

UNITED STATES GOVERNMENT

Memorandum

410339

TO : A. W. Klement, Fallout Studies Branch
Division of Biology and Medicine

FROM : *I. E. Wallen*
I. E. Wallen, Aquatic Biologist, Environmental
Sciences Branch, Division of Biology & Medicine

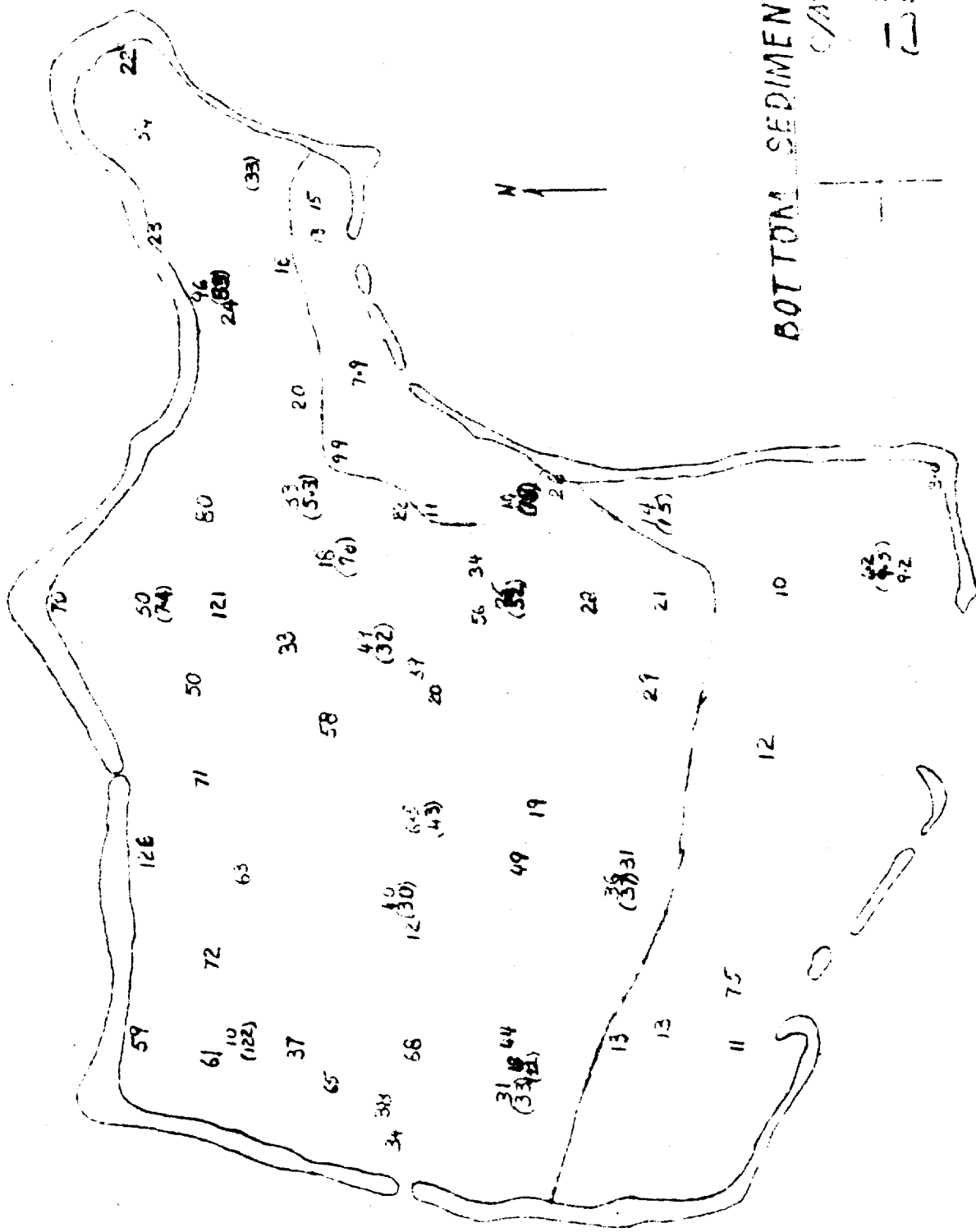
DATE: February 23, 1960

SUBJECT: RONGELAP DATA

SYMBOL: BMES:IEW

Recently Allyn Seymour of the University of Washington brought in the attached data which represents preliminary results of the Rongelap Survey of last September. The attached copy is for your Rongelap notebook.

