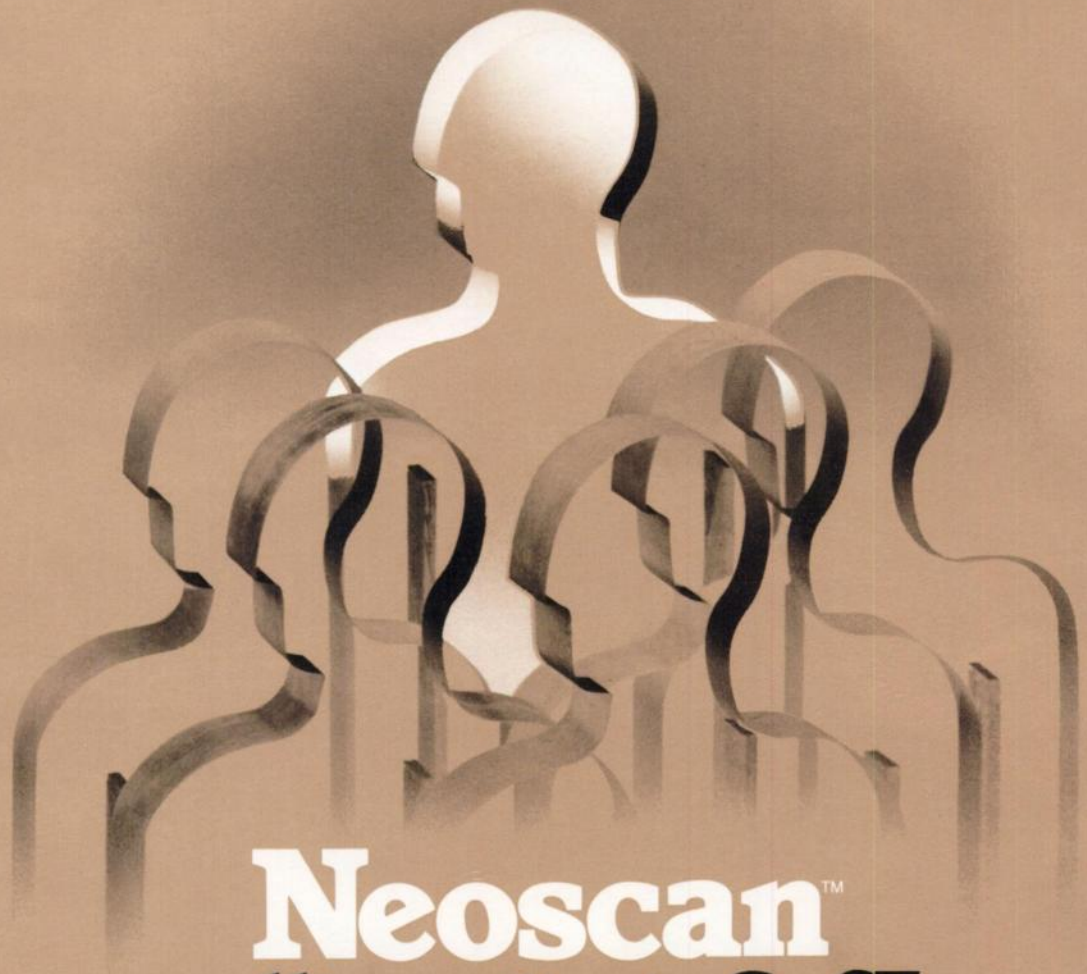
When nuclear medicine discusses gallium imaging, one name will keep coming up...



Neoscan™
gallium citrate Ga 67

from medi+physics™

NEOSCAN MEANS gallium citrate Ga 67 from Medi-Physics, Inc. Neoscan can aid in demonstrating the presence and extent of Hodgkin's disease, lymphoma *and* bronchogenic carcinoma. Positive uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease state.

NEOSCAN MEANS a gallium citrate Ga 67 that is produced by MPI on both the East and West Coasts and is available from 4 locations across the country for easy access when you need it. Neoscan is calibrated twice weekly in two convenient sizes: 3.0mCi and 13.2mCi.

NEOSCAN MEANS a gallium citrate Ga 67 that MPI will send to you with no additional delivery charge along with your supply of Sodium Iodide I 123, Technetium Prepared Products or Xenon 133-V.S.S. (xenon Xe 133).

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Toll Free (In N.J.) (800) 272-1253
(800) 272-1254
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Neoscan™
gallium citrate Ga 67

For complete product information, consult the package insert, a summary of which follows:

DESCRIPTION: Neoscan for diagnostic use is supplied as a sterile, apyrogenic aqueous solution for intravenous injection. Each milliliter of the solution contains 2 millicuries of gallium Ga 67 at calibration time, no-carrier-added, 2.5% sodium citrate, and 1% benzyl alcohol as a preservative. The pH is between 4.5-7.5. Gallium Ga 67, with a half-life of 78.1 hours, is cyclotron produced by the proton irradiation of zinc Zn 68-enriched zinc oxide. The radionuclidic composition, at calibration time, is not less than 98.9% of the total activity from gallium 67 with less than 1% of the total radioactivity due to gallium 66 and with zinc 65 and other radiocontaminants contributing less than 0.1% of the total activity.

INDICATIONS AND USAGE: Neoscan may be useful to demonstrate the presence and extent of Hodgkin's disease, lymphomas, and bronchogenic carcinoma. Positive gallium Ga 67 uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease state.

CONTRAINDICATIONS: None known.

WARNINGS: This radiopharmaceutical should not be administered to children or to patients who are pregnant or to nursing mothers unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, in women of child-bearing capability should be performed during the first few (approximately 10) days following the onset of menses.

PRECAUTIONS: A thorough knowledge of the normal distribution of intravenously administered gallium citrate Ga 67 is essential in order to accurately interpret pathologic studies. The finding of an abnormal gallium concentration usually implies the existence of underlying pathology, but further diagnostic studies should be done to distinguish benign from malignant lesions. Neoscan is intended for use as an adjunct in the diagnosis of certain neoplasms. Negative results do not preclude the presence of disease.

Gallium citrate Ga 67 as well as other radioactive drugs, must be handled with care. Appropriate safety measures should be used to minimize radiation exposure to clinical personnel and to patients, consistent with proper patient management.

No long-term animal studies have been performed to evaluate carcinogenic potential.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Gallium citrate Ga 67 should be used in pregnant women only when clearly needed.

Gallium citrate Ga 67 has been found to accumulate in breast milk and should not be used in nursing mothers.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: No adverse reactions have been reported with the use of Neoscan at this time.

DOSAGE AND ADMINISTRATION: The recommended adult (70 kg) dose is 2-5 millicuries. Neoscan is intended for intravenous administration only. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Studies indicate the optimal tumor-to-background concentration ratios are often obtained about 48 hours after administration. However, considerable biological variability may occur in individuals, and acceptable images may be obtained as early as 6 hours and as late as 120 hours after injection.

Approximately 10% of the administered dose is excreted in the feces during the first week after injection. Daily laxatives and/or enemas are recommended from the first day of injection until the final images are obtained in order to cleanse the bowel of radioactive material and minimize the possibility of false positive studies.

Radiopharmaceuticals should be used only by persons who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

HOW SUPPLIED: Neoscan is supplied as a no-carrier-added sterile apyrogenic aqueous solution for intravenous use. Each milliliter contains 2 mCi ± 10% gallium Ga 67 at the time of calibration with 2.5% sodium citrate. Benzyl alcohol 1% is present as a preservative. The pH is between 4.5-7.5.

The contents of the vial are radioactive and adequate shielding and handling precautions must be maintained.

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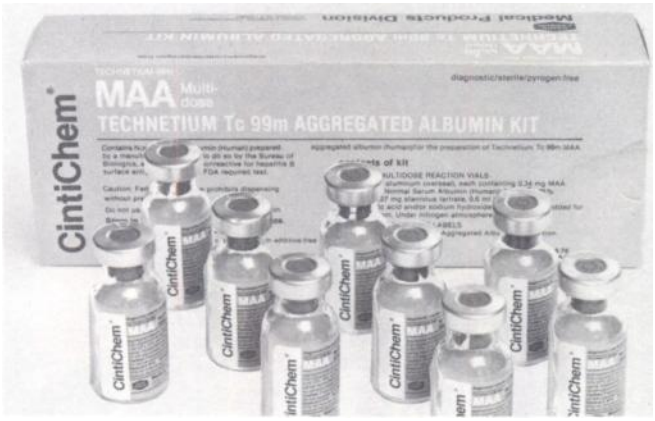

Easy to prepare.[1]

Stable formulation prepared with stannous tartrate, which is more resistant to oxidation than stannous chloride.[2]

Lowest dose rate to the lungs of any commercially available kit.[3]

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CintiChem®

TECHNETIUM 99m

Technetium Tc 99m Aggregated Albumin Kit MAA

DIAGNOSTIC - FOR INTRAVENOUS USE

BRIEF SUMMARY OF PRESCRIBING INFORMATION

indications and usage

Technetium Tc 99m Aggregated Albumin is indicated as a lung imaging agent to be used as an adjunct in the evaluation of pulmonary perfusion.

contraindications

Technetium Tc 99m Aggregated Albumin should not be administered to patients with severe pulmonary hypertension.

The use of Technetium Tc 99m Aggregated Albumin is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

warnings

The possibility of allergic reactions should be considered in patients who receive multiple doses.

Theoretically the intravenous administration of any particulate material such as aggregated albumin imposes a temporary small mechanical impediment to blood flow. While this effect is probably physiologically insignificant in most patients, the administration of aggregated albumin is possibly hazardous in acute *cor pulmonale* and other states of severely impaired pulmonary blood flow.

This radiopharmaceutical preparation should not be administered to children, to pregnant women or lactating women unless the expected benefits to be gained outweigh the potential risks.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

precautions

In cases of right-to-left cardiac shunt, additional risk may exist due to the rapid entry of aggregated albumin into the systemic circulation.

The contents of the kit are not radioactive. However, after the Sodium Pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

The labeling reactions involved in preparing the agent depend on maintaining the tin in the reduced state. Any oxidant present in the Sodium Pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, Sodium Pertechnetate Tc 99m containing oxidants, or other additives, should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The contents of the vial are sterile and pyrogen-free. It is essential that the user follows the directions carefully and adheres to strict aseptic procedures during preparation of the radiodiagnostic.

Technetium Tc 99m Aggregated Albumin is physically unstable and as such the particles will settle with time. Failure to agitate the vial adequately before use may result in non-uniform distribution of radioactivity.

It is also recommended that, because of the increasing probability of agglomeration with aging, a batch of Technetium Tc 99m Aggregated Albumin not be used after eight hours from the time of preparation. Refrigerate at 2° to 8° C after preparation. If blood is withdrawn into the syringe, unnecessary delay prior to injection may result in clot formation *in situ*.

The contents of the vial are under a nitrogen atmosphere and should be protected from air. On preparation with Sodium Pertechnetate Tc 99m, the contents of the vial should be mixed by gentle swirling to avoid changes in particle size. Do not use if clumping or foaming of the contents is observed.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Aggregated Albumin should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to the occupational worker.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides.

adverse reactions

The literature contains reports of deaths occurring after the administration of aggregated albumin to patients with pre-existing severe pulmonary hypertension. Instances of hemodynamic or idiosyncratic reactions to preparations of Technetium Tc 99m labeled aggregated albumin have been reported.

Hypersensitivity reactions are possible whenever protein-containing materials such as Technetium Tc 99m labeled aggregated albumin are used in man. Epinephrine, antihistamines and corticosteroid agents should be available for use.

how supplied

kit contents

5 STERILE MULTIDOSE REACTION VIALS (10 cc, silver aluminum overseal), each containing 0.34 mg MAA Aggregated Normal Serum Albumin (Human) $2.0 \times 10^6 \pm$ 25% particles, 0.27 mg stannous tartrate, 0.6 ml of isotonic saline. Hydrochloric acid and/or sodium hydroxide may have been added for pH adjustment.

10 PRESSURE-SENSITIVE LABELS for final Technetium Tc 99m Aggregated Albumin preparation.

1 PACKAGE INSERT.

FOR FULL PREPARATION AND PRESCRIBING INFORMATION, SEE PACKAGE INSERT.

Notes: 1. See package insert for full preparation instructions. 2. Reg. U.S. Pat. Off. #3987157, Union Carbide Corporation, Oct. 19, 1976. 3. Refer to Union Carbide and competitive package inserts for full lung dosimetry information.

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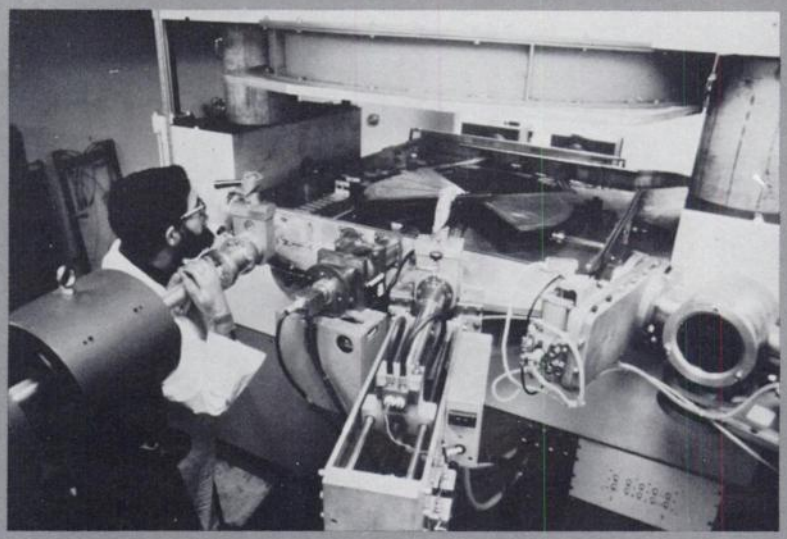

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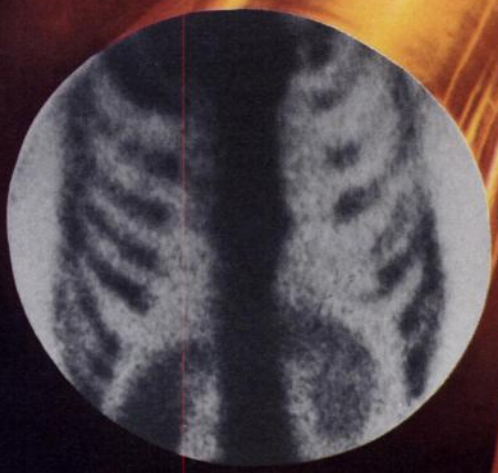
There are three good reasons you should specify

TechneScan® MDP Kit

(Technetium Tc99m Medronate Sodium)

from Mallinckrodt/Nuclear



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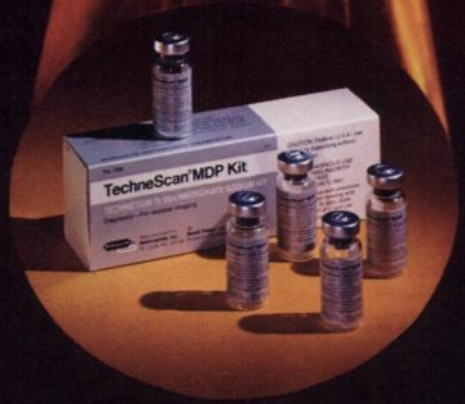

2 The TechneScan® Image: Consistent Quality—Reliable Performance.

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Please refer to brief summary on next page.

Introducing Mallinckrodt
TechneScan® MDP Kit
(Technetium Tc99m Medronate Sodium)
The latest advance in skeletal imaging.

References:
1. Davis MA, Jones AG: Comparison of ^{99m}Tc-Labeled Phosphate and Phosphonate Agents for Skeletal Imaging. *Sem. Nucl. Med. 6*:19, 1976.
2. Subramanian G, McAfee JG, Blair RJ, et al: Technetium-99m-methylene Diphosphonate—A Superior Agent for Skeletal Imaging: Comparison with Other Technetium Complexes. *J. Nucl. Med. 16*:744, 1975.

INDICATIONS AND USAGE
Technetium Tc 99m Medronate Sodium is a skeletal imaging agent used to demonstrate areas of altered osteogenesis as seen for example in metastatic bone disease, Paget's disease, arthritic disease and osteomyelitis.

CONTRAINDICATIONS
None known at present.

WARNINGS
This radiopharmaceutical should not be administered to children or to patients who are pregnant or to nursing mothers unless the benefits to be gained outweigh the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, in women of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

This class of compound is known to complex cations such as calcium. Particular caution should be used with patients who have, or who may be predisposed to, hypocalcemia (i.e., alkalosis).

PRECAUTIONS
General
The finding of an abnormal concentration of radioactivity implies the existence of underlying pathology, but further study is required to distinguish benign from malignant lesions.

Technetium Tc 99m Medronate Sodium as well as other radioactive drugs must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to patients consistent with proper patient management.

To minimize the radiation dose to the bladder, the patient should be encouraged to void before the examination and as often thereafter as possible for the next 4-6 hours.

