NIRS-RSD-26

RADIOACTIVITY SURVEY DATA in Japan

NUMBER 26
FEB. 1970

National Institute of Radiological Sciences
Chiba, Japan

Radioactivity Survey Data in Japan

Number 26

Feb. 1970

Contents

National Institute of Radiological Sciences

Meteorological Data

Strontium-90 and Cesium-137 in Rain and Dry Fallout

(Japan Analytical Chemistry Research Institute)

Since May 1963, the Japan Analytical Chemistry Research Institute has measured the level of strontium-90 and Cesium-137 in Rain and dry-fallout samples aquired at various locations throughout Japan.

Sampling and pre-treatment for concentration were performed by 25 prefectural public health laboratories throughout Japan.

Sampling locations are indicated in Figure 1.

The collection tray has an area of 5000 cm^2, and is exposed to rain and dust for about a month. The depth of water in the tray is kept at 10 mm to prevent dust from being blown away. At the end of each month, water in the tray and water used to wash the tray are combined with strontium and cesium carriers, and passed through a column filled with sodium type cation exchange resion (Dowex 50W-X8, 50-100 mesh). The column was then sent to the Japan Analytical Chemistry Research Institute for analysis.

After the fraction containing both strontium-90 and cesium-137 was eluted from the resion, radiochemical analysis was carried out using the method recommended by the Science and Technology Agency.

Results obtained during the period from April 1969 to March 1970 are shown in Table 1.

Figure 1. Rain and Dry Fallout Sampling Location

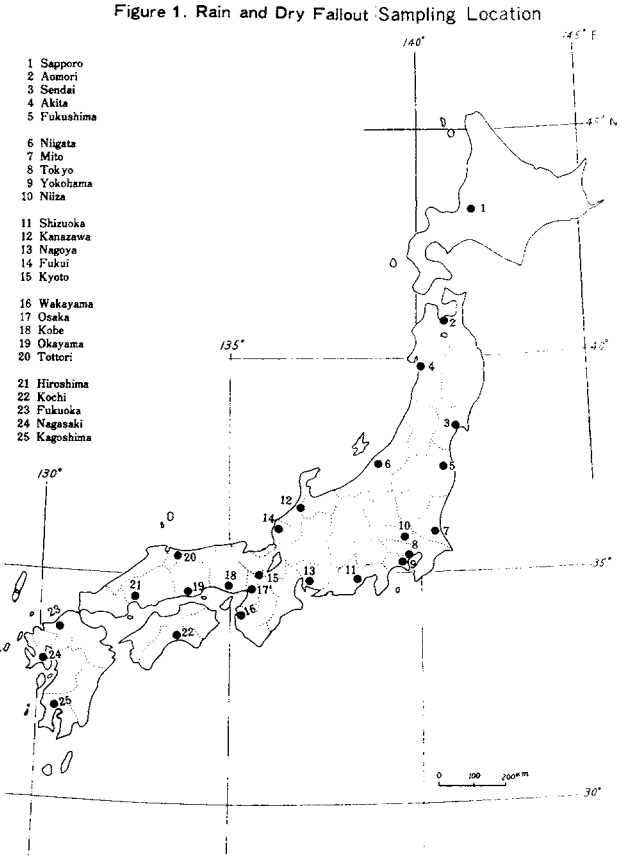

Table 1. ^{90}Sr and ^{137}Cs in Rain and Dry Fallout –Apr., 1969 to Mar., 1970–

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

(Japan Analytical Chemistry Research Institute)

(Continued from Table 1, Issue No. 23, of this Publication)

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Apr. 1969				
Sapporo, HOKKAIDO	31	150.5	0.21	0.27
Aomori, AOMORI	29	117.5	0.06	0.12
Sendai, MIYAGI	29	71.9	0.05	0.07
Akita, AKITA	30	206.5	0.10	0.11
Fukushima, FUKUSHIMA	30	53.5	0.06	0.09
Niigata, NIIGATA	29	139.5	0.15	0.25
Mito, IBARAKI	29	66.1	0.10	0.15
TOKYO	29		0.07	0.13
Yokohama, KANAGAWA	31	98.0	0.12	0.16
Niiza, SAITAMA	35	56.2	0.12	0.15
Shizuoka, SHIZUOKA	23	125.0	0.14	0.15
Kanazawa, ISHIKAWA	30	196.0	0.43	0.19
Nagoya, AICHI	28	88.0	0.10	0.16
Fukui, FUKUI	30	151.8	0.18	0.28
Kyoto, KYOTO	30	147.7	0.08	0.16
Wakayama, WAKAYAMA	29	96.5	0.04	0.05
Osaka, OSAKA	29	129.5	0.08	0.16
Kobe, HYOGO	30	82.3	0.07	0.12
Okayama, OKAYAMA	30	35.6	0.07	0.11
Tottori, TOTTORI	30	109.4	0.21	0.39
Hiroshima, HIROSHIMA	30	90.2	0.12	0.16
Kochi, KOCHI	35	150.5	0.21	0.27
Fukuoka, FUKUOKA	31	30.5	0.06	0.12
Nagasake, NAGASAKI	30	133.7	0.17	0.24
Kagoshima, KAGOSHIMA	30	122.5	0.13	0.21
May '69				
Sapporo, HOKKAIDO	31	77.0	0.11	0.15
Aomori, AOMORI	31	74.9	0.11	0.14
Sendai, MIYAGI	31	104.9	0.16	0.24
Akita, AKITA	32	118.0	0.18	0.24
Fukushima, FUKUSHIMA	31	59.0	0.10	0.17
Niigata, NIIGATA	31	80.5	0.07	0.13
Mito, IBARAKI	32	151.5	0.20	0.26
TOKYO	31		0.14	0.23
Yokohama, KANAGAWA	33	102.5	0.15	0.25
Niiza, SAITAMA	32	78.2	0.15	0.19
Shizuoka, SHIZUOKA	31	153.0	0.15	0.07
Kanazawa, ISHIKAWA	31	142.5	0.14	0.16
Nagoya, AICHI	32	70.0	0.14	0.19
Fukui, FUKUI	32	109.4	0.15	0.22
Kyoto, KYOTO	32	94.6	0.07	0.18
Wakayama, WAKAYAMA	35	189.0	0.15	0.15
Osaka, OSAKA	32	103.2	0.10	0.17
Kobe, HYOGO	33	102.5	0.16	0.24
Okayama, OKAYAMA	32	121.1	0.16	0.22
Tottori, TOTTORI	29	91.3	0.14	0.23
Hiroshima, HIROSHIMA	31	107.4	0.11	0.21

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Kochi, KOCHI	32	234.9	0.23	0.30
Fukuoka, FUKUOKA	31	101.0	0.09	0.16
Nagasaki, NAGASAKI	32	140.0	0.10	0.15
Kagoshima, KAGOSHIMA	31	255.5	0.07	0.13
June '69				
Sapporo, HOKKAIDO	30	104.0	0.09	0.19
Aomori, AOMORI	30	37.2	0.15	0.29
Sendai, MIYAGI	29	126.0	0.08	0.14
Akita, AKITA	29	81.5	0.20	0.23
Fukushima, FUKUSHIMA	30	159.0	0.15	0.32
Niigata, NIIGATA	31	57.0	0.05	0.14
Mito IBARAKI	29	180.0	0.19	0.25
TOKYO	30		0.11	0.20
Yokohama, KANAGAWA	31	265.5	0.15	0.26
Niiza, SAITAMA	29	125.0	0.10	0.17
Shizuoka, SHIZUOKA	38	837.0	0.19	1.06
Kanazawa, ISHIKAWA	30	140.5	0.17	0.22
Nagoya, AICHI	29	184.0	0.19	0.33
Fukui, FUKUI	30	243.7	0.15	0.24
Kyoto, KYOTO	29	373.1	0.23	0.32
Wakayama, WAKAYAMA	30	408.0	0.18	0.22
Osaka, OSAKA	28	256.7	0.19	0.24
Kobe, HYOGO	31	368.0	0.22	0.33
Okayama, OKAYAMA	29	274.8	0.18	0.33
Tottori, TOTTORI	32	191.5	0.18	0.27
Hiroshima, HIROSHIMA	30	223.5	0.21	0.29
Kochi, KOCHI	29	441.0	0.20	0.40
Fukuoka, FUKUOKA	30	230.0	0.13	0.21
Nagasaki, NAGASAKI	29	457.5	0.09	0.24
Kagoshima, KAGOSHIMA	30	631.8	0.10	0.20
July '69				
Sapporo, HOKKAIDO	31	57.5	0.12	0.17
Aomori, AOMORI	31	70.5	0.07	0.11
Sendai, MIYAGI	31	173.7	0.20	0.26
Akita, AKITA	31	198.0	0.18	0.30
Fukushima, FUKUSHIMA	31	112.5	0.18	0.26
Niigata, NIIGATA	30	178.0	0.10	0.17
Mito, IBARAKI	31	110.0	0.07	0.12
TOKYO	31		0.13	0.19
Yokohama, KANAGAWA	32	134.0	0.10	0.30
Niiza, SAITAMA	30	93.4	0.10	0.14
Shizuoka, SHIZUOKA	22	167.0	0.05	0.11
Kanazawa, ISHIKAWA	31	263.5	0.13	0.21
Nagoya, AICHI	31	188.0	0.09	0.16
Fukui, FUKUI	31	281.5	0.15	0.22
Kyoto, KYOTO	31	260.5	0.12	0.20
Wakayama, WAKAYAMA	31	269.0	0.06	0.02
Osaka, OSAKA	29	118.2	0.08	0.12
Kobe, KYOTO	31	135.3	0.09	0.13
Okayama, OKAYAMA	31	214.2	0.11	0.12
Tottori, TOTTORI	34	188.5	0.15	0.24
Hiroshima, HIROSHIMA	31	455.0	0.12	0.18
Kochi, KOCHI	31	301.9	0.07	0.12