Attachment:
As stated above



BOTTOM SEDIMENT CORES
C/M/G B-COUNTS

TOP CORE
SECOND CORE

Date as of
9 Feb. 66
100 gms ground sample
on each plate

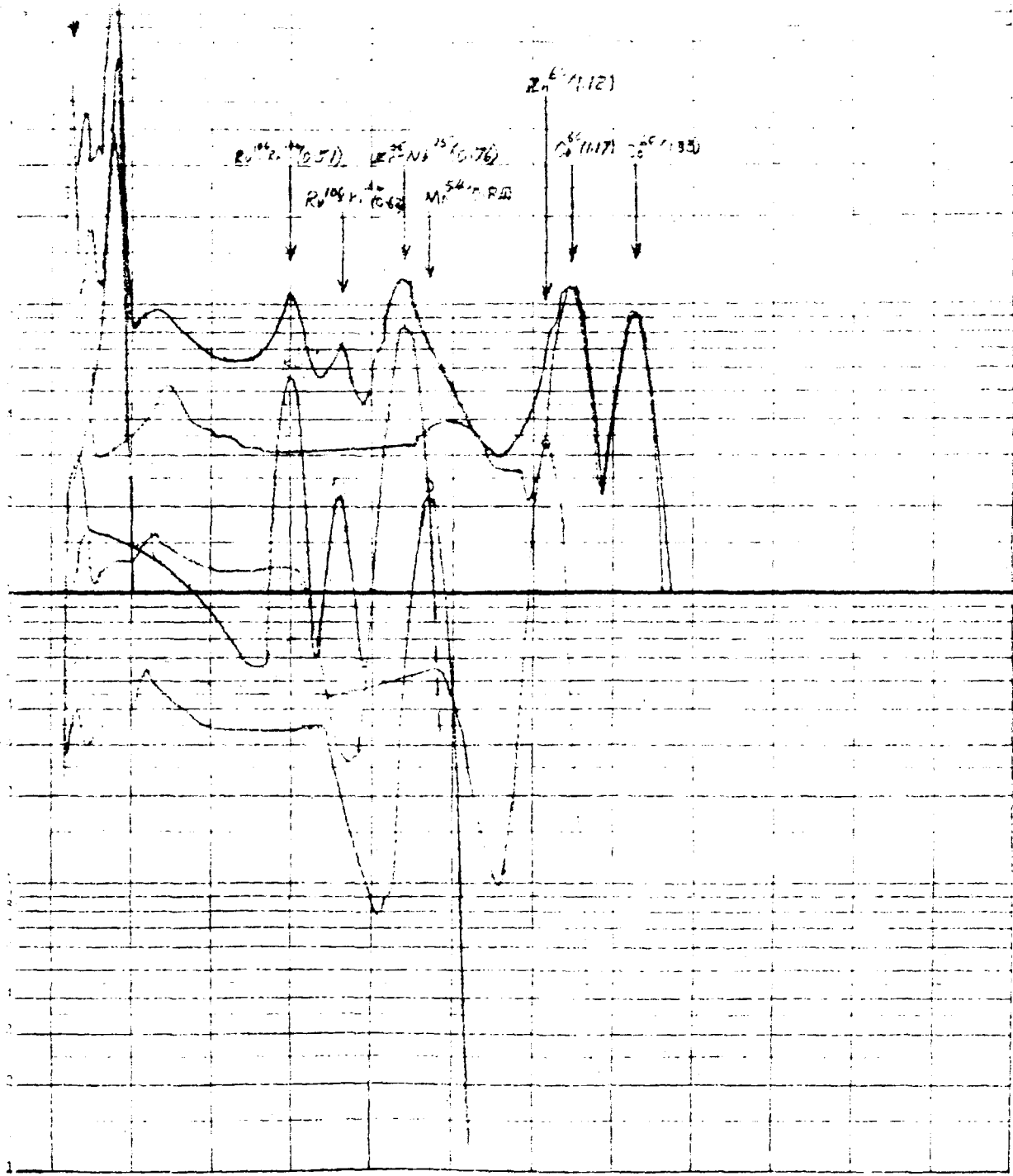
BEST COPY AVAILABLE

PLAYBOY B
 Dec. 1969

$\Delta \epsilon^{25} 124 \parallel \Delta \epsilon^{100} = 5^{100} (0.13)$

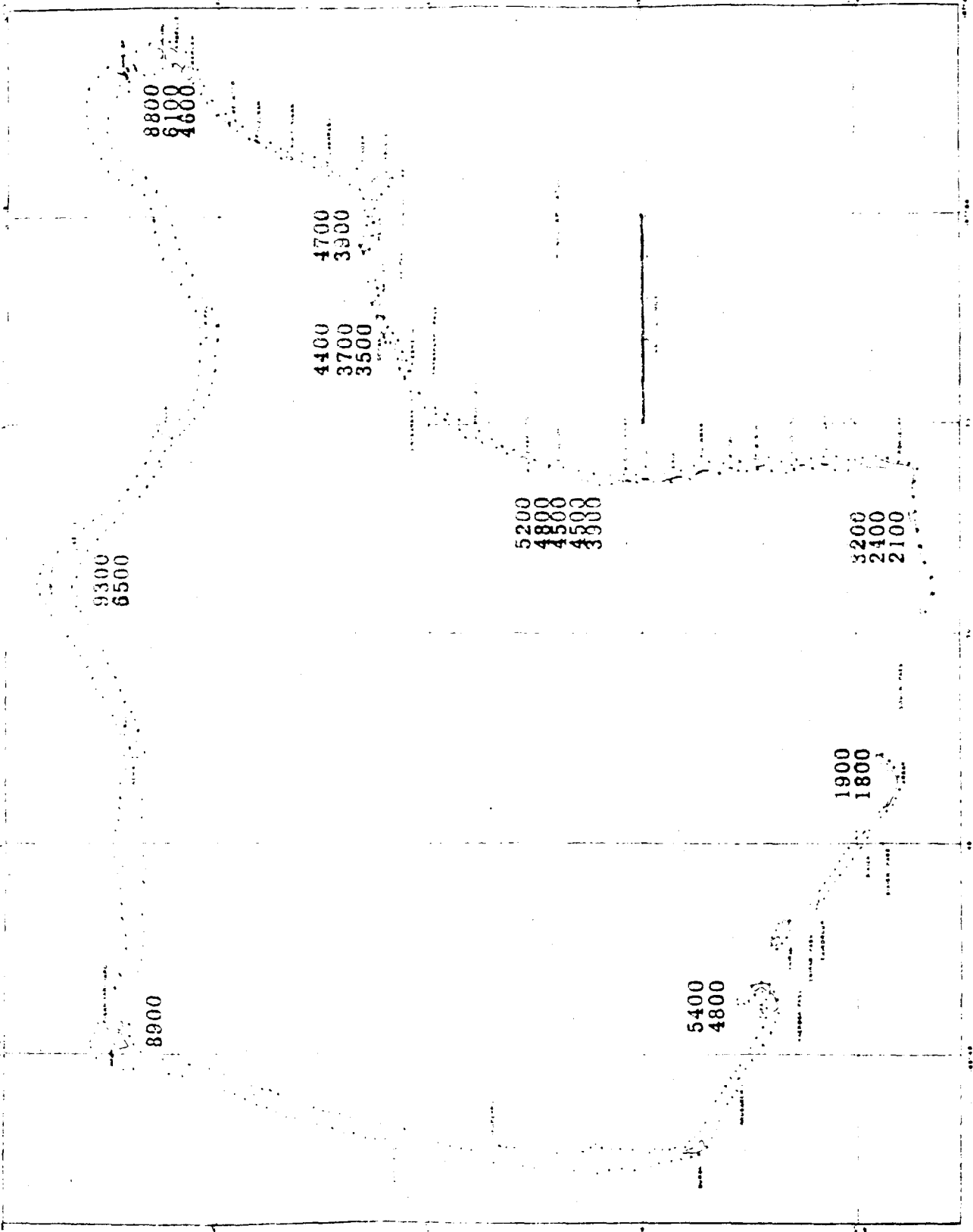
WIPER CURVE = c/m less BKGD
 ECLIPSED SAMPLE

