RADIOACTIVITY SURVEY DATA in Japan

NUMBER 3

MAY 1964

National Institute of Radiological Sciences

Chiba, Japan

In April 1963, in compliance with directives set forth by the Japan Atomic Energy Commission, the Division of Radioactivity Survey, National Institute of Radiological Sciences was directed to:

1. Collect, record and maintain information on radiation from National and International sources.
2. Analyze the information collected.
3. Establish a radiation survey information exchange center.

As a part of the assignment, data from the Nationwide Radioactivity Survey Network were assembled and compiled in this publication. Present plans are to issue this type of publication on a quarterly basis.

For further information on any subject reported in this issue, readers are referred to the contributors indicated in the table headings.

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Contents

National Institute of Radiological Sciences

Meteorological Data

Monthly and Cumulative Deposition of Strontium-90 and Cesium-137

(Meteorological Research Institute, Tokyo)

Since 1954, rain water and falling dust have been collected monthly in a receiver (collection area, 1 m^2) at the Meteorological Research Institute and the content of strontium-90 and cesium-137 are radiochemically determined. The samples collected monthly (receiver collection area, 0.5m^2) at 6 different stations in Japan were also analyzed.

The results of observation of strontium-90 and cesium-137 during the period from January 1961 to December 1963 are shown in Table 1. Table 2 gives the annual deposition of these radionuclides at the Meteorological Research Institute during the period from 1954 to 1963. The total cumulative deposition of strontium-90 and cesium-137 reached the levels of 54.0 and 151.8 mc/km^2 respectively at the end of December 1963 at the Meteorological Research Institute in Tokyo, as shown in Figure 1.

Table 1. Monthly Deposition of ^{90}Sr and ^{137}Cs —1961 to 1963—

By Y. Miyake, K. Saruhashi, Y. Katsuragi and T. Kanazawa
(Meteorological Research Institute)

Tokyo (Meteorological Research Institute)
Geographical Location 35°42′ N, 139°39′ E
Receiver Collection Area, 1 m^2

	^{90}Sr mc/km^2			^{137}Cs mc/km^2			$^{137}Cs/^{90}Sr$			Precipitation mm		
	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan	0.03	0.19	0.11	0.09	0.89	0.19	3.0	4.7	1.7	32	32	0
Feb	0.04	0.22	0.31	0.09	0.78	0.71	2.2	3.5	2.3	39	15	21
Mar	0.17	0.58	2.58	0.20	1.89	4.85	1.2	3.3	1.9	103	58	85
Apr	0.20	1.08	1.16	0.37	3.16	3.42	1.9	2.9	3.0	167	113	79
May	0.13	1.63	2.66	0.23	3.97	5.58	1.8	2.4	2.1	49	185	119
Jun	0.31	1.21	4.59	0.57	4.18	14.8	1.8	3.5	3.2	299	204	240
Jul	0.05	0.80	2.24	0.11	1.60	5.09	2.2	2.0	2.3	20	155	126
Aug	0.02	0.29	1.89	0.08	0.70	7.09	4.0	2.4	3.8	28	103	417
Sep	0.05	0.10	1.66	0.30	0.31	5.33	6.0	3.1	3.2	87	4	157
Oct	0.60	0.58	1.47	3.22	1.73	4.28	5.4	2.6	2.9	313	82	315
Nov	0.25	1.00	0.23	1.37	2.02	0.53	5.5	2.0	2.3	53	142	79
Dec	0.23	0.41	0.16	0.71	0.69	0.42	3.1	1.7	2.6	44	62	20
Total	2.08	8.09	19.06	7.34	21.92	52.29	3.5	2.7	2.7	1232	1153	1658

Note: Data during the period from Jan 61 to Jul 63 were published in a previous edition of this publication.

Table 1. Monthly Deposition of ^{90}Sr and ^{137}Cs —1961 to 1963— *(continued)*

Tokyo (Tokyo District Central Meteorological Observatory)
Geographical Location 35°41′ N, 139°46′ E (4.1 m)
Receiver Collection Area, 0.5 m^2

	^{90}Sr mc/km^2			^{137}Cs mc/km^2			$^{137}Cs/^{90}Sr$			Precipitation mm		
	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan	0.04	0.18	0.11	0.10	0.65	0.60	2.5	3.6	5.5	39	41	0
Feb	0.06	0.10	0.30	0.15	0.53	1.02	2.5	5.3	3.4	44	14	21
Mar	0.18	0.26	2.05	0.75	0.78	6.29	4.2	3.0	3.1	107	66	87
Apr	0.12	0.89	2.43	0.34	2.57	5.81	2.8	2.9	2.4	183	124	76
May	0.13	2.21	1.59	0.20	3.84	5.24	1.5	1.7	3.3	69	212	136
Jun	0.27	0.93	4.47	0.92	3.86	14.3	3.4	4.2	3.2	295	247	248
Jul	0.07	1.39	2.43	0.22	1.70		3.1	1.2		26	165	66
Aug	0.02	0.05	1.58	0.08	0.29		4.0	5.8		31	50	382
Sep	0.03	0.13	1.61	0.12	0.27		4.0	2.1		37	5	146
Oct	0.35	0.23	1.89	0.60	1.46		1.7	6.3		338	120	292
Nov	0.25	1.26	0.39	0.32	2.88		1.3	2.3		51	152	91
Dec	0.19	0.50	0.49	0.60	1.50		3.2	3.0		41	63	30
Total	1.71	8.13	19.34	4.40	20.33		2.6	2.5		1261	1259	1575

Sapporo (Sapporo District Central Meteorological Observatory)
Geographical Location 43°03′ N, 141°20′ E (16.9 m)
Receiver Collection Area, 0.5 m^2

	^{90}Sr mc/km^2			^{137}Cs mc/km^2			$^{137}Cs/^{90}Sr$			Precipitation mm		
	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan		0.95	0.96		1.39	1.99		1.5	2.1	89	135	68
Feb	0.56	0.92	0.78	0.79	1.55	1.80	1.4	1.7	2.3	105	68	60
Mar		0.82	1.85		2.57	5.71		3.1	3.1	72	92	62
Apr		0.39	2.18		1.19	6.43		3.1	2.9	30	70	94
May	0.10	0.99	3.07	0.42	1.58	8.06	4.2	1.6	2.6	92	21	73
Jun		1.34	1.20		3.37	4.18		2.5	3.5	33	56	84
Jul	0.42	0.68	2.80	0.93	0.92		2.2	1.4		193	124	99
Aug		1.31	2.15		1.87			1.4		99	357	81
Sep	0.21	0.60	3.14	0.34	1.34		1.6	2.2		155	107	214
Oct	0.24	0.48	1.14	0.41	0.88		1.7	1.8		94	19	91
Nov	0.35	0.92	1.08	0.70	1.66		2.0	1.8		74	78	113
Dec	0.35	1.18	0.91	0.66	2.49		1.9	2.1		53	100	98
Total	2.23	10.58	21.26	4.25	20.81		1.9	2.0		1089	1227	1137

Table 1. Monthly Deposition of ^{90}Sr and ^{137}Cs —1961 to 1963— *(continued)*

Sendai (Sendai District Central Meteorological Observatory)
Geographical Location 38°16′ N, 140°54′ E (38.4 m)
Receiver Collection Area, 0.5 m²

	^{90}Sr mc/km²			^{137}Cs mc/km²			$^{137}Cs/^{90}Sr$			Precipitation mm		
	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan		0.15	0.53		0.30	1.81		2.0	3.4	58	68	32
Feb	0.32	0.31	0.49	0.79	0.64	1.73	2.5	2.1	3.5	45	27	40
Mar		0.10	2.12		0.30	8.31		3.0	3.9	36	50	109
Apr		0.73	1.45		2.44	6.55		3.3	4.5	105	86	60
May	0.34	1.81	1.14	0.76	4.01	3.49	2.2	2.2	3.1	64	98	34
Jun		1.25	3.28		3.19	13.5		2.6	4.1	205	115	143
Jul	0.13	2.08	3.87	0.58	3.74		4.5	1.8		92	148	155
Aug		0.87	0.80		1.49			1.7		143	165	138
Sep	0.13	0.75	1.05	0.29	1.37		2.2	1.8		133	106	48
Oct	0.50	0.67	0.85	1.12	1.21		2.2	1.8		226	85	147
Nov	0.20	0.60	0.77	0.61	0.88		3.0	1.5		86	40	119
Dec	0.29	0.80	0.65	0.48	1.52		1.7	1.9		92	64	23
Total	1.91	10.12	17.00	4.63	21.09		2.4	2.1		1285	1052	1048

Akita (Akita District Meteorological Observatory)
Geographical Location 39°43′ N, 140°06′ E (9.1 m)
Receiver Collection Area, 0.5 m²

	^{90}Sr mc/km²			^{137}Cs mc/km²			$^{137}Cs/^{90}Sr$			Precipitation mm		
	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan		0.59	5.58		1.10	14.7		1.9	2.6	158	146	196
Feb	0.82	1.31	4.03	2.05	3.27	13.1	2.5	2.5	3.3	159	129	104
Mar		1.14	4.10		3.14	9.88		2.8	2.4	48	89	82
Apr		1.03	3.40		1.95	10.7		1.9	3.1	132	128	169
May	0.54	0.85	3.46	1.64	2.08	16.3	3.0	2.4	4.7	146	92	228
Jun		1.10	2.90		2.86	15.5		2.6	5.3	142	159	111
Jul	0.18	0.36	3.75	0.68	1.59		3.8	4.4		276	88	215
Aug		0.75	3.26		1.19			1.6		167	255	269
Sep	0.04	0.50	2.42	0.09	1.30		2.2	2.7		327	137	184
Oct	0.18	1.43	1.22	0.40	2.56		2.2	1.8		99	121	149
Nov	0.69	2.20	1.27	1.12	3.02		1.6	1.4		202	138	187
Dec	1.35	3.37	4.89	2.97	7.60		2.2	2.3		183	183	180
Total	3.80	14.63	40.28	8.95	31.66		2.4	2.2		2039	1665	2074

Table 1. Monthly Deposition of ^{90}Sr and ^{137}Cs —1961 to 1963— *(continued)*

Osaka (Osaka District Central Meteorological Observatory)

Geographical Location 34°39′ N, 135°32′ E (6.7 m)

Receiver Collection Area, 0.5 m^2

	^{90}Sr mc/km^2			^{137}Cs mc/km^2			$^{137}Cs/^{90}Sr$			Precipitation mm		
	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan		0.15	0.50		0.19	1.18		1.3	2.4	40	13	21
Feb	0.12	0.38	0.29	0.25	0.51	1.33	2.1	1.3	4.6	36	19	33
Mar		0.31	1.53		1.86	4.87		6.0	3.2	112	36	114
Apr		0.34	0.99		1.76	2.83		5.2	2.9	137	137	148
May	0.36	0.63	2.68	0.77	2.18	9.57	2.1	3.5	3.6	114	127	361
Jun		0.84	3.39		1.66	13.2		2.0	3.9	354	372	208
Jul	0.10	0.52	1.65	0.16	1.04		1.6	2.0		99	190	70
Aug		0.11	0.78		0.15			1.4		69	59	192
Sep	0.02	0.07	0.53	0.09	0.34		4.5	4.9		86	44	103
Oct	0.10	0.19	0.48	0.31	0.65		3.1	3.4		318	73	102
Nov	0.13	0.34	0.25	0.39	0.51		3.0	1.5		64	82	37
Dec	0.22	0.47	0.72	0.52	1.43		2.4	3.0		41	56	23
Total	1.05	4.35	13.79	2.49	12.28		2.4	2.8		1470	1208	1412

Fukuoka (Fukuoka District Central Meteorological Observatory)

Geographical Location 33°35′ N, 130°23′ E (2.1 m)

Receiver Collection Area, 0.5 m^2

	^{90}Sr mc/km^2			^{137}Cs mc/km^2			$^{137}Cs/^{90}Sr$			Precipitation mm		
	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan		1.58	3.29		5.31	8.99		3.4	2.7	48	102	121
Feb	0.18	0.81	1.07	0.45	2.80	3.40	2.5	3.5	3.2	43	45	60
Mar		0.84	2.09		3.05	4.25		3.6	2.0	122	53	84
Apr		1.35	2.18		2.85	6.02		2.1	2.8	98	75	170
May	0.53	0.41	3.51	0.78	0.77	10.05	1.5	1.9	2.9	154	141	496
Jun		2.11	3.06		2.64	9.64		1.3	3.2	92	322	504
Jul	0.10	0.95	0.81	0.16	1.14		1.6	1.2		158	352	222
Aug		0.33	1.04		0.47			1.4		139	168	319
Sep	0.11	0.15	0.15	0.35	0.40		3.2	2.7		212	161	114
Oct	0.72	0.44	0.67	1.69	1.23		2.3	2.8		260	116	74
Nov	0.22	0.69	0.55	0.44	1.35		2.0	2.0		70	115	63
Dec	0.94	2.70	1.55	1.73	4.89		1.8	1.8		68	132	73
Total	2.80	12.36	19.30	5.60	26.90		2.0	2.2		1464	1782	2300

Table 2. Annual Deposition of ^{90}Sr and ^{137}Cs in Tokyo
-At MRI-

Year	^{90}Sr mc/km^2	^{137}Cs mc/km^2
1954	1.0	
1955	0.7	29.0
1956	3.8	
1957	3.4	
1958	5.3	11.4
1959	8.1	23.6
1960	2.4	6.2
1961	2.1	7.3
1962	8.1	21.9
1963	19.1	52.3
Total	54.0	151.7

