RADIOACTIVITY SURVEY DATA in Japan

NUMBER 1
NOV. 1963

National Institute of Radiological Sciences
Chiba, Japan

In April of 1963, in compliance with directives set forth the Japan Atomic Energy Commission, the Division of Radioactivity Survey in 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 Nationwide Radioactivity Survey Network were assembled and compiled in this publication. Present plans are to issue this kind of publication on a quarterly basis.

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

Preface

It would be advantageous to assemble and compile data on radioactive contamination of human environment in Japan and publish it in English for the use of research workers in this relevant field at home and in foreign countries. There are various kinds of institutions and laboratories in this country which are concerned with the research in radioactive environmental contamination.

Recently numerous valuable data to assess hazards of radiation to man from these radiation levels are coming forth from such institutions.

Present plans are to compile these data by our institution and to issue this publication on a quarterly basis, however, this will depend largely on the response and circulation derived from this issue.

This is a first attempt for us to issue this kind of booklet in compliance with a request of Atomic Energy Bureau, Science and Technology Agency of Japan.

Any assistance, comments and informations which will help us to reach our objective at this time is desired and will be greatly appreciated.

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Radioactivity Survey Data in Japan

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Contents

National Institute of Radiological Sciences

Meteorological Data

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

(Meteorological Research Institute)

Since 1954, the Meteorological Research Institute, using large trays, has collected monthly deposits of strontium-90 and cesium-137 and the resultant products observed and recorded.

The total cumulative deposits of strontium-90 reached 48.6 mc/km^2, and cesium-137 reached 134.1 mc/km^2 in July 1963 in Tokyo. The monthly deposits of strontium-90 and cesium-137 recorded during the period Jan 1961 to Jul 1963 are shown in Table 1. Table 2 shows the annual deposits recorded during the period 1954 to 1963, and Figure 1 shows the cumulative amount recorded in Tokyo.

Table 1. Monthly Deposits of ^{90}Sr, ^{89}Sr and ^{137}Cs Collected in Tokyo

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

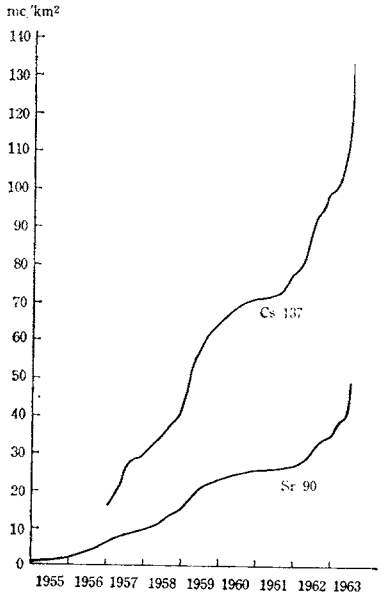
	^{90}Sr (mc/km^2)			^{137}Cs (mc/km^2)			^{89}Sr* (mc/km^2)			^{137}Cs/^{90}Sr			^{89}Sr/^{90}Sr			Precipitation (mm)		
Year / Month	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963	1961	1962	1963
Jan	0.03	0.19	0.11	0.09	0.89	0.19	0	6.07	1.13	3.0	4.7	1.7	0	30.3	10.3	31.7	31.7	0
Feb	0.04	0.22	0.31	0.09	0.78	0.71	0	5.66	3.93	2.2	3.5	2.3	0	25.8	12.6	38.6	14.5	21.2
Mar	0.17	0.58	2.58	0.20	1.89	4.85	0	10.4	2.20	1.2	3.3	1.9	0	17.9	0.9	102.5	57.5	84.7
Apr	0.20	1.08	1.16	0.37	3.16	3.42	0	16.2	7.00	1.9	2.9	2.9	0	15.0	6.0	166.9	112.6	79.0
May	0.13	1.63	2.66	0.23	3.97	5.58	0	11.8	10.6	1.8	2.4	2.1	0	7.2	4.0	49.1	184.7	118.7
Jun	0.31	1.21	4.59	0.57	4.18	14.8	0	10.1	5.5	1.8	3.5	3.2	0	8.3	1.2	299.2	203.7	239.8
Jul	0.05	0.80	2.24	0.11	1.60	5.1	0	4.5	4.2	2.2	2.0	2.3	0	5.7	1.9	19.6	155.0	125.6
Aug	0.02	0.29		0.08	0.70		0	1.94		4.0	2.4		0	6.7		28.2	102.9	
Sep	0.05	0.10		0.30	0.31		1.05	1.18		6.0	3.1		26.3	11.8		86.8	4.1	
Oct	0.60	0.58		3.22	1.73		18.4	7.83		5.4	2.6		30.6	13.5		313.2	82.4	
Nov	0.25	1.00		1.37	2.02		12.5	20.3		5.5	2.0		50	20.3		52.8	141.7	
Dec	0.23	0.41		0.71	0.69		9.1	12.4		3.1	1.7		40	30.2		43.7	62.1	
Total	2.08	8.09		7.34	21.92											1232.3	1152.9	

* ^{89}Sr converted value as of the 15th of each month

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

	^{90}Sr mc/km^2	^{137}Cs mc/km^2
1954	1.0	
1955	0.7	
1956	3.8	29.0
1957	3.5	
1958	5.28	11.41
1959	8.09	23.6
1960	2.39	6.2
1961	2.08	7.34
1962	8.09	21.92
1963 Jan～Jul	13.65	34.65
Total	48.6	134.1

Figure 1. Cumulative Amount of ^{90}Sr and ^{137}Cs Deposits (Tokyo) -By MRI-



Dietary Data

Strontium-90 and Cesium-137 in Total Diet

(National Institute of Nutrition) and
(The Institute of Public Health)

Total diet samples collected from vaious parts of the country were analyzed for strontium-90 content at the National Institute of Nutrition.

Samples were collected by the staff of the Prefectural Research Institutes of Hygiene or the Local Health Centers.

The total diet is similar in all respects to that eaten regularly by the family.

A town and village from each prefecture shown in Figure 2 were chosen and ten families from each location were picked up at random. Each subject family cooked an additional portion in excess of the normal amount for an adult or child. Samplings on birthdays of family members and special feasts were avoided. Samples of all food eaten for breakfast, lunch, supper and between meals each day was collected. The samples included milk and tea but, inedible portions such as shells, fishbone, etc., were removed. To analyze the strontium-90 content, one diet sample was prepared from the total amount collected from nine of the ten subject families. The analytical method recommended by the Science and Technology Agency was used.

Results of analyses are shown in Table 3-1 and 3-2.

The remaining sample was analyzed at The Institute of Public Health for cesium-137 content. The analytical method reported by N. Yamagata and T. Yamagata in the "Analyst, Vol. 85", was used.

Resulted of analyses are shown in Table 3-3.

Figure 2. Sampling Locations
Total Deit-

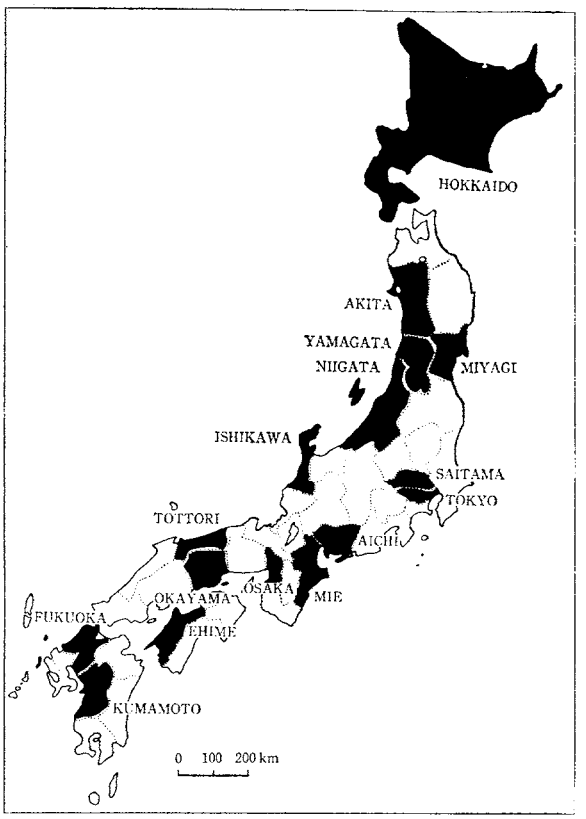


Table 3-1. Daily Intake of ^{90}Sr ($\mu\mu c$) During the Period Aug 1960 to Feb 1963

By H. Hayami, T. Hayakawa, R. Sasaki,
K. Suzuki and S. Gotou
(National Institute of Nutrition)

District	Category	1960 Aug	1960 Nov	1961 Aug	1961 Oct	1961 Nov	1962 Feb	1962 Jun	1962 Jul	1962 Oct	1962 Nov	1962 Dec	1963 Feb
													(Mar)
HOKKAIDO	U A	3.9	5.0	5.9	7.2			8.0		10.7		6.5	11.7
	R A	4.9	5.0	4.1	7.4			10.2		9.2		7.8	9.5
	R C	2.8	6.4	2.7	3.3			7.7		6.5		3.5	6.8
MIYAGI	U A	6.4							3.6		8.0		
	R A	9.0							3.7		11.6		
	R C								4.7		8.8		
													(Mar)
AKITA	U A							20.0		22.7		16.2	15.7
	R A							18.6		19.3		16.7	21.4
	R C							9.7		13.6		10.0	17.7
YAMAGATA	U A			10.9		6.9							
	R A			6.1		12.9							
					(Sep)								
SAITAMA	U A	3.7	8.1		3.8		4.3						
	R A	4.2	3.7		4.8		3.9						
	R C	3.5	3.4		2.7		4.1						
TOKYO	D A						4.9						
	D C						4.1						
	Up A						5.0						
	Up C						4.5			(Sep)			
	U A							5.6		5.1		7.0	4.1
	R A							5.6		8.2		9.0	6.0
	R C							4.5		4.3		5.5	5.6
NIIGATA	U A						8.5						
	U C						7.7						
	R A						10.5						
	R C						8.4						
ISHIKAWA	U A	5.8	11.9	5.4		8.5			13.5		17.5		
	R A	4.7	10.7	8.1		10.0			8.5		16.6		
	R C	5.4	6.7	5.3		5.9			6.7		9.2		
AICHI	U A								5.5		7.0		
	R A								4.2		11.3		
	R C								3.1		5.3		
MIE	U A	8.2	6.8	3.9									
	R A	6.0	5.7										
OSAKA	U A								4.0		8.0		
	R A								3.8		10.2		
	R C								3.3		6.6		
TOTTORI	U A								16.2		19.1		
	R A								10.7		13.1		
	R C								4.7		10.9		
OKAYAMA	U A			4.2		3.0							
	R A			4.6		6.1							
EHIME	U A	4.1	6.3	3.4		4.9							
	R A	9.2	7.8	5.4		3.6							
								(May)		(Aug)		(Oct)	
FUKUOKA	U A							5.4		6.3		8.4	7.8
	U C							5.0					
	R A						8.4	6.5		5.9		12.8	7.8
	R C							4.1		5.0		4.5	7.8
KUMAMOTO	U A	5.7	6.2		4.4	5.8							
	R A	8.0	10.0		6.9	9.5							
	R C	12.4	7.5		5.9	7.5							

Category; UA-Urban adults: RA-Rural adults; UC-Urban children; RC-Rural children;
DA-Downtown adults; DC-Downtown children; UpA-Uptown adults; UpC-Uptown children.

Table 3 2. ^{90}Sr ($\mu\mu$c/gCa) in Total Diet Aug 1960 to Feb 1963

By H. Hayami, T. Hayakawa, R. Sasaki,
K. Suzuki and S. Gotou
(National Institute of Nutrition)

District	Category	1960 Aug	1960 Nov	1961 Aug	1961 Oct	1961 Nov	1962 Feb	1962 Jun	1962 Jul	1962 Oct	1962 Nov	1962 Dec	1963 Feb
													(Mar)
HOKKAIDO	U A	8.9	9.1	9.5	11.0			17.7		16.6		13.5	20.1
	R A	9.1	5.3	6.8	12.1			16.9		14.0		16.1	13.7
	R C	7.4	7.5	9.2	11.4			18.0		12.5		10.7	11.3
MIYAGI	U A	8.1							8.6		15.3		
	R A	21.5							15.5		24.8		
	R C								19.2		26.3		
													(Mar)
AKITA	U A							37.2		39.9		20.1	32.6
	R A							33.8		27.9		21.2	17.8
	R C							35.8		29.6		17.7	36.6
YAMAGATA	U A			20.9		9.3							
	R A			8.2		14.9							
					(Sep)								
SAITAMA	U A	6.4	14.0		8.1		8.8						
	R A	21.0	5.6		12.5		9.2						
	R C	18.7	7.6		12.1		14.2						
TOKYO	D A						12.1						
	D C						10.4						
	Up A						7.8						
	Up C						14.3						
										(Sep)			
	U A							12.0		11.0		11.7	7.3
	R A							13.6		22.8		17.4	9.9
	R C							11.6		12.8		12.6	10.9
NIIGATA	U A						20.7						
	U C						19.9						
	R A						23.0						
	R C						18.0						
ISHIKAWA	U A	11.0	9.1	11.1		12.4			36.1		26.6		
	R A	6.6	16.6	11.3		15.5			17.3		21.2		
	R C	24.7	16.2	12.0		17.7			18.8		24.9		
AICHI	U A								11.4		12.9		
	R A								13.6		19.6		
	R C								12.7		12.6		
MIE	U A	10.3	8.9	6.0									
	R A	10.8	4.3										
OSAKA	U A								8.7		11.8		
	R A								8.6		20.8		
	R C								9.4		18.6		
TOTTORI	U A								23.9		25.2		
	R A								18.5		16.4		
	R C								16.3		23.1		
OKAYAMA	U A			9.8		6.1							
	R A			11.7		11.9							
EHIME	U A	6.3	6.6	5.7		6.9							
	R A	11.7	13.2	7.4		4.6							
								(May)	(Aug)				
FUKUOKA	U A							18.0	11.3	15.2			12.4
	U C							17.3					
	R A						14.4	13.3	11.0	15.0			19.2
	R C							10.8	17.3	11.7			12.8
KUMAMOTO	U A	15.2	12.0		6.5	12.3							
	R A	13.6	16.0		9.7	21.6							
	R C	12.5	12.3		13.1	20.8							

Category; UA-Urban adults; RA-Rural adults; UC-Urban children; RC-Rural children; DA-Downtown adults, DC-Downtown children; UpA-Uptown adults; UpC-Uptown adults.

