longer and the organ such as liver can be contained within fifty percent area.

2) Halflayer-tomoscintigram was obtained by subtruction technique. The influence of relative area existing at the distal side from focus and half layer of organ were eliminated by subtruction.

3) Tomoscintigram was obtained by crossing method of detector axis and addition technique.

20 cm focus collimators were used on both sides and inclined to suitable angle and data from both counters were added.

Experience of Put to Use the Contour Brain Scanner

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It has been very popularizing diagnosis that the decide of localization of brain tumours are able to by scanning method after injection fo radioactive iodinated human serum albumin labelled with iodine-131 (RIHSA), though we have set up the automatic contour brain scanner which was ordered from TOSHIBA RADIATION CORPORATION, yet the usual rectilinear scanning method are not so evaluation of such as spherical cranium. This design has developed and utilized on clinic in Canada.

This automatic contour brain scanner operate as follows, the technique utilizes twin balanced scintillation detectors which simultaneously survey both sides of the head from front to back in a series of seven or eight parasagittal concentric arcs, and present this information on a chart, these arched tracks are consist of counting rates on the right side compared with those on the left.

Besides more two para-tracks are i.e. excessive scanner makes which present for subtraction of the countrate from right and left sides of the head by the difference circuit, because, these para-tracks are meaming that representation of the locate brain tumours may be there.

The result of the imitative brain tumour test by contour brain scanning so very clearly appeared in para-tracks, that attached collimator of detector are multi-focus (i.e. 5, 10 and 15 cm focusing) of 36 holes.

The Whole Body Counter at Kyoto University

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The whole body counter at Kyoto University was planned for the application in the field of radiological health, clinical metabolic studies and medical diagnostic investigations, and was completed in March, 1966 by the Mitsubishi Atomic Power Industries.

Description of Counter

The whole body counter is located in the Central Clinical Radioisotope Division at Kyoto University Medical School. The laboratory consists of a waiting room, shower and locker room, iron room and operation room, iron room and operation room. The iron walls, ceiling and floor of the iron room are 20 cm thick, with the inner surfaces lined with 3 mm Pb sheet. The internal dimensions are $220 \times 86 \times 170$ cm. The radioactivity of the materials has been premonitored.

The 8" NaI (Tl) scintillation probe con-

sists of a 8"×4" NaI (Tl) crystal and three photomultiplier tubes (Dumont 6363), and is movable to any position above the bed.

The main uses of this detector are identification and determination of radionuclides in the whole body.

Four sets of probes, consisting of a 1.5"×1.5" NaI (Tl) crystal and a Dumont 6342A photomultiplier tube, are arranged below the ceiling in the iron room. These probes are closed by one lead collimator and can be used for X-Y scan. The main use of this detector is the determination of distribution of radionuclide in the whole body.

Four plastic scintillation probes are set under the bed so as to cover the underside of the subjects body and distance from the subject to the probes is 6 cm. Each plastic scintillation probe consists of a 50×50×15 cm scintillator and four photomultiplier tubes (Philips 54 AVP).

The output signal from each probe can be fed into a Mitsubishi 400-channel pulse-height analyzer when complete spectral information is desired. Furthermore, signals from 8" NaI (Tl) scintillation probe and plastic scintillation probe are sorted by a dual-channel pulse-height analyzer. The 400-channel pulse-height analyzer can be connected to Tape Type Control Unit and typewriter.

With this apparatus, either stretcher, chair and arc bed can be arranged to accommodate the subject to undergo total body radioactivity measurement.

Some Characteristics of the Counter

Table 1 and 2 show some data from measurements made with calibration sources containing 419 g of potassium of 1.26 μCi of ^{137}Cs in 70 kg phantom (height 157.5 cm) by 8" NaI probe and plastic scintillation probe. Table 3 shows the counting efficiency of ^{40}K and ^{137}Cs in various sizes of phantom.