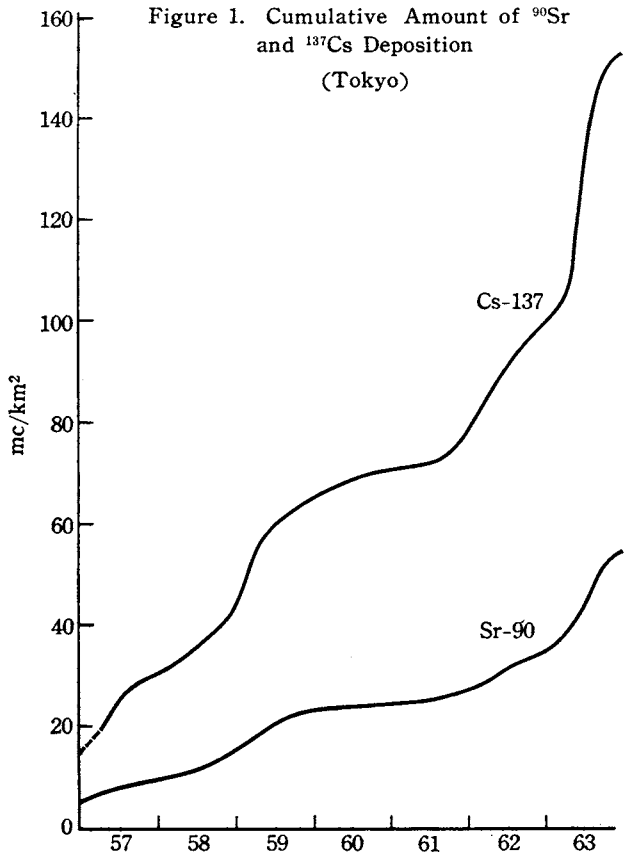
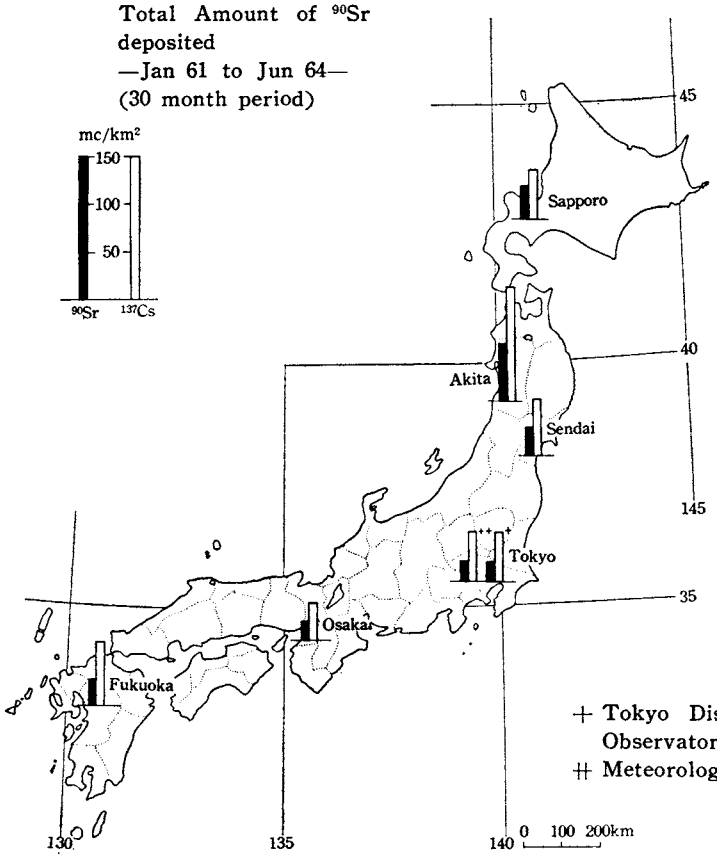


Figure 2. Sampling Locations and Total Amount of ^{90}Sr deposited
—Jan 61 to Jun 64—
(30 month period)



+ Tokyo District Central Meteorological Observatory
# Meteorological Research Institute, Tokyo

Water Data

Strontium-90 and Cesium-137 in Potable Rain Water

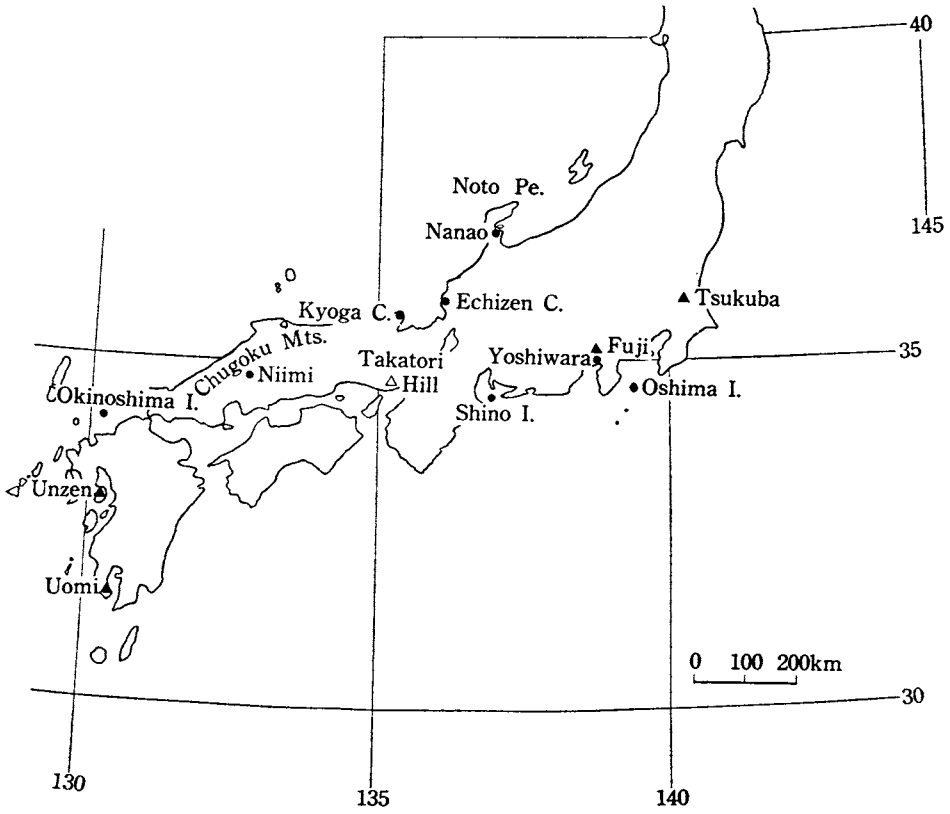
Part I *(National Institute of Radiological Sciences)*

As a Part of the special radioactivity survey program subsequent to the resumption of nuclear tests in September of 1961, the strontium-90 content in potable rain water collected from 12 prefectural public health laboratories was determined at the National Institute of Radiological Sciences. This project was carried out during the period November 1961 to March 1962.

Two to ten liter samples taken from potable rain water tanks were collected once a month by the prefectural public health laboratories, and sent to the National Institute of Radiological Sciences for strontium-90 analysis. After pretreatment for concentration, the samples were analyzed by the fuming nitric acid method.

Results obtained are shown in Table 3.

Figure 3. Sampling Location —Potable Rain Water Part I—



Tabel 3. ^{90}Sr in Potable Rain Water —Dec 61 to Mar 62—

By N. Mochizuki, G. Tanaka, Y. Kurosawa, Y. Suzuki and S. Yoshizawa
(National Institute of Radiological Sciences)

Location	Tank			Strontium-90 $\mu\mu c/l$			
	Capacity (m^3)	Cover	Filter	Dec 61	Jan 62	Feb 62	Mar 62
Top of Mt. Tsukuba, (IBARAGI)	6	yes	yes	3.4	1.2	1.0	4.7
Izu-oshima Island, (TOKYO)	—	—	no	3.7	5.2	10.4	14.0
Nanao, Noto Pe., (ISHIKAWA)	0.2	yes	no	—	10.3	9.3	—
Cape Echizen, (FUKUI)	15.2	—	yes	2.3	3.6	4.8	4.0
Yoshiwara, Foot of Mt. Fuji, (SHIZUOKA)	3.7	yes	no	1.6	—	1.0	—
Shino Island, (AICHI)	—	no	no	—	5.0	—	6.1
Cape Kyoga, (KYOTO)	8	yes	yes	1.7	1.6	1.4	9.0
Top of Takatori Hill, (HYOGO)	1.7	yes	no	0.8	1.5	2.0	5.5
Niimi, Chugoku Mts., (OKAYAMA)	15.6	yes	yes	0.6	1.6	1.3	5.5
Okino Island, (FUKUOKA)	6.7	yes	—	0.7	1.0	6.6	7.0
Mt. Unzen, (NAGASAKI)	10	yes	—	0.6	3.0	7.3	16.4
Top of Mt. Uomi, (KAGOSHIMA)	32	yes	yes	1.1	—	3.9	7.3

Part II *(Hydrographic Division, Maritime Safety Agency)*
(National Institute of Hygienic Sciences)

Since December 1961, potable rain water used by residents of beacon lighthouses has been analyzed for strontium-90 content by the Hydrographic Division of the Maritime Safety Agency. In April 1962, this work has been transferred to the National Institute of Hygienic Sciences.

Samples were collected in polyethylene bottles at 14 beacon lighthouses once a month during the period December 1961 to March 1963. However, since April 1963, the number of sampling locations were reduced to seven and the frequency of sampling reduced to once every other month. Ten liter samples each of potable rain water, with and without filteration through sand and charcoal, were sent from each beacon lighthouse.

The analytical method applied was the method recommended by the Science and Technology Agency.

Results obtained during the period December 1961 to March 1962 by the Hydrographic Division of the Maritime Safety Agency are shown in Table 4, and those obtained during the period April 1962 to Feburuary 1964 by the National Institute of Hygienic Sciences are shown in Table 5.

Figure 4. Sampling Location —Potable Rain Water Part II—

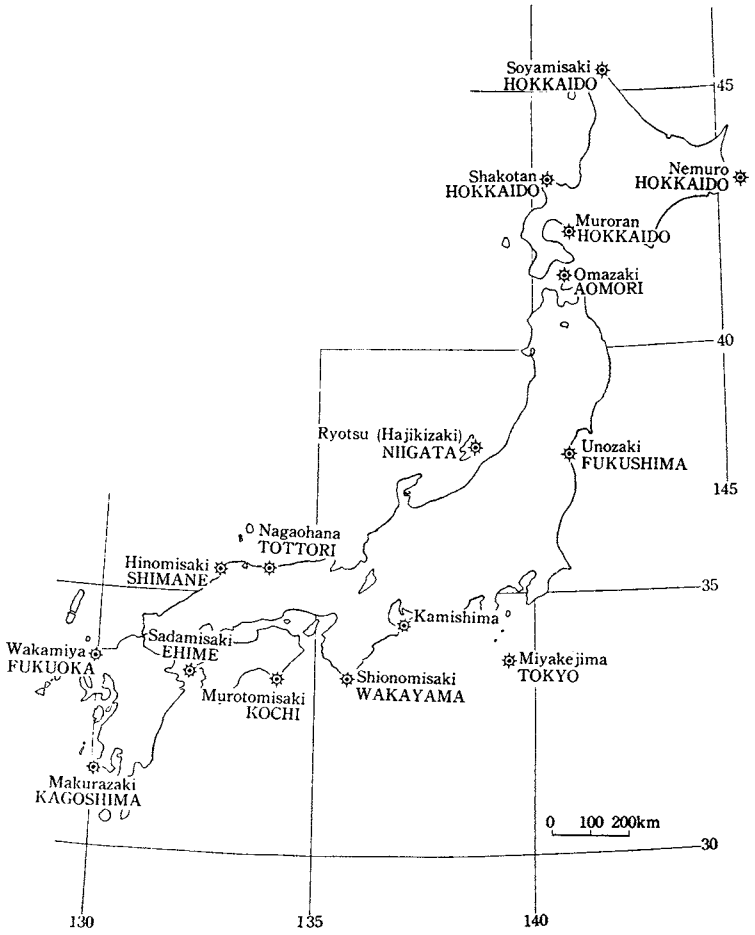


Table 4. ^{90}Sr in Potable Rain Water —Dec 61 to Mar 62—

By R. Higano and Y. Seto

(Hydrographic Division, Maritime Safety Agency)

Beacon Lighthouse	^{90}Sr $\mu\mu c/l$			
	Dec 61	Jan 62	Feb 62	Mar 62
Soyamisaki	0.1	0.9	6.5	1.0
	0.3	0.0	0.1	0.1
Nemuro	—	—	—	—
	0.1	0.1	0.4	0.1
Shakotan	0.2	0.0	0.2	0.1
	0.1	0.5	0.2	0.4
Muroran	3.2	0.3	2.3	—
	—	1.6	2.3	—
Omazaki	2.6	7.2	13	5.7
	1.8	2.4	4.5	3.0
Unozaki	1.3	1.4	2.0	1.6
	2.2	1.7	1.7	1.0
Miyakejima	1.2	1.3	3.8	2.7
	1.7	1.4	1.8	1.8

Beacon Lighthouse	^{90}Sr $\mu\mu c/l$			
	Dec 61	Jan 62	Feb 62	Mar 62
Ryotsu	2.3	4.2	4.8	5.7
	2.2	2.6	2.3	2.5
Kamishima	2.3	2.5	3.4	7.9
	0.5	0.5	0.6	2.0
Shionomisaki	1.4	1.1	1.4	1.7
	0.9	0.6	0.4	0.5
Hinomisaki	2.8	4.1	13	—
	2.8	7.1	8.2	—
Sadamisaki	0.6	—	5.8	3.5
	1.0	—	15	9.1
Wakamiya	1.4	161	5.7	8.9
	1.3	2.4	2.9	2.9
Makurazaki	4.7	6.5	14	2.2
	1.1	2.5	2.3	0.1

Note: Measurements from the original and filtrated water samples are indicated in the upper and lower lines respectively

Table 5. ^{90}Sr in Potable Rain Water —Apr 62 to Feb 64—

By K. Nagasawa, G. Urakubo and K. Kametani
(National Institute of Hygienic Sciences)

Lighthouse	Date			Original		Filtrate	
				Residue g/l	^{90}Sr $\mu\mu c/l$	Residue g/l	^{90}Sr $\mu\mu c/l$
Soyamisaki	16	Apr	62	0.464	0.49	0.508	0.42
	19	May	62	0.239	0.04	0.202	0.04
	21	Jun	62	0.287	0.37	0.353	0.14
	31	Jul	62	0.227	0.10	0.257	0.18
	4	Sep	62	0.103	0.21	0.163	0.18
	26	Sep	62	0.154	0.29	0.287	0.30
	27	Oct	62	0.206	0.21	0.164	0.03
	23	Nov	62	1.568	0.24	0.171	0.09
	21	Dec	62	0.173	0.26	0.201	0.07
	29	Jan	63	—	5.79	—	0.10
	28	Feb	63	0.750	11.89	0.202	0.09
	4	Mar	63	0.160	0.16	—	0.42
	30	May	63	0.163	1.88	0.183	0.21
		Jul	63	0.184	0.45	0.218	0.26
		Sep	63	0.180	0.35	0.212	0.14
		Nov	63	0.391	0.24	0.190	0.13
		Jan	64	0.391	0.08	0.190	0.23
Nemuro	25	Apr	62	—	0.04	—	0.03
	18	Jun	62	—	3.76	0.038	0.04
	21	Jul	62	0.585	3.78	0.948	2.56
	30	Aug	62	0.555	0.16	0.607	0.25
	22	Sep	62	0.151	0.50	0.706	0.08
	20	Oct	62	0.530	0.12	0.711	0.12
	25	Nov	62	—	0.08	—	0.09
		Dec	62	0.202	8.81	0.201	0.15
	16	Jan	63	—	0.05	—	0.12
	25	Feb	63	—	0.35	—	0.25
	25	Mar	63	0.235	3.29	0.524	0.04
Shakotan	18	Apr	62	0.176	0.12	0.175	0.29
	20	May	62	0.253	1.41	0.312	0.18
	21	Jun	62	0.400	0.20	0.461	0.25
	25	Jul	62	—	0.26	—	0.15
	25	Aug	62	0.227	0.26	0.221	0.15
		Sep	62	—	0.14	—	0.09
		Oct	62	0.359	0.09	—	0.13
	25	Nov	62	0.257	0.10	0.256	0.06
	5	Jan	63	0.240	0.08	0.256	0.08
	29	Jan	63	0.356	0.10	0.426	0.09
		Feb	63	—	0.29	—	0.32
		Mar	63	—	0.29	—	0.32
		Apr	63	0.279	0.09	0.319	0.14
Muroran		Apr	62	0.575	3.56	0.524	3.06
	17	May	62	—	4.50	—	1.36
	24	Jun	62	2.355	18.72	0.750	2.85
	20	Jul	62	0.313	9.29	0.384	2.57
	23	Aug	62	0.467	5.22	0.135	1.77
	18	Sep	62	—	3.87	—	1.02
	22	Oct	62	0.182	11.61	0.224	0.18
	28	Nov	62	0.441	4.29	0.455	0.12
		Dec	62	0.352	2.77	0.441	2.36
	23	Jan	63	0.642	2.35	0.612	2.36
	26	Feb	63	0.345	26.46	0.525	2.51
	24	Mar	63	0.629	9.21	0.147	2.44
Omazaki	7	May	62	0.510	1.20	0.292	4.70
	4	Jun	62	0.627	6.47	—	1.07
	4	Aug	62	0.241	5.56	0.361	2.78
	24	Aug	62	0.310	6.24	0.366	3.72
	29	Sep	62	—	2.34	—	3.13
	24	Oct	62	0.242	2.41	0.310	3.46
	29	Nov	62	0.345	3.58	0.364	4.73
		Dec	62	—	4.45	0.376	5.92
	26	Jan	63	0.478	4.84	0.417	8.56
	1	Mar	63	0.430	8.89	0.475	8.33

