957 can be found in preceeding HASL Strontium Summary Reports. Data for all samples analyzed are presented graphically in Figure 8. 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

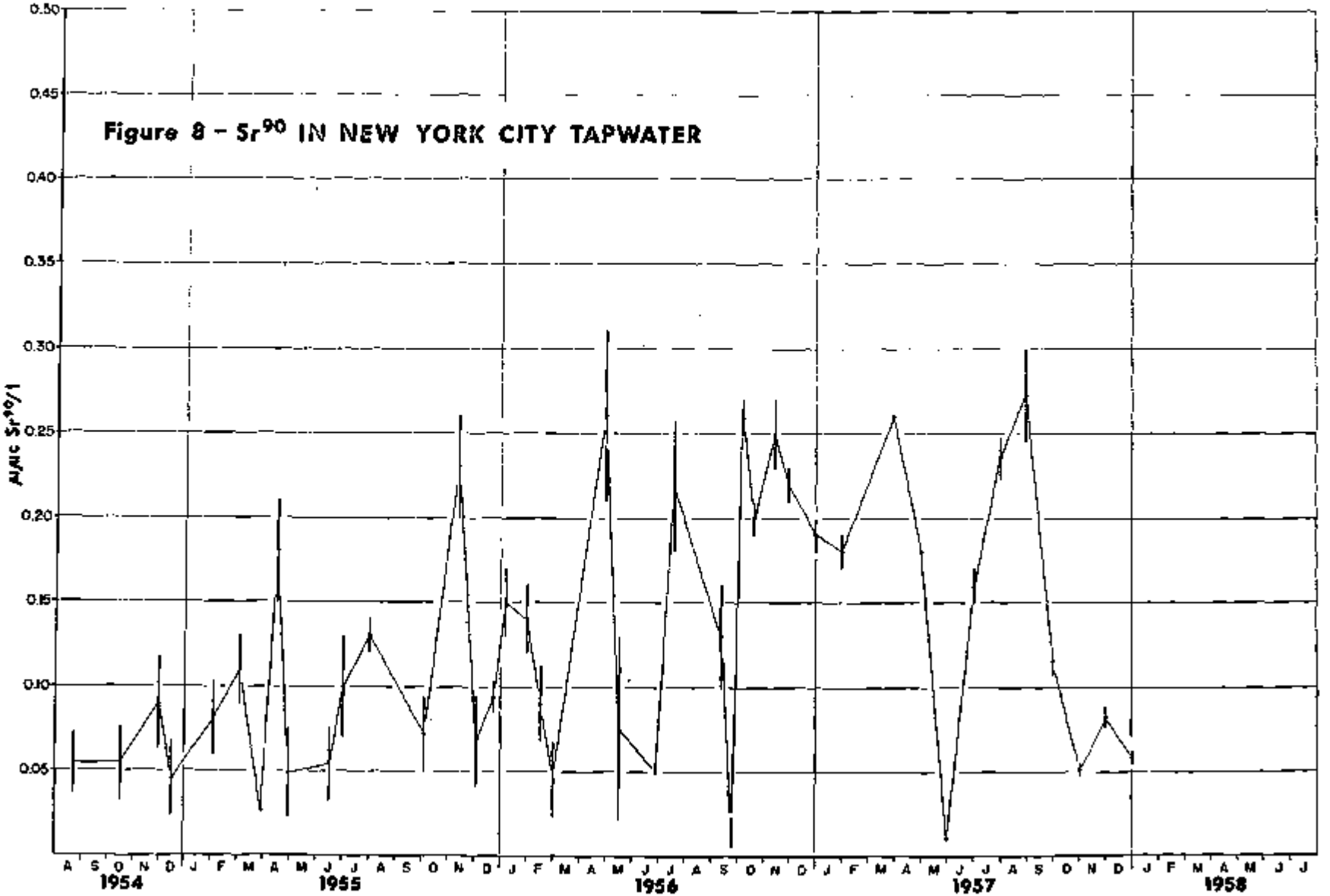


Figure 8 – Sr^{90} IN NEW YORK CITY TAPWATER

5. Appendix

This is a retabulation of the data which is reported internally on the first of each month. The data recorded at this time represent results which were submitted during the month of February 1958.

5.11

POT FALLOUT - Monthly Collections

Analytical Lab - Nuclear Science and Engineering Corporation

HASL#	Site	Collection Period	Total β Activity HCl Soluble mc/mi²	C-date	HCl Insoluble mc/mi²	C-date	Sr^{89} mc/mi²	C-date	Sr^{90} mc/mi²
6973	Birmingham, Ala.	September 1957	165 ± 14	12-2-57	70.5 ± 6.1	12-22-57	10.1 ± 1.8	12-19-57	0.421 ± 0.043
7096	Birmingham, Ala.	October 1957	90.4 ± 9.2	1-7-58	21.4 ± 3.1	1-14-58	7.97 ± 0.92	1-31-58	0.342 ± 0.018
7265	Birmingham, Ala.	November 1957	27.0 ± 3.1	1-9-58	8.1 ± 1.2	1-20-58	2.55 ± 0.23	1-31-58	0.221 ± 0.017
7049	Coral Gables, Fla.	9/6-10/6/57	13.2 ± 1.2	12-4-57	6.89 ± 0.61	12-22-57	9.96 ± 1.07	12-3-57	0.521 ± 0.029
7138	Coral Gables, Fla.	10/6-11/6/57	55.2 ± 6.1	1-6-58	1.53 ± 0.46	1-23-58	6.28 ± 0.92	2-3-58	0.408 ± 0.020
7070	Lemont, Ill.	9/2-10/7/57	16.0 ± 1.5	12-4-57	1.84 ± 0.33	12-22-57	3.00 ± 0.50	12-19-57	0.123 ± 0.010
7237	Lemont, Ill.	10/7-11/11/57	27.4 ± 3.0	1-9-58	3.67 ± 0.67	1-21-58	1.87 ± 0.13	2-12-58	0.218 ± 0.013
7071	W. Los Angeles, Calif.	September 1957	1.38 ± 0.46	12-4-57	0.46 ± 0.15	12-22-57	0.11 ± 0.03	12-19-57	0.043 ± 0.004
7175	W. Los Angeles, Calif.	October 1957	13.6 ± 1.5	1-7-58	2.60 ± 0.61	1-20-58	1.27 ± 0.18	2-6-58	0.262 ± 0.014
6972	Salt Lake City, Utah	September 1957	23.3 ± 2.3	12-2-57	15.9 ± 1.5	12-2-57	1.56 ± 0.31	1-15-58	0.150 ± 0.015
7112	Salt Lake City, Utah	October 1957	81.2 ± 9.2	1-2-58	10.3 ± 1.5	1-23-58	9.04 ± 1.38	1-31-58	0.390 ± 0.029
7251	Salt Lake City, Utah	November 1957	22.8 ± 2.6	1-10-58	6.58 ± 1.1	1-21-58	2.76 ± 0.46	1-31-58	0.409 ± 0.023
6979	Vermillion, S. D.	September 1957	65.9 ± 6.1	12-3-57	34.5 ± 3.0	12-22-57	10.7 ± 1.2	12-18-57	0.873 ± 0.077
7130	Vermillion, S. D.	October 1957	107 ± 12	1-4-58	18.4 ± 3.1	1-20-58	14.4 ± 1.2	2-3-58	0.934 ± 0.061
7263	Vermillion, S. D.	November 1957	11.0 ± 1.4	1-11-58	3.06 ± 0.11	1-21-58	0.86 ± 0.11	2-12-58	0.142 ± 0.009
	Westwood, N. J.	October 1957	46.8 ± 1.2	12-4-57					0.948 ± 0.009 * 0.663 ± 0.010
	Westwood, N. J.	November 1957							0.597 ± 0.012 * 0.506 ± 0.010
	Pittsburgh, Pa.	October 1957					7.20 ± 0.61 7.05 ± 0.61	11-1-57	0.244 ± 0.012 0.228 ± 0.014
	Pittsburgh, Pa.	November 1957					2.51 ± 0.23 2.70 ± 0.23	12-1-57	0.38 ± 0.02 0.110 ± 0.008 } *
	Pittsburgh, Pa.	December 1957					7.66 ± 0.92 7.81 ± 0.92	1-1-58	0.57 ± 0.03 0.51 ± 0.03