c/m



Amount of
 sample
 (0.15 cm)
 (0.1 cm)

359 92
 1000 5.00 1000.000



Strontium units in Birgus latro (coconut crab) skeleton at Rongelap Atoll, September, 1959

Strontium-90 in Birgus latro (coconut crab) skeleton
Collected at Rongelap Atoll September 1959
Mean Values

Island	Sample numbers	Sr ⁹⁰ Mean d/m/g dry	Standard deviation	Mean strontium units	Standard deviation
Rongelap	554, 553, 552	1440	216	2570	566
Ujaetok	556, 559, 557 558, 555	2570	334	4580	151
Cogon	650, 651, 663	2120	282	3870	468
Mella	659, 652	2490	267	4300	566
Kabelle	649, 648, 653	3500	1044	6500	2128
Cejen	655, 658	4530	1011	7900	1980
Naen	661	5250	--	8900	--
Tufa	660, 662	3090	117	5100	424
Arbar	657, 654	1070	14	1850	71

Note: The counting error (95%) ranges from 3.6 to 4%.

Sr^{90} in Birgus latro (Coconut Crab) Skeleton

Collected at Rongelap Atoll September 1959

Individual Values

<u>Island</u>	<u>Sample Number</u>	<u>Sr⁹⁰ d/m/g dry</u>	<u>Ca mg/g dry</u>	<u>Strontium Units</u>
Rongelap	552	1250	275.1	2100
	553	1380	267.3	2400
	554	1670	238.5	3200
Eniaetok	555	2140	251.0	3900
	556	3030	262.8	5200
	557	2390	239.9	4500
	558	2600	264.1	4500
	559	2710	256.2	4800
Gogon	650	2430	253.0	4400
	651	1870	228.2	3700
	663	2080	268.9	3500
Mellu	652	2300	265.5	3900
	659	2680	258.8	4700
Kabelle	648	3100	230.2	6100
	649	4690	243.2	8800
	653	2720	267.5	4600
Gejen	655	5240	257.5	9300
	656	3830	267.5	6500
Naen	661	5250	267.5	8900
Tufa	660	3180	268.9	5400
	662	3010	284.3	4800
Arbar	654	1060	264.2	1800
	657	1080	264.2	1900

Note: Counting error (95%) ranges from 3.6 to 4%.

Gross Beta Activity in Land Plants - Rongelap Atoll

Rongelap Island

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. μ c/kg wet
Aug. 1958	<u>Artocarpus</u>	Leaves	1	538.5	.104
"	"	Fruit	1	138.3	.013
Mar. 1958	<u>Boerhaavia</u>	Leaves	1	518	.039
Aug. 1958	"	"	1	1468.0	.100
Aug. 1958	<u>Canavalia</u>	Leaves	1	325.8	.032
Aug. 1958	<u>Carica</u>	Pulp	1	152.4	.005
Mar. 1959	"	"	4	215	.007
Aug. 1958	"	Seeds and skin	1	289.8	.018
March 1959	"	"	4	390.6	.024
Mar. 1958	<u>Cassytha</u>	Whole plant	2	155	.014
Aug. 1958	"	"	3	503.2	.040

Rongelap Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. $\mu\text{c/kg}$ wet
Mar. 1958	<u>Cocos</u>	Leaves	3	197.6	.028
Aug. 1958	"	"	4	653.4	.143
Mar. 1958	"	Trunk borings	3	30	.005
Aug. 1958	"	"	2	22.8	.004
Mar. 1958	"	Husks	1	38	.012
Aug. 1958	"	"	4	28.4	.010
Mar. 1958	"	Meat	8	57.6	.023
Aug. 1958	"	"	4	40.9	.012
Mar. 1958	"	Milk	2	192	.005
Aug. 1958	"	"	2	525.6	.011
Aug. 1958	<u>Cucurbita</u>	Leaves	2	1588	.032 *

* Includes samples of terminal and basal foliage. See tables of individual collections.