Table 5. ^{90}Sr in Potable Rain Water —Aar 62 to Feb 64— *(continued)*

Lighthouse	Date			Original		Filtrate	
				Residue g/*l*	^{90}Sr $\mu\mu c/l$	Residue g/*l*	^{90}Sr $\mu\mu c/l$
Ryotsu	18	Apr	62	—	2.96	—	0.04
	17	May	62	—	0.53	—	3.54
	19	Jun	62	0.438	10.41	0.272	3.91
	20	Jul	62	0.390	7.68	0.253	3.90
	18	Aug	62	0.223	9.35	0.072	4.38
	18	Sep	62	0.148	3.75	0.304	4.64
	20	Oct	62	0.116	3.85	—	4.55
	19	Nov	62	0.090	5.64	0.127	4.78
	17	Dec	62	0.210	11.32	0.145	5.31
	24	Jan	63	0.297	13.23	0.319	13.13
	10	Mar	63	0.842	29.19	0.390	6.60
	25	Mar	63	0.215	12.12	0.326	12.63
	14	Apr	63	0.237	6.71	0.331	—
	20	Jul	63	0.114	8.37	0.154	4.24
	31	Aug	63	0.148	4.25	0.105	11.06
	16	Oct	63	—	13.30	—	3.13
	17	Dec	63	—	12.17	—	8.50
	22	Feb	64	0.258	7.24	—	4.43
Unozaki	25	Apr	62	0.226	3.25	0.499	1.20
	25	May	62	0.902	9.02	0.923	1.61
	25	Jun	62	0.313	5.13	0.533	2.01
	26	Jul	62	0.297	4.14	0.667	—
	27	Aug	62	0.113	2.61	0.504	1.27
	25	Oct	62	0.344	4.62	0.524	1.22
	25	Nov	62	0.192	4.40	0.392	1.39
	25	Dec	62	0.313	5.83	0.373	1.96
		Jan	63	—	4.13	—	2.52
		Feb	63	0.232	11.11	—	2.40
Miyakejima	19	Apr	62	—	2.07	—	3.62
	15	May	62	0.184	5.42	0.403	1.48
	25	Jun	62	0.365	13.76	0.503	6.61
	24	Sep	62	0.145	5.44	0.350	1.34
	20	Oct	62	0.520	3.71	—	4.20
	15	Nov	62	0.304	1.65	0.300	1.48
	15	Dec	62	0.361	7.57	0.323	3.59
	15	Jan	63	0.423	8.12	0.270	3.54
	16	Feb	63	—	10.71	—	5.28
	16	Mar	63	1.016	17·46	1.200	18.17
	25	Apr	63	0.577	5.93	0.480	4.65
	16	Jun	63	0.413	5.17	0.215	4.52
	19	Aug	63	0.104	3.51	0.141	2.83
	19	Oct	63	—	6.34	—	5.20
	24	Dec	63	—	1.62	—	6.74
	18	Feb	64	0.134	6.70	0.240	5.37
Kamishima	25	Apr	62	0.211	0.70	—	2.27
	17	May	62	0.092	22.21	0.217	1.35
	22	Jun	62	—	—	0.267	2.53
	23	Jun	62	0.062	11.30	—	—
	21	Jul	62	4.663	2.25	0.297	1.60
		Aug	62	0.090	1.79	0.209	4.58
	24	Sep	62	0.325	8.84	0.251	1.73
	25	Oct	62	0.241	4.81	0.247	1.88
		Nov	62	0.037	3.42	0.185	1.35
		Dec	62	0.202	2.29	0.067	4.95
		Jan	63	0.205	1.36	0.329	2.40
		Feb	63	—	8.63	—	2.24
		Mar	63	—	8.41	0.194	2.96
Nagaohana	18	Apr	62	0.103	12.48	0.152	11.81
	23	May	62	0.099	2.00	0.212	1.70
	21	Jun	62	0.078	16.57	0.322	6.72
	29	Jul	62	0.224	8.50	0.347	1.42
	19	Aug	62	0.028	6.69	0.221	1.04
	21	Sep	62	0.108	6.70	—	—
	22	Sep	62	—	—	0.278	0.58
	25	Oct	62	0.139	11.63	—	0.99
	20	Nov	62	0.128	0.61	0.273	10.51
	28	Dec	62	0.186	14.62	0.274	3.04

Table 5. ^{90}Sr in Potable Rain Water —Apr 62 to Feb 64— *(continued)*

Lighthouse	Date			Original Residue g/l	Original ^{90}Sr $\mu\mu c/l$	Filtrate Residue g/l	Filtrate ^{90}Sr $\mu\mu c/l$
	23	Jan	63	0.474	17.91	0.548	15.25
	27	Feb	63	0.560	26.97	0.260	13.89
	24	Mar	63	0.097	32.15	0.144	4.63
	30	Apr	63	0.010	5.37	0.273	4.07
	19	May	63	0.017	3.22	0.164	3.73
	12	Sep	63	—	0.58	—	14.31
	9	Oct	63	—	1.26	—	0.43
Shionomisaki		Apr	62	—	0.79	—	0.64
		May	62	0.097	3.47	0.275	—
		Jun	62	0.152	3.65	0.384	1.87
		Jul	62	0.355	2.52	0.619	2.50
		Aug	62	0.093	2.89	0.270	2.62
		Sep	62	0.226	4.41	0.283	0.98
		Oct	62	0.174	3.20	0.291	2.19
	17	Nov	62	0.104	3.49	0.296	0.83
		Dec	62	0.155	4.41	0.363	0.84
		Jan	63	0.255	6.77	0.149	1.36
	22	Feb	63	0.205	6.24	0.270	1.16
	18	Mar	63	0.056	4.90	0.289	1.53
Murotomisaki	18	May	62	—	1.10	—	1.84
	21	Jun	62	0.037	24.59	0.216	1.05
	27	Jul	62	1.784	9.52	0.101	2.78
	26	Aug	62	0.362	18.29	0.059	5.85
		Sep	62	—	2.50	—	2.49
	20	Oct	62	0.243	7.93	—	0.94
	15	Nov	62	0.090	3.45	0.089	1.13
	17	Dec	62	—	30.20	0.129	2.41
	24	Jan	63	0.509	25.33	0.131	2.53
	16	Feb	63	0.349	11.18	—	3.51
	18	May	63	4.847	47.97	0.105	2.06
	17	Jul	63	0.735	13.02	0.115	4.11
	15	Sep	63	0.935	19.31	0.084	7.72
	22	Nov	63	0.272	7.59	0.092	3.09
	29	Jan	64	—	70.80	—	0.16
Wakanomiya	25	Apr	62	—	3.32	—	0.52
	25	May	62	0.202	0.42	0.210	0.54
	21	Jun	62	—	13.02	—	12.42
	21	Jul	62	0.088	6.08	0.199	2.42
	24	Aug	62	0.077	1.55	0.176	1.99
	17	Sep	62	0.078	2.25	0.183	1.95
	24	Oct	62	0.143	1.86	0.280	2.39
	15	Nov	62	0.118	2.55	0.149	2.56
	15	Dec	62	0.147	2.33	0.226	3.61
	25	Jan	63	0.247	5.57	0.230	4.88
	25	Feb	63	0.145	6.76	0.332	3.29
	23	Mar	63	0.179	4.11	—	7.69
Makurazaki	17	Apr	62	1.417	12.33	0.856	3.78
	19	May	62	0.388	1.15	0.486	1.99
	17	Jun	62	—	12.31	—	5.13
	24	Jul	62	—	10.77	0.317	4.15
	22	Aug	62	1.271	8.82	0.838	7.84
	21	Sep	62	—	3.39	—	0.67
	19	Oct	62	0.323	3.83	0.284	2.41
	20	Nov	62	0.340	2.74	0.380	1.74
	16	Dec	62	0.279	2.96	0.554	3.25
	25	Jan	63	1.287	9.56	0.976	14.90
	15	Feb	63	1.228	19.62	1.121	13.97
	15	Mar	63	0.890	13.03	1.010	7.71
	18	May	63	0.472	2.46	0.476	1.93
	2	Jul	63	0.190	5.39	0.240	1.76
	23	Sep	63	0.198	6.11	0.221	3.75
		Dec	63	—	4.10	—	3.32
		Feb	64	0.258	21.15	0.251	16.44

Dietary Data

Strontium-90 and Cesium-137 in Total Diet

(Japan Analytical Chemistry Research Institute)

Analyses of strontium-90 and cesium-137 in total diet samples have been carried out at the National Institute of Nutrition and the Institute of Public Health. In April 1963, this work was transferred to the National Institute of Radiological Sciences and the Japan Analytical Chemistry Research Institute.

The Japan Analytical Chemistry Research Institute analyzed samples collected by 19 prefectural public health laboratories. One city and one village in each prefecture were chosen as a representative of urban and rural districts of these prefectures respectively. Ten families from each location were chosen at random, and each family presented a normal portion of the regular diet consumed in one day for an adult or a child. Diet at special occasions was avoided.

Composite samples from the 10 families were ashed together and analyzed using the method recommended by the Science and Technology Agency.

Results obtained during the summer of 1963 are shown in Table 6.

Table 6. ^{90}Sr and ^{137}Cs in Total Diet —Summer 1963—

By T. Asari, M. Chiba and M. Kuroda
(Japan Analytical Chemistry Research Institute)

(URBAN ADULT DIET)

Location	Month	Daily Intake					^{90}Sr	^{137}Cs
		Ash g	Ca mg	K mg	^{90}Sr $\mu\mu c$	^{137}Cs $\mu\mu c$	$\mu\mu c/gCa$	$\mu\mu c/gK$
Aomori, AOMORI	Jul	13.91	392	1008	13.8	37.9	35.2	37.6
Sendai, MIYAGI	Jul	18.52	443	1461	10.8	70.2	24.4	48.0
Akita, AKITA	Jun	20.95	534	1455	42.6	97.9	79.8	67.4
Mito, IBARAGI	Jun	20.19	323	1339	7.4	70.1	22.9	52.3
Omiya, SAITAMA	Jul	25.00	295	1434	6.9	114.2	23.5	79.6
Hiratsuka, KANAGAWA	Jun	22.40	327	1900	10.9	86.0	33.4	45.2
Kanazawa, ISHIKAWA	Jul	13.75	572	1258	6.3	42.5	11.0	33.9
Fukui, FUKUI	Jul	15.72	390	1297	6.3	48.5	16.2	37.4
Shimada, SHIZUOKA	Aug	12.76	258	1231	8.7	61.4	33.7	49.8
Anjo, AICHI	Jul	13.90	386	1129	9.8	34.9	25.2	30.9
Kyoto, KYOTO	Jul	21.01	441	1719	19.8	92.4	45.0	53.7
Kakogawa, HYOGO	Aug	14.71	168	1241	6.8	39.5	40.5	31.8
Wakayama, WAKAYAMA	Jul~Aug	10.10	343	880	4.4	34.0	12.7	38.6
Tottori, TOTTORI	Jun	17.60	548	1506	23.1	94.8	42.2	62.9
Okayama, OKAYAMA	Jun	18.83	520	1323	9.4	55.6	18.1	42.0
Hiroshima, HIROSHIMA	Jun~Jul	12.84	389	1361	12.3	82.1	31.7	60.3
Kochi, KOCHI	Jun	14.83	368	1272	14.5	73.2	39.4	57.5
Nagasaki, NAGASAKI	Jun	14.39	537	1209	9.4	51.5	17.4	42.5
Kagoshima, KAGOSHIMA	Jul	12.32	444	999	9.2	41.4	20.7	41.4

Table 6. ^{90}Sr and ^{137}Cs in Total Diet —Summer 1963— *(continued)*

(RURAL ADULT DIET)

Location	Month	Daily Intake					^{90}Sr	^{137}Cs
		Ash g	Ca mg	K mg	^{90}Sr μμc	^{137}Cs μμc	μμc/gCa	μμc/gK
Aomori, AOMORI	Jul	27.30	620	1829	37.0	75.9	59.7	41.5
Natori, MIYAGI	Jul	20.80	366	1554	30.0	68.5	82.0	44.1
Akita, AKITA	Jun	26.73	351	1254	41.4	50.9	117.9	40.6
Tokai, IBARAGI	Jun	19.41	476	1181	8.5	49.8	17.8	42.1
Menuma, SAITAMA	Jul	15.20	350	1464	8.0	35.8	23.0	24.5
Atsugi, KANAGAWA	Jul	17.55	347	1478	10.0	59.8	28.8	40.4
Kanazawa, ISHIKAWA	Jul	12.92	388	999	10.4	29.9	26.8	29.9
Asahi, FUKUI	Jun	16.34	321	1580	10.8	54.1	33.6	34.2
Shibakawa, SHIZUOKA	Aug	15.60	240	1589	8.7	71.8	36.3	45.2
Anjo, AICHI	Jul	13.94	330	1347	6.3	43.1	19.2	32.0
Otokuni, KYOTO	Jun	18.35	385	1134	7.9	43.0	20.0	37.9
Kakogawa, HYOGO	Aug	12.87	305	1146	5.4	39.5	17.7	34.4
Iwade, WAKAYAMA	Jul	12.26	291	1031	2.7	40.0	9.3	38.8
Fukube, TOTTORI	Jun	17.05	773	1500	26.8	59.7	34.6	39.8
Tsudaka, OKAYAMA	Jun	14.55	386	1151	7.6	35.0	19.6	30.4
Shiwa, HIROSHIMA	Jul~Aug	14.93	406	1397	11.9	57.0	29.3	40.8
Haruno, KOCHI	Jun	14.77	437	1312	9.9	87.0	22.7	66.3
Tokitsu, NAGASAKI	Jun	18.58	752	1453	13.4	83.0	17.8	57.1
Tsuruta, KAGOSHIMA	Jul	13.52	356	1437	9.9	81.9	27.8	56.4