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Fukuoka, FUKUOKA	31	292.6	0.08	0.19
Nagasaki, NAGASAKI	31	337.5	0.08	0.13
Kagoshima, KAGOSHIMA	32	436.2	0.11	0.18
Aug. '69				
Sapporo, HOKKAIDO	31	141.5	0.15	0.23
Aomori, AOMORI	31	216.0	0.10	0.15
Sendai, MIYAGI	31	190.0	0.13	0.11
Akita, AKITA	31	249.5	0.11	0.18
Fukushima, FUKUSHIMA	31	154.5	0.10	0.16
Niigata, NIIGATA	31	146.5	0.10	0.13
Mito, IBARAKI	31	138.5	0.08	0.10
TOKYO	31		0.05	0.07
Yokohama, KANAGAWA	32	194.5	0.06	0.09
Niiza, SAITAMA	32	76.7	0.12	0.14
Shizuoka, SHIZUOKA	34	374.5	0.11	0.38
Kanazawa, ISHIKAWA	31	207.5	0.12	0.17
Nagoya, AICHI	31	184.6	0.05	0.08
Fukui, FUKUI	31	136.6	0.06	0.07
Kyoto, KYOTO	31	200.0	0.07	0.10
Wakayama, WAKAYAMA	31	125.0	0.02	0.01
Osaka, OSAKA	32	14.2	0.03	0.02
Kobe, HYOGO	32	50.4	0.02	0.02
Okayama, OKAYAMA	31	80.2	0.02	0.03
Tottori, TOTTORI	28	140.2	0.04	0.03
Hiroshima, HIROSHIMA	31	101.7	0.04	0.04
Kochi, KOCHI	31	194.1	0.05	0.06
Fukuoka, FUKUOKA	31	145.4	0.09	0.11
Nagasaki, NAGASAKI	31	60.5	0.04	0.05
Kagoshima, KAGOSHIMA	32	234.8	0.04	0.09
Sept. '69				
Sapporo, HOKKAIDO	30	104.5	0.09	0.12
Aomori, AOMORI	30	95.0	0.04	0.07
Sendai, MIYAGI	30	39.7	0.04	0.06
Akita, AKITA	30	132.0	0.08	0.12
Fukushima, FUKUSHIMA	31	142.1	0.07	0.08
Niigata, NIIGATA	32	166.5	0.09	0.12
Mito, IBARAKI	30	138.0	0.07	0.09
TOKYO	30		0.05	0.12
Yokohama, KANAGAWA	31	88.0	0.07	0.11
Niiza, SAITAMA	32	192.3	0.10	0.17
Shizuoka, SHIZUOKA	36	199.6	0.09	0.20
Kanazawa, ISHIKAWA	30	259.5	0.08	0.12
Nagoya, AICHI	31	150.0	0.10	0.14
Fukui, FUKUI	31	248.0	0.05	0.08
Kyoto, KYOTO	30	90.5	0.03	0.05
Wakayama, WAKAYAMA	30	25.5	0.01	0.02
Osaka, OSAKA	28	29.8	0.02	0.03
Kobe, HYOGO	34	26.7	0.02	0.04
Okayama, OKAYAMA	28	38.5	0.03	0.04
Tottori, TOTTORI	30	135.6	0.07	0.07
Hiroshima, HIROSHIMA	31	24.5	0.01	0.02
Kochi, KOCHI	30	102.3	0.06	0.08
Fukuoka, FUKUOKA	31	91.9	0.03	0.05

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Nagasaki, NAGASAKI	30	25.5	0.02	0.03
Kagoshima, KAGOSHIMA	30	39.0	0.04	0.05
Oct. '69				
Sapporo, HOKKAIDO	31	93.0	0.04	0.06
Aomori, AOMORI	31	50.5	0.06	0.10
Sendai, MIYAGI	30	143.7	0.05	0.07
Akita, AKITA	31	96.4	0.07	0.10
Fukushima, FUKUSHIMA	31	121.8	0.04	0.05
Niigata, NIIGATA	29	161.5	0.10	0.14
Mito, IBARAGI	31	178.5	0.18	0.22
TOKYO	30	141.0	0.08	0.11
Yokohama, KANAGAWA	32	123.0	0.03	0.05
Niiza, SAITAMA	28	135.2	0.10	0.14
Shizuoka, SHIZUOKA	25	35.5	0.03	0.08
Kanazawa, ISHIKAWA	31	157.5	0.13	0.18
Nagoya, AICHI	30	61.0	0.03	0.03
Fukui, FUKUI	32	120.6	0.07	0.10
Kyoto, KYOTO	31	75.2	0.05	0.07
Wakayama, WAKAYAMA	34	77.0	0.05	0.03
Osaka, OSAKA	31	32.7	0.02	0.04
Kobe, HYOGO	28	51.8	0.03	0.05
Okayama, OKAYAMA	31	19.9	0.03	0.04
Tottori, TOTTORI	32	158.7	0.12	0.14
Hiroshima, HIROSHIMA	32	73.7	0.04	0.06
Kochi, KOCHI	31	61.5	0.04	0.05
Fukuoka, FUKUOKA	31	58.4	0.04	0.06
Nagasaki, NAGASAKI	31	47.0	0.02	0.03
Kagoshima, KAGOSHIMA	31	78.0	0.06	0.10
Nov. '69				
Sapporo, HOKKAIDO	30	57.0	0.04	0.05
Aomori, AOMORI	30	116.5	0.10	0.15
Sendai, MIYAGI	29	44.0	0.03	0.01
Akita, AKITA	30	157.3	0.10	0.18
Fukushima, FUKUSHIMA	31	62.3	0.03	0.04
Niigata, NIIGATA	30	356.0	0.13	0.18
Mito, IBARAKI	29	82.0	0.03	0.05
TOKYO	29		0.03	0.05
Yokohama, KANAGAWA	30	104.5	0.04	0.05
Niiza, SAITAMA	29	95.7	0.03	0.05
Shizuoka, SHIZUOKA	37	46.5	0.05	0.14
Kanazawa, ISHIKAWA	30	167.0	0.16	0.20
Nagoya, AICHI	30	61.0	0.03	0.03
Fukui, FUKUI	30	112.9	0.12	0.17
Kyoto, KYOTO	30	81.0	0.03	0.04
Wakayama, WAKAYAMA	28	130.0	0.03	0.02
Osaka, OSAKA	30	35.9	0.02	0.04
Kobe, HYOGO	30	83.9	0.03	0.04
Okayama, OKAYAMA	29	30.0	0.02	0.03
Tottori, TOTTORI	31	88.9	0.12	0.18
Hiroshima, HIROSHIMA	28	52.5	0.02	0.03
Kochi, KOCHI	30	123.0	0.05	0.06
Fukuoka, FUKUOKA	30	84.7	0.07	0.10
Nagasaki, NAGASAKI	30	115.0	0.04	0.06

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Kagoshima, KAGOSHIMA	30	114.0	0.03	0.05
Dec. '69				
Sapporo, HOKKAIDO	33	83.0	0.04	0.06
Aomori, AOMORI	30	229.0	0.08	0.17
Sendai, MIYAGI	30	31.2	0.01	0.01
Akita, AKITA	26	220.5	0.16	0.23
Fukushima, FUKUSHIMA	31	28.1	0.02	0.02
Niigata, NIIGATA	35	330.0	0.19	0.33
Mito, IBARAKI	34	3.5	0.02	0.02
TOKYO	34		0.01	0.01
Yokohama, KANAGAWA	36	18.5	0.06	0.04
Niiza, SAITAMA	35	13.7	0.04	0.01
Shizuoka, SHIZUOKA	37	46.5	0.05	0.14
Kanazawa, ISHIKAWA	30	263.5	0.12	0.19
Nagoya, AICHI	36	52.8	0.04	0.05
Fukui, FUKUI	26	317.1	0.23	0.41
Kyoto, KYOTO	30	29.4	0.02	0.04
Wakayama, WAKAYAMA	31	39.0	0.01	0.02
Osaka, OSAKA	34	65.5	0.02	0.04
Kobe, HYOGO	36	48.5	0.03	0.04
Okayama, OKAYAMA	34	36.8	0.02	0.03
Tottori, TOTTORI	35	149.1	0.16	0.26
Hiroshima, HIROSHIMA	38	33.5	0.02	0.04
Kochi, KOCHI	37	59.0	0.04	0.04
Fukuoka, FUKUOKA	31	68.7	0.08	0.15
Nagasaki, NAGASAKI	30	95.0	0.08	0.11
Kagoshima, KAGOSHIMA	36	73.0	0.05	0.06
Jan. '70				
Sapporo, HOKKAIDO	27	80.5	0.03	0.04
Aomori, AOMORI	31		0.04	0.06
Sendai, MIYAGI	30	51.8	0.06	0.06
Akita, AKITA	27	158.5	0.15	0.19
Fukushima, FUKUSHIMA	31	37.7	0.03	0.05
Niigata, NIIGATA	26	188.5	0.11	0.16
Mito, IBARAKI	28	52.0	0.03	0.05
TOKYO	25		0.05	0.08
Yokohama, KANAGAWA	27	66.5	0.04	0.05
Niiza, SAITAMA	27	54.2	0.06	0.08
Shizuoka, SHIZUOKA	26	95.0	0.09	0.20
Kanazawa, ISHIKAWA	30	247.0	0.21	0.31
Nagoya, AICHI	27	34.5	0.03	0.04
Fukui, FUKUI	38	446.5	0.27	0.44
Kyoto, KYOTO	30	51,3	0.03	0.04
Wakayama, WAKAYAMA	34	84.5	0.03	0.03
Osaka, OSAKA	27	40.3	0.02	0.03
Kobe, HYOGO	28	46.0	0.02	0.03
Okayama, OKAYAMA	26	20.3	0.02	0.03
Tottori, TOTTORI	28	146.0	0.17	0.23
Hiroshima, HIROSHIMA	25	26.4	0.02	0.03
Kochi, KOCHI	27	48.3	0.02	0.04
Fukuoka, FUKUOKA	31	6.2	0.03	0.04