Table 3–3. Daily Intake of ^{137}Cs ($\mu\mu c$) During the Period Aug 1960 to Sep 1962

By N. Yamagata and K. Iwashima

(The Institute of Public Health)

District	Category	1960		1961		1962					
		Aug	Nov	Aug	Nov	Feb	May	Jun	Jul	Aug	Sep
HOKKAIDO	U A	43	32	45	35				69		
	R A	24	41	40	28				82		
	R C								29		
AKITA	U A							24			
	R A							39			
	R C							27			
SAITAMA	U A	16	33	31	82						
	R A	19	18	26	64						
	R C	23	16	14	42						
TOKYO	D A					34					
	D C					26					
	UpA					60					
	UpC					65					
	U A							45			70
	R A							54			28
	R C							27			16
NIIGATA	U A					37					
	U C					26					
	R A					45					
	R C					34					
ISHIKAWA	U A	21	40	33	19				24		
	R A	14	46	33	38				35		
	R C	34	38	26	17				20		
AICHI	U A								116		
	R A								94		
	R C								84		
MIE	U A	21	42	18		43				124	
	R A	27	38							39	
	R C									19	
TOTTORI	U A								43		
	R A								57		
	R C								39		
OKAYAMA	U A			21		43			66		
	R A			37		46			47		
	R C								43		
EHIME	U A	15	22	20	45						
	R A	19	18	42	48						
FUKUOKA	U A					52	42				
	U C						34				
	R A					40	116				
	R C						54				
KUMAMOTO	U A	18	19	26	23						
	R A	26	37		35						
	R C	18	31	31	39						

Category; UA-Urban adults; RA-Rural adults; UC-Urban children; RC-Rural children; DA-Downtown adults; DC-Downtown children; UpA-Uptown adults; UpC-Uptown children.

Strontium-90 and Cesium-137 in Rice and Wheat

(National Institute of Agricultural Sciences) and *(The Institute of Public Health)*

Analysis of the strontium-90 content in rice and wheat has been conducted at the National Institute of Agricultural Sciences.

Samples were sent from National and Prefectural Agricultural Experimental Stations from various parts of the country. The cereal samples were cultivated under the usual conditions (consisting of soil type, crop variety, fertilizer application, harvest time etc.) found in the area. Sampling stations are shown in Figure 3.

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

Results obtained in 1961 are shown in Table 4-1 and 5-1.

The samples listed in those tables were analyzed at The Institute of Public Health, Ministry of Public Welfare, to determine the cesium-137 content. The analytical method reported in the "Analyst, Vol. 85", was used.

Results of analyses are shown in Table 4-2 and 5-2.

Strontium-90 and cesium-137 content during the period 1957 to 1961 are shown in Figure 4 and 5.

Figure 3. Sampling Stations
- Rice and Wheat

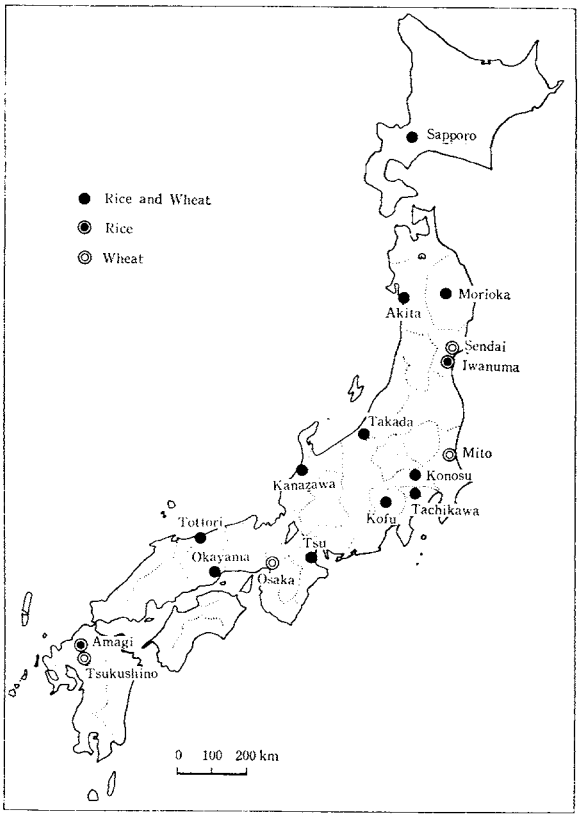


Table 4-1. ^{90}Sr in Rice-1961
By K. Kodaira
(National Institute of Agricultural Sciences)

Location	Month Harvested	Unpolished ^{90}Sr $\mu\mu c/kg$	Polished ^{90}Sr $\mu\mu c/kg$
Sapporo, HOKKIDO	Sep	7	1
Morioka, IWATE	Sep	8	1
Sendai, MIYAGI	Sep	9	2
Akita, AKITA	Oct	9	2
Mito, IBARAGI	Sep	4	1
Konosu, SAITAMA	Oct	14	2
Tachikawa, TOKYO	Oct	13	2
Takada, NIIGATA	Oct	10	2
Kanazawa, ISHIKAWA	Sep	5	1
Kofu, YAMANASHI	Oct	5	1
Tsu, MIE	Sep	6	2
Osaka, OSAKA	Nov	9	2
Tottori, TOTTORI	Oct	13	2
Okayama, OKAYAMA	Nov	6	1
Tsukushino, FUKUOKA	Oct	11	2
Mean Values		8.6	1.6

Table 4-2. ^{137}Cs in Rice-1961
By N. Yamagata
(The Institute of Public Health)

Location	Month Harvested	Polished Rice ^{137}Cs $\mu\mu c/kg$
Sapporo, HOKKAIDO	Sep	65
Morioka, IWATE	Sep	49
Akita, AKITA	Oct	39
Mito, IBARAGI	Sep	29
Konosu, SAITAMA	Oct	25
Tachikawa, TOKYO	Oct	35
Takada, NIIGATA	Oct	59
Kanazawa, ISHIKAWA	Sep	39
Kofu, YAMANASHI	Oct	14
Tsu, MIE	Sep	41
Osaka, OSAKA	Nov	22
Tottori, TOTTORI	Oct	31
Okayama, OKAYAMA	Nov	23
Tsukushino, FUKUOKA	Oct	43
Mean Value		37

Table 5-1. ^{90}Sr in Wheat-1961

By K. Kodaira

(National Institute of Agricultural Sciences)

Location	Month Harvested	Whole Grain ^{90}Sr $\mu\mu c/kg$	Flour ^{90}Sr $\mu\mu c/kg$
Sapporo, HOKKAIDO	Aug	10	4
Morioka, IWATE	Jul	41	8
Iwanuma, MIYAGI	Jul	35	7
Akita, AKITA	Jul	79	21
Konosu, SAITAMA	Jun	25	6
Tachikawa, TOKYO	Jun	24	5
Takada, NIIGATA	Jun	39	11
Kanazawa, ISHIKAWA	Jun	25	6
Kofu, YAMANASHI	Jun	8	2
Tsu, MIE	Jun	66	16
Tottori, TOTTORI	Jun	25	7
Okayama, OKAYAMA	Jun	17	5
Amagi, FUKUOKA	Jun	20	4
Mean Values		24.2	7.7

Table 5-2. ^{137}Cs in Wheat-1961

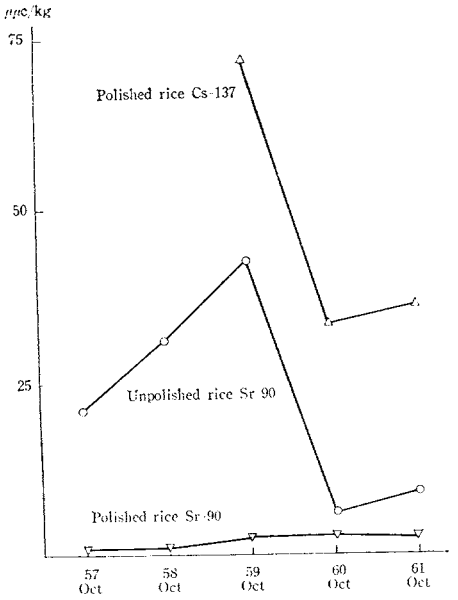
By N. Yamagata

(The Institute of Public Health)

Location	Month Harvested	Flour ^{137}Cs $\mu\mu c/kg$
Sapporo, HOKKAIDO	Aug	44
Morioka, IWATE	Jul	50
Akita, AKITA	Jul	49
Konosu, SAITAMA	Jun	50
Tachikawa, TOKYO	Jun	38
Takada, NIIGATA	Jun	39
Kanazawa, ISHIKAWA	Jun	33
Kofu, YAMANASHI	Jun	68
Tsu, MIE	Jun	75
Tottori, TOTTORI	Jun	23
Okayama, OKAYAMA	Jun	42
Amagi, Fukuoka	Jun	25
Mean Value		45

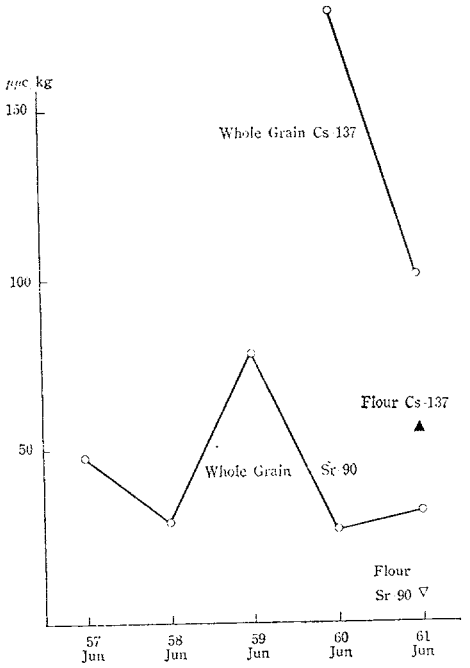
Figure 4. ^{90}Sr and ^{137}Cs in Rice-1957 to 1961

-By NIAS and TIPH-



Figue 5. ^{90}Sr and ^{137}Cs in Wheat-1957 to 1961

-By NIAS and TIPH-



Strontium-90 and Cesium-137 in Milk

Part I *(Japan Analytical Chemistry Research Institute)*

Since December 1961, milk samples from various parts of the country were analyzed for strontium -90 and cesium-137 content. Sampling stations are shown in Figure 6.

Three liter samples were purchased at large representative farms in selected prefectures, by the staff of 24 Prefectural Research Institutes of Hygiene. The samples were incinerated at 550 °C, then sent to the Japan Analytical Chemistry Research Institute for analyses.

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

Results of analyses, arranged according to samping area and month during 1961 and 1962 are tabulated in Table 6 and 7. Table 8 shows the results during the period January to May 1963.

Figure 6. Sampling Stations -Milk-Part I-

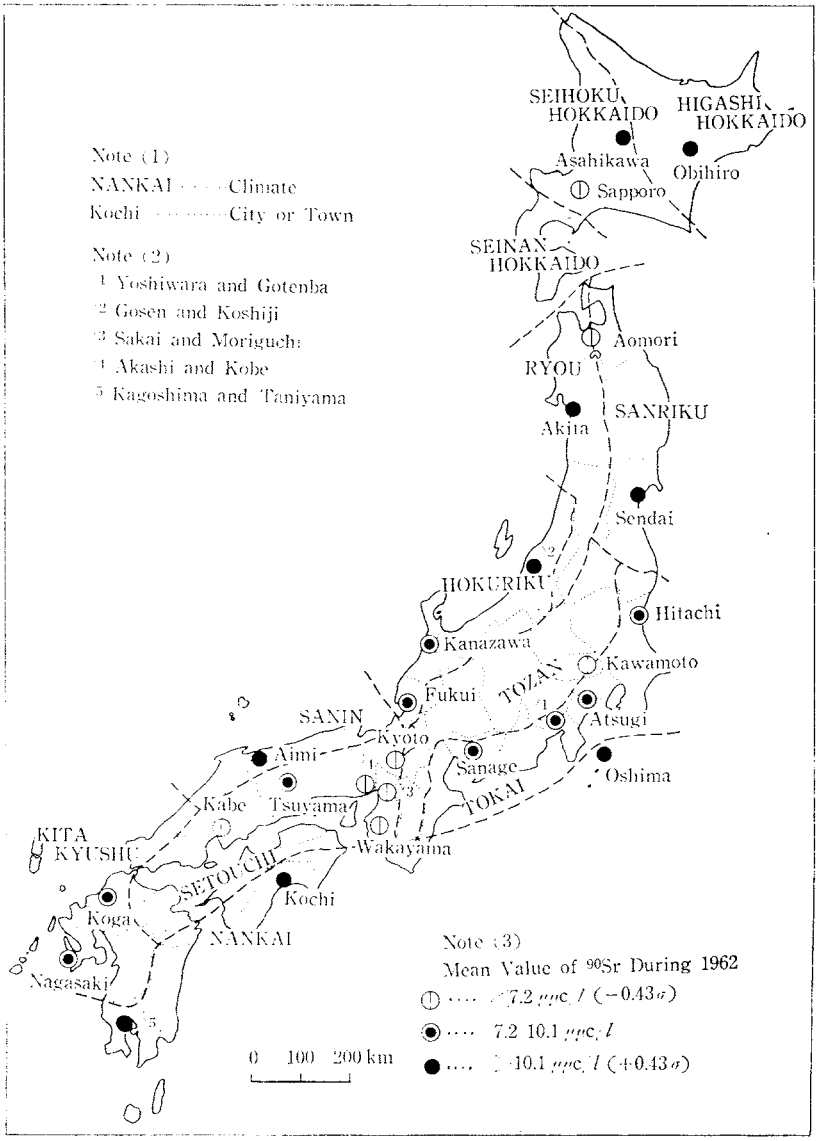


Table 6. ^{90}Sr and ^{137}Cs in Milk-Dec 1961

By T. Asari, M. Chiba, M. Kuroda and others

(Japan Analytical Chemistry Research Institute)

Location	Strontium-90		Cesium-137	
	μμc/l	μμc/g Ca	μμc/l	μμc/gK
Aomori, AOMORI	6.7	6.2	38	23
Kawamoto, SAITAMA	4.5	3.6	23	12
Atsugi, KANAGAWA	4.1	3.8	30	21
Kawasaki, KANAGAWA	3.6	3.4	29	16
Kanazawa, ISHIKAWA	6.9	6.3	43	29
Kyoto, KYOTO	6.1	5.5	31	20
Wakayama, WAKAYAMA	4.0	3.6	26	18
Aimi, TOTTORI	7.7	6.0	48	28
Tsuyama, OKAYAMA	4.9	4.7	23	16
Kabe, HIROSHIMA	4.1	3.1	35	23
Nagasaki, NAGASAKI	5.3	4.6	19	17