(RURAL CHILD DIET)

Location	Month	Daily Intake					^{90}Sr	^{137}Cs
		Ash g	Ca mg	K mg	^{90}Sr μμc	^{137}Cs μμc	μμc/gCa	μμc/gK
Aomori, AOMORI	Jul	10.05	384	730	8.4	31.0	21.9	42.5
Natori, MIYAGI	Jul	11.56	236	862	10.7	41.1	45.5	47.6
Akita, AKITA	Jun	10.27	423	677	7.4	59.9	17.5	88.5
Tokai, IBARAGI	Jun	13.50	612	1118	6.4	63.1	10.5	56.4
Menuma, SAITAMA	Jul	6.70	184	792	3.9	22.1	21.7	28.0
Atsugi, KANAGAWA	Jul	10.60	102	1243	6.4	52.3	63.7	42.0
Kanazawa, ISHIKAWA	Jul	8.70	227	706	7.5	20.3	33.0	28.8
Asahi, FUKUI	Jun	9.65	195	1027	9.1	34.8	46.7	33.8
Shibakawa, SHIZUOKA	Aug	9.60	178	1217	5.4	42.3	30.3	34.7
Anjo, AICHI	Jul	8.84	180	836	3.7	31.4	20.6	37.6
Otokuni, KYOTO	Jun	7.87	243	716	3.5	31.1	14.5	43.4
Kakogawa, HYOGO	Aug	11.31	321	1217	7.8	44.5	24.3	36.5
Iwade, WAKAYAWA	Jul	7.32	224	658	3.0	31.8	13.4	48.4
Fukube, TOTTORI	Jun	4.50	246	462	6.4	24.5	26.1	53.0
Tsudaka, OKAYAMA	Jun	7.69	337	572	6.7	56.6	19.9	98.9
Shiwa, HIROSHIMA	Jul~Aug	10.55	251	1090	8.9	54.0	35.4	49.5
Haruno, KOCHI	Jun	10.27	485	1408	9.4	49.5	19.3	35.1
Tokitsu, NAGASAKI	Jun	7.42	298	671	4.4	31.4	14.8	46.8
Tsuruta, KAGOSHIMA	Jul	7.01	226	614	5.8	27.0	25.6	44.0

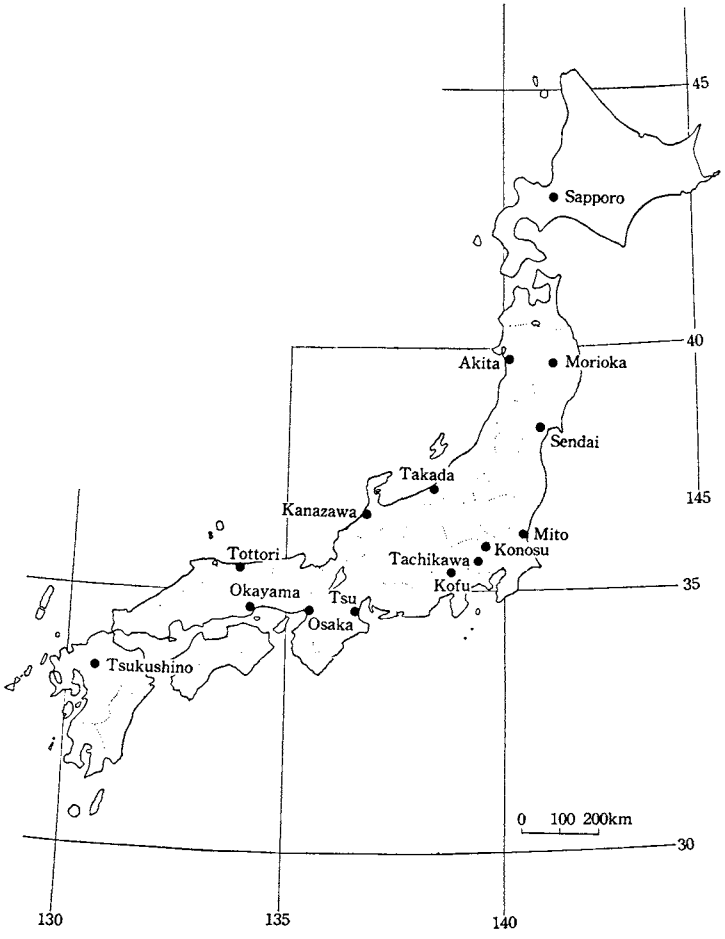
Strontium-90 and Cesium-137 in Rice

(National Institute of Agricultural Sciences)
(Institute of Public Health)

Strontium-90 content in farm soil, rice and wheat have been determined at the National Institute of Agricultural Sciences since 1957. Cesium-137 analysis, in cooperation with the Institute of Public Health, was started at this Institute during 1961 using stock samples.

All rice samples were collected at, and sent from national and prefectural agricultural experiment stations, covering all important agricultural areas throughout Japan. The samples were chosen as representative of agricultural conditions, including soil type, crop variety, fertilizer application and harvest time. Sampling stations are shown in Figure 5.

Figure 5. Sampling Station
—Rice-62—



Rice samples sent to the National Institute of Agricultural Sciences were husked and polished at a 90% extraction rate. Usually one to two kg of brown rice (unpolished rice) and three kg of polished rice were ashed in an electric muffle furnace. The temperature was raised gradually, kept at 450°C until almost completely ashed, then finally raised to 500°C for several hours. Hydrochloric acid solutions of the finely ground ash were measured according to the method recommended by the Science and Technology Agency for radiochemical analysis of strontium-90 and cesium-137. Beta-radioactivity of strontium-90 was measured by a low background counter at the National Institute of Agricultural Sciences.

Usually, the cesium fraction was chemically separated and sent to the Institute of Public Health for β-counting with a low-background counter. However, when contamination due to fresh fallout was negligible, rice grains without prior treatment were sent to the Institute of Public Health for direct γ-spectrometry.

Results of analyses are shown in Tables 7-1 and 7-2. Figure 6 shows the yearly average of strontium-90 and cesium-137 content during the period 1957 to 1962.

Table 7-1. ^{90}Sr in Rice —1962—

By K. Kodaira and M. Ishikawa
(National Instiute of Agricultural Scienes)

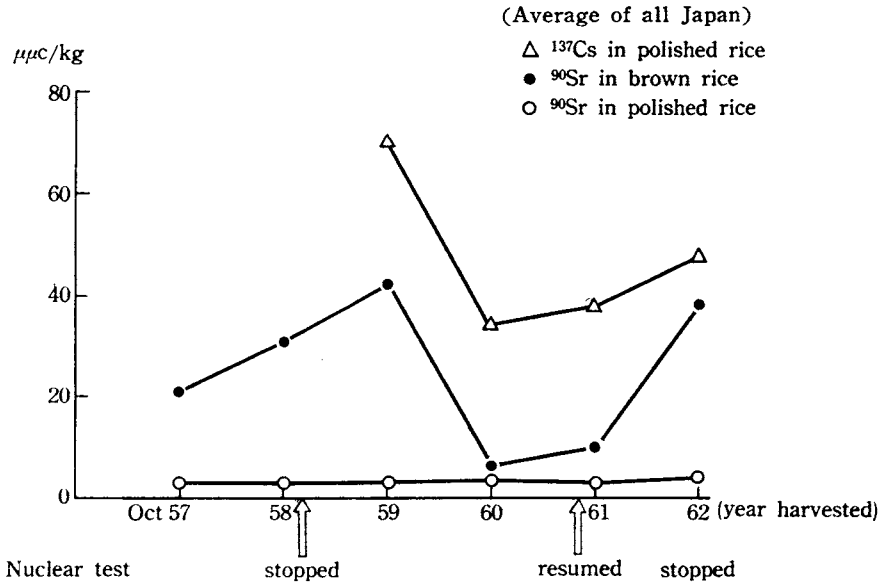
Station Location	Month Harvested	Strontium-90 μμc/kg Brown Rice	Strontium-90 μμc/kg Polished Rice
Sapporo, HOKKAIDO	Oct	36	7.8
Morioka, IWATE	〃	78	4.9
Sendai, MIYAGI	Sep	61	8.2
Akita, AKITA	Oct	49	5.3
Mito, IBARAGI	Sep	48	4.4
Konosu, SAITAMA	〃	21	3.3
Tachikawa, TOKYO	〃	19	3.1
Takada, NIIGATA	〃	36	3.8
Kanazawa, ISHIKAWA	〃	12	3.4
Kofu, YAMANASHI	Oct	12	1.9
Tsu, MIE	Sep	10	2.7
Osaka, OSAKA	Nov	12	2.4
Tottori, TOTTORI	Oct	85	5.8
Okayama, OKAYAMA	〃	18	3.0
Tsukushino, FUKUOKA	〃	49	6.3
Mean Values		36	4.4

Table 7-2. ^{137}Cs in Rice —1962—

By K. Kodaira and A. Tsumura
(National Institute of Agricultural Sciences)
N. Yamagata
(Institute of Public Health)

Station Location	Month Harvested	Cesium-137 μμc/kg Polished Rice
Sapporo, HOKKAIDO	Oct	154
Morioka, IWATE	〃	120
Sendai, MIYAGI	Sep	74
Akita, AKITA	Oct	87
Mito, IBARAGI	Sep	43
Konosu, SAITAMA	〃	25
Tachikawa, TOKYO	〃	32
Takada, NIIGATA	〃	30
Kanazawa, ISHIKAWA	〃	26
Kofu, YAMANASHI	Oct	31
Tsu, MIE	Sep	14
Osaka, OSAKA	Nov	14
Tottori, TOTTORI	Oct	46
Okayama, OKAYAMA	〃	12
Tsukushino, FUKUOKA	〃	45
Mean Value		50

Figure 6. Yearly Variation of ^{90}Sr and ^{137}Cs in Rice



Strontium-90 and Cesium-137 in Milk

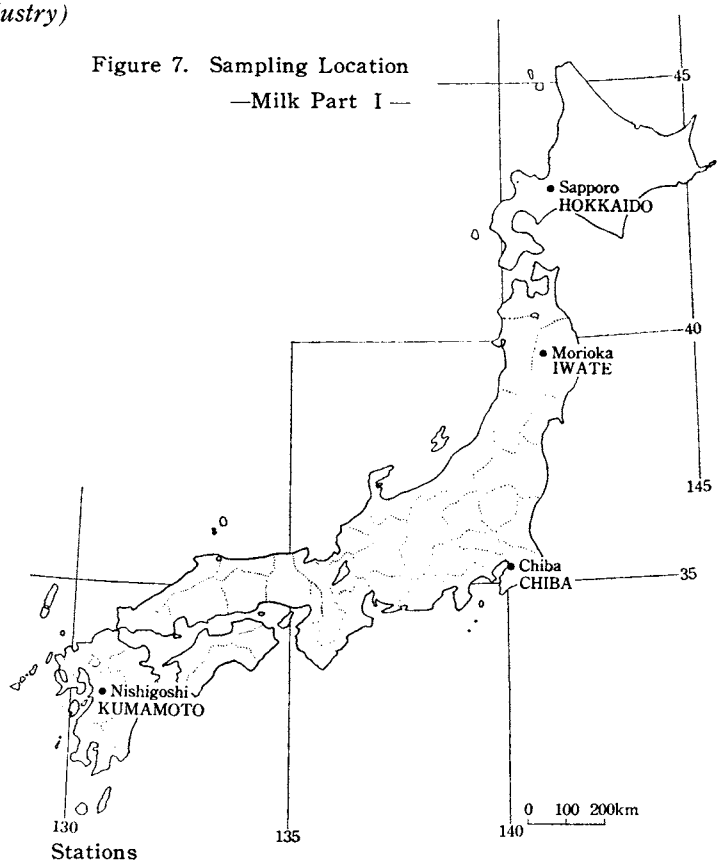
Part I *(National Institute of Animal Industry)*

The observation of the monthly variation of strontium-90 and cesium-137 content in milk was made at the National Institute of Animal Industry. Individual milk samples were collected from a cow once a month.

Samples were collected at the farm of this institute and from three other national agricultural experiment stations monthly and analyzed by the method recommended by the Science and Technology Agency.

Results obtained during the period July 1963 to January 1964 are shown in Table 8.