Location	Duration (days)	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)
Nagasaki, NAGASAKI	31	29.5	0.03	0.05
Kagoshima, KAGOSHIMA	25	25.0	0.02	0.03
Feb. '70				
Sapporo, HOKKAIDO	29	130.5	0.04	0.06
Aomori, AOMORI	27		0.03	0.06
Sendai, MIYAGI	27	41.0	0.03	0.07
Akita, AKITA	28	119.5	0.13	0.19
Fukushima, FUKUSHIMA	28	36.5	0.02	0.03
Niigata, NIIGATA	28	80.5	0.14	0.21
Mito, IBARAKI	27	35.0	0.02	0.03
TOKYO	27		0.05	0.04
Yokohama, KANAGAWA	29	39.0	0.04	0.07
Niiza, SAITAMA	27	39.0	0.04	0.04
Shizuoka, SHIZUOKA	21	92.1	0.06	0.19
Kanazawa, ISHIKAWA	27	143.5	0.16	0.22
Nagoya, AICHI	28	75.5	0.04	0.06
Fukui, FUKUI	26	169.0	0.13	0.19
Kyoto, KYOTO	30	77.4	0.05	0.08
Wakayama, WAKAYAMA	26	65.0	0.04	0.04
Osaka, OSAKA	27	57.1	0.04	0.04
Kobe, HYOGO	28	80.5	0.14	0.21
Okayama, OKAYAMA	27	44.0	0.05	0.06
Tottori, TOTTORI	29	89.2	0.14	0.19
Hiroshima, HIROSHIMA	28	54.9	0.05	0.07
Kochi, KOCHI	26	39.5	0.05	0.07
Fukuoka, FUKUOKA	12	46.5	0.05	0.08
Nagasaki, NAGASAKI	28	88.0	0.07	0.10
Kagoshima, KAGOSHIMA	28	72.6	0.05	0.08
Mar. '70				
Sapporo, HOKKAIDO	30	173.2	0.09	0.13
Aomori, AOMORI	30	203.0	0.01	0.03
Sendai, MIYAGI	30	44.7	0.05	0.12
Akita, AKITA	28	75.5	0.16	0.23
Fukushima, FUKUSHIMA	31	37.5	0.06	0.10
Niigata, NIIGATA	33	68.5	0.12	0.21
Mito, IBARAKI	29	48.0	0.04	0.05
TOKYO	30		0.02	0.02
Yokohama, KANAGAWA	28	62.5	0.06	0.09
Niiza, SAITAMA	24	37.6	0.04	0.05
Shizuoka, SHIZUOKA	36	115.0	0.11	0.19
Kanazawa, ISHIKAWA	30	135.0	0.27	0.30
Nagoya, AICHI	30	58.0	0.05	0.07
Fukui, FUKUI	30	153.1	0.25	0.36
Kyoto, KYOTO	29	60.1	0.06	0.10
Wakayama, WAKAYAMA	21	44.5	0.04	0.02
Osaka, OSAKA	28	49.0	0.05	0.09
Kobe, HYOGO	30	31,8	0.06	0.08
Okayama, OKAYAMA	29	37.9	0.05	0.08
Tottori, TOTTORI	28	86.2	0.29	0.39
Hiroshima, HIROSHIMA	31	33.5	0.05	0.08
Kochi, KOCHI	24	84.1	0.06	0.07
Fukuoka, FUKUOKA	30		0.02	0.03
Nagasaki, NAGASAKI	30	57.0	0.06	0.13
Kagoshima, KAGOSHIMA	31	96.0	0.09	0.15

Table 2 shows the monthly mean values of strontium-90 and cesium-137 collected by the 25 locations during the period from April 1969 to March 1970.

Table 3 shows the monthly mean values of precipitation, strontium-90 and cesium-137 deposits in each sampling location during the period from April 1969 to March 1970.

Table 2. Monthly Mean Values of ^{90}Sr and ^{137}Cs Collected by the 25 Locations – Apr., 1969 to Mar., 1970 –

(Continued from Table 2, Issue No. 23, of this Publication)

Month	Precipitation (mm)	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)	$^{137}Cs/^{90}Sr$
Apr. 1969	110	0.120	0.171	1.43
May "	119	0.133	0.191	1.44
June "	262	0.147	0.284	1.93
July "	210	0.110	0.174	1.58
Aug. "	157	0.072	0.105	1.46
Sept. "	108	0.054	0.083	1.54
Oct. "	94	0.060	0.084	1.40
Nov. "	100	0.055	0.082	1.49
Dec. "	97	0.064	0.101	1.58
Jan. 1970	89	0.064	0.096	1.50
Feb. "	75	0.066	0.099	1.50
Mar. "	78	0.086	0.127	1.48
Average	125	0.086	0.133	1.55

Table 3. Monthly Mean Values of ^{90}Sr and ^{137}Cs Deposits in each Sampling Location – Apr., 1969 to Mar., 1970 –

(Continued from Table 3, Issue No. 23, of this Publication)

Location		Precipitation(mm)	^{90}Sr(mCi/km^2)	^{137}Cs(mCi/km^2)
1	Hokkaido	104	0.088	0.128
2	Aomori	121	0.071	0.121
3	Miyagi	89	0.074	0.102
4	Akita	151	0.135	0.192
5	Fukushima	83	0.072	0.114
6	Niigata	163	0.113	0.181
7	Ibaraki	101	0.086	0.116
8	Tokyo		0.066	0.104
9	Kanagawa	108	0.077	0.127
10	Saitama	83	0.083	0.111
11	Shizuoka	191	0.093	0.243
12	Ishikawa	194	0.177	0.206
13	Aichi	101	0.074	0.112
14	Fukui	208	0.151	0.232
15	Kyoto	128	0.070	0.115
16	Wakayama	129	0.055	0.053
17	Osaka	78	0.056	0.085
18	Hyogo	92	0.074	0.111
19	Okayama	79	0.063	0.093
20	Tottori	124	0.138	0.199
21	Hiroshima	106	0.068	0.102
22	Kochi	153	0.090	0.130
23	Fukuoka	105	0.064	0.101
24	Nagasaki	132	0.067	0.113
25	Kagoshima	160	0.060	0.100
	Average	125	0.086	0.133

Dietary Data

Strontium-90 and Cesium-137 in milk

(Japan Analytical Chemistry Research Institute)

Since December 1961, milk samples from various parts of Japan have been collected by 25 prefectural public health laboratories and analyzed for strontium-90 and cesium-137 content at the Japan analytical Chemistry research Institute. Sampling locations are indicated in Figure 2.

Three liters of fresh milk were purchased at a representative farm in each prefecture and carbonized by the public health laboratories.

The carbonized samples were sent to the Japan Analytical Chemistry Research Institute and ashed, then analyzed using the method recommended by Science and Technology Agency.

Results obtained during the period from April, 1969 to March, 1970 are shown in Table 4.

Figure 2. Milk Sampling Location

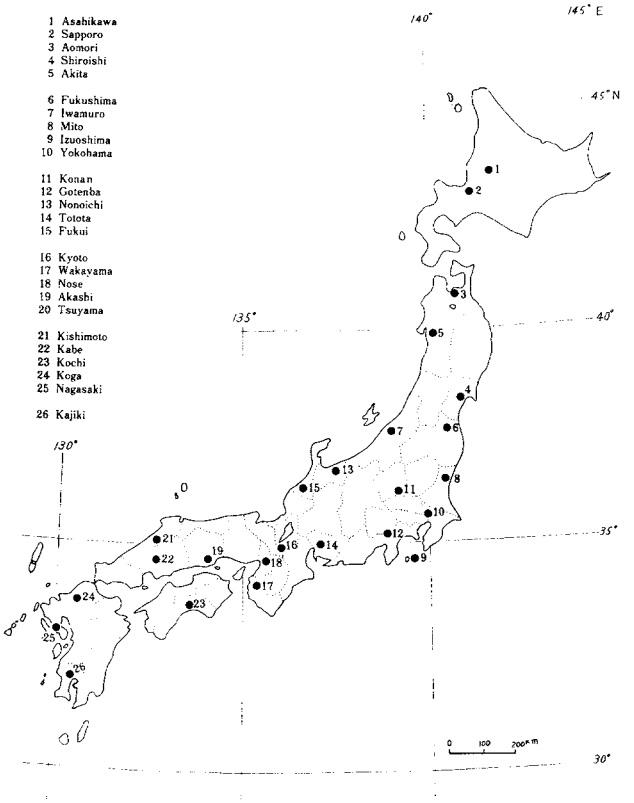

Table 4. ^{90}Sr and ^{137}Cs in Milk –Apr., 1969 to Mar., 1970–

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

(Japan Analytial Chemistry Research Institute)

(Continued from Table 2, Issue No. 24 of this Publication)