The preparation contains no bacteriostatic preservative. Therefore, after labeling with Technetium Tc 99m the solution should be stored at 2°-8°C and discarded after 6 hours.

The image quality may be adversely affected by obesity, old age and impaired renal function.

Carcinogenesis
No long term animal studies have been performed to evaluate carcinogenic potential.

Pregnancy
Adequate reproductive studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. There have been no studies in pregnant women. *Technetium Tc 99m Medronate Sodium* should be used in pregnant women only when clearly needed.

Nursing Mothers
It is not known whether this drug is excreted in human milk. As a general rule nursing should not be undertaken while a patient is on the drug since many drugs are excreted in human milk.

Pediatric Use
Safety and effectiveness in children have not been established.

ADVERSE REACTIONS
At present adverse reactions have not been reported that are specifically attributable to the use of *Technetium Tc 99m Medronate Sodium.*

DOSAGE AND ADMINISTRATION
The recommended adult dose is 10 to 20 mCi (200 uCi/kg) by slow intravenous injection over a period of 30 seconds. Optimum scanning time is 1 to 4 hours post-injection.

The patient should be encouraged to drink fluids before and after the examination and to void immediately before imaging is started. This is to minimize the contribution of the bladder content to the image.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

HOW SUPPLIED
TechneScan MDP Kit-Technetium Tc 99m Medronate Sodium Kit

Product No. 088

Each kit consists of 5 reaction vials, each vial containing, in lyophilized form, sterile and non-pyrogenic:

Medronic Acid	10 mg
Stannous Chloride	1 mg

The pH is adjusted to 6.5 to 7.5 with HCl or NaOH prior to lyophilization. The vials are sealed under an atmosphere of nitrogen.

Labels with radiation warning symbols and directions are supplied with each kit.

Manufactured for:
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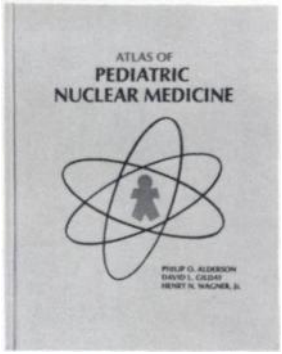

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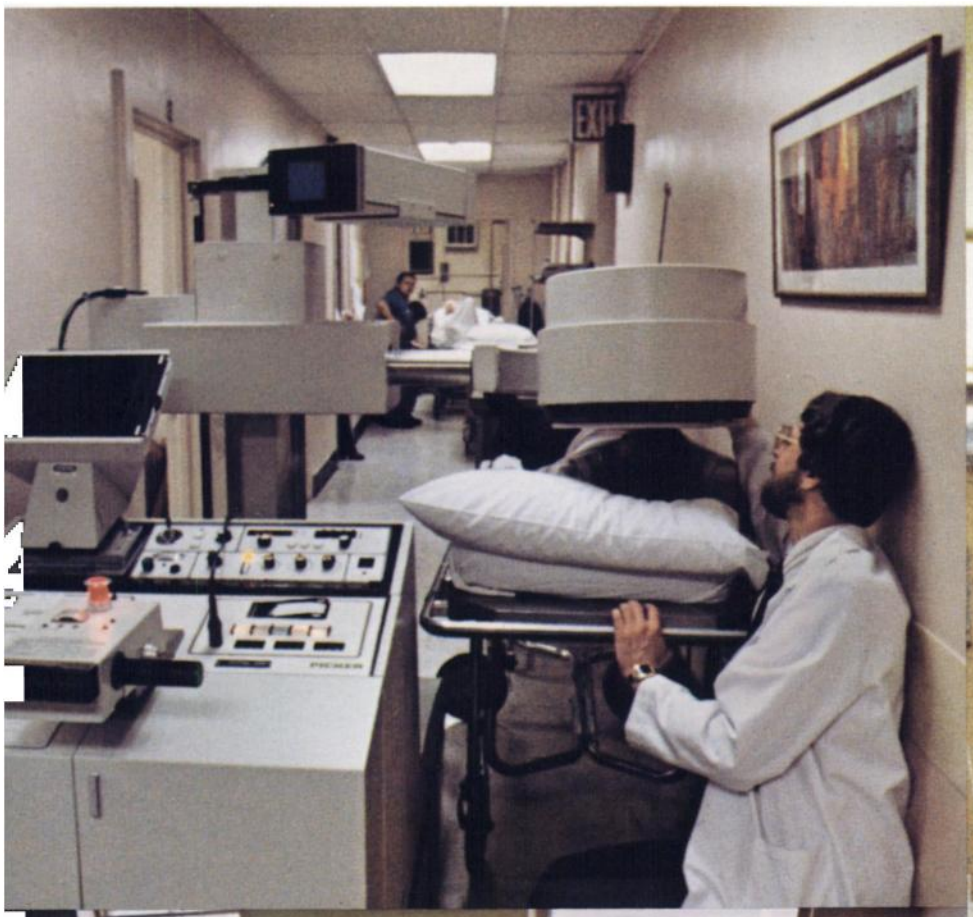

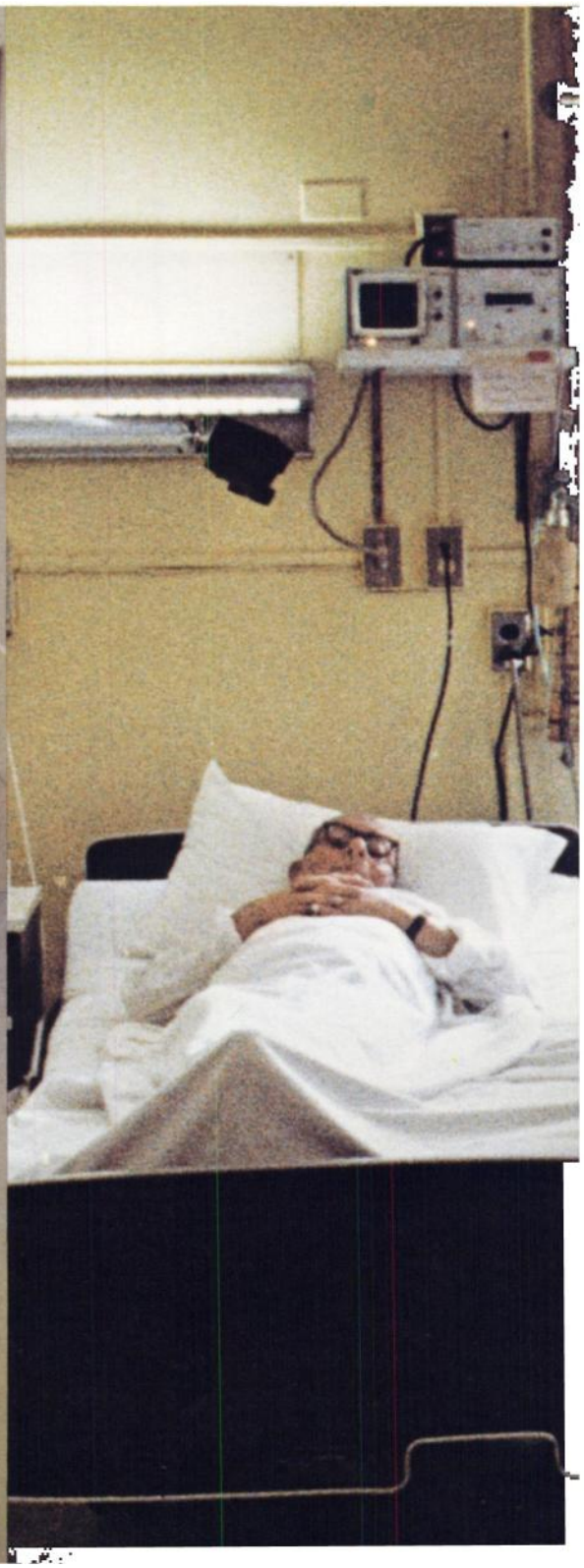

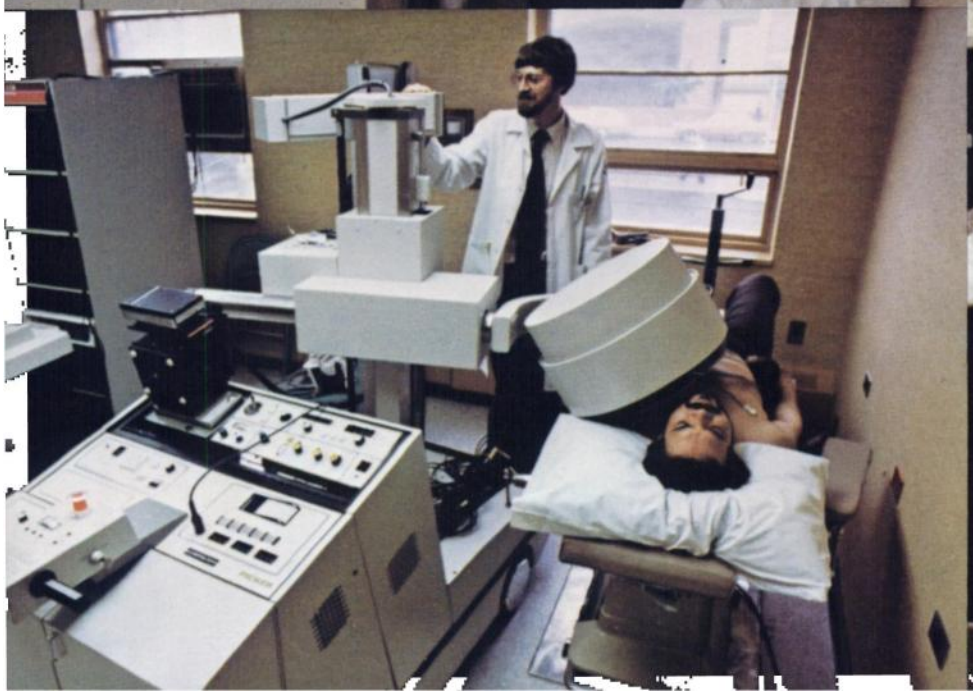

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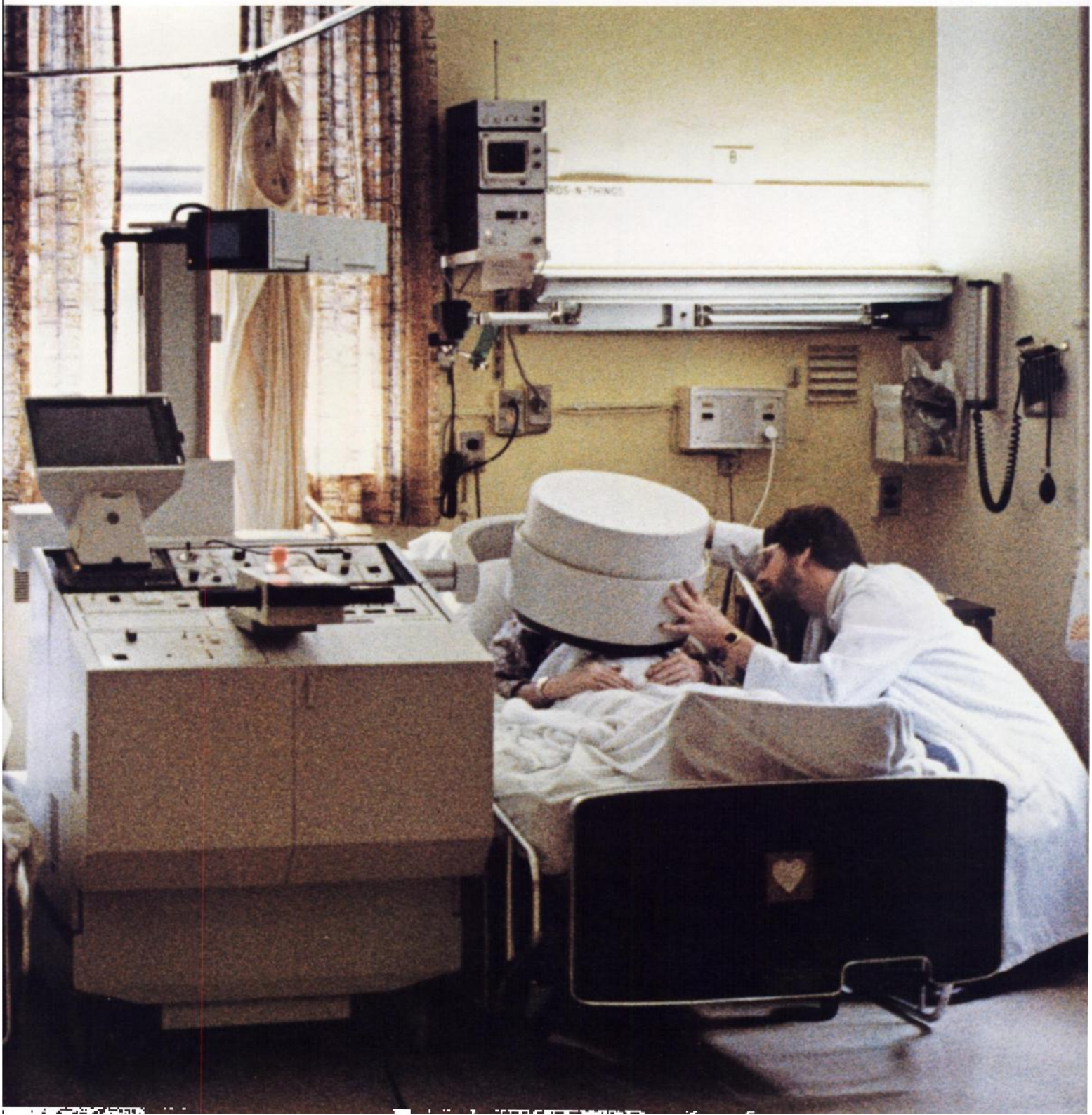

Radiopharmaceutical Quality Control System

Tc-99m Labelling Efficiency for only...$2495.00

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In combination with the Tectrol Quality Control Test Kit the Atomaster completes a comprehensive system for radiopharmaceutical quality assurance. The system produces fast, accurate, computerized analysis of radiopharmaceutical purity.

- Simple to use...all components are color-coded. (Spot a red-coded strip, develop in the red-coded solvent, press the red Atomaster button, etc.).
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- No need to cut strips...whole developed strips are placed in the external tray for scanning by the geiger detector.
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- Determines the percentage of hydrolyzed reduced Tc-99m.
- Determines the label/tag efficiency.

***TECTROL™ Quality Control Test Kit**
determines Tc-99m labelling efficiency in 30 SECONDS.

CONTENTS OF THE "TECTROL" TEST KIT
Only $42.50 complete (Cat. No. 151-110)

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From 10 km the earth is flat.
From 100 km the earth is round...
...at last.

TCK-15-S has the widest diagnostic spectrum...
at last.

Many hepatobiliary agents are fine for bilirubin levels up to 10 mg/100 ml. But only TCK-15-S allows diagnosis in icteric patients where the bilirubin level may be as high as 25 mg/100 ml.

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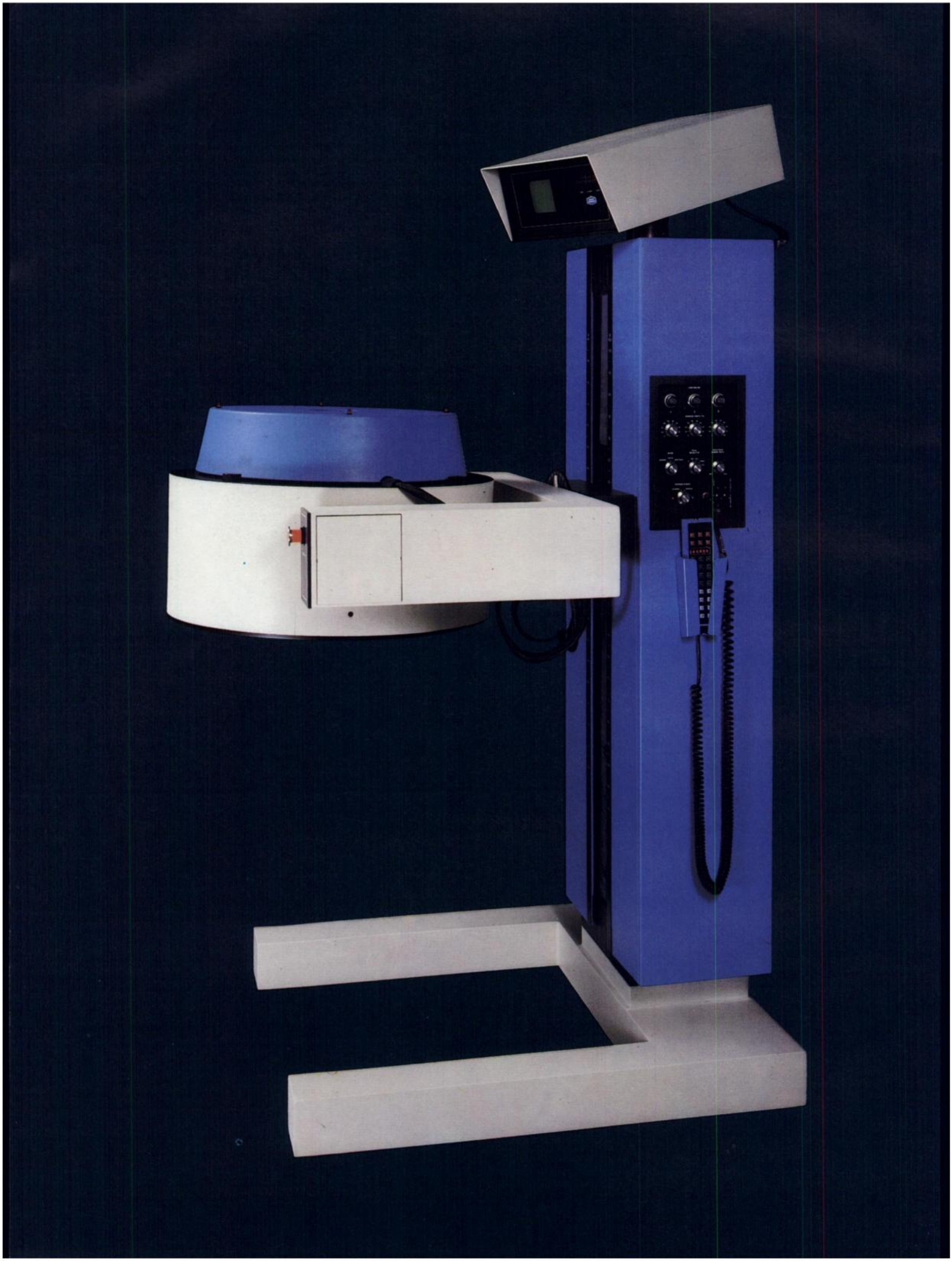

The UNION CARBIDE Large Field Gamma Camera... Stands Alone.