Total potassium and ^{137}Cs Content in healthy subjects

Total potassium and ^{137}Cs contents were measured in 18 healthy young subjects. Total potassium contents ranged from 70 to 150 g; men were distributed over 100 g, while women were distributed under 100 g. The^{137}Cs contents ranged from 5 to 26 mμCi, men were distributed over 10 mμCi, while women were distributed under 10 mμCi.

Table 1. ^{40}K & ^{137}Cs Sensitivity Data for 8″ NaI Crystal Scintillator System.
Integral Background (0.1–2.0 MeV) 925.8 cpm (0.280 cdm/cm^3 Crystal)

Total Crystal Volume		3300 cm^3	
Geometry (cm		Standard chair $\frac{a+b}{2}=40$	Arc Bed 70
^{40}K	Spectrometric Resolution (%)	6.85	9.85
	Width of Energy Band (MeV)	0.28	0.28
	Background (cpm)	69.24	69.51
	Partial Energy Peak Sensitivity (cpm/gK)	0.664	0.93
	Fraction of Full Peak (%)	100	100
	Full Energy Peak Sensitivity (cpm/gK)	0.664	0.293
^{137}Cs	Spectrometric Resolution (%)	9.67	9.25
	Width of Energy Band (MeV)	0.18	0.18
	Background (cpm)	103.32	101.94
	Partial Energy Peak Sensitivity (cpm/μCi)	3.23×10^3	1.46×10^3
	Fraction of Full Peak (%)	99.1	99.8
	Contribution from ^{40}K (cpm/gK)	0.200	0.085
	Full Energy Peak Sensitivity (cpm/μCi)	3.26×10^3	1.46×10^3

Table 2. ^{40}K& ^{137}Cs sensitivity Data forl Plastic Scintillator System. Integra Background (0.1-2.0 MeV) 1.87×10^4 cpm (125.0 cpm/l Volume)

Total Detector Volume (l)		150	Total Detector Volume (l)		150
^{40}K	Spectrometic Half-resolution (%)	18.35	^{137}Cs	Spectrometric Half-resolution)%)	31.3
	Width of Energy Band (MeV)	0.64		Width of Energy Band (MeV)	0.44
	Background (cpm)	2.71×10^3		Background (cpm)	3.44×10^3
	Partial Energy Peak Sensitivity (cpm/gK)	8.35		Partial Energy Peak Sensitivity (cpm/μCi)	3.99×10^4
	Contribution from ^{137}Cs	negligible		Contribution from ^{40}K (cpm/gK)	6.90

Table 3. Counting Efficiency of ^{40}K & ^{137}Cs in Various Sizes of Phantom

		^{40}K			^{137}Cs		
		10 kg Phantom 56.1 gK	30 kg Phantom 137 gK	70 kg Phantom 419 gK	10 kg Phantom 0.16 μCi	30 kg Phantom 0.52 μCi	70 kg Phantom 1.26 μCi
8″ NaI Standard Chair Method	400-CH PHA (%)	0.40	0.36	0.32	0.151	0.149	0.148
	Dual-CH PHA (%)	0.48	0.44	0.40	0.157	0.156	0.156
8″ NaI Arc Bed Method	400-CH PHA (%)	0.18	0.17	0.15	0.082	0.075	0.074
	Dual-CH PHA (%)	0.20	0.19	0.18	0.085	0.079	0.077
Plastic Scintillator System	400-CH PHA (%)	6.60	5.75	4.88	2.45	2.13	2.03
	Dual-CH PHA (%)	3.64	3.23	2.83	1.03	0.91	0.86

Basic Studies on the Whole Body Counting. (Report II)

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The medium level whole body counter has built for the clinical use in the Radioisotope Laboratory of the Chiba University Hospital in July 1966, The counter system is set in the small room roughly shielded from the external radiation with 25 cm thick concrete wall. Four detectors are hanged from the ceiling above the couch that can be pushed in on the rail into the shielded room. Four 3×3 inch NaI scintillation crystals with photomultiplier tubes are equipped in the detectors. They are positioned about 60 cm above the couch without any lead collimators so that the sensitive area of the system covers the entire length of the couch. The outputs of the four detectors are fed together into a