Table 7-1. ^{90}Sr (μμc/l) in Milk 1962

By T. Asari, M. Chiba, M. Kuroda and others

(Japan Analytical Chemistry Reserch Institute)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wakkanai, HOKKIDO	8.1		5.1									
Asahikawa, HOKKAIDO					15		14		16		27	
Obihiro, HOKKAIDO	5.1		8.7		6.7		13		19		17.1	
Sapporo, HOKKAIDO	2.5		3.4	4.8		3.0		4.5	12.7	5.7		10.7
Aomori, AOMORI	3.9				3.4				10.8		5.5	
Sendai, MIYAGI	7.1	6.0			13		21		19		17.2	
Chihata, AKITA	6.1		7.3		3.5		23		6.7		20	
Hitachi, IBARAGI	2.9		12		13	8.3		6.9		5.1		7.2
Kawamoto, SAITAMA		3.1		3.9		5.5		5.0		2.5		3.3
Izu-Oshima, TOKYO	11.0		7.5	10.0		15		9.9		11.6		14.1
Atsugi, KANAGAWA		2.1			5.1			31	3.8		7.8	
Gosen, NIIGATA	6.0		10									
Koshiji, NIIGATA					9.5		22		24		10.0	
Kanazawa, ISHIKAWA		4.1		8.2		13.2		8.4		8.1	12	
Obama, FUKUI	7.2											
Fukui, FUKUI			4.7		6.8		8.0		8.8		12	
Yoshiwara, SHIZUOKA	5.2		6.6		10.5		11					
Gotenba, SHIZUOKA									11		14.8	
Sanage, AICHI	4.0		8.1	8.0		14		5.9		6.2		9.0
Kyoto, KYOTO		2.1					4	6.9			2.4	
Sakai, OSAKA	1.6		3.5									
Moriguchi, OSAKA				7.3		5.7		4.8		4.0		5.8
Akashi, HYOGO	1.6		2.3									
Kobe, HYOGO					4.4		3.7		2.8		3.1	
Wakayama, WAKAYAMA			3.2		3.1					1.1		1.7
Aimi, TOTTORI		7.3			16		16.5	14				
Tsuyama, OKAYAMA		3.8		8.6		18		5.5		7.4		8.2
Kabe, HIROSHIMA		2.1			6.1		8.4		4.0		4.6	
Kochi, KOCHI	5.8		6		19		19		11.0		7.3	
Koga, FUKUOKA	3.7		5.2		8.2		7.7		13		14.3	
Nagasaki, NAGASAKI		9.6					7.7	5.3	7.0		9.2	
Kagoshima, KAGOSHIMA	4.8		8									
Taniyama, KAGOSHIMA				4.9		19		8.7	13			19.7

Table 7-2. ^{90}Sr (μμc/g Ca) in Milk-1962

By T. Asari, M. Chiba, M. Kuroda and others

(Japan Analytical Chemistry Reserch Institute)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wakkanai, HOKKAIDO	7.3		4.9									
Asahikawa, HOKKAIDO					11.5		13		15		23	
Obihiro, HOKKAIDO	4.9		8.1		6.3		10.0		18		14.9	
Sapporo, HOKKAIDO	2.0		3.6	4.5		2.3		3.6	42	4.7		9.1
Aomori, AOMORI	4.2				3.6				13.5		5.4	

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sendai, MIYAGI	6.9	5.2			13		19		14		13.1	
Chihata, AKITA	7.3		6.6		3.0		26		6.0		16	
Hitachi, IBARAGI	2.9		10		9.2	7.3		6.0		5.3		8.0
Kawamoto, SAITAMA		3.2		4.7		5.1		4.9		2.6		3.5
Izu-oshima, TOKYO	10.0		7.4	10.1		14.9		7.1		9.5		13.2
Atsugi, KANAGAWA		2.3			4.9			57	4.0		7.2	
Gosen, NIIGATA	5.9		10									
Koshiji, NIIGATA					8.8		23		17		12.1	
Kanazawa, ISHIKAWA		4.3		7.7		12.0		8.1		8.3	11.4	
Obama, FUKUI	7.2											
Fukui, FUKUI			4.5		6.6		7.4		7.4		10.9	
Yoshiwara, SHIZUOKA	4.9		6.5		9.3		11					
Gotenba, SHIZUOKA									9.8		11.8	
Sanage, AICHI	3.3		7.2	6.4		9.0		6.2		4.7		7.2
Kyoto, KYOTO		2.1					4.1	5.1			2.3	
Sakai, OSAKA	1.6		2.7									
Moriguchi, OSAKA				6.1		4.3		4.0		3.6		5.2
Akashi, HYOGO	1.5		2.3									
Kobe, HYOGO					5.2		3.7		2.6		3.2	
Wakayama, WAKAYAMA			3 0		4.5					1.8		3.4
Aimi, TOTTORI		7.6			15		13.5	11.2				
Tsuyama, OKAYAMA		3.7		7.8		18		4.5		6.6		7.1
Kabe, HIROSHIMA		1.9			5.5		6.3		3.2		3.8	
Kochi, KOCHI	5.1		4.7		20		20		9.0		7.1	
Koga, FUKUOKA	3.3		5.3		6.4		6.4		10.5		11.2	
Nagasaki, NAGASAKI		9.9					7.2	4.7	5.8		7.6	
Kagoshima, KAGOSHIMA	4.5		8									
Taniyama, KAGOSHIMA				4.6		14.9		7.6	11.0			15.6

Table 7-3. ^{137}Cs ($\mu\mu c/l$) in Milk-1962

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

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wakkanai, HOKKAIDO	32		40									
Asahikawa, HOKKAIDO					48		77		166		47	
Obihiro, HOKKAIDO	25		80		43		79		71		58	
Sapporo, HOKKAIDO	27		150	32		33		44	51	71		56
Aomori, AOMORI	28				32				103		63	
Sendai, MIYAGI	65	28			153		229		190		146	
Chihata, AKITA	25		24		38		558		97		135	
Hitachi, IBARAGI	39		78		76	47		260		62		58
Kawamoto, SAITAMA		22		151		62		24		45		35
Izu-oshima, TOKYO	189		71	121		114		98		98		144
Atsugi, KANAGAWA		32			52			19	35		59	
Gosen, NIIGATA	31		34									
Koshiji, NIIGATA					84		69		112		32	
Kanazawa, ISHIKAWA		25		69		102		114		54	37	
Obama, FUKUI	31											
Fukui, FUKUI			29		66		42		68		112	
Yoshiwara, SHIZUOKA	30		33		142		134					
Gotenba, SHIZUOKA									193		122	
Sanage, AICHI	27		28	43		78		36		46		50
Kyoto, KYOTO		26					41	102			27	
Sakai, OSAKA	18		49									
Moriguchi, OSAKA				47		42		95		35		37
Akashi, HYOGO	28		86									
Kobe, HYOGO					57		74		72		30	
Wakayama, WAKAYAMA			24		47					30		31
Aimi, TOTTORI		41			73		87	84				
Tsuyama, OKAYAMA		23		75		88		55		64		54
Kabe, HIROSHIMA		18			55		62		38		62	
Kochi, KOCHI	36		24		98		18		104		89	
Koga, FUKUOKA	40		26		95		65		46		96	
Nagasaki, NAGASAKI		61					74	62	63		116	
Kagoshima, KAGOSHIMA	69		50									
Taniyama, KAGOSHIMA				38		91		170	58			26

Table 7-4. ^{137}Cs ($\mu\mu c$/gK) in Milk 1962

By T. Asari, M. Chiba, M. Kuroda and others

(Japan Analytical Chemistry Research Institute)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wakkanai, HOKKAIDO	25		46									
Asahikawa, HOKKAIDO					28		50		169		25	
Obihiro, HOKKAIDO	20		89		29		51		45		38	
Sapporo, HOKKAIDO	19		249	40		25		28	33	48		34
Aomori, AOMORI	24				32				71		47	
Sendai, MIYAGI	52	18			82		117		91		67	
Chihata, AKITA	25		26		23		402		64		86	
Hitachi, IBARAGI	27		66		60	69		148		39		43
Kawamoto, SAITAMA		16		181		40		19		28		24
Izu-oshima, TOKYO	144		48	114		83		56		52		81
Atsugi, KANAGAWA		24			37			19	24		37	
Gosen, NIIGATA	21		28									
Koshiji, NIIGATA					53		56		74		28	
Kanazawa, ISHIKAWA		16		71		67		78		56	24	
Obama, FUKUI	18											
Fukui, FUKUI			18		46		31		42		73	
Yoshiwara, SHIZUOKA	20		28		95		92					
Gotenba, SHIZUOKA									121		82	
Sanage, AICHI	25		19	59		57		27		32		30
Kyoto, KYOTO		21					25	91			19	
Sakai, OSAKA	14		86									
Moriguchi, OSAKA				30		28		58		22		24
Akashi, HYOGO	16		161									
Kobe, HYOGO					46		34		49		20	
Wakayama, WAKAYAMA			19		49					43		44
Aimi, TOTTORI		29			45		56	52				
Tsuyama, OKAYAMA		15		55		57		37		24		34
Kabe, HIROSHIMA		12			39		48		24		44	
Kochi, KOCHI	28		26		62		10		68		53	
Koga, FUKUOKA	26		30		59		49		42		66	
Nagasaki, NAGASAKI		39					47	43	30		100	
Kagoshima, KAGOSHIMA	59		60									
Taniyama, KAGOSHIMA				28		74		112	38			17

Table 8. ^{90}Sr and ^{137}Cs in Milk 1963

By T. Asari, M. Chiba, M. Kuroda and others

(Japan Analytical Chemistry Research Institute)

Date	Strontium-90 $\mu\mu c/l$	Strontium-90 $\mu\mu c$/gCa	Cesium-137 $\mu\mu c/l$	Cesium-137 $\mu\mu c$/gK
(Asahikawa, HOKKAIDO)				
10 Jan 63	10.7	9.7	37	24
14 Mar 63	16.6	14.3	131	86
(Obihiro, HOKKAIDO)				
30 Jan 63	15.4	13.8	76	50
15 Mar 63	14.2	13.0	50	34
(Sapporo, HOKKAIDO)				
13 Feb 63	4.9	4.9	68	110
24 May 63	6.9	5.4	85	66
(Aomori, AOMORI)				
18 Jan 63	10.5	9.8	73	46
6 Mar 63	28.0	28.0	110	67
(Sendai, MIYAGI)				
28 Jan 63	12.0	10.1	101	62
8 Mar 63	13.6	11.6	55	34
(Chihata, AKITA)				
5 Jan 63	14.5	15.1	72	50
19 Feb 63	13.4	12.2	99	48
(Hitachi, IBARAGI)				
5 Feb 63	11.1	11.3	90	54
(Kawamoto, SAITAMA)				
5 Feb 63	2.8	3.1	45	28
(Izu-oshima, TOKYO)				
14 Feb 63	7.7	6.8	102	65
22 May 63	25.8	25.1	214	119
(Atsugi, KANAGAWA)				
26 Jan 63	5.9	7.1	55	50
14 Mar 63	7.0	6.5	51	36
(Koshiji, NIIGATA)				
25 Feb 63	16.8	14.2	90	53
7 Mar 63	43.4	36.7	101	115
22 May 63	17.4	14.2	78	54
(Kanazawa, ISHIKAWA)				
3 Feb 63	6.2	5.9	49	33
25 May 63	12.4	12.2	139	93

Date	Strontium-90 μμc/l	Strontium-90 μμc/gCa	Cesium-137 μμc/l	Cesium-137 μμc/gK
(Fukui, FUKUI)				
16 Jan 63	6.3	6.1	39	26
1 Mar 63	9.8	7.4	68	46
(Gotenba, SHIZUOKA)				
25 Jan 63	11.7	10.0	59	30
4 Mar 63	11.0	9.1	139	93
(Sanage, AICHI)				
22 Feb 63	6.5	5.7	54	62
(Kyoto, KYOTO)				
14 Jan 63	1.9	1.8	37	25
4 Feb 63	2.8	2.5	66	44
11 Mar 63	3.5	3.2	100	61
9 May 63	6.9	6.6	60	41
(Moriguchi, OSAKA)				
5 Feb 63	4.4	3.8	27	17
(Tondabayashi, OSAKA)				
24 May 63	10.7	9.8	81	46
(Nose, OSAKA)				
24 May 63	15.9	14.9	127	81
(Kobe, HYOGO)				
19 Jan 63	5.3	4.6	44	31
26 Feb 63	4.8	2.8	38	24

Date	Strontium-90 μμc/l	Strontium-90 μμc/gCa	Cesium-137 μμc/l	Cesium-137 μμc/gK
(Wakayama, WAKAYAMA)				
18 Jan 63	3.8	5.6	19	23
7 Feb 63	2.3	2.7	32	33
6 Mar 63	2.8	3.8	28	30
(Aimi, TOTTORI)				
22 Jan 63	22.7	19.9	90	58
4 Mar 63	16.3	14.1	79	49
(Tsuyama, OKAYAMA)				
14 Feb 63	6.0	5.4	48	35
(Kabe, HIROSHIMA)				
12 Jan 63	1.3	1.2	63	49
1 Mar 63	6.1	5.9	59	40
(Kochi, KOCHI)				
16 Jan 63	9.1	7.7	50	34
1 Mar 63	5.4	4.8	43	27
(Koga, FUKUOKA)				
18 Jan 63	7.6	7.7	64	42
5 Mar 63	7.0	5.8	53	62
(Nagasaki, NAGASAKI)				
16 Jan 63	10.5	8.5	73	42
27 Feb 63	7.3	6.0	73	50
(Taniyama, KAGOSHIMA)				
19 Feb 63	10.1	8.3	105	71

Part II *(National Institute of Animal Industry)*

The National Institute of Animal Industry, in co-operation with 4 National Agricultural Experimental Stations (HOKKAIDO, TOHOKU, CHUGOKU and KYUSHU) and a Prefectural Livestock Breeding Station (NIIGATA), has also analyzed milk received from those areas to determine strontium-90 and cesium-137 content. Sampling stations are shown in Figure 7.

Samples were taken from the same cow if possible, and analyzed by the radioactive strontium determination method recommended by the Science and Technology Agency.

The results obtained are shown in Table 9 and the mean values determined during the period 1958 to 1961 are shown in Table 10. Table 11 shows the values arranged according to sampling area and month during 1962.