Rongelap Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. μ c/kg wet
Mar. 1958	<u>Fimbristylis</u>	Leaves	3	118	.018
Aug. 1958	"	"	4	446.3	.076
Mar. 1959	"	"	3	480.6	.071
Mar. 1958	<u>Guettarda</u>	Leaves	4	190.05	.022
Aug. 1958	"	"	5	411.7	.049
Aug. 1958	"	Fruit	1	107.1	.020
Mar. 1958	<u>Ipomoea</u>	Leaves	1	287	.016
Aug. 1958	"	"	1	621.7	.055
Mar. 1958	<u>Lepturus</u>	Leaves	2	160	.030
Aug. 1958	"	"	2	864.2	.194
Mar. 1959	"	"	1	195.5	.044
Mar. 1959	<u>Messerschmidea</u>	Leaves	5	380.4	.029*

* Includes samples of terminal and basal foliage. See tables of individual collections.

Rongelap Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. μ c/kg wet
Mar. 1953	<u>Pandanus</u>	Leaves	4	197.2	.028
Aug. 53	"	"	4	495.7	.073
Mar. 1953	"	"	5	328.9	.049
Mar. 1953	"	Fruit, edible	1	666	.060
Aug. 1953	"	" "	1	110.9	.008
Mar. 1953	"	" "	5	345.0	.030
Mar. 1953	<u>Pandanus</u>	Trunk borings	1	125	.011
Aug. 1953	"	"	1	174.3	.015
Mar. 1953	"	Stem	2	172.5	
Aug. 1953	<u>Pemphis</u>	Leaves	1	81.37	.015
Mar. 1953	Roots	Roots	8	46.5	.007
Aug. 1953	"	"	6	109	.025

Rongelap Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. $\mu\text{c/kg}$ wet
Mar. 1958	<u>Scaevola</u>	Leaves	4	234.2	.010
Aug. 1958	"	"	5	225.5	.017
Mar. 1959	"	"	7	383.4	.034 *
Mar. 1958	<u>Tacca</u>	Leaves	1	260	.022
Aug. 1958	"	"	1	343.8	.020
Mar. 1958	"	Corm. Peel	1	154	.008
Aug. 1958	"	" "	1	216.5	.016
Mar. 1958	"	Corm. whole	1	80	.059
Aug. 1958	"	" "	1	247.1	.017
Mar. 1959	"	" "	5	230	.015
Mar. 1958	<u>Triumfetta</u>	Leaves	1	650	.056
Aug. 1958	"	"	2	958.6	.080

* Includes samples of terminal and basal foliage. See tables of individual collections.

Eniaetck Island

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. μ c/kg wet
Aug. 1958	<u>Canavalia</u>	Leaves	1	1195	.091
Mar. 1958	<u>Cassya</u>	Whole plant	1	358	.038
Aug. 1958	"	"	2	268.9	.025
Mar. 1958	<u>Cocoa</u>	Meat	1	214	.020
Aug. 1958	"	"	4	76.24	.019
Mar. 1958	<u>Cocos</u>	Milk	1	158	.002
Aug. 1958	<u>Cocos</u>	Leaves	2	441.4	.087
Mar. 1958	<u>Cucurbita</u>	Meat	1	353	.025
Mar. 1958	<u>Cucurbita</u>	Pulp, seeds	1	1649	.025

Eniaetok island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. $\mu\text{c/kg}$ wet
Mar. 1958	<u>Cucurbita</u>	Skin	1	448	.030
Mar. 1958	<u>Fimbristylis</u>	Leaves	1	332	.067
Aug. 1958	"	"	1	142.4	.028
Mar. 1958	<u>Ipomoea</u>	Leaves	2	579	.035
Aug. 1958	"	"	2	285.4	.016
Mar. 1958	<u>Messerschmidea</u>	Leaves	1	612	.042
Mar. 1958	<u>Morinda</u>	Fruit	1	199	.015
Mar. 1958	<u>Morinda</u>	Leaves	2	447	.033
Aug. 1958	"	"	2	862.2	.074
March 1958	<u>Pandanus</u>	Fruit	2	258	.035
Aug. 1958	"	"	1	77.4	.008

Eniaetok Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. $\mu\text{c/kg}$ wet
Mar. 1958	<u>Pandanus</u>	Leaves	2	224	.030
Aug. 1958	"	"	2	370.1	.062
Aug. 1958	<u>Portulaca</u>	Leaves	1	208.3	.009
Mar. 1958	Roots	Roots	2	137	.015
Mar. 1958	<u>Scaevola</u>	Leaves	2	116	.011
Aug. 1958	"	"	5	552.6	.044 *
Mar. 1958	<u>Tacca</u>	Corm, whole	1	595	.059
Aug. 1958	"	" "	2	151.9	.007
Mar. 1958	<u>Tacca</u>	Corm, peel	1	378	.030
Aug. 1958	"	" "	2	194.4	.009

*Includes samples of terminal and basal foliage. See tables of individual collections.