- The only true stand-alone gamma camera available anywhere; all essential controls are built in.
- Unique hand control replaces conventional operator console.
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- Built-in microprocessor-based uniformity correction provides flat-field uniformity to within ±4%.
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- Interfaces directly to commercially available computer systems or UNION CARBIDE Image Processor.
- Base specially designed to accommodate wheelchairs, hospital beds and stretchers.

Above – *The UNION CARBIDE Hand-held Console.*

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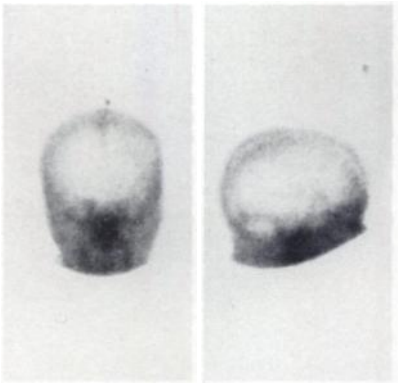
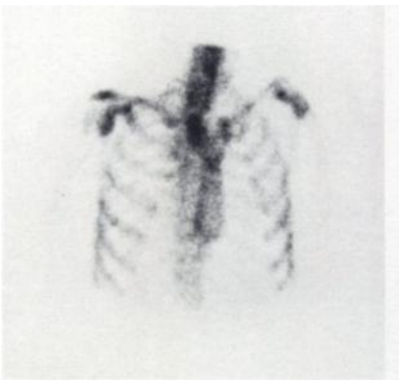
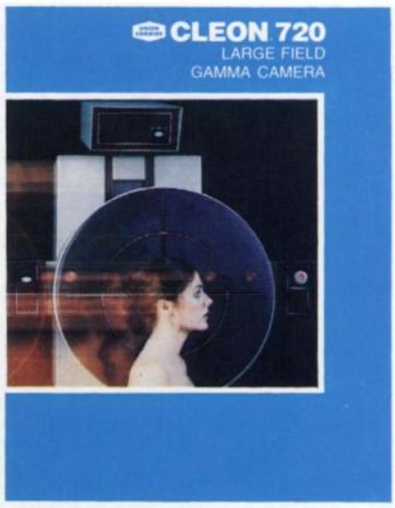


Top – *Subdural hematoma on left, seen in 76-year-old male with 20 mCi D.T.P.A.*

Bottom – *Anterior chest of a 76-year-old male with 15 mCi Tc^{99m} P.Y.P.; slight rotation gives a three dimensional effect.*





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Medical Products Division
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Within area 617, call 769-5400.
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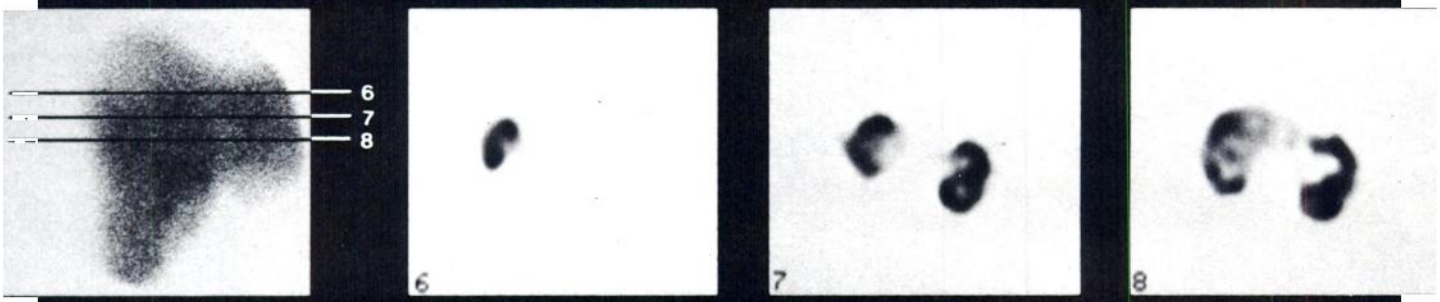
HEART — *55 year old male three years after massive myocardial infarction.*

Although patient is symptom-free, ECT demonstrates multiple areas of old infarcted myocardium.

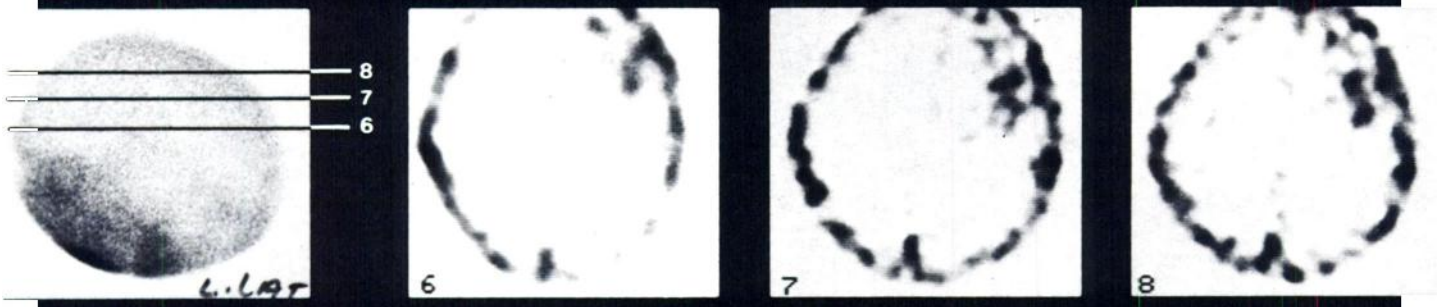


LIVER — *Gamma camera measures irregular shaped defects in the left and right lobes as well as marked hepatomegaly (female, 55).*

ECT scan reveals irregular areas of decreased activity in both liver lobes. A prominent splenic defect is apparent extending from the hilus.

LUNGS — *54 year old male with fibrotic lung disease; multiple abnormalities are noted in the perfusion study of both lung fields.*

ECT more precisely localizes the perfusion defects in the lower lung fields.



BRAIN — *Study shows decreased flow in the area of the middle cerebral artery of a 63 year old male.*

In the ECT, a focus of increased activity is seen more clearly in the left frontal parietal region, probably indicating cerebral infarction. (The TCT, with and without contrast media, was normal.)

The UNION CARBIDE Emission Tomographic Imagers . . . New Slices of Life.

The UNION CARBIDE Radionuclide Brain and Body Function Imagers are two powerful new tools for looking into life.

- These are the two most sensitive diagnostic instruments in nuclear medicine.
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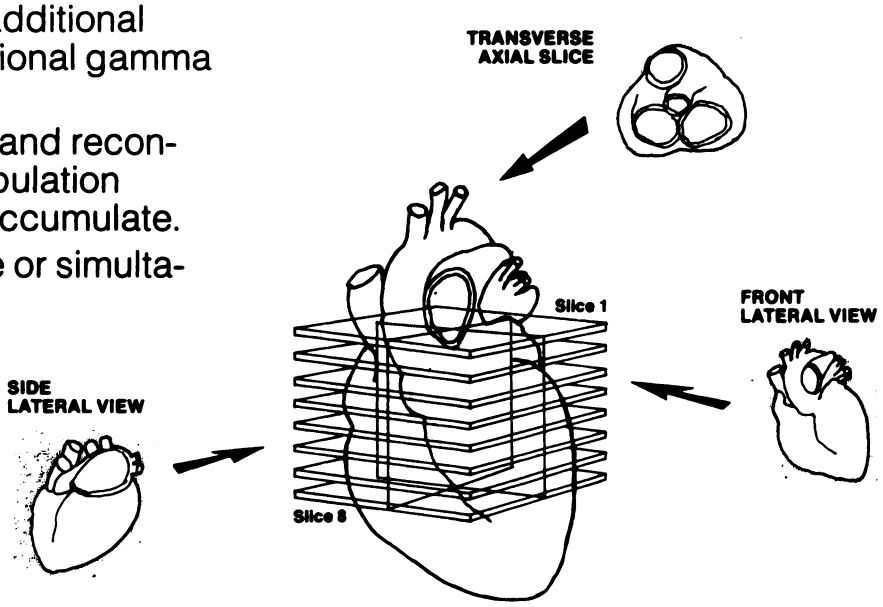
- Both use conventional single-photon radiopharmaceuticals and require no additional dose to that needed for a conventional gamma camera study.
- Slices are individually acquired and reconstructed, and are subject to manipulation and analysis while further slices accumulate.
- Operating modes include single or simultaneous dual radionuclide study.
- Image processing software provides zoom, quantitative measurement from an irregular region, addition and subtraction of slices, accumulation of slices, histogram plotting of activity through a slice, and lateral viewing of slice data.



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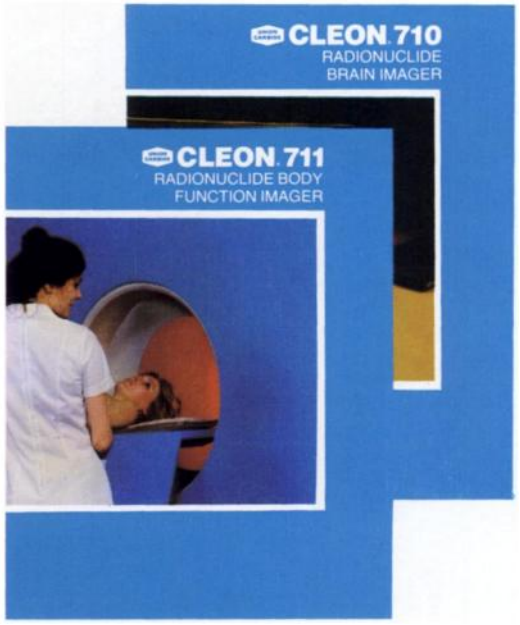

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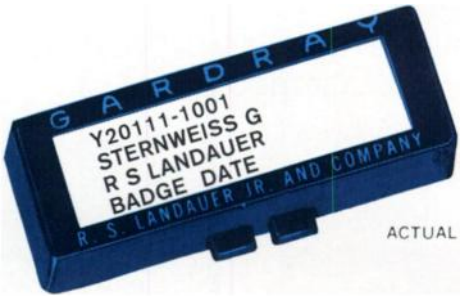
"Make the best available better!"



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Our people have always accepted the challenge and it's what makes us the leader.

We agree that all things considered the Landauer Gardray 8 film badge system is the best available personnel dosimeter. And, although we are always looking for the ultimate, we have continued to work hard and invest money and time to make it better.

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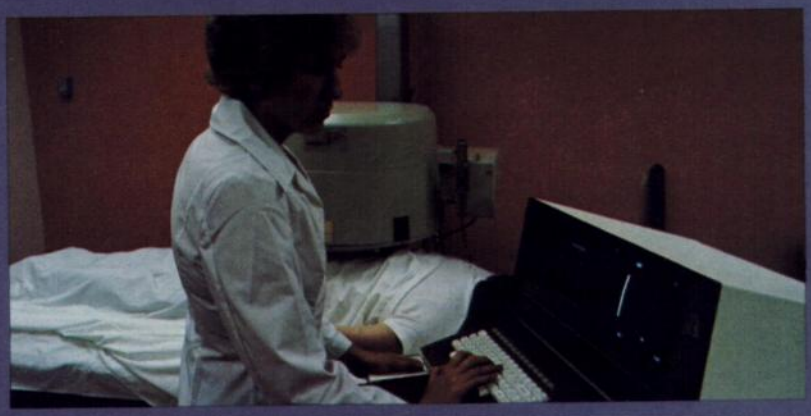

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The new A²* Single Terminal Systems contribute significant benefits to image processing and display, and a few surprises to our competition.

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You hardly need an instruction manual. Interactive menus guide you step by step — in English — through patient files, data acquisition, and image processing functions. And, it performs conveniently in your office, camera room, CCU, stress laboratory and conference room — either mobile or stationary.

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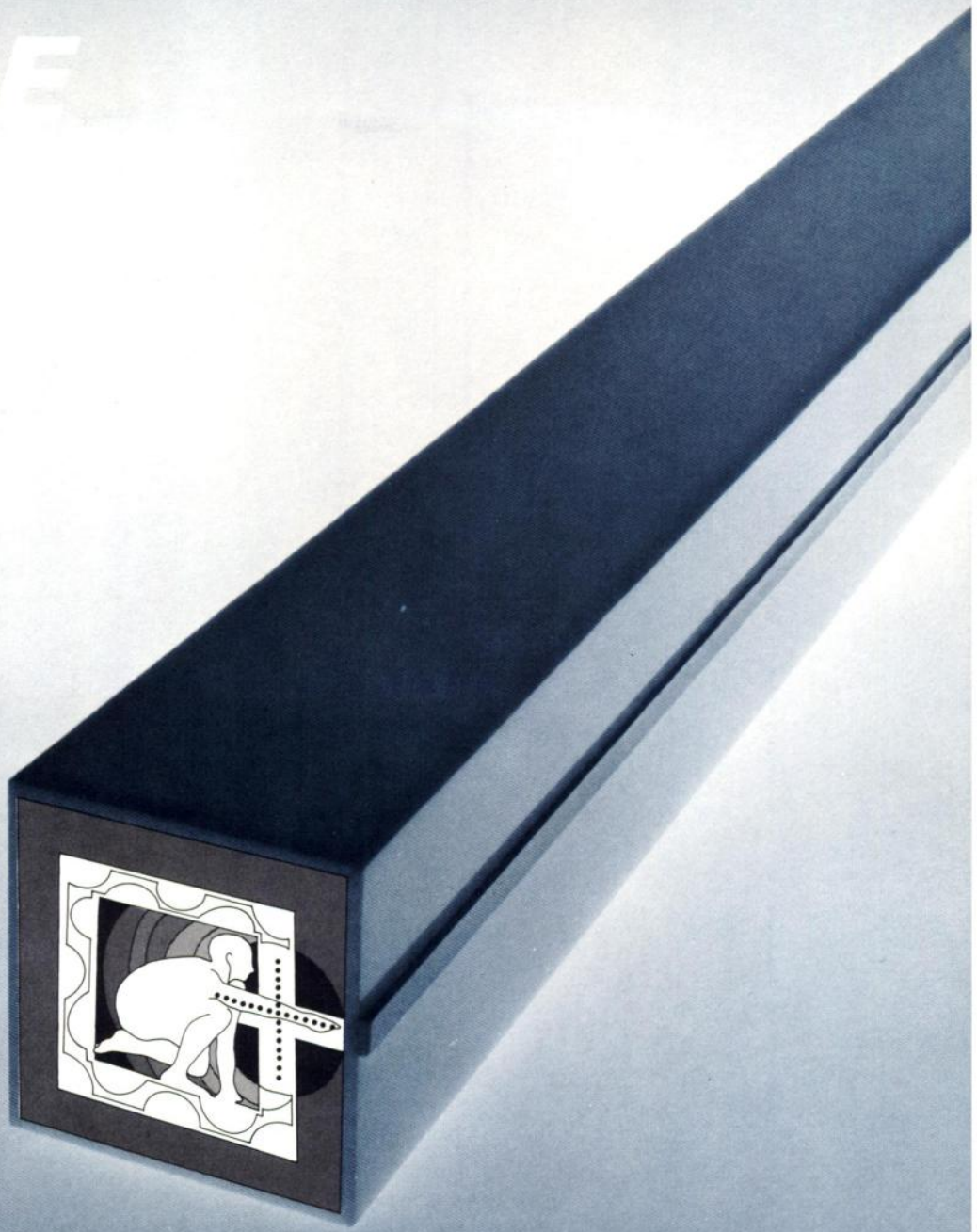