Figure 7. Sampling Stations Milk Part II

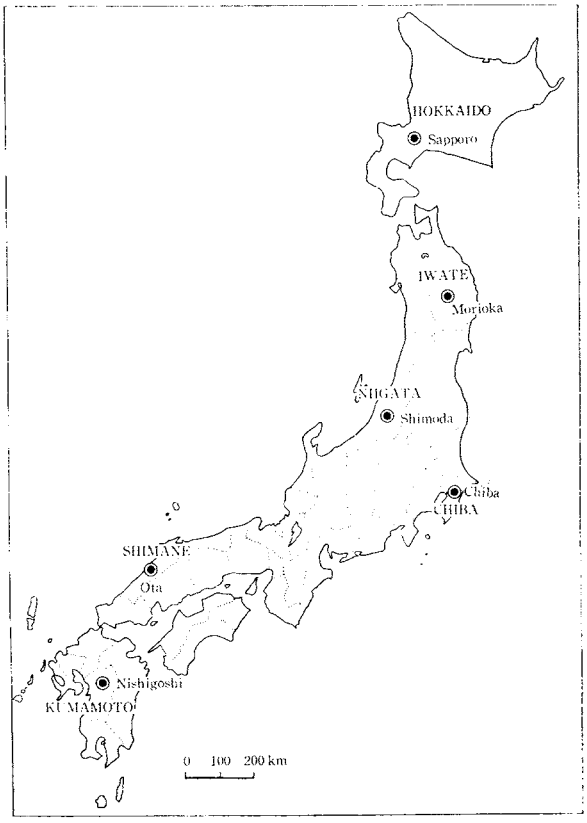


Table 9. ^{90}Sr and ^{137}Cs in Milk During the Period Nov 1961 to Jun 1963

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

Date	Strontium-90		Cesium-137	
	μμc/*l*	μμc/gCa	μμc/*l*	μμc/gK
(Sapporo, HOKKAIDO)				
11 Nov 61	25.3	20.0	142	127
25 Nov 61	17.4	14.3	104	87
22 Dec 61	6.5	5.4	26.5	24.3
19 Jan 62	11.5	9.7	26.1	19.5
19 Feb 62	2.6	2.4	19.6	16.5
14 Mar 62	2.9	2.4	15.2	12.5
7 Apr 62	5.7	3.9	16.9	13.6
12 May 62	7.6	5.8	17.0	13.1
21 Jun 62	9.1	7.9	79.6	71.0
31 Jul 62	43.0	40.5	99.6	61.9
〃	37.8	38.5	103.2	73.7
14 Aug 62	47.5	42.4	134.5	75.9
〃	50.1	50.6	96.5	—
13 Sep 62	16.8	17.7	49.7	34.5
〃	15.2	15.2	64.8	45.0
9 Oct 62	18.6	20.7	39.2	28.0
〃	16.0	16.7	33.0	23.2
15 Nov 62	13.5	14.0	68.2	47.9
〃	17.1	19.2	66.3	52.8
5 Dec 62	15.6	16.5	47.3	36.7
〃	14.4	15.8	43.5	30.7
20 Jan 63	18.7	19.8	73.6	51.2
〃	18.7	20.4	67.2	48.5
15 Feb 63	9.5	8.8	55.7	40.4
〃	10.5	9.9	37.2	35.4
18 Mar 63	17.1	16.3	100.0	74.5
〃	17.4	16.0	74.8	55.4
15 Apr 63	16.5	15.0	157.8	109.1
16 May 63	25.7	20.9	187.7	133.6
18 Jun 63	23.9	21.4	257.9	181.2
(Morioka, IWATE)				
18 Jun 62	14.2	11.7	68.7	55.0
4 Jul 62	24.8	26.7	129.2	77.3
18 Aug 62			83.0	51.2
15 Sep 62	15.5	15.5	70.8	47.0
13 Oct 62	17.1	16.9	61.1	43.8
18 Nov 62	11.7	11.7	48.8	30.2
14 Dec 62	15.8	17.4	58.5	40.7
18 Jan 63	11.3	11.7	61.7	42.7
17 Feb 63	8.7	8.0	70.7	50.6
15 Mar 63	21.8	20.3	124.9	94.9
16 Apr 63	17.4	16.4	81.6	64.7
17 May 63	19.9	21.2	308.4	235.4
(Chiba, CHIBA)				
1 Nov 61	7.3	7.1	28.0	23.6
〃	3.2	3.0	16.8	13.5
〃	6.1	5.6	30.6	20.3
14 Nov 61	16.3	14.1	89.6	71.3
〃	18.1	15.1	54.3	41.8
〃	17.0	16.2	83.0	61.4
1 Dec 61	11.2	10.0	52.3	44.0
〃	15.4	14.4	52.2	42.9
〃	10.2	10.2	48.9	41.5
15 Dec 61	8.7	7.8	34.7	27.0
〃	16.4	13.8	62.6	50.6
〃	9.9	9.3	47.2	37.0
6 Jan 62	3.9	3.5	28.9	21.7
〃	3.3	3.0	23.5	20.2
19 Jan 62	2.4	2.4	23.5	16.5
20 Jan 62	10.5	9.7	21.7	17.4
〃	7.9	6.8	19.4	14.1
〃	5.0	4.5	18.2	14.5
2 Feb 62	4.8	4.3	29.7	25.6
〃	4.2	3.9	27.6	22.6
9 Feb 62	3.9	3.5	21.5	19.7
20 Feb 62	4.5	4.2	18.7	14.6
〃	1.3	1.2	16.0	12.7
〃	2.8	2.5	23.1	18.1
2 Mar 62	2.7	2.6	24.5	21.3
〃	1.5	1.4	15.1	12.8
〃	1.1	1.0	14.2	10.9
20 Mar 62	4.3	3.7	21.1	19.5
〃	1.7	1.6	16.4	12.1
〃	1.4	1.3	12.5	10.0
1 May 62	8.4	7.7	21.0	17.2
〃	5.4	4.6	15.7	11.8
〃	2.8	1.1	22.6	20.4
15 May 62	11.2	9.3	25.4	18.0
〃	6.8	5.4	17.9	14.0
〃	4.8	3.6	23.3	17.8
15 Jun 62	12.6	11.9	30.4	28.2
〃	10.0	8.4	42.5	35.5
15 Jul 62	4.3	5.5	28.2	16.5
〃	11.2	11.2	35.8	23.5
15 Aug 62	6.6	5.0	22.0	12.9
〃	12.4	9.8	18.5	11.0
15 Sep 62	4.8	5.1	10.6	6.8
〃	3.4	2.8	16.7	11.6
9 Oct 62	5.8	5.8	10.8	7.3
〃	3.0	2.7	11.0	7.7
15 Nov 62	5.7	4.9	25.9	13.3
〃	4.4	4.3	25.5	17.8
15 Dec 62	4.8	5.0	22.3	15.4
〃	7.3	7.0	30.8	23.1
15 Jan 63	3.2	3.3	42.7	29.3
〃	3.2	2.8	42.3	29.4
15 Feb 63	3.0	2.7	26.8	18.8
〃	3.7	2.9	29.7	23.1
15 Mar 63	2.3	2.2	41.3	30.2
〃	3.7	2.9	39.5	29.1
15 Apr 63	6.6	6.0	75.3	51.6
〃	6.7	5.3	85.0	63.6
15 May 63	9.8	8.7	177.4	123.8
15 Jun 63	22.0	19.4	266.7	186.2
〃	30.2	34.1	276.1	190.8
(Shimoda, NIIGATA)				
11 Nov 61	20.1	17.4	121	101
25 Nov 61	23.2	20.9	139	99
18 Dec 61	6.4	5.9	32.6	24.5
11 Jan 62	8.0	7.6	40.9	36.8
12 Feb 62	4.9	4.5	21.0	17.0
15 Mar 62	3.5	3.1	20.6	15.9
5 Apr 62	4.5	5.3	14.0	11.9
14 May 62	18.2	15.2	27.4	21.8
20 Jun 62	46.4	38.0	86.9	66.8
25 Jul 62	19.6	17.8	52.2	33.6
21 Sep 62	19.3	15.8	36.0	25.9
〃	19.6	14.3	34.4	31.3
15 Oct 62	27.0	22.5	66.4	51.1
(Ota, SHIMANE)				
15 Jun 62	3.2	3.2	28.4	25.6
17 Aug 62	4.0	2.4	22.3	13.4
18 Sep 62	6.6	6.8	13.6	9.4
25 Nov 62	6.1	5.3	43.0	31.2
10 Dec 62	12.0	8.8	43.4	36.5
21 Jan 63	0.9	10.1	49.8	41.2

Date	Strontium-90 μμc/l	Strontium-90 μμc/gCa	Cesium-137 μμc/l	Cesium-137 μμc/gK
(Nishigoshi, KUMAMOTO)				
11 Nov 61	18.2	15.8	95	66.3
25 Nov 61	8.7	8.9	104	74.5
18 Dec 61	2.0	2.0	28.8	22.2
17 Jan 62	3.3	3.0	37.8	27.8
13 Feb 62	1.4	1.2	23.0	18.7
19 Mar 62	2.3	2.1	15.0	12.7
5 Apr 62	1.5	1.2	14.6	11.0
17 May 62	9.6	8.1	18.9	15.1
21 Jun 62	8.9	7.4	30.0	23.1
〃	7.1	6.0	57.7	47.6
27 Jul 62	14.3	15.2	28.5	17.8
〃	9.1	9.3	28.7	15.8
15 Aug 62	19.9	18.8	44.6	28.7
〃	10.8	10.0	45.2	23.1
13 Sep 62	9.8	10.4	21.6	14.9
〃	7.3	7.3	17.9	12.5
16 Oct 62	13.1	10.5	28.3	20.2
〃	3.7	3.4	17.4	12.0
13 Nov 62	5.1	4.7	26.9	18.8
〃	4.3	4.1	39.6	27.9
8 Dec 62	7.6	7.7	50.4	34.8
〃	9.3	9.3	47.6	33.0
21 Jan 63	5.0	5.0	75.5	52.3
〃	5.5	5.5	71.5	48.7
16 Feb 63	2.1	1.8	58.7	44.5
〃	4.9	4.7	66.7	47.5
20 Mar 63	5.9	5.5	189.6	137.6
〃	5.0	4.9	154.4	111.4
15 Apr 63	11.5	9.6	74.5	52.0
16 May 63	13.5	12.3	142.9	100.1
19 Jun 63	16.8	16.1	190.5	133.7

Table 10-1. ^{90}Sr (μμc/l) in Milk-1958 to 1961 —By NIAI—

Location	1958 Nov	1959 Nov	1960 Nov	Aug	1961 Nov	Dec
Sapporo, HOKKAIDO					(2) 21.4	(1) 6.5
Chiba, CHIBA	(12) 5.2	(6) 8.0	(7) 11.9	(1) 7.8	(6) 11.3	(6) 12.0
Shimoda, NIIGATA					(2) 21.7	(1) 6.4
Nishigoshi, KUMAMOTO					(2) 13.5	(1) 2.0

( ) Number of samples

Table 10-2. ^{90}Sr (μμc/gCa) in Milk-1958 to 1961 —By NIAI—

Location	1958 Nov	1959 Nov	1960 Nov	Aug	1961 Nov	Dec
Sapporo, HOKKAIDO					(2) 17.2	(1) 5.4
Chiba, CHIBA	(12) 5.5	(6) 8.7	(7) 12.9	(1) 7.3	(6) 10.2	(6) 10.9
Shimoda, NIIGATA					(2) 19.2	(1) 5.9
Nishigoshi, KUMAMOTO					(2) 12.4	(1) 2.0

( ) Number of samples

Table 10-3. ^{137}Cs (μμc/l) in Milk-1961 —By NIAI—

Location	Nov	Dec
Sapporo, HOKKAIDO	(2) 123	(1) 26.5
Chiba, CHIBA	(6) 50.4	(6) 49.7
Shimoda, NIIGATA	(2) 130	(1) 32.6
Nishigoshi, KUMAMOTO	(2) 99.5	(1) 28.8

( ) Number of samples

Table 10-4. ^{137}Cs (μμc/gK) in Milk-1961 —By NIAI—

Location	Nov	Dec
Sapporo, HOKKAIDO	(2) 107	(1) 24.3
Chiba, CHIBA	(6) 38.7	(6) 40.5
Shimoda, NIIGATA	(2) 100	(1) 24.5
Nishigoshi, KUMAMOTO	(2) 60.4	(1) 22.2

( ) Number of samples

Table 11-1. ^{90}Sr ($\mu\mu c/l$) in Milk 1962 --By NIAI--

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sapporo, HOKKAIDO	11.5	2.6	2.9	5.7	7.6	9.1	40.4	48.8	16.0	17.3	15.3	15.0
Morioka, IWATE						14.2	24.8		15.5	17.1	11.7	15.8
Chiba, CHIBA	5.5	3.6	2.1		6.6	11.3	7.8	9.5	4.1	4.4	5.1	6.1
Shimoda, NIIGATA	8.0	4.9	3.5	4.5	18.2	46.4	19.6		19.5	27.0		
Ota, SHIMANE						3.2		4.0	6.6		6.1	12.0
Nishigoshi, KUMAMOTO	3.3	1.4	2.3	1.5	9.6	8.0	11.7	15.4	8.6	8.4	4.7	8.5

Table 11-2. ^{90}Sr ($\mu\mu c/gCa$) in Milk 1962 --By NIAI--

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sapporo, HOKKAIDO	9.7	2.4	2.4	3.9	5.8	7.9	39.5	46.5	16.5	18.7	16.6	16.2
Morioka, IWATE						11.7	26.7		15.5	16.9	11.7	17.4
Chiba, CHIBA	5.0	3.3	1.9		5.3	10.2	8.4	7.4	4.0	4.3	4.6	6.0
Shimoda, NIIGATA	7.6	4.5	3.1	5.3	15.2	38.0	17.8		15.1	22.5		
Ota, SHIMANE						3.2		2.4	6.8		5.3	8.8
Nishigoshi, KUMAMOTO	3.0	1.2	2.1	1.2	8.1	6.7	12.3	14.4	8.9	7.0	4.4	8.5

Table 11-3. ^{137}Cs ($\mu\mu c/l$) in Milk 1962 --By NIAI--

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sapporo, HOKKAIDO	26	20	15	17	17	80	101	(116)*	57	36	67	45
Morioka, IWATE						69	129	83	71	61	49	59
Chiba, CHIBA	23	23	17		21	36	32	20	14	11	26	27
Shimoda, NIIGATA	41	21	21	14	27	87	52		35	66		
Ota, SHIMANE						28		22	14		43	43
Nishigoshi, KUMAMOTO	38	23	15	15	19	44	29	45	20	23	33	49

Table 11-4. ^{137}Cs ($\mu\mu c/gK$) in Milk 1962 --By NIAI--

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sapporo, HOKKAIDO	20	17	13	14	13	71	68	(76)*	40	26	50	34
Morioka, IWATE						55	77	51	47	44	30	41
Chiba, CHIBA	17	19	14		17	32	20	12	9	8	16	19
Shimoda, NIIGATA	37	17	16	12	22	67	34		29	51		
Ota, SHIMANE						26		13	9		31	37
Nishigoshi, KUMAMOTO	28	19	13	11	15	35	17	26	14	16	23	34

*( ) See to Table 9.