Location	Component			^{90}Sr		^{137}Cs	
	Ash (g/*l*)	Ca (g/*l*)	K(g/*l*)	(pCi/*l*)	(pCi/gCa)	(pCi/*l*)	(pCi/gK)
Apr. 1969							
Asahikawa, HOKKAIDO	8.50	1.20	0.70	9.0	7.5	17.9	10.5
Aomori, AOMORI	7.00	0.93	1.37	24.6	26.5	22.3	16.3
Iwamuro, NIIGATA	5.00	0.77	0.93	3.1	4.0	8.2	8.8
Mito, IBARAKI	7.50	1.06	1.26	3.4	3.2	10.7	8.5
Nonoichi, ISHIKAWA	7.17	1.03	1.32	4.6	4.5	16.3	12.3
Tsuyama, OKAYAMA	7.67	1.25	1.36	4.5	3.6	10.7	7.9
May '69							
Sapporo, HOKKAIDO	7.33	1.07	1.29	4.9	4.6	30.7	23.7
Shiroishi, MIYAGI	7.00	1.07	1.46	5.0	4.7	13.6	9.3
Akita, AKITA	8.00	1.10	1.16	7.5	6.8	13.5	11.6
Fukushima, FUKUSHIMA	7.67	1.11	1.27	7.0	6.3	18.5	14.6
Izu-oshima, TOKYO	7.22	1.09	1.63	10.8	9.9	58.7	36.0
Konan, SAITAMA	6.50	1.00	1.07	3.7	3.7	9.8	9.2
Gotemba, SHIZUOKA	7.57	1.07	1.68	7.4	6.9	81.6	48.6
Toyota, AICHI	7.17	1.10	1.28	2.8	2.5	12.7	9.9
Fukui, FUKUI	7.50	1.01	1.13	5.0	5.0	12.4	11.0
Kyoto, KYOTO	7.83	1.07	1.34	5.0	4.7	17.0	12.7
Nose, OSAKA	7.67	1.11	1.31	4.2	3.8	10.5	8.0
Akashi, HYOGO	7.33	1.11	1.34	3.4	3.1	6.6	4.9
Kishimoto, TOTTORI	7.17	1.07	1.32	5.8	5.4	32.7	24.8
Kabe, HIROSHIMA	7.83	1.14	1.25	3.9	3.4	21.3	17.0
Kochi, KOCHI	7.67	1.02	1.32	4.8	4.7	14.0	10.6
Koga, FUKUOKA	7.83	1.10	1.49	3.4	3.1	12.9	8.7
Nagasaki, NAGASAKI	7.00	1.03	1.45	8.8	8.5	9.6	6.6
Kajiki, KAGOSHIMA	7.50	1.11	1.42	6.7	6.0	23.4	16.5
June '69							
Asahikawa, HOKKAIDO	7.70	1.15	1.61	8.9	7.7	14.1	8.8
Shiroishi, MIYAGI	7.00	1.06	1.41	4.3	4.1	16.9	12.0
Fukushima, FUKUSHIMA	8,37	1.18	1.59	5.0	4.2	22.8	14.3
Iwamuro, NIIGATA	6.70	0.97	1.59	4.7	4.8	8.5	5.3
Mito, IBARAKI	6.83	0.87	1.28	2.7	3.1	10.6	8.3
Yokohama, KANAGAWA	7.50	1.16	1.25	3.4	2.9	11.0	8.8
Gotenba. SHIZUOKA	7.57	1.07	1.68	7.4	6.9	81.6	48.6
Nonoichi, ISHIKAWA	6.83	1.07	1.25	7.2	6.7	11.6	9.3
Fukui, FUKUI	7.00	1.06	1.26	6.2	5.8	11.6	9.2
Wakayama, WAKAYAMA	6.25	1.01	0.97	9.4	9.3	9.3	9.5
Tsuyama, OKAYAM	7.10	1.10	1.37	4.7	4.3	13.5	9.9
July '69							
Sapporo, HOKKAIDO	7.23	1.23	1.33	4.7	3.8	9.9	15.0
Akita, AKITA	7.57	0.96	1.44	6.2	6.5	10.9	7.6
Fukushima, FUKUSHIMA	7.73	1.13	1.53	5.2	4.6	12.4	8.1
Izu-ohshima, TOKYO	6.93	1.00	1.47	10.5	10.5	51.5	35.0
Yokohama, KANAGAWA	7.03	1.06	1.42	2.9	2.7	10.3	7.3
Konan, SAITAMA	6.55	1.04	1.29	4.4	4.2	6.7	5.2
Toyota' AICHI	7.33	1.09	1.34	4.5	4.1	6.5	4.9
Kyoto, KYOTO	9.20	1.02	1.29	3.6	3.5	11.4	8.8

Location	Component			^{90}Sr		^{137}Cs	
	Ash (g/*l*)	Ca (g/*l*)	K (g/*l*)	(pCi/*l*)	(pCi/gCa)	(pCi/*l*)	(pCi/gK)
Wakayama, WAKAYAMA	5.31	0.80	0.96	3.1	3.9	4.0	4.2
Nose, OHSAKA	7.47	1.08	1.51	6.9	6.4	9.5	6.3
Akashi, HYOGO	7.43	1.13	1.45	2.6	2.3	9.9	6.8
Kishimoto, TOTTORI	7.07	1.04	1.48	9.1	8.8	33.5	22.6
Kabe, HIROSHIMA	7.50	0.97	1.38	3.3	3.4	5.8	4.2
Kochi, KOCHI	8.17	1.26	1.50	7.9	6.3	12.9	8.6
Koga, FUKUOKA	7.37	1.08	1.36	5.1	4.7	7.6	5.6
Nagasaki, NAGASAKI	7.13	1.02	1.65	6.7	6.6	15.3	9.3
Kajiki, KAGOSHIMA	7.53	1.14	1.52	9.2	8.1	24.0	15.8
Aug. '69							
Asahikawa, HOKKAIDO	7.17	1.04	1.65	11.1	10.7	13.8	8.4
Aomori, AOMORI	6.90	0.95	1.29	15.4	16.2	18.9	14.7
Shiroishi, MIYAGI	7.00	1.04	1.49	5.4	5.2	16.6	11.1
Fukushima, FUKUSHIMA	8.43	1.40	1.45	8.8	6.3	13.9	9.6
Iwamuro, NIIGATA	6.30	0.84	1.53	5.0	6.0	4.8	3.1
Mito, IBARAKI	7.17	1.18	1.47	2.7	2.3	8.4	5.7
Gotenba, SHIZUOKA	6.87	1.02	1.47	9.4	9.2	46.7	31.8
Nonoichi, ISHIKAWA	6.50	0.99	1.38	5.5	5.6	8.7	6.3
Fukui, FUKUI	7.27	1.03	1.42	4.5	4.4	8.7	6.1
Tsuyama, OKAYAMA	7.17	1.03	1.61	5.3	5.1	8.2	5.1
Sept. '69							
Sapporo, HOKKAIDO	7.20	1.03	1.46	4.0	3.9	17.3	11.8
Akita, AKITA	7.07	1.10	1.46	7.4	6.7	11.0	7.5
Fukushima, FUKUSHIMA	7.87	1.02	1.36	4.5	4.5	10.1	7.4
Izu-ohshima, TOKYO	7.02	1.04	1.51	9.7	9.3	53.2	35.2
Konan, SAITAMA	6.73	1.05	1.47	5.9	5.6	37.4	25.4
Toyota, AICHI	7.27	1.03	1.54	3.9	3.8	5.8	3.8
Kyoto, KYOTO	7.27	1.08	1.42	2.8	2.6	6.8	4.8
Nose, OSAKA	7.17	1.03	1.50	4.7	4.6	6.4	4.3
Akashi, HYOGO	7.93	1.19	1.50	2.5	2.1	6.0	4.0
Kishimoto, TOTTORI	7.27	1.05	1.52	7.6	7.2	12.9	8.5
Kabe, HIROSHIMA	7.10	0.98	1.46	2.6	2.7	3.4	2.3
Kochi, KOCHI	7.20	1.04	1.54	6.9	6.6	5.0	3.2
Koga, FUKUOKA	7.23	1.17	1.37	2.4	2.1	7.8	5.7
Nagasaki, NAGASAKI	6.93	1.17	1.48	5.6	4.8	9.7	6.6
Kajiki, KAGOSHIMA	7.60	1.13	1.57	4.8	4.2	14.2	9.0
Oct. '69							
Asahikawa, HOKKAIDO	7.33	1.16	1.16	9.1	7.8	22.0	13.7
Aomori, AOMORI	7.40	1.05	1.47	22.5	21.4	19.9	13.5
Shiroishi, MIYAGI	6.67	1.06	1.41	4.5	4.2	14.0	9.9
Fukushima, FUKUSHIMA	8.73	1.29	1.70	4.2	3.3	20.0	11.8
Iwamuro, NIIGATA	6.87	0.89	1.39	4.4	4.5	14.8	10.6
Mito, IBARAKI	6.83	1.17	1.21	2.0	1.7	6.5	5.5
Yokohama, KANAGAWA	7.69	1.38	1.32	4.6	3.3	8.0	6.1
Gotenba, SHIZUOKA	6.23	0.88	1.29	4.2	4.8	33.7	26.1
Nonoichi, ISHIKAWA	5.90	0.90	1.20	3.6	4.0	6.9	5.8
Fukui, FUKUI	7.40	1.20	1.34	5.0	4.2	8.1	5.0
Wakayama, WAKAYAMA	5.72	0.86	1.14	2.0	2.3	7.9	6.9
Tsuyama, OKAYAMA	7.27	1.04	1.58	3.5	3.4	8.4	5.3
Nov. '69							
Sapporo, HOKKAIDO	7.40	1.06	1.34	6.3	5.9	33.6	25.1
Akita, AKITA	7.93	1.11	1.47	7.9	7.1	15.8	10.7