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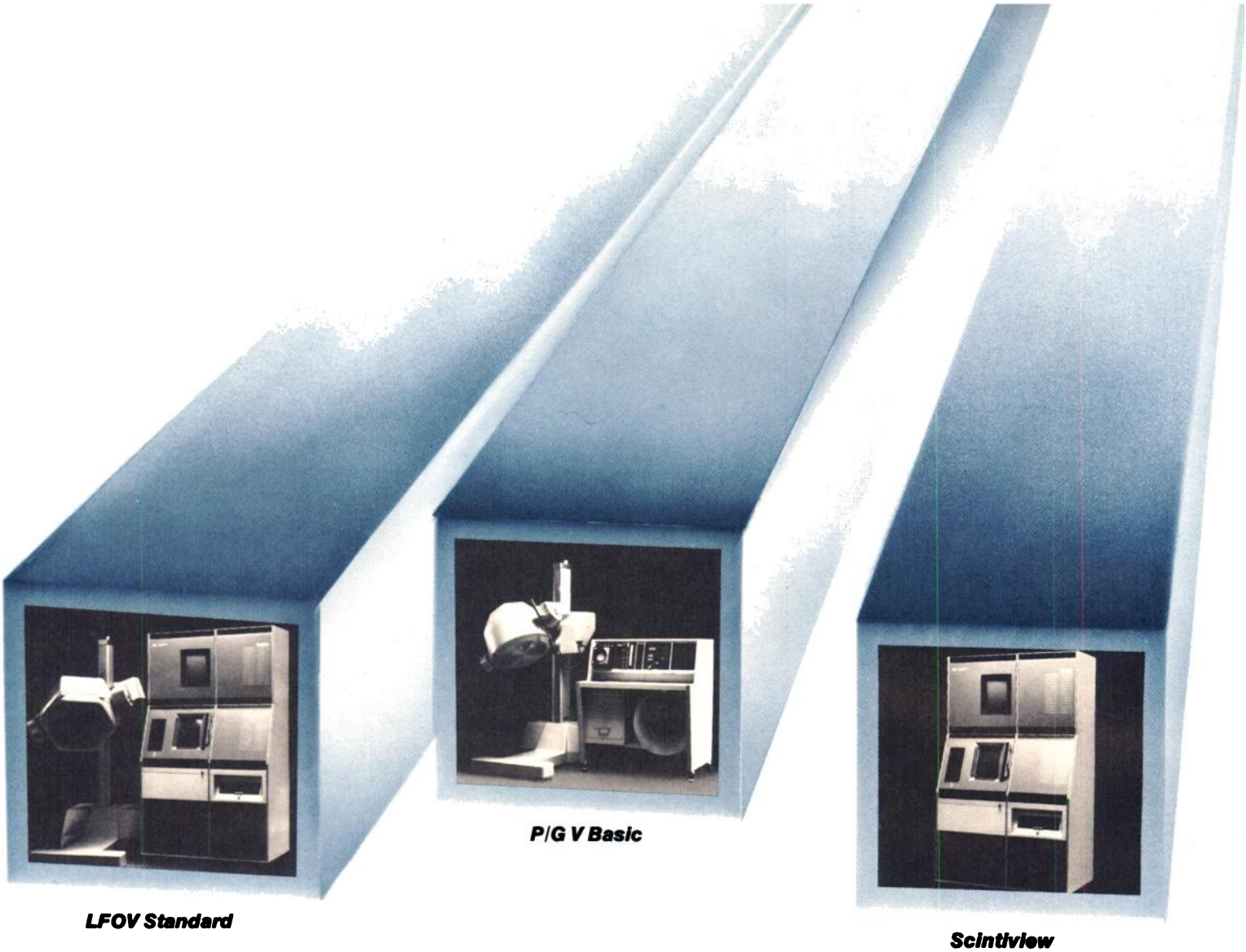

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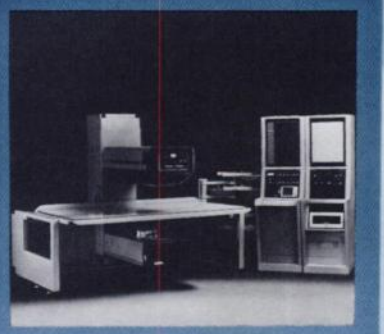

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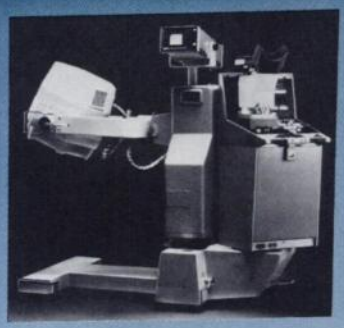

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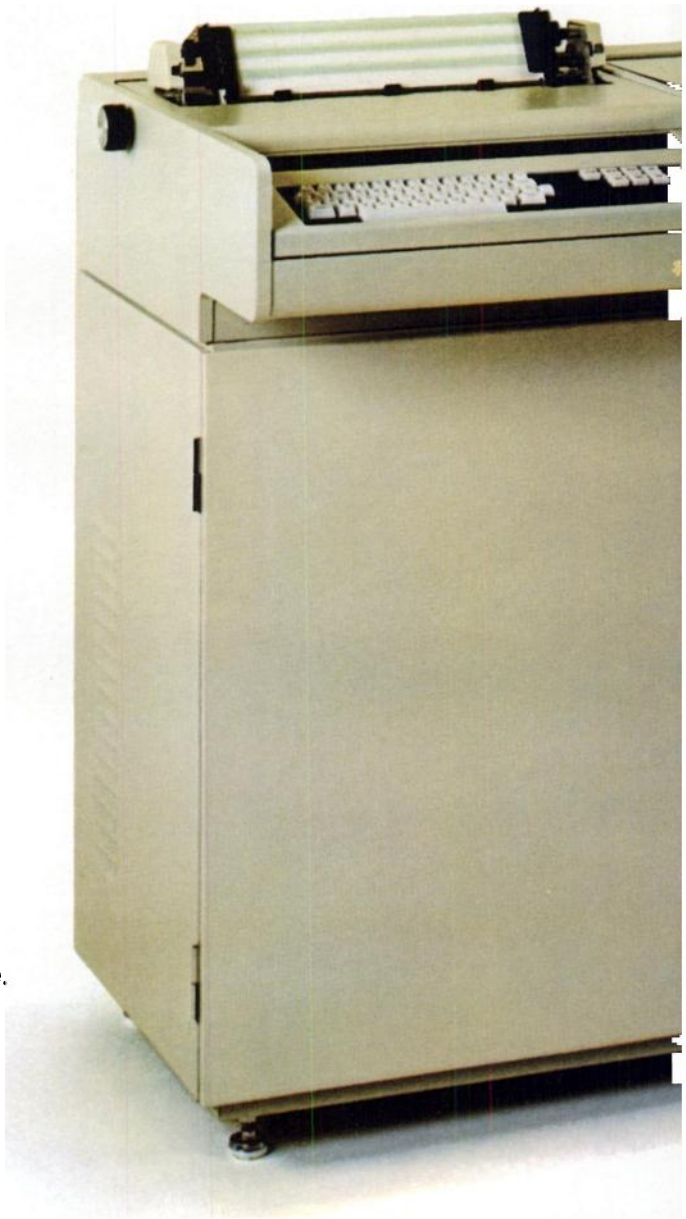
So automated it makes other RIA systems seem downright manual

1



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Gammaflo™ totally automates RIA

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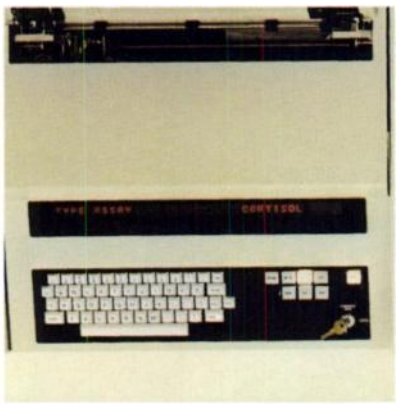

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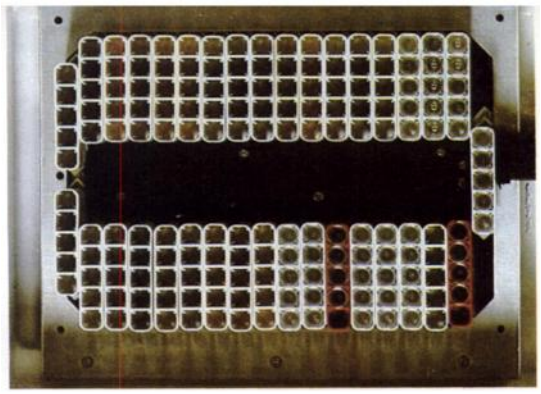

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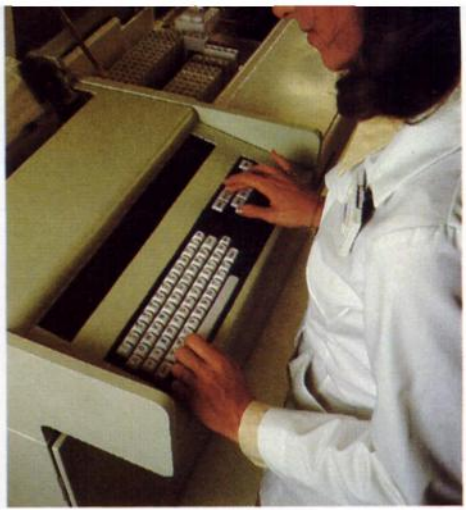

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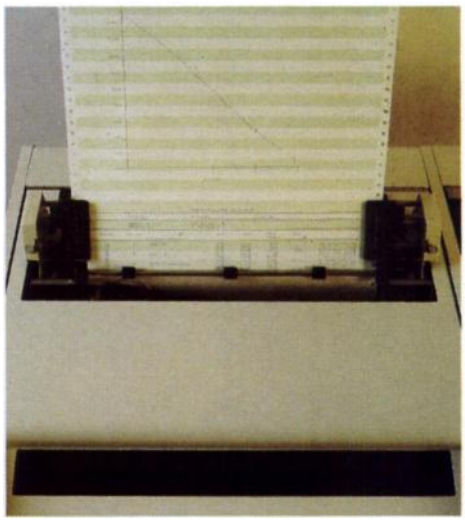

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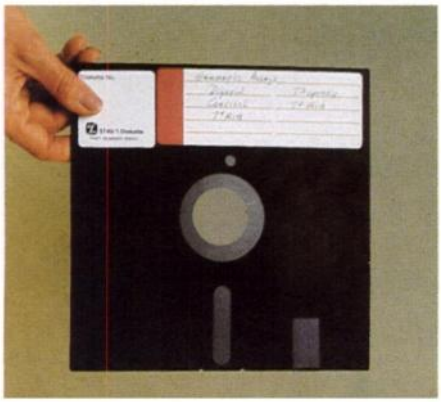

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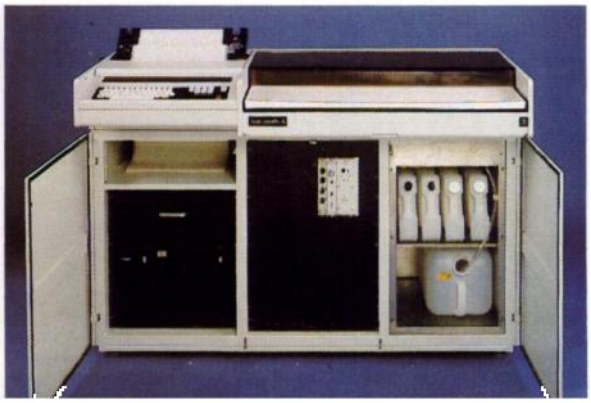

Now from the leader in nuclear medicine computer systems:

The ADAC Radiation Therapy Planning System.

This remarkable new system combines innovative ADAC technology and clinically-proven software by the Northwest Medical Physics Center—plus lower cost.

Only ADAC provides all these features:

- A complete software package developed by the Northwest Medical Physics Center for use in their treatment planning network of 26 hospitals —includes external beam, irregular field and brachytherapy calculations.
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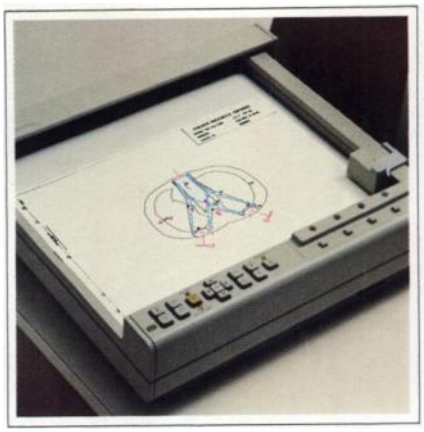

Exclusive 4-color plotter provides easy-to-read dose distributions.

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ADAC

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Small brown spheres number one for diagnosis.

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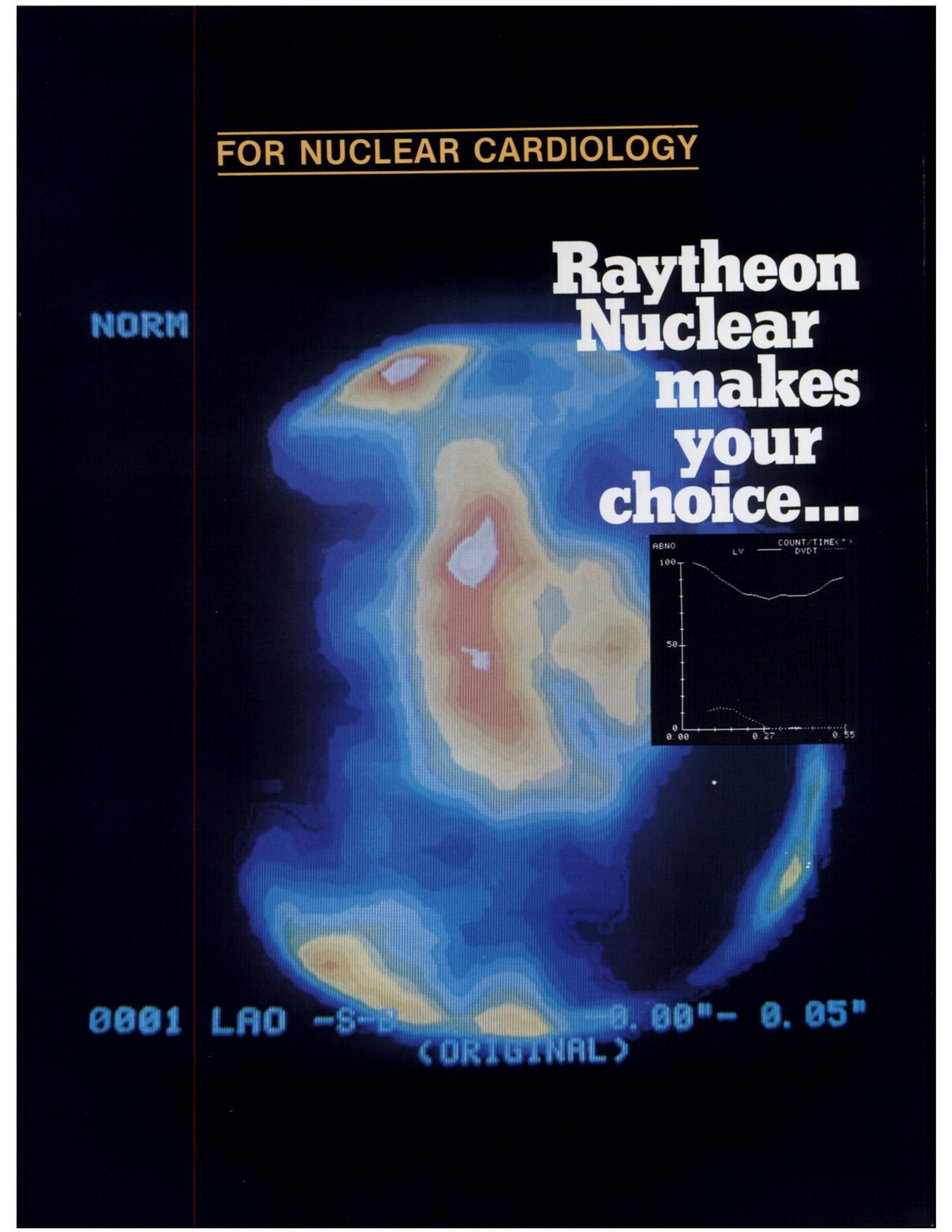

