dition is an angle of 60 degrees between two detectors and a clearance of 3 cm from the collimators to body surface. In our opinion, laminoscanning is so far not beyond experimental stage but must be practical sooner or later and there remain several problems for further improvement.

Isosensitive Scintiscanning with MUHC

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Since in conventional scanning a layer of a few centimeters from surface of the human body is scanned which has a thickness of about 20 cm, conventional scanning is suitable for the superficial organ e.g. thyroid gland, but is unsuitable for the thick organ such as the lung, liver and head. And it is also unsuitable for either multi-nuclide scintiscanning, lateral scanning of the liver in the near future or quantative evaluation of pulmonary blood flow by lung scan. For this reason, isosensitive secintiscanning is needed.

In developing Medical Universal Human Counter (MUHC), a concept of isosensitive scintiscanning was introduced. Suppose a thickness of the human body is 20 cm, it is necessary for isosensitive scanning to use a combination of two opposed scintillation detectors employing 3 in. diameter by 2 in. thick NaI crystals having a clearance of 5 cm above and below the humanbody. These two detectors are moved in a scan motion together. Isosensitive scanning was carried out successfully in the liver phantom and the human body. As compared with conventional scan, isosensitive scan improves the accuracy of detecting deep-situated abnormality in human body. Since isosensiteve scanning can detect radioactivities in any layer of the thick organ e.g. the lung, liver and head sharply, and a isosinsitive scintigram is more clearly demonstrated than a conventional scintigram, one can reduce a risk of overlooking the abnormality. Besides, as two detectors are employed in the isosensitive scan, the amount of isotope required can be reduced.

A Rescanner with Polaroid Color

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The purpose of this instrument is to extract latent information in the record of radioisotope scanning. The original scan taken by the routine technique is placed between a small light source and a light sensor of the rescanner and is scanned. The output of the sensor drives a color wheel with the aid of the DC servomotor and selects a color filter. An optical position-feedback mechanism quickly decides the balancing point where the color wheel must stop. The angular displacement of the color wheel is proportional

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to the opacity of original scan record. This instrument was proved to be useful for the accentuation and visualization of the small variations of counting rate within the organ that could be suspected on the original scan. The rescanner was also applied to analyzing the original scans of very high or very low density. Little time is required for rescanning in the use of polaroid color film and the novel servomotor mechanism, that allows to set the rescan speed high without any distortion of the image.

Scanning with Technetium-9mm —Brain, Thyroid, Liver, and Bone Marrow—

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Technetium 99m has been used for scanning with the conventional scanners in our hospital since January 1965. Relatively low gamma-ray energy of Tc-99m (140 keV) interacts more effectively with NaI crystal than those of ^{131}I or ^{198}Au. The background can be reduced fairly low by the effective shielding of crystal to its soft gamma-rays. The fact that Tc-99m has no beta-rays and its half life is relatively short (6 hours) makes it possible to administer the large dose of the isotope to the patient without increment of internal radiation. The large-dose administration increases the counting rate in scanning and increases the target to non-target ratio. Besides, Tc-99m can be used for scannings of various organs with various chemical forms.

Methods: Scans of brain, thyriod, liver and bone marrow with Tc-99m were compared with those of ^{197}Hg, ^{203}Hg, ^{131}I, and ^{198}Au. The 3″ × 2″ crystal scanner (37 holes collimator) and the 2″ ×2″ crystal scanner (19 holes collimator) were used. Brains and thyroids were scanned with $^{99m}TcO_4$, and livers and bone marrows with $^{99m}Tc_2S_7$ colloid.

Results: Brain scan with Tc-99m is superior in the detectability of brain tumors to those of ^{197}Hg or ^{203}Hg Neohydrin. This seems to be due mainly to the effect of high dose administration. Scans of thyroid and liver are comparative to those of ^{131}I and ^{198}Au colloid. For the bone marrow scans, Tc-99m is expected to be the substitute of ^{198}Au colloid with the reduction of considerablly high radiation to the liver and spleen. But our results were less satisfactory than those with ^{198}Au colloid.

Application of Tc-99m Preparations for the Organ Scanning

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Recently interest has increased in the use of Technetium-99m as a scanning agent. The main reasons are as follows; 1) short physical half life of 6 hours, 2) the absence of primary particle radiation, 3) the emission of clean 140 Kev gamma ray and 4) the pos-