Location	Component			^{90}Sr		^{137}Cs	
	Ash (g/l)	Ca (g/l)	K (g/l)	(pCi/l)	(pCi/gCa)	(pCi/l)	(pCi/gK)
Fukushima, FUKUSHIMA	7.93	1.32	1.44	7.2	5.5	12.9	8.3
Izuoshima, TOKYO	6.56	0.97	1.35	12.4	12.8	67.3	49.9
Konan, SAITAMA	6.63	0.97	1.31	5.3	5.5	29.7	22.7
Toyota, AICHI	7.50	1.05	1.39	2.9	2.8	7.9	5.7
Kyoto, KYOTO	7.57	1.13	1.43	2.4	2.1	6.6	4.6
Nose, OSAKA	7.33	1.07	1.32	2.8	2.6	7.2	5.5
Akashi, HYOGO	7.57	1.07	1.44	1.9	1.8	4.9	3.4
Kishimoto, TOTTORI	7.40	1.10	1.36	6.7	6.1	23.9	17.6
Kabe, HIROSHIMA	8.00	1.07	1.33	2.1	2.0	13.1	9.8
Kochi, KOCHI	8.67	1.15	1.62	3.8	3.3	5.8	3.6
Koga, FUKUOKA	7.30	1.14	1.32	2.6	2.3	11.3	8.6
Nagasaki, NAGASAKI	7.47	1.11	1.26	2.2	2.0	12.3	9.8
Kajiki, KAGOSHIMA	7.30	1.12	1.35	5.9	5.3	23.5	47.4
Dec. '69							
Asahikawa, HOKKAIDO	7.40	1.11	1.84	6.8	6.1	22.9	16.6
Aomori, AOMORI	6.73	1.15	1.31	9.2	8.0	30.7	23.4
Shiroishi, MIYAGI	6.97	1.04	1.30	5.7	5.5	15.5	11.9
Fukushima, FUKUSHIMA	7.33	1.07	1.29	7.3	6.8	18.6	14.4
Iwamuro, NIIGATA	6.77	0.97	1.46	4.0	4.1	18.2	12.5
Mito, IBARAKI	6.67	0.91	1.53	2.1	2.3	14.2	9.3
Yokohama, KANAGAWA	7.63	1.29	1.15	2.6	2.0	14.0	12.2
Gotenba, SHIZUOKA	7.40	1.14	1.46	8.2	7.2	43.1	29.5
Nonoichi, ISHIKAWA	6.57	0.98	1.18	4.6	4.7	19.2	16.3
Fukui, FUKUI	6.50	1.13	0.97	2.6	2.3	9.2	9.5
Tsuyama, OKAYAMA	7.60	1.20	1.46	3.4	2.8	16.0	11.3
Jan. '70							
Sapporo, HOKKAIDO	7.30	1.03	1.39	1.6	1.6	17.7	12.7
Akita, AKITA	7.40	1.17	1.32	5.0	4.3	13.6	10.3
Fukushima, FUKUSHIMA	7.30	1.05	1.28	3.3	3.1	14.0	10.9
Izu-oshima, TOKYO	5.75	1.00	1.51	11.3	11.3	72.2	47.8
Yokohama, KANAGAWA	7.58	1.12	1.25	1.2	1.1	7.8	6.2
Konan, SAITAMA	7.03	1.16	1.17	3.4	2.9	10.9	9.3
Toyota, AICHI	7.27	1.04	1.29	3.2	3.1	12.1	9.4
Kyoto, KYOTO	7.10	1.10	1.39	2.8	2.5	12.8	9.2
Wakayama, WAKAYAMA	7.47	0.72	1.01	2.3	3.2	4.9	4.9
Nose, OSAKA	7.47	1.10	1.43	3.3	3.0	10.8	7.6
Akashi, HYOGO	7.83	1.09	1.43	2.3	2.1	9.8	7.6
Kishimoto, TOTTORI	7.47	1.05	1.42	8.5	8.1	36.8	25.9
Kabe, HIROSHIMA	6.33	0.93	1.15	4.0	4.3	8.6	7.5
Kochi, KOCHI	7.57	1.08	1.33	2.5	2.3	6.6	5.0
Koga, FUKUOKA	7.30	1.10	1.35	1.5	1.4	8.0	5.9
Nagasaki, NAGASAKI	6.77	1.05	1.25	4.3	4.1	12.8	10.2
Kajiki, KAGOSHIMA	7.50	1.17	1.35	3.0	2.7	12.9	9.6
Feb. '70							
Asahikawa, HOKKAIDO	7.37	1.04	1.50	3.7	3.6	25.4	16.9
Aomori, AOMORI	7.17	1.14	1.62	7.1	6.2	19.9	12.3
Shiroishi, MIYAGI	7.23	1.14	1.61	3.5	3.1	14.4	8.9
Fukushima, FUKUSHIMA	6.07	0.87	1.24	4.0	4.6	8.2	6.6
Iwamuro, NIIGATA	7.40	1.17	1.41	7.9	6.8	7.6	5.4
Mito, IBARAGI	7.37	1.10	1.36	2.2	2.0	12.4	9.1
Gotenba, SHIZUOKA	7.63	1.12	1.61	3.6	3.2	35.6	22.1

Location	Component			^{90}Sr		^{137}Cs	
	Ash (g/*l*)	Ca (g/*l*)	K (g/*l*)	(pCi/*l*)	(pCi/gCa)	(pCi/*l*)	(pCi/gK)
Nonoichi, ISHIKAWA	7.27	1.12	1.55	2.5	2.2	10.9	6.6
Tsuyama, OKAYAMA	7.47	1.01	1.50	3.0	3.0	10.9	7.3
Mar. '70							
Sapporo, HOKKAIDO	7.68	1.15	1.56	4.2	3.7	22.6	14.5
Akita, AKITA	7.93	1.11	1.42	6.7	6.0	15.9	11.2
Fukushima, FUKUSHIMA	7.57	1.22	1.73	8.5	7.0	9.8	5.7
Izu-oshima, TOKYO	6.92	1.03	1.54	10.5	10.2	52.3	34.0
Yokohama, KANAGAWA	7.50	1.15	1.61	0.5	0.4	9.2	5.7
Konan, SAITAMA	6.90	1.06	1.34	1.5	1.4	8.0	6.0
Toyota, AICHI	7.60	1.08	1.62	2.1	1.9	11.0	6.8
Fukui, FUKUI	6.53	1.00	1.05	1.9	1.9	6.6	6.3
Kyoto, KYOTO	7.93	1.09	1.59	2.4	2.2	10.2	6.4
Wakayama, WAKAYAMA	5.58	0.82	1.15	2.3	2.8	4.7	4.1
Nose, OSAKA	7.83	1.16	1.71	6.9	5.9	8.2	4.8
Akashi, HYOGO	7.80	1.09	1.67	1.8	1.7	8.0	4.8
Kishimoto, TOTTORI	7.47	1.08	1.48	4.0	3.7	27.4	18.5
Kabe, HIROSHIMA	8.67	1.26	1.67	2.8	2.2	14.6	8.7
Kochi, KOCHI	7.47	1.16	1.60	2.6	2.2	9.8	6.1
Koga, FUKUOKA	7.53	1.11	1.69	2.2	2.0	7.4	4.4
Nagasaki, NAGASAKI	7.83	1.36	1.43	3.5	2.6	10.3	7.2
Kajiki, KAGOSHIMA	7.57	1.19	1.71	4.8	4.0	15.6	9.1

Strontium-90 and Cesium-137 in Total Diet

(Japan Analytical Chemistry Research Institute)

Since June 1963, the Japan Analytical Chemistry Research Institute has conducted analyses of total diet samples from the 19 prefectures shown in Figure 3.

One city and one village in each prefecture were chosen as representative of urban and rural districts of these prefectures, respectively. Ten families from each family presented a normal portion of the regular diet consumed in one day by an adult or a child.

Diets at special occasions were 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 period from March 1969 to March 1970 are shown in Table 5.

Figure 3. Total Diet Sampling Location

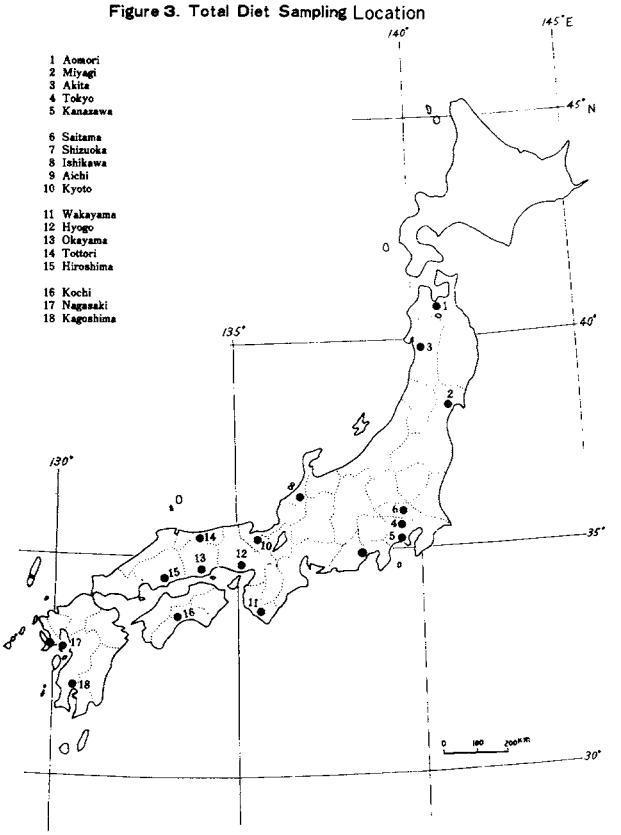

Table 5 ^{90}Sr and ^{137}Cs in Total Diet –Mar., 1969 to Mar., 1970–

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

(Japan Analytical Chemistry Research Institute)

(Continued from Table 5, Issue No. 24 of This Publication)