* Each of these results based on two assays of Sr^{90} by Y^{90} milking which were in agreement.

* Analyses by Isotopes, Inc.

POT FALLOUT - monthly collections - continued

AMALYTICAL LAB. - HASL

New York City

HASL #	S-Date	Total β Activity mc/mi²	c-Date	Sr^{89} mc/mi²	c-Date	Sr^{90} mc/mi²	Sr^{89}/Sr^{90}
6960	Sept 1957	150 ± 1 140 ± 1	10- 7-57	3.49 ± 0.08 1.83 ± 0.06	12-26-57	0.354 ± 0.021 0.476 ± 0.024	9.9 ± 0.7 3.9 ± 0.2
7191	Oct 1957	79.6 ± 1.1 73.5 ± 0.9	11-15-57	2.36 ± 0.18 0.87 ± 0.14	2-26-58	1.589 ± 0.089 1.402 ± 0.075	1.48 ± 0.05 0.63 ± 0.29
7295	Nov 1957	29.4 ± 0.4 35.3 ± 0.5	12-16-57	1.73 ± 0.12 lost	2-26-58	0.847 ± 0.054 lost	2.05 ± 0.06 lost
7486	Dec 1957	67.8 ± 0.6 65.2 ± 0.9	1-14-58	3.60 ± 0.21 2.74 ± 0.32	2-25-58	2.339 ± 0.087 2.229 ± 0.142	1.54 ± 0.03 1.28 ± 0.16

POT FALLOUT - Monthly Collections - Cont'd.

Analytical Lab - Nuclear Science and Engineering Corporation

BASL#	Site	Collection Period	Total β Activity HCl Soluble mc/mi²	C-date	HCl Insoluble mc/mi²	C-date	Sr^{89} mc/mi²	C-date	Sr^{90} mc/mi²
	OAHU, HAWAII								
6976	ABC Lab - Coconut Is.	September 1957	9.04 ± 1.07	12-2-57	1.22 ± 0.31	12-22-57	2.88 ± 0.28	12-18-57	0.274 ± 0.023
7110	ABC Lab - Coconut Is.	October 1957	21.0 ± 2.1	1-7-58	1.07 ± 0.31	1-21-58	3.68 ± 0.45	1-31-58	0.368 ± 0.023
7267	ABC Lab - Coconut Is.	10/31-12/3/57	56.7 ± 7.7	1-10-58	6.74 ± 1.07	1-23-58	13.9 ± 1.4	2-14-58	1.18 ± 0.06
6977	Weather St.-Coconut Is.	September 1957	7.20 ± 0.77	12-3-57	0.61 ± 0.15	12-22-57	2.50 ± 0.20	12-19-57	0.188 ± 0.011
7109	Weather St.-Coconut Is.	October 1957	7.66 ± 1.22	1-4-58	0.35 ± 0.08	1-23-58	2.60 ± 0.46	1-31-58	0.400 ± 0.038
7266	Weather St.-Coconut Is.	10/31-12/3/57	8.58 ± 1.22	1-10-58	2.30 ± 0.46	1-20-58	5.51 ± 0.46	2-12-58	0.679 ± 0.043
6978	Gartley Hall - Univ. of H.	September 1957	7.66 ± 1.07	12-3-57	0.46 ± 0.15	12-22-57	1.12 ± 0.12	12-23-57	0.159 ± 0.014
7111	Gartley Hall - Univ. of H.	October 1957	9.65 ± 1.53	1-7-58	1.07 ± 0.31	1-20-58	1.07 ± 0.12	1-31-58	0.126 ± 0.009
7268	Gartley Hall - Univ. of H.	11/1-12/3/57	25.9 ± 2.8	1-10-58	7.36 ± 1.22	1-22-58	3.98 ± 0.46	2-6-58	0.043 ± 0.031
7129	Bangkok, Thailand	September 1957	5.21 ± 1.07	1-4-58	1.22 ± 0.31	1-21-58	0.53 ± 0.06	1-31-58	0.066 ± 0.008
6984	Nagasaki, Japan	September 1957	22.1 ± 1.8	12-3-57	2.60 ± 0.31	12-22-57	4.44 ± 0.61	12-23-57	0.260 ± 0.012
7174	Nagasaki, Japan	October 1957	10.1 ± 1.2	1-6-58	2.76 ± 0.61	1-14-58	1.68 ± 0.31	2-3-58	0.206 ± 0.018
7270	Nagasaki, Japan	November 1957	10.7 ± 1.5	1-10-58	3.06 ± 0.61	1-23-58	1.76 ± 0.23	1-31-58	0.193 ± 0.012
7050	Hiroshima, Japan	September 1957	8.43 ± 0.92	12-4-57	0.76 ± 0.15	12-22-57	3.06 ± 0.61	12-19-57	0.277 ± 0.015
	Hiroshima, Japan	October 1957	Sample lost at collecting station						
7262	Hiroshima, Japan	November 1957	14.1 ± 2.3	1-10-58	2.60 ± 0.61	1-20-58	1.08 ± 0.21	2-3-58	0.135 ± 0.012
7113	Vienna, Austria	September 1957	46.0 ± 6.1	1-6-58	5.52 ± 0.92	1-21-58	4.60 ± 0.46	1-31-58	0.593 ± 0.031
7271	Vienna, Austria	October 1957	7.97 ± 1.22	1-11-58	1.22 ± 0.31	1-22-58	0.14 ± 0.04	2-14-58	0.026 ± 0.009
7114	Klagenfurt, Austria	September 1957	38.3 ± 4.6	1-6-58	5.06 ± 0.77	1-20-58	3.37 ± 0.61	1-31-58	0.473 ± 0.024
7269	Klagenfurt, Austria	October 1957	11.3 ± 1.5	1-13-58	4.29 ± 0.77	1-21-58	0.83 ± 0.07	2-2-58	0.078 ± 0.011
7055	Dakar, Fr. W. Africa	September 1957	9.80 ± 0.92	12-4-57	3.52 ± 0.31	12-22-57	2.28 ± 0.25	12-19-57	0.244 ± 0.014
7242	Dakar, Fr. W. Africa	October 1957	9.65 ± 1.80	1-8-58	0.92 ± 0.31	1-22-58	0.28 ± 0.06	2-12-58	0.046 ± 0.015
7292	Salisbury, S. Rhodesia	November 1957	10.4 ± 1.4	1-8-58	1.5 ± 0.5	1-20-58	0.39 ± 0.06	2-14-58	0.109 ± 0.014
7008	Kikuyu, Kenya	September 1957	3.68 ± 0.61	12-4-57	0.61 ± 0.15	12-22-57	0.11 ± 0.03	12-23-57	0.038 ± 0.008
7237	Kikuyu, Kenya	October 1957	*1.5	1-2-58	0.27 ± 0.08	1-17-58	0.04 ± 0.03	2-6-58	0.087 ± 0.006
7009	Durban, U. S. Africa	September 1957	8.73 ± 0.92	12-4-57	0.92 ± 0.15	12-22-57	0.75 ± 0.11	12-23-57	0.230 ± 0.016
7229	Durban, U. S. Africa	October 1957	7.97 ± 2.30	1-11-58	1.22 ± 0.31	1-21-58	0.57 ± 0.09	2-12-58	0.239 ± 0.014
7291	Durban, U. S. Africa	November 1957	254 ± 24	1-8-58	4.28 ± 0.77	1-22-58	0.93 ± 0.12	2-3-58	0.325 ± 0.018
7199	Pretoria, U. S. Africa	September 1957	22.8 ± 2.4	12-31-57	2.60 ± 0.61	1-21-58	0.80 ± 0.12	2-3-58	0.447 ± 0.024
7264	Pretoria, U. S. Africa	October 1957	6.89 ± 1.2	1-9-58	1.84 ± 0.46	1-23-58	0.41 ± 0.06	2-12-58	0.187 ± 0.015