Eniaetok Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. $\mu\text{c/kg}$ wet
Mar. 1958	<u>Tacca</u>	Corm, center	1	176	.022
Aug. 1958	"	" "	2	222.7	.008
Aug. 1958	<u>Tacca</u>	Leaves	2	611.8	.043
Mar. 1958	<u>Triumfetta</u>	Leaves	2	362	.052
Aug. 1958	"	"	2	443.6	.036

Kabellie Island

Date collected	Genus	Tissue	No. of samples	Ave. $\frac{d}{m}$ /g dry	Ave. $\frac{\mu c}{kg}$ wet
Mar. 1953	<u>Boerhaavia</u>	Leaves	6	1434	.100
Aug. 1953	"	"	7	1319	.133
Mar. 1953	<u>Cocos</u>	Leaves	3	401.6	.049
Aug. 1953	"	"	3	1926	.458
Mar. 1953	"	Husk	2	50	.017
Aug. 1953	"	"	4	229.5	.076
Mar. 1953	"	Meat	2	128.5	.015
Aug. 1953	"	"	4	96.22	.034
Mar. 1953	"	Milk	2	975	.022
Aug. 1953	"	"	2	873.5	.018
Mar. 1953	<u>Fimbristylis</u>	Leaves	1	196	.035
Aug. 1953	"	"	1	597.4	.090

Kabelle Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. $\mu\text{c/kg}$ wet
Mar. 1958	<u>Guetarda</u>	Leaves	3	369	.043
Aug. 1958	"	"	3	3102	.252
Mar. 1958	<u>Lepturus</u>	Leaves	4	1278	.119
Aug. 1958	"	"	3	1494	.362
Mar. 1958	<u>Messerschmidea</u>	Leaves	3	703	.049
Aug. 1958	"	"	5	838.2	.180
Mar. 1959	"	"	6	1912	.148*
Mar. 1958	<u>Morinda</u>	Fruit	1	660	.052
Aug. 1958	"	"	1	518.5	.038
Mar. 1958	"	Leaves	2	690	.055
Aug. 1958	"	"	1	1309.2	.105
Mar. 1958	<u>Pandanus</u>	Fruit	1	246	.040
Aug. 1958	"	"	1	228.6	.021

*Includes samples of terminal and basal foliage. See tables of individual collections.

Kabelle Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. $\mu\text{c/kg}$ wet
Mar. 1958	<u>Pisonia</u>	Leaves	3	1153	.097
Aug. 1958	"	"	4	4034	.437
Mar. 1958	"	Trunk borings	2	188	.028
Aug. 1958	"	"	1	220.2	.066
Mar. 1958	<u>Portulaca</u>	Leaves	2	2762	.146
Aug. 1958	"	"	1	2929	.137
Mar. 1958	Roots	Roots	5	3431	.309
Aug. 1958	"	"	2	1987	.310
Mar. 1958	<u>Scaevola</u>	Leaves	7	380.3	.035
Aug. 1958	"	"	11	2270	.022*
Mar. 1959	"	"	7	1131	.088*
Mar. 1958	<u>Sida</u>	Leaves	1	1077	.123
Aug. 1958	"	"	1	2292.8	.317

*Includes samples of terminal and basal foliage. See tables of individual collections.

Kabell's Island - (cont.)

Date collected	Genus	Tissue	No. of samples	Ave. d/m/g dry	Ave. μ c/kg wet
Aug. 1958	<u>Tacca</u>	Leaves	1	475.2	.037
Aug. 1958	<u>Tacca</u>	Corm. whole	1	952	.051
Aug. 1958	<u>Tacca</u>	Corm. peel	1	713.4	.048
Mar. 1958	<u>Triumfetta</u>	Leaves	4	472.5	.037
Aug. 1958	"	"	3	1123	.128

Cesium-137 and Total Potassium in Pandanus collected
at Rongelap Island during March, 1959.

		Cs ¹³⁷ d/m/g dried	Cs ¹³⁷ μmc/g dried	K mg/g dried	Cesium units μmc Cs ¹³⁷ gram K
Old bark	#2	22	10	0.80	13000
New bark	#2	30	14	5.8	2400
	#3	42	19	4.3	4500
	#4	38	17	4.3	4100
Green stem	#2	33	38	6.0	6200
	#4	59	27	10.2	2800

Summary Table. Cs¹³⁷ in Pandanus Fruit

Island	Date collected	Cs ¹³⁷		Kmg/g wet	Cesium
		Number per gram samples	wet sample		units $\mu\text{mc Cs}^{137}$ / gram. K
Rongelap	Jan. 1955	1	215		
Rongelap	Oct. 1955	1	112		
Rongelap	July, 1956	1	56		
	(seed end)				
Rongelap	July 1957	1	168		
Rongelap	March 1958	1	154	3.6	14000
Rongelap	Aug. 1958	1	31	1.4	10000
Rongelap	Mar. 1959	5	42 \pm 27*	2.4 \pm 1.5*	13000 \pm 12500*
Kabelle	Mar. 1958	1	268	5.2	23000
Kabelle	Aug. 1958	1	31	1.3	4000
Eniaetok	Mar. 1958	2	172 \pm 36*	5.6 \pm 1.4*	16500 \pm 11500*
Eniaetok	Aug. 1958	1	65	2.3	13000

*Standard Deviation

Cesium-137 in the Jan. 1955 sample was determined by a standard chemical method; cesium-137 in the Oct. 1955 and July 1958 samples by analysis of gamma spectra of the dried filtrate from Sr(NO₃)₂ precipitation; and cesium-137 in the remaining samples by analysis of gamma spectra of dried unashed sample.

Cesium-137 and Total Potassium in Pandanus collected
at Rongelap Island during March, 1959.