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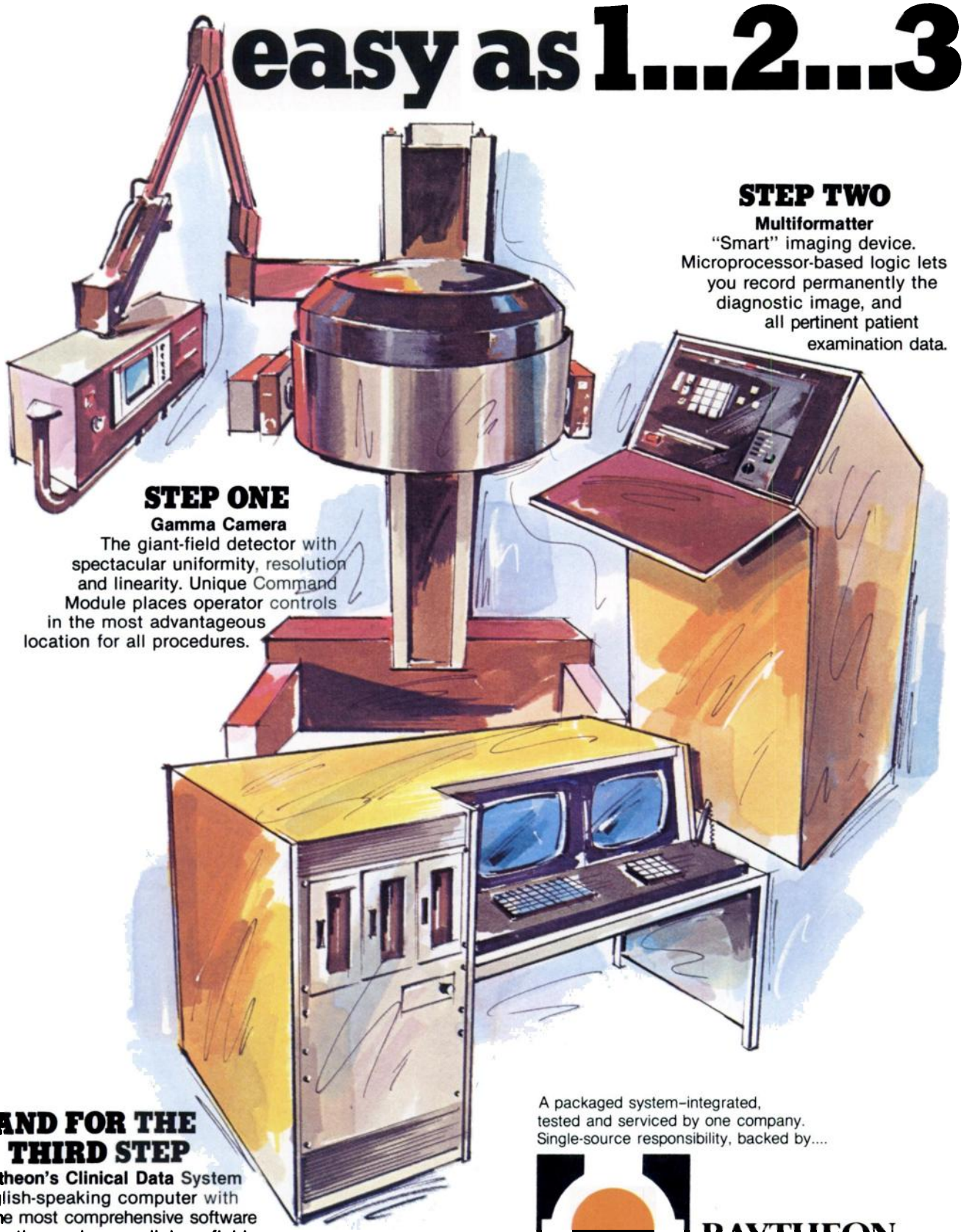

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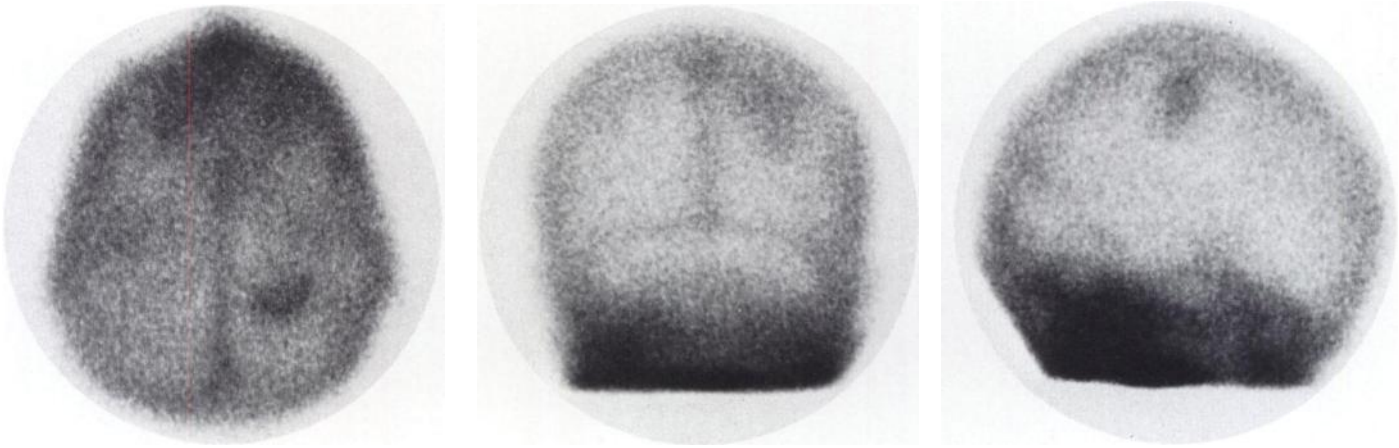

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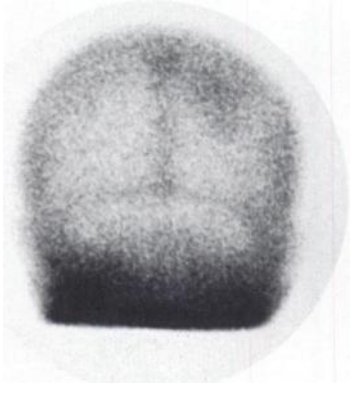
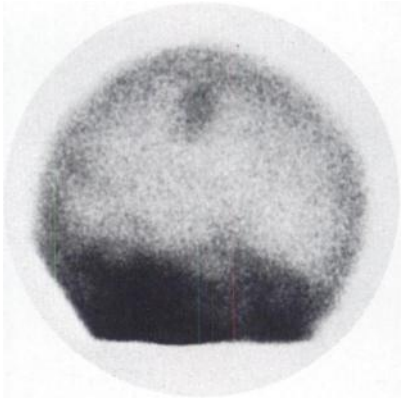
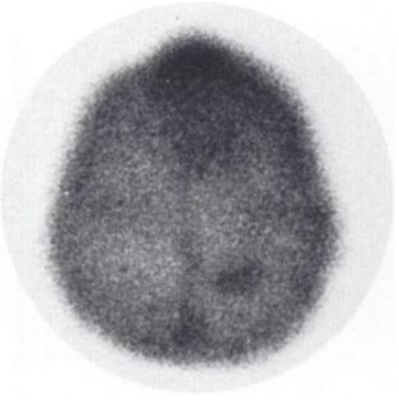


Posterior

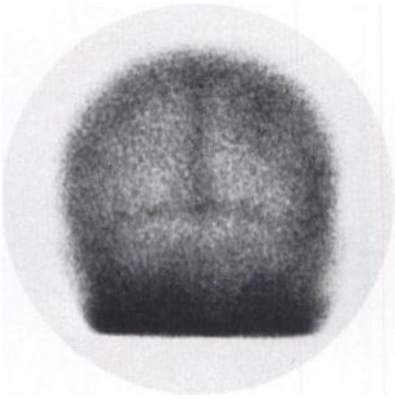


Right Lateral

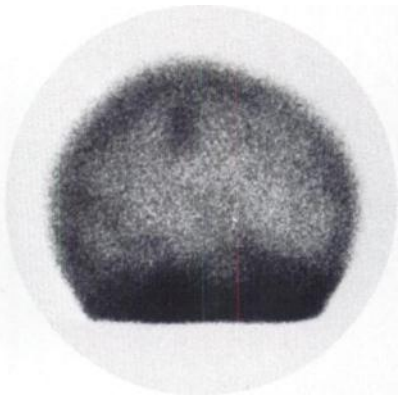
Sodium Pertechnetate



Vertex



Posterior



Right Lateral

A 67-year-old female patient was referred for a brain scan two weeks following bilateral carotid endarterectomy, shortly after onset of left-sided weakness and slurred speech. ^{99m}Tc gluceptate sodium images made two hours postinjection clearly demonstrate several areas of abnormally increased uptake in the right parietal and temporal regions, yielding the impression of multiple emboli. A repeat study with ^{99m}Tc sodium pertechnetate made five days later at three hours postinjection revealed the same lesions, although the lower target-to-background ratio of sodium pertechnetate clearly diminishes appreciation of abnormal areas.

lesion detection."[3]

Considered superior to sodium pertechnetate, DTPA

Published studies by Léveillé et al[1], Rollo et al[2] and Waxman et al[3] compared Technetium Tc 99m gluceptate sodium (glucoheptonate) to sodium pertechnetate and/or Technetium Tc 99m DTPA. Their findings:

24% higher target-to-background ratio

"The results of the computer background study for ^{99m}Tc GH versus $^{99m}TcO_4$ show an average calvaria/brain ratio of 2.1 and 1.6 for ^{99m}Tc GH and $^{99m}TcO_4$, respectively, at 90 minutes after injection." Rollo et al[2]

May detect lesions not seen with other agents

". . . ^{99m}Tc glucoheptonate concentrates in all lesions which accumulate $^{99m}TcO_4$ or ^{99m}Tc DTPA, and in certain cases, appears to localize lesions which do not concentrate other agents." Rollo et al[2]

When compared to pertechnetate . . . "Glucoheptonate offers a significant improvement in lesion detection (for both infarcts and tumors)." Waxman et al[3]

Optimal imaging at 90 minutes postinjection, without $KClO_4$

"^{99m}Tc glucoheptonate combines the absence of oral activity with the convenience of obtaining highly diagnostically accurate images at 90 minutes." Rollo et al[2]

1. Léveillé J et al: Technetium-99m glucoheptonate in brain-tumor detection: An important advance in radiotracer techniques. J Nucl Med 18 (10):957-961, 1977.
2. Rollo FD et al: Comparative evaluation of ^{99m}TC GH; $^{99m}TcO_4$; and ^{99m}Tc DTPA as brain imaging agents. Radiology 123:379-383, 1977.
3. Waxman AD et al: Technetium 99m glucoheptonate as a brain scanning agent: A critical comparison with pertechnetate. J Nucl Med 17 (5):345-8, 1975.

GLUCOSCAN™
Technetium Tc 99m Gluceptate Sodium Kit

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See following page for full prescribing information.

GLUCOSCAN

May 1978

Technetium Tc 99m Gluceptate Sodium Kit

FOR DIAGNOSTIC USE

DESCRIPTION: New England Nuclear's GLUCOSCAN™ Technetium Tc 99m Gluceptate Sodium Kit is supplied sterile and non-pyrogenic in lyophilized kit form suitable for reconstitution with sodium pertechnetate Tc 99m to form a diagnostic imaging agent for intravenous administration. Each vial contains 200mg gluceptate sodium, 0.07mg maximum tin and 0.06mg (min.) stannous chloride. Prior to lyophilization, hydrochloric acid and/or sodium hydroxide solution may be added to adjust the pH.

PHYSICAL CHARACTERISTICS

Technetium Tc 99m decays by isomeric transition with a physical half-life of 6.02 hours (SOURCE: Martin, M.J., Nuclear Data Project, ORNL, March, 1976). Photons that are useful for imaging studies are listed in Table 1.

Table 1. Principal Radiation Emission Data

Radiation	Mean %/ Disintegration	Mean Energy (keV)
Gamma-2	88.96	140.5

To facilitate correction for physical decay of Technetium Tc 99m, the fractions of initial activity that remain at selected intervals after the time of calibration are shown in Table 2.

Table 2. Technetium Tc 99m Physical Decay Chart; Half-Life 6.02 Hours

Hours	Fraction Remaining	Hours	Fraction Remaining
0°	1.000	5	.562
1	.891	6	.501
2	.794	7	.447
3	.708	8	.398
4	.631		

°Calibration Time

EXTERNAL RADIATION

The specific gamma ray constant for Technetium Tc 99m is 0.8R/mCi-hr at 1 cm. The first half-value thickness of lead (Pb) is 0.2mm. A range of values for the relative attenuation of the radiation emitted by this radionuclide that results from interposition of various thicknesses of lead is shown in Table 3. For example, the use of a 6.3mm thickness of lead will attenuate the radiation by a factor greater than 10^{-6}.

Table 3. Radiation Attenuation by Lead Shielding

Shield Thickness Lead (Pb) mm	Coefficient of Attenuation
0.2	0.5
0.95	10^{-1}
1.8	10^{-2}
2.7	10^{-3}
3.6	10^{-4}
4.5	10^{-5}
5.4	10^{-6}
6.3	10^{-7}

CLINICAL PHARMACOLOGY: Technetium Tc 99m Gluceptate Sodium has been shown by comparative renograms to concentrate in the kidney by both glomerular filtration and tubular secretion. Kinetic studies have shown that while some of the activity is rapidly cleared through the urine, the remainder is retained in the renal cortex. In humans, about 25% of the injected dose is excreted in the urine during the first hour post-injection. Within the same interval, blood activity rapidly clears to less than 2% of the injected dose.

Technetium Tc 99m Gluceptate Sodium has also been shown to localize in areas of intracranial pathology characterized by a disturbance in the blood brain barrier. The mechanism is probably non-specific since neoplasms, cerebrovascular accidents and extracerebral hematomas have all shown pronounced radionuclide uptake. Used in conjunction with dynamic flow studies, Technetium Tc 99m Gluceptate Sodium may detect vascular stenoses and arteriovenous malformations. There is no concentration of the agent by the salivary glands or the choroid plexus.

INDICATIONS AND USAGE: Technetium Tc 99m Gluceptate Sodium is used for brain imaging.

Technetium Tc 99m Gluceptate Sodium is indicated for renal perfusion imaging as an adjunct in the diagnosis, localization and evaluation of kidney disease. It may provide useful information about renal size, shape, and position and may delineate lesions affecting renal blood flow.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the GLUCOSCAN vial are intended only for use in the preparation of Technetium Tc 99m Gluceptate Sodium and are NOT to be directly administered to the patient.

Ideally examinations using radiopharmaceuticals—especially those elective in nature—of a woman of childbearing capability should be performed during the first ten days following the onset of the menses.

Dehydration and/or patient positioning may result in failure to visualize urinary excretory structures in the presence of normal function. Adequate patient fluid intake and repositioning may reduce the incidence of such false positive studies.

PRECAUTIONS: Technetium Tc 99m Gluceptate Sodium, as well as any radioactive agent, must be handled with care. Once sodium pertechnetate Tc 99m is added to the kit, appropriate safety measures should be used to minimize external radiation exposure to clinical personnel.

Care should also be taken to minimize radiation exposure to patients in a manner consistent with proper patient management.

The Technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m Gluceptate Sodium depends on the maintenance of tin in the divalent state. Any oxidant present in the sodium pertechnetate Tc 99m employed may adversely affect the quality of the prepared agent. Thus, sodium pertechnetate Tc 99m containing oxidants should not be used without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The use of bacteriostatic sodium chloride as a diluent for sodium pertechnetate Tc 99m may adversely affect the biologic distribution of the prepared agent, and its use is not recommended.

No long term animal studies have been performed to evaluate carcinogenic potential.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Gluceptate Sodium should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken when a patient is administered radioactive material.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: Although infrequent, erythema has been reported in association with the use of Technetium Tc 99m Gluceptate Sodium.

DOSAGE AND ADMINISTRATION: The recommended dose for the average (70kg) adult patient is 10-20 millicuries for both renal and brain imaging. Technetium Tc 99m Gluceptate Sodium is intended for intravenous administration only.

Technetium Tc 99m Gluceptate Sodium should be used within eight hours after aseptic reconstitution with sodium pertechnetate Tc 99m. For optimal results, this time should be minimized. The reaction vial contains no bacteriostat.

Optimal results for both renal and brain imaging are obtained one hour after administration. Studies have shown that although optimal target-to-background ratios for brain lesions are obtained at two hours post-injection, there is no improvement in diagnostic efficacy after one hour.

Radiopharmaceuticals should be used by persons with specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate governmental agencies authorized to license the use of radionuclides.

The components of the New England Nuclear GLUCOSCAN Kit are supplied sterile and non-pyrogenic. Aseptic procedures normally employed in making additions and withdrawals from sterile, non-pyrogenic containers should be used during addition of pertechnetate solution and the withdrawal of doses for patient administration.

RADIATION DOSIMETRY

The estimated radiation absorbed doses to an average adult patient (70kg) from an intravenous injection of a maximum dose of 20 millicuries of Technetium Tc 99m Gluceptate Sodium are shown in Table 4.