Location	Month	Daily Intake						
		Ash (g)	Ca (mg)	K(g)	^{90}Sr (pCi)	^{90}Sr (pCi/gCa)	^{137}Cs (pCi)	^{137}Cs (pCi/gK)
				(URBAN ADULT DIET)				
Aomori, AOMORI	June 1969	17.8	570	1.36	9.1	16.0	11.5	8.5
Aomori, AOMORI	Nov. 1969	20.6	505	1.76	11.2	22.2	17.2	9.8
Sendai, MIYAGI	June 1969	19.4	446	1.89	9.2	20.6	17.8	9.5
Sendai, MIYAGI	Nov. 1969	20.0	720	2.14	5.8	8.1	14.4	6.7
Akita, AKITA	May 1969	17.0	432	1.28	8.6	19.9	13.6	10.6
Akita, AKITA	Nov. 1969	14.9	621	1.53	7.4	11.9	18.6	12.2
TOKYO	June 1969	17.2	449	1.75	7.0	15.6	21.0	12.0
"	Nov. 1969	18.6	536	1.89	11.6	21.6	15.4	8.1
"	Mar. 1970	17.8	570	1.75	7.8	13.7	11.7	6.7
Hiratsuka, KANAGAWA	June 1969	19.2	622	1.82	4.6	7.4	12.8	7.0
Hiratsuka, KANAGAWA	Nov. 1969	22.1	776	2.58	6.2	8.0	18.7	7.2
Ohmiya, SAITAMA	May 1969	19.2	564	1.51	17.1	30.3	11.7	7.8
Ohmiya, SAITAMA	Nov. 1969	19.8	608	1.82	7.3	12.0	13.1	7.2
Shimada, SHIZUOKA	June 1969	13.6	299	1.34	10.0	33.4	28.3	21.1
Shimada, SHIZUOKA	Nov. 1969	16.8	462	1.88	7.2	15.6	10.4	5.5
Kanazawa, ISHIKAWA	May 1969	27.4	452	2.28	21.5	47.6	20.1	8.8
Kanazawa, ISHIKAWA	Nov. 1969	16.6	498	1.67	11.0	22.1	12.5	7.5
Kariya, AICHI	June 1969	17.0	366	1.44	4.4	12.0	27.3	18.9
Kariya, AICHI	Nov. 1969	21.2	717	2.21	10.7	14.9	12.4	5.6
Kyoto, KYOTO	May 1969	19.4	345	1.58	11.2	32.5	11.6	7.3
Kyoto, KYOTO	Nov. 1969	18.1	508	1.59	7.9	15.6	9.5	6.0
Wakayama, WAKAYAMA	June 1969	14.0	610	0.86	3.0	4.9	4.6	5.4
Wakayama, WAKAYAMA	Nov. 1969	16.6	465	1.09	3.7	8.0	7.0	6.4
Kakogawa, HYOGO	June 1969	19.0	488	1.15	5.4	12.9	9.5	8.3
Kakogawa, HYOGO	Nov. 1969	37.5	695	0.18	7.3	10.5	11.2	60.9
Okayama, OKAYAMA	May 1969	17.0	318	1.14	4.0	12.6	6.7	7.3
Okayama, OKAYAMA	Nov. 1969	19.2	403	2.16	6.5	16.1	7.3	3.4
Tottori, TOTTORI	May 1969	24.4	359	2.02	13.9	38.7	13.6	6.7
Tottori, TOTTORI	Nov. 1969	24.0	876	2.47	12.0	13.7	20.7	8.4
Hiroshima, HIROSHIMA	May 1969	15.0	348	1.45	5.4	15.5	9.0	6.2
Hiroshima, HIROSHIMA	Dec. 1969	14.3	505	1.83	7.8	15.4	6.8	3.7
Kochi, KOCHI	May 1969	13.8	255	1.20	7.1	27.8	10.4	8.7
Kochi, KOCHI	Nov. 1969	15.8	545	1.76	10.7	19.6	9.3	5.3
Nagasaki, NAGASAKI	May 1969	24.8	315	1.30	5.4	17.1	15.2	11.8
Nagasaki, NAGASAKI	Nov. 1969	13.6	653	1.13	4.0	6.1	7.0	6.2
Kagoshima, KAGOSHIMA	May 1969	21.2	560	1.69	6.9	12.3	19.1	11.3
Kagoshima, KAGOSHIMA	Nov. 1969	17.4	572	1.51	25.4	44.4	17.3	11.5
				(RURAL ADULT DIET)				
Aomori, AOMORI	June 1969	18.6	484	1.35	12.8	26.4	19.0	14.0
Aomori, AOMORI	Nov. 1969	16.0	349	1.27	6.5	18.6	16.3	12.8
Natori, MIYAGI	June 1969	19.8	319	1.56	7.1	22.3	17.1	11.0
Natori, MIYAGI	Nov. 1969	22.8	670	2.57	6.5	9.7	13.9	5.4
Yuwa, AKITA	June 1969	19.0	876	1.35	18.9	21.6	14.4	10.6

Location	Month	Daily Intake						
		Ash (g)	Ca (mg)	K (g)	^{90}Sr (pCi)	^{90}Sr (pCi/gCa)	^{137}Cs (pCi)	^{137}Cs (pCi/gK)
Yuwa, AKITA	Nov. 1969	18.4	554	1.90	18.0	32.5	18.9	9.9
TOKYO	June 1969	19.8	656	1.56	12.5	19.1	15.4	9.9
"	Nov. 1969	20.0	542	1.45	16.9	21.2	15.8	10.9
"	Mar. 1970	15.1	489	1.24	6.5	13.3	13.2	10.6
Zama, KANAGAWA	June 1969	21.2	530	1.94	4.9	9.2	12.1	6.2
Atsugi, KANAGAWA	Nov. 1969	21.9	593	2.37	4.7	7.9	16.2	6.8
Niiza, SAITAMA	May 1969	20.4	416	1.44	8.2	19.7	10.3	7.2
Niiza, SAITAMA	Nov. 1969	17.2	827	1.49	4.2	5.1	10.9	7.3
Okabe, SHIZUOKA	June 1969	13.4	330	1.31	10.9	33.0	78.0	59.8
Okabe, SHIZUOKA	Nov. 1969	10.1	288	1.28	15.2	52.8	10.6	8.3
Matsuto, ISHIKAWA	May 1969	15.4	320	0.97	15.2	47.5	6.8	6.8
Matsuto, ISHIKAWA	Dec. 1969	18.8	1261	1.31	6.3	5.0	7.8	5.9
Nishio, AICHI	June 1969	15.6	382	1.34	3.7	9.7	10.2	7.6
Nishio, AICHI	Nov. 1969	21.2	717	2.21	10.7	14.9	12.4	5.6
Miyama, KYOTO	May 1969	27.0	324	1.90	27.9	86.1	15.0	7.9
Miyama, KYOTO	Nov, 1969	25.6	543	2.94	11.0	20.3	18.1	5.2
Hidaka, WAKAYAMA	June 1969	13.6	1020	0.98	3.7	3.5	4.9	5.2
Hidaka, WAKAYAMA	Nov. 1968	13.0	711	1.09	8.4	11.8	4.9	4.5
Kakogawa, HYOGO	June 1969	11.6	771	0.95	3.1	8.4	6.3	6.9
Kakogawa, HYOGO	Nov. 1969	17.2	413	1.78	5.6	13.5	10.6	6.2
Tsudaka, OKAYAMA	May 1969	17.0	318	1.14	4.0	12.6	6.7	5.9
Tsudaka, OKAYAMA	Nov. 1969	15.2	530	1.85	5.9	11.1	7.7	4.2
Fukube, TOTTORI	May 1969	22.6	452	1.68	13.2	29.2	17.6	10.5
Fukube, TOTTORI	Nov. 1969	20.2	624	1.64	16.2	26.0	20.4	12.5
Shiwa, HIROSHIMA	May 1969	21.0	712	2.01	13.8	19.4	12.9	6.4
Shiwa, HIROSHIMA	Nov. 1969	21.2	703	2.97	9.8	12.8	15.2	5.1
Haruno, KOCHI	May 1969	23.8	276	1.51	7.2	26.1	11.2	7.4
Haruno, KOCHI	Nov.1969	19.6	661	1.59	5.3	8.0	9.9	6.2
Tokitsu, NAGASAKI	May 1969	18.2	222	1.08	4.5	20.3	10.4	9.6
Tokitsu, NAGASAKI	Nov. 1969	21.2	464	1.59	6.0	13.2	13.9	8.8
Shibushi, KAGOSHIMA	May 1969	19.6	510	1.44	5.3	10.4	17.7	12.3
Shibushi, KAGOSHIMA	Nov. 1969	14.6	403	1.08	5.6	13.9	10.5	9.7
		(RURAL CHILD DIET)						
Aomori, AOMORI	June 1969	8.8	290	0.64	6.8	23.4	7.8	12.2
Aomori, AOMORI	Nov. 1969	13.0	421	0.98	8.4	20.0	11.3	11.4
Natori, MIYAGI	June 1969	16.4	344	1.32	5.5	16.0	10.8	8.2
Natori, MIYAGI	Nov. 1969	15.7	443	1.87	4.6	10.4	10.0	5.3
Kowa, AKITA	June 1969	10.8	230	0.77	9.6	41.7	9.3	12.1
Kowa, AKITA	Nov. 1969	8.4	297	0.79	4.8	16.2	8.3	10.5
Zama, KANAGAWA	June 1969	10.6	394	0.92	2.7	6.9	6.7	7.3
Atsugi, KANAGAWA	Nov. 1969	11.4	451	1.32	2.9	6.4	10.0	7.6
Niiza, SAITAMA	May 1969	14.2	375	1.18	3.3	8.8	9.9	8.4
Niiza, SAITAMA	Nov. 1969	13.6	413	1.37	3.7	9.0	9.6	7.0
Okabe, SHIZUOKA	June 1969	5.2	135	0.56	2.9	21.5	22.3	43.3
Okabe, SHIZUOKA	Nov. 1969	6.1	184	0.92	5.9	32.1	5.7	6.2
Matsuto, ISHIKAWA	May 1969	9.0	244	0.71	5.4	22.1	4.8	6.8
Matsuto, ISHIKAWA	Dec. 1969	10.1	623	0.97	4.9	7.9	5.8	6.0
Nishio, AICHI	June 1969	9.8	312	1.09	3.3	10.6	5.6	5.5
Nisho, AICHI	Nov. 1969	11.4	384	1.46	4.1	10.7	9.7	6.7
Miyama, KYOTO	May 1969	22.2	317	1.49	20.5	64.7	14.0	9.4
Miyama, KYOTO	Nov. 1969	18.2	471	2.29	27.4	58.2	14.0	6.1