		Cs ¹³⁷ d/m/g dried	Cs ¹³⁷ μC/g wet	K mg/g dried	Cesium units μC Cs ¹³⁷ gram K
Fruit (edible portion)	#1	424	38	5.2	37000
	#2	223	20	27.2	3700
	#3	99	8.6	9.7	4600
	#4	74	6.3	11.5	2900
	#5	266	24.	7.1	17000
	Ave.		217	19	12.2
Fruit (inedible portion)	#1	234	25	7.3	17000
	#2	79	6.8	9.2	3900
	#3	126	11	13.6	4200
	#4	65	5.9	14.0	2100
	#5	174	15.	8.4	9400
	Ave.		146	13	10.6
Leaves	#1	80	12	0.90	40000
	#2	67	10	6.2	4900
	#3	46	6.8	4.2	5000
	#4	35	5.5	10.5	1500
	#5	10	1.5	1.6	2840
	Ave.		48	10	4.7
Leaves, seedlings		343	52	3.7	42000

Sr^{90} in Pandanus Fruit - Summary Table

Island	Date collected	Number samples	Sr^{90} d/m per gram wet sample	Ca mg/g wet	Strontium units	Limit of detectability μ m/g wet
Rongelap	Jan. 1955	1	2.4			0.11
Rongelap	Oct. 1955	1	3.8			0.11
Rongelap (see end)	July 1956	1	2.2	4.5	150	0.15
Rongelap	July 1957	1	1.7	0.74	1058	0.8
Rongelap	March 1958	1	0	2.44	0	0.5
Rongelap	Aug. 1958	1	0.74	0.68	512	0.25
Rongelap	March 1959	3	$3.7 \pm 2.6^*$	$1.04 \pm .46$	$1478 \pm 4.90^*$	0.25
Kabell	March 1958	1	0	2.96	0	0.5
	Aug. 1958	1	2.30	0.83	1538	0.25
Eniaetok	March 1958	2	0	3.67	0	0.5
	Aug. 1958	1	3.02	1.15	1502	0.25

*Standard deviation

Strontium-90 and Total Calcium in Pandanus collected
at Rongelap Island during March, 1959

		Sr ⁹⁰ d/m/g dried	Sr ⁹⁰ μc/g wet	Ca mg/g dried	Strontium units
Fruit edible portion	#1	6.8±0.8	0.8±0.5	3.16±0.28	978
	#2	37.6±2.0	3.4±0.2	9.00±0.03	1899
	#3	31.5±2.0	2.8±0.2	7.35±0.04	1966
	#4	7.5±0.8	0.8±0.1	4.13±0	798
	#5	11.5±0.8	1.0±0.5	2.98±0.08	1749
	Ave.		19.0	1.7	5.33
Fruit inedible portion	#1	11.3±0.7	1.0±0.05	2.84±0.12	1810
	#2	10.3±0.7	0.8±0.05	1.91±0.02	2450
	#3	13.0±0.8	1.3±0.1	4.09±0.14	1545
	#4	6.0±0.5	0.5±0.05	4.13±0.07	656
	#5	11.6±0.4	1.0±0.04	2.38±0.04	2214
	Ave.		10.6	0.9	3.70
Leaves	#1	27.9±1.7	4.2±0.3	7.71±0.05	1645
	#2	31.9±1.9	4.8±0.3	12.04±0	1204
	#3	64.2±3.3	9.7±0.5	20.91±0.04	1396
	#4	81.3±7.0	13.8±1.0	15.20±0.11	2736
	#5	2.8±0.8	0.42±0.10	17.46±0.05	73
	Ave.		49.7	6.6	14.66
Leaves, seedlings		76.5±4.2	11.9±0.7	11.91±0	3187

Errors given for radioactivity values are obtained from counting error.

Errors given for total calcium values are obtained from standard deviations of replicate analyses.

		Sr ⁹⁰ d/m/g dried	Sr ⁹⁰ μc/g wet	Ca mg/g dried	Strontium units
Green Stem	#2	67.6 ± 3.4	30.7 ± 1.5	18.92 ± 0	1816
	#4	8.3 ± 0.3	3.3 ± 0.2	6.28 ± 0.08	600
Old bark	#2	14.1 ± 0.3	6.4 ± 0.4	4.59 ± 0.22	1397
New bark	#2	18.2 ± 3.2	7.4 ± 1.5	6.53 ± 0	1129
	#3	9.9 ± 2.0	4.5 ± 0.9	3.64 ± 0.25	1236
	#4	226. ± 12.	103. ± 5	3.49 ± 0.16	29383

Wet weight values for these samples are not available.

Errors given for radioactivity values are obtained from counting error.

Errors given for total calcium values are obtained from standard deviations for replicate samples.

Strontium-90 and Total Calcium in Tacca Collected
at Rongelap Atoll.