Table 4. Radiation Absorbed Doses

Tissue	Absorbed Dose Rads/20 millicuries
Kidneys	3.40
Liver	0.20
Bladder Wall	5.60
Ovaries	0.32
Testes	0.20
Whole Body	0.15

HOW SUPPLIED: NEN's GLUCOSCAN Technetium Tc 99m Gluceptate Sodium Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each vial contains in lyophilized form:

Gluceptate Sodium—200mg
Maximum Tin—0.07mg
Stannous Chloride (min.)—0.06mg

Prior to lyophilization the pH is adjusted with hydrochloric acid and/or sodium hydroxide solution. Store at room temperature (15°-30°C). Included in each five vial kit is one package insert and six radiation labels. Included in each thirty vial kit is one package insert and thirty-six radiation labels.

INSTRUCTIONS FOR PREPARATION OF TECHNETIUM Tc 99m GLUCEPTATE SODIUM KIT: Aseptically inject 3 to 7ml of sodium pertechnetate Tc 99m into the supplied vial of GLUCOSCAN after placing vial in a radiation shield. Swirl for several seconds to dissolve completely. Label shield appropriately. Use within eight hours of reconstitution.

Using proper shielding, the vial containing the reconstituted solution should be visually inspected to insure that it is clear and free of particulate matter.

The contents of the kit vials are not radioactive: however, after reconstitution with sodium pertechnetate Tc 99m the contents are radioactive and adequate shielding and handling precautions must be maintained.

This reagent kit is approved for use by persons licensed by the U.S. Nuclear Regulatory Commission pursuant to Section 35.14 and 35.100 Group III of 10 CFR or under equivalent licenses of Agreement States.

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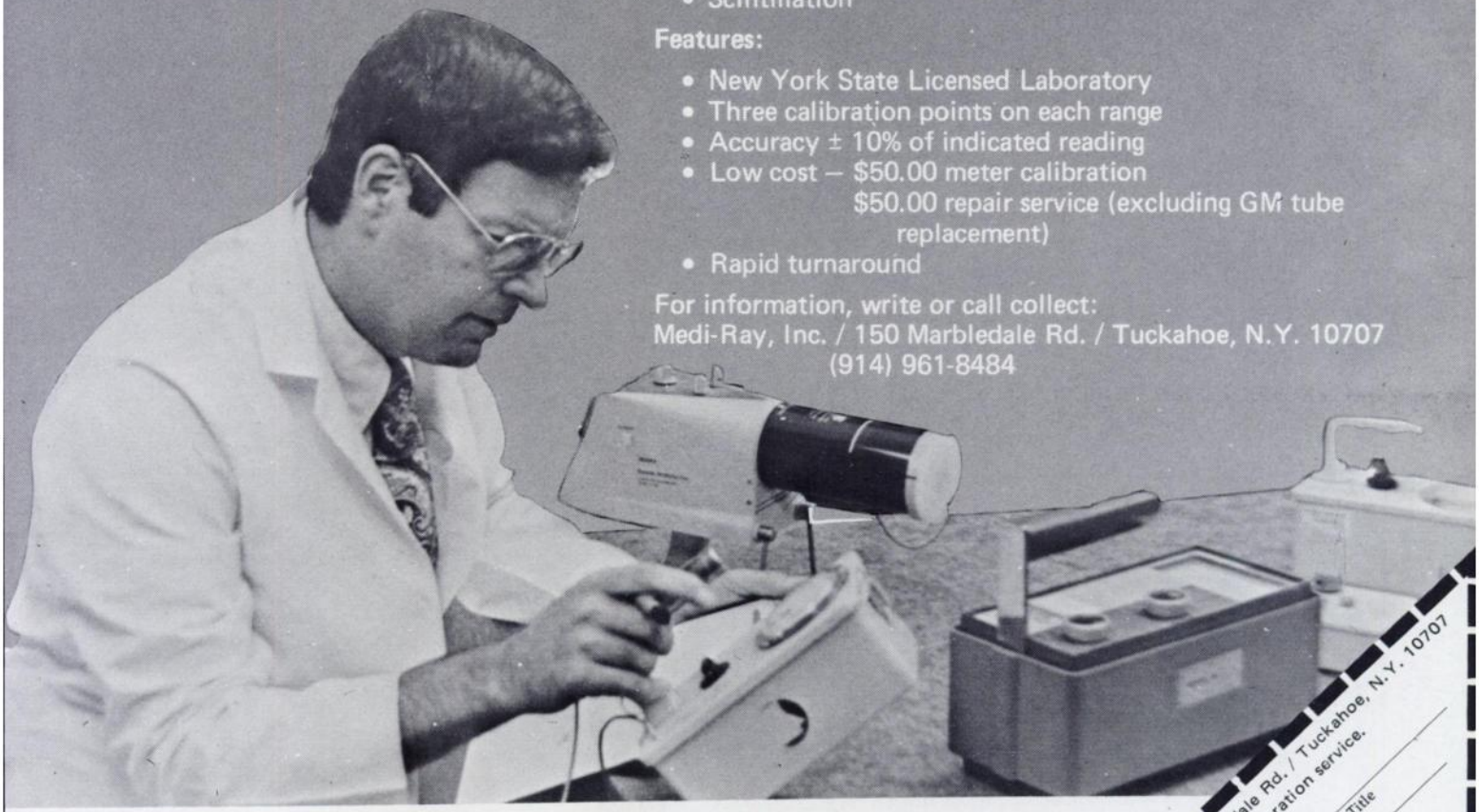

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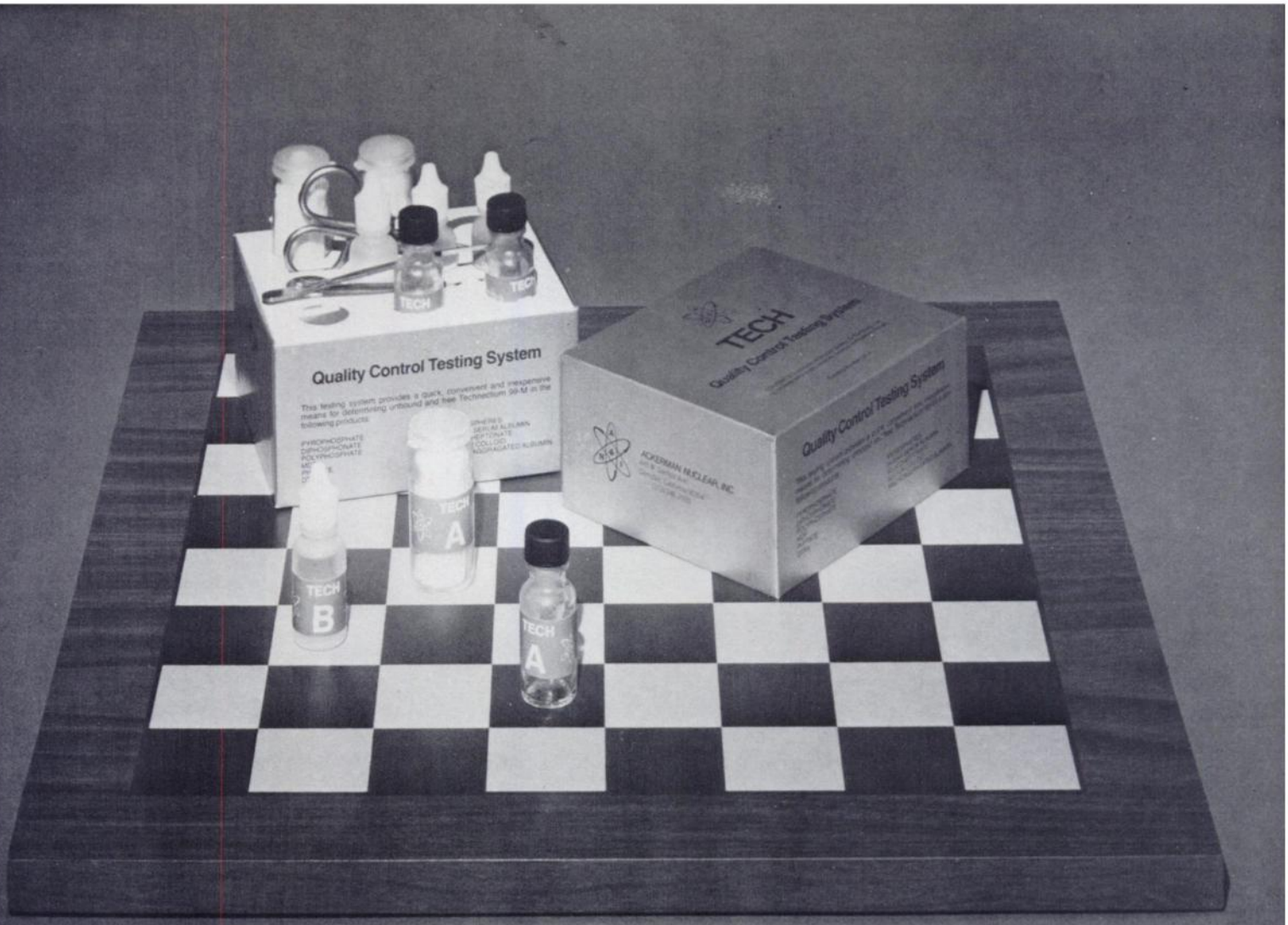

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For nearly a week, the water stood 41 inches deep in Womans Hospital. When it finally receded the following Thursday, Clover surveyed $1.5 million in damages. Among the few items of equipment appearing remotely salvageable, was the Radiology Department's two year old Dunn Instruments Model 600 multi-image camera. Although it had been totally submerged for several days, the administrator decided to have it returned to the factory for evaluation.

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Brief summary of Package Insert. Before using, please consult the full Package Insert included in each kit.

Description: Each vial of OSTEOSCAN contains 5.9 mg etidronate disodium, 0.16 mg stannous chloride and 0.56 mg sodium ascorbate as active ingredients. Upon addition of ADDITIVE-FREE sodium pertechnetate Tc99m the etidronate disodium and stannous chloride combine with Tc99m to form a stable soluble complex.

Clinical pharmacology: When injected intravenously, Tc99m-labeled OSTEOSCAN has a specific affinity for areas of altered osteogenesis. Areas of bone which are undergoing neoplastic invasion often have an unusually high turnover rate which may be imaged with Tc99m-labeled OSTEOSCAN. Three hours after intravenous injection of Tc99m-labeled OSTEOSCAN, an estimated 40-50% of the injected dose has been taken up by the skeleton. At this time approximately 50% has been excreted in the urine and 6% remains in the blood. A small amount is retained by the soft tissue. The level of Tc99m-labeled OSTEOSCAN excreted in the feces is below the level detectable by routine laboratory techniques. Tc99m-labeled OSTEOSCAN is also taken up in areas of necrosis and severely injured myocardial cells. Approximately 1.5 hours following intravenous injection 0.01-0.02 percent of the administered dose per gram of tissue is taken up by an acutely infarcted myocardium.

Indications: OSTEOSCAN is a skeletal imaging agent used to demonstrate areas of altered osteogenesis and a cardiac imaging agent used as an adjunct in the diagnosis of acute myocardial infarction. When used as an adjunct in the diagnosis of myocardial infarction the incidence of false negatives has been found to be approximately 14% and false positives about 16%. False negatives may result from failure to observe temporal requirements for good myocardial imaging; false positives may be related to coronary heart disease, left ventricular aneurysms, trauma, repeated cardioversion following coronary by-pass surgery or old myocardial infarcts.

Contraindications: None known.

Warnings: This radiopharmaceutical should not be administered to patients who are pregnant or lactating unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses. The technetium used to tag the product should be routinely tested for molybdenum and aluminum; if an unacceptable level of either is found, the technetium should not be used. Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

Precautions: As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers. Bone Imaging: Both prior to and following Tc99m-labeled OSTEOSCAN administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the Tc99m-labeled OSTEOSCAN injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation. Cardiac Imaging: Patient's cardiac condition should be stable before beginning the cardiac imaging procedure. If not contraindicated by the cardiac status, patients should be encouraged to ingest fluids and to void frequently in order to reduce unnecessary radiation exposure. Interference from chest wall lesions such as breast tumors and healing rib fractures can be minimized by employing the three recommended projections.

Adverse reactions: None known.

Dosage and administration: The recommended adult dose of Tc99m-labeled OSTEOSCAN is 10-15 mCi. The activity of each dose should be measured by a suitable radiation calibration system just prior to administration. The dose should be given intravenously by slow injection. For optimal results bone imaging should be done 2-4 hours post injection and cardiac imaging 1-1½ hours post injection. The acute myocardial infarct can be visualized from 1-9 days following onset of symptoms with maximum uptake at 2-3 days. It is recommended that three projections of the heart be made (anterior, left anterior oblique and left lateral).

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References:
1. Fogelman, I. et al: J. Nucl. Med. 20:98, 1979.
2. Khedkar, N. et al: Presented at the 1978 Annual Meeting, SNM, Southeastern chapter.
3. Arnold, J. S.: Kinetic Analysis of Bone Imaging Agents, Proceedings of First International Symposium on Radiopharmacology, Innsbruck, Austria, 1978 (to be published).

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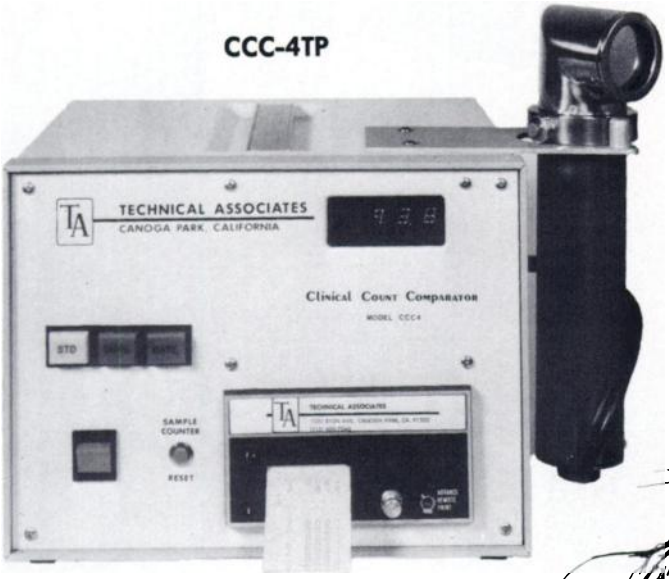