Pittsburgh Fallout - Galvanized Tub Collections - (Gross β Activity, Ba^{140}, Sr^{89}, Sr^{90})

Report	Collection Period from	Collection Period to	Volume liters	Rainfall (inches)	Gross β Activity: HCl Soluble d/m	HCl Soluble Cu date	HCl Insoluble d/m	HCl Insoluble Cu date	HF soluble residue d/m	HF soluble residue Cu date	HF Insoluble d/m	HF Insoluble Cu date	Total Ba^{140}(1) d/m	Total Sr^{89}(1) d/m	Sr^{90} Total d/m	Sr^{90} d/m/liter	Sr^{90} mc/mi²
PR-1774	12/4/57	12/8/57	6.42	1.11	590 ± 60	12/19	—		—		—		15	530 ± 40	27.6 ± 2.5	4.3 ± 0.4	0.135 ± 0.012
B	1715	1000	6.13	1.12	580 ± 60	12/19	—		—		—		4	580 ± 70	26.6 ± 3.3	4.3 ± 0.8	0.129 ± 0.007
Σ(3)			—	—	—		1210 ± 100	12/25	530 ± 50	1/27/58	140 ± 20	1/14/58	64 ± 10	59 ± 10	4.6 ± 0.5	—	0.024 ± 0.003
PR-1784	12/8/57	12/9/57	0.55	0.11	180 ± 30	12/19	—		—		—		32 ± 4	96 ± 9	5.9 ± 0.4	10.7 ± 0.8	0.089 ± 0.002
B	1000	2016	0.56	0.11	170 ± 30	12/19	—		—		—		27 ± 4	96 ± 12	5.2 ± 0.3	9.2 ± 0.6	0.085 ± 0.002
Σ(3)			—	—	—		30 ± 10	12/25	50	1/27	10 ± 5	1/14	12 ± 6	14	4.2 ± 0.5	—	0.020 ± 0.002
PR-1794	12/9/57	12/13/57	dry	dry	200 ± 30	12/22	—		—		—		5.7 ± 1.5	18 ± 2	1.5 ± 0.3	—	0.007 ± 0.002
B	2016	2000	dry	dry	270 ± 40	12/22	—		—		—		10.3 ± 2.5	20 ± 7	1.6 ± 0.8	—	0.008 ± 0.004
Σ(3)			—	—	—		130 ± 20	12/25	120 ± 30	1/27	40 ± 5	1/14	85 ± 5	14	40.5	—	<0.003
PR-1804(2)	12/13/57	12/16/57	—	0.04	1410 ± 120	12/26	—		—		—		83 ± 10	58 ± 7	8.7 ± 1.0	—	0.042 ± 0.005
B(2)	2000	1616	—	0.04	1400 ± 120	12/26	—		—		—		28 ± 9	70 ± 6	7.8 ± 0.5	—	0.038 ± 0.003
Σ(2)(3)			—	—	—		3700 ± 300	1/3/58	430	2/1	2100 ± 200	2/11	19 ± 7	5 ± 2	<0.4	—	<0.002
PR-1814	12/16/57	12/18/57	3.52	0.61	450 ± 50	12/26	—		—		—		530 ± 20	280 ± 50	10.0 ± 0.7	2.85 ± 0.20	0.018 ± 0.005
B	1616	2115	3.55	0.62	460 ± 50	12/26	—		—		—		280 ± 20	310 ± 60	8.7 ± 0.7	2.45 ± 0.20	0.042 ± 0.005
Σ(3)			—	—	—		300 ± 40	1/9	850 ± 40	2/2	130 ± 20	2/11	130	22 ± 8	1.8 ± 0.9	—	0.009 ± 0.004
PR-1824	12/18/57	12/19/57	0.63	0.15	260 ± 40	12/26	—		—		—		39 ± 6	182 ± 20	6.0 ± 0.6	9.5 ± 1.0	0.029 ± 0.005
B	2115	1500	0.65	0.15	280 ± 40	12/26	—		—		—		48 ± 4	119 ± 17	7.1 ± 0.7	10.9 ± 1.1	0.035 ± 0.004
Σ(3)			—	—	—		200 ± 30	1/9	100 ± 30	1/27	30 ± 10	2/11	40	14	<0.5	—	<0.003
PR-1834	12/19/57	12/21/57	6.46	1.22	610 ± 70	12/26	—		—		—		151 ± 15	450 ± 70	26.9 ± 2.0	4.1 ± 0.3	0.131 ± 0.010
B	1500	0900	6.75	1.22	600 ± 70	12/26	—		—		—		68 ± 12	440 ± 40	23.7 ± 1.2	3.5 ± 0.2	0.115 ± 0.006
Σ(3)			—	—	—		440 ± 40	1/9	430	2/1	210 ± 30	2/11	45	16	<0.4	—	<0.002