Figure 7. Sampling Location
—Milk Part I—



Stations
Sapporo: National Hokkaido Agricultural Experiment Station
Morioka: National Tohoku Agricultural Experiment Station
Chiba: National Institute of Animal Industry
Nishigoshi: National Kyushu Agricultural Experiment Station

Table 8. ^{90}Sr and ^{137}Cs in Milk —Jul 63 to Jan 64—

By H. Danbara and T. Mitsuhashi
(National Institute of Animal Industry)

(Continuation of Table 9, Issue No. 1, "Radioactivity Survey Data in Japan")

Station Location	Date	Component g/l		Strontium-90		Cesium-137	
		Ca	K	μμc/l	μμc/gCa	μμc/l	μμc/gK
Sapporo, HOKKAIDO	15 Jul 63	1.20	1.78	25.5	21.3	233.8	131.2
	〃	1.25	1.67	32.7	26.0	265.9	158.8
	15 Aug 63	1.18	1.43	24.3	20.5	216.7	151.0
	〃	1.20	1.46	20.2	16.7	272.0	185.2
	16 Sep 63	1.10	1.44	24.9	22.5	140.7	93.7
	〃	1.15	1.46	25.9	22.4	201.3	137.0
	15 Oct 63	1.20	1.38	45.9	38.3	155.4	112.5
	〃	1.19	1.36	47.4	39.9	160.7	118.6
	17 Nov 63	1.35	1.33	46.2	34.3	233.8	176.0
	〃	1.07	1.41	62.1	57.9	240.2	170.2
	13 Dec 63	1.08	1.46	43.7	40.4	206.4	141.1
	〃	0.99	1.32	39.0	39.5	153.4	116.1
	13 Jan 64	1.02	1.34	37.5	36.8	148.0	110.4
	〃	1.08	1.16	49.9	46.1	185.2	116.7

Table 8. ^{90}Sr and ^{137}Cs in Milk —Jul 63 to Jan 64— *(continued)*

Station Location	Date	Component g/l		Strontium-90		Cesium-137	
		Ca	K	μμc/l	μμc/gCa	μμc/l	μμc/gK
Morioka, IWATE	15 Jul 63	0.97	1.69	29.9	30.6	492.1	289.6
	20 Aug 63	0.94	1.44	19.6	20.7	242.2	167.6
	18 Sep 63	0.93	1.44	25.4	27.1	205.2	141.8
	20 Oct 63	1.07	1.34	47.8	44.8	257.9	193.1
	20 Nov 63	1.06	1.32	24.8	23.4	146.6	111.3
	20 Jan 64	0.89	1.69	17.2	19.2	114.0	67.6
Chiba, CHIBA	15 Jul 63	0.97	1.73	17.0	17.5	141.1	81.2
	〃	0.89	1.81	13.1	14.7	137.3	75.5
	15 Aug 63	0.96	1.53	7.0	7.2	81.3	52.8
	〃	0.96	1.52	5.6	5.8	75.5	49.4
	15 Sep 63	0.96	1.55	7.9	8.2	54.7	35.2
	〃	0.96	1.53	7.9	8.2	53.2	34.7
	16 Oct 63	0.99	1.41	11.2	11.3	40.6	28.8
	〃	0.88	1.37	8.8	10.0	40.3	29.4
	15 Nov 63	1.05	1.35	13.2	12.5	43.2	32.1
	〃	1.08	1.40	7.3	6.8	47.6	33.9
	15 Dec 63	1.14	1.48	15.2	13.3	49.4	33.3
	〃	0.97	1.65	9.3	9.6	67.6	41.1
	15 Jan 64	1.19	1.65	16.3	13.7	57.1	34.7
	〃	0.97	1.65	8.2	8.5	53.6	32.6
Nishigoshi, KUMAMOTO	15 Jul 63	1.08	1.53	7.7	7.1	121.7	79.4
	〃	1.01	1.67	10.2	10.1	77.0	46.1
	16 Aug 63	1.07	1.48	10.9	10.2	74.6	50.2
	〃	1.01	1.46	9.1	9.0	70.6	48.2
	16 Sep 63	1.07	1.48	11.3	10.5	59.9	40.2
	〃	1.01	1.47	9.8	9.6	59.8	40.6
	13 Nov 63	0.96	1.40	16.4	17.1	92.8	66.5
	〃	1.12	1.42	25.8	22.9	78.8	55.5
	15 Dec 63	0.99	1.56	16.5	16.7	75.9	48.5
	〃	0.99	1.59	13.6	13.8	49.7	31.4
	15 Jan 64	0.89	1.56	11.6	13.0	76.3	48.7
	〃	0.98	1.61	11.6	11.9	63.8	39.7

Part II *(Japan Analytical Chemistry Research Institute)*

Since December 1961, milk samples from various parts of Japan were collected by 24 prefectural public health laboratories and analyzed for strontium-90 and cesium-137 content at the Japan Analytical Chemistry Research Institute. Sampling stations are shown in Figure 8.

Three liters of fresh milk was purchased at a representative farm in each prefecture, and carbonized by the 24 prefectural public health laboratories. The carbonized samples were then sent to the Japan Analytical Chemistry Research Institute, and ashed and analyzed using the method recommended by the Science and Technology Agency.

Results obtained during the period May to December 1963 are shown in Table 9. Table 10 is a rearrangement of the results obtained during 1963, to show seasonal and local variations.

Figure 8. Sampling Station of Milk and Mean Value of ^{90}Sr Content at These Areas —1963—

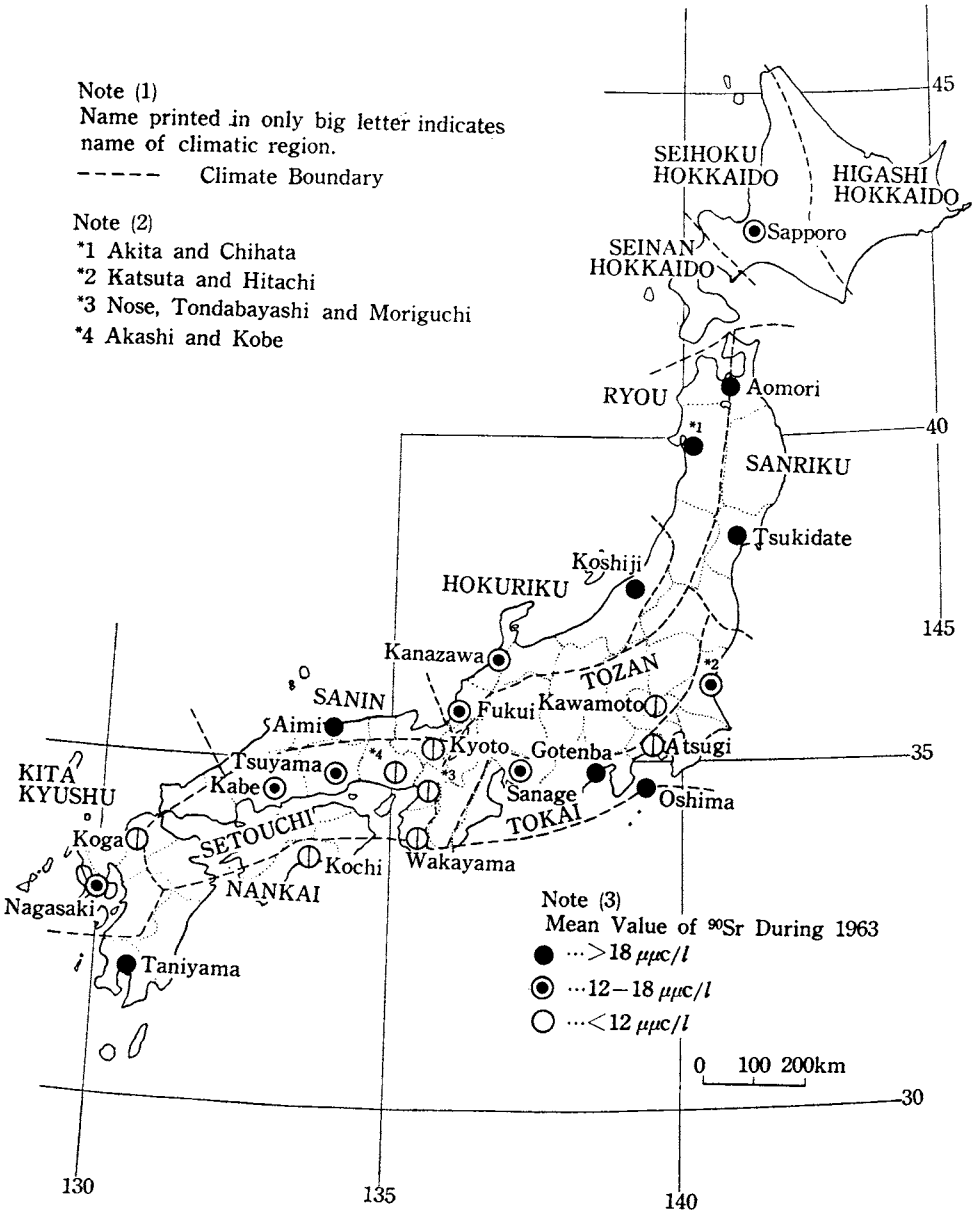


Table 9. ^{90}Sr and ^{137}Cs in Milk —May to Dec 63—

By T. Asari, M. Chiba and M. Kuroda
(Japan Analytical Chemistry Research Institute)

(Continuation of Table 8, Issue No. 1, "Radioactivity Survey Data in Japan")

Location	Date	Component g/l			Strontium-90		Cesium-137	
		Ash	Ca	K	μμc/l	μμc/gCa	μμc/l	μμc/gK
Sapporo, HOKKAIDO	9 Jul 63	7.28	1.05	1.08	9.4	9.0	106	98
	13 Sep 63	7.56	1.23	1.49	15.1	12.3	232	156
	20 Nov 63	7.36	1.22	1.44	37.0	30.3	190	132
Aomori, AOMORI	11 Jul 63	6.89	0.96	1.24	15.5	16.1	102	82
	20 Sep 63	7.00	1.02	1.59	21.1	20.8	134	85
	15 Nov 63	7.69	1.05	1.58	34.3	32.8	159	100

Table 9. ^{90}Sr and ^{137}Cs in Milk —May to Dec 63— *(continued)*

Location	Date	Component g/l			Strontium-90		Cesium-137	
		Ash	Ca	K	μμc/l	μμc/gCa	μμc/l	μμc/gK
Tsukidate, MIYAGI	25 Jun 63	7.53	0.93	1.22	26.0	28.0	470	385
	28 Aug 63	7.33	0.98	1.79	31.7	32.2	123	69
	28 Oct 63	8.81	1.16	1.86	25.1	21.6	164	88
	19 Dec 63	9.81	1.02	0.94	14.7	14.4	121	128
Akita, AKITA	12 Jul 63	7.47	0.99	1.15	14.2	14.4	92	80
	9 Sep 63	7.64	1.31	1.48	24.8	18.9	132	89
	7 Nov 63	8.06	1.25	1.58	30.1	24.0	156	99
Katsuta, IBARAGI	13 Jun 63	6.90	1.07	1.27	36.1	33.7	279	219
	3 Aug 63	6.58	0.92	1.42	15.0	16.3	119	85
	4 Oct 63	8.03	1.13	1.32	16.2	14.3	124	94
	13 Dec 63	8.19	1.24	1.84	9.2	9.1	102	55
Kawamoto, SAITAMA	12 Jul 63	6.92	0.95	1.41	6.1	6.4	89	63
	11 Sep 63	6.83	0.98	1.25	6.6	6.7	61	49
	7 Nov 63	6.64	0.86	1.35	10.9	12.6	69	51
Izu-oshima, TOKYO	22 Jul 63	6.67	0.95	1.42	15.3	16.1	140	98
	16 Sep 63	7.45	1.07	1.60	12.0	11.2	114	71
	9 Nov 63	7.68	1.13	1.56	38.1	33.6	325	209
Atsugi, KANAGAWA	29 May 63	7.08	1.03	1.43	19.1	18.5	130	91
	18 Jul 63	6.81	1.01	1.26	15.3	15.2	131	104
	11 Sep 63	7.19	1.00	1.31	7.8	7.8	76	58
	18 Nov 63	7.22	1.05	1.51	10.9	10.3	115	76
Koshiji, NIIGATA	24 Jul 63	6.72	1.04	1.28	17.3	16.6	153	120
	20 Sep 63	7.50	0.95	1.22	27.1	28.4	128	105
	14 Nov 63	7.89	0.98	0.94	61.3	62.3	251	268
Kanazawa, ISHIKAWA	14 Aug 63	7.03	1.04	1.51	12.1	11.6	79	52
	10 Oct 63	7.03	1.05	1.52	15.7	14.9	94	62
	10 Dec 63	7.11	1.03	1.54	14.5	14.2	155	101
Fukui, FUKUI	6 Jul 63	6.92	1.08	1.32	24.1	22.3	164	124
	11 Sep 63	6.69	1.06	1.31	9.9	9.3	55	42
	11 Nov 63	7.58	1.13	1.48	17.9	15.8	110	74
Gotenba, SHIZUOKA	31 May 63	5.75	0.90	1.33	24.5	27.4	294	219
	16 Jul 63	6.53	0.95	1.42	25.0	26.4	318	224
	10 Sep 63	6.94	1.02	1.58	17.6	17.3	282	179
	28 Nov 63	6.67	1.09	1.25	26.9	24.7	219	234
Sanage, AICHI	19 Jun 63	7.67	1.21	1.50	46.3	38.3	260	174
	8 Aug 63	7.78	1.22	1.62	14.7	12.1	96	59
	23 Oct 63	6.53	1.03	1.33	8.3	8.0	34	26
	12 Dec 63	7.67	1.11	1.67	13.3	12.0	66	40
Kyoto, KYOTO	13 Jun 63	6.64	1.06	1.28	13.3	12.5	77	60
	1 Aug 63	6.47	0.93	1.36	14.0	15.1	113	84
	1 Oct 63	6.67	0.96	1.31	10.3	10.8	70	54
	3 Dec 63	6.78	1.06	1.32	7.7	7.3	90	68

Table 9. ^{90}Sr and ^{137}Cs in Milk —May to Dec 63— *(continued)*

Location	Date	Component g/l			Strontium-90		Cesium-137	
		Ash	Ca	K	μμc/l	μμc/gCa	μμc/l	μμc/gK
Nose, OSAKA	26 Jul 63	7.22	1.02	1.61	14.2	13.9	117	73
	11 Oct 63	7.47	1.11	1.50	11.0	9.9	90	60
Akashi, HYOGO	24 Jul 63	6.97	0.98	1.54	12.1	12.4	148	96
	19 Sep 63	7.17	1.05	1.70	7.5	7.1	78	46
	13 Nov 63	7.64	1.18	1.49	10.6	9.6	132	88
Wakayama, WAKAYAMA	17 Jun 63	6.31	0.93	1.36	20.6	22.3	149	109
	8 Aug 63	6.33	0.89	1.29	9.5	10.7	62	48
	17 Oct 63	6.42	0.88	1.30	4.5	5.1	28	22
	13 Dec 63	4.33	0.56	0.96	3.7	6.6	36	38
Aimi, TOTTORI	13 Jun 63	7.31	1.01	2.15	35.4	35.1	228	105
	12 Aug 63	7.86	1.10	1.49	40.5	36.8	105	71
	17 Oct 63	7.72	1.12	1.48	24.0	22.1	94	64
	5 Dec 63	8.94	1.14	1.60	22.6	19.7	231	145
Tsuyama, OKAYAMA	13 May 63	7.08	1.04	2.09	14.8	14.2	119	56
	13 Jul 63	6.33	0.99	1.36	27.1	27.3	126	93
	9 Sep 63	6.83	0.99	1.43	4.8	4.8	78	55
	19 Nov 63	6.83	1.03	1.42	16.1	15.6	89	63
Kabe, HIROSHIMA	30 Jul 63	7.11	1.07	1.19	19.0	17.8	60	51
	27 Sep 63	7.75	1.10	1.40	23.2	22.2	69	49
	8 Nov 63	7.97	1.07	1.26	11.2	10.5	92	73
Kochi, KOCHI	7 Jun 63	7.25	0.99	1.67	15.7	15.9	163	97
	7 Aug 63	7.22	1.03	1.60	6.4	6.2	62	39
	4 Oct 63	7.31	0.90	1.92	12.7	14.1	171	89
	6 Dec 63	7.42	0.87	1.36	17.5	20.3	352	259
Koga, FUKUOKA	30 Jun 63	7.33	1.02	1.40	21.2	20.8	201	144
	24 Aug 63	7.22	1.00	1.50	8.5	8.5	93	62
	22 Oct 63	6.72	0.99	1.31	15.0	15.1	68	52
	18 Dec 63	7.61	1.06	1.33	10.3	9.7	101	76
Nagasaki, NAGASAKI	10 Jul 63	7.86	1.22	1.57	16.6	13.6	202	128
	3 Sep 63	7.83	1.17	1.60	12.1	10.3	101	63
	13 Nov 63	7.33	1.09	1.51	16.6	15.2	98	65
Taniyama, KAGOSHIMA	20 Jun 63	6.94	1.07	1.19	32.8	30.7	158	133
	26 Aug 63	7.11	1.18	0.85	24.9	21.1	105	123
	15 Oct 63	7.42	1.25	1.38	23.6	18.9	59	43
	17 Dec 63	7.75	1.31	1.48	11.2	8.6	83	56

