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THE ENRICO FERMI INSTITUTE FOR NUCLEAR STUDIES

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PROJECT SUNSHINE

Chicago Bulletin No. 11

December 1, 1955

THE UNIVERSITY OF CHICAGO

The Enrico Fermi Institute for Nuclear Studies

Edward A. Martell
Project Director

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Table of Contents

	Page
Introduction	1
Interlaboratory Check Data	2
I. Checks with Lamont and NYOO	2
II. Checks with Pittsburgh Laboratory	3
Cumulative List, Chicago Sunshine Results	6
I. Human Bone	6
A. Stillborns and Babies (under 30 days)	6
1. United States	6
a. Chicago	6
b. New England	14
c. Utah	15
d. California	15
2. Foreign, Northern Hemisphere	15
a. Japan	15
b. India	16
3. Foreign, Southern Hemisphere	16
a. Chile	16
B. Children (30 days to 15 years)	17
1. United States	17
a. Chicago	17
b. New England: Dr. A. K. Solomon	17
c. New England: Dr. Shields Warren	17
2. Foreign, Southern Hemisphere	19
C. Adults (over 15 years)	19
1. United States	19
a. Chicago	19
b. New England: Dr. A. K. Solomon	21
c. New England: Dr. Shields Warren	21
d. California	21
2. Foreign, Northern Hemisphere	22
a. England	22
3. Foreign, Southern Hemisphere	23
a. Brazil	23
b. Chile	23
D. Dentine	23
1. Boston, Massachusetts	23
2. England	24
II. Animal Bone	24
A. United States	24
B. Foreign	25

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Table of Contents (cont'd)

		Page
III.	Animal Products	28
	A. Cheese	28
	1. United States	28
	2. Foreign, Northern Hemisphere	29
	3. Foreign, Southern Hemisphere	30
	B. Milk	31
	1. Chicago Milkshed	31
	2. Fresh Milk from Chicago Dairies	32
	3. Other United States Milks	33
	4. Foreign, Northern Hemisphere	34
	5. Foreign, Southern Hemisphere	35
IV.	Miscellaneous Zoological Samples	36
	A. Fish	36
	B. Eggs	36
V.	Botanical Samples	37
	A. United States	37
	B. Foreign, Northern Hemisphere	38
	C. Foreign, Southern Hemisphere	38
VI.	Soil	39
	A. Chicago Milkshed	39
	1. 1953 Collections	39
	2. 1954 Collections	42
	B. Other United States Soils	43
	C. Foreign, Northern Hemisphere	44
	D. Foreign, Southern Hemisphere	47
VII.	Precipitation	48
	A. Chicago	48
	B. Washington, D. C.	53
	C. Pittsburgh	54
	D. Other Areas	55
VIII.	Antarctic Snow	56
IX.	Water other than Precipitation	57
	A. United States	57
	B. Foreign	57
	C. CASTLE Sea Water	57
X.	Air Concentration	59
	A. Washington, D. C.	59
	B. Kodiak, Alaska	60
	C. Yokosuka, Japan	60
	D. Port Lyautey, Morocco	61
	E. Multiple Filters	61
	F. Platinum Screen Collections	62
XI.	Gummed Paper Collections	63

INTRODUCTION

In this bulletin are presented all strontium-90 measurement data obtained by the University of Chicago Sunshine Project group to date. Results for samples assayed by the Nuclear Science and Engineering Corporation, Pittsburgh, Pennsylvania, under subcontract, are also included and are designated by the letter "P" following the CL number (i.e., CL xxx-P).

The data for all biological samples are presented in units of 1/1000 of the tolerance dose of strontium-90 for an average man of 1000 grams total body content of calcium. Thus, the "Sunshine Unit" is 1/1000 microcuries of strontium-90 per 1000 grams calcium or 2.2 disintegrations per minute of strontium-90 per gram of calcium.

Results for water samples are reported in disintegrations per minute of strontium-90 per unit volume. Air concentration data are given in disintegrations per minute per 10^6 cubic feet of air.

A summary of results obtained on check samples measured by each of several laboratories participating in the Sunshine Program is included.

A description of the Chicago Sunshine method, which has also been adopted by the Nuclear Science and Engineering Corporation, will be presented in a separate report.

INTERLABORATORY CHECK DATA

I. Checks with Lamont and NYOO

As a test of the reliability of the strontium-90 data obtained by each of the several participating laboratories, a number of samples were divided and exchanged as check samples. Results for check samples measured at the Lamont Geological Observatory, the Health and Safety Laboratory of the New York Operations Office and the University of Chicago are presented in Table I. Of these, the most recent data are for CL 305, 326, 327 and 328, which were measured early in 1955. Additional check samples have been exchanged and are in process of measurement.

Table I. Chicago-Lamont-NYOO Check Data

		SUNSHINE UNITS		
CL No.	Sample Description	Chicago	Lamont*	NYOO**
CL 47	Alfalfa, Chicago Milkshed #6	4.05 ± 0.15	—	30 ± 14
CL 66	Milk, Chicago Milkshed #6	0.73 ± 0.04	—	0.2 ± 0.1
CL 101	Soil, Chicago Milkshed #6-A, 0-1", NH_4AC extract.	13.1 ± 0.3	—	8.1 ± 0.5
CL 102	Soil, Chicago Milkshed #6, 0-1", HCl after NH_4AC extract.	12.5 ± 0.8	—	17.0 ± 1.4
CL 104,5	Calf bone, Troy, N.Y., YB-5, HASL 249	3.74 ± 0.05	3.36 ± 0.21	~2.4
CL 174	Cheese, Azores, YC-1	2.69 ± 0.06	2.86 ± 0.10	—
CL 175	Cheese, Wisconsin Minster, YC-4	1.53 ± 0.03	1.21 ± 0.14	—
CL 176	Calf bone, Lewiston, Mont., YB-3, HASL 246	1.95 ± 0.04	1.35 ± 0.09	2.0 ± 0.2
CL 305	Sheep bone, Normandie, France, YB-19, HASL 651	2.85 ± 0.10	2.82 ± 0.06	0.33 ± 0.03

(continued)

		SUNSHINE UNITS		
CL No.	Sample Description	Chicago	Lamont*	NYOO**
CL 326	Animal bone, Tifton, Georgia, B-84, HASL 130	3.28 ± 0.12	2.50 ± 0.05	2.75 ± 0.15
CL 327	Animal bone, Albany, New York, B-85, HASL 747	3.26 ± 0.10	3.25 ± 0.06	3.12 ± 0.18
CL 328	Milk, New York Milkshed, HASL 276	1.16 ± 0.04	1.29 ± 0.11	(2.4 ± 0.3 d/m/qt)
CL 329	Animal bone, Norway, B-47	1.97 ± 0.09	1.81 ± 0.03	---

* Project Sunshine Annual Progress Report, Lamont Geological Observatory, March 15, 1955.

** The Health and Safety Laboratory Reports, October 26, 1954 and January 17, 1955.

II. Checks with Pittsburgh Laboratory

The samples assayed by the Nuclear Science and Engineering Corporation have included a number of check samples previously measured and reported by the Chicago Laboratory. Both laboratories are using the same sensitive absolute beta counting method[1] and essentially the same chemical procedures. The results for the Chicago and Pittsburgh Laboratory check samples are given in Table II.

Comparison of values for disintegrations per minute per gram of ash indicates quite satisfactory results for all except four samples (CL 212, 225, 291 and 263). For CL 225 and 291 the Pittsburgh group obtained very low results

1 "Absolute Assay of Beta Radioactivity in Thick Solids; Application to Naturally Radioactive Potassium." A. D. Suttle, Jr. and W. F. Libby, Anal. Chem. 27, 921 (1955).

Table II. Chicago-Pittsburgh Check Data

	Gms Calcium per Gm Ash		D.P.M. per Gm Ash		Sunshine Units	
Sample	Chgo.	N.S.E.	Chgo.	N.S.E.	Chgo.	N.S.E.
CL 185	0.409	0.400	2.62	2.43	2.92 ± 0.08	2.76 ± 0.18
CL 188	0.400	0.392	2.44	2.13	2.77 ± 0.08	2.47 ± 0.37
CL 202	0.350	0.399	0.55	0.51	0.71 ± 0.03	0.58 ± 0.05
CL 211	0.374	0.450	0.36	0.28	0.44 ± 0.04	0.29 ± 0.02
CL 212	0.363	0.416	0.26	0.52	0.33 ± 0.02	0.57 ± 0.06
CL 224	0.260	0.258	0.78	0.74	1.36 ± 0.05	1.33 ± 0.08
CL 225	0.162	0.158	0.571	0.254	1.63 ± 0.06	0.74 ± 0.06
CL 226	0.309	0.303	0.75	0.77	1.13 ± 0.05	1.16 ± 0.05
CL 227	0.116	0.111	0.10	0.12	0.38 ± 0.03	0.48 ± 0.04
CL 262	0.150	0.158	0.10	0.10	0.31 ± 0.03	0.29 ± 0.02
CL 263	0.249	0.295	0.212	0.830	0.39 ± 0.03	1.28 ± 0.20
CL 291	0.266	0.211	0.88	0.50	1.51 ± 0.09	1.08 ± 0.06
CL 337	0.266	0.261	1.96	1.88	3.35 ± 0.10	3.26 ± 0.24
CL 388	0.718	0.715*	0.156	0.142	0.099 ± 0.010	0.090 ± 0.008
CL 389	0.712	0.715*	0.166	0.154	0.106 ± 0.010	0.098 ± 0.013

* Assumed from ratio of weights of soil extract oxalate before and after muffling at 900°C.

on the first yttrium phosphate milks and the higher tabulated results on the second milks, showing incomplete solution of yttrium which suggests incomplete solution of sample strontium as the basis of disagreement. For CL 212 and 263 the differences appear to be attributable to uncertainty in chemical yield in the final and first resolvable milk of several successive milks.

Comparison of Sunshine Unit values shows satisfactory results with the two additional differences for CL 202 and 211. For these two the difference in calcium assay is the basis of disagreement.

Numerous indirect checks are provided among the data in this bulletin, including a number of samples of each of several given types collected at the same location and time. Other check measurements are in progress.

Steps have been taken to eliminate difficulties in calcium assay and sample solution. The latest check samples show generally excellent agreement.

CUMULATIVE LIST, CHICAGO SUNSHINE RESULTS

Sample	Sunshine Units
I. Human Bone In all cases, the date of sample corresponds to the date of death or post-mortem.	
A. Stillborns and Babies (under 30 days)	
1. United States	
a. Chicago: Samples furnished by Dr. E. L. Potter and Dr. L. O. Jacobson, Argonne Cancer Research Hospital	
(1) No. 1: Stillborn, July 26, 1953, 37 weeks gestation, 90 g, ash.	$\leq 0.3 \pm 0.04$
(2) No. 2: Stillborn, July 30, 1953, 29 weeks gestation, 57 g ash.	$\leq 0.36 \pm 0.08$
(3) No. 3: Premature, September 11, 1953, live weight 1830 g, 38.3 g ash.	$\leq 0.4 \pm 0.1$
(4) No. 4: Premature, September 5, 1953, live weight 930 g, 6 months gestation, 24.2 g ash.	$\leq 0.4 \pm 0.1$
(5) No. 5: Stillborn, September 15, 1953, 39 weeks gestation, 58 g ash.	$\leq 0.23 \pm 0.05$
(6) No. 6: Stillborn, September 13, 1953, 38 weeks gestation, 65 g ash.	$\leq 0.17 \pm 0.04$
(7) No. 7: Premature, September 17, 1953, live weight 660 g, 13 g ash.	$\leq 0.071 \pm 0.038$
(8) No. 10: Stillborn, September 20, 1953, 32 weeks gestation, 25 g ash.	$\leq 0.058 \pm 0.015$
(9) No. 11: Stillborn, September 27, 1953, 32 weeks gestation, 24 g ash.	0.070 ± 0.052
(10) No. 12: Stillborn, September 26, 1953, 40 weeks gestation, 81 g ash.	$\leq 0.102 \pm 0.031$
(11) No. 14: Stillborn, September 26, 1953, 37 weeks gestation, 35 g ash.	0.043 ± 0.014
(12) No. 15: Stillborn, September 28, 1953, 20 weeks gestation, 18 g ash.	0.143 ± 0.024

	Sample	Sunshine Units
(13)	No. 16: Stillborn, September 24, 1953, 34 weeks gestation, 52 g ash.	0.207 ± 0.019
(14)	No. 17: Stillborn, September 27, 1953, 36 weeks gestation, 88 g ash.	0.153 ± 0.014
(15)	No. 18: Stillborn, September 28, 1953, 39 weeks gestation, 72 g ash.	0.13 ± 0.02
(16)	No. 19: Stillborn, October 7, 1953, 36 weeks gestation, 46 g ash.	0.218 ± 0.023
(17)	No. 24: Stillborn, October 10, 1953, 30 weeks gestation, 26.2 g ash.	0.11 ± 0.01
(18)	No. 26: Stillborn, October 12, 1953, 30 weeks gestation, 18 g ash.	0.19 ± 0.02
(19)	No. 27: Born September 30, 1953, live weight 2400 g, 39 weeks gestation, 61 g ash.	0.094 ± 0.008
(20)	No. 28: Stillborn, October 14, 1953, 36 weeks gestation, 15.2 g ash.	0.32 ± 0.05
(21)	No. 29: Premature, October 12, 1953, 36 weeks gestation, live weight 1880 g, 42.6 g ash.	0.24 ± 0.05
(22)	No. 31: Stillborn, October 27, 1953, 39 weeks gestation, 75.7 g ash.	0.15 ± 0.02
(23)	No. 32: Premature, October 27, 1953, 31 weeks gestation, live weight 2020 g, 39.7 g ash.	0.095 ± 0.020
(24)	No. 33: Premature, October 29, 1953, 31 weeks gestation, live weight 1150 g, 27.5 g ash.	0.21 ± 0.01
(25)	No. 34: Stillborn, November 2, 1953, 34 weeks gestation, 57.3 g ash.	0.067 ± 0.030
(26)	No. 36: Stillborn, November 6, 1953, 26 weeks gestation, 15 g ash.	0.15 ± 0.05
(27)	No. 37: Stillborn, November 8, 1953, 36 weeks gestation, 79.4 g ash.	0.12 ± 0.04
(28)	No. 38: Stillborn, November 8, 1953, 34 weeks gestation, 46.6 g ash.	0.066 ± 0.020
(29)	No. 39: Premature, November 9, 1953, 32 weeks gestation, live weight 1800 g, 42.5 g ash.	0.15 ± 0.04

	Sample	Sunshine Units
(30)	No. 40: Born November 7, 1953, 39 weeks gestation, live weight 2225 g, 62.1 g ash.	0.13 ± 0.03
(31)	No. 41: Stillborn, November 9, 1953, 34 weeks gestation, 58.8 g ash.	0.06 ± 0.02
(32)	No. 42: Premature, November 10, 1953, 38 weeks gestation, live weight 2530 g, 50.5 g ash.	0.15 ± 0.05
(33)	No. 43: Stillborn, November 10, 1953, 30 weeks gestation, 34.3 g ash.	0.18 ± 0.03
(34)	No. 44: Stillborn, November 11, 1953, 28 weeks gestation, 16.6 g ash.	0.19 ± 0.02
(35)	No. 45: Stillborn, November 11, 1953, 28 weeks gestation, 13.5 g ash.	0.21 ± 0.02
(36)	No. 46: Stillborn, November 13, 1953, 36 weeks gestation, 49.98 g ash.	0.21 ± 0.02
(37)	No. 47: Stillborn, November 18, 1953, 30 weeks gestation, 47.22 g ash.	0.12 ± 0.01
(38)	No. 48: Stillborn, November 18, 1953, 31 weeks gestation, 21.68 g ash.	0.17 ± 0.04
(39)	No. 49: Premature, November 18, 1953, 31 weeks gestation, live weight 1350 g, 29.1 g ash.	0.13 ± 0.04
(40)	No. 50: Born November 21, 1953, 39 weeks gestation, live weight 3140 g, 88.3 g ash.	0.12 ± 0.01
(41)	No. 51: Stillborn, November 21, 1953, 39 weeks gestation, 47.2 g ash.	0.11 ± 0.01
(42)	No. 52: Stillborn, November 22, 1953, 36 weeks gestation, 60.7 g ash.	0.13 ± 0.01
(43)	No. 53: Stillborn, November 20, 1953, 26 weeks gestation, 19.42 g ash.	0.18 ± 0.02
(44)	No. 56: Premature, November 20, 1953, 26 weeks gestation, live weight 915 g, 17.38 g ash.	0.18 ± 0.05
(45)	No. 57: Stillborn, November 20, 1953, 26 weeks gestation, 18.79 g ash.	0.22 ± 0.06
(46)	No. 61: Stillborn, weighed 3679 g, 70.24 g ash.	0.11 ± 0.01