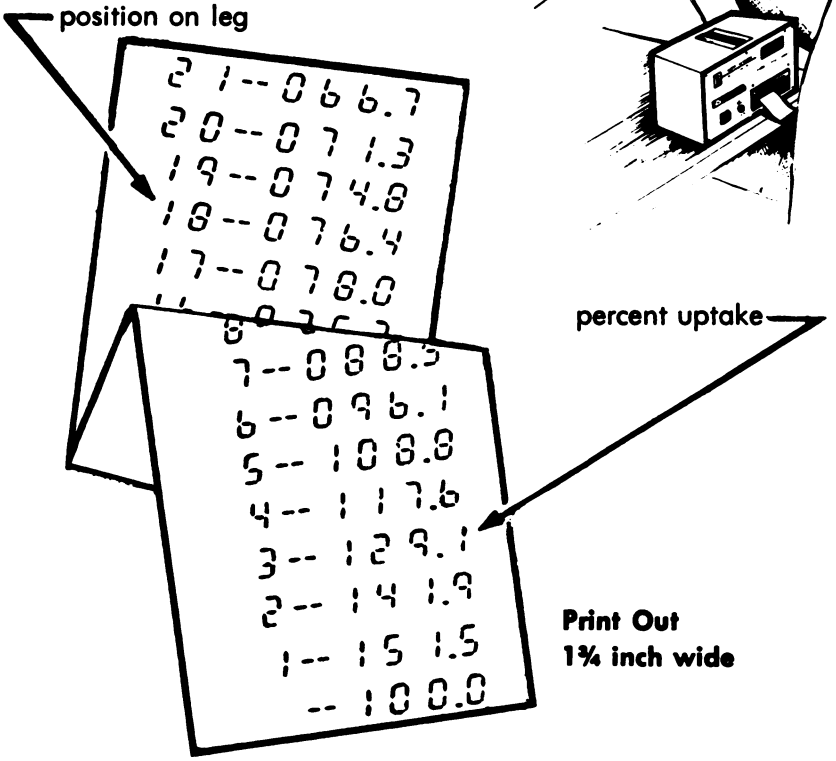

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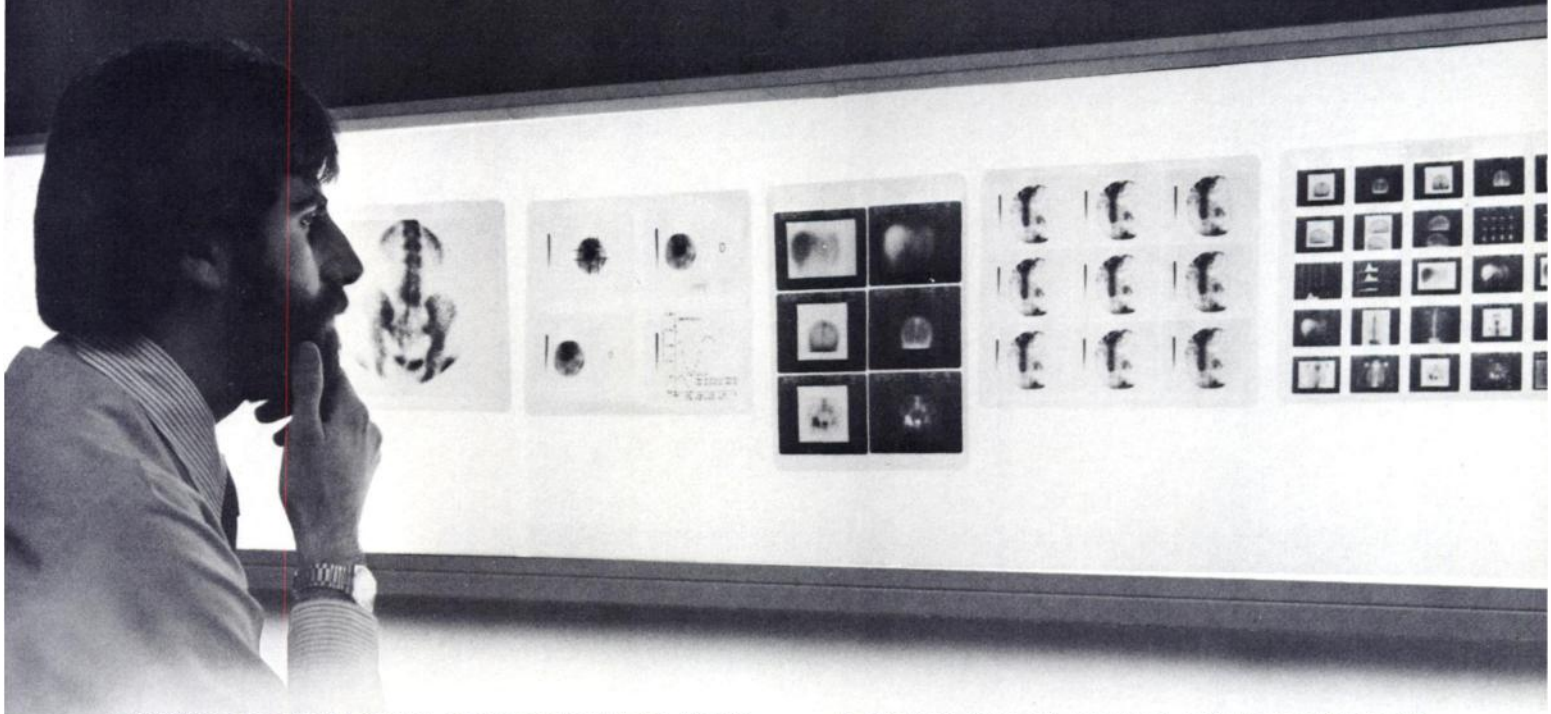

Everything medical imaging cameras should do, that is. Effortlessly. Automatically. Excellently, in over 1,000 new installations a year. Matrix video cameras embody the latest in video, optical and microprocessor technology. They handle the relatively diverse demands of ultrasound and nuclear computers as well as the special, high line rate requirements of CT or fluoroscopy reproduction. They give you quality images, from which you can diagnose confidently.

The video cameras that do everything are *the only ones which automatically adjust exposure time*. Other camera systems make you do it manually. We think you have enough to do. Matrix cameras have a photometer which measures a calibration pattern. ***Before each exposure***, it reads light levels, compares them with optimum values and adjusts accordingly. Automatically. All in a quarter of a second. You can be confident the scans you do at the end of the day will have the same gray scale content as the ones you do at the beginning of the day.

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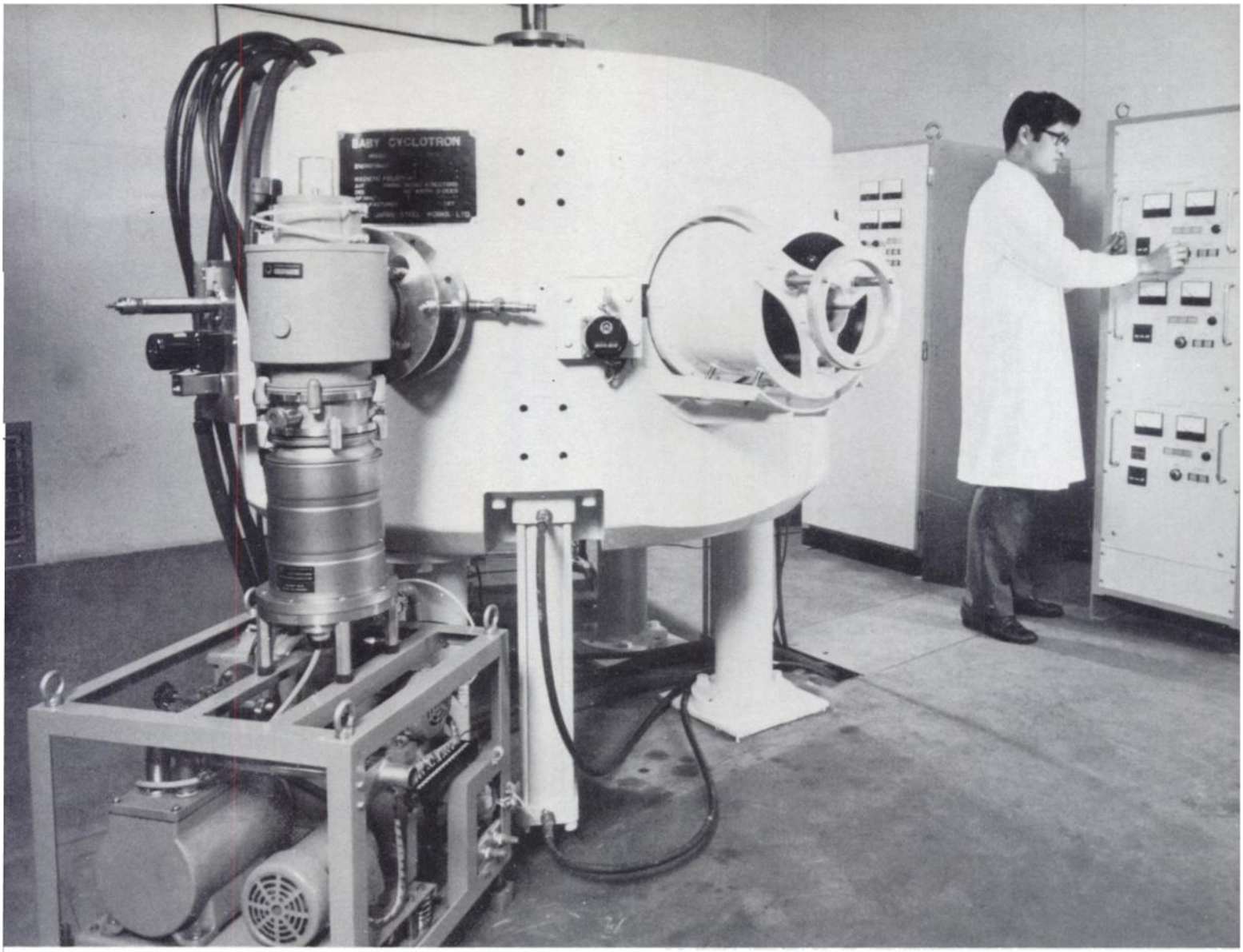

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The JSW Mini Cyclotron from Atomic Energy of Canada Limited dramatically expands the capabilities of diagnostic nuclear medicine. A radical departure from traditional accelerator technology, it is the first cyclotron available dedicated to the clinical environment, offering hospitals and research institutions a variety of immediate advantages. Its role significance is especially evident when viewed in the light of recent major developments in new imaging systems – specifically, positron emission cameras such as AECL's Therascan 3128. The Mini Cyclotron allows these new physiological tomography systems to achieve full operation potential by making the crucial, short half-life radioisotopes ^{11}C, ^{13}N, ^{15}O, and ^{18}F immediately available within the nuclear medicine department.

Compact, the Mini Cyclotron can be installed in an area of only 20 square meters. Economic, it features both proton and deuteron acceleration, eliminating the need for expensive, enriched target gases. Safe, simple, reliable, little training is required for its operation, while an innovative two-part design ensures swift, easy servicing. Nuclear medicine comes of age with the JSW Mini Cyclotron. And it's available now! For complete information, contact AECL.

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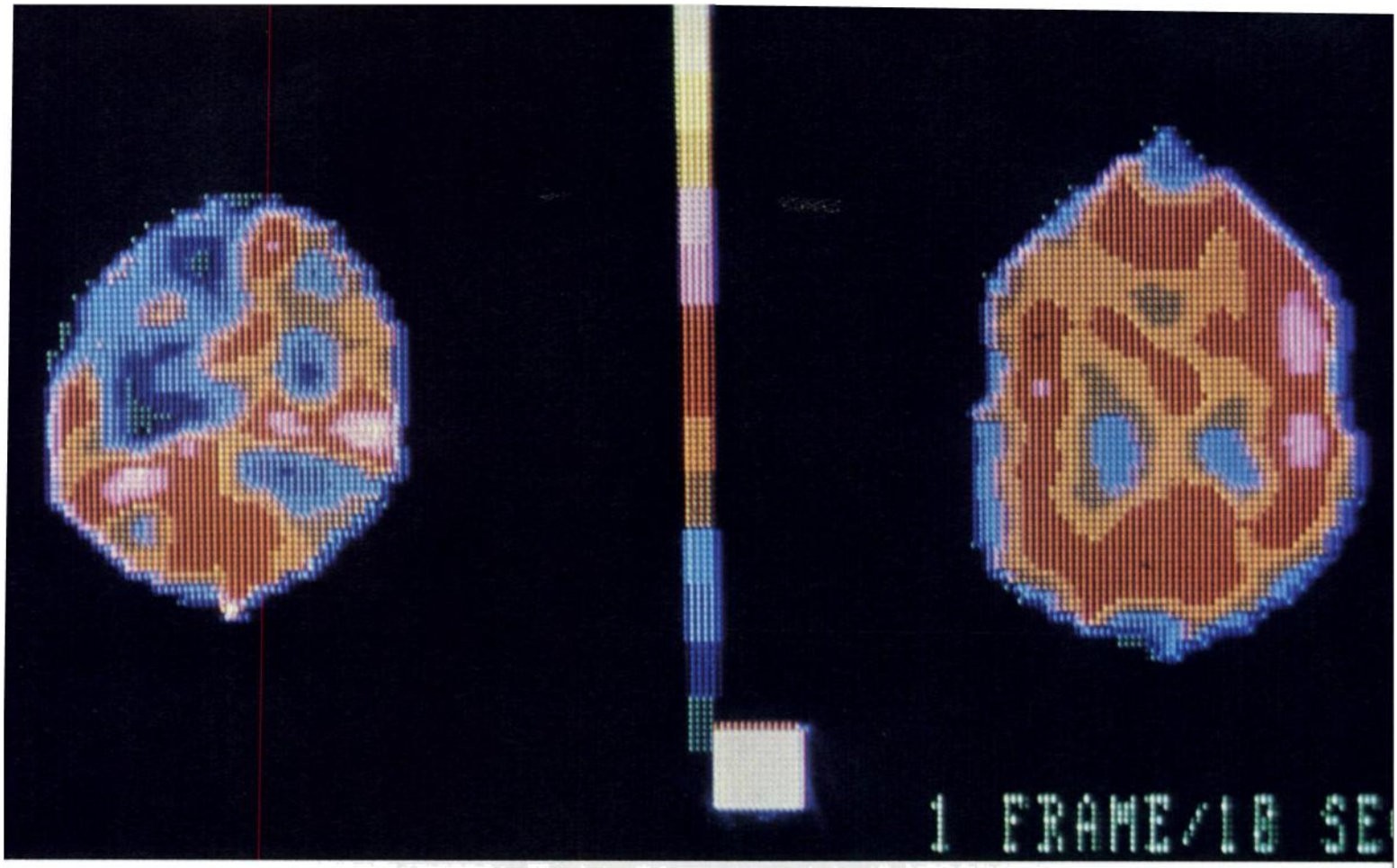
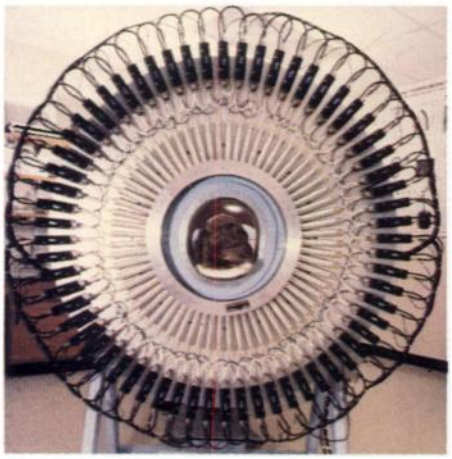


High speed, high resolution, high efficiency.
Therascan 3128 Positron Emission Tomograph from AECL.



Therascan 3128 from Atomic Energy of Canada Limited is the first bismuth germanate ring system in routine clinical use for both outpatient and inpatient studies. A state-of-the-art emission tomograph, it establishes new frontiers in neurological diagnosis and research investigations. Versatile and simple to operate, requiring little computer expertise, the Therascan 3128 method provides a safe, rapid, three-dimensional measurement of brain blood flow as well as biochemical mapping of the brain. Its role is especially significant for patients suffering from strokes, epilepsy, brain tumour, dementia, or other metabolic disorder.

The clinical example shown above demonstrates the unique ability of Therascan to perform dynamic studies of regional cerebral blood flow for diagnosis and treatment evaluation. Pictured is a comparison of pre-op and post-op rCBF studies. The patient had experienced dysphasia with mild paralysis in the right extremities. Clinical signs indicated ischemia in the left fronto-parietal area. An angiogram showed complete occlusion of the left internal carotid artery and a 30% stenosis of the right internal carotid artery, while a CT scan showed no abnormality. However, Therascan 3128, using the isotope ^{77}Kr, showed a marked reduction of cerebral blood flow in a large portion of the left fronto-central area, the right parietal area, and the right anterior frontal area. The patient subsequently underwent extra-intracranial arterial anastomosis (bypass surgery), and the general improvement at the three month follow-up is shown very clearly in the scan on the right.

The extraordinary efficiency of the detector array allows Therascan to image three slices simultaneously in as little as one second, creating many new possibilities for investigations of rapidly changing phenomena. Therascan achieves superior quality scans for both dynamic and static studies, using generator produced isotopes like ^{68}Ga, and the shortlived isotopes ^{11}C, ^{13}N, ^{15}O and ^{18}F, as produced by the JSW Mini Cyclotron (also from AECL.)

Therascan 3128 is truly a radical departure, a major advance, in nuclear medicine. To discover its exceptional versatility and unparalleled detection efficiency firsthand, contact AECL.