Σ = combined residues of A and B.
Area of A and B = 2.58 ft² each.
Area of Σ = 5.16 ft².

(1) Activity corrected for decay to end of collection period.
(2) Collecting tube scraped.
(3) Ba^{140}, Sr^{89}, Sr^{90} assays on HF solutions of combined residue from A and B collection tube.

5.13

Chicago Fallout - galvanized tub collections

NSEC #	Collection Period from	to	Volume Liters	Total Sr^{90} d/m	Spec. Act. d/m Sr^{90}/l	Sr^{90} mc/mi^2	Total Sr^{89} d/m(3)
CR-22	9-16-57 1300	9-30-57 1000	dry	Sample lost en route to Pittsburgh			
CR-23	9-30-57 1000	10-15-57 0900	dry	4.0 ± 0.4		[illegible] ± 0.002	
CR-24	10-15-57 0900	10-28-57 1000	~30	170(1)	3.4 ± 0.2	0.6[illegible]	
CR-25	10-28-57 1000	11-11-57 1000	---(2)	< 0.6(2)		<0.0025(2)	
CR-26	11-11-57 1000	11-25-57 1000	~30	174(1)	5.8 ± 3.0	0.70(1)	2100(1)
CR-27	11-25-57 1000	12-9-57 1300	dry	11.7 ± 0.7		0.047 ± 0.003	220 ± 50
CR-28	12-9-57 1300	12-23-57 0900	3.74	35.7 ± 2.0	9.5 ± 0.6	0.144 ± 0.009	560 ± 60
CR-29	12-23-57 0900	1-6-58 0900	~7	138(1)	20.2 ± 1.2	0.56(1)	1900(1)

Area of collection 3.1 ft^2

(1) Calculated from measured specific activity and approximate total volume of sample collected.

(2) Winds upset collector Nov. 8, 1957; sample consists of residue only in distilled water.

(3) Corrected to end of collection period.

HUMAN BONE

Source: NEW YORK

Analytical Lab - Isotopes, Inc.

L.G.O.#	Autopsy#	Date of Death	Age	Bone Type	gms. ash	gms. Ca	Sr^{90} d/m	pμc/g Ca
3650	194	2-7-56	54M	Femur	25.0	9.53	≤0.24	≤0.01
3651	194	2-7-56	54M	Humerus	32.5	12.42	1.31 ± 0.23	0.05 ± 0.01
3659cb	194	2-7-56	54M	Ulna	31.4	11.57	0.95 ± 0.47	0.04 ± 0.02
2294	4-13054	6-56	58M	TBA	Solu.	38.8	0.354 ± 0.425	0.004 ± 0.005
3248	T-145	1-55	60M	TBA	Solu.		Sample Lost	
3698	207	3-56	62F	Vert.	25.2	9.01	2.85 ± 0.28	0.14 ± 0.01
3715	206	3-56	56M	Ribs	25.0	9.62	0.94 ± 0.39	0.04 ± 0.02
3735	218	1-56	54M	Skull	25.0	9.41	≤0.42	≤0.02
3222	#21	5-56	40F	TBA	Solu.	35.7	5.592 ± 0.280	0.071 ± 0.004
3600	184	1-56	63M	Femur	Solu.	29.7	1.753 ± 0.277	0.027 ± 0.004
3601	184	1-56	63M	Tibia	Solu.	25.2	0.554 ± 0.277	0.010 ± 0.005
3603	184	1-56	63M	Tibia	Solu.	22.3	1.477 ± 0.277	0.030 ± 0.006
3604	184	1-56	63M	R. Femur	Solu.	35.2	0.650 ± 0.375	0.008 ± 0.004
3605cb	184	1-56	63M	L. Ribs	Solu.	23.7	3.035 ± 0.379	0.058 ± 0.007
3606	184	1-56	63M	Vert.	Solu.	21.2	3.125 ± 0.377	0.067 ± 0.008
3611cb	184	1-56	63M	L. Humerus	Solu.	20.4	0.497 ± 0.434	0.011 ± 0.009
3221	#20	6-56	63F	TBA	Solu.	38.0	2.855 ± 0.431	0.034 ± 0.005
3223	#22	10-56	60M	TBA	Solu.	27.0	2.308 ± 0.288	0.039 ± 0.005
3224	#23	7-56	78M	TBA	Solu.	24.5	5.865 ± 0.288	0.109 ± 0.005
3225	#24	6-56	74M	TBA	Solu.	36.0	3.594 ± 0.387	0.045 ± 0.005
3227	T-1	10-55	65M	TBA	Solu.	36.0	2.101 ± 0.442	0.027 ± 0.006
3228	T-2	8-55	26M	TBA	Solu.	35.0	2.356 ± 0.323	0.031 ± 0.004
3229	T-3	9-55	81M	TBA	Solu.	36.0	3.187 ± 0.277	0.040 ± 0.003
3231	T-5	11-55	67M	TBA	Solu.	39.0	0.624 ± 0.468	0.007 ± 0.005
3232	T-6	10-55	84M	TBA	Solu.	36.0	4.213 ± 0.416	0.053 ± 0.005
3249	T-51	1-55	73M	TBA	Solu.	38.0	2.341 ± 0.416	0.028 ± 0.005
3251	T-53	1-55	58M	TBA	Solu.	36.0	2.341 ± 0.468	0.030 ± 0.006
3254	T-61	11-53	65M	TBA	Solu.	36.0	0.641 ± 0.481	0.018 ± 0.013
3258	T-65	12-54	65M	TBA	Solu.	37.0	0.648 ± 0.278	0.008 ± 0.003
3265	635	1-54	63M	TBA	Solu.	35.0	1.763 ± 0.561	0.023 ± 0.007
2094	7-7273	4-56	50M	Ulna	Solu.	5.69	0.29 ± 0.24	0.02 ± 0.02
2095	7-7273	4-56	50M	Fibula	Solu.	6.34	≤0.34	≤0.02
2098	7-7273	4-56	50M	Radius	Solu.	5.04	≤0.24	≤0.02
2117	10-7695	4-56	39M	L. Fibula	Solu.	6.44	0.19 ± 0.24	0.01 ± 0.02
2121	10-7695	4-56	39M	L. Radius	Solu.	6.07	0.29 ± 0.24	0.02 ± 0.02
2122	10-7695	4-56	39M	R. Ulna	Solu.	7.52	≤0.24	≤0.01
2123	10-7695	4-56	39M	R. Fibula	Solu.	5.38	0.49 ± 0.24	0.04 ± 0.02
2126	10-7695	4-56	39M	R. Radius	Solu.	8.02	0.46 ± 0.34	0.03 ± 0.02
2127	10-7695	4-56	39M	L. Ribs	Solu.	9.56	1.55 ± 0.34	0.07 ± 0.02
2129	10-7695	4-56	39M	R. Ribs	Solu.	5.92	1.26 ± 0.33	0.10 ± 0.03
2172	14-7895	3-55	65M	L. Ulna	Solu.	6.72	0.37 ± 0.28	0.03 ± 0.02