Iodine-131 in Milk

Part I *(The Institute of Public Health)*

During the periods October to December 1961 and August 1962 to February 1963, samples of milk purchased on the regular market were analyzed for iodine-131 content by The Institute of Public Health. Sampling locations are shown in Figure 8.

Two analytical methods, depending on the iodine-131 concentration, were used. One was the direct gamma spectrometry method using a 3.6 *l* sample of milk and the other, an indirect method using 200 m*l* of anion exchange resin and a 5.6 *l* sample of milk. This method was reported in the Journal of Radiation Research, Tokyo; Vol 3 No 1.

The measuring instrument used was a heavy scintillation detector (75 mmϕ×75 mm NaI) housed in 25 mm mercury and 100 mm lead shields, optically coupled to a 75 mm photomultiplier tube with a 256 channel pulse height analyzer. Daily background measurements revealed a standard deviation of 2.34% over the spectral region of 0.30-0.42 MeV. The overall error in determination was generally considered less than ±10%.

Results are shown in Table 12.

Figure 8. Sampling Locations -Milk ^{131}I-

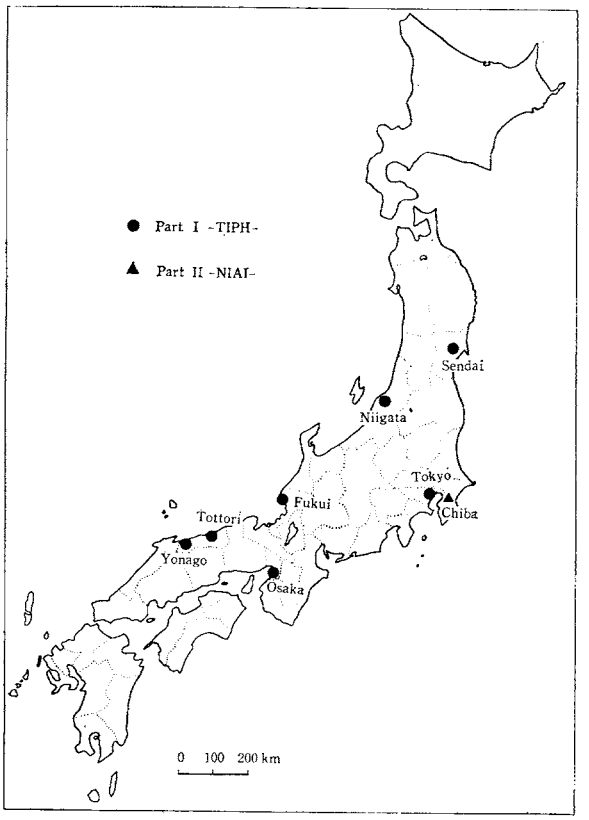


Table 12. ^{131}I in Milk During the Period Oct 1961 to Feb 1963

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

Date	Location	^{131}I $\mu\mu$c/*l*
(1961)		
7 Oct	Tokyo	*74
9 Oct	〃	*75
19 Oct	〃	*80
24 Oct	〃	*36
22 Nov	〃	*116
30 Nov	〃	50
6 Dec	〃	33
8 Dec	〃	28
28 Dec	〃	12
(1962)		
24 Aug	Tokyo	20
12 Sep	〃	67
14 Sep	〃	136
19 Sep	〃	96
20 Sep	〃	67
24 Sep	〃	100
26 Sep	〃	100
2 Oct	〃	98
4 Oct	〃	98
6 Oct	〃	77
8 Oct	Tokyo	55
〃	Sendai	93
〃	Niigata	31
〃	Osaka	66
10 Oct	Sendai	87
11 Oct	Tokyo	40
〃	Niigata	32
〃	Osaka	40
12 Oct	Sendai	81
15 Oct	Tokyo	34
〃	Niigata	47
〃	Osaka	56
18 Oct	Tokyo	45
〃	Sendai	117
〃	Niigata	99
22 Oct	Tokyo	120
〃	Niigata	55
〃	Osaka	120
25 Oct	Tokyo	200
〃	Sendai	140

Date		Location	^{131}I $\mu\mu c/l$
25	Oct	Niigata	60
	〃	Osaka	140
29	Oct	Tokyo	160
	〃	Niigata	71
	〃	Osaka	86
1	Nov	Tokyo	130
	〃	Osaka	93
5	Nov	Tokyo	100
8	Nov	〃	97
12	Nov	〃	80
15	Nov	〃	47
	〃	Sendai	46
19	Nov	Tokyo	85
22	Nov	〃	75
26	Nov	〃	74
3	Dec	〃	62
6	Dec	〃	66
10	Dec	〃	<30
13	Dec	〃	61
20	Dec	〃	49
24	Dec	〃	<30
(1963)			
5	Jan	Tokyo	30
10	Jan	〃	35
14	Jan	〃	48
17	Jan	〃	22
21	Jan	〃	<20
	〃	Tottori	35
22	Jan	Yonago	50
24	Jan	Tokyo	<20
28	Jan	〃	28
31	Jan	〃	<20
	〃	Tottori	75
	〃	Yonago	75
2	Feb	Fukui	45
4	Feb	Tokyo	22
7	Feb	〃	<20
14	Feb	〃	<20

* Direct gamma spectrometry by use of 3.6 *l* milk

Part II *(National Institute of Animal Industry)*

Samples of milk from cows at the National Institute of Animal Industry during the period September 1962 to January 1963 were analyzed by the indirected gamma spectrometry method for iodine-131 content.

Results are shown in Table 13.

Table 13. ^{131}I in Milk-Sep 1962 to Jan 1963

By H. Nozaki and K. Makino
(National Institute of Animal Industry)

Location; Chiba

Date		^{131}I $\mu\mu c/l$
(1962)		
14	Sep	27
8	Oct	47
12	Oct	45
19	Oct	<20
25	Oct	249
2	Nov	317
9	Nov	282
16	Nov	88
22	Nov	150
30	Nov	80
7	Dec	88
15	Dec	55
21	Dec	37
28	Dec	45
(1963)		
11	Jan	50
12	Jan	49
18	Jan	55
26	Jan	48
1	Feb	43
8	Feb	<20
15	Feb	<20
22	Feb	<20
1	Mar	31
8	Mar	31
15	Mar	<20
23	Mar	<20
29	Mar	<20
5	Apr	<20

Human Data

Strontium-90 in Human Bone

(National Institute of Radiological Sciences)

The measurement of strontium-90 content in human bones is required to estimate the strontium-90 exposure dose of the population. Since 1959, human bones collected from various parts of the country have been analyzed at the National Institute of Radiological Sciences.

Samples from autopsies are collected by pathologists in co-operation with medical schools and hospitals. Sampling locations are shown in Figure 9.

Samples were analyzed for strontium-90 by the method described in the FAO Atomic Energy Series No. 1, Rome, 1959; and WHO Technical Report Series No. 173, 1959.

In 1962, strontium-90 concentrations in Japanese human bone were 0.08 to 2.24 $\mu\mu$c/g of calcium. Individual analysis data are shown in Table 14. Figure 10 is a graphic presentation of the concentration. Table 15 is a summary of results obtained during the period 1960 to 1962.

Figure 9. Sampling Locations
-Human Bone-

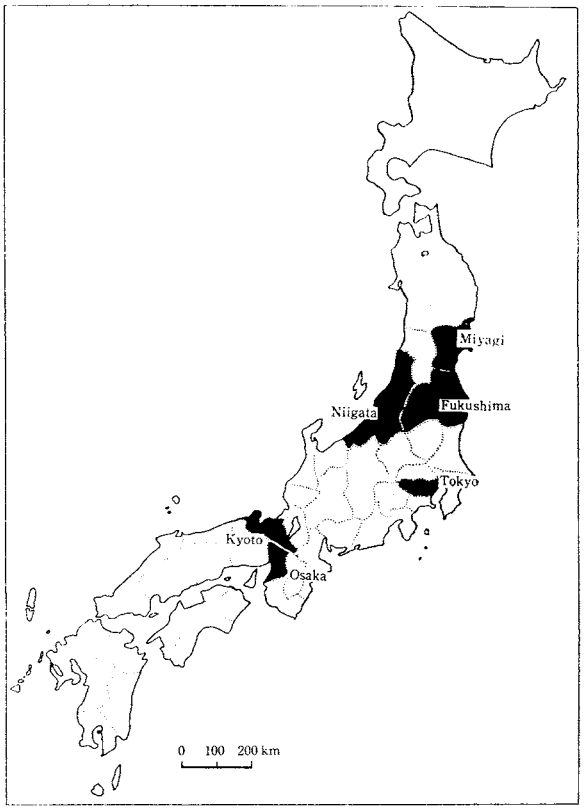


Table 14. ^{90}Sr in Japanese Human Bone During the Period May 1961 to Dec 1962

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

Age	District	Month of death	Sex	Number of samples	Bone	Natural Sr mg/gCa	^{90}Sr $\mu\mu$c/gCa
(1961)							
0— 3	TOKYO	Nov-Dec		7	Rib		0.80
3	〃	〃		1	〃		1.36
9—17	〃	Oct		3	〃		0.91
11	KYOTO	〃	F	1	〃		1.44
18	OSAKA	Nov	M	1	〃		1.38
18—19	TOKYO	Oct-Nov	M	2	〃		1.61
19	OSAKA	Nov	M	1	〃		2.00
19	TOKYO	〃	M	1	〃		1.07
20—21	〃	Oct		5	〃		0.54
20, 26	OSAKA	Nov		2	〃		0.75

Age	District	Month of death	Sex	Number of samples	Bone	Natural Sr mg/gCa	^{90}Sr μμc/gCa
21	TOKYO	Dec	F	1	Femur		0.65
22	OSAKA	Nov	M	1	Rib		0.55
24	〃	〃	M	1	〃		0.37
24	TOKYO	Oct	M	1	〃		0.63
24—28	〃	Dec	M	5	〃		0.53
26	〃	Oct	M	1	Tibia		0.92
27	NIIGATA	Dec	F	1	Rib	0.6	0.68
27	〃	〃	F	1	〃	0.7	0.64
28	TOKYO	Oct	M	1	〃		0.45
28, 29	〃	Nov	F	2	Tibia		0.65
30	OSAKA	Nov	M	1	Rib		0.38
30—34	〃	Nov-Dec		4	〃		0.33
32, 37	KYOTO	Oct-Nov	F	2	〃		0.32
33—36	TOKYO	Oct		3	〃		0.34
34—35	OSAKA	Nov-Dec	F	3	〃		0.59
35—36	〃	Nov	M	2	〃		0.33
37	〃	〃	M	1	〃		0.17
37, 39	〃	Nov-Dec	M	2	〃		0.40
38	NIIGATA	Dec	M	1	〃	0.5	0.34
38	TOKYO	May	M	1	Sternum		0.39
39	〃	Oct	F	1	Tibia		0.78
39	〃	Aug	F	1	Sternum		0.41
41	〃	Oct	M	1	〃		0.33
41, 43	〃	〃		2	Rib		0.73
41, 44	KYOTO	Nov-Dec		2	〃		0.54
42	OSAKA	Nov	M	1	Rib		0.36
43	TOKYO	Oct	M	1	Femur		0.30
43	〃	〃	M	1	Patella		0.09
44	〃	〃	M	1	Rib		0.33
45	〃	Sep	M	1	Tibia		0.21
47	OSAKA	Nov	M	2	Rib		0.46
49	KYOTO	〃	F	1	〃		0.23
50	TOKYO	Dec	M	1	Femur		0.32
50, 54	〃	Oct, Dec	M	2	Rib		0.41
50—58	OSAKA	Nov	M	4	〃		0.39
50—59	〃	〃	M	4	〃		0.33
52	TOKYO	〃	F	1	Sternum		0.35
52, 54	OSAKA	Nov-Dec	M	2	Rib		0.48
54	TOKYO	Oct	M	1	Vertebra		0.32
54, 56	NIIGATA	Sep-Oct	F	2	Rib		0.36
55	TOKYO	Oct	M	1	Tibia		0.17
55, 61	〃	Nov	M	2	Sternum		0.45
55, 62	〃	Oct	M	2	〃		0.33
56	〃	〃	M	1	〃		0.40
57, 62	OSAKA	Nov	M	2	Rib		0.56
58	TOKYO	〃	M	1	〃		0.22
58, 59	KYOTO	〃	M	2	〃		0.74
59	TOKYO	Oct	M	1	〃		0.19
60—63	OSAKA	Nov-Dec	M	3	〃		0.30
60—64	TOKYO	Oct		4	Sternum		0.61
60, 65	〃	Nov		2	Rib		0.54
60—66	OSAKA	〃	M	3	〃		0.42
60, 69	〃	Oct, Dec	M	2	〃		0.19
61	TOKYO	Oct	M	1	Sternum		0.41
61, 62	〃	Nov-Dec		4	Rib		0.45
61, 66	〃	〃		2	〃		0.06
61—68	〃	Oct	M	3	〃		0.29
63	〃	Nov	M	1	Vertebra		0.60
63—82	〃	Nov-Dec		4	Rib		0.30
63—72	〃	Oct	M	3	Vertebra		0.70
69	KYOTO	〃	M	1	Rib		0.54
69—72	TOKYO	〃		4	〃		0.34
71	KYOTO	Nov	M	1	〃		0.58
72	TOKYO	〃	M	1	Patella		0.12
(1962)							
Fetus	TOKYO	Dec	M	1	Whole skeleton	0.7	1.00
〃	〃	〃	M	1	〃	0.6	1.17
〃	〃	〃	F	1	〃	0.7	0.70
〃	〃	〃	F	1	〃	0.6	0.95
New born	〃	〃	M	1	〃	0.6	0.59