Table 10. ^{90}Sr and ^{137}Cs in Milk —1963 rearranged—

Strontium-90 $\mu\mu c/l$

Prefecture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HOKKAIDO (N)*	10.7		16.6									
〃 (SE)*	15.4		14.2									
〃 (SW)*		4.9			6.9		9.4		15.1		37.0	
AOMORI	10.5		28.0				15.5		21.1		34.3	
MIYAGI	12.0		13.6			26.0		31.7		25.1		14.7
AKITA	14.5	13.4					14.2		24.8		30.1	
IBARAGI		11.1				36.1		15.0		16.2		9.2
SAITAMA		2.8					6.1		6.6		10.9	
TOKYO (Oshima)		7.7			25.8		15.3		12.0		38.1	
KANAGAWA	5.9		7.0		19.1		15.3		7.8		10.9	13.6
NIIGATA		16.8	43.4		17.4		17.3		27.1		61.3	
ISHIKAWA		6.2			12.4			12.1		15.7		14.5
FUKUI	6.3		9.8				24.1		9.9		17.9	
SHIZUOKA	11.7		11.0		24.5		25.0		17.6		26.9	
AICHI		6.5				46.3		14.7		8.3		13.3
KYOTO	1.9	2.8	3.5		6.9	13.3		14.0		10.3		7.7
OSAKA		4.4			13.3		14.2			11.0		
HYOGO	5.3	4.8					12.1		7.5		10.6	
WAKAYAMA	3.8	2.3	2.8			20.6		9.5		4.5		3.7
TOTTORI	22.7		16.3			35.4		40.5		24.0		22.6
OKAYAMA		6.0			14.8		27.1		4.8		16.1	
HIROSHIMA	1.3		6.1				19.0		23.2		11.2	
KOCHI	9.1		5.4			15.7		6.4		12.7		17.5
FUKUOKA	7.6		7.0			21.2		8.5		15.0		10.3
NAGASAKI	10.5	7.3					16.6		12.1		16.6	
KAGOSHIMA		10.1				32.8		24.9		23.6		11.2

* HOKKAIDO (N), (SE) aud (SW) indicates Northern, Southeastern and Southwestern HOKKAIDO respectively.

Strontium-90 $\mu\mu c/gCa$

Prefecture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HOKKAIDO (N)*	9.7		14.3									
〃 (SE)*	13.8		13.0									
〃 (SW)*		4.9			5.4		9.0		12.3		30.3	
AOMORI	9.8		28.0				16.1		20.8		32.8	
MIYAGI	10.1		11.6			28.0		32.2		21.6		14.4
AKITA	15.1	12.2					14.4		18.9		24.0	
IBARAGI		11.3				33.7		16.3		14.3		9.1
SAITAMA		3.1					6.4		6.7		12.6	
TOKYO (Oshima)		6.8			25.1		16.1		11.2		33.6	
KANAGAWA	7.1		6.5		18.5		15.2		7.8		10.3	12.3
NIIGATA		14.2	36.7		14.2		16.6		28.4		62.3	
ISHIKAWA		5.9			12.2			11.6		14.9		14.2
FUKUI	6.1		7.4				22.3		9.3		15.8	
SHIZUOKA	10.0		9.1		27.4		26.4		17.3		24.7	
AICHI		5.7				38.3		12.1		8.0		12.0

Table 10. ^{90}Sr and ^{137}Cs in Milk —1963 rearranged— *(continued)*

Prefecture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
KYOTO	1.8	2.5	3.2		6.6	12.5		15.1		10.8		7.3
OSAKA		3.8			12.4		13.9			9.9		
HYOGO	4.6	4.3					12.4		7.1		9.6	
WAKAYAMA	5.6	2.7	3.8			22.3		10.7		5.1		6.6
TOTTORI	19.9		14.1			35.1		36.8		22.1		19.7
OKAYAMA		5.4			14.3		27.3		4.9		15.6	
HIROSHIMA	1.2		5.9				17.8		22.2		10.5	
KOCHI	7.7		4.8			15.9		6.2		14.1		20.3
FUKUOKA	7.7		5.8			20.8		8.5		15.1		9.7
NAGASAKI	8.5	6.0					13.6		10.4		15.2	
KAGOSHIMA		8.3				30.7		21.1		18.9		8.6

* HOKKAIDO (N), (SE) and (SW) indicates Northern, Southeastern and Southwestern HOKKAIDO respectively.

Cesium-137 $\mu\mu c/l$

Prefecture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HOKKAIDO (N)*	37		131									
〃 (SE)*	76		50									
〃 (SW)*		68			85		106		232		190	
AOMORI	73		110				102		134		159	
MIYAGI	101		55			470		123		164		121
AKITA	72	99					92		132		156	
IBARAGI		90				279		119		124		102
SAITAMA		45					89		61		69	
TOKYO (Oshima)		102			214		140		114		325	
KANAGAWA	55		51		130		131		76		115	111
NIIGATA		90	101		78		153		128		251	
ISHIKAWA		49			139			79		94		155
FUKUI	39		68				164		55		110	
SHIZUOKA	59		139		294		318		282		291	
AICHI		54				260		96		34		66
KYOTO	37	66	100		60	77		113		70		90
OSAKA		27			104		117			90		
HYOGO	44	38					148		78		132	
WAKAYAMA	19	32	28			149		62		28		36
TOTTORI	90		79			228		105		94		231
OKAYAMA		48			119		126		78		89	
HIROSHIMA	63		59				60		69		92	
KOCHI	50		43			163		62		171		352
FUKUOKA	64		53			201		93		68		101
NAGASAKI	73	73					202		101		98	
KAGOSHIMA		105				158		105		59		83

* HOKKAIDO (N), (SE) and (SW) indicates Northern, Southeastern and Southwestern HOKKAIDO repectively.

Table 10. ^{90}Sr and ^{137}Cs in Milk —1963 rearranged— *(continued)*

Cesium-137 $\mu\mu c/gK$

Prefecture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HOKKAIDO (N)*	24		86									
〃 (SE)*	50		34									
〃 (SW)*		110			66		98		156		132	
AOMORI	46		67				82		85		100	
MIYAGI	62		34			385		69		88		128
AKITA	50	48					80		89		99	
IBARAGI		54				219		85		94		55
SAITAMA		28					63		49		51	
TOKYO (Oshima)		65			119		98		71		209	
KANAGAWA	50		36		91		104		58		76	73
NIIGATA		53	115		54		120		105		268	
ISHIKAWA		33			93			52		62		101
FUKUI	26		46				124		42		74	
SHIZUOKA	30		93		219		224		179		234	
AICHI		62				174		59		26		40
KYOTO	25	44	61		41	60		84		54		68
OSAKA		17			64		73			60		
HYOGO	31	24					96		46		88	
WAKAYAMA	23	33	30			109		48		22		38
TOTTORI	58		49			105		71		64		145
OKAYAMA		35			56		93		55		63	
HIROSHIMA	49		40				51		49		73	
KOCHI	34		27			97		39		89		259
FUKUOKA	42		62			144		62		52		76
NAGASAKI	42	50					128		63		65	
KAGOSHIMA		71				133		123		43		56

* HOKKAIDO (N), (SE) and (SW) indicates Northern, Southeastern and Southwestern HOKKAIDO respectively.

Cesium-137 in Powdered Milk

(Institute of Public Health)

Cesium-137 content in powdered whole milk produced in Japan and imported powdered skim milk was determined at the Institute of Public Health.

The samples were directly measured in the standard 1 lb. or a 500 g can placed on the top of a $3''\phi \times 3''$ sodium iodide crystal. Techniques and instruments used in the γ-spectrometric determination of cesium-137 were the same as described in "Bull. Inst. Publ. Health, **10** (3); 135-138".

The results are shown in Tables 11 and 12.

Figure 9. Location Produced
—Powdered Milk—

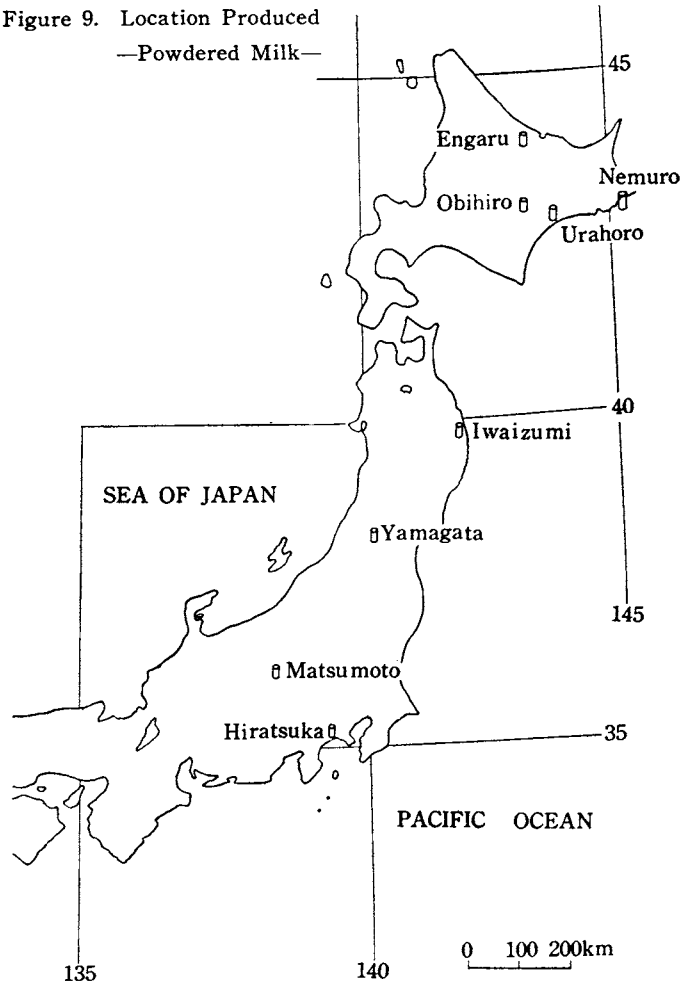


Table 11. ^{137}Cs in Powdered Whole Milk Produced in Japan

By N. Yamagata and K. Iwashima
(Institute of Public Health)

Date Produced	Location Produced	^{137}Cs $\mu\mu c/kg$
(1959)		
16 Jun	Matsumoto, NAGANO	192
30 Jun	〃	341
(1961)		
18 Nov	Matsumoto, NAGANO	171
(1962)		
13 Jan	Engaru, HOKKAIDO	170
20 Jan	Obihiro, HOKKAIDO	210
16 Feb	Engaru, HOKKAIDO	< 43
17 Feb	Iwaizumi, IWATE	323
17 Mar	Engaru, HOKKAIDO	< 43
13 Apr	〃	< 43
8 Jul	〃	511
1 Aug	Yamagata, YAMAGATA	340
30 Aug	Engaru, HOKKAIDO	665
24 Dec	Hiratsuka, KANAGAWA	245
29 Dec	Hiratsuka, KANAGAWA	175
(1963)		
7 Jan	Engaru, HOKKAIDO	298
19 Jan	Urahoro, HOKKAIDO	420
16 Feb	〃	1400
5 Mar	〃	525
15 Mar	〃	770
23 Mar	Obihiro, HOKKAIDO	428
4 Apr	Engaru, HOKKAIDO	467
20 Apr	Iwaizumi, IWATE	428
25 May	Engaru, HOKKAIDO	511
27 May	〃	341
12 Jun	Matsumoto, NAGANO	1260
21 Jun	Nemuro, HOKKAIDO	1150
11 Jul	Matsumoto, NAGANO	766
20 Jul	Obihiro, HOKKAIDO	1670
10 Aug	〃	2200
24 Aug	Matsumoto, NAGANO	1150
17 Sep	〃	511
11 Oct	Engaru, HOKKAIDO	809
12 Oct	〃	447
4 Nov	Matsumoto, NAGANO	767

Table 12. ^{137}Cs in Imported Powdered Skim Milk

By N. Yamagata and K. Iwashima
(Institute of Public Health)

Month Produced	Location Produced	^{137}Cs $\mu\mu c/kg$
May 62	Iowa, U. S. A.	341
Aug 62	Idaho, U. S. A.	341
〃	Washington, U. S. A.	1020
Sep 62	Idaho, U. S. A.	340
〃	Wellington, New Zealand	162
Oct 62	California, U. S. A.	426
Jan 63	Idaho, U. S. A.	596
Feb 63	〃	682
〃	California, U. S. A.	426

Human Data

Strontium-90 in Human Bone

(National Institute of Radiological Sciences)

Since 1959, human bones collected from various parts of Japan have been analyzed at the National Institute of Radiological Sciences.

The bone samples were collected from Sapporo, Niigata, Fukushima and Tokyo. After separation of adhering tissues, the bone samples were ashed in a muffle furnace at 550°C. The ash was then pulverized and homogenized.

To determine strontium-90, five g of the ash was analyzed by the fuming nitric acid separation method described in the publications, FAO Atomic Energy Series, No. 1, 1959, and WHO Technical Report Series, No. 173, 1959. Strontium was precipitated as a carbonate. After storing the separated strontium carbonate for at least two weeks, the daughter product, yttrium-90, was separated and counted with an endwindow type low-background gas flow counter.

Results derived from human bone samples from subjects who died during the period January 1962 to October 1963 are shown in Table 13.

The S.U. (^{90}Sr $\mu\mu$c/gCa) values obtained up to October 1963, for four different age groups, are summarized in Table 14. Summaries of values for 1960 and 1961 are also included in the table for comparison. A considerable increase of strontium-90 concentration was found in the bones of young age groups, especially in 0-4 year age group.

Figure 10 shows the annual variation of mean values of S. U. for the four age groups.