Summary Table

Island	Tissue	Date collected	Number samples	Sr ⁹⁰ d/m/g wet	Ca mg/g wet	"Strontium units"	Limit of detectability d/m/g wet
Labaredj	whole corms	Oct. 1955	1	1.2			0.10
Rongelap	whole corms	July 1956	1	2.5	3.3	340	0.08
		July 1957	1	0.5	0.75	306	0.13
		March 1958	1	1.12	0.19	2600	0.19
		Aug. 1958	1	7.91	1.00	3600	0.62
	centers	Mar. 1958	1	0.445 ⁽²⁾ ±0.015	0.166 ⁽³⁾ ±0.007	1210 ⁽³⁾ ±10	0.17
		Aug. 1958	1	2.73 ⁽¹⁾	0.21 ⁽¹⁾	6000 ⁽¹⁾	0.41
		Mar. 1959	5	0.36 ⁽¹⁾ ±0.15	0.067 ⁽¹⁾ ±0.015	2400 ⁽¹⁾ ±700	0.09
	peels	Mar. 1958	1	1.02	0.42	1100	0.92
		Aug. 1958	1	18.53	1.46	5800	1.58
Kabelle	whole corms	Mar. 1958	1	3.85	0.48	3600	0.37
		Aug. 1958	1	12.94	1.87	3200	0.63
	centers	Mar. 1958	1	1.1	1.37 ⁽³⁾ ±0.37	490	0.36
		Aug. 1958	1	(2)	0.67	(2)	
	peels	Mar. 1958	1	6.18	0.66	4300	1.05
		Aug. 1958	1	12.34	1.68	7400	4.58
Eniaetok	whole corms	Mar. 1958	1	1.50 ⁽¹⁾	2.0 ⁽¹⁾	350	0.36
		Aug. 1958	2	8.33 ⁽¹⁾ ±1.16	1.45 ⁽¹⁾ ±0.12	2600 ⁽¹⁾ ±590	0.50
R122	centers	Mar. 1958	1	0.38 ⁽³⁾ ±0.13	0.31 ⁽³⁾ ±0.21	1340 ⁽³⁾ ±1170	0.3(4)
		Aug. 1958	2	4.32 ⁽¹⁾ ±0.21	0.87 ⁽¹⁾ ±0.02	2300 ⁽¹⁾ ±53	0.75
	peels	Mar. 1958	1	3.9 ⁽³⁾ ±0.4	0.92 ⁽³⁾ ±0.03	2000	0.7
Aug. 1958		2	8.14 ⁽³⁾ ±0.15	1.50 ⁽³⁾ ±0.08	2500 ⁽³⁾ ±86	0.64	

(1) Standard deviation

(2) Not yet done; results will be available later

(3) Averages of separated determinations made at different times, errors given are standard deviations.

(4) The large difference between two strontium unit values is due to widely differing calcium values. The determination of calcium in this sample is being rechecked.

Strontium-90 and Total Calcium in Tacca
Collected at Rongelap Atoll

			Date of analysis	Sr ⁹⁰ (1) d/m/g dried	Sr ⁹⁰ (1) μuc/g wet	Ca mg/g dried	Strontium units
<u>March 1958</u>							
norms	R 10a	Rongelap	Jan. 60	7.0±1.0	0.51±0.61	1.2	2600
	R 93a	Kabeile	Jan. 60	11.51	1.75±0.17	1.4	3600
	R122a	Eniaetok	Jan. 60	6.9±1.3	0.68±0.13	0.1	350
peels	R 10b	Rongelap	Jan. 60	11.75	0.46±0.24	4.3	1100
	R 93b	Kabeile	Jan. 60	67.29	2.3 ±0.4	7.1	4500
	R122b	Eniaetok	Jan. 60			4.0	
	R122b	"	Jan. 59	21.12	1.3 ±0.2	5.3	1300
centers	R 10c	Rongelap	Jan. 60	1.1±0.3	0.21±0.06	0.40	1200
	R 10c	"	Jan. 59	1.0±0.4	0.20±0.08	0.37	1200
	R 93c	Kabeile	Jan. 60			1.4	
	R 93c	"	Jan. 59	2.8±0.4	0.55±0.09	4.2	280
	R122c	Eniaetok	Jan. 60	2.0±0.8	0.25±0.10	0.4	2504
	R122c	"	Jan. 59	0.7±0.6	0.19±0.07	1.3	173
leaves	R 11	Rongelap	Jan. 60	1		20.1	
			Jan. 59	13 ±1	1.09±0.09	19.5	298
(native ⁽²⁾ prep.)	R132	Rongelap	Jan. 59	0.3±0.5 ⁽³⁾	0.13±0.23 ⁽⁴⁾	0.6	0

- (1) Errors given were obtained from counting error.
 (2) Starch extracted by repeated washing.
 (3) For this determination 7g dried sample were used.
 (4) μuc/g dried; wet weight not available.

see attached note

Where samples were analyzed at two different times results from both analyses are given.

Total calcium was determined by KMnO_4 titration of calcium oxalate in Dec. 59 and by EDTA titration using murexide indicator in Jan. 59. Calcium values are being rechecked where the discrepancy between the two analyses is greater than 10%.

Strontium-90 and Total Calcium in Tacca collected at Rongelap Atoll

			Sr ⁹⁰ (1)	Sr ⁹⁰ (1)	Ca	Strontium
			d/m/g	µmc/g	mg/g	units
			dry	wet	dry	
<u>March, 1959</u>						
corms	#1	Rongelap	2.0±0.3	0.20±0.03	0.24	3600
(centers)	#2		2.2±0.4	0.22±0.04	0.42	2400
	#3		1.1±0.3	0.11±0.03	0.30	1700
	#4		1.1±0.3	0.10±0.03	0.24	2000
	#5		1.5±0.4	0.15±0.04	0.35	2000
	Av.		1.8±0.4 ⁽²⁾	0.16±0.05 ⁽²⁾	0.31±0.07 ⁽²⁾	2400±700 ⁽²⁾
<u>August 1959</u>						
corms	1	Rongelap	51±4	3.6±0.3	6.4	3600
	7	Kabelle	109±7	5.9±0.4	15.7	3200
	10	Eniaetok	75±6	3.3±0.3	16.6	2100
	11	Eniaetok	74±3	4.3±0.1	10.4	3200
peels	1	Rongelap	113±12	8.4±0.9	8.9	3800
	7	Kabelle	184±24	12.3±1.6	11.3	7400
	10	Eniaetok	83±6	3.8±0.3	16.7	2100
	11	Eniaetok	63±4	8.0±0.5	11.2	2600
centers	1	Rongelap	19±2	1.3±0.2	1.4	6000
	7	Kabelle	(3)	(3)	7.1	(3)
	10	Eniaetok	64±4	2.1±0.1	12.5	2300
	11	Eniaetok	45±3	1.9±0.1	9.3	2200
leaves	1	Rongelap	79±8	4.7±0.3	4.8	7600
	7	Kabelle	90±5	7.1±0.4	10.1	3600
	10	Eniaetok	60±4	4.3±0.3	9.3	2900
	11	Eniaetok	60±4	4.2±0.2	9.7	2300

(1) Errors given are obtained from counting error.
 (2) Standard deviation
 (3) Sr⁹⁰ determination not yet done; result will be available later.