Source: NEW YORK

Analytical Lab - Isotopes, Inc.

L.G.O.#	Autopsy#	Date of Death	Age	Bone Type	gms. ash	gms. Ca	Sr^{90} d/m	μμc/g Ca
4120	262	7-56	65M	L. Tibia	25.0	9.07	≤0.23	≤0.01
4122	262	7-56	65M	R. Tibia	25.0	9.35	0.25 ± 0.07	0.05 ± 0.01
4123	262	7-56	65M	L. Ribs	30.5	11.67	2.62 ± 0.28	0.10 ± 0.01
4124	262	7-56	65M	R. Ribs	30.9	10.97	3.23 ± 0.33	0.13 ± 0.01
4125	262	7-56	65M	Vert.	25.0	9.82	3.84 ± 0.33	0.18 ± 0.02
4126	262	7-56	65M	Skull	24.6	9.15	2.71 ± 0.28	0.13 ± 0.01
4130	262	7-56	65M	R. Humerus	23.2	8.53	1.02 ± 0.37	0.05 ± 0.02
4133cb	262	7-56	65M	Radius	21.9	8.32	≤0.47	≤0.03
4134	262	7-56	65M	R. Femur	25.0	9.24	≤0.43	≤0.02
4135cb	262	7-56	65M	Ulna	23.8	9.21	0.33 ± 0.28	0.02 ± 0.01
4153	267	7-56	72M	R. Ribs	22.6	8.77	1.92 ± 0.28	0.10 ± 0.01
4155	267	7-56	72M	R. Tibia	25.0	9.78	≤0.37	≤0.02
4158cb	267	7-56	72M	Fibula	26.0	9.79	≤0.32	≤0.01
4159	267	7-56	72M	L. Tibia	25.0	9.92	≤0.43	≤0.02
4163	267	7-56	72M	Vert.	25.0	8.77	2.30 ± 0.24	0.12 ± 0.01
4164	267	7-56	72M	R. Humerus	22.5	8.57	≤0.24	≤0.01
4165	267	7-56	72M	L. Humerus	21.5	8.33	0.43 ± 0.29	0.02 ± 0.02
4166	267	7-56	72M	L. Femur	25.0	9.95	0.28 ± 0.24	0.01 ± 0.01
4167cb	267	7-56	72M	Ulna	29.4	12.10	≤0.33	≤0.01
4168cb	267	7-56	72M	Radius	24.8	9.08	0.48 ± 0.24	0.02 ± 0.01
4338	275	8-56	55M	R. Ribs	25.0	9.04	0.83 ± 0.39	0.04 ± 0.02
4339	275	8-56	55M	L. Ribs	25.0	9.33	1.97 ± 0.38	0.10 ± 0.02
4343	275	8-56	55M	R. Tibia	25.0	9.40	≤0.33	≤0.02
4345	275	8-56	55M	Sternum	7.7	2.62	≤0.49	≤0.09
4346	275	8-56	55M	L. Humerus	25.0	9.16	≤0.33	≤0.02
4348	275	8-56	55M	R. Humerus	25.0	9.57	0.33 ± 0.33	0.02 ± 0.02
4349	275	8-56	55M	L. Femur	25.0	9.28	0.95 ± 0.42	0.05 ± 0.02
4351cb	275	8-56	55M	Radius	34.0	12.75	1.37 ± 0.32	0.05 ± 0.01
4352	275	8-56	55M	L. Tibia	25.0	9.84	≤0.42	≤0.02
4353	275	8-56	55M	R. Femur	25.0	9.65	≤0.47	≤0.02
4354cb	275	8-56	55M	Ulna	33.8	11.62	0.27 ± 0.48	0.01 ± 0.02
4386	282	9-56	72M	R. Femur	25.0	9.30	0.65 ± 0.23	0.03 ± 0.01
4391	282	9-56	72M	R. Tibia	25.0	9.15	≤0.23	≤0.01
4393	282	9-56	72M	R. Ribs	36.7	13.70	≤0.55	≤0.02
4394	282	9-56	72M	L. Tibia	27.9	9.99	0.68 ± 0.37	0.03 ± 0.02
4395	282	9-56	72M	L. Ribs	36.4	13.86	2.00 ± 0.42	0.07 ± 0.01
4396cb	282	9-56	72M	Ulna	25.0	8.71	0.79 ± 0.42	0.04 ± 0.02
4397	282	9-56	72M	L. Femur	25.0	8.79	≤0.32	≤0.02
4398cb	282	9-56	72M	Radius	34.2	13.01	≤0.53	≤0.02
4399cb	282	9-56	72M	Fibula	25.0	9.19	0.57 ± 0.24	0.03 ± 0.01
4400	282	9-56	72M	L. Humerus	25.0	9.38	0.66 ± 0.24	0.03 ± 0.01
4401	282	9-56	72M	Skull	25.0	9.31	≤0.24	≤0.01
4408	284	10-56	91M	L. Humerus	25.2	10.03	0.76 ± 0.43	0.03 ± 0.02
4409	284	10-56	91M	R. Tibia	25.0	9.41	≤0.38	≤0.02
4410	284	10-56	91M	R. Femur	25.0	9.27	0.19 ± 0.28	0.01 ± 0.01
4411	284	10-56	91M	L. Femur	19.6	7.38	0.23 ± 0.23	0.01 ± 0.01
4416	284	10-56	91M	R. Humerus	20.7	7.84	≤0.28	≤0.02

Source: NEW YORK

Analytical Lab - Isotopes, Inc.