Age	District	Month of death	Sex	Number of samples	Bone	Natural Sr mg/gCa	^{90}Sr $\mu\mu$c/gCa
0	TOKYO	Jan-May	F	6	Rib		1.13
0— 3	〃	Jan-Mar	M	12	〃		2.24
8	MIYAGI	May	F	1	Femur	0.7	1.44
8	〃	Nov	M	1	〃	0.7	0.93
12	〃	〃	F	1	Sternum	0.4	2.22
12—17	TOKYO	Mar-May		3	Rib		1.58
14	FUKUSHIMA	Sep	M	1	Vertebra	0.7	1.56
15	MIYAGI	Jul	M	1	Sternum	0.8	2.02
17	NIIGATA	Jan	M	1	Rib		1.72
18—19	TOKYO	Jan-Mar		4	〃		1.12
20	NIIGATA	Aug	M	1	〃		1.28
20	〃	May	M	1	〃	0.6	1.42
20—22	TOKYO	Jan-Feb	F	4	〃	0.5	0.31
20—25	〃	Jan		6	〃	0.7	0.57
21—28	OSAKA	〃	M	3	〃		0.78
24	NIIGATA	Nov	F	1	〃	0.5	0.85
24	〃	Feb	M	1	〃	0.5	0.48
25	TOKYO	〃	F	1	〃	0.8	0.58
25	NIIGATA	Mar	F	1	〃	0.5	0.38
25	〃	〃	F	1	〃	0.6	0.38
25—27	TOKYO	Jan	F	4	〃	0.9	0.87
25—29	〃	Jan-Mar	M	4	〃	0.8	0.47
27	〃	Aug	M	1	〃		0.64
27	NIIGATA	Jan	F	1	〃	0.6	0.14
28	〃	May	M	1	〃	0.6	0.84
29	〃	Mar	M	1	〃	0.6	0.42
30—39	TOKYO	Feb-Apr		4	〃	0.7	0.70
31	NIIGATA	Aug	M	1	〃		0.79
31	〃	Apr	M	1	〃	0.4	0.34
31	〃	Mar	M	1	〃	0.5	0.25
34, 36	〃	Jun	F	2	〃	0.6	0.28
36	〃	May	F	1	〃	0.6	0.39
37	〃	Jan	F	1	〃	0.5	0.55
40	〃	Feb	M	1	〃		0.33
40	〃	Jan	M	1	〃		0.27
40	〃	Mar	F	2	〃	0.5	0.40
41, 45	OSAKA	Nov	M	2	〃		0.45
42—51	TOKYO	Feb	F	4	〃		0.21
44—52	〃	Jan-Feb	M	3	〃		0.33
47	〃	Dec	M	1	〃		0.35
47	NIIGATA	Mar	F	1	〃	0.5	0.29
48	〃	May	M	1	〃	0.7	0.44
48	〃	〃	M	1	〃	0.6	0.33
53	TOKYO	Jul	M	1	〃		0.33
54	NIIGATA	May	M	1	〃	0.6	0.32
54	〃	Mar	F	1	〃	0.5	0.19
54—58	TOKYO	Nov 61-Jan	M	2	〃	0.3	0.38
55	NIIGATA	Apr	F	1	〃	0.5	0.16
55—59	TOKYO	Jan-Feb	M	4	〃	0.3	0.36
56	NIIGATA	Mar	F	1	〃	0.5	0.27
59	TOKYO	Oct	M	1	〃		0,39
59	NIIGATA	Feb	M	1	〃	0.6	0.90
59	〃	Mar	M	1	〃	0.5	0.39
60—68	TOKYO	Nov 61-Jan	M	3	〃		0.24
61	NIIGATA	Jun	M	1	〃	0.4	0.56
63	TOKYO	Nov	F	1	〃		0.32
63	NIIGATA	Apr	F	1	〃	1.0	0.08
63	〃	Jun	F	1	〃	0.6	0.26
63—65	TOKYO	Feb	M	5	〃		0.19
63—69	〃	Feb-Mar	F	6	〃		0.46
64	NIIGATA	Jun	M	1	〃	0.5	0.63
65	〃	Apr	F	1	〃	0.6	0.17
66	〃	Jan	M	1	〃	0.6	0.18
68	〃	Nov	F	1	〃		0.32
70—82	TOKYO	Jan May	M	4	〃		0.19
71	NIIGATA	May	F	1	〃	0.6	0.25
71—74	TOKYO	Jan-Feb	F	3	〃		0.24
73	〃	Nov	M	1	〃		0.22
73	NIIGATA	May	M	1	〃	0.9	0.21
73	〃	Jan	F	1	〃		0.10

Age	District	Month of death	sex	Number of samples	Bone	Natural Sr mg/gCa	^{90}Sr $\mu\mu$c/gCa
73—77	TOKYO	Jan-Feb	M	2	〃		0.26
74	〃	Oct	M	1	〃		0.35
76	NIIGATA	May	M	1	〃	1.1	0.34
78	〃	Jun	M	1	〃	0.3	0.55
79	〃	〃	F	1	〃	0.7	0.29
80	〃	May	F	1	〃	1.2	0.36

Figure 10. ^{90}Sr in Japanese Human Bone Arranged According to Age. 1962
-By NIRS-

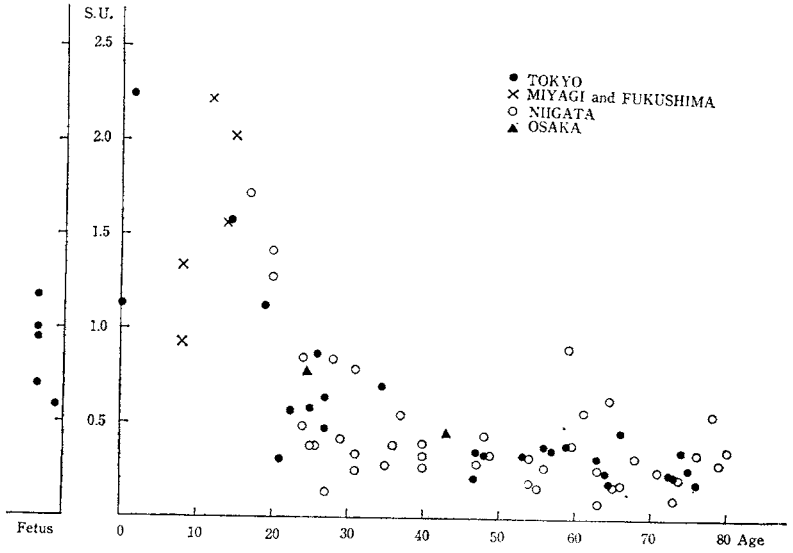


Table 15. Summary of ^{90}Sr ($\mu\mu$c/gCa) in Haman Bone -By NIRS-

Years		Age group			
		Fetus	0～4	5～19	20<
1960	Number of samples		7	42	33
	Mean		1.00	0.90	0.58
	Standard deviation		0.33	0.13	0.18
	Minimum ～ Maximum		0.22～1.66	0.21～2.56	0.09～2.77
1961	Number of samples	2	9	51	106
	Mean	1.43	1.36	1.38	0.41
	Standard deviation	0.99	0.63	0.74	0.31
	Minimum ～ Maximum	1.38～1.98	0.22～2.15	0.32～3.64	0.06～1.91
1962	Number of samples	5	3	31	91
	Mean	0.88	1.66	1.38	0.45
	Standard deviation	0.20	0.45	0.54	0.31
	Minimum ～ Maximum	0.59～1.17	0.95～2.24	0.37～2.37	0.03～1.33

Cesium-137 in Human Muscle

(The Institute of Public Health)

Cesium-137 content in the human muscle was determined by The Institute of Public Health.

Breast muscles from autopsies are being continuously collected at the School of Medicine, University of Tokyo. After radiochemical separation, a low background ß counting technique is used to determine the amount present. This separation method was reported by N. Yamagata and T. Yamagata in "The Analyst, Vol. 85; 282-285".

Analytical results covering the period from December 1960 to November 1962 are shown in Table 16. Results covering the period from February 1960 to August 1960 are summarized in Table 17.

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Table 16. ^{137}Cs in Human Muscle During the Period Dec 1961 to Nov 1962

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

Date of death	Age	Sex	Cesium-137 μμc/g	Cesium-137 μμc/gK
1 Dec 61	3.5	M	0.15	31
2 Dec 61	36	M	0.052	35
〃	64	M	0.050	25
4 Dec 61	7	F	0.20	82
〃	57	M	0.073	23
8 Dec 61	52	M	0.12	104
9 Dec 61	56	M	0.030	26
10 Dec 61	47	M	0.11	58
〃	23	F	0.17	66
〃	61	M	0.084	32
11 Dec 61	51	M	0.086	43
〃	71	M	0.069	28
12 Dec 61	17	F	0.042	32
14 Dec 61	69	M	0.076	56
〃	45	F	0.048	28
16 Dec 61	52	F	0.032	32
〃	47	M	0.14	98
〃	38	F	0.059	75
18 Dec 61	66	M	0.035	26
〃	42	F	0.086	38
22 Dec 61	66	M	0.18	110
24 Dec 61	14	M	0.095	67
〃	37	M	0.16	111
26 Dec 61	7	M	0.21	65
27 Dec 61	66	F	0.14	71
30 Dec 61	71	F	0.11	56
Av. for Dec 1961 (26)*			**0.100**	**55**
4 Jan 62	29	M	0.054	42
6 Jan 62	64	M	0.13	44
11 Jan 62	51	M	0.065	35
〃	65	M	0.11	54
〃	68	M	0.069	47
17 Jan 62	55	M	0.056	21
〃	38	M	0.054	35
19 Jan 62	49	M	0.083	37
21 Jan 62	22	M	0.057	51
〃	6	M	0.080	23
23 Jan 62	63	M	0.12	47
〃	40	F	0.061	31
25 Jan 62	45	M	0.14	119
26 Jan 62	15	F	0.038	60
〃	69	F	0.075	50
27 Jan 62	60	M	0.15	68
29 Jan 62	88	M	0.069	47
31 Jan 62	48	M	0.13	17
〃	25	F	0.19	101
〃	60	M	0.24	111
Av. for Jan 1962 (20)			**0.099**	**52**
5 Feb 62	67	M	0.11	62
〃	60	M	0.17	67
6 Feb 62	72	F	0.13	81
7 Feb 62	62	F	0.079	35
9 Feb 62	63	M	0.14	48
〃	54	M	0.13	39
10 Feb 62	29	M	0.11	35
11 Feb 62	60	M	0.26	101
12 Feb 62	68	M	0.062	31
〃	46	F	0.094	35
〃	55	M	0.18	109
13 Feb 62	49	M	0.16	48
〃	55	M	0.15	105
15 Feb 62	45	F	0.073	36
〃	24	M	0.16	129
16 Feb 62	51	M	0.12	42
17 Feb 62	47	M	0.27	138
16 Feb 62	51	M	0.23	145
21 Feb 62	58	M	0.14	67
Av. for Feb 1962 (19)			**0.145**	**71**
20 Mar 62	61	M	0.24	296
21 Mar 62	57	M	0.20	180
〃	59	M	0.20	101
〃	58		0.17	124
25 Mar 62	30	M	0.20	55
26 Mar 62	40	F	0.24	83
27 Mar 62	65	M	0.21	77
〃	42	M	0.19	78
30 Mar 62	20	F	0.16	48
Av. for Mar 1962 (9)			**0.20**	**116**
3 Apr 62	26	F	0.19	84
4 Apr 62	45	M	0.16	83
〃	19	F	0.14	58
〃	59	M	0.21	64
5 Apr 62	47	M	0.20	77

Date of death	Age	Sex	Cesium-137 μμc/g	Cesium-137 μμc/gK
8 Apr 62	72	M	0.087	40
〃	14	F	0.10	61
10 Apr 62	34	F	0.080	46
11 Apr 62	79	F	0.085	39
〃	25	M	0.15	42
〃	61	M	0.087	38
13 Apr 62	65	F	0.10	66
14 Apr 62	30	M	0.11	17
〃	48	M	0.14	91
17 Apr 62	55	M	0.19	67
18 Apr 62	60	M	0.092	43
〃	24	M	0.125	47
20 Apr 62	23	M	0.11	44
〃	63	M	0.11	36
24 Apr 62	68	M	0.092	43
25 Apr 62	30	M	0.090	44
〃			0.10	45
29 Apr 62	35	M	0.11	62
〃			0.061	39
29 Apr 62			0.18	80
Av. for Apr 1962 (25)			**0.124**	**54**
1 May 62			0.13	58
5 May 62	53	M	0.092	57
〃	23	M	0.091	43
7 May 62	74	M	0.080	59
〃	1	F	0.165	58
9 May 62	56	F	0.074	44
10 May 62	26	M	0.052	37
13 May 62	35	F	0.088	48
14 May 62	64	M	0.11	68
15 May 62	44	F	0.11	58
17 May 62	7	M	0.11	45
〃	63	F	0.12	64
18 May 62	3 d	F	0.063	29
〃	65	M	0.060	40
19 May 62	68	M	0.077	27
20 May 62	78	F	0.051	27
23 May 62	15	M	0.070	23
26 May 62	72	M	0.091	32
Av. for May 1962 (18)			**0.090**	**45**
1 Jun 62	52	F	0.057	35
〃	50	M	0.080	32
2 Jun 62	64	M	0.16	66
3 Jun 62	21	M	0.11	38
〃	83	M	0.079	39
〃	24	F	0.17	79
〃	19	M	0.096	45
〃	18	M	0.060	40
4 Jun 62	59	M	0.086	67
6 Jun 62	84	F	0.056	34
—	--	—	0.051	18
—	—	—	0.090	53
8 Jun 62	31	M	0.11	55
9 Jun 62	73	F	0.39	132
11 Jun 62	62	F	0.14	111
13 Jun 62	42	F	0.055	25
〃	81	F	0.15	52
14 Jun 62	59	M	0.16	52
15 Jun 62	3.5 m	M	0.079	33
〃	6	M	0.059	27
16 Jun 62	35	M	0.086	42
18 Jun 62	59	M	0.072	43
〃	59	M	0.091	43
22 Jun 62	64	F	0.072	52
〃	10 m	F	0.047	30
27 Jun 62	65	F	0.078	46
〃	47	M	0.10	43
29 Jun 62	76	M	0.11	40
30 Jun 62	66	M	0.058	32
〃	67	M	0.043	34
Av. for Jun 1962 (30)			**0.100**	**48**
3 Jul 62	1 m	F	0.31	137
4 Jul 62	59	M	0.081	91
6 Jul 62	53	M	0.050	42
〃	72	M	0.18	35
〃	57	F	0.082	42
8 Jul 62	64	M	0.047	33
10 Jul 62	7	M	0.10	29
11 Jul 62	56	M	0.10	45
12 Jul 62	19	M	0.069	27
14 Jul 62	0	M	0.068	31
〃	47	M	0.10	51
16 Jul 62	59	F	0.047	24
17 Jul 62	53	M	0.085	32
20 Jul 62	57	M	0.11	46
22 Jul 62	61	F	0.11	36
24 Jul 62	33	M	0.089	29
27 Jul 62	54	F	0.089	38
〃	12	F	0.042	18
28 Jul 62	62	M	0.17	39
31 Jul 62	41	M	0.11	47
Av. for Jul 1962 (20)			**0.102**	**44**
1 Aug 62	61	M	0.084	54
3 Aug 62	52	F	0.21	63
〃	24	M	0.14	32
6 Aug 62	61	M	0.30	96
〃	82	F	0.084	78
9 Aug 62	3 d	F	0.25	45
10 Aug 62	4 m	F	0.30	89
〃	47	M	0.070	34
11 Aug 62	15	M	0.058	23
12 Aug 62			0.023	21
〃	58	M	0.14	56
13 Aug 62	45	M	0.079	31
14 Aug 62	14	M	0.049	27
16 Aug 62	48	F	0.092	66
17 Aug 62	7	F	0.059	26
18 Aug 62	79	F	0.071	46
〃	4	M	0.096	37
21 Aug 62	56	M	0.17	52
〃	27	M	0.22	97
22 Aug 62	14	M	0.13	51
23 Aug 62	63	F	0.037	40
24 Aug 62	44	M	0.083	64
〃	31	M	0.14	68
〃	78	F	0.20	120
26 Aug 62	78	M	0.10	32
〃	64	M	0.12	52
28 Aug 62	49	F	0.040	29
29 Aug 62	15	F	0.083	26
30 Aug 62	50	F	0.17	82
〃	7	F	0.073	32
〃	60	M	0.076	38
31 Aug 62	45	M	0.17	77
Av. for Aug 1962 (32)			**0.122**	**53**
3 Sep 62	36 d	F	0.13	70
〃	26	F	0.091	49
〃	56	M	0.11	58
5 Sep 62	56	M	0.077	58
11 Sep 62	74	M	0.071	56