	Sample	Sunshine Units
(47)	No. 68: Premature, December 17, 1953, 34 weeks gestation, autopsy weight 2150 g, 54 g ash.	0.12 ± 0.01
(48)	No. 69: Stillborn, December 19, 1953, 38 weeks gestation, 61 g ash.	0.10 ± 0.01
(49)	No. 70: Stillborn, December 19, 1953, 38 weeks gestation, 63 g ash.	0.16 ± 0.02
(50)	No. 71: Stillborn, December 22, 1953, 36 weeks gestation, 55 g ash.	0.14 ± 0.01
(51)	No. 72: Stillborn, December 20, 1953, 36 weeks gestation, 54 g ash.	0.16 ± 0.01
(52)	No. 74: Premature, December 11, 1953, 31 weeks gestation, autopsy weight 1450 g, 40 g ash.	0.14 ± 0.01
(53)	No. 75: Stillborn, December 24, 1953, 40 weeks gestation, 44 g ash.	0.10 ± 0.01
(54)	No. 76: Stillborn, December 26, 1953, 43 weeks gestation, 44 g ash.	0.06 ± 0.01
(55)	No. 77: Stillborn, December 27, 1953, 39 weeks gestation, 41 g ash.	0.10 ± 0.02
(56)	No. 78: Stillborn, December 23, 1953, 35 weeks gestation, 23 g ash.	0.06 ± 0.01
(57)	No. 79: Stillborn, December 25, 1953, 34 weeks gestation, 39 g ash.	0.12 ± 0.02
(58)	No. 81: Stillborn, December 29, 1953, 41 weeks gestation, 68 g ash.	0.08 ± 0.01
(59)	No. 82: Born January 4, 1954, 38 weeks gestation, 74 g ash.	0.14 ± 0.01
(60)	No. 83: Stillborn, December 26, 1953, 36 weeks gestation, 18 g ash.	0.18 ± 0.02
(61)	No. 84: Stillborn, December 31, 1953, 38 weeks gestation, 69 g ash.	0.06 ± 0.01
(62)	No. 85: Stillborn, January 1, 1954, 37 weeks gestation, 48 g ash.	0.07 ± 0.02
(63)	No. 86: Premature, January 2, 1954, 33 weeks gestation, live weight 1915 g, 25 g ash.	0.14 ± 0.01

	Sample	Sunshine Units
(64)	No. 87: Premature, January 2, 1954, 33 weeks gestation, live weight 2100 g, 28 g ash.	0.16 ± 0.02
(65)	Later milkings from babies Nos. 2, 3, 4, and 5 were combined for average.	0.182 ± 0.010
(66)	The milks from 30 Chicago baby samples were combined (sample Nos. 4, 5, 6, 9, 10, 11, 13, 14, 16, 19, 24, 25, 27, 29, 32, 33, 34, 39, 41, 42, 43, 48, 49, 55, 57, 58, 60, 62, 63, and 67).	0.050 ± 0.001
(67)	The first milks from 9 Chicago babies were combined.	0.079 ± 0.008
	(a) No. 158: Stillborn, April 19, 1954, 35 weeks gestation, 23 g ash.	
	(b) No. 159: Stillborn, April 17, 1954, 40 weeks gestation, 62 g ash.	
	(c) No. 160: Born April 17, 1954, 38 weeks gestation, autopsy weight 3190 g, 24 g ash.	
	(d) No. 161: Premature, April 16, 1954, 32 weeks gestation, birth weight 2 lbs., 7 3/4 oz., 28 g ash.	
	(e) No. 164: Stillborn, April 29, 1954, 41 weeks gestation, 103 g ash.	
	(f) No. 165: Premature, April 16, 1954, 33 weeks gestation, birth weight 1900 g, 23 g ash.	
	(g) No. 166: Stillborn, April 23, 1954, 27 weeks gestation, 21 g ash.	
	(h) No. 167: Stillborn, April 22, 1954, 40 weeks gestation, 89 g ash.	
	(i) No. 168: Stillborn, April 24, 1954, 29 weeks gestation, 20 g ash.	
(68)	The first milks from 10 Chicago babies were combined.	0.072 ± 0.003
	(a) No. 169: Born April 27, 1954, 39 weeks gestation, birth weight 3905 g, 81 g ash.	

Sample		Sunshine Units
	(b) No. 170: Stillborn, May 1, 1954, 27 weeks gestation, 25 g ash.	
	(c) No. 171: Stillborn, May 3, 1954, 39 weeks gestation, 77 g ash.	
	(d) No. 172: Stillborn, May 18, 1954, 40 weeks gestation, 78 g ash.	
	(e) No. 174: Premature, May 8, 1954, 36 weeks gestation, birth weight 2360 g, 58 g ash.	
	(f) No. 175: Born May 8, 1954, 37 weeks gestation, birth weight 2815 g, 67 g ash.	
	(g) No. 176: Premature, May 7, 1954, 30 weeks gestation, autopsy weight 1200 g, 31 g ash.	
	(h) No. 177: Stillborn, May 13, 1954, gestation unknown, 82 g ash.	
	(i) No. 178: Stillborn -May 15, 1954, 35 weeks gestation, 47 g ash.	
	(j) No. 181: Stillborn, May 22, 1954, 33 weeks gestation, 34 g ash.	
(69)	The second and third milks from 10 Chicago babies were combined (sample nos. 24, 28, 29, 32, 33, 37, 39, 41, 42, and 45).	0.05 ± 0.01
(70)	The first milks from 10 Chicago babies were combined.	0.10 ± 0.01
	(a) No. 184: Premature, May 26, 1954, 34 weeks gestation, birth weight 1260 g, 25 g ash.	
	(b) No. 185: Premature, May 27, 1954, 31 weeks gestation, 41 g ash.	
	(c) No. 186: Stillborn, May 27, 1954, 27 weeks gestation, 6 g ash.	
	(d) No. 187: Stillborn, May 31, 1954, 28 weeks gestation, 16 g ash.	
	(e) No. 188: Stillborn, May 31, 1954, 28 weeks gestation, 14 g ash.	

Sample	Sunshine Units
(f) No. 192:- Premature, June 3, 1954, 33 weeks gestation, birth weight 1720 g, 27 g ash.	
(g) No. 193: Stillborn, June 7, 1954, gestation unknown, 42 g ash.	
(h) No. 194: Stillborn, June 8, 1954, 40 weeks gestation, 53 g ash.	
(i) No. 195: Premature, June 7, 1954, 27 weeks gestation, birth weight 2 lbs., 18 g ash.	
(j) No. 197: Stillborn, June 11, 1954, gestation unknown, 82 g ash.	
(71) The first milks from 10 Chicago babies were combined.	0.134 ± 0.002
(a) No. 204: Stillborn, June 27, 1954, autopsy weight 2200 g, 81 g ash.	
(b) No. 205: Stillborn, June 28, 1954, autopsy weight 4300 g, 86 g ash.	
(c) No. 206: Born July 2, 1954, autopsy weight 2510 g, 25 g ash.	
(d) No. 207: Premature, June 25, 1954, autopsy weight 850 g, 22 g ash.	
(e) No. 208: Premature, July 1, 1954, autopsy weight 2470 g, 61 g ash.	
(f) No. 209: No information available, sample received July 1, 1954, weight 1098 g, 37 g ash.	
(g) No. 210: Born July 2, 1954, autopsy weight 3560 g, 99 g ash.	
(h) No. 211: Stillborn, July 4, 1954, autopsy weight 2600 g, 94 g ash.	
(i) No. 212: Stillborn, July 5, 1954, autopsy weight 1420 g, 36 g ash.	
(j) No. 213: Stillborn, July 7, 1954, autopsy weight 540 g, 9 g ash.	

Sample	Sunshine Units
(72) The first milks from 10 Chicago babies were combined.	0.160 ± 0.005
(a) No. 214: Stillborn July 10, 1954, autopsy weight 3750 g, 86 g ash.	
(b) No. 215: Premature, July 20, 1954, autopsy weight 2230 g, 18 g ash.	
(c) No. 216: Stillborn, July 19, 1954, autopsy weight 435 g, 7 g ash.	
(d) No. 217: Stillborn, July 18, 1954, autopsy weight 460 g, 9 g ash.	
(e) No. 218: Stillborn, July 18, 1954, autopsy weight 445 g, 9 g ash.	
(f) No. 219: Stillborn, July 6, 1954, autopsy weight 600 g, 12 g ash.	
(g) No. 220: Stillborn, July 22, 1954, autopsy weight 3450 g, 97 g ash.	
(h) No. 221: No information available, sample received July 22, 1954, weight 1524 g, 33 g ash.	
(i) No. 224: Premature, July 10, 1954, autopsy weight 1000 g, 24 g ash.	
(j) No 225: Premature, July 11, 1954, autopsy weight 1020 g, 19 g ash.	
(73) The first milks from 10 Chicago babies were combined..	0.160 ± 0.003
(a) No. 249: Stillborn, August 25, 1954, autopsy weight 2500 g, 69 g ash.	
(b) No. 250: Premature, August 25, 1954, autopsy weight 1009 g, 20 g ash.	
(c) No. 251: Stillborn, August 26, 1954, autopsy weight 600 g, 11 g ash.	
(d) No. 252: Born August 20, 1954, autopsy weight 4850 g, 81 g ash.	
(e) No. 253: Premature, August 15, 1954, autopsy weight 750 g, 15 g ash.	

Sample	Sunshine Units
(f) No. 254: No information available, sample received approximately August 25, 1954, weight 3133 g, 100 g ash.	
(g) No. 255: Stillborn, August 18, 1954, autopsy weight 3280 g, 73 g ash.	
(h) No. 256: Stillborn, August 19, 1954, sample weight 1645 g, 59 g ash.	
(i) No. 257: Premature, August 31, 1954, autopsy weight 1280 g, 26 g ash.	
(j) No. 258: Autopsy date September 4, 1954, autopsy weight 770 g, 13 g ash.	
(74) CL 453: Combined stillborns, Nos. 64, 65, 66, 73, and 80, December 1953, 55.3 g ash, 13.9 g Ca.	0.11 ± 0.01
(75) CL 444-P: Combined stillborns, Nos. 106, 107, 110, and 112, February 1954, 134.6 g ash, 46.4 g Ca.	0.095 ± 0.012
(76) CL 445-P: Combined stillborns, Nos. 131, 132, 134, and 137, March 1954, 187.08 g ash, 58.1 g Ca.	0.073 ± 0.009
(77) CL 446-P: Combined stillborns, Nos. 153, 155, and 156, April 1954, 148.07 g ash, 49.9 g Ca.	0.070 ± 0.006
(78) CL 447-P: Combined stillborns, Nos. 190, 199, 200, and 203, June 1954, 179.38 g ash, 53.7 g Ca.	0.060 ± 0.005
b. New England: Samples furnished by Dr. Shields Warren, Cancer Research Institute, New England Deaconess Hospital, Boston, Massachusetts.	
(1) Four samples combined, age range 1-30 days, Massachusetts, sections of vertebral columns and ribs, 17.21 g ash, 6.27 g Ca.	0.31 ± 0.02
(a) CL 83: #218, Sept. 15, 1953, 13 days.	
(b) CL 86: #221, Sept. 17, 1953, 2 days.	
(c) CL 87: #225, Sept. 22, 1953, 5 days.	
(d) CL 89: #228, Sept. 28, 1953, 26 days.	

[redacted]

Sample	Sunshine Units
(2) CL 572: Age 2 weeks, Massachusetts, S.W. # A-55-66, March 8, 1955, 5.5 g ash, 1.8 g Ca.	0.35 ± 0.04
(3) CL 582: Age 2 weeks, Connecticut, S.W. # A-55-93, April 8, 1955, 3.71 g ash, 1.28 g Ca.	0.45 ± 0.05
c. Utah: Samples furnished by Dr. J. Z. Bowers, University of Utah Medical School, Salt Lake City, Utah.	
(1) CL 165: Stillborn, Salt Lake City, Utah, March 8, 1954, 18.64 g ash, 5.78 g Ca.	0.19 ± 0.04
(2) CL 203: Stillborn, Salt Lake City, Utah, April 4, 1954, 9.88 g ash, 3.08 g Ca.	0.252 ± 0.003
d. California: Samples arranged for by Dr. Hardin B. Jones, University of California, and collected by Dr. W. M. Bogart, Central Medical Laboratories, Concord, California.	
(1) CL 313: Stillborn, (#6), October 30, 1954, 30.9 g ash, 8.15 g Ca.	0.38 ± 0.02
(2) CL 314: Stillborn, (#7), October 15, 1954, 66.3 g ash, 17.76 g Ca.	0.091 ± 0.005
(3) CL 315: Neo-natal death, 10 hours, (#8), November 10, 1954, 41.2 g ash, 10.2 g Ca.	≤0.078
(4) CL 391: Stillborn, (#12), November 18, 1954, 31.1 g ash, 10.58 g Ca.	0.096 ± 0.007
2. Foreign, Northern Hemisphere	
a. Japan: Samples furnished by Dr. J. K. Scott, Atomic Bomb Casualty Commission; obtained from Dr. Hayashi, Professor of Pathology, Nagasaki Medical School, vertebrae and long bones.	
(1) CL 230: Stillborn, 40 weeks gestation, March 5, 1954, 21.37 g ash, 8.31 g Ca.	0.082 ± 0.083
(2) CL 231: Stillborn, 40 weeks gestation, March 29, 1954, 14.0 g ash, 5.33 g Ca.	0.125 ± 0.075
(3) CL 232: Stillborn, 41 weeks gestation, March 8, 1954, 16.29 g ash, 5.79 g Ca.	0.17 ± 0.07

Sample	Sunshine Units
(4) CL 247: Stillborn, 10 months gestation, May 27, 1954, 17.2 g ash, 6.35 g Ca.	0.10 ± 0.05
(5) CL 248: Stillborn, June 3, 1954, 11 g ash, 4.09 g Ca.	0.30 ± 0.15
(6) CL 352: Stillborn, #1859, 10 months gestation, August 7, 1954, 11.9 g ash 4.13 g Ca.	0.117 ± 0.004

b. India: Samples furnished by Dr. E. W. Gault, Christian Medical College and Hospital, Vellore, South India.

(1) CL 154: Stillborn, P.M. #1363, full term, December 24, 1953, weight 1850 g, 35.2 g ash, 13.5 g Ca.	0.05 ± 0.01
(2) CL 155: Stillborn, P.M. #1368, full term, January 3, 1954, weight 2050 g, 43.2 g ash, 16.8 g Ca.	0.04 ± 0.01
(3) CL 156: Stillborn, P.M. #1369, full term, January 3, 1954, weight 2550 g, 50.01 g ash, 19.6 g Ca.	0.04 ± 0.01

3. Foreign, Southern Hemisphere

a. Chile: Samples furnished by Dr. Juan Vial, Catholic University School of Medicine, Santiago, Chile. Collection arrangements made by Dr. Robert Briggs Watson, Rockefeller Foundation, Rio de Janeiro, Brazil.

(1) CL 714-P: Age 10 days, July 20, 1955, femur, ribs and sternum, 1.82 g ash, 0.72 g Ca.	0.89 ± 0.12
(2) CL 719-P: Age 1 day, Aug. 10, 1955, ribs, sternum, femur, vertebral column and parietal, 3.9 g ash, 1.4 g Ca.	0.64 ± 0.20
(3) CL 721: Age 8 hours, August 12, 1955, ribs, vertebral column, sternum and parietal, 5.09 g ash, 1.97 g Ca.	0.049 ± 0.006
(4) CL 724-P: Age 4 days, August 17, 1955, ribs, vertebral column, parietal and sternum, 4.2 g ash, 1.6 g Ca.	0.34 ± 0.07
(5) CL 725-P: Age 3 hours, August 18, 1955, ribs, vertebral column, parietal and sternum, 2.7 g ash, 1.0 g Ca.	0.72 ± 0.26

Sample	Sunshine Units

B. Children (30 days to 15 years)

1. United States

a. Chicago: Samples furnished by Dr. R. Hasterlik, Argonne Cancer Research Hospital.

(1) CL 634: Age 12½ years, #9387, April 8, 1955, 3.93 g ash, 1.41 g Ca. — 0.41 ± 0.02

(2) CL 636: Age 7 years, #9420, May 11, 1955, 5.40 g ash, 1.83 g Ca. — 0.18 ± 0.06

b. New England: Samples furnished by Dr. A. K. Solomon, Harvard University.

(1) CL 12: Ages 7 yr., 7 yr., 3½ yr., 1 yr., 1 yr., 1 yr., 5 wks., 12 days, 8 days, 6 days, Massachusetts, received Sept. 8, 1953, ribs, 8.9 g ash, 3.14 g Ca. — 0 ± 0.32

(2) CL 80: Five samples combined, ages unknown, A-53-204, A-53-205, A-53-206, A-53-207 and A-53-208, Massachusetts, received November 23, 1953, 13.99 g ash, 6.13 g Ca. — 0.25 ± 0.03

(3) CL 81: Six samples combined, ages unknown, A-53-200, a-53-211, A-53-216, A-53-217, A-53-218 and A-53-243, received November 23, 1953, 6.19 g ash, 2.56 g Ca. — 0.26 ± 0.07

c. New England: Samples furnished by Dr. Shields Warren, Cancer Research Institute, New England Deaconess Hospital, Boston, Massachusetts.

(1) CL 88: Age 3¼ years, #226, Massachusetts, September 25, 1953, sections of vertebral column and ribs, 24.05 g ash, 9.87 g Ca. — 0.17 ± 0.01

(2) Four samples combined, Maine and Massachusetts, sections of vertebral columns and ribs, 12.95 g ash, 4.72 g Ca. — 0.15 ± 0.06

(a) CL 84: Age 7 wks., #219, Sept. 17, 1953.