L.G.O.#	Autopsy#	Date of Death	Age	Bone Type	gms. ash	gms. Ca	Sr^{90} d/m	pmc/g Ca
5564	Baby brown	10-57	2 days M	Vert.	5.7	1.79	1.93 ± 0.29	0.49 ± 0.07
5565	Baby brown	10-57	2 days M	Ribs	2.8	0.85	1.01 ± 0.29	0.54 ± 0.16
5566	Baby brown	10-57	2 days M	Arms & Legs	10.5	3.37	2.46 ± 0.29	0.33 ± 0.04
5567	Baby brown	10-57	2 days M	Skull	16.4	5.98	7.87 ± 0.39	0.60 ± 0.39
5568	Baby brown	10-57	2 days M	Pelvis	2.3	0.63	0.63 ± 0.24	0.46 ± 0.17
5570	Baby E.S.	11-57	few days F	Ribs	3.4	0.96	0.14 ± 0.29	0.07 ± 0.13
5571	Baby E.S.	11-57	few days F	Arms & Legs	8.0	2.31	0.88 ± 0.38	0.17 ± 0.08
5572	Baby E.S.	11-57	few days F	Vert.	5.5	2.08	1.53 ± 0.44	0.33 ± 0.10
5573	Baby E.S.	11-57	few days F	TBA	18.0	3.48	4.87 ± 0.33	0.64 ± 0.04

- -

Source: GERMANY — Analytical Lab - Isotopes, Inc.

L.G.O.#	Autopsy#	Date of Death	Age	Bone Type	gms. ash	gms. Ca	Sr^{90} d/m	μμc/g Ca
5115A	444/57	6-57	M	Femur	8.2	5.70	0.72 ± 0.39	0.06 ± 0.03
5115B	444/57	6-57	M	Vert.	5.2	1.83	2.55 ± 0.28	0.63 ± 0.07
5117A	432/57	6-57	2M	Whole Femur	5.0	1.76	1.58 ± 0.32	0.41 ± 0.08
5117B	432/57	6-57	2M	Vert.	2.4	0.84	1.21 ± 0.28	0.65 ± 0.15
5119A	443/57	6-57	M	Femur	2.6	0.94	2.81 ± 0.37	1.36 ± 0.18
5119C	443/57	6-57	M	Vert.	2.7	0.92	0.74 ± 0.37	0.37 ± 0.18
5121A	457/57	7-57	8 Mo.F	Rib	2.6	0.86	0.32 ± 0.47	0.17 ± 0.25
5121B	457/57	7-57	8 Mo.F	Vert.	1.6	0.54	1.10 ± 0.47	0.93 ± 0.40
5121C	457/57	7-57	8 Mo.F	Femur	4.2	1.46	2.86 ± 0.37	0.89 ± 0.12

Source: CALCUTTA, INDIA — Analytical Lab - Isotopes, Inc.

5273	--	5-57	12M	Clavicle	7.5	2.78	11.28 ± 0.63	1.84 ± 0.10
5274	--	5-57	12M	Sacral Vert.	14.0	4.01	1.03 ± 0.47	0.12 ± 0.05
5275	--	5-57	12M	Sternum	2.5	0.98	0.73 ± 0.32	0.34 ± 0.15
5276	--	5-57	12M	Lower Jaw	15.0	5.77	1.28 ± 0.47	0.10 ± 0.04
5277	--	5-57	12M	Wisdom Teeth and 12 yr. Molars	8.4	3.00	0.26 ± 0.31	0.04 ± 0.05
5278	--	5-57	12M	Other Teeth	17.0	2.88	2.43 ± 0.37	0.38 ± 0.06
5279A	--	5-57	12M	Ulna	11.0	5.60	1.87 ± 0.33	0.15 ± 0.03
5279B	--	5-57	12M	Radius	9.8	3.68	≤0.42	≤0.05
5280A	--	5-57	12M	Ulna	11.0	4.20	1.72 ± 0.23	0.19 ± 0.03
5280B	--	5-57	12M	Radius	9.8	3.58	≤0.69	≤0.09
5282	--	5-57	12M	R. Humerus	14.9	5.72	1.58 ± 0.28	0.13 ± 0.02
5283	--	5-57	12M	L. Humerus	24.1	9.37	3.28 ± 0.42	0.16 ± 0.02
5284	--	5-57	12M	Epiphysis and R.&L. Humerus	6.7	2.54	≤0.55	≤0.10
5285	--	5-57	12M	R. Scapula	10.7	4.21	2.10 ± 0.23	0.23 ± 0.03
5286	--	5-57	12M	L. Scapula	10.1	3.75	1.07 ± 0.23	0.13 ± 0.03
5287	--	5-57	12M	Cervical Vert.	12.0	4.58	2.10 ± 0.28	0.21 ± 0.03
5289	--	5-57	12M	Thoracic Vert.	4.8	1.81	0.66 ± 0.36	0.17 ± 0.09
5290	--	5-57	12M	Thoracic Vert.	6.0	2.29	≤0.37	≤0.07
5292	--	5-57	12M	Lumbar Vert.	6.3	2.36	0.52 ± 0.33	0.10 ± 0.06
5293	--	5-57	12M	Lumbar Vert.	7.3	2.50	0.21 ± 0.49	0.04 ± 0.09
5294	--	5-57	12M	Ribs	30.15	11.05	5.44 ± 0.37	0.22 ± 0.02
5295	--	5-57	12M	L. Ilium	24.1	8.82	3.04 ± 0.28	0.16 ± 0.01
5296	--	5-57	12M	L. Ischium	7.4	2.67	1.44 ± 0.37	0.24 ± 0.06
5298	--	5-57	12M	R. Ilium	25.6	9.32	4.12 ± 0.28	0.20 ± 0.01
5299	--	5-57	12M	R. Ischium	7.9	2.74	1.37 ± 0.50	0.23 ± 0.08
5300cb	--	5-57	12M	R. Pubis	6.5	2.31	2.18 ± 0.37	0.43 ± 0.07

Source: CALCUTTA, INDIA Analytical Lab - Isotopes, Inc.