Location	Month	Daily Intake						
		Ash (g)	Ca (mg)	K (g)	^{90}Sr (pCi)	^{90}Sr (pCi/gCa)	^{137}Cs (pCi)	^{137}Cs (pCi/gK)
Hidaka, WAKAYAMA	June 1969	6.8	521	0.47	2.2	4.2	2.4	5.1
Hidaka, WAKAYAMA	Nov. 1969	7.1	335	0.87	5.3	15.8	5.4	6.2
Kakogawa, HYOGO	June 1969	20.2	574	1.92	4.6	8.0	10.3	5.4
Kakogawa, HYOGO	Nov. 1969	15.3	419	1.75	4.9	11.7	8.8	5.0
Tsudaka, OKAYAMA	May 1969	15.6	501	1.04	7.1	14.2	8.1	7.8
Tsudaka, OKAYAMA	Nov. 1969	7.0	265	1.24	2.6	9.8	5.6	4.5
Fukube, TOTTORI	May 1969	12.2	349	1.11	5.4	15.5	9.8	8.8
Fukube, TOTTORI	Nov. 1969	12.7	495	1.16	5.7	11.5	10.9	9.4
Shiwa, HIROSHIMA	May 1969	14.4	552	1.52	7.7	13.9	7.7	5.1
Shiwa, HIROSHIMA	Nov. 1969	16.5	520	2.24	8.1	15.6	9.1	4.1
Haruno, KOCHI	May 1969	11.8	262	0.93	5.8	22.1	5.8	6.4
Haruno, KOCHI	Nov. 1969	8.6	312	1.01	4.6	14.7	6.6	6.5
Tokitsu, NAGASAKI	May 1969	8.4	133	0.41	1.6	12.0	3.7	9.1
Tokitsu, NAGASAKI	Nov. 1969	11.2	419	0.58	4.4	10.5	6.6	7.5
Shibushi, KAGOSHIMA	May 1969	10.0	285	1.00	3.3	11.6	9.1	9.1
Shibushi, KAGOSHIMA	Nov. 1969	9.4	233	0.79	4.0	19.2	7.5	9.4

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 National Institute of Radiological Sciences.

The bone samples were collected from Tokyo.

The values of strontium-90 in bone samples were determined by the same method mentioned in the explanation of page 25, Issue No.3 of this publication.

Results derived from human bone samples from subjects that deceased during the period from January to October, 1969 are shown in Table 6.

The S.U. (^{90}Sr pCi/gCa) values obtained up to October 1969, for four different age groups, are summarized in Table 7.

Table 6 ^{90}Sr in Human Bone – Feb. 1968 to Oct. 1969 –

By G. Tanaka, H. Kawamura and M. Izyuin
(National Institute of Radiological Sciences)

(Continued from Table 4, Issue No. 21 of this Publication) during 1968

Location	Age	Sex	Month of Death	Number	Name of Bone	^{90}Sr (pCi/gCa)
Tokyo	Fetus	–	1968 June	3	Whole skeleton	1.05
"	"	–	" "	2	"	1.01
"	"	–	" Aug.	5	"	0.87
"	"	–	" "	5	"	1.49
"	"	–	" "	2	"	1.03
"	"	–	" "	4	"	0.65
"	"	–	" Sept.	1	"	1.03
"	"	–	" "	1	"	0.92
"	"	–	" "	1	"	1.11
"	"	–	" "	2	"	0.84
"	"	–	" "	1	"	1.26
"	"	–	" "	1	"	1.65
"	1 Month	M	" Feb.	4	Vertebra	1.03
	" "	"	" "	4	"	0.89
"	" "	F	" Apr.	4	"	1.94
"	" "	"	" "	2	"	1.04
"	3 "	"	" "	2	"	1.15
"	5 "	M	" May	3	"	2.67
"	2 "	"	" "	2	"	2.84
"	6 "	"	" "	2	"	3.80
"	9 "	F	" Aug.	2	"	2.48
"	0 Year	M	" "	4	"	2.11
"	" "	"	" Oct.	1	"	2.54
"	" "	"	" "	1	"	1.34
"	1 "	"	" July	1	"	2.81
"	" "	F	" "	1	Whole skeleton	2.28
"	" "	–	" "	1	"	3.80
"	" "	M	" "	1	"	4.00
"	" "	"	" Aug.	1	"	2.65
"	" "	"	" "	1	Vertebra	2.90
"	" "	"	" "	1	"	4.03
"	" "	"	" "	1	Whole skeleton	3.21
"	" "	"	" May	1	Vertebra	4.18
"	" "	"	" "	1	Femur	2.15
"	2 "	"	" Aug.	1	Vertebra	1.35
"	" "	"	" "	1	"	2.21
"	" "	"	" "	1	"	2.65
"	" "	"	" "	1	"	3.14
"	3 "	"	" "	1	Whole skeleton	2.71
"	" "	F	" "	2	Vertebra	1.80
"	4 "	F	" July	1	"	2.41
"	" "	"	" "	1	Rib	1.69
"	" "	"	" "	1	Cranium	1.32
"	5 "	M	" Sept.	1	Whole skeleton	2.24
"	" "	"	" May	1	Femur	2.41

Location	Age	Sex	Month of Death	Number	Name of Bone	^{90}Sr (pCi/gCa)
Tokyo	5 Year	F	1968 July	1	Cranium	1.68
"	" "	"	" "	1	Vertebra	2.70
"	" "	M	" Nov.	1	Rib	1.85
"	" "	"	" "	1	Vertebra	2.80
"	" "	F	" July	1	Femur	1.50
"	" "	"	" "	1	Vertebra	2.06
"	" "	"	" Sept.	1	"	1.76
"	" "	M	" "	1	"	1.60
"	6 "	"	" July	1	Femur	1.77
"	" "	"	" Aug.	1	"	2.61
"	" "	"	" "	1	Vertebra	3.01
"	7 "	"	" Oct.	1	Femur	1.04
"	8 "	F	" July	1	Vertebra	1.94
"	" "	"	" "	1	Rib	1.76
"	" "	M	" June	1	"	2.83
"	" "	"	" "	1	Vertebra	2.81
"	11 "	"	" Oct.	1	Femur	1.18
"	" "	"	" "	1	Rib	1.34
"	12 "	"	" July	1	Femur	1.60
"	" "	"	" June	1	Rib	1.84
"	13 "	"	" July	1	Rib	2.17
"	16 "	"	" "	1	Vertebra	3.19
"	" "	"	" "	1	Rib	2.20
"	" "	F	" Oct.	1	Vertebra	1.66
"	" "	"	" "	1	Rib	1.51
"	" "	M	" Nov.	1	Femur	0.36
"	17	"	" July	1	Rib	1.49
"	" "	"	" "	1	Femur	1.54
"	" "	"	" "	1	Cranium	2.53
"	18 "	"	" June	1	Tibia	5.43
"	18 "	M	" June	1	Ossa Pedis	5.65
"	" "	F	" "	1	Femur	1.07
"	" "	"	" "	1	Rib	1.47
"	" "	M	" "	1	Vertebra	2.56
"	" "	"	" "	1	Rib	2.45
"	" "	"	" "	1	Femur	2.06
"	" "	"	" Sept.	1	"	1.57
"	" "	F	" Aug.	1	"	1.59
"	" "	"	" Nov.	1	Vertebra	2.36
"	" "	M	" June	1	Femur	1.04
"	" "	"	" "	1	Vertebra	2.37
"	19 "	"	" Sept.	1	"	2.14
"	" "	F	" "	1	Femur	2.56
"	" "	M	" July	1	"	2.35
"	" "	F	" "	1	Vertebra	1.69
"	20	M	" Apr.	1	Rib	0.92
"	" "	F	" July	1	Vertebra	1.76
"	" "	"	" "	1	Rib	0.65
"	28 "	"	" Aug.	1	"	0.45
"	23–25 "	M	" Mar.–June	3	Rib, Femur	0.36