(b) CL 85: Age 6½ wks., #220, Sept. 17, 1953.

(c) CL 93: Age 8 wks., #236, Oct. 10, 1953.

(d) CL 97: Age 2 mo., #243, Oct. 22, 1953.

(3) CL 91: Age 7 years, #232, Akron, Ohio, October 2, 1953, sections of vertebral column and ribs, 17.0 g ash, 8.27 g Ca. — 0.12 ± 0.01

	Sample	Sunshine Units
(4)	CL 94: Age 7 11/12 years, #237, Maine, October 14, 1953, sections of vertebral column and ribs, 18.7 g ash, 9.0 g Ca.	0.13 ± 0.02
(5)	Four samples combined, Massachusetts and New Hampshire, sections of vertebral columns and ribs, 11.58 g ash, 4.22 g Ca.	0.43 ± 0.03
	(a) CL 90: Age 4 mo., #230, Oct. 2, 1953.	
	(b) CL 92: Age 4½ mo., #235, Oct. 9, 1953.	
	(c) CL 95: Age 3½ mo., #240, Oct. 16, 1953.	
	(d) CL 99: Age 2½ mo., #250, Oct. 30, 1953.	
(6)	Three samples combined, Massachusetts and Maine, sections of vertebral columns and ribs, 12.56 g ash, 4.48 g Ca.	0.31 ± 0.07
	(a) CL 96: Age 2 5/12 yr., #241, Oct. 16, 1953.	
	(b) CL 98: Age 3 11/12 yr., #247, Oct. 26, 1953.	
	(c) CL 100: Age 6 yr., #251, Oct. 30, 1953.	
(7)	CL 485: Age 2½ yr., A-55-49, Massachusetts, Feb. 11, 1955, sections of vertebral column and ribs, 3.90 g ash, 1.36 g Ca.	0.46 ± 0.06
(8)	CL 486: Age 17 months, A-55-56, Rhode Island, February 20, 1955, sections of vertebral column, 4.6 g ash, 1.67 g Ca.	0.23 ± 0.03
(9)	CL 482: Age 2 7/12 years, A-55-55, Rhode Island, February 21, 1955, sections of vertebral column, 7.0 g ash, 2.52 g Ca.	0.41 ± 0.04
(10)	CL 483: Age 19 months, A-55-67, Massachusetts, March 7, 1955, sections of vertebral column, 7.8 g ash, 2.76 g Ca.	0.46 ± 0.04
(11)	CL 573: Age 8 years, A-55-69, Massachusetts, March 9, 1955, 7.6 g ash, 2.6 g Ca.	0.77 ± 0.05
(12)	CL 484: Age 9 3/4 years, A-55-60, Massachusetts, March 15, 1955, sections of vertebral column, 6.7 g ash, 2.42 g Ca.	0.26 ± 0.03

Sample	Sunshine Units
(13) CL 575: Age 11 1/3 years, A-55-75, Massachusetts, March 19, 1955, 21.4 g ash, 7.35 g Ca.	0.24 ± 0.02
(14) CL 578: Age 1 8/12 years, A-55-79, Maine, March 20, 1955, 3.8 g ash, 1.99 g Ca.	0.53 ± 0.05
(15) CL 576: Age 3½ years, A-55-76, Massachusetts, March 21, 1955, 6.1 g ash, 2.09 g Ca.	0.24 ± 0.03
(16) CL 577: Age 4 years, A-55-78, Massachusetts, March 22, 1955, 6.5 g ash, 2.3 g Ca.	0.25 ± 0.03
(17) CL 588: Age 6½ years, A-55-80, Connecticut, March 26, 1955, 8.2 g ash, 2.81 g Ca.	≤0.37
(18) CL 580: Age 2 3/4 years, A-55-90, Massachusetts, April 5, 1955, 7.3 g ash, 2.41 g Ca.	≤0.29
(19) CL 583: Age 1 5/12 years, A-55-95, Massachusetts, April 10, 1955, 3.0 g ash, 0.935 g Ca.	0.63 ± 0.06
(20) CL 587: Age 7 years, A-395-206, Massachusetts, April 12, 1955, 6.1 g ash, 1.98 g Ca.	0.21 ± 0.02

2. Foreign, Southern Hemisphere

a. Santiago, Chile: Sample furnished by Dr. Juan Vial, Catholic University School of Medicine, Santiago, Chile. Collection arrangements made by Dr. Robert Briggs Watson, Rockefeller Foundation, Rio de Janeiro, Brazil.

(1) CL 711: Age 1 year, June 30, 1955, femur and ribs, 5.7 g ash, 2.18 g Ca.	0.11 ± 0.01

C. Adults (over 15 years)

1. United States

a. Chicago: Samples furnished by Dr. R. Hasterlik, Argonne Cancer Research Hospital.

(1) CL 639: Six samples combined, 71.3 g ash, 29.48 g Ca.	0.017 ± 0.002
(a) Age 52 yr., #9385, April 5, 1955.	
(b) Age 54 yr., #9396, April 20, 1955.	
(c) Age 55 yr., #9398, April 21, 1955.	

Sample	Sunshine Units
(d) Age 59 yr., #9399, April 24, 1955.	
(e) Age 51 yr., #9400, April 25, 1955.	
(f) Age 57 yr., #9402, April 26, 1955.	
(2) CL 640-P: Ten samples combined, 121.3 g ash, 41.74 g Ca.	0.025 ± 0.006
(a) Age 72 yr., #9391, April 15, 1955.	
(b) Age 66 yr., #9397, April 20, 1955.	
(c) Age 72 yr., #9407, April 27, 1955.	
(d) Age 78 yr., #9408, May 2, 1955.	
(e) Age 62 yr., #9410, May 4, 1955.	
(f) Age 70 yr., #9412, May 6, 1955.	
(g) Age 60 yr., #9421, May 12, 1955.	
(h) Age 72 yr., #9423, May 16, 1955.	
(i) Age 60 yr., #9424, May 16, 1955.	
(j) Age 67 yr., #9427, May 20, 1955.	
(3) CL 635: Age 33 years, #9415, May 6, 1955, 14.9 g ash, 5.75 g Ca.	≤0.038
(4) CL 637: Age 38 years, #9425, May 16, 1955, 14.0 g ash, 6.1 g Ca.	≤0.032
(5) CL 688-P: Combination of 3 samples, ages 26, 27, and 28 years, #9456, 9433, 9436, June and July, 1955, 34.2 g ash, 11.31 g Ca.	0.092 ± 0.031
(6) CL 689-P: Combination of 2 samples, ages 30 years, #9446 and 9437, June and July, 1955, 22.5 g ash, 8.13 g Ca.	0.040 ± 0.031
(7) CL 690-P: Combination of 4 samples, ages 48, 58, 58, and 59 years, #9448, 9447, 9442, and 9432, June and July, 1955, 31.7 g ash, 11.41 g Ca.	0.04 ± 0.01
(8) CL 691-P: Combination of 4 samples, ages 63, 64, 65, and 69 years, #9444, 9445, 9449, and 9474, June and July, 1955, 29.0 g ash, 11.42 g Ca.	0.11 ± 0.03

Sample	Sunshine Units
b. New England: Sample furnished by Dr. A. K. Solomon, Harvard University.	
(1) CL 1: Adult rib, age unknown, Massachusetts, sample received August 12, 1953, 16.14 g ash, 5.73 g Ca.	0 ± 0.12
c. New England: Samples furnished by Dr. Shields Warren, Cancer Research Institute, New England Deaconess Hospital, Boston, Massachusetts.	
(1) CL 126: Age 55 years, leg bone, #149913, Massachusetts, amputated November 16, 1953, 213.9 g ash, 87.0 g Ca.	0.010 ± 0.006
(2) CL 127: Age 68 years, leg bone, #149953, Massachusetts, amputated November 18, 1953, 203.9 g ash, 84.4 g Ca.	0.020 ± 0.003
(3) CL 128: Age 68 years, leg bone, #150295, Massachusetts, amputated from same man as CL 127, December 3, 1953, 184 g ash, 76 g Ca.	0.0110 ± 0.0012
(4) CL 662-P: Combination of 2 samples, Massachusetts, 29.16 g ash, 10.96 g Ca.	0.16 ± 0.04
(a) Age 35 yr., A-55-71, March 12, 1955.	
(b) Age 37 yr., A-55-84, April 1, 1955.	
(5) CL 664-P: Combination of 3 samples, Massachusetts, 38.5 g ash, 14.22 g Ca.	0.15 ± 0.01
(a) Age 61 yr., #160094, March 22, 1955.	
(b) Age 59 yr., #55-S-464, April 11, 1955.	
(c) Age 65 yr., #160736, April 21, 1955.	
d. California: Samples arranged for by Dr. Hardin B. Jones, University of California, and collected by Dr. W. M. Bogart, Central Medical Laboratories, Concord, California.	
(1) CL 281: Age 89 years, #1, September 13, 1954, 105.6 g ash, 40.4 g Ca.	≤0.03
(2) CL 282: Age 83 years, #2, September 13, 1954, 242.8 g ash, 94.2 g Ca.	0.030 ± 0.001
(3) CL 283: Age 80 years, #3, September 13, 1954, 197.8 g ash, 76.8 g Ca.	0.033 ± 0.001

Sample	Sunshine Units
(4) CL 311: Age 58 years, #4, September 23, 1954; sample in two portions.	
(a) CL 311-A: 58.6 g ash, 22.2 g Ca.	≤0.004
(b) CL 311-B: 44.5 g ash, 16.9 g Ca.	≤0.006
(5) CL 312: Age 93 years, #5, October 14, 1954, 60.7 g ash, 22.55 g Ca.	≤0.005
(6) CL 316: Age 78 years, #9, November 6, 1954, 162.3 g ash, 63.4 g Ca.	≤0.004
(7) CL 317: Age 51 years, #10, November 13, 1954, 125.8 g ash, 83.0 g Ca.	≤0.005
(8) CL 390-P: Age 69 years, #11, November 17, 1954, 152.3 g ash, 49.1 g Ca.	0.050 ± 0.017
(9) CL 392-P: Age 79 years, #13, November 22, 1954, 198.99 g ash, 76.8 g Ca.	0.087 ± 0.028
(10) CL 393-P: Age 82 years, #14, November 24, 1954, 253.61 g ash, 96.3 g Ca.	0.17 ± 0.01
(11) CL 394-P: Age 63 years, #15, November 21, 1954, 178.6 g ash, 67.9 g Ca.	0.063 ± 0.006
(12) CL 395-P: Age 52 years, #16, December 2, 1954, 159.5 g ash, 58.4 g Ca.	0.045 ± 0.004
(13) CL 396-P: Age 70 years, #17, December 4, 1954, 192.6 g ash, 71.5 g Ca.	0.046 ± 0.011
2. Foreign, Northern Hemisphere	
a. England: Samples furnished by S. R. Stitch, Atomic Energy Research Establishment, Harwell, England.	
(1) CL 666-P: Age 27 years, P.M. 183/55, early 1955, 6.3 g ash, 2.48 g Ca.	0.22 ± 0.05
(2) CL 667-P: Combination of 9 samples, age range 48-65 years, P.M. Nos. 150/55, 153/55, 154/55, 158/55, 168/55, 169/55, 175/55, 188/55, and 250/55, early 1955, 28.9 g ash, 10.87 g Ca.	0.10 ± 0.03
(3) CL 668-P: Combination of 8 samples, age range 70-89 years, P.M. Nos. 157/55, 162/55, 163/55, 165/55, 174/55, 180/55, and 201/55, early 1955, 27.8 g ash, 9.064 g Ca.	0.069 ± 0.018

Sample	Sunshine Units
3. Foreign, Southern Hemisphere	
a. Brazil: Samples collected by Dr. Jairo Câmara, Departmento de Anatomia, Faculdade de Medicina, Universidade de Minas Gerais, Belo Horizonte, M. G., Brazil. Collection arrangements made by Dr. Robert Briggs Watson, Rockefeller Foundation, Rio de Janeiro, Brazil.	
(1) CL 738: Age 45 years, Belo Horizonte, Brazil, July 28, 1955, rib fragments, sternum and cartilage, 62.5 g ash, 22.0 g Ca.	≤0.01
(2) CL 740: Age 36 years, Curvelo, Brazil, September 11, 1955, 15.4 g ash, 4.98 g Ca.	≤0.02
b. Santiago, Chile: Samples collected by Dr. Juan Vial, Catholic University School of Medicine, Santiago, Chile. Collection arrangements made by Dr. Robert Briggs Watson, Rockefeller Foundation, Rio de Janeiro, Brazil.	
(1) CL 712: Age 19 years, July 12, 1955, tibia and rib, 59.7 g ash, 22.4 g Ca.	≤0.01
(2) CL 713: Age 24 years, July 18, 1955, tibia and rib, 62.2 g ash, 23.0 g Ca.	0.025 ± 0.004
(3) CL 715: Age 18 years, July 22, 1955, tibia and rib, 26.09 g ash, 9.63 g Ca.	≤0.02
(4) CL 716: Age 20 years, August 2, 1955, tibia and rib, 58.9 g ash, 24.04 g Ca.	≤0.006
D. Dentine	
1. Boston, Massachusetts: Samples collected by Dr. Stack during the summer, 1954, and furnished by Dr. Shields Warren, New England Deaconess Hospital.	
a. Group I: Primary dentition both sound and carious, (CL 233, 234, 235, and 280), 41 g ash, 15.5 g Ca.	0.038 ± 0.010
b. Group II: Both sound and carious teeth from children under 15 years (CL 236, 237, and 238), 19.8 g ash, 7.52 g Ca.	≤0.12
c. Group III: Carious teeth from children under 15 years (CL 239), 46.53 g ash, 17.1 g Ca.	≤0.046

Sample	Sunshine Units
d. Group IV: Both sound and carious teeth from persons over 15 years (CL 240, 241, and 242), 19.35 g ash, 7.14 g Ca.	≤ 0.043
e. Group V: Carious teeth from persons over 15 years (CL 243), 48.15 g ash, 17.7 g Ca.	≤ 0.006
2. England: Samples furnished by Dr. Shields Warren, New England Deaconess Hospital, Boston, Massachusetts.	
a. CL 159: From adults ages 18 to 35 years, London, England, April and May, 1950, 22.08 g ash, 7.85 g Ca.	0.014 ± 0.010
b. CL 400: Deciduous, Bristol, England, October 1954 to January 1955, 12.62 g ash, 4.78 g Ca.	≤ 0.10
c. CL 594: Deciduous, Bristol, England, January to April, 1955, 16.31 g ash, 6.20 g Ca.	≤ 0.012
II. Animal Bone	
A. United States	
1. CL 211: Steer, "soup bone," New Hampshire, furnished by Dr. Shields Warren, killed January 1952, 50.0 g ash, 18.95 g Ca.	0.44 ± 0.04
2. CL 212: Steer (same as CL 211), "steak bone," New Hampshire, furnished by Dr. Shields Warren, killed January 1952, 50.0 g ash, 18.2 g Ca.	0.33 ± 0.02
3. CL 327: Animal bone, HASL #747, Albany, New York, collected by Dr. J. H. Harley, Spring 1953, 50.5 g ash, 18.8 g Ca.	3.26 ± 0.10
4. CL 104: Calf leg bone, 8 months old, Easton, New York, furnished by Dr. J. H. Harley, killed November 1, 1953, 92.99 g ash, 36.4 g Ca.	3.71 ± 0.06
5. CL 105: Calf leg bone (second portion of CL 104), 8 months old, Easton, New York, furnished by Dr. J. H. Harley, killed November 1, 1953, 106.96 g ash, 41.2 g Ca.	3.76 ± 0.10
6. CL 326: Animal bone, HASL #130, Tifton, Georgia, collected by Dr. J. H. Harley, Spring 1953, 50.2 g ash, 18.8 g Ca.	3.28 ± 0.12
7. CL 202: Calf leg bone, Green Bay, Wisconsin, obtained from Co-op, killed in April 1954, 103.6 g ash, 36.5 g Ca.	0.71 ± 0.03

Sample	Sunshine Units
8. CL 176: Calf bone, 6 months old, Lewiston, Montana, obtained by J. L. Kulp (YB-3), August 1953, 32.2 g ash, 11.93 g Ca.	1.95 ± 0.04
9. Lamb bones, Logan, Utah, obtained by Dr. L. Alexander, animals from same herd killed in December 1954 and January 1955.	
a. CL 421: Metacarpals, December 1954, 19.5 g ash, 7.28 g Ca.	2.51 ± 0.10
b. CL 422: Metacarpals and shanks, December 1954, 72.6 g ash, 27.58 g Ca.	2.46 ± 0.09
c. CL 423: Metacarpals and shanks, December 1954, 75.7 g ash, 28.6 g Ca.	2.76 ± 0.09
d. CL 424: Metacarpals, shanks and femurs, January 1955, 81.6 g ash, 30.2 g Ca.	2.55 ± 0.08
e. CL 425: Metacarpals, shanks and femurs, January 1955, 72.6 g ash, 26.7 g Ca.	2.62 ± 0.08
f. CL 426: Metacarpals, shanks and femurs, January 1955, 68.1 g ash, 25.6 g Ca.	2.57 ± 0.07
g. CL 427: Metacarpals and shanks, January 1955, 73.7 g ash, 27.1 g Ca.	2.42 ± 0.11
h. CL 428: Metacarpals, shanks and femurs, January 1955, 67.2 g ash, 23.9 g Ca.	2.63 ± 0.07
B. Foreign	
1. CL 180: Sheep, 1 year old, west coast of Norway, purchased by Dr. L. Alexander, March 8, 1954, 70 g ash, 26.3 g Ca.	7.4 ± 0.3
2. CL 181: Sheep, 1 year old, west coast of Norway, purchased by Dr. L. Alexander, March 8, 1954, 70 g ash, 26.09 g Ca.	4.1 ± 0.4
3. CL 182: Sheep, 1 year old, west coast of Norway, purchased by Dr. L. Alexander, March 8, 1954, 70 g ash, 26.2 g Ca.	3.45 ± 0.08
4. CL 329: Sheep, 2 years old, Hammerfest, Norway, obtained by Dr. J. L. Kulp (YB-47), August 1954, 49.9 g ash, 17.85 g Ca.	1.97 ± 0.09
5. CL 218: Sheep, 1 year old, East Suffolk, England, collected by Dr. L. Alexander, April 1954, 49.8 g ash, 19.1 g Ca.	1.97 ± 0.05