Table 13. ^{90}Sr in Human Bone —1962 and 1963—

By M. Saiki, T. Koyanagi, G. Tanaka and A. Tomikawa
(National Institute of Radiological Sciences)

(year) Location	Age	Sex	Month of Death	Number*2	Name of Bone	^{90}Sr $\mu\mu$c/gCa
(1962)*1						
Tokyo	1	F	Jul	1	Rib, Vertebra	1.61
〃	7	F	Jan	1	Rib	0.95
〃	8	F	Sep	1	〃	1.00
〃	12	F	Jul	1	〃	1.99
〃	13	M	Jan	1	〃	2.37
〃	13	M	Jul	1	〃	1.45
Fukushima	14	F	〃	1	〃	0.55
Tokyo	15	F	〃	1	〃	1.38
〃	16	M	Sep	1	Tibia	2.05
〃	17	M	Oct	1	Rib	2.03
〃	18	F	Jun	1	〃	0.84
〃	18	M	Nov	1	Vertebra	1.64
〃	18	M	〃	1	Rib	1.81
〃	18	M	Aug	1	Rib, Vertebra	1.08
〃	18	M	Sep	1	Rib	2.07
〃	18	M	〃	1	〃	0.81
〃	18	F	Oct	1	Sternum	1.14
〃	18	F	Jan	1	Rib	1.18
〃	18	M	Sep	1	〃	1.44
〃	19	M	Jul	1	〃	1.35
〃	19	F	Oct	1	〃	0.88
〃	19	F	Sep	1	Vertebra	0.78
〃	19	F	〃	1	Rib	1.30
〃	19	F	〃	1	Femur	0.37
〃	20	M	Mar	1	〃	0.75

Table 13. ^{90}Sr in Human Bone —1962 and 1963— *(continued)*

(year) Location	Age	Sex	Month of Death	Number*2	Name of Bone	^{90}Sr $\mu\mu c/gCa$
Tokyo	20	M	Sep	1	Rib	0.93
〃	21	M	Aug	1	〃	0.46
〃	21	M	〃	1	Vertebra	1.06
〃	21	M	〃	1	〃	1.33
〃	21	M	Jun	1	〃	1.20
Niigata	21	F	Dec	1	Rib	1.11
〃	22	M	〃	1	〃	0.74
Tokyo	22	M	Jun	1	〃	0.51
Niigata	27	M	Nov	1	〃	0.27
Tokyo	29	M	Jul	1	〃	0.74
〃	30	F	Feb	1	Femur	0.03
〃	31	F	Mar	1	Rib	0.16
〃	36	F	Oct	1	Vertebra	1.20
Niigata	40	F	Mar	2	Rib	0.36
Tokyo	51	F	Jan	1	Knee cap	0.59
〃	51	M	Nov	1	Femur	0.20
〃	51	M	〃	1	Knee cap	0.22
〃	51	M	〃	1	Vertebra	0.28
〃	59	M	Jan	1	Knee cap	0.40
〃	59	M	〃	1	Femur	0.26
〃	62	M	Nov	1	Knee cap	0.23
〃	62	M	〃	1	Femur	0.26
〃	73	M	Jan	1	Sternum	0.33
〃	73	M	〃	1	Knee cap	0.14
〃	73	M	〃	1	Femur	0.19
(1963)*3						
Tokyo	Fetus		Jun	1	Whole skeleton	0.86
〃	Fetus		Jul	1	〃 〃	1.09
〃	Fetus		〃	1	〃 〃	2.14
〃	Fetus		〃	1	〃 〃	1.19
〃	Fetus		〃	1	〃 〃	1.35
〃	Fetus		Aug	1	〃 〃	1.18
〃	Fetus		〃	1	〃 〃	1.22
〃	Fetus		Oct	1	〃 〃	1.43
〃	Fetus		〃	1	〃 〃	2.10
〃	Fetus		〃	1	〃 〃	1.33
〃	Fetus		〃	1	〃 〃	1.41
〃	Fetus		〃	1	〃 〃	1.49
〃	Fetus		〃	1	〃 〃	2.38
〃	Fetus		〃	1	〃 〃	0.94
〃	Fetus		〃	1	〃 〃	0.98
〃	Fetus		〃	1	〃 〃	0.85
〃	Fetus		〃	1	〃 〃	1.25
〃	0 (4 mo)	M	Feb	1	〃 〃	3.15
〃	0 (5 mo)	F	Jun	1	〃 〃	2.81
〃	0 (7 mo)	M	May	1	Femur	0.80
〃	0		Jan	14	Rib	1.38
〃	0	M, F	Feb	8	Rib	1.96
〃	0	M, F	Jun		〃	2.06
〃	1	M	Aug	1	〃	4.37
〃	3	F	Jun	1	Femur	2.12
〃	3	F	〃	1	Rib, Femur	1.34
〃	4	M	〃	1	〃 〃	1.24
〃	4	M	〃	1	〃 〃	1.47
〃	1-4	M, F	〃	7	Rib	0.95
〃	5	F	〃	1	〃	1.78
〃	6	F	Jul	1	Rib, Femur	0.99
〃	7	M	Jan	1	Vertebra	1.13
〃	7	M	〃	1	Rib	0.70
〃	7	F	Apr	1	〃	1.28
〃	7	M	Jul	1	〃	1.64
〃	7	M	〃	1	Rib, Femur	1.14
〃	7	F	Aug	1	〃 〃	1.25
〃	8	F	Feb	1	Rib	1.10
〃	8	M	May	1	〃	2.50
Hokkaido	9	F	Mar	1	〃	1.94
Tokyo	9	F	〃	1	〃	2.18

Table 13. ^{90}Sr in Human Bone —1962 and 1963— *(continued)*

(year) Location	Age	Sex	Month of Death	Number*2	Name of Bone	^{90}Sr $\mu\mu c/gCa$
Tokyo	9	F	Apr	1	〃	1.64
〃	9	F	Jul	1	Rib, Femur	0.91
〃	9	F	〃	1	〃 〃	1.30
Hokkaido	11	M	Feb	1	Rib	1.66
Tokyo	11	M	Mar	1	〃	1.63
〃	11	M	Jun	1	〃	1.13
〃	11	M	Aug	1	Rib, Femur	0.92
〃	11	F	〃	1	〃 〃	1.37
〃	12	M	Apr	1	Rib	1.79
〃	12	F	〃	1	Vertebra	1.78
〃	12	F	Jun	1	Rib	2.08
〃	12	M	Aug	1	Rib, Femur	0.83
〃	13	M	〃	1	〃 〃	1.98
〃	15	M	Mar	1	Rib	1.97
〃	15	M	Jun	1	〃	1.82
〃	15	F	Jul	1	Rib, Femur	1.06
〃	16	M	Feb	1	Rib	1.03
〃	16	M	Jun	1	〃	2.30
〃	16	M	Aug	1	〃	1.07
〃	17	F	Mar	1	〃	1.34
〃	17	F	Aug	1	〃	2.02
〃	18	F	Apr	1	〃	1.40
〃	18	F	May	1	〃	1.23
〃	18	F	Jun	1	〃	1.59
〃	18	M	Aug	1	〃	0.55
〃	19	M	Mar	1	〃	1.75
〃	19	M	〃	1	〃	1.13
〃	19	M	〃	1	〃	0.53
〃	19	M	Sep	1	〃	1.17
〃	5-10	M, F	Jan-May	3	〃	0.96
〃	20	M	Aug	2	Rib, Tibia	1.29
〃	21	M	Jan	1	Rib	1.15
Niigata	25	F	Feb	1	〃	0.42
Tokyo	29	F	May	1	〃	0.42
〃	20-21	M	Jun-Aug	3	〃	0.41
〃	27	M	Jun	1	〃	0.51
〃	33-38	M, F	Feb-Mar	3	Rib, Vertebia	0.38
Niigata	37-38	M	〃	3	Rib	0.40
Tokyo	40-44	M	Jan-Mar	5	〃	0.42
〃	40-48	F	Jan-Apr	4	〃	0.36
〃	54-59	F	Jan-Mar	3	〃	0.22
〃	50-59	M	〃	6	〃	0.40
〃	60-69	M, F	〃	6	Rib, Sternum	0.27
〃	70-79	M, F	Jan-Apr	8	Rib	0.32

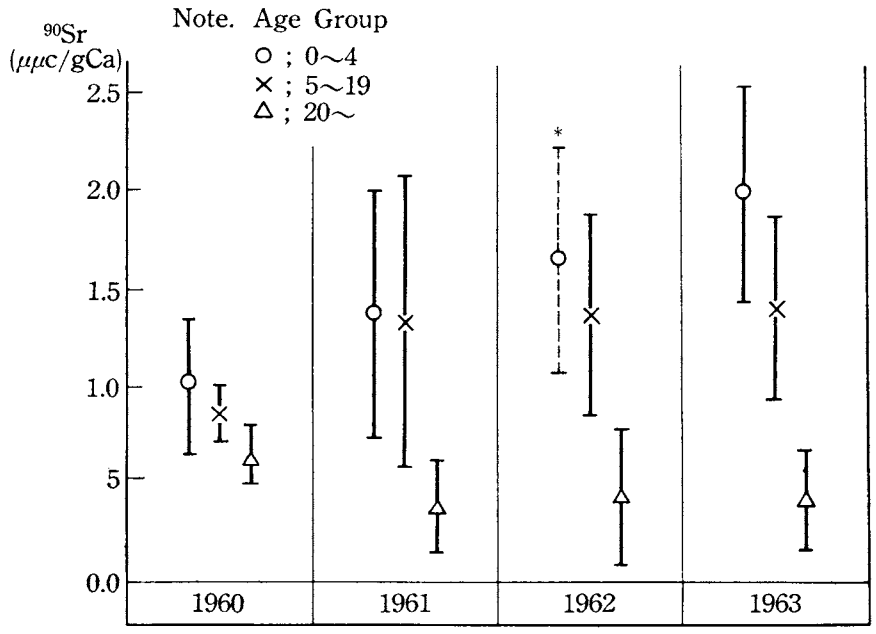
(1962)*1 ; Continuation of Table 14, Issue No. 1, "Radioactivity Survey Data in Japan"
Number*2; Number of individual in composite sample
(1963)*3 ; Data obtained up to October 1963

Table 14. Summary of ^{90}Sr in Human Bone

Age Group of Samples		Fetus	0～4	5～19	20
1960	No. of Samples Analyzed		7	42	33
	Mean		1.00	0.90	0.58
	$^{90}Sr\mu\mu c/gCa$ Std. dev.		0.33	0.13	0.18
	Min.～Max.		0.22～1.66	0.21～2.56	0.09～2.77
1961	No. of Samples Analyzed	2	9	51	106
	Mean	1.43	1.36	1.38	0.41
	$^{90}Sr\mu\mu c/gCa$ Std. dev.		0.63	0.74	0.31
	Min.～Max.	1.38～1.98	0.22～2.15	0.32～3.64	0.06～1.91
1962	No. of Samples Analyzed	5	3	31	91
	Mean	0.88	1.66	1.38	0.45
	$^{90}Sr\mu\mu c/gCa$ Std. dev.			0.54	0.31
	Min.～Max.	0.59～1.17	0.95～2.24	0.37～2.37	0.03～1.33
1963	No. of Samples Analyzed	17	12	42	14
	Mean	1.36	2.01	1.41	0.41
	$^{90}Sr\mu\mu c/gCa$ Std. dev.	0.44	1.01	0.47	0.25
	Min.～Max.	0.86～2.38	0.80～4.37	0.55～2.50	0.22～1.29

Note; Data obtained up to Oct 1963.

Figure 10. Summary of ^{90}Sr ($\mu\mu c/gCa$) in Human Bone —1960 to 1963—



* Number of Samples Analyzed is only three.

Cesium-137 in Human Blood

(Institute of Public Health)

Since 1963, in order to estimate the total body cesium-137 level, whole blood samples have been analyzed, at the Institute of Public Health. The work was carried out at this institute because the blood bank system, which covers the various parts of Japan, is readily accessible to the institute which makes acquisition samples relatively simple.

Citric whole blood ampoules from 47 licensed blood banks and from about 100 hospitals were used. One liter blood samples were homogenized by vigorous mechanical agitation, and an aliquot of 150 g was placed into a fused silica basin. The aliquot was evaporated to dryness on a hot plate and ashed at 450-500°C in an electric furnace.

The ash was dissolved by adding hydrochloric acid into the basin after the addition of 20 mg of cesium carrier. The solution was then subjected to radiochemical separation by the dipicrylaminate and chloroplatinate method as described in the "Analyst Vol. 85 282-285".

Results obtained during the period July to December 1963 are shown in Table 15.

This work was financially supported by the International Atomic Energy Agency under contract No. 140/RI/RB.

Table 15 ^{137}Cs in Whole Blood Samples from Blood Banks —Jul to Dec 63—

By N. Yamagata

(Institute of Public Health)

Date Collected	Number of Samples	Cesium-137 $\mu\mu$c/kg	Mean*
17 Jul 63	16	16	(Jul) 16
14 Aug 63	4	37	(Aug) 32
28 Aug 63	17	31	
4 Sep 63	10	29	
14 Sep 63	5	67	(Sep) 45
〃	5	54	
3 Oct 63	5	29	
〃	5	31	
〃	5	29	
4 Oct 63	5	21	
〃	5	20	
24 Oct 63	5	76	(Oct) 36
30 Oct 63	5	34	
〃	5	39	
〃	5	34	
〃	5	50	
14 Nov 63	6	23	
27 Nov 63	5	67	
〃	5	43	(Nov) 34
〃	5	31	
〃	5	10	
12 Dec 63	5	22	
〃	5	33	
〃	4	32	
24 Dec 63	5	25	
〃	5	31	(Dec) 29
〃	5	28	
〃	5	34	
〃	5	19	
〃	5	37	

* Weighted mean for month

Cesium-137 in Human Blood and Total Body Burden

(Institute of Public Health)

The estimation of the cesium-137 burden in the human body and the cesium-137 content in the blood of the same subject, were carried out at the Institute of Public Health.

In the basic determination, the total body burden of nine laboratory personnel were measured with a whole body counter at the Japan Atomic Energy Research Institute, using the method reported by S. Suguri in I. A. E. A. Report 219-233. One hundred m*l* blood samples were taken from each of the subjects, either the day before or the day after whole body measurements, and processed as described in "Cesium-137 in Human Blood", page 29 of this issue. The results are shown in Table 16. If Cesium-137 determinations were made on subjects in which equilibrium conditions between the blood and whole body tissues, with respect to cesium-137, were assumed, the total body burden could be estimated.

Trble 16. ^{137}Cs Total Body Burden and Content in the Blood of the Same Subject

By N. Yamagata

(Institute of Public Health)

Date Measured	Sex	Age	Body Weight kg	^{137}Cs in Blood $\mu\mu$c/kg	Total Body Burden (mμc)	*Factor
20 Nov 63	M	32	57.5	40	10.8	4.7
〃	〃	22	61.2	37	10.0	4.4
〃	〃	22	53.0	34	5.1	2.8
〃	〃	29	65.3	40	11.4	4.4
〃	〃	**24	55.7	32	9.5	5.3
8 Jan 64	〃	**24	56.0	66	8.4	2.3
〃	〃	37	56.0	91	11.0	2.2
〃	〃	43	52.0	92	10.4	2.2
〃	F	23	47.5	100	3.8	0.8
〃	〃	22	43.0	69	3.9	1.3

$$* \text{Factor} = \frac{\text{Total Body Burden of } ^{137}\text{Cs (m}\mu\text{c)} \times 1000}{\text{Body Weight(kg)} \times ^{137}\text{Cs in Blood } (\mu\mu\text{c/kg})}$$

The mean value of the factor for 8 male determinations was 3.5 with a std. dev. of ±1.3
The female data were excluded because sex dependency was known

**The same person were used as subjects

Cesium-137 in Human Urine

(National Institute of Radiological Sciences)

Cesium-137 content in human urine has been analyzed at the National Institute of Radiological Sciences since 1959 to estimate the cesium-137 body burden of the population. During the period 1959 to 1961, samples were sent from Osaka and Ishikawa Prefectures twice a year. However, since 1962 this work has been expanded and samples are being sent from the above prefectures quarterly, and from Hokkaido and Fukuoka Prefectures twice a year.