Date of death	Age	Sex	Cesium-137 μμc/g	μμc/gK
12 Sep 62	55	M	0.14	78
14 Sep 62	75	M	0.049	48
15 Sep 62	45	M	0.054	21
16 Sep 62	44	M	0.065	36
18 Sep 62	3 m	M	0.27	113
〃	22	M	0.18	75
20 Sep 62	49	F	0.12	112
〃	10	F	0.086	43
22 Sep 62	49	M	0.086	59
〃	28	M	0.13	79
23 Sep 62	18	M	0.098	26
25 Sep 62	56	M	0.16	58
28 Sep 62	72	M	0.11	87
〃	23	M	0.13	63
29 Sep 62	23	F	0.25	73
〃	50	M	0.12	58
			0.093	50
30 Sep 62	44	M	0.12	47
Av. for Sep 1962 (23)			**0.119**	**62**
1 Oct 62	12	M	0.082	61
〃	57	M	0.18	62
3 Oct 62		M	0.18	83
4 Oct 62	63	M	0.10	53
5 Oct 62	49	F	0.22	69
〃	37	M	0.15	59
6 Oct 62	42	M	0.15	44
〃	70	M	0.37	146
〃	47	F	0.080	32
7 Oct 62	24	M	0.045	44
8 Oct 62	79	F	0.14	55
9 Oct 62	6	M	0.14	77
〃	43	M	0.099	53
13 Oct 62	21	M	0.15	77
〃	26	M	0.22	149
14 Oct 62	36	F	0.13	63
15 Oct 62	54	M	0.12	89
16 Oct 62	43	M	0.23	67
17 Oct 62	52	M	0.15	111
〃	69	M	0.071	49
〃	17 d	F	0.16	90
18 Oct 62	26	M	0.15	68
20 Oct 62	49	M	0.12	69
21 Oct 62	23	M	0.11	47
23 Oct 62	63	M	0.34	174
〃	0		0.087	76
〃	66	M	0.16	66
24 Oct 62	67	M	0.14	67
27 Oct 62	20	M	0.15	83
〃	50	M	0.18	63
〃	35	M	0.20	73
28 Oct 62	62	M	0.092	48
〃	53	M	0.20	77
29 Oct 62	28	M	0.16	55
〃	40	M	0.19	74
30 Oct 62	71	F	0.16	157
Av. for Oct 1962 (36)			**0.156**	**76**
1 Nov 62	4 m	F	0.13	69
2 Nov 62	3	M	0.62	174
〃	69	M	0.17	81
3 Nov 62	73	M	0.15	75
〃	38	M	0.25	133
〃	68	M	0.091	80
4 Nov 62	10	F	0.25	156
5 Nov 62	73	F	0.090	56
〃	58	M	0.14	80
7 Nov 62	19	M	0.071	71
7 Nov 62	59	M	0.071	70
8 Nov 62	46	M	0.20	111
9 Nov 62	29	M	0.11	64
〃	17	M	0.13	73
12 Nov 62	57	M	0.074	54
14 Nov 62	66	F	0.088	60
〃	23	M	0.099	59
17 Nov 62	69	M	0.095	101
18 Nov 62	68	F	0.089	64
19 Nov 62	57	F	0.034	38
〃	51	F	0.12	61
20 Nov 62	8	M	0.12	56
21 Nov 62	50	F	0.14	91
22 Nov 62	63	F	0.093	53
24 Nov 62	57	M	0.077	53
〃	42	F	0.16	73
25 Nov 62	16	F	0.24	50
〃	5	F	0.056	32
27 Nov 62	60	F	0.11	69
28 Nov 62	63	F	0.11	43
30 Nov 62	31	M	0.069	41
Av. for Nov 1962 (31)			**0.137**	**74**

*( ) Number of Samples

Table 17. ^{137}Cs in Human Muscle (Feb 1960 to Nov 1962) —By TIPH—

Year	Month	Number of samples	^{137}Cs in muscle μμc/g fresh
1960	Feb	(8)	0.25
	Mar	(14)	0.15
	Apr	(13)	0.11
	May	(6)	0.14
	Jun	(9)	0.26
	Jul	(11)	0.19
	Aug	(5)	0.91
1961	Dec	(26)	0.10
1962	Jan	(20)	0.099
	Feb	(19)	0.145
	Mar	(9)	0.20
	Apr	(25)	0.124
	May	(18)	0.090
	Jun	(30)	0.100
	Jul	(20)	0.10
	Aug	(32)	0.122
	Sep	(23)	0.119
	Oct	(36)	0.156
	Nov	(31)	0.137

Iodine-131 in Human Thyroid Gland

(The Institute of Public Health)

The content of iodine-131 in human thyroid glands was measured at The Institute of Public Health.

Thyroid gland samples were obtained from the Office of the Tokyo Medical Examiner mainly from persons who died instantaneously. The instrument used to determine the iodine-131 content is described on page (17) of this issue.

Results of analyses are shown in Table 18 and 19. The values of iodine-131 are caluclated back to the date of death.

Table 18. ^{131}I in Human Thyroid Glands During the Period Dec 1961 to Jun 1962

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

Date of death	Age	Sex	^{131}I $\mu\mu c/g$ fresh
4 Dec 61	35	M	4.8
〃	68	M	1.4*
〃	16	M	8.6
〃	31	M	5.8
〃	22	M	2.9*
5 Dec 61	27	M	2.4*
〃	75	F	1.7*
〃	52	M	6.0
〃	61	F	1.7*
〃	78	F	2.1
6 Dec 61	47	M	1.9*
〃	64	M	48
〃	65	M	3.5
〃	45	M	3.3*
〃	38	M	4.7
〃	66	M	3.7*
〃	18	M	15
7 Dec 61	42	F	3.6
〃	77	M	3.1*
〃	88	F	7.8
8 Dec 61	32	M	26
〃	72	M	4.5*
〃	55	M	3.5*
〃	60	M	3.2*
〃	35	M	5.4
〃	55	M	6.7*
9 Dec 61	37	F	3.0*
〃	38	M	4.1
〃	50	M	4.1
〃	27	M	3.1*
9 Dec 61	26	M	3.2
〃	74	M	2.1*
〃	56	M	6.1*
10 Dec 61	43	M	1.0*
〃	35	M	2.1*
11 Dec 61	47	F	1.3
〃	23	M	2.9*
〃	63	F	2.8
〃	45	M	4.6*
〃	48	M	2.9*
〃	33	M	13
〃	67	M	1.7
〃	18	F	3.6
12 Dec 61	64	M	3.0
	61	F	2.3*
〃	26	M	2.4*
〃	65	M	20
〃	23	M	3.3*
〃	36	M	1.9
〃	23	F	3.7
〃	71	M	4.3*
〃	71	M	2.3*
Av. for Dec 1961 (62)			**5.6***
4 Jan 62	73	M	2.5*
6 Jan 62	57	M	1.8*
8 Jan 62	52	M	5.6
9 Jan 62	59	M	2.3*

* Means less than the indicated values

Table 19. ^{131}I in Human Thyroid Glands During the Period Sep to Oct 1962

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

Date of death	Age	Sex	^{131}I $\mu\mu c/g$ fresh
10 Sep 62	76	F	3.1
〃	75	F	2.6
〃	20	F	0.5
11 Sep 62	87	M	4.9
12 Sep 62	4 m	M	1.9
〃	18	M	1.9
13 Sep 62	69	F	4.4
13 Sep 62	26	M	2.0
〃	64	F	1.1
〃	61	M	2.8
〃	46	M	<0.2
〃	58	F	0.3
〃	62	M	1.0
14 Sep 62	19	F	1.1

Date of death	Age	Sex	^{131}I $\mu\mu$c/g fresh
14 Sep 62	38	M	1.6
〃	56	F	2.5
〃	50	M	<0.2
〃	53	M	3.5
〃	38	M	3.5
〃	69	M	2.2
〃	45	M	4.4
15 Sep 62	87	F	2.5
16 Sep 62	14	M	
17 Sep 62	27	M	1.8
〃	79	F	
16 Sep 62	38	F	
17 Sep 62	58	M	1.9
	17	F	
18 Sep 62	19	M	
〃	48	F	
〃	33	M	4.5
〃	82	F	
〃	36	M	
17 Sep 62	37	M	0.5
18 Sep 62	23	M	
27 Sep 62	69	F	
28 Sep 62	31	F	0.2
〃	37	M	
〃	27	M	0.9
29 Sep 62	20	M	
28 Sep 62	20	F	
29 Sep 62	80	M	0.7
〃	56	F	
28 Sep 62	40	M	1.1
29 Sep 62	61	M	
Av. for September 1962			**2.0**
1 Oct 62	24	F	
〃	34	M	0.3
〃	76	F	
2 Oct 62	57	F	
〃	18	M	
〃	52	F	1.3
〃	70	M	
〃	53	M	
〃	61	M	1.3
〃	41	F	
3 Oct 62	59	M	1.1
〃	55	M	
〃	14	M	
7 Oct 62	54	M	
〃	73	F	0.5
〃	76	M	
9 Oct 62	60	F	
〃	66	F	1.2
〃	55	F	
〃	73	M	
〃	71	M	
10 Oct 62	33	F	
〃	64	M	0.8
〃	50	M	
〃	73	F	
〃	31	F	
11 Oct 62	54	M	0.8
〃	4	F	
12 Oct 62	45	M	
〃	43	M	
〃	81	M	1.2
〃	22	M	

Date of death	Age	Sex	^{131}I $\mu\mu$c/g frseh
13 Oct 62	59	M	
〃	35	M	0.8
〃	62	F	
〃	73	F	
15 Oct 62	72	M	1.1
〃	29	F	
16 Oct 62	22	M	
16 Oct 62	21	M	1.4
〃	79	F	
〃	51	M	0.3
17 Oct 62	48	M	
〃	90	F	
〃	1	F	2.4
18 Oct 62	26	M	
〃	55	M	
〃	29	M	0.7
〃	75	M	
〃	62	F	0.6
〃	58	M	2.4
20 Oct 62	68	F	
	75	F	0.9
21 Oct 62	65	F	
22 Oct 62	82	M	
〃	15	M	
〃	66	F	1.1
〃	30	M	
〃	66	M	0.7
23 Oct 62	50	M	1.2
24 Oct 62	26	M	
		M	
23 Oct 62	50	M	2.7
24 Oct 62	60	M	
〃	74	F	
25 Oct 62	49	M	2.4
〃	72	F	
〃	56	M	0.6
〃	58	M	
〃	64	F	1.2
〃	55	M	
26 Oct 62	58	M	0.1
〃	50	M	
〃	25	F	
〃	46	M	0.9
〃	50	M	
27 Oct 62	58	M	
28 Oct 62	16	F	<0.2
29 Oct 62	69	F	
28 Oct 62	69	M	
29 Oct 62	47	F	<0.2
Av. for October 1962			**1.1**
3 Nov 62	53	M	
〃	82	F	1.7
4 Nov 62	39	M	
〃	43	M	
〃	52	M	1.2
〃	43	F	
6 Nov 62	21	M	
〃	44	M	1.8
〃	77	F	
7 Nov 62	40	M	
〃	54	M	2.0
〃	75	M	
〃	54	F	
〃	28	M	1.3
8 Nov 62	55	M	

Date of death	Age	Sex	^{141}I $\mu\mu$c/g fresh
Nov 62	0	M	
〃	38	M	3.8
〃	40	M	
9 Nov 62	61	F	
〃	55	M	1.8
〃	43	M	
〃	39	M	1.9
〃	36	M	
〃	34	M	
10 Nov 62	52	M	2.0
〃	63	M	
〃	63	F	
11 Nov 62	70	M	0.4
12 Nov 62	26	F	
13 Nov 62	68	M	
14 Nov 62	16	M	1.6
〃	30	M	
15 Nov 62	63	M	0.5
〃	85	F	
14 Nov 62	25	M	
15 Nov 62	27	F	1.4
〃	38	M	
〃	37	M	5.1
16 Nov 62	52	F	
〃	36	M	
〃	54	M	1.0
〃	72	M	
〃	1	F	
17 Nov 62	43	M	3.0
〃	73	F	
18 Nov 62	78	M	
17 Nov 62	49	M	1.4
19 Nov 62	71	M	
〃	82	M	1.4
〃	33	M	
〃	65	F	1.5
〃	34	F	
19 Nov 62	67	M	1.7
〃	60	M	
23 Nov 62	72	M	
〃	66	M	3.2
〃	42	M	
〃	52	M	
〃	52	M	1.4
24 Nov 62	53	M	
〃	67	M	
〃	52	M	0.9
〃	70	M	
〃	61	F	
26 Nov 62	66	F	2.2
27 Nov 62	60	M	
28 Nov 62	44	M	2.7
〃	50	M	
〃	54	M	
29 Nov 62	38	M	
〃	88	M	1.5
〃	50	M	
〃	59	M	
〃	4 m	M	
〃	28	F	1.4
30 Nov 62	30	M	
〃	66	M	
Av. for November 1962			**1.8**

Iodine-131 and Zirconium-95 in Human Lung

(The Institute of Public Health)

Iodine-131 and zirconium-niobium-95 content in lungs were measured at the Institute of Public Health.