	Sample	Sunshine Units
6.	CL 219: Sheep, 1 year old, East Suffolk, England, collected by Dr. L. Alexander, April 1954, 49.7 g ash, 18.9 g Ca.	1.82 ± 0.07
7.	CL 220: Sheep, Woodbridge, East Suffolk, England, collected by Dr. L. Alexander, April 1954, 99.2 g ash, 38.8 g Ca.	1.15 ± 0.03
8.	CL 622: Sheep, 1 year old, Suffolk, England, Beltsville UK/B3A, killed February 28, 1955, 170 g ash, 63.2 g Ca.	31.4 ± 0.6
9.	CL 623: Sheep, 1 year old, Suffolk, England, Beltsville UK/B4A, killed February 28, 1955, 129.6 g ash, 48.5 g Ca.	13.1 ± 0.2
10.	CL 215: Sheep, 1 year old, Ffostill, Talgarth, Brecon, Wales, collected by Dr. L. Alexander, April 1954, 99.6 g ash, 37.3 g Ca.	1.54 ± 0.06
11.	CL 216: Sheep, 1 year old, TyLlwyd farm, Montgomery, Wales, collected by Dr. L. Alexander, April 1954, 58.2 g ash, 21.8 g Ca.	7.74 ± 0.21
12.	CL 217: Sheep, 1 year old, Tyllwyd, Cardigan, Wales, collected by Dr. L. Alexander, April 1954, 42.8 g ash, 15.8 g Ca.	18.8 ± 0.3
13.	CL 624: Sheep, 1 year old, Breconshire, Wales, Beltsville UK/B5A, killed in Spring 1955, 151 g ash, 58.4 g Ca.	5.2 ± 0.3
14.	CL 625: Sheep, 1 year old, Cwmystwyth, Wales, Beltsville UK/B6A, killed in Spring 1955, 59.3 g ash, 22.0 g Ca.	60.6 ± 1.2
15.	CL 626: Sheep, 1 year old, Lake Vyrnwy, Wales, Beltsville UK/B7A, killed in Spring 1955, 87.7 g ash, 32.7 g Ca.	18.3 ± 0.4
16.	CL 305: Lamb, 6½ months old, Normandie, France, obtained by Dr. J. L. Kulp (YB-19), August 1954, 40.4 g ash, 15.1 g Ca.	2.85 ± 0.10
17.	CL 464: Sheep, 1 year old, Paris, France, Beltsville #55480, collected in February 1955, 149.6 g ash, 58.79 g Ca.	3.4 ± 0.4
18.	CL 183: Merino sheep, just over 1 year old, Mahzolina Estate, 15 km north of Rome, Italy, collected by Dr. L. Alexander, killed March 3, 1954, 70 g ash, 25 g Ca.	3.9 ± 0.2

	Sample	Sunshine Units
19.	CL 184: Merino sheep, just over 1 year old, Mahzolina Estate, 15 km north of Rome, Italy, collected by Dr. L. Alexander, killed March 3, 1954, 70.2 g ash, 26.45 g Ca.	3.2 ± 0.3
20.	CL 185: Merino sheep, just over 1 year old, Mahzolina Estate, 15 km north of Rome, Italy, collected by Dr. L. Alexander, killed March 3, 1954, 35.1 g ash, 14.37 g Ca.	2.92 ± 0.08
21.	CL 456: Sheep, 1 year old, Italy, Beltsville #55392, collected February 4, 1955, 153 g ash, 58.5 g Ca.	2.3 ± 0.2
22.	CL 457-P: Sheep, 1 year old, Italy, Beltsville #55391, collected February 4, 1955, 143.1 g ash, 45.1 g Ca.	4.89 ± 0.29
23.	CL 186: Kirvircik sheep, 1 year old, Orman Chiftlik, Turkey, collected by Dr. L. Alexander, killed March 1, 1954, 63.0 g ash, 23.1 g Ca.	4.9 ± 0.3
24.	CL 187: Kirvircik sheep, 1 year old, Orman Chiftlik, Turkey, collected by Dr. L. Alexander, killed March 1, 1954, 70.1 g ash, 26.85 g Ca.	4.01 ± 0.08
25.	CL 188: Kirvircik sheep, 1 year old, Orman Chiftlik, Turkey, collected by Dr. L. Alexander, killed March 1, 1954, 35.0 g ash, 14.02 g Ca.	2.77 ± 0.08
26.	CL 194: Sheep, 1 year old, Damascus, Syria, purchased by Dr. L. Alexander, February 26, 1954, 44 g ash, 15.9 g Ca.	0.9 ± 0.1
27.	CL 195: Sheep, 1 year old, Damascus, Syria, purchased by Dr. L. Alexander, February 26, 1954, 34.7 g ash, 12.3 g Ca.	≤0.62
28.	CL 189: Sheep, 1 year old, Beka's Valley, Lebanon, collected by Dr. L. Alexander, February 25, 1954, 70 g ash, 26.2 g Ca.	0.40 ± 0.06
29.	CL 190: Sheep, 1 year old, Beka's Valley, Lebanon, collected by Dr. L. Alexander, February 25, 1954, 70 g ash, 24.6 g Ca.	1.0 ± 0.1
30.	CL 191: Sheep, 1 to 2 years old, Boghari, Algeria, purchased by Dr. L. Alexander, February 22, 1954, 70 g ash, 26.4 g Ca.	2.1 ± 0.1
31.	CL 192: Sheep, 1 to 2 years old, Boghari, Algeria, purchased by Dr. L. Alexander, February 22, 1954, 70 g ash, 27.3 g Ca.	0.61 ± 0.01

Sample	Sunshine Units

III. Animal Products

A. Cheese

1. United States

a. CL 18: Wisconsin Swiss, Green County, Wisconsin, 17.5 lbs. purchased from V. Berg, Chicago, September 23, 1953, manufactured July 3, 1953, 242.5 g ash, 74.0 g Ca. — 1.16 ± 0.05

b. CL 19: Wisconsin Münster, Dodge County, Wisconsin, 18 lbs. purchased from V. Berg, Chicago, October 1, 1953, manufactured July 26, 1953, 372.0 g ash, 45.8 g Ca. — 2.07 ± 0.07

c. CL 175: Wisconsin Münster, Madison, Wisconsin, obtained by Dr. J. L. Kulp (YC-4), manufactured in July 1953, 26.7 g ash, 7.68 g Ca. — 1.53 ± 0.03

d. CL 198-P: Wisconsin Romano, 21 lbs. purchased from V. Berg, Chicago, May 5, 1954, manufactured approximately in March 1954, 492.9 g ash, 56.1 g Ca. — 0.20 ± 0.01

e. CL 199: Wisconsin Sharp Cheddar, Green Bay, Wisconsin, 18 lbs. purchased from V. Berg, Chicago, May 5, 1954, probably manufactured in January 1954, 148.0 g ash, 31.1 g Ca. — 0.36 ± 0.02

f. CL 224: Wisconsin Swiss, Green County, Wisconsin, 13 lbs. purchased from V. Berg, Chicago, June 28, 1954, manufactured April 24, 1954, 111.4 g ash, 29.1 g Ca. — 1.36 ± 0.05

g. CL 225: Wisconsin Münster, Dodge County, Wisconsin, 16 lbs. purchased from V. Berg, Chicago, June 28, 1954, manufactured May 12, 1954, 140.9 g ash, 22.8 g Ca. — 1.63 ± 0.06

h. CL 291: Wisconsin Swiss, Monroe, Green County, Wisconsin, purchased from V. Berg, Chicago, October 21, 1954, manufactured August 2, 1954, 175.8 g ash, 46.7 g Ca. — 1.51 ± 0.09

i. CL 293: Wisconsin Münster, Dodge County, Wisconsin, 17.5 lbs. purchased from V. Berg, Chicago, October 21, 1954, manufactured September 1, 1954, 296.9 g ash, 17.51 g Ca. — 2.24 ± 0.09

j. CL 335: Wisconsin Münster, Dodge County, Wisconsin, 18 lbs. purchased from V. Berg, Chicago, January 17, 1955, manufactured December 15, 1954, 267.2 g ash, 31.6 g Ca. — 1.66 ± 0.05

Sample	Sunshine Units
k. CL 337-P: Wisconsin Swiss, Monroe, Green County, Wisconsin, 12 lbs. purchased from V. Berg, Chicago, January 17, 1955, manufactured November 2, 1954, 110.0 g ash, 28.14 g Ca.	3.35 ± 0.10
l. CL 564-P: Domestic Swiss, Monroe, Green County, Wisconsin, 14½ lbs. purchased from V. Berg, Chicago, April 27, 1955, manufactured January 18, 1955, 208.0 g ash, 32.96 g Ca.	2.98 ± 0.17
m. CL 565-P: Wisconsin Münster, Dodge County, Wisconsin, 18½ lbs. purchased from V. Berg, Chicago, April 27, 1955, manufactured March 29, 1955, 274.6 g ash, 34.6 g Ca.	2.02 ± 0.09
n. CL 709-P: Wisconsin Münster, Dodge County, Wisconsin, purchased from V. Berg, Chicago, August 25, 1955, manufactured July 8, 1955, 130.1 g ash, 22.62 g Ca.	2.41 ± 0.06
2. Foreign, Northern Hemisphere	
a. CL 120: Danish Blue, Denmark, 12 lbs. 6 oz. obtained by Dr. R. A. Dudley from Kraft Cheese Co., manufactured in Spring 1953, 189.6 g ash, 23.0 g Ca.	0.99 ± 0.02
b. CL 200: Danish Blue, Denmark, 14½ lbs. purchased from V. Berg, Chicago, May 5, 1954, manufactured in Fall 1953, 215.0 g ash, 28.98 g Ca.	0.424 ± 0.017
c. CL 227: Danish Blue, Denmark, 14 lbs. purchased from V. Berg, Chicago, June 28, 1954, manufactured in February 1954, 110.0 g ash, 12.7 g Ca.	0.38 ± 0.03
d. CL 334: Danish Blue, Denmark, 20.75 lbs. purchased from V. Berg, Chicago, January 17, 1955, manufactured in September 1954, 115.6 g ash, 10.9 g Ca.	1.81 ± 0.05
e. CL 567-P: Danish Blue, Denmark, 19.75 lbs. purchased from V. Berg, Chicago, April 27, 1955, manufactured in September 1954, 350.58 g ash, 36.7 g Ca.	0.36 ± 0.03
f. CL 710-P: Danish Blue, Denmark, purchased from V. Berg, Chicago, August 25, 1955, manufactured in March 1955, 151.3 g ash, 15.39 g Ca.	2.21 ± 0.05
g. CL 121: Imported Dutch Edam, Rotterdam, Holland, 10 lbs. obtained by Dr. R. A. Dudley from Kraft Cheese Co., manufactured in Spring 1953, 207.1 g ash, 36.2 g Ca.	1.10 ± 0.02

	Sample	Sunshine Units
h.	CL 20: Imported Swiss, Switzerland, 19 lbs. purchased from V. Berg, Chicago, October 1, 1953, manufactured in Spring 1953, 353.0 g ash, 96.1 g Ca.	1.25 ± 0.15
i.	CL 119: Imported Swiss, Switzerland, 10 lbs. 3 oz. obtained by Dr. R. A. Dudley from Kraft Cheese Co., manufactured in Spring, 1953, 123.7 g ash, 38.8 g Ca.	2.70 ± 0.05
j.	CL 226: Imported Swiss, Switzerland, 14 lbs. purchased from V. Berg, Chicago, June 28, 1954, manufactured December 1953, 103.1 g ash, 31.9 g Ca.	1.13 ± 0.05
k.	CL 292: Imported Swiss, Switzerland, 13½ lbs. purchased from V. Berg, Chicago, October 21, 1954, manufactured January 31, 1954, 87.6 g ash, 13.6 g Ca.	1.54 ± 0.04
l.	CL 336: Imported Swiss, Switzerland, 12.75 lbs. purchased from V. Berg, Chicago, January 17, 1955, manufactured June 12, 1954, 184.3 g ash, 43.2 g Ca.	1.34 ± 0.05
m.	CL 566-P: Imported Swiss, Switzerland, 12 lbs. purchased from V. Berg, Chicago, April 27, 1955, manufactured in September 1954, 124.8 g ash, 19.42 g Ca.	5.1 ± 0.3
n.	CL 174: Praia da Vitoria, Azores, obtained by Dr. J. L. Kulp (YC-1), manufactured early in 1953, 33.7 g ash, 10.04 g Ca.	2.69 ± 0.06
o.	CL 58: Japanese Meiji, processed in Tokyo or Osaka, Honshu Island, Japan, 10 lbs. obtained by Dr. J. E. Mayer, University of Chicago, manufactured in Summer 1953, 243.4 g ash, 32.4 g Ca.	0.110 ± 0.005
p.	CL 59: Japanese Hokkaido, natural, Hokkaido Island, Japan, 10 lbs. obtained by Dr. J. E. Mayer, University of Chicago, manufactured in Summer 1953, 192.8 g ash, 42.5 g Ca.	0.136 ± 0.004
3.	Foreign, Southern Hemisphere	
a.	CL 197: African, Reivilo, South Africa, 2½ lbs. obtained by Dr. J. L. Kulp, manufactured January 25, 1954, 48.95 g ash, 10.85 g Ca.	0.20 ± 0.05

Sample	Sunshine Units
b. CL 262: Sbrinz, Buenos Aires, Argentina, 8.75 lbs. obtained February 1954, Beltsville #976, 109.67 g ash, 17.3 g Ca.	0.31 ± 0.03
c. CL 263: Huallanca, Cajamarca, Peru, 3 lbs. obtained in February 1954, Beltsville #979, 24.28 g ash, 6.04 g Ca.	0.39 ± 0.03

B. Milk

1. Chicago Milkshed samples collected by Dr. L. T. Alexander, Plant Industry Station, U. S. Department of Agriculture, Beltsville, Maryland, and dried by Dr. Arthur Swanson at the University of Wisconsin. (Related to soil and alfalfa samples similarly numbered.)

a. CL 61: Fresh milk from Grabow Farm (#1), Rock County, Wisconsin, collected September 28, 1953, 75.6 g ash, 17.23 g Ca.	1.70 ± 0.08
b. CL 62: Fresh milk from Swain Farm (#2), Rock County, Wisconsin, collected September 29, 1953, 64.1 g ash, 10.1 g Ca.	1.30 ± 0.08
c. CL 63: Fresh milk from Swanson Farm (#3), Winnebago County, Illinois, collected September 29, 1953, 134.2 g ash, 19.9 g Ca.	1.21 ± 0.02
d. CL 64: Fresh milk from Holcomb Farm (#4), Rock County, Wisconsin, collected September 29, 1953, 130.8 g ash, 26.8 g Ca.	1.6 ± 0.1
e. CL 65: Fresh milk from Lemke Farm (#5), Dane County, Wisconsin, collected September 30, 1953, 88.2 g ash, 11.6 g Ca.	2.25 ± 0.10
f. CL 66: Fresh milk from Premo Farm (#6), Columbia County, Wisconsin, collected September 30, 1953, 139.7 g ash, 16.6 g Ca.	0.73 ± 0.04
g. CL 67: Fresh milk from Kurpeski Farm (#7), McHenry County, Illinois, collected September 30, 1953, 199.9 g ash, 22.1 g Ca.	1.30 ± 0.02
h. CL 68: Fresh milk from Austin Farm (#8), McHenry County, Illinois, collected October 1, 1953, 84.9 g ash, 15.4 g Ca.	1.80 ± 0.07
i. CL 69: Fresh milk from McKee Farm (#9), McHenry County, Illinois, collected October 1, 1953, 149.0 g ash, 25.6 g Ca.	1.4 ± 0.1