L.G.O.#	Autopsy#	Date of Death	Age	Bone Type	gms. ash	gms. Ca	Sr^{90} d/m	μμc/g Ca
5302	--	5-57	12M	L. Shaft Fibula	10.6	3.61	3.89 ± 0.34	0.49 ± 0.04
5303	--	5-57	12M	Epiphysis lower leg	7.7	2.90	0.72 ± 0.24	0.11 ± 0.04
5304	--	5-57	12M	Shaft of Fibula	10.3	3.73	0.63 ± 0.37	0.08 ± 0.04
5305	--	5-57	12M	R. Epiphysis lower leg	7.9	2.95	≤0.39	≤0.06
5306	--	5-57	12M	R. Shaft Tibia	30.0	10.92	3.83 ± 0.46	0.16 ± 0.02
5308	--	5-57	12M	L. Epiphysis Femur	13.6	4.58	2.05 ± 0.37	0.20 ± 0.04
5309	--	5-57	12M	R. Femur Shaft	42.7	14.99	4.09 ± 0.29	0.12 ± 0.009
5310	--	5-57	12M	R. Epiphysis Femur	14.9	5.43	1.71 ± 0.28	0.14 ± 0.02
5311	--	5-57	12M	Tarsals	40.3	15.27	6.56 ± 0.32	0.20 ± 0.01
5312	--	5-57	12M	Carpals	3.4	1.13	1.11 ± 0.28	0.45 ± 0.11
5313	--	5-57	12M	Foot Phalanges	4.5	1.59	0.31 ± 0.37	0.09 ± 0.10
5314	--	5-57	12M	Hand Phalanges	6.7	2.43	1.13 ± 0.41	0.21 ± 0.08
5316	--	5-57	12M	Metacarpals	12.9	4.78	2.26 ± 0.36	0.22 ± 0.03
5317	--	5-57	12M	Metatarsals	15.5	5.65	1.40 ± 0.41	0.11 ± 0.03
5318	--	5-57	12M	Epiphyses Feet & Hands	3.0	9.89	1.02 ± 0.23	0.05 ± 0.01
5319	--	5-57	12M	Tibia	7.6	2.60	1.85 ± 0.28	0.32 ± 0.05
5321	--	5-57	12M	Next 4 cm Tibia	7.9	2.78	1.44 ± 0.28	0.24 ± 0.05
5322	--	5-57	12M	Next 4 cm Tibia	7.1	2.57	0.53 ± 0.37	0.09 ± 0.07
5323	--	5-57	12M	Next 4 cm Tibia	6.1	2.21	≤0.28	≤0.06
5324	--	5-57	12M	L. Tibia	5.4	1.92	0.23 ± 0.23	0.06 ± 0.06
5325	--	5-57	12M	Next 4 cm Tibia	5.2	1.82	1.24 ± 0.28	0.31 ± 0.07
5326	--	5-57	12M	5 cm L. Femur	14.5	5.36	1.87 ± 0.28	0.16 ± 0.02
5327	--	5-57	12M	5 cm Femur	13.4	4.33	1.24 ± 0.41	0.13 ± 0.04
5329	--	5-57	12M	5 cm Femur	10.9	4.06	0.47 ± 0.31	0.05 ± 0.04
5330	--	5-57	12M	5 cm Femur	9.5	3.38	1.21 ± 0.37	0.16 ± 0.05
5331	--	5-57	12M	5 cm Femur	9.9	3.41	1.57 ± 0.31	0.21 ± 0.04
5332	--	5-57	12M	5 cm Femur	11.5	4.32	2.01 ± 0.33	0.21 ± 0.03
5332A	--	5-57	12M	Skull minus Teeth	30.0	11.32	4.46 ± 0.46	0.18 ± 0.02

Source: NEW YORK

Analytical Lab - Nuclear Science and Engineering Corp.

L.G.O.#	Autopsy#	Date of Death	Age	Bone Type	gms. ash	gms. Ca	Sr^{90} d/m	μμc/g Ca
3038	A18646	12-56	40F	Ribs	8.64	3.34	≤0.4	≤0.06
3040	A18690	2-57	44M	Rib	9.50	3.73	≤0.5	≤0.07
3041	A18667	1-57	45F	Rib	16.6	6.36	≤0.4	≤0.03
3044	A18616	12-56	47F	Ribs	20.6	7.85	≤0.5	≤0.03
3047	A18095	2-57	38M	Ribs	9.03	3.54	1.2 ± 0.4	0.15 ± 0.05
3057	A18635	12-57	30M	Rib	13.7	5.41	≤0.6	≤0.06
3354	44231	5-57	56	Vert.	10.5	3.95	≤0.5	≤0.06
3355	44193	4-57	62	Vert.	12.2	4.44	≤0.4	≤0.04
3358	44157	4 & 5/57	60	Vert.	24.2	9.34	3.1 ± 0.5	0.15 ± 0.03
3359	44195	4-57	72M	Vert.	14.8	5.82	2.1 ± 0.4	0.16 ± 0.03
3362	44138	4 & 5/57	71M	Vert.	17.9	6.70	3.4 ± 0.9	0.23 ± 0.08
3363	44164	4 & 5/57	57M	Ster/Vert.	10.5	3.88	1.4 ± 0.4	0.17 ± 0.05
3364	44208	4 & 5/57	65	Vert.	14.4	5.74	3.0 ± 0.6	0.24 ± 0.05
3366	44150	4 & 5/57	79F	Vert.	10.6	4.28	≤0.6	≤0.07
3367	44146	4 & 5/57	62M	Vert.	23.7	9.40	3.2 ± 0.8	0.15 ± 0.04
3369	44227	4-57	80M	Vert.	13.2	4.45	1.2 ± 0.4	0.12 ± 0.04
3370	44139	4-57	43M	Vert.	13.0	5.02	2.0 ± 0.5	0.18 ± 0.04
3372	44156	4-57	55	Vert.	16.6	6.45	2.0 ± 0.7	0.14 ± 0.05
3374	44140	4 & 5/57	55M	Vert.	15.9	6.20	2.5 ± 0.6	0.18 ± 0.04
3375	44167	4-57	65	Vert.	13.1	4.85	2.2 ± 0.4	0.21 ± 0.04
3376	44190	4-57	Adult	Vert.	12.6	4.68	2.4 ± 0.6	0.24 ± 0.06
3459	168	11-55	75F	R. Ribs	25.2	9.90	≤0.7	≤0.04
3460	168	11-55	75F	R. Tibia	37.4	15.4	≤0.5	≤0.015
3461	168	11-55	75F	Femur	61.9	25.8	≤0.4	≤0.007
3463ab	168	11-55	75F	L.Humerus	39.9	15.4	≤0.4	≤0.012
3464	168	11-55	75F	L. Ribs	21.7	8.25	≤0.4	≤0.025
3469	168	11-55	75F	L. Femur	45.6	17.8	≤0.4	≤0.010
3471	168	11-55	75F	L. Tibia	45.2	17.7	≤0.4	≤0.010
3472	171	12-55	67M	Skull	35.1	13.5	≤0.5	≤0.020
3473	171	12-55	67M	R. Tibia	37.8	13.8	≤0.4	≤0.015
3474	171	12-55	67M	L. Femur	58.6	22.9	≤0.4	≤0.008
3475	171	12-55	67M	L.Humerus	19.4	7.65	≤0.4	≤0.03
3476	171	12-55	67M	L. Ribs	37.4	14.9	1.1 ± 0.4	0.034 ± 0.014
3477	171	12-55	67M	R. Femur	41.1	16.4	≤0.4	≤0.012
3481	171	12-55	67M	Vert.	34.5	14.7	1.4 ± 0.6	0.05 ± 0.02
3483	171	12-55	67M	R.Humerus	19.5	7.85	≤0.5	≤0.03
3485ab	171	12-55	67M	Radius	26.6	11.0	≤0.5	≤0.025
3486ab	171	12-55	67M	Ulna	30.2	12.4	≤0.6	≤0.025
3487	171	12-55	67M	Tibia	34.9	14.1	≤0.5	≤0.020
3488	171	12-55	67M	R. Ribs	34.0	13.9	1.1 ± 0.3	0.036 ± 0.010
3489	172	12-55	77M	L. Ribs	20.1	8.21	0.9 ± 0.4	0.05 ± 0.02
3490	172	12-55	77M	Vert.	44.4	18.1	3.4 ± 0.8	0.086 ± 0.020
3491	172	12-55	77M	R. Femur	44.6	17.6	0.8 ± 0.3	0.021 ± 0.008