Approximately 1200 middle school students in each prefecture each supplied 200 ml of urine. The urine taken from 50 students were combined to make one 10 liter sample. Urine was collected and concentrated at the prefectural public health laboratories, then sent to the National Institute of Radiological Sciences.

For the analysis of cesium-137, an aliquot of the acidified urine sample was taken after adding a cesium carrier, then the cesium was adsorbed on solid ammonium phosphomolybdate. The precipitate was dissolved with a sodium hydroxide solution, and cesium was separated by using a phenol-sulfonic acid type cation exchange resin column. Cesium was finally precipitated as cesium perchlorate, and the β-activity measured with an anticoincidence low-background counter.

Results obtained during the period June 1962 to March 1963 are shown in Table 17. Table 18 shows a summary of results obtained since 1959, and Figure 11 shows graphically the time course of cesium-137 content in human urine.

Table 17. ^{137}Cs in Human Urine —Jun 62 to Mar 63—

By M. Izawa, S. Saiki, M. Uchiyama and M. Tano
(National Institute of Radiological Sciences)

Kanazawa, ISHIKAWA (Jun, Jul 62)

Age	Sex	Month Sampled	^{137}Cs$\mu\mu$c/l
13	F	Jul 62	21.5
〃	M	〃	21.2
12	〃	Jun 62	20.8
〃	〃	Jul 62	18.9
13	〃	〃	18.6
12	〃	〃	18.5
〃	〃	〃	17.5
13	F	〃	17.4
12	M	〃	17.0
〃	F	〃	17.0
13	F	〃	16.9
12	M	〃	16.8
〃	F	〃	16.8
12	M	〃	16.4
13	〃	〃	16.4
12	F	〃	16.3
〃	〃	Jun 62	16.0
〃	M	Jul 62	15.9
〃	F	〃	15.6
〃	M	Jun 62	15.2
〃	F	Jul 62	15.0
〃	〃	〃	12.3
〃	〃	Jun 62	12.2
〃	〃	Jul 62	10.2
Ave.			16.9

Osaka, OSAKA (Jun, Jul 62)

Age	Sex	Month Sampled	^{137}Cs$\mu\mu$c/l
13, 14	M	Jul 62	37.5
〃	〃	Jun 62	36.2
〃	〃	〃	33.8
〃	〃	Jul 62	32.6
〃	F	〃	32.3
〃	M	〃	29.5
〃	F	〃	29.5
〃	M	〃	27.7
〃	F	〃	26.6
〃	M	〃	25.7
〃	〃	Jun 62	25.4
〃	〃	Jul 62	25.2
〃	F	〃	24.7
〃	〃	〃	24.5
〃	〃	〃	23.4
〃	〃	Jun 62	23.2
〃	M	Jul 62	23.2
〃	〃	〃	22.9
〃	F	Jun 62	21.8
〃	〃	Jul 62	21.7
〃	〃	〃	20.4
〃	M	〃	18.3
〃	F	〃	18.2
〃	〃	Jun 62	16.3
Ave.			25.7

Table 17. ^{137}Cs in Human Urine —Jun 62 to Mar 63— *(continued)*

Sapporo, HOKKAIDO (Jun, Jul 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
12	F	Jul 62	31.9
〃	M	〃	28.5
〃	F	〃	27.9
〃	M	〃	27.5
〃	M	〃	26.7
〃	M	Jun 62	26.1
〃	F	〃	25.7
〃	F	Jul 62	23.4
〃	M	〃	22.3
〃	F	〃	22.1
〃	F	〃	21.8
〃	M	〃	21.6
〃	M	〃	21.3
〃	F	〃	21.2
〃	F	〃	20.9
〃	M	Jun 62	20.4
〃	M	〃	20.2
〃	M	〃	19.7
〃	F	〃	19.0
〃	M	Jul 62	18.9
〃	F	Jun 62	18.4
〃	F	Jul 62	16.9
〃	F	Jun 62	16.1
〃	M	〃	16.0
Ave.			22.5

Fukuoka, FUKUOKA (Jun 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
12	F	Jun 62	26.3
〃	M	〃	25.6
〃	M	〃	25.1
〃	M	〃	24.1
〃	F	〃	20.8
〃	F	〃	20.6
〃	F	〃	20.5
〃	F	〃	20.2
〃	F	〃	20.2
〃	M	〃	19.9
〃	M	〃	19.7
〃	F	〃	19.7
〃	M	〃	19.1
〃	F	〃	19.0
〃	F	〃	18.2
〃	M	〃	17.8
〃	F	〃	17.6
〃	F	〃	17.5
〃	M	〃	17.1
〃	M	〃	16.6
〃	M	〃	16.3
〃	F	〃	16.3
〃	M	〃	15.4
〃	M	〃	13.5
Ave.			19.6

Kanazawa, ISHIKAWA (Sep, Oct 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
12	F	Sep 62	32.9
13	M	Oct 62	31.8
12	M	〃	30.8
13	M	〃	28.1
12	M	Sep 62	27.9
〃	F	Oct 62	27.9
13	F	〃	27.5
〃	F	〃	27.1
12	M	〃	26.3
〃	F	〃	25.1
13	M	〃	24.7
〃	F	〃	24.6
12	F	Sep 62	24.5
〃	F	Oct 62	24.3
〃	M	Sep 62	23.9
〃	M	〃	23.8
〃	M	〃	23.3
〃	M	Oct 62	23.3
〃	F	Sep 62	21.4
〃	F	〃	20.9
〃	M	〃	20.6
〃	F	〃	18.4
〃	M	〃	17.9
〃	F	〃	16.2
Ave.			26.7

Osaka, OSAKA (Sep 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
13, 14	F	Sep 62	25.4
〃	M	〃	24.6
14	F	〃	23.6
13, 14	M	〃	23.2
14	F	〃	21.7
13, 14	M	〃	21.6
14	M	〃	20.9
13, 14	M	〃	20.9
〃	F	〃	20.9
14	M	〃	20.5
13. 14	F	〃	20.5
〃	F	〃	20.0
14	M	〃	18.6
13, 14	F	〃	18.2
14	F	〃	18.1
〃	F	〃	17.4
〃	M	〃	17.1
13, 14	F	〃	17.1
14	M	〃	17.0
〃	F	〃	16.9
〃	F	〃	15.4
〃	M	〃	15.1
13, 14	M	〃	15.0
〃	F	〃	13.0
Ave.			18.2

Table 17. ^{137}Cs in Human Urine —Jun 62 to Mar 63— *(continued)*

Kanazawa, ISHIKAWA (Dec 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
13	M	Dec 62	54.6
12	F	〃	49.3
13	M	〃	49.0
12	M	〃	48.6
〃	M	〃	48.4
〃	M	〃	47.9
13	F	〃	46.8
〃	M	〃	45.7
12	F	〃	45.3
〃	M	〃	44.7
〃	M	〃	44.2
〃	F	〃	43.1
〃	M	〃	42.4
〃	M	〃	41.8
〃	F	〃	41.0
〃	M	〃	40.6
13	F	〃	38.7
12	F	〃	37.7
〃	F	〃	37.5
〃	M	〃	36.2
13	F	〃	35.2
12	F	〃	34.2
〃	F	〃	33.2
〃	F	〃	26.5
	Ave.		42.4

Osaka, OSAKA (Nov, Dec 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
14	F	Dec 62	36.4
13, 14	M	Nov 62	34.7
〃	F	〃	32.8
14	M	Dec 62	31.7
13, 14	F	Nov 62	31.5
〃	F	〃	31.3
14	M	Dec, Nov 62	30.9
〃	M	Dec 62	30.8
〃	M	〃	30.5
〃	M	Nov 62	30.3
13, 14	M	Nov 62	30.3
〃	F	〃	30.3
14	M	Dec 62	28.9
13, 14	M	Nov 62	28.2
〃	M	〃	27.9
14	F	Dec 62	27.7
〃	M	〃	25.9
〃	M	〃	25.8
〃	F	〃	25.5
〃	F	〃	25.0
13, 14	F	Nov 62	25.0
〃	F	〃	23.8
14	F	Dec 62	22.9
〃	F	〃	19.6
	Ave.		28.3

Sapporo, HOKKAIDO (Dec 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
12	F	Dec 62	76.1
〃	F	〃	75.8
〃	F	〃	75.0
〃	F	〃	71.7
〃	F	〃	69.6
〃	M	〃	62.7
〃	M	〃	62.3
〃	M	〃	61.9
〃	M	〃	59.2
〃	F	〃	58.4
〃	F	〃	55.4
〃	F	〃	54.1
〃	M	〃	53.1
〃	M	〃	50.7
〃	M	〃	50.2
〃	M	〃	48.3
〃	F	〃	45.7
〃	M	〃	44.8
〃	M	〃	43.1
〃	F	〃	42.6
〃	M	〃	41.9
〃	F	〃	38.5
〃	M	〃	36.6
〃	F	〃	28.3
	Ave.		54.4

Fukuoka, FUKUOKA (Dec 62)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
12	M	Dec 62	46.8
〃	M	〃	44.2
〃	M	〃	42.9
〃	M	〃	41.4
〃	M	〃	37.7
〃	F	〃	33.4
〃	M	〃	32.9
〃	F	〃	32.6
〃	F	〃	31.6
〃	F	〃	31.2
〃	M	〃	30.8
〃	M	〃	30.4
〃	F	〃	30.0
〃	M	〃	29.5
〃	F	〃	28.7
〃	F	〃	28.6
〃	F	〃	27.5
〃	F	〃	27.3
〃	M	〃	26.5
〃	F	〃	26.1
〃	F	〃	25.7
〃	M	〃	25.5
〃	M	〃	24.3
〃	F	〃	24.1
	Ave.		31.2

Table 17. ^{137}Cs in Human Urine —Jun 62 to Mar63— *(continued)*

Kanazawa, ISHIKAWA (Feb, Mar 63)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
13	M	Mar 63	51.0
12	M	Feb 63	45.2
〃	F	〃	44.9
13	F	Mar 63	44.6
〃	M	〃	43.2
12	M	Feb 63	43.0
〃	F	Mar 63	43.0
〃	F	Feb 63	42.8
〃	M	Mar 63	42.6
〃	M	Feb 63	42.4
13	F	Mar 63	41.3
〃	F	〃	41.1
12	M	Feb 63	40.9
〃	F	〃	40.5
〃	M	〃	39.5
13	M	Mar 63	39.1
12	F	〃	38.8
〃	M	〃	37.8
〃	F	Feb 63	36.2
〃	M	〃	35.4
〃	F	Mar 63	34.2
〃	M	〃	32.7
〃	F	Feb 63	32.5
〃	F	〃	31.9
Ave.			40.7

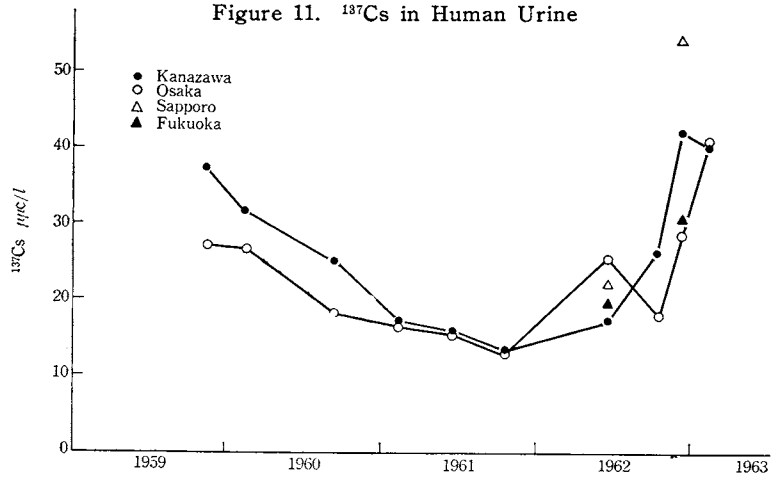
Osaka, OSAKA (Feb 63)

Age	Sex	Month Sampled	$^{137}Cs\mu\mu c/l$
14	M	Feb 63	52.2
〃	F	〃	52.0
〃	F	〃	50.5
〃	M	〃	49.2
〃	M	〃	47.5
〃	M	〃	46.5
〃	F	〃	45.8
〃	F	〃	45.0
13, 14	F	〃	44.7
14	M	〃	44.0
〃	M	〃	42.1
〃	F	〃	41.0
〃	M	〃	40.6
〃	F	〃	40.4
〃	F	〃	39.0
〃	F	〃	38.5
〃	M	〃	36.7
〃	F	〃	35.5
〃	M	〃	34.4
〃	M	〃	32.6
〃	M	〃	31.5
〃	M	〃	30.9
〃	F	〃	29.6
〃	F	〃	29.3
Ave.			40.8

Table 18. Summary of Average ^{137}Cs Concentration in Human Urine

Date			$^{137}Cs\mu\mu c/l$ Kanazawa	Osaka	Sapporo	Fukuoka
1959	Nov	50	37.6	27.2		
1960	Feb	60	31.8	26.9		
	Sep	〃	25.4	18.6		
1961	Feb	61	17.4	16.8		
	Jun	〃	15.5	15.3		
	Oct	〃	13.9	13.1		
1962	Jun, Jul	62	16.9	25.7	22.5	19.6
	Sep, Oct	〃	26.7	18.2		
	Nov, Dec	〃	42.4	28.3	54.4	31.2
1963	Feb, Mar	63	40.7	40.8		

Figure 11. ^{137}Cs in Human Urine



Contributor

The analytical results quoted in this issue were contributed by the following institutes.

Institute and Address	Item
Meteorological Research Institute 49, Mabashi-4-chome, Suginami-ku, Tokyo	Fallout
National Institute of Radiological Sciences 250, Kurosuna-cho, Chiba-shi	Rain Water, Human Bone, Human Urine
Hydrographic Division, Maritime Safety Agency 2, Tsukiji-5-chome, Chuo-ku, Tokyo	Rain Water
National Institute of Hygienic. Sciences 203, Tamagawayoga-machi-2-chome, Setagaya-ku, Tokyo	Rain Water
Japan Analytcal Chemistry Research Institute 17, Kikukawa-cho-2-chome, Sumida-ku, Tokyo	City Water, Milk, Total Diet
National Institute of Agricultural Sciences 1, Nishigahara-2-chome, Kita-ku, Tokyo	Rice
Institute of Public Health 39, Shibashiroganedai-machi-1-chome, Minato-ku, Tokyo	Powdered Milk, Human Blood
National Institute of Animal Industry 959, Aoba-cho, Chiba-shi	Milk