Sample	Sunshine Units
j. CL 70: Fresh milk from Blomberg Farm (#10), McHenry County, Illinois, collected October 1, 1953, 121.3 g ash, 22.1 g Ca.	1.19 ± 0.07
2. Fresh milk from Chicago dairies.	
a. CL 465: Wanzer Dairy, purchased March 5, 1955, 63.0 g ash, 13.8 g Ca.	1.26 ± 0.05
b. CL 449: Bowman Dairy, purchased March 9, 1955, 64.6 g ash, 11.88 g Ca.	1.50 ± 0.06
c. CL 450: Borden Dairy, purchased March 9, 1955, 64.1 g ash, 12.15 g Ca.	1.17 ± 0.04
d. CL 451: Capitol Dairy, purchased March 9, 1955, 42.8 g ash, 8.51 g Ca.	1.24 ± 0.06
e. CL 480-P: Wanzer Dairy, purchased April 2, 1955, 51.8 g ash, 10.9 g Ca.	1.39 ± 0.09
f. CL 478: Bowman Dairy, purchased April 4, 1955, 45.5 g ash, 8.35 g Ca.	1.21 ± 0.07
g. CL 479: Borden Dairy, purchased April 4, 1955, 61.9 ± 11.22 g Ca.	1.50 ± 0.06
h. CL 487: Pure Milk Ass'n. Dairy, purchased April 8, 1955, 35.5 g ash, 6.85 g Ca.	1.98 ± 0.10
i. CL 595-P: Bowman Diary, purchased May 2, 1955, 49.5 g ash, 11.03 g Ca.	1.70 ± 0.16
j. CL 597-P: Pure Milk Ass'n. Dairy, purchased May 2, 1955, 90.2 g ash, 12.0 g Ca.	1.56 ± 0.10
k. CL 598-P: Borden Dairy, purchased May 3, 1955, 49.9 g ash, 8.7 g Ca.	1.84 ± 0.09
l. CL 672-P: Borden Dairy, purchased May 31, 1955, 69.7 g ash, 10.6 g Ca.	5.15 ± 0.25
m. CL 671-P: Pure Milk Ass'n. Dairy, purchased June 1, 1955, 55.1 g ash, 8.95 g Ca.	5.94 ± 0.28
n. CL 674-P: Wanzer Dairy, purchased June 1, 1955, 80.6 g ash, 12.9 g Ca.	6.45 ± 0.31
o. CL 676-P: Bowman Dairy, purchased July 1, 1955, 16.0 g ash, 3.47 g Ca.	5.05 ± 0.48
p. CL 677-P: Borden Dairy, purchased July 1, 1955, 66.1 g ash, 11.5 g Ca.	4.64 ± 0.22

	Sample	Sunshine Units
q.	CL 678-P: Pure Milk Ass'n Dairy, purchased July 1, 1955, 33.3 g ash, 6.64 g Ca.	3.40 ± 0.34
r.	CL 736: Bowman Dairy, purchased September 1, 1955, 33.0 g ash, 4.99 g Ca.	2.22 ± 0.08
s.	CL 737: Wanzer Dairy, purchased September 1, 1955, 55.6 g ash, 8.27 g Ca.	2.0 ± 0.1
t.	CL 741: Borden Dairy, purchased September 6, 1955, 55.5 g ash, 8.07 g Ca.	1.55 ± 0.04
u.	CL 742: Pure Milk Ass'n. Dairy, purchased September 6, 1955, 55.5 g ash, 8.07 g Ca.	1.56 ± 0.03
3.	Other United States Milks	
a.	CL 72, 73, 74: Powdered whole, "Golden State," made by Golden State Company, Ltd., San Francisco, California, collected by Dr. L. Alexander, in 1943, 73.8 g ash, ~17.0 g Ca.	0 ± 0.008
b.	CL 78: Dried skim, Weber Central Dairy, Logan, Utah, collected by Dr. L. Alexander, October 1953, 289.4 g ash, 48.6 g Ca.	1.35 ± 0.05
c.	CL 79: Dried skim, Brooklawn Creamery Co., Beaver, Utah, collected by Dr. L. Alexander, October 1953, 266.1 g ash, 46.7 g Ca.	0.91 ± 0.02
d.	CL 328: Powdered, New York, collected by Dr. J. H. Harley, HASL #276, June 1954, 33.9 g ash, 5.16 g Ca.	1.16 ± 0.04
e.	CL 270: Land O'Lakes dry skim, Wisconsin-Minnesota, purchased from Co-op, manufactured in Spring 1954, 55.6 g ash, 8.59 g Ca.	0.24 ± 0.03
f.	CL 397-P: Land O'Lakes dry skim, Wisconsin-Minnesota, purchased from Co-op, manufactured June 11, 1954, 173.6 g ash, 28.0 g Ca.	2.02 ± 0.18
g.	CL 398: Land O'Lakes dry skim, Wisconsin-Minnesota, purchased from Co-op, manufactured August 27, 1954, 141.3 g ash, 20.4 g Ca.	3.06 ± 0.08
h.	CL 342: Powdered, Clinton, Wisconsin, collected by Dr. L. Alexander, manufactured May 4, 1954, 41.1 g ash, 6.43 g Ca.	0.810 ± 0.045
i.	CL 343: Powdered, Clinton, Wisconsin, collected by Dr. L. Alexander, manufactured June 5, 1954, 42.0 g ash, 6.86 g Ca.	1.05 ± 0.03

Sample	Sunshine Units
j. CL 344: Powdered, Clinton, Wisconsin, collected by Dr. L. Alexander, manufactured June 6, 1954, 37.1 g ash, 8.63 g Ca.	0.97 ± 0.04
k. CL 345: Powdered, Clinton, Wisconsin, collected by Dr. L. Alexander, manufactured June 7, 1954, 41.2 g ash, 6.34 g Ca.	1.32 ± 0.06
l. CL 346: Powdered, Janesville, Wisconsin, collected by Dr. L. Alexander, manufactured May 24, 1954, 39.9 g ash, 6.42 g Ca.	0.71 ± 0.04
m. CL 347: Powdered, Janesville, Wisconsin, collected by Dr. L. Alexander, manufactured May 25, 1954, 37.6 g ash, 6.3 g Ca.	0.88 ± 0.04
n. CL 348: Powdered, Janesville, Wisconsin, collected by Dr. L. Alexander, manufactured May 26, 1954, 33.4 g ash, 5.39 g Ca.	0.76 ± 0.04
o. CL 349: Powdered, Janesville, Wisconsin, collected by Dr. L. Alexander, manufactured May 27, 1954, 33.2 g ash, 5.47 g Ca.	0.69 ± 0.04
p. CL 350: Powdered, Janesville, Wisconsin, collected by Dr. L. Alexander, manufactured September 4, 1954, 66.0 g ash, 10.31 g Ca.	0.93 ± 0.04
4. Foreign, Northern Hemisphere	
a. CL 286: Milk solids, Bogota, Colombia, Beltsville #973, collected in January 1954, 45.0 g ash, 7.39 g Ca.	0.11 ± 0.01
b. CL 171: Powdered skim, Oslo, Norway, purchased by Dr. L. Alexander, March 6, 1954, 76.76 g ash, 18.1 g Ca.	1.50 ± 0.15
c. CL 632-P: Powdered skim, Brand "Molico Torret Skummet Milk," Oslo, Norway, Beltsville #55779, purchased retail and was in store prior to the end of January 1955, 40.6 g ash, 6.94 g Ca.	0.170 ± 0.022
d. CL 633-P: Powdered, Brand "Viking-Torrmelk," Oslo, Norway, Beltsville #55780, purchased retail and was in store prior to the end of January 1955, 28.4 g ash, 4.86 g Ca.	1.18 ± 0.10
e. CL 481-P: Powdered, "Regime," France, Beltsville #55493, collected in February 1955, 139.4 g ash, 25.44 g Ca.	1.35 ± 0.09

	Sample	Sunshine Units
f.	CL 458: Dry skim, Italy, Beltsville #55393, collected February 5, 1955, 107.5 g ash, 20.8 g Ca.	1.09 ± 0.09
g.	CL 620-P: Dried, Kars, Turkey, Beltsville #55763, processed in Spring 1952, 32.2 g ash, 6.03 g Ca.	0.63 ± 0.07
h.	CL 621-P: Dried, Kars, Turkey, Beltsville #55764, processed in July 1954, 10.9 g ash, 2.11 g Ca.	3.65 ± 0.28
i.	CL 679-P: Powdered, Kars, Turkey, Beltsville #55894, processes in May 1954 and left in open hopper of machine until May 21, 1955, 16.33 g ash, 2.55 g Ca.	3.53 ± 0.26
j.	CL 680-P: Powdered, Kars, Turkey, Beltsville #55895, processed May 21, 1955, 29.2 g ash, 5.17 g Ca.	14.6 ± 0.9
k.	CL 287: Evaporated, Military Farms, Pakistan, collected in January 1954, 13.3 g ash, 2.61 g Ca.	0.14 ± 0.05
l.	CL 675-P: Evaporated, Military Farms, Pakistan, Beltsville #55849, collected in February 1955, 71.0 g ash, 15.72 g Ca.	0.39 ± 0.06
m.	CL 590-P: Powdered, Okkoppe, Hokkaido Prefecture, Japan, Beltsville #55641, manufactured June 26, 1954, 58.4 g ash, 9.27 g Ca.	0.84 ± 0.06
n.	CL 591-P: Powdered, Matsumoto, Nagano Prefecture, Japan, Beltsville #55642, manufactured January 9, 1955, 51.1 g ash, 8.55 g Ca.	1.81 ± 0.11
5.	Foreign, Southern Hemisphere	
a.	CL 267-P: Powdered, Lima, Peru, collected in Spring 1954, 119.1 g ash, 22.1 g Ca.	0.050 ± 0.005
b.	CL 268-P: Powdered, "Exeter," Buenos Aires, Argentina, collected in Spring 1954, 430.2 g ash, 70.2 g Ca.	0.10 ± 0.01
c.	CL 269-P: Condensed, "Nestle," Buenos Aires, Argentina, collected in Spring 1954, 59.2 g ash, 12.3 g Ca.	0.29 ± 0.05
d.	CL 265: Powdered, "Nestle," Natal, South Africa, collected in March 1954, 52.4 g ash, 8.3 g Ca.	0.24 ± 0.03

Sample	Sunshine Units
e. CL 631-P: Powdered whole, "Nespray," Natal, South Africa, Beltsville #55776, manufactured in August 1954, 83.3 g ash, 13.39 g Ca.	0.49 ± 0.05
f. CL 615-P: Roller dried full cream powder, Peters Creameries Pty. Ltd., Taree, New South Wales, Australia, Beltsville #55670, manufactured February 12, 1955 from milk produced the same or previous day, 73.0 g ash, 13.0 g Ca.	2.02 ± 0.09
g. CL 616-P: Spray dried full cream powder, Peters Creameries Pty. Ltd., Grafton, New South Wales, Australia, Beltsville #55671, manufactured January 22, 1955 from milk produced the same or previous day, 71.8 g ash, 11.6 g Ca.	2.21 ± 0.16
h. CL 670-P: Condensed, "Nestle," Perth, Australia, Beltsville #55842, manufactured February 12, 1955, 102.6 g ash, 17.7 g Ca.	0.77 ± 0.05
i. CL 288: Whole milk solids, Hamilton, New Zealand, collected in April 1954, Beltsville #974, 42.6 g ash, 7.67 g Ca.	0.18 ± 0.01
IV. Miscellaneous Zoological Samples	
A. Fish	
1. CL 250: Salmon bones, Puget Sound, Washington, caught commercially on July 20, 1954 full grown and therefore probably 2 to 5 years old, 103.63 g ash, 29.25 g Ca.	0.05 ± 0.01
B. Eggs	
1. CL 9: Shells, obtained from Coffee Shop at the University of Chicago, September 4, 1953, 174.1 g ash, 73.5 g Ca.	0.485 ± 0.062
2. CL 10: Shells, obtained from Billings Hospital, University of Chicago, September 8, 1953, 185.9 g ash, 70.4 g Ca.	0.284 ± 0.033

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Sunshine Units

V. Botanical Samples

A. United States: Alfalfa samples from Chicago Milkshed soils collected by Dr. L. T. Alexander, Soil Survey Laboratory, Plant Industry Station, U. S. Department of Agriculture, Beltsville, Maryland. (Related to milk and soil samples similarly numbered.)

1.	CL 42: Grabow Farm (#1), Rock County, Wisconsin, collected September 28, 1953, 140.5 g ash, 46.4 g Ca.	12.8 ± 0.3
2.	CL 43: Swain Farm (#2), Rock County, Wisconsin, collected September 29, 1953, 192.1 g ash, 51.3 g Ca.	5.30 ± 0.19
3.	CL 44: Swanson Farm (#3), Winnebago County, Illinois, collected September 29, 1953, 123.0 g ash, 29.7 g Ca.	7.12 ± 0.40
4.	CL 45: Holcomb Farm (#4), Rock County, Wisconsin, collected September 29, 1953, 130.5 g ash, 35.8 g Ca.	8.32 ± 0.27
5.	CL 46: Lewke Farm (#5), Dane County, Wisconsin, collected September 30, 1953, 137.0 g ash, 9.25 g Ca.	20.9 ± 0.9
6.	CL 47: Premo Farm (#6), Columbia County, Wisconsin, collected September 30, 1955, 139.0 g ash, 27.8 g Ca.	4.05 ± 0.15
7.	CL 48: Kurpeski Farm (#7), McHenry County, Illinois, collected September 30, 1953, 152.5 g ash, 41.3 g Ca.	7.44 ± 0.46
8.	CL 49: Austin Farm (#8), McHenry County, Illinois, collected October 1, 1953, 153.9 g ash, 42.2 g Ca.	4.95 ± 0.27
9.	CL 50: McKee Farm (#9), McHenry County, Illinois, collected October 1, 1953, 143.5 g ash, 32.5 g Ca.	14.8 ± 0.3
10.	CL 51: Blomberg Farm (#10), McHenry County, Illinois, collected October 1, 1953, 183.9 g ash, 56.9 g Ca.	9.50 ± 0.34
11.	CL 52: Van Winkle Farm (#11), near Wilmington, Illinois, collected October 2, 1953, 111.4 g ash, 23.4 g Ca.	4.98 ± 0.22
12.	CL 53: Carver Farm (#12), Will County, Illinois, collected October 2, 1953, 156.8 g ash, 39.8 g Ca.	2.31 ± 0.05
13.	CL 339-P: Swain Farm (#2), Rock County, Wisconsin, collected in October 1954, 44.1 g ash, 11.8 g Ca.	0.50 ± 0.05
14.	CL 338-P: Holcomb Farm (#4), Rock County, Wisconsin, collected in October 1954, 111.0 g ash, 17.0 g Ca.	1.48 ± 0.09

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Sample	Sunshine Units
15. CL 340-P: Austin Farm (#8), McHenry County, Illinois, collected in October 1954, 116.9 g ash, 33.3 g Ca.	0.39 ± 0.02
16. CL 341-P: Carver Farm (#12), Will County, Illinois, collected in October 1954, 142.9 g ash, 37.2 g Ca.	0.87 ± 0.04
B. Foreign, Northern Hemisphere	
1. CL 75: Alfalfa plants 2 years old, 20 km west of Ankara, Turkey, Beltsville #531691a, collected by a member of the Ankara Provincial Extension Service Alfalfa Demonstration Area, October 2 & 6, 1953, 139.8 g ash, 24.3 g Ca.	2.16 ± 0.18
2. CL 178: Tobacco, Perfecto cigars, manufactured in Havana, Cuba, purchased from South End Tobacco Co., on April 19, 1954, 18.6 g ash, 26.58 g Ca.	1.7 ± 0.2
C. Foreign, Southern Hemisphere	
1. CL 164-P: Forage, Chile, Beltsville #5472a, collected in November 1953, 117.7 g ash, 14.2 g Ca.	0.04 ± 0.02
2. CL 162-P: Forage from Judgeford silt loam, New Zealand, Beltsville #531804a, collected in November 1953, 60.37 g ash, 6.78 g Ca.	1.17 ± 0.28
3. CL 163-P: Forage from Claremont silt loam, New Zealand, Beltsville #5485a, collected in January 1954, 91.18 g ash, 5.42 g Ca.	0.84 ± 0.10

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Sample	Sunshine Units

VI. Soil

All soil samples listed below were obtained by Dr. L. T. Alexander and extracted at the Soil Survey Laboratory, U.S. Department of Agriculture, Beltsville, Maryland. Note that most soils have been extracted with normal natural ammonium acetate which is a measure of the strontium and calcium available for plant uptake and not of the total soil concentration. Soil Survey Laboratory analyses on these samples include the determination of Na, K, Mg, Ca and Sr.

A. Chicago Milkshed Soils; Collected by Dr. L. T. Alexander. (Milk and alfalfa samples similarly numbered were collected at the same location and date.)

1. 1953 collections

a. Grabow Farm (#1), Rock County, Wisconsin, Knox fine sandy loam, collected September 28, 1953.

(1)	CL 106: Beltsville #531665, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 12.65 g oxalate, 4.87 g oxide, 3.48 g Ca.	26.3 ± 1.0
(2)	CL 107: Beltsville #531666, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 10.87 g oxalate, 4.18 g oxide, 2.98 g Ca.	6.7 ± 0.4
(3)	CL 137: Beltsville #531665, 8 lbs. soil leached with HCl after NH_4AC, 0-1" depth, 3.83 g oxalate, 1.46 g oxide, 1.64 g Ca.	24.6 ± 0.8
(4)	CL 143: Beltsville #531665, calcium oxalate from 200 g soil fused with sodium carbonate following extraction with NH_4AC and HCl, 0-1" depth, 0.578 g oxide, 0.28 g Ca.	6.95 ± 0.20

b. Swain Farm (#2), Rock County, Wisconsin, Knox fine sandy loam, collected September 29, 1953.