Comparison of Sr-90 Levels in Land Crabs Collected at Rongelap Atoll
in July 1956 and July 1957

Island	Tissue	Coenobita (land hermit crab) July 1956			Birgus (coconut crab) July 1957		
		d/m/g vet	s. u.	NYO d/m/g vet	d/m/g dry	APL d/m/g vet	S. U.
Kabelle	Liver	42	6250	34	180	78	4800
		47	3110	25	310	160	35000
	Muscle	62	8890	16	53	10	3200
Rongelap	Liver	24	4910	9.5	47	11	410
		90	5120	--	33	9.5	3800
	Skeleton	2400	5310	1550	3600	2300	6800
Rongelap	Liver	1310	2960	910	2800	2000	4600
		2130	4440	1450	4300	3000	6100
	Muscle	--	--	--	56	15	1600
Rongelap	Liver	--	--	--	87	28	2000
		--	--	--	10	2.5	150
	Muscle	--	--	--	29	5.8	1900
Rongelap	Liver	1310	3360	750	1100	710	1700
		--	--	--	1800	1200	3000
	Muscle	--	--	--	--	--	--

STRONTIUM-90 In BONE SAMPLES FROM RATS COLLECTED AT
RONGELAP ISLAND, MARCH 1958

Specimen No.	Sr ⁹⁰ d/m/g wet	Ca mg/g wet	Strontium Densitome units
V-1	207 ± 17	181 ± 5	519
V-2	294 ± 19	243 ± 21	551
V-3	109 ± 11	183 ± 0	273
V-4	69 ± 7	99 ± 0	313
V-5	155 ± 12	113 ± 19	619
V-6	220 ± 14	108 ± 19	926
V-7	71 ± 7	104 ± 19	308
V-8	80 ± 9	118 ± 7	305
V-9	153 ± 15	130 ± 4	538
V-10	110 ± 14	143 ± 0	350
V-11	93 ± 9	157 ± 3	268
V-12	104 ± 12	137 ± 7	343
V-13	143 ± 10	125 ± 3	440
Average	139 ± 64	142 ± 38	443 ± 181

NOTES:

1. 0.95 counting error is given for individual Sr⁹⁰ determinations.
2. Standard deviation of duplicate samples is given for Ca determinations.
3. Standard deviation is given for averages.

March 1958

June 1958

Sr^{90} in the Skeletons of Land Crabs collected
at Rongelap Atoll

Island	Date of Collection	Laboratory	No. of Samples	Sr^{90} d/m/g dry	Sr^{90} d/m/g wet	Sensitivity um its
Kabela	July 1958	NYO	3		1300±280	3240±780
	"	U. W.	3		1950±470	4240±970
	July 1957	U. W.	3	3870±610	2430±430	5820±920
	March 1958	U. W.	5	3280±380	2360±310	6200±850
Rongelap	July 1958	NYO	1		750	1300
		U. W.	1		1810	1300
	July 1957	U. W.	2	1500±350	958±248	2280±350
	March 1958	U. W.	3	1680±441	1180±300	3140±580
Eniaetok	March 1958	U. W.	2	3200±800	2250±550	6600±1200

Radiostrontium in Land Hermit Crabs (*Geochelone sp.*)
 Collected at Rongelap Atoll July 23-24, 1956

Radioactivity as of Counting Date, September 10, 1956

Specimen Number	Tissue	Island	Total activity d/m/g wet	Sr-90 d/m/g wet	Collection date	Sample No.	89 Sr %
1-49	Liver	Labelle	843	483	0.00304	68501311	1.640.3
	Muscle	"	194	623	0.00320	889013110	0.0
	Skeleton	"	5410	24009	0.306	53101319	0.2470.08
1-50	Liver	Labelle	633	4714	0.00718	31101346	3.65.6
	Muscle	"	273	2426	0.00223	491013170	2.170.75
	Skeleton	"	4100	131043	0.308	2960137	0.5830.16
1-51	Muscle	Labelle	444	9046	0.00218	31001308	0.710.05
	Skeleton	"	5600	21301339	0.108	31001308	0.3450.04
1-52	Skeleton	Rongelap	3900	131013	0.177	3360134	0.4650.14

APPLIED PHYSICS LABORATORY
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Radioactivity in Plants Collected at Rongelap Island

Counted by *[illegible]* on *[illegible]* at *[illegible]*

Plant	Flavor	Island	Radioactivity d/m ² /hr	Total activity d/m ² /hr	Weight g/m ²	Radioactivity d/m ² /hr
Breadfruit	Pulp	Rongelap	42.0	0.820,0	1.17	0.820,0
Morinda	Pulp & Seed	"	80.4	3.120,1	0.820,0	3.120,1
Pandanus	Seed	"	79.7	2.220,6	0.00254	2.220,6
Arrowroot	Pulp & Stalk	"	108	2.520,6	0.00333	2.520,6
Coconut	Milk	"	262	0		0
"	Meat	"	64.6	0		0
"	Milk	Labelle	36.9	0		0
"	Meat	"	148	0		0

Note: Specimen numbers will be forwarded later.

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