Location	Age	Sex	Month of Death	Number	Name of Bone	^{90}Sr (pCi/gCa)
〃	25–28 〃	F	〃 June–Oct.	3	〃	0.32
Hokkaido	28–29 〃	〃	〃 Mar.	2	Rib	0.44
Tokyo	31–33 〃	M	〃 Apr.–June	4	〃	0.42
〃	34–35 〃	〃	〃 Aug.–Oct.	3	〃	0.38
〃	35–38 〃	〃	〃 〃	2	〃	0.39
Tokyo	41–48 Year	F	1968 June–Oct.	3	Rib	0.42
〃	50–59 〃	M	〃 Apr.–June	3	〃	0.35
Hokkaido	60–71 〃	〃	〃 〃	2	〃	0.36
Tokyo	Fetus	–	1969 July	3	Whole Skeleton	0.52
〃	〃	–	〃 〃	4	〃	0.54
〃	〃	–	〃 June	5	〃	0.61
〃	〃	–	〃 Aug.	4	〃	0.63
〃	〃	–	〃 June	3	〃	0.68
〃	〃	–	〃 〃	6	〃	0.78
〃	〃	–	〃 Aug.	3	〃	0.85
〃	〃	–	〃 〃	1	〃	0.93
〃	〃	–	〃 〃	1	〃	1.03
〃	2 Mon.	M	〃 Mar.	1	Vertebra	1.94
〃	3 Mon.	F	〃 Feb.	5	〃	1.53
〃	〃	〃	〃 Apr.	4	〃	1.37
〃	6 Mon.	M	〃 〃	3	〃	1.30
〃	8 Mon.	〃	〃 May	2	〃	1.11
〃	1	F	〃 Jan.	1	〃	3.34
〃	1	M	〃 Feb.	2	〃	1.74
〃	〃	F	〃 Mar.	2	〃	1.32
〃	2	〃	〃 Apr.	1	〃	3.22
〃	〃	M	〃 〃	2	〃	1.58
〃	2	〃	〃 Jan.	2	〃	3.44
〃	2	〃	〃 〃	1	〃	2.04
〃	〃	〃	〃 〃	1	〃	2.58
〃	3	F	〃 Mar.	2	〃	2.19
〃	〃	〃	〃 Apr.	2	〃	1.10
〃	〃	M	〃 Feb.	1	〃	1.91
〃	〃	F	〃 May	1	〃	0.61
〃	〃	M	〃 Jan.	1	Rib	1.78
〃	4	〃	〃 Apr.	1	Femur	0.58
〃	5	〃	〃 Apr.	1	Vertebra	1.54
〃	〃	〃	〃 〃	1	Rib	1.35
〃	6	F	〃 May	1	Vertebra	0.96
〃	〃	M	〃 Jan.	1	〃	2.10
〃	〃	〃	〃 〃	3	Rib	1.90
〃	7	F	〃 Mar.	1	Femur	0.52
〃	〃	〃	〃 〃	1	Vertebra	0.83
〃	〃	〃	〃 〃	1	〃	0.73
〃	8	〃	〃 Apr.	1	〃	2.40
〃	〃	〃	〃 〃	1	Femur	1.62
〃	〃	〃	〃 〃	1	Rib	1.12
〃	〃	〃	〃 〃	1	Femur	0.56
〃	9	M	〃 May	1	Vertebra	1.76
〃	10	F	〃 Oct.	2	Rib	1.17
〃	16	M	〃 Aug.	1	Vertebra	1.33
〃	〃	〃	〃 〃	1	〃	2.36
〃	17	M	〃 Sept.	2	〃	2.03

〃	5–10	M F	〃	May–Oct.	5	Long Bone	0.36
〃	22	M	〃	Oct.	1	Rib	1.40
〃	25	F	〃	May	1	〃	0.83
〃	30	M	〃	Jan.–Oct.	3	〃	0.95
〃	40	〃	〃	〃	2	〃	0.31
〃	50	〃	〃	〃	3	〃	0.32
〃	60	〃	〃	〃	2	〃	0.36

Table 7. Summary of ^{90}Sr(pCi/gCa) in Human Bone – 1968 and 1969 –

By G. Tanaka, H. Kawamura and M. Izyuin
(National Institute of Radiological Sciences)

		Age group			
		Fetus	0–4	5–19	20
1968	Number of Samples	12	31	47	13
	Average	1.08	2.42	2.11	0.56
	Standard Deviation	0.27	0.92	0.93	0.38
	Minimum–Maximum	0.65–1.65	0.89–4.18	0.36–5.65	0.32–1.76

		Age group			
		Fetus	0–4	5–19	20
1969	Number of Samples	30	135	26	12
	Average	0.73	1.83	1.37	0.69
	Standard Deviation	0.17	0.81	0.62	0.40
	Minimum–Maximum	0.52–1.03	0.58–3.44	0.36–2.40	0.31–1.40

Cesium-137 Body Burden in Japanese male adults

(National Institute of Radiological Sciences)

Cesium-137 body burden in Japanese has been determined at the National Institute of Radiological Sciences since November 1963. Total of 46 male subjects, from the staff of this institute, who lived in Tokyo or Chiba, were tested at the interval of three months with a NaI (T1) whole body spectrometer at this institute.

Results obtained in 1969 are shown in Table 8.

The amount of cesium-137 body burden has get so low that accuracy of the present data should have been sacrificed compared with the former data.

Table 8. Cesium–137 Body Burden in Japanese male adults – 1969 –
By M. Uchiyama, T. A. Iinuma and G. Tanaka
(National Institute of Radiological Sciences)

Time of Measurement	No. of Subjects	Body Burden (mμCi)				Body Burden (pCi/gK)			
		Max.	AV.	S.D.	Min.	Max.	AV.	S.D.	Min.
May 1969	14	2.9	1.7	0.6	0.8	23	14	5	7
Aug. 1969	12	3.1	1.8	0.7	N.D.	27	14	6	N.D.
Nov. 1969	8	2.1	1.8	1.0	N.D.	18	15	3	N.D.
Jan. 1970	12	2.1	1.6	0.5	N.D.	19	12	4	N.D.

Total of 92 male subjects, from the staff of this institute, who lived in Tokyo or Chiba, were tested at appropriate intervals with a NaI(T1) whole body spectrometer at this institute.

Results obtained from 1967 to 1969 are shown in Table 9.

The amount of Cesium-137 body burden seems to have such a rapid decreasing tendency that the amount might be prospective to come under the detection limit within coming two years if the same fall-out tendency as it in these two years will keep.

Table 9. Cesium–137 Body Burden in Japanese male adults –1967 to 1969 –
By M. Saiki, T. A. Iinuma and M. Uchiyama
(National Institute of Radiological Sciences)

Time of Measurement	No. of Subjects	Body Burden (mμCi)				Body Burden (pCi/gK)			
		Max.	Av.	S.D.	Min.	Max.	Av.	S.D.	Min.
May 1967	9	5.1	3.5	1.1	2.0	50	31	10	19
July 1967	7	11.7	5.5	3.0	1.9	90	48	21	17
Sept. 1967	7	6.0	3.8	1.5	1.4	50	29	12	11
Nov. 1967	7	5.0	3.4	1.2	2.1	40	26	9	17
Jan. 1968	7	4.1	2.8	1.1	1.0	33	22	9	8
Mar. 1968	7	6.6	3.5	1.8	1.0	52	28	15	9
May 1968	9	3.9	2.5	1.0	1.2	34	20	8	10
Aug. 1968	9	3.4	2.2	0.7	1.2	25	17	5	9
Nov. 1968	15	4.3	1.8	0.8	1.0	32	14	6	8
Feb. 1969	15	5.0	2.0	1.3	1.0	34	15	9	7

ERRATA

Survey Data Number 26

Page	Lines (table)	Fault	Right	Note
2		0.21	0.06	^{90}Sr (pCi/km^2)
		0.27	0.12	^{137}Cs (mCi/km^2)
	2	0.12	0.10	^{90}Sr (pCi/km^2)
	15	0.08	0.10	"
	23	0.06	0.11	"
		0.12	0.19	^{137}Cs (pCi/km^2)
	28	0.24	0.22	"
	31	0.07	0.77	"
3	38	0.30	0.17	"
	47	KYOTO	HYOGO	
4	6	0.13	0.14	^{90}Sr (pCi/km^2)
5	15	0.03	0.04	^{137}Cs (mCi/km^2)
	38	0.05	0.04	^{90}Sr (mCi/km^2)
		0.14	0.15	^{137}Cs (mCi/km^2)
7	5	0.07	0.03	"
	20	0.14	0.04	^{90}Sr (mCi/km^2)
		0.21	0.05	^{137}Cs (mCi/km^2)
10	7	23.7	23.8	(pCi/gK)
	9	7.0	7.7	(pCi/l)^{137}Cs
		14.6	11.1	(pCi/gK)
	10	7.0	7.7	(pCi/l)^{90}Sr
		6.3	6.6	(pCi/gCa)
	13	7.4	5.3	(pCi/l)^{90}Sr
		6.9	5.1	(pCi/gCa)
		81.6	42.4	(pCi/l)^{137}Cs
		48.6	26.0	(pCi/gK)
	34	9.3	9.2	(pCi/l)^{137}Cs
11	22	4.5	4.6	(pCi/l)^{90}Sr
	26	6.8	1.8	(pCi/l)^{137}Cs
	40	5.5	5.4	(pCi/gK)
12	1	14.6	11.1	(pCi/gK)
	13	47.4	17.4	(pCi/gK)
	14	22.9	29.9	(pCi/l)^{137}Cs
	41	2.7	2.6	(pCi/gCa)
13	1	10.9	10.2	(pCi/l)^{137}Cs
	3	3.7	3.0	(pCi/gCa)
15	13	17.8	17.9	(pCi)^{137}Cs
	21	18.1	18.2	Ash (g)
	26	7.3	5.9	(pCi/gK)
16	3	21.2	31.2	(pCi/gCa)
	14	21.2	17.6	Ash (g)
		717	371	Ash (g)
		2.21	1.70	Ca (mg)
		10.7	5.2	^{90}Sr (pCi)
		14.9	14.0	^{90}Sr (pCi/gCa)
		12.4	11.8	^{137}Cs (pCi)
		5.6	6.9	^{137}Cs (pCi/gK)
	16	5.2	6.2	"
	17	1020	1070	Ca (mg)
		0.98	0.93	K (g)
	19	771	371	Ca (mg)
		0.95	0.92	K (g)
	20	13.5	13.6	^{90}Sr (pci/gCa)
	21	17.0	8.8	Ash (g)
		318	335	Ca (mg)
		1.14	0.82	K (g)
		4.0	3.7	^{90}Sr (pCi)
		12.6	11.0	^{90}Sr (pCi/gCa)
		6.7	4.7	^{137}Cs (pCi)
		5.9	5.7	^{137}Cs (pCi/gK)
	30	464	454	Ca (mg)
	35	0.98	0.99	K (g)
	44	0.56	0.52	K (g)
	48	1.09	1.02	K (g)
17	11	0.93	0.91	K (g)
	14	0.58	0.88	K (g)