(1)	CL 132: Beltsville #531667, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 40.14 g oxalate, 14.9 g oxide, 7.75 g Ca.	7.36 ± 0.33
(2)	CL 133: Beltsville #531668, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 27.69 g oxalate, 10.2 g oxide, 7.25 g Ca.	2.20 ± 0.23

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Sample	Sunshine Units
c. Swanson Farm (#3), Winnebago County, Illinois, Carrington-like silt loam, collected September 30, 1953.	
(1) CL 108: Beltsville #531669, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 34.4 g oxalate, 12.06 g oxide, 7.44 g Ca.	15.80 ± 0.37
(2) CL 109: Beltsville #531670, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 36.88 g oxalate, 12.80 g oxide, 7.34 g Ca.	2.54 ± 0.17
d. Holcomb Farm (#4), Rock County, Wisconsin, Carrington silt loam, September 29, 1953.	
(1) CL 134: Beltsville #531671, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 35.92 g oxalate, 12.4 g oxide, 7.02 g Ca.	8.73 ± 0.19
(2) CL 135: Beltsville #531672, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 43.34 g oxalate, 15.1 g oxide, 9.05 g Ca.	1.75 ± 0.59
e. Lewke Farm (#5), Dane County, Wisconsin, Miami silt loam, collected September 30, 1953.	
(1) CL 115: Beltsville #531673, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 17.19 g oxalate, 6.50 g oxide, 4.65 g Ca.	10.20 ± 0.34
(2) CL 116: Beltsville #531674, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 20.77 g oxalate, 7.82 g oxide, 5.59 g Ca.	2.93 ± 0.15
f. Premo Farm (#6), Columbia County, Wisconsin, Miami silt loam, collected September 30, 1953.	
(1) CL 101: Beltsville #531675, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 17.87 g oxalate, 6.66 g oxide, 4.77 g Ca.	13.1 ± 0.3
(2) CL 102: Beltsville #531675, 8 lbs. soil leached with HCl after NH_4AC extraction, 0-1" depth, 7.51 g oxalate, 2.90 g oxide, 2.07 g Ca.	12.5 ± 0.8
(3) CL 136: Beltsville #531676, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 30.19 g oxalate, 10.2 g oxide, 6.05 g Ca.	2.54 ± 0.10

Sample	Sunshine Units
g. Kurpeski Farm (#7), McHenry County, Illinois, Miami silt loam, collected September 30, 1953.	
(1) CL 117: Beltsville #531677, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 14.04 g oxalate, 5.36 g oxide, 3.83 g Ca.	16.30 ± 0.53
(2) CL 118: Beltsville #531678, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 14.02 g oxalate, 5.26 g oxide, 3.76 g Ca.	5.59 ± 0.29
h. Austin Farm (#8), McHenry County, Illinois, Miami silt loam, collected October 1, 1953.	
(1) CL 138: Beltsville #531679, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 15.95 g oxalate, 6.0 g oxide, 4.24 g Ca.	22.40 ± 0.28
(2) CL 139: Beltsville #531680, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 14.54 g oxalate, 5.5 g oxide, 3.78 g Ca.	4.74 ± 0.13
i. McKee Farm (#9), McHenry County, Illinois, Drummer silty clay loam, collected October 1, 1953.	
(1) CL 122: Beltsville #531681, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 53.24 g oxalate, 19.8 g oxide, 14.24 g Ca.	8.10 ± 0.19
(2) CL 123: Beltsville #531682, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 84.12 g oxalate, 29.9 g oxide, 19.5 g Ca.	0.91 ± 0.07
(3) CL 140: Beltsville #531681, leached with HCl after NH_4AC extraction of 8 lbs. soil, 0-1" depth, 37.73 g oxalate, 14.2 g oxide, 9.48 g Ca.	4.0 ± 0.2
(4) CL 144: Beltsville #531681, calcium oxalate from 200 g soil fused with sodium carbonate following extraction of 8 lbs. soil with NH_4AC and HCl, 0-1" depth, 1.28 g oxide, 0.56 g Ca.	6.37 ± 0.20
j. Blomberg Farm (#10), McHenry County, Illinois, Drummer silty clay loam, collected October 1, 1953.	
(1) CL 110: Beltsville #531683, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 28.99 g oxalate, 11.06 g oxide, 7.78 g Ca.	1.65 ± 0.05

Sample	Sunshine Units
(2) CL 111: Beltsville #531683, leached with HCl after NH_4AC extraction of 8 lbs. soil, 0-1" depth, 17.06 g oxalate, 6.58 g oxide, 4.67 g Ca.	4.40 ± 0.43
(3) CL 145: Beltsville #531684, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 65.73 g oxalate, 24.5 g oxide, 16.6 g Ca.	≤0.32

k. Van Winkle Farm (#11), near Wilmington, Illinois, Plainfield sand, collected October 2, 1953.

(1) CL 124: Beltsville #531685, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 12.23 g oxalate, 4.59 g oxide, 3.61 g Ca.	13.8 ± 0.7
(2) CL 125: Beltsville #531686, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 10.85 g oxalate, 4.12 g oxide, 2.95 g Ca.	7.90 ± 0.09

l. Carver Farm (#12), Will County, Illinois, Plainfield Sand, collected October 2, 1953.

(1) CL 146: Beltsville #531687, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 7.96 g oxalate, 3.1 g oxide, 2.49 g Ca.	42.1 ± 2.3
(2) CL 147: Beltsville #531688, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 8.38 g oxalate, 3.2 g oxide, 1.88 g Ca.	5.62 ± 0.38

2. 1954 collections. These samples were taken from the same fields sampled in 1953.

a. Swain Farm (#2), Rock County, Wisconsin, Knox fine sandy loam, collected October 4, 1954.

(1) CL 558: Beltsville #54831, NH_4AC extraction of 4 lbs. soil, 0-2" depth, 11.1 g oxalate, 5.16 g oxide, 3.05 g Ca.	7.66 ± 0.28
(2) CL 559: Beltsville #54832, NH_4AC extraction of 4 lbs. soil, 2-6" depth, 10.81 g oxalate, 5.15 g oxide, 3.04 g Ca.	0.61 ± 0.04

b. Holcomb Farm (#4), Rock County, Wisconsin, Carrington silt loam, collected October 4, 1954.

(1) CL 556: Beltsville #54829, NH_4AC extraction of 4 lbs. soil, 0-2" depth, 16.46 g oxalate, 7.35 g oxide, 4.90 g Ca.	7.45 ± 0.26

Sample	Sunshine Units
(2) CL 557: Beltsville #54830, NH_4AC extraction of 4 lbs. soil, 2-6" depth, 17.11 g oxalate, 7.6 g oxide, 4.5 g Ca.	0.817 ± 0.032
c. Austin Farm (#8), McHenry County, Illinois, Miami silt loam, collected October 5, 1954.	
(1) CL 560: Beltsville #54833, NH_4AC extraction of 4 lbs. soil, 0-2" depth, 6.81 g oxalate, 3.57 g oxide, 1.93 g Ca.	16.9 ± 0.6
(2) CL 561: Beltsville #54834, NH_4AC extraction of 4 lbs. soil, 2-6" depth, 5.57 g oxalate, 2.94 g oxide, 1.54 g Ca.	2.06 ± 0.08
d. Carver Farm (#12), Will County, Illinois, Plainfield sand, collected in October 1954.	
(1) CL 600-P: Beltsville #54835, NH_4AC extraction of 4 lbs. soil, 0-2" depth, 3.87 g oxalate, 1.49 g oxide, 1.12 g Ca.	27.7 ± 1.2
(2) CL 601-P: Beltsville #54836, NH_4AC extraction of 4 lbs. soil, 2-6" depth, 3.05 g oxalate, 1.18 g oxide, 0.87 g Ca.	2.7 ± 0.3
B. Other United States Soils	
1. CL 76: Carrington loam, Iowa, Beltsville #C-2916, collected, by Dr. L. Alexander in 1937, leached with HCl after NH_4AC extraction of 8 lbs. soil, 0-3" depth, 30.84 g oxalate, 11.6 g oxide, 8.28 g Ca.	0 ± 0.05
2. CL 77: Carrington loam, Iowa, Beltsville #C-2917, collected by Dr. L. Alexander in 1937, NH_4AC extraction of 8 lbs. soil, 0-3" depth, 26.5 g oxalate, 10.1 g oxide, 7.22 g Ca.	0 ± 0.05
3. CL 149: Milville loam, Utah, Beltsville #531689, collected in October 1953, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 41.58 g oxalate, 15.4 g oxide, 11.07 g Ca.	1.38 ± 0.08
4. CL 150: Milville loam, Utah, Beltsville #531690, collected in October 1953, NH_4AC extraction of 8 lbs. soil, 1-6" depth, 48.92 g oxalate, 17.3 g oxide, 10.19 g Ca.	0.20 ± 0.02

Sample	Sunshine Units
C. Foreign, Northern Hemisphere	
1. CL 470-P: Bogota, Colombia, Beltsville #54715, collected in Spring 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 15.65 g oxalate, 5.97 g oxide, 4.27 g Ca.	0.67 ± 0.04
2. CL 471-P: Bogota, Colombia, Beltsville #54716, collected in Spring 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 17.25 g oxalate, 6.54 g oxide, 4.67 g Ca.	0.91 ± 0.08
3. CL 300-P: Oslo, Norway, Beltsville #54410, collected in April 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 39.86 g oxalate, 14.99 g oxide, 10.7 g Ca.	1.44 ± 0.06
4. CL 302: Oslo, Norway, Beltsville #54412, collected in April 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 36.0 g oxalate, 13.2 g oxide, 9.17 g Ca.	1.51 ± 0.05
5. CL 303: Ffostill, Talgarth, Brecon, Wales, Beltsville #54415, collected in April 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 29.2 g oxalate, 10.7 g oxide, 7.1 g Ca.	3.30 ± 0.12
6. CL 306-P: Cardigan County, Wales, Beltsville #54417, collected in April 1954, NH_4AC extraction of 8 lbs. soil, ~0-2" depth, 0.95 g oxalate, 0.38 g oxide, 0.274 g Ca.	97.0 ± 9.1
7. CL 307: England, Beltsville #54418, collected in April 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 39.5 g oxalate, 17.3 g oxide, 14.58 g Ca.	1.37 ± 0.06
8. CL 308: England, Beltsville #54419, collected in April 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 48.0 g oxalate, 21.0 g oxide, 17.75 g Ca.	0.89 ± 0.05
9. CL 309: England, Beltsville #54420, collected in April 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 44.3 g oxalate, 19.4 g oxide, 16.1 g Ca.	0.94 ± 0.09
10. CL 435: Rothamsted, England, Beltsville #54675, collected in July 1954, NH_4AC extraction of 4 lbs. soil, ~0-3" depth, 16.72 g oxalate, 6.77 g oxide, 4.8 g Ca.	1.31 ± 0.07
11. CL 277: Algeria, Africa, 10.7 km from Boghari on road to Algiers, Beltsville #54359, collected February 22, 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 48.1 g oxalate, 17.9 g oxide, 12.41 g Ca.	3.40 ± 0.08

	Sample	Sunshine Units
12.	CL 278: Algeria, Africa, 5.8 km south of Boghari, brown silty clay loam, Beltsville #54360, collected February 22, 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 49.1 g oxalate, 18.9 g oxide, 12.76 g Ca.	3.8 ± 0.1
13.	CL 295-P: Boghari, Algiers, Africa, Beltsville #54361, collected in February 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 36.14 g oxalate, 13.6 g oxide, 9.75 g Ca.	3.46 ± 0.08
14.	CL 433-P: Dakar, French West Africa, Beltsville #54673, collected in Spring 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 6.14 g oxalate, 2.34 g oxide, 1.67 g Ca.	1.88 ± 0.18
15.	CL 434: Dakar, French West Africa, Beltsville #54674, collected in Spring 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 27.66 g oxalate, 10.8 g oxide, 7.72 g Ca.	≤0.16
16.	CL 103: 20 km west of Ankara, Turkey, heavy alluvial, Beltsville #531691, collected on October 2 and 6, 1953, NH_4AC extraction of 8 lbs. soil, 1-2" depth, 62.02 g oxalate, 24.2 g oxide, 17.3 g Ca.	1.17 ± 0.10
17.	CL 273: Village 41 km southeast of Damascus, Syria, native grazing land, Beltsville #54295, collected February 26, 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 45.7 g oxalate, 17.3 g oxide, 11.62 g Ca.	1.90 ± 0.08
18.	CL 274: Tel Muskan, 30 km from Damascus, Syria, irrigated alluvial area with wheat stubble from previous year, Beltsville #54296, collected February 26, 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 68.1 g oxalate, 23.0 g oxide, 11.1 g Ca.	1.1 ± 0.1
19.	CL 260: El Hibri's farm, Beka's Valley, Lebanon, grass sod, Beltsville #54293, collected February 25, 1954, NH_4AC extraction of 8 lbs. soil, 0-2" depth, 76.19 g oxalate, 28.3 g oxide, 19.3 g Ca.	0.86 ± 0.05
20.	CL 272: El Hibri's farm, Beka's Valley, Lebanon, sub-surface sample of wheat field which had been plowed, Beltsville #54294, collected February 25, 1954, NH_4AC extraction of 8 lbs. soil, 0-3" depth, 69.4 g oxalate, 26.7 g oxide, 19.6 g Ca.	2.03 ± 0.07
21.	CL 310: Aden, S.W. Arabia, Beltsville #54421, collected in Spring 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 25.5 g oxalate, 11.2 g oxide, 8.74 g Ca.	0.51 ± 0.03

	Sample	Sunshine Units
22.	CL 351: Gold Mohur, Aden, S.W. Arabia, Beltsville #54422, collected in Spring 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 34.8 g oxalate, 13.5 g oxide, 9.45 g Ca.	1.05 ± 0.10
23.	CL 431-P: Pakistan, Beltsville #54671, collected in February 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 14.83 g oxalate, 5.77 g oxide, 4.13 g Ca.	0.27 ± 0.03
24.	CL 432: Pakistan, Beltsville #54672, collected in February 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 14.85 g oxalate, 6.14 g oxide, 4.4 g Ca.	0.35 ± 0.04
25.	CL 141: India, Beltsville #531803, collected in October 1953, NH_4AC extraction of 8 lbs. soil, 0--1.5" depth, 37.84 g oxalate, 14.3 g oxide, 11.38 g Ca.	1.70 ± 0.01
26.	CL 275: Madras, India (sample A), Beltsville #54357, collected in February 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 19.63 g oxalate, 7.2 g oxide, 5.36 g Ca.	1.21 ± 0.02
27.	CL 276: Madras, India (sample B), Beltsville #54358, collected in February 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 20.9 g oxalate, 7.6 g oxide, 4.96 g Ca.	0.30 ± 0.03
28.	CL 388: 64 miles from Poona, India, Beltsville #54573, collected in March 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 51.9 g oxalate, 19.5 g oxide, 14.0 g Ca.	0.099 ± 0.009
29.	CL 389: 64 miles from Poona, India, Beltsville #54574, collected in March 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 30.9 g oxalate, 11.7 g oxide, 8.32 g Ca.	0.106 ± 0.011
30.	CL 429: New Delhi, India, Beltsville #54575, collected in March 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 22.09 g oxalate, 8.86 g oxide, 6.33 g Ca.	1.66 ± 0.08
31.	CL 430: New Delhi, India, Beltsville #54576, collected in March 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 20.29 g oxalate, 8.11 g oxide, 5.8 g Ca.	1.97 ± 0.10
32.	CL 386: Bin Tong Park area, Singapore, Beltsville #54571, collected in March 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 0.0449 g oxalate, 0.0141 g oxide, 0.0101 g Ca.	≤50

	Sample	Sunshine Units
33.	CL 387: Near Tengah RAF Base, Singapore, Beltsville #54572, collected in March 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 0.9278 g oxalate, 0.3505 g oxide, 0.2506 g Ca.	22 ± 2
34.	CL 298-P: Philippine Islands, area of 3% slope, Beltsville #54401, collected in February 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 53.92 g oxalate, 20.24 g oxide, 14.5 g Ca.	1.47 ± 0.21
35.	CL 299-P: Philippine Islands, Beltsville #54402, collected in February 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 12.93 g oxalate, 4.98 g oxide, 3.56 g Ca.	20.1 ± 2.3
36.	CL 279: Composite sample from Hiroshima and Nagasaki, Japan, Beltsville #54608, collected in February 1954, NH_4AC extraction of 8 lbs. soil, 0-12" depth, 10.94 g oxalate, 4.1 g oxide, 2.86 g Ca.	6.70 ± 0.24
D.	Foreign, Southern Hemisphere	
1.	CL 148: Chile, Beltsville #5472, collected in November 1953, NH_4AC extraction of 8 lbs. soil, 0-1" depth, 36.64 g oxalate, 13.8 g oxide, 9.55 g Ca.	≤0.33
2.	CL 384: Southwest of Buenos Aires, Argentina, Beltsville #54569, collected in March 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 32.3 g oxalate, 12.5 g oxide, 6.8 g Ca.	0.45 ± 0.03
3.	CL 385: Southwest of Buenos Aires, Argentina, Beltsville #54570, collected in March 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 24.4 g oxalate, 9.5 g oxide, 8.9 g Ca.	0.44 ± 0.03
4.	CL 255: Brazil, Beltsville #54288, collected March 2, 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 0.66 g oxalate, 0.2 g oxide, 0.165 g Ca.	13.5 ± 1.3
5.	CL 256: Brazil, Beltsville #54289, collected March, 2, 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 1.56 g oxalate, 0.7 g oxide, 0.406 g Ca.	4.17 ± 0.30
6.	CL 472-P: Leopoldville, Africa, Beltsville #54717, collected in Spring 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 8.47 g oxalate, 3.19 g oxide, 2.28 g Ca.	0.92 ± 0.08
7.	CL 553-P: Belgian Congo, Africa, Beltsville #54718, collected in Spring 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 16.64 g oxalate, 6.34 g oxide, 4.52 g Ca.	0.21 ± 0.04