Source: NEW YORK

Analytical Lab - Nuclear Science and Engineering Corp.

L.G.O.#	Autopsy#	Date of Death	Age	Bone Type	gms. ash	gms. Ca	Sr^{90} d/m	μμc/g Ca
3492	172	12-55	77M	R. Ribs	32.3	12.6	1.4 ± 0.6	0.05 ± 0.02
3494	172	12-55	77M	R.Humerus	22.8	9.14	≤0.5	≤0.03
3497	172	12-55	77M	R. Tibia	57.4	23.6	≤0.4	≤0.008
3498	172	12-55	77M	R.Humerus	22.9	8.74	≤0.5	≤0.03
3499cb	172	12-55	77M	Fibula	27.1	10.9	≤0.4	≤0.020
3500cb	172	12-55	77M	Radius	22.6	9.45	≤0.5	≤0.025
3501cb	172	12-55	77M	Ulna	26.2	10.9	≤0.4	≤0.020
3502	172	12-55	77M	L. Femur	74.6	29.5	≤0.5	≤0.008
3503	172	12-55	77M	L. Tibia	51.1	22.6	≤0.5	≤0.010
3504	174	12-55	64M	L.Humerus	24.0	9.01	≤0.4	≤0.020
3505	174	12-55	64M	L. Tibia	46.5	18.1	≤0.7	≤0.020
3506	174	12-55	64M	R. Tibia	51.0	21.5	≤0.4	≤0.009
3507	174	12-55	64M	R. Femur	64.3	24.0	≤0.5	≤0.010

Source: BOSTON

Analytical Lab - Nuclear Science and Engineering Corp.

3378	177392	6-57	64F	Vert.	11.5	4.56	≤0.7	≤0.07
3379	177670	6-57	57M	Vert.	13.1	4.88	≤0.7	≤0.07
3380	177478	6-57	58M	Vert.	15.4	6.02	2.0 ± 0.9	0.15 ± 0.07
3381	177557	6-57	87F	Vert.	15.7	6.03	3.6 ± 0.6	0.28 ± 0.04
3382	177558	6-57	44F	Vert.	24.9	9.87	4.2 ± 0.4	0.19 ± 0.02
3383	177391	6-57	25M	Vert.	13.1	5.26	2.9 ± 0.5	0.25 ± 0.04

Source: BRAZIL

Analytical Lab - Nuclear Science and Engineering Corp.

3286	1941/56	11-56	44M	Ribs	25.7	9.63	≤0.5	≤0.03
3292	1829/56	10-56	28M	Ribs	39.1	15.1	2.0 ± 0.3	0.061 ± 0.010
3303	2038/56	11-56	40F	Rib	11.4	4.31	≤0.4	≤0.04

TAP WATER

ANALYTICAL LAB. - HASL

New York City

HASL #	Volume Collected	Month	Sr^{89} c-Date	Sr^{89}/Sr^{90}	Sr^{90} uuc/l
6961	105 liter	Sept 1957	12-26-57	1.6 ± 0.1	0.115 ± 0.008
7293	120 liter	Oct 1957	2-26-58	1.2 ± 0.2	0.051 ± 0.004
7294	100 liter	Nov 1957	2-25-58	0.9 ± 0.2	0.082 ± 0.006
7485	135 liter	Dec 1957	2-25-58	1.0 ± 0.2	0.058 ± 0.004

PRECIPITATION SAMPLES - Mt. Washington Observatory

ANALYTICAL LABORATORY - ISOTOPES, INC.

HASL #	Collection Date	Volume Sample	Sr^{90} d/m/s	Sr^{90} d/m/l
7190	8/17-18/57	3578 ml	166.31 ± 1.41	46.48 ± 0.39
7191	9/20/57	3539 ml	24.81 ± 0.58	7.01 ± 0.16
7192	11/1/57	4060 ml	25.40 ± 0.76	6.26 ± 0.19
7193	11/1/57	3990 ml	11.22 ± 0.44	2.81 ± 0.11
7194	11/2/57	4015 ml	10.83 ± 0.54	2.70 ± 0.13
7195	11/2/57	4080 ml	9.10 ± 0.54	2.23 ± 0.13
7196	11/2/57	4060 ml	6.48 ± 0.28	1.60 ± 0.07