Lung samples from humans weighting approximately 400 g respectively, were cremated and the gamma spectrum of ashes measured. The instrument used to determine the zirconium-niobium-95 content is described on page (17) of this issue.

Results are shown in Table 20. "^{95}Zr-^{95}Nb" shown in this Table indicates the total amount of zirconium-niobium-95 collected.

Table 20. ^{131}I and ^{95}Zr-^{95}Nb ($\mu\mu$c/g fresh) in Human Lung Tissues -Dec 1961-

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

Date	^{131}I	^{95}Zr-^{95}Nb	$\frac{^{95}\text{Zr-}^{95}\text{Nb}}{^{131}\text{I}}$
20 Dec 61	0.44	0.35	0.80
21 Dec 61	0.26	0.26	1.0
〃	0.26	0.22	0.85
〃	0.21	0.21	1.1

Cesium-137 in Human Urine

(National Institute of Radiological Sciences)

Cesium-137 in human urine has been measured at the National Institute of Radiological Sciences since 1959 to determine the cesium-137 body burden of the population.

To accomplish this, approximately 2400 middle school pupils in OSAKA and ISHIKAWA Prefectures, shown in Figure 11, each supplied two hundred ml of urine. The urine taken from 50 pupils were combined to make one 10 l sample. Samples were collected by the conventional method though not representative of 24 hour urine.

Urine samples were collected by members in the OSAKA Prefectural Institute for Public Health Research and the ISHIKAWA Hygienic Laboratory.

For the analysis of cesium-137 in urine, two methods were applied in accordance with the level of the contamination. For high activity urine ($>20\,\mu\mu$c of cesium-137/l), cesium was separated by adding sodium molybdate, then measured with a γ-spectrometer using a "dip type" scintillation detector. For low activity urine ($<20\,\mu\mu$c of cesium-137/l), cesium was separated using a column of a phenol-sulfonic acid type cation exchange resin, and measured with an anticoincidence low background counter.

Results of analyses are shown in Table 21 and Figure 12.

Figure 11. Sampling Locations -Human Urine

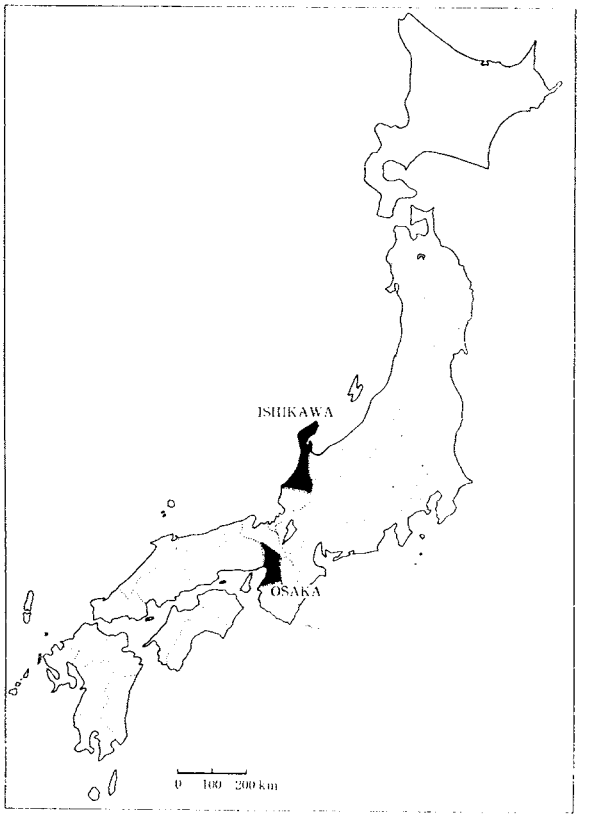


Figure 12. ^{137}Cs Concentration in Urine Versus Time of Collection -By NIRS

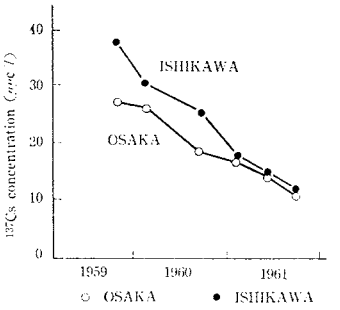


Table 21. ^{137}Cs in Human Urine During the Period Nov 1959 to Oct 1961

By M. Izawa and H. Tsubota
(National Institute of Radiological Sciences)

Sample	^{137}Cs Concentration ($\mu\mu c/l$)					
	Nov 1959	Feb 1960	Sep 1960	Feb 1961	Jun 1961	Oct 1961
OSAKA						
1	29	31	18	19	14.5	13.1
2	29	31	25	19	18.4	14.6
3	30	26	21	19	16.9	13.5
4	32	30	24	19	17.3	14.7
5	30	32	20	17	15.9	13.1
6	27	28	19	16	13.7	12.8
7	27	25	18	17	13.1	12.2
8	25	32	23	18	17.4	14.5
9	21	27	19	20	15.0	16.0
10	22	39	19	18	16.7	14.9
11	24	24	28	13	15.2	13.9
12	24	22	19	18	15.4	14.6
13	26	27	21	17	13.8	11.3
14	28	24	18	20	16.6	15.5
15	24	29	16	15	17.4	16.2
16	24	23	20	17	16.7	13.4
17	31	26	18	17	17.1	15.1
18	27	23	17	18	13.8	13.0
19	24	28	15	14	15.2	11.2
20	27	23	18	14	16.9	8.6
21	30	24	17	14	14.1	9.7
22	29	26	14	13	13.2	11.1
23	23	19	14	16	12.4	9.6
24	39	26	16	16	11.2	12.9
Average	**27.2**	**26.9**	**18.6**	**16.8**	**15.3**	**13.1**
ISHIKAWA						
1	44	41	24	18	16.3	14.3
2	33	32	28	19	14.4	13.2
3	39	27	31	20	15.2	10.4
4	39	36	24	19	17.9	16.0
5	33	36	21	15	15.0	15.3
6	40	33	24	15	15.9	14.5
7	44	26	22	16	15.3	12.1
8	40	32	25	19	14.0	11.3
9	39	31	25	19	16.6	13.1
10	—	33	26	17	15.2	14.0
11	—	32	19	15	15.1	13.4
12	—	34	25	16	14.3	12.5
13	45	38	24	16	—	10.2
14	47	32	22	18	—	13.7
15	39	36	27	18	14.4	15.0
16	42	38	24	17	—	12.4
17	24	26	21	17	16.8	12.7
18	36	27	24	19	14.6	17.5
19	34	27	29	17	—	15.2
20	32	31	28	20	—	16.1
21	39	29	34	17	16.0	14.0
22	26	31	29	19	16.9	17.1
23	37	27	27	16	16.5	13.1
24	38	29	27	15	13.6	16.1
Average	**37.6**	**31.8**	**25.4**	**17.4**	**15.5**	**13.9**

Appendix

Nationwide Radioactivity Survey Project and Network

The nationwide radioactivity survey project and network has been in effect since 1957, on a cooperative basis by the various ministries, agencies, national institutes and prefectural governments under the direction of the Japan Atomic Energy Commission. This system has been revised and expanded yearly and its present status (during the period April 1963 to March 1964) is briefly described.

Surveys of atmospheric radioactivity are conducted by the Meteorological Agency, Meteorological Research Institute and Defense Agency. Total β radioactivity of precipitation is measured at 14 observatories while near ground airborne and dust is measured at 5 observatories location at various points throughout Japan. Monthly cummulative deposits of radioactive nuclides are analyzed by Meteorological Research Institute in Tokyo. When precipitation with an abnormally high radioactivity content is found, the sample is sent to the Meteorological Research Institute to determine the types of nuclides present. In addition, 24 Prefectural Research Institutes of Hygiene send samples of precipitation and dry fallout accumulated monthly, to the Japan Analytical Chemistry Research Institute for nuclide analysis.

In stratospheric surveys, airborne dust is collected by jet aircraft at three military bases, then sent to the Defense Agency's Defense and Development Institute for total measurements and nuclide analysis.

Surveys for radioactivity in drinking water, food, soil, etc. are conducted at 24 Prefectural Research Institutes of Hygiene. Total radioactivity is measured at each collection point and the samples sent to the Japan Analytical Chemistry Research Institute for nuclide analysis. However, some of the samples from specified prefectures are sent to The Institute of Public Health or the National Institute of Radiological Sciences for analyses. Potable rain water is analyzed by the National Institute of Hygenic Sciences.

In marine radioactivity surveys, seawater analysis is conducted by the Hydrographic Division of the Maritime Safety Agency and the Meteorological Research Institute. Analysis of marine organisms is condcted by the Tokai Regional Fisheries Research Institute.

To accomplish radioactivity determination in the human body, the National Institute of Radiological Sciences was assigned the task of conducting nuclide analyses of bones, internal organs and urine collected at various locations in Japan, and The Institute of Public Health to conduct analyses of human muscles collected in and around the Tokyo area. The National Institute of Health and the National Institute of Animal Health are conducting analyses of human teeth and animal bones.

The exposure dose, based on the information collected on environmental radioactivity, is evaluated for the population as a whole and for specific groups.

In other studies, research on environmental contamination is being conducted with special emphasis on radioecology, such as food-chain contamination and decontamination of food. The institutes concerned and studies being conducted are as follows:

The Institute of Public Health
- Research on the behavior of short and intermediate life fission products

National Institute of Nutrition
- Research on the relationship between nutrition and excretion of ^{90}Sr, ^{137}Cs, etc.

National Institute of Agricultural Sciences
- Research on the behavior of fission products in soil and crops
- Research on the control of ^{90}Sr absorption into corps

National Institute of Animal Health
- Research on the behavior of fission pro-

ducts in dairy cows

Research on the behavior of fission products in the cow-to-milk chain

Tokai Regional Fisheries Research Laboratory

Research on the radioactive contamination of marine organisms

Radiation Research Association

Research on the exposure dose of infants

Osaka Prefecture Radiation Center

Research on the physical and chemical characteristics of the short and intermediate life fission products

Japan Dairy Technique Association

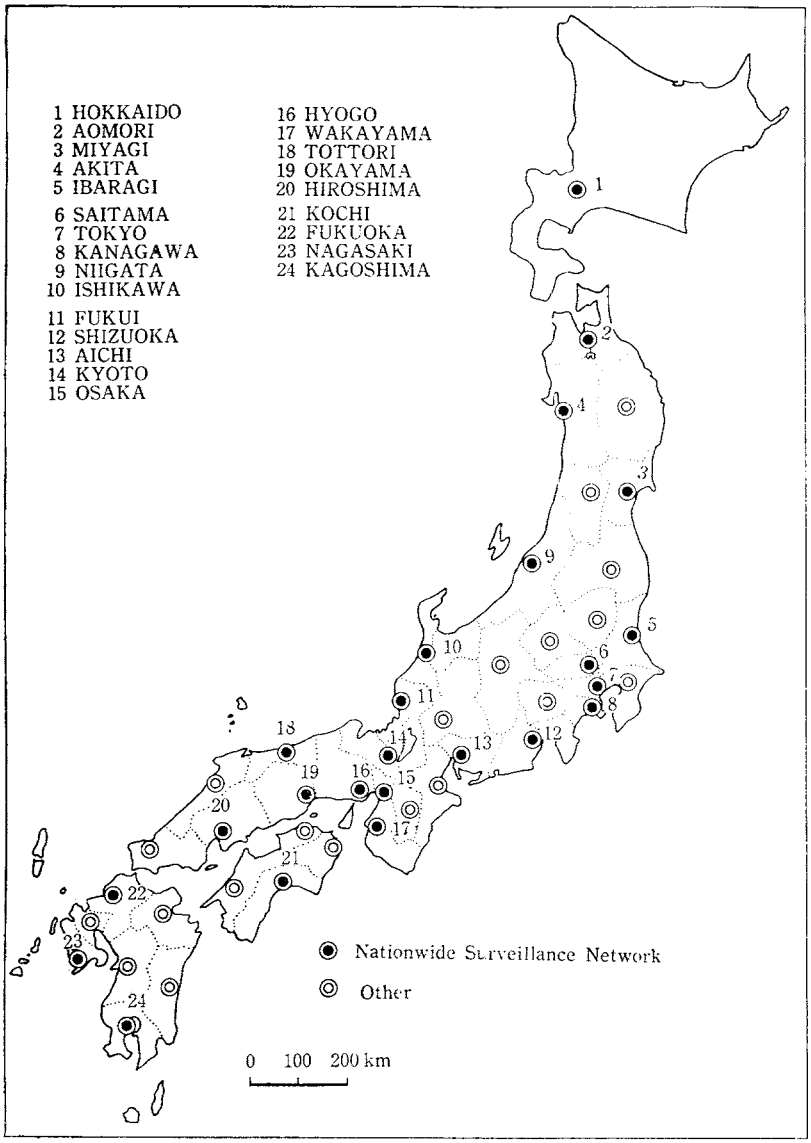
Research on the decontamination of milk

National Institute of Radiological Sciences

Research on external and internal radiation body burden

Research on the behavior of radionuclides derived from fallout and radioactive wastes in the air, the ground surface, foods, river water, sea water and marine products

Figure 13. Prefectural Research Institutes of Hygine



Abbreviations

NIRS National Institute of Radiological Sciences, Science and Technology Agency

TIPH The Institute of Public Health, Ministry of Public Welfare

NIN National Institute of Nutrition, Ministry of Public Welfare

NIAS National Institute of Agricultural Sciences, Ministry of Agriculture and Forestry

NIAI National Institute of Animal Industry, Ministry of Agriculture and Forestry

MRI Meteorological Research Institute, Meteorological Agency

JACRI Japan Analytical Chemistry Research Institute