Sample	Sunshine Units
8. CL 296-P: Natal, South Africa, Beltsville #54399, collected in Spring 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 7.55 g oxalate, 2.85 g oxide, 2.04 g Ca.	0.49 ± 0.08
9. CL 297-P: Natal, South Africa, Beltsville #54400, collected 3 miles southeast of CL 296-P in Spring 1954, NH_4AC extraction of 8 lbs. soil, 0-4" depth, 6.09 g oxalate, 0.62 g oxide, 0.441 g Ca.	9.80 ± 0.71
10. CL 151: New Zealand, Beltsville #531804, Judgeford silt loam, collected in November 1953, NH_4AC extraction of 8 lbs. soil, 0-3" depth, 29.17 g oxalate, 11.2 g oxide, 8.04 g Ca.	≤0.21
11. CL 152: New Zealand, Beltsville #5471, Wharekohe silt loam, collected in Nov. 1953, NH_4AC extraction of 8 lbs. soil, 0-3" depth, 3.25 g oxalate, 1.3 g oxide, 0.86 g Ca.	2.51 ± 0.09
12. CL 170: New Zealand, Beltsville #5485, Claremont silt loam, collected in January 1954, NH_4AC extraction of 8 lbs. soil, 0-3" depth, 24.04 g oxalate, 9.0 g oxide, 6.4 g Ca.	≤0.18
13. CL 468-P: Featherston, New Zealand, Beltsville #54693, collected in April 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 4.77 g oxalate, 1.82 g oxide, 1.30 g Ca.	38.2 ± 0.3
14. CL 469-P: Fernside, New Zealand, Beltsville #54694, collected in April 1954, NH_4AC extraction of 4 lbs. soil, 0-4" depth, 10.96 g oxalate, 4.16 g oxide, 2.98 g Ca.	3.43 ± 0.26

VII. Precipitation — dpm/gal

A. Chicago

All 1952 and 1953 rain and snow samples were collected by the University of Chicago tritium research group. These samples are water run-off from the roof of the Jones Chemistry Laboratory and the precipitation in inches is that reported by the Weather Bureau for the University of Chicago station for the day the sample was taken. All 1954 and 1955 samples (except those indicated as collected by the tritium group) were collected in galvanized tubs placed on the roof of Jones Chemistry Laboratory. For these the equivalent precipitation in inches (derived from sample volume and collection area) is given.

1952

1. CL 27: Rain, 3.4 gal., 0.31", collected November 17.	7.5 ± 0.2

	Sample	dpm/gal
2.	CL 28: Rain, 3.8 gal., 1.24", collected November 22 to November 26.	4.5 ± 0.2
3.	CL 21: Snow, 4.5 gal., 0.05", collected December 2.	≤ 3.3
	1953	
4.	CL 29: Rain, 3.9 gal., 0.03", collected February 11.	3.40 ± 0.15
5.	CL 22: Snow, 3.3 gal., 0.19", collected February 16.	0.81 ± 0.15
6.	CL 30: Rain, 1.7 gal., 0.98", collected March 12.	0 ± 0.3
7.	CL 32: Rain, 1.4 gal., 0.06", collected March 20 to March 22.	2.6 ± 0.3
8.	CL 33: Rain, 1.5 gal., 0.68", collected 1030-1100, March 31.	7.2 ± 0.5
9.	CL 34: Rain, 2.0 gal., 0.08", collected 1000-1030, April 3.	5.5 ± 1.0
10.	CL 24: Rain, 5 gal., 0.44", collected April 15.	8.42 ± 0.60
11.	CL 35: Rain, 1.5 gal., 0.13", collected April 24.	4.0 ± 0.4
12.	CL 36: Rain, 1.6 gal., 0.94", collected 1500-1520, April 30.	67.3 ± 3.2
13.	CL 25: Rain, 2.5 gal., 0.75", collected May 22.	4.70 ± 0.48
14.	CL 26: Rain, 5 gal., 1.86", collected 1530-1610, June 5.	12.8 ± 0.3
15.	CL 38: Rain, 2.1 gal., 0.01", collected 2200-2400, June 25.	108.0 ± 2.5
16.	CL 39: Rain, 2.2 gal., 0.11", collected July 1 and July 2.	7.40 ± 0.25
17.	CL 40: Rain, 2.4 gal., 0.40", collected July 5.	5.0 ± 0.4
18.	CL 41: Rain, 1.8 gal., 1.44", collected July 17 to July 20.	10.4 ± 0.8
19.	CL 13: Rain, 2.5 gal., 0.74", collected August 1 to August 3.	2.47 ± 0.35
20.	CL 14: Rain, 5 gal., 0.14", collected August 4.	3.48 ± 0.46
21.	CL 15: Rain, 5 gal., 0.33", collected 0400-1100, September 11.	13.5 ± 0.6

	Sample	dpm/gal	
22.	CL 16: Rain, 5 gal., 0.45", collected September 18.	39.0 ± 1.2	
23.	CL 71: Rain, 5 gal., 0.45", collected October 26.	46.0 ± 1.5	
24.	CL 136X: Rain, 2.5 gal., 0.39", collected November 20.	2.1 ± 0.1	
	1954		
25.	CL 142: Rain, 0.87 gal., 0.445" equivalent, collected March 19.	55.8 ± 0.7	
26.	CL 168: Rain, 2.70 gal., 1.38" equivalent, collected March 24 to March 25.	1.79 ± 0.80	.019 mc/cc *
27.	CL 169: Rain, 1.30 gal., 0.664" equivalent, collected March 25 to March 29.	11.8 ± 0.7	.062 "
28.	CL 173: Rain, 0.90 gal., 0.46" equivalent, collected March 30 to April 6.	34.6 ± 3.5	.125 "
29.	CL 179: Rain, 1.05 gal., 0.536" equivalent, collected 1730, April 21 to 0830, April 22.	8.7 ± 0.5	.037 "
30.	CL 195X: Rain, 1.67 gal., 0.852" equivalent, collected April 25 to April 27.	6.6 ± 0.2	.045 "
31.	CL 208: Rain, 0.35 gal., 0.179" equivalent, collected 1900, May 26 to 0730, May 27.	18.5 ± 1.2	.026 "
32.	CL 209: Rain, 1.22 gal., 0.623" equivalent, collected 2000, May 27 to 0600, May 28.	14.2 ± 1.6	.070 "
33.	CL 210: Rain, 1.24 gal., 0.634" equivalent, collected 1400, May 31 to 1300, June 1.	13.0 ± 0.7	.066 "
34.	CL 221: Rain, 1.20 gal., 0.613" equivalent, collected June 19 to June 20.	26.3 ± 2.6	.125 "
35.	CL 222: Rain, 0.6 gal., 0.307" equivalent, collected June 20 to June 22.	1.14 ± 0.06	.003 "
36.	CL 244: Rain, 5.82 gal., 2.97" equivalent, collected June 29 to July 7.	4.8 ± 0.3	.11 "
37.	CL 330: Rain, 1.9 gal., 1.10", collected by University of Chicago Tritium Group (T-206), 1600 to 1730, July 20.	4.7 ± 0.2	.04 "
38.	CL 246: Rain, 1.16 gal., 0.593" equivalent, collected 1700, July 20 to 0200, July 21.	≤2.84	

* 1.6" = 1 gal/ft²

	Sample	dpm/gal	
39.	CL 254: Rain, 0.66 gal., 0.332" equivalent, collected July 21 to July 27.	7.2 ± 0.5	.037 mc/mi
40.	CL 261: Rain, 0.22 gal., 0.113" equivalent, collected 1745 to 1830, August 2,	61.6 ± 5.0	.054 "
41.	CL 324: Rain, 0.95 gal., .485" equivalent, collected 1000 to 1030, August 25.	≤0.41	.112 "
42.	CL 284: Rain, 11.0 gal., 5.62" equivalent, collected October 8 to October 11.	2.52 ± 0.25	.112 "
43.	CL 285: Rain, 1.18 gal., .603" equivalent, collected October 11 to October 12.	0.49 ± 0.08	.002 "
44.	CL 289: Rain, 0.53 gal., .302" equivalent, collected October 12 to October 14.	16.6 ± 0.2	.039 "
45.	CL 331: Rain, 1.0 gal., 0.05", collected by University of Chicago Tritium Group (T-232), November 22.	25.3 ± 1.0	.0094
46.	CL 318: Rain, 0.25 gal., .128" equivalent, collected November 23 to November 24.	8.75 ± 0.88	.0088
47.	CL 319: Rain, 0.60 gal., .307" equivalent, collected December 16 to December 20.	22.8 ± 2.3	.054 "
48.	CL 320: Rain, 1.82 gal., .930" equivalent, collected December 24 to December 27.	26.3 ± 2.5	.196 "
49.	CL 325: Rain and snow, 1.1 gal., .562" equivalent, collected December 28 to December 31.	12 ± 1	.052 "
	1955		
50.	CL 353 & 354: Snow, 0.37 gal., 0.18" equivalent, collected January 12 to January 22.	12.5 ± 2.7	.017 "
51.	CL 355: Snow, 0.21 gal., 0.10" equivalent, collected January 24 to January 25.	9.2 ± 1.0	.0071 "
52.	CL 407 & 408: Rain, 0.71 gal., 0.36" equivalent, collected February 18 to February 21.	38.8 ± 1.9	.110 "
53.	CL 409: Rain, 0.39 gal., 0.20" equivalent, collected February 22, to February 26.	14.0 ± 1.4	.021 "
54.	CL 419-P: Rain, 4.49 gal., 2.29" equivalent, collected 1530, March 10 to 0900, March 16.	16.5 ± 1.0	.30 "
55.	CL 448-P: Snow, 0.066 gal., 0.034" equivalent, collected 1030, March 4 to 0800, March 7.	95.0 ± 13.5	.026 "

	Sample	dpm/gal.	x
56.	CL 459-P: Rain, 0.44 gal., 0.22" equivalent, collected 1000, March 16 to 0915, March 21.	65 ± 5	.11 mc/m
57.	CL 460-P: Rain, 0.45 gal., 0.23" equivalent, collected 1000, March 16 to 0915, March 21. Sample collected in tub covered with plastic sheet with small central opening to eliminate blow-in of dry fall-out between rains.	70.8 ± 4.9	.13 "
58.	CL 462-P: Snow, 1.18 gal., 0.60" equivalent, collected 1030, March 21 to 1315, March 23.	23.2 ± 2.3	.11 "
59.	CL 477-P: Rain and snow, 4.92 gal., 2.56" equivalent, collected 1530, March 21 to 1000, April 4.	7.2 ± 0.5	.143 "
60.	CL 466-P: Snow, 0.34 gal., 0.17" equivalent, collected 1630, March 23 to 1030, March 28.	51.5 ± 4.1	.070 "
61.	CL 551-P: Rain, 0.70 gal., 0.36" equivalent, collected 0950, April 4 to 1400, April 14.	41.7 ± 2.7	.118 "
62.	CL 552-P: Rain, 0.69 gal., 0.35" equivalent, collected 0950, April 4 to 1400, April 14. Sample collected in tub covered with a plastic sheet with small central opening to eliminate blow-in of dry fall-out between rains.	49.5 ± 3.5	.136 "
63.	CL 562-P: Rain, 2.17 gal., 1.11" equivalent, collected 2100, April 14 to 1630, April 20.	24.7 ± 1.5	.209 "
64.	CL 563-P: Rain, 1.86 gal., 0.95" equivalent, collected 2100, April 14 to 1630, April 20. Sample collected in tub covered with plastic sheet with small central opening to eliminate blow-in of dry fall-out between rains.	18.5 ± 1.0	.138 "
65.	CL 617-P: Rain, 0.098 gal., 0.050" equivalent, collected 1800, April 28 to 0930, May 13.	685 ± 72	.27 "
66.	CL 619-P: Rain, 0.99 gal., 0.50" equivalent, collected 1800, April 28 to 0930, May 13.	73.5 ± 4.9	.24 "

B. Washington, D. C.

Collected at the Naval Research Laboratory. Samples were taken by direct fall into galvanized tubs on the roof of one of the NRL buildings. The precipitation in inches is that reported by the local Weather Bureau station for the period of sample collection. (See also air filter, gummed paper, and platinum screen collections made at the same location and during the same period.)

Table III

Sr^{90} CONCENTRATION, NRL RAIN COLLECTIONS, WASHINGTON, D.C.

Sample Number	Precipitation	Collection Period	Volume* (Liters)	D.P.M. Sr^{90} Total	D.P.M./ft^2
CL 488-P	0.42" rain 2" snow	1045-1200, 2/11/55 1200-1900, 2/11/55	10.05	61.5 ± 5.1	10.61 ± .88
CL 489-P	0.24" rain	1430-1600, 2/22/55	3.50	44.4 ± 2.9	7.65 ± .50
CL 490-P	0.61" rain	0100-1030, 2/23/55	8.37	28.2 ± 2.2	4.86 ± .38
CL 491-P	1.3" snow	1445-1830, 2/24/55	3.47	26.1 ± 1.3	4.50 ± .22
CL 492-P	0.14" rain	0430-0900, 2/27/55	1.67	13.8 ± 0.8	2.38 ± .14
CL 493-P	0.23" rain 0.22" rain	0900-1200, 3/1/55 2015-2330, 3/3/55	3.28 3.32	48.0 ± 2.9	8.27 ± .50
CL 494-P	0.55" rain 0.09" rain 0.69" rain	2000, 3/4—0400, 3/5/55 1900-2100, 3/5/55 2300, 3/5—1500, 3/6/55	9.96 11.3	94.0 ± 5.5	16.22 ± .95
CL 495-P	0.13" rain	1015-1215, 3/11/55	1.70	30.2 ± 2.1	5.21 ± .36
CL 496-P	0.24" rain 0.06" rain 0.15" rain	1300-1700, 3/15/55 0530-1700, 3/16/55 1515-1545, 3/16/55	4.20 1.85	58.5 ± 3.5	10.01 ± .60
CL 497-P	0.19" rain	0345-0815, 3/18/55	2.70	48.0 ± 2.9	8.27 ± .50
CL 498-P	0.58" rain 0.36" rain	0230-1100, 3/21/55 0100-0900, 3/22/55	8.95 4.50	60.7 ± 3.0	10.48 ± .52
				Total	88.5 ± 1.8

* Collections made in two new galvanized #2 wash tubs, 5.8 square feet collection area.

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Sample	dpm/gal
C. Pittsburgh Collected by the Nuclear Science and Engineering Corporation. Samples were taken by direct fall into galvanized tubs on the roof of the laboratory building. The precipitation in inches is that reported by the local Weather Bureau station for the period of sample collection.	
1. CL 681-P: Rain, PL-1-RW, 0.625 gal., 0.51", collected 1630, February 25, 1955 to 1430, March 1, 1955.	35.2 ± 5.1
2. CL 682-P: Rain and snow, PL-2-RW, 0.643 gal., 1.85" rain, 2.3" snow, collected 1430, March 1, 1955 to 1200, March 10, 1955.	38.5 ± 2.3
3. CL 683-P: Rain, PL-3-RW, 1.08 gal., 1.32", collected 1200, March 10, 1955 to 1730, March 17, 1955.	37.4 ± 2.2
4. CL 684-P: Rain and snow, PL-4-RW, 1.67 gal., 1.73" of which 1.3" is snow, collected 1730, March 17, 1955 to 1200, April 15, 1955.	4.2 ± 0.9
5. CL 685-P: Rain, PL-5-RW, 3.0 gal., 0.94", collected 1200, April 15, 1955 to 1200, April 20, 1955.	49.5 ± 4.0
6. CL 686-P: Rain, PL-6-RW, 7.0 gal., 2.17" rain, collected 1200, April 20, 1955 to 1200, April 25, 1955.	43 ± 2
7. CL 695-P: Rain, PL-8-RW, 0.96 gal., 0.29" collected 1200, April 25, 1955 to 1200, May 11, 1955.	112 ± 6
8. CL 696-P: Rain, PL-9-RW, 1.51 gal., 0.30", collected 1200, May 11, 1955 to 1200, May 14, 1955.	15.0 ± 0.7
9. CL 697-P: Rain, PL-10-RW, 0.85 gal., 0.28", collected 1200, May 14, 1955 to 1000, May 23, 1955.	93.5 ± 5.1
10. CL 698-P: Rain, PL-11-RW, 1.57 gal., 0.31", collected 1000, May 23, 1955 to 1030, May 24, 1955.	182 ± 10
11. CL 699-P: Rain, PL-12-RW, 0.83 gal., 0.44", collected 1030, May 24, 1955 to 1100, May 26, 1955.	40.5 ± 1.9
12. CL 700-P: Rain, PL-13-RW, 0.64 gal., 0.20", collected 1100, May 26, 1955 to 1100, May 31, 1955.	143 ± 7
13. CL 758-P: Rain, PL-14-RW, 14.5 gal., 2.72", collected 1100, May 31, 1955 to 1500, June 8, 1955.	11.6 ± 0.6
14. CL 759-P: Rain, PL-15-RW, 1.91 gal., 0.38", collected 1500, June 8, 1955 to 1000, June 11, 1955.	10.2 ± 0.4

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Sample	dpm/gal
15. CL 760-P: Rain, PL-16-RW, 3.18 gal., 0.60", collected 1000, June 11, 1955 to 1200, June 13, 1955.	42.1 ± 2.2
16. CL 800-P: Rain, PL-17-RW, 3.14 gal., 0.12", collected 1200, June 13, 1955 to 1500, June 23, 1955.	29.4 ± 2.9
17. CL 801-P: Rain, PL-18-RW, 0.63 gal., 0.34", collected 1500, June 23, 1955 to 1700, July 6, 1955.	122 ± 5
18. CL 802-P: Rain, PL-19-RW, 5.11 gal., 0.28", collected 1700, July 6, 1955 to 1200, July 10, 1955.	27.8 ± 2.1
D. Other Areas	
1. CL 17: Rain, 5 gal., Philippine Islands, collected by Univ. of Chicago Tritium Group (T-98) in March 1953.	7.76 ± 1.79
2. CL 129: Rain, Wellington, New Zealand, collected in the afternoon and evening, October 1, 1953.	
a. 5 gal.	0.30 ± 0.03
b. 5 gal.	0.23 ± 0.03
3. CL 323: Rain, Los Alamos, New Mexico, 2.16 gal., 0.17", collected by University of Chicago Tritium Group (T-203), 1430 to 1630, June 25, 1954.	30.4 ± 1.0
4. CL 332: Rain, Puebla, Mexico, 1.06 gal., collected by University of Chicago Tritium Group (T-237), September 8, 1954 to September 10, 1954.	2.70 ± 0.27
5. CL 333: Rain, Puebla, Mexico, 0.93 gal., collected by University of Chicago Tritium Group (T-238), October 12, 1954 to October 13, 1954.	≤ 0.69
6. CL 322: Rain, Valparaiso, Chile, 2.0 gal., collected by University of Chicago Tritium Group (T-179), April 5, 1954.	≤0.2

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VIII. Antarctic Snow

Snow cores and surface snow samples collected in Antarctica during January and February 1955. Arranged for by New York Operations Office and collected by Mr. Paul Humphrey of the U. S. Weather Bureau, Department of Commerce, Washington, D.C.. These samples were also analyzed for tritium by Dr. F. Begemann of the University of Chicago.

A. Snow core, Admiral Byrd Bay, 69°34'S, 00°41'W, collected February 19, 1955; core cross section: 7" x 7".

Sample #	Depth (feet)	Volume (liters)	DPM Sr^{90}/liter
CL 605	0 - 1	3.37	1.95 ± 0.20
CL 606	1 - 2	3.10	1.7 ± 0.2
CL 607	2 - 3	2.96	0.48 ± 0.04
CL 602	3 - 4	3.96	0.90 ± 0.06
CL 603	4 - 5	3.37	≤0.48
CL 604	5 - 6	3.70	0.29 ± 0.03

B. Snow core, Little America III, ~78°S, ~170°W, collected January 15, 1955; core cross section: 7" x 7".

Sample #	Depth (feet)	Volume (liters)	DPM Sr^{90}/liter
CL 608	0 - 1	2.67	0.34 ± 0.10
CL 609	1 - 2	2.56	1.35 ± 0.26
CL 610	2 - 3	2.96	0.5 ± 0.1
CL 611	3 - 6	7.65	≤ 0.30

C. Surface samples, 0-8" depth.

Sample #	Location	Collection Date	Volume (liters)	DPM Sr^{90}/liter
CL 612	Near Quonset, Little America III	1/15/55	11.30	3.2 ± 0.3
CL 613	½ mile east, Little America III	1/17/55	15.85	3.1 ± 0.7
CL 614	6 miles inland on ice shelf, Atka Bay, 70°35'S, 08°06'W	(Feb. 1955)	5.44	5.3 ± 0.5

Sample	dpm/gal

IX. Water other than Precipitation

A. United States

1.	CL 8: Sea water, 80 liters, Pacific Ocean, collected at Santa Monica, California by Dr. W. F. Libby, May 20, 1953.	1.0 ± 0.4
2.	CL 54: River water, 3.6 gal., Mississippi River at Memphis, Tennessee, collected by University of Chicago Tritium Group (#28), February 4, 1953.	1.13 ± 0.16
3.	CL 57: River water, 5.0 gal., Mississippi River at St. Louis, Missouri, collected by University of Chicago Tritium Group (#58), April 17, 1953.	0.77 ± 0.18
4.	CL 60: Tap water, 9.83 gal., University of Chicago (water from Lake Michigan), October 27, 1953.	0.39 ± 0.08
5.	CL 687-P: Tap water, 6.98 gal., Pittsburgh, Pennsylvania, collected by Nuclear Science and Engineering Corporation (PL-7-RW), in May 1955.	1.16 ± 0.08

B. Foreign

1.	CL 112: River water, 5.0 gal., Mosel River, Metz, France, collected by University of Chicago Tritium Group, September 7, 1953.	0 ± 0.05
2.	CL 113: River water, 5.0 gal., Seine River, Nogent, France, collected by University of Chicago Tritium Group, September 8, 1953.	0 ± 0.09
3.	CL 114: River water, 5.0 gal., Donau River, Ulm, Germany, collected by University of Chicago Tritium Group, September 12, 1953.	0 ± 0.07

C. CASTLE Sea Water — dpm/liter

Samples collected in area of heavy fall-out shortly after each of the last two shots of the Spring 1954 Pacific tests. Collected by Dr. T. Folsom, Scripps Institution of Oceanography and provided by the U.S. Naval Radiological Defense Laboratory. Complete information including collection data and horizontal and vertical fission product activity distribution data are presented in the report of CASTLE Project 2.7, "Distribution of Radioactive Fall-out by Survey and Analysis of Contaminated Sea Water," ITR-935, Secret, Restricted Data. (See Tables 4.2 and 4.3, ITR-935 for complete description of the following samples.)

1.	CL 473: Surface sample, Station 1, approximately 65 nautical miles downwind, 1436 Mike, May 6, 1954, collection time +34 hours.	165.0 ± 9.7

	Sample	dpm/liter
2.	CL 474: 50 meters depth, Station 1, approximately 65 nautical miles downwind, 1436 Mike, May 6, 1954, collection time +34 hours.	61.0 ± 6.4
3.	CL 475: Surface sample, Station 8, approximately 65 nautical miles downwind, 1525 Mike, May 9. 1954, collection time +106 hours.	323 ± 24
4.	CL 476: 50 meter depth, Station 8, approximately 65 nautical miles downwind, 1525 Mike, May 9, 1954, collection time +106 hours.	102 ± 4
5.	CL 650-P: Surface sample, Station 6, approximately 170 nautical miles downwind, 2225 Mike, May 7, 1954, collection time +66 hours.	23.2 ± 2.5
6.	CL 651-P: 25 meter depth, Station 6, approximately 170 nautical miles downwind, 2225 Mike, May 7, 1954, collection time +66 hours.	17.5 ± 1.6
7.	CL 652-P: 50 meter depth, Station 6, approximately 170 nautical miles downwind, 2225 Mike, May 7, 1954, collection time +66 hours.	9.10 ± 0.61
8.	CL 653-P: 100 meter depth, Station 6, approximately 170 nautical miles downwind, 2225 Mike, May 7, 1954, collection time +66 hours.	7.65 ± 0.59
9.	CL 655-P: 25 meter depth, Station 8, approximately 65 nautical miles downwind, 1525 Mike, May 9, 1954, collection time +106 hours.	74.1 ± 5.2
10.	CL 656-P: 100 meter depth, Station 8, approximately 65 nautical miles downwind, 1525 Mike, May 9, 1954, collection time +106 hours.	30.0 ± 2.1
11.	CL 657-P: Surface sample, Station 26, 1900 Mike, May 15, 1954, collection time ~30 hours.	167.0 ± 8.4
12.	CL 658-P: Surface sample, Station 28, 1925 Mike, May 15, 1954, collection time <30 hours.	90.0 ± 4.3
13.	CL 659-P: Surface sample, Station 54, 0500 Mike, May 15, 1954, collection time <30 hours.	259 ± 17
14.	CL 660-P: Surface sample, Station 57, 0140 Mike, May 15, 1954, collection time <30 hours.	260 ± 13

X. Air Concentration

A. Sr^{90} Air Concentration, Washington, D. C.

Sample Number	Collection Period	dpm $Sr^{90}/10^6 ft^3$
CL 204A	Oct. 2-6, 1953	41.1 ± 3.0
CL 204B	Oct. 6-9, 1953	30.5 ± 1.1
CL 130	Oct. 12-15, 1953	70.4 ± 12.0
CL 204C	Mar. 9-11, 1954	125 ± 5
CL 514-P	Apr. 3-5, 1954	91 ± 7
CL 204D	Apr. 5-8, 1954	18.6 ± 0.7
CL 204E	Apr. 8-10, 1954	6.35 ± 0.16
CL 204F	Apr. 10-12, 1954	258 ± 6
CL 515-P	Apr. 12-14, 1954	65.5 ± 4.6
CL 204G	Apr. 15-17, 1954	11.0 ± 0.5
CL 204H	Apr. 17-19, 1954	20.7 ± 0.6
CL 516-P	Apr. 29-May 1, 1954	32.2 ± 2.6
CL 517-P	May 11-13, 1954	31.3 ± 2.2
CL 518-P	May 24-26, 1954	216 ± 11
CL 519-P	June 1-3, 1954	68.3 ± 4.1
CL 520-P	July 16-17, 1954	47.0 ± 2.4
CL 521-P	July 24-26, 1954	73.5 ± 5.2
CL 522-P	July 26-29, 1954	48.0 ± 3.9
CL 401-P	Nov. 1-3, 1954	120 ± 7
CL 402-P	Dec. 1-2, 1954	103 ± 4
CL 411-P	Jan. 3-4, 1955	281 ± 6
CL 412-P	Feb. 5-6, 1955	127 ± 5
CL 413-P	Feb. 10-12, 1955	241 ± 10
CL 523-P	Feb. 22-23, 1955	202 ± 11

Sample Number	Collection Period	dpm $Sr^{90}/10^6 ft^3$
CL 524-P	March 3-4, 1955	270 ± 13
CL 525-P	March 7-8, 1955	394 ± 20
CL 526-P	March 13-14, 1955	267 ± 16
CL 527-P	March 16-17, 1955	310 ± 15
CL 528-P	March 22-23, 1955	393 ± 20
CL 529	March 27-28, 1955	24 ± 5

B. Sr^{90} Air Concentration, Kodiak, Alaska

Sample Number	Collection Period	dpm $Sr^{90}/10^6 ft^3$
CL 131	Nov. 18-23, 1953	8.53 ± 1.60
CL 205C	Feb. 9-15, 1954	9.15 ± 0.23
CL 205D	Feb. 15-18, 1954	1.22 ± 0.12
CL 205E	Feb. 18-22, 1954	4.77 ± 0.18
CL 403-P	Oct. 30-Nov. 1, 1954	23 ± 2
CL 404-P	Dec. 1-2, 1954	204 ± 18
CL 414-P	Jan. 1, 1955	264 ± 20
CL 415-P	Feb. 1-2, 1955	252 ± 25
CL 535-P	March 1-3, 1955	79 ± 10

C. Sr^{90} Air Concentration, Yokosuka, Japan

Sample Number	Collection Period	dpm $Sr^{90}/10^6 ft^3$
CL 417-P	Feb. 1-3, 1955	172 ± 25
CL 534-P	March 1-3, 1955	216 ± 20

D. Sr^{90} Air Concentration, Port Lyautey, Morocco

Sample Number	Collection Period	dpm $Sr^{90}/10^6 ft^3$
CL 206B	July 9-11, 1953	9.70 ± 0.45
CL 206C	July 11-13, 1953	38.6 ± 1.1
CL 206D	July 13-16, 1953	8.70 ± 0.33
CL 206A	Sept. 30-Oct. 1, 1953	20.1 ± 0.6
CL 206E	Nov. 2-9, 1953	8.10 ± 0.22
CL 405-P	Nov. 8-9, 1954	155 ± 14
CL 406-P	Dec. 3-4, 1954	214 ± 20
CL 416-P	Jan. 4-6, 1955	58.1 ± 10.0
CL 530-P	Feb. 28-Mar. 2, 1955	552 ± 110
CL 531-P	March 6-8, 1955	430 ± 60
CL 532-P	March 16-18, 1955	313 ± 40
CL 533-P	March 22-24, 1955	119 ± 25

E. Multiple Filters

Multiple filter collections were made by the Naval Research Laboratory, Washington, D.C., using a set of three filters in series, with flow rate maintained at 20 CFM. The two week collection volume is 4.0×10^5 cubic feet. The top filter, changed daily, is a viscose filter which gives 75% penetration of 1.0 μ particles and 85% penetration of 0.3 μ particles at this flow rate. The middle filter, also viscose, gives 25 and 50 percent penetration of 1.0 μ and 0.3 μ particles, respectively. The bottom filter is Army Chemical Corps Type 7 (asbestos filter) of very nearly 100% retention.

Table IV

MULTIPLE FILTER DATA

Sample Number	Filter	Collection Period	Comb. No. of Papers	D.P.M. Sr^{90} Total Frac.	% of Sr^{90} Activity
CL 539-P	Top - Mult. #1&2	1/31/55-2/14/55	14/1 d	23.0 ± 1.5	44.0
CL 540-P	Middle " "	" "	2/1 wk	13.9 ± 1.2	26.6
CL 541-P	Bottom " "	" "	2/1 wk	15.4 ± 1.0	29.4
CL 542-P	Top - Mult. #3&4	2/14/55-2/28/55	14/1 d	37.2 ± 2.1	51.9
CL 543-P	Middle " "	" "	2/1 wk	12.8 ± 0.8	17.8
CL 544-P	Bottom " "	" "	2/1 wk	21.7 ± 2.4	30.3

F. Platinum Screen Collections

This is a Naval Research Laboratory experimental collector. An uncharged platinum screen is mounted vertically and held normal to surface winds by a large vane. Two week total activity collections made by NRL with this collector range up to that for 0.5×10^6 cubic feet of air. For individual twenty-four hour periods, total activities as high as 20 times that for gummed paper collectors have been observed.

Sample	Total Sr^{90} in dpm
1. CL 536-P: 1.0 sq. ft., 80 mesh platinum screen, Washington, D.C., collected 1600, February 14, 1955 to 1600, February 21, 1955.	26.0 ± 1.7
2. CL 537-P: 1.0 sq. ft., 80 mesh platinum screen, Washington, D. C., collected 1600, February 21, 1955 to 1600, February 28, 1955.	14.9 ± 0.8
3. CL 538-P: 1.0 sq. ft., 80 mesh platinum screen, Washington, D.C., collected 1600, February 28, 1955 to 1600, March 7, 1955.	37.2 ± 1.6

XI. Gummed Paper Collections: Collected by Naval Research Laboratory using standard NYOO gummed papers, changed daily. Location and collection period same as for NRL rains (see Table III, page 53).

Table V

Sr^{90} CONCENTRATION, NRL GUMMED PAPER COLLECTIONS
WASHINGTON, D. C.

Sample Number	NRL GP #	Date	Collection Time	Total Sr^{90} (dpm/ft^2)
CL 499-P	2	2/7/55-2/14/55	7.0 days	2.2 ± 0.3
CL 500-P	3	2/14/55-2/21/55	7.0 days	1.9 ± 0.2
CL 501-P	4	2/21/55-2/28/55	7.0 days	2.2 ± 0.3
CL 502-P	5	2/28/55-3/7/55	7.0 days	3.1 ± 0.3
CL 503-P	6, 7 & 8	3/7/55-3/10/55	3.0 days	2.6 ± 0.3
CL 504-P	9	3/10/55-3/11/55	1.0 day	1.3 ± 0.2
CL 505-P	10, 11 & 12	3/11/55-3/14/55	3.0 days	4.0 ± 0.5
CL 506-P	13 & 14	3/14/55-3/16/55	2.0 days	1.9 ± 0.2
CL 507-P	15	3/16/55-3/17/55	1.0 day	2.8 ± 0.4
CL 508-P	16	3/17/55-3/18/55	1.0 day	2.7 ± 0.3
CL 509-P	17 & 18	3/18/55-3/20/55	51.75 hours	0.64 ± 0.16
CL 510-P	19 & 20	3/20/55-3/22/55 (one day missing)	2.0 days	2.2 ± 0.3
CL 511-P	21 & 22	3/23/55-3/25/55	2.0 days	≤0.3
CL 512-P	23	3/25/55-3/26/55	28 hours	2.9 ± 0.3
CL 513-P	24 & 25	3/26/55-3/27/55	2.0 days	1.9 ± 0.2
			Total	32.6 ± 1.2