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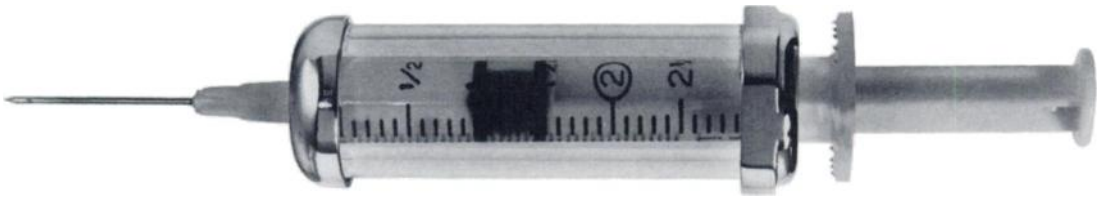

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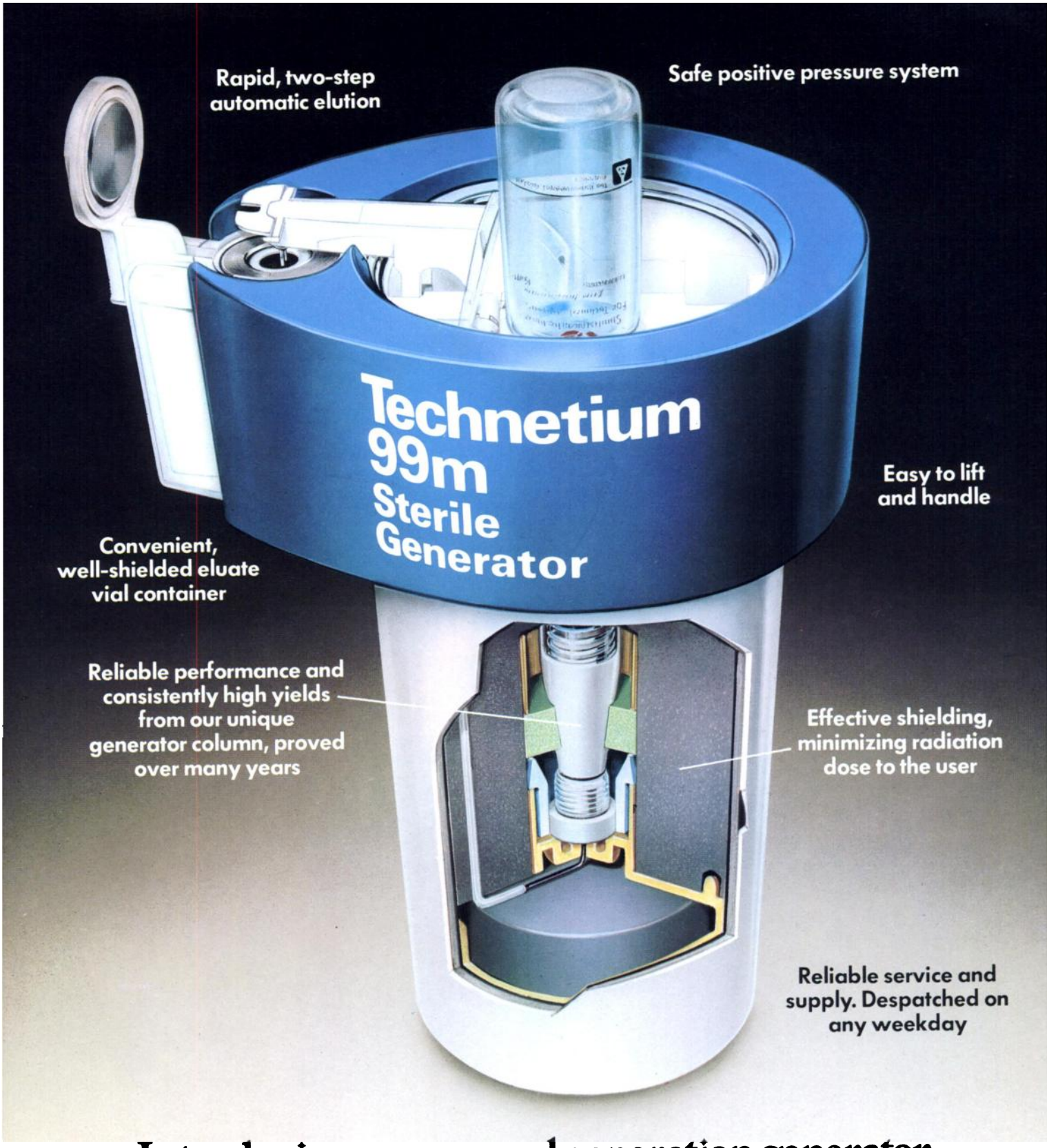

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*IEEE Transactions on Nuclear Science, Volume NS-25 No. 1, February 1978.

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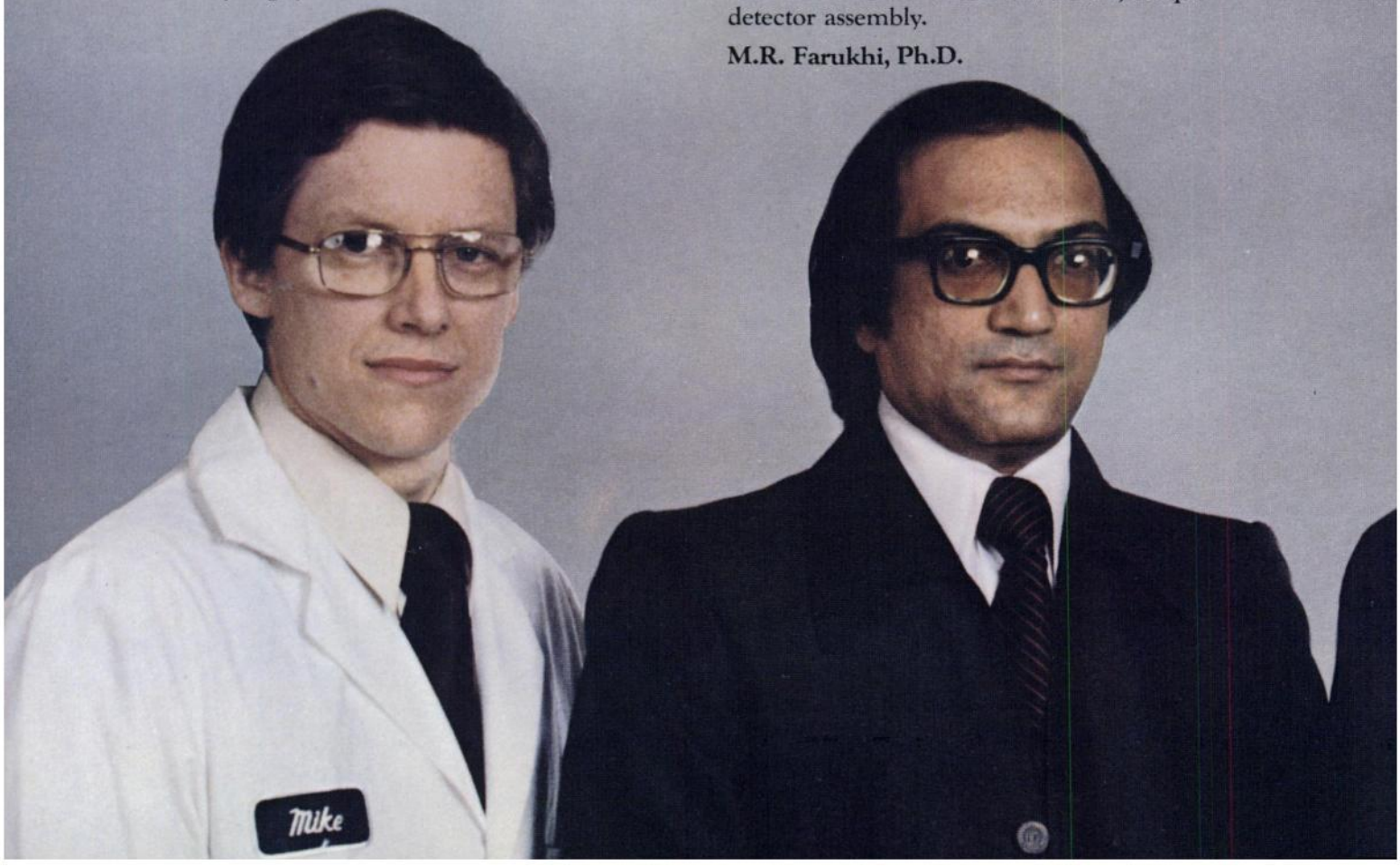
M.R. Farukhi, Ph.D.



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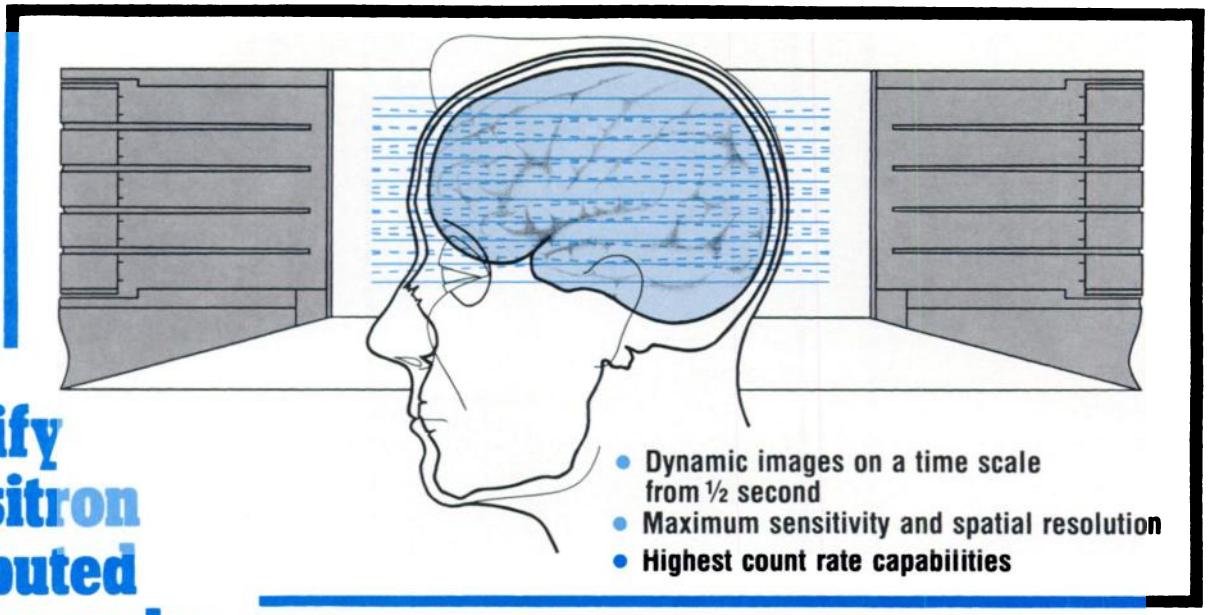

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Until recently, the intact human cardiovascular and central nervous systems were not accessible to research scientists for precise quantitative study. The lack of adequate technology to measure "in-vivo" perfusion and metabolism has severely limited the study of these and other dynamic systems. With the introduction of *Multi-slice Positron Tomography* by The Cyclotron Corporation of Berkeley, California, technology in this currently evolving field of research takes a big step forward.

Multi-slice Positron Tomography

Cyclotron's unique Positron Tomograph System represents a promising research tool for non-invasive evaluation of human cerebral and cardiovascular function: Short-lived, positron emitting isotopes (e.g., O^{15}, C^{11}, F^{18}, N^{13}) incorporated into metabolically-active compounds provide a safe "in-vivo" method for monitoring dynamic processes such as perfusion, flow, and metabolism in the human body.

A system to fit the application

One major area of concern among researchers has been finding adequate instrumentation to fulfill particular, and perhaps unique, requirements. Instrumentation requirements are dictated by the research application—any tradeoff between sensitivity, resolution, count rate capability and field of view must be carefully weighed in relation to the application at hand. Accordingly, The Cyclotron Corporation has developed its Multi-slice Positron Tomograph systems in varying configurations to fill a growing number of critical needs. Consider, for example, the Model 4600 (one of the three possible systems indicated in the chart below) in which high resolution and count rate capabilities are paramount system parameters. The Cyclotron Corporation welcomes the opportunity to discuss the research physician's unique interests and to configure a system to meet exacting requirements.

Model Number	Application	Number of Simultaneous Image Planes	Geometric Resolution (x, y, z) (mm FWHM)	Average Sensitivity Per Image Plane*	Maximum Useable System Count Rate**
4500	Body	7	10.0	16000	10^6
4600	Neuro	9	8.5	29000	5×10^5
4650	Neuro	7	5.5	16000	3.8×10^5

*Sensitivity expressed as counts/sec per $\mu Ci/cm^3$ for activity uniformly dispersed in 20 cm diameter, water-filled vessel.

**Defined as the "Trues" rate (counts/sec) at which true counts and random counts are equally abundant in the raw data prior to correction and image reconstruction. Tests conducted with 20 cm diameter water-filled phantom extending well beyond detector shield.

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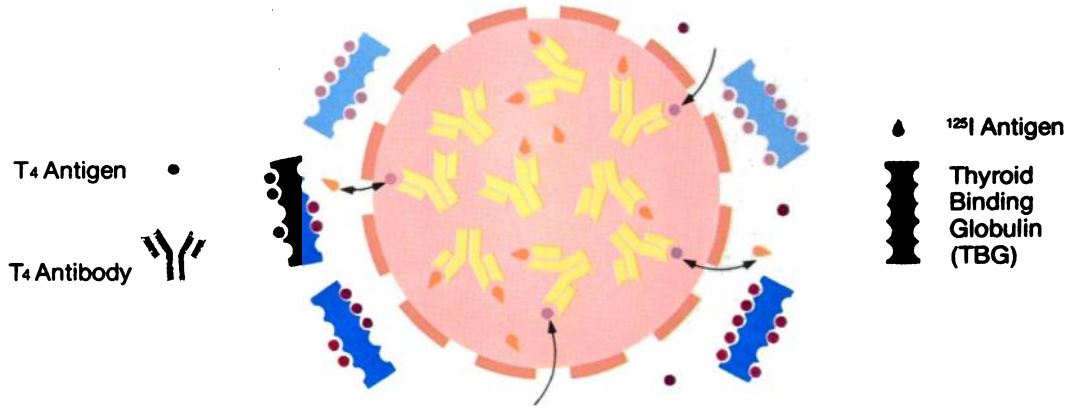

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The Damon Diagnostics LiquiSol™ Free T_4 ^{125}I RIA Test System is the first to combine the benefits of liquid and solid phase technology in a single tube radioimmunoassay procedure. Precise amounts of anti-T_4 specific antibody in solution are encapsulated within a semi-permeable nylon membrane. Constant amounts of ^{125}I-T_4 is pre-bound in each test. Hundreds of thousands of microcapsules per test produce the following results:

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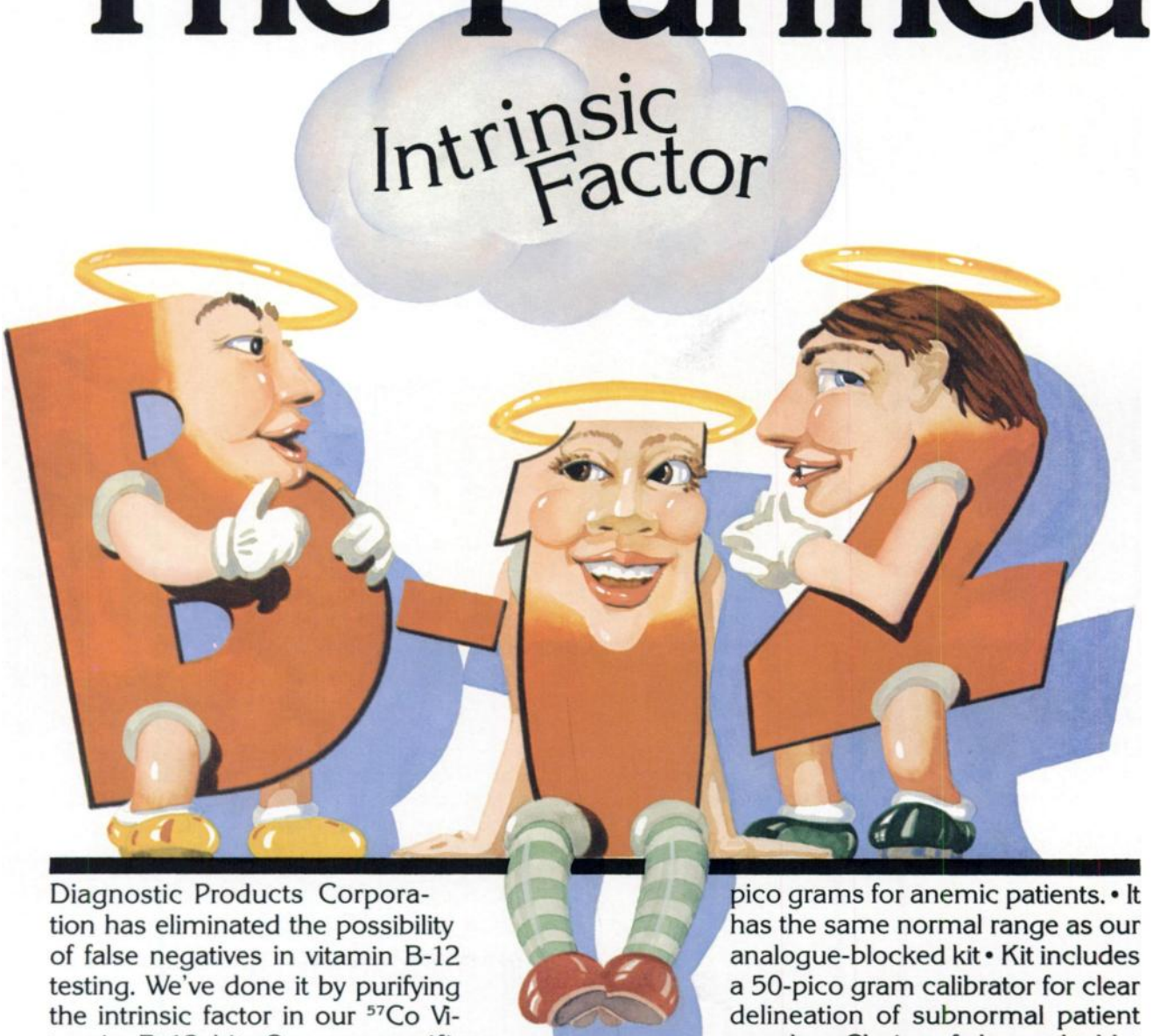

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RADIONUCLIDE DOSE COMPUTATION AND MEASUREMENT RECORD ©

PATIENT'S NAME: John Doe

I.D.: 049-267-8412

STUDIES: MI

NUCLIDE: THALLIUM-201

FORM: Thallous Chloride SAMPLE NO. 12

LOT NO.: T029496 KIT NO.:

DATE: 4 APRIL 79 14:10

CONCENTRATION: 970 uCi/ml

DOSE DESIRED: 1.5 mCi

VOLUME REQUIRED: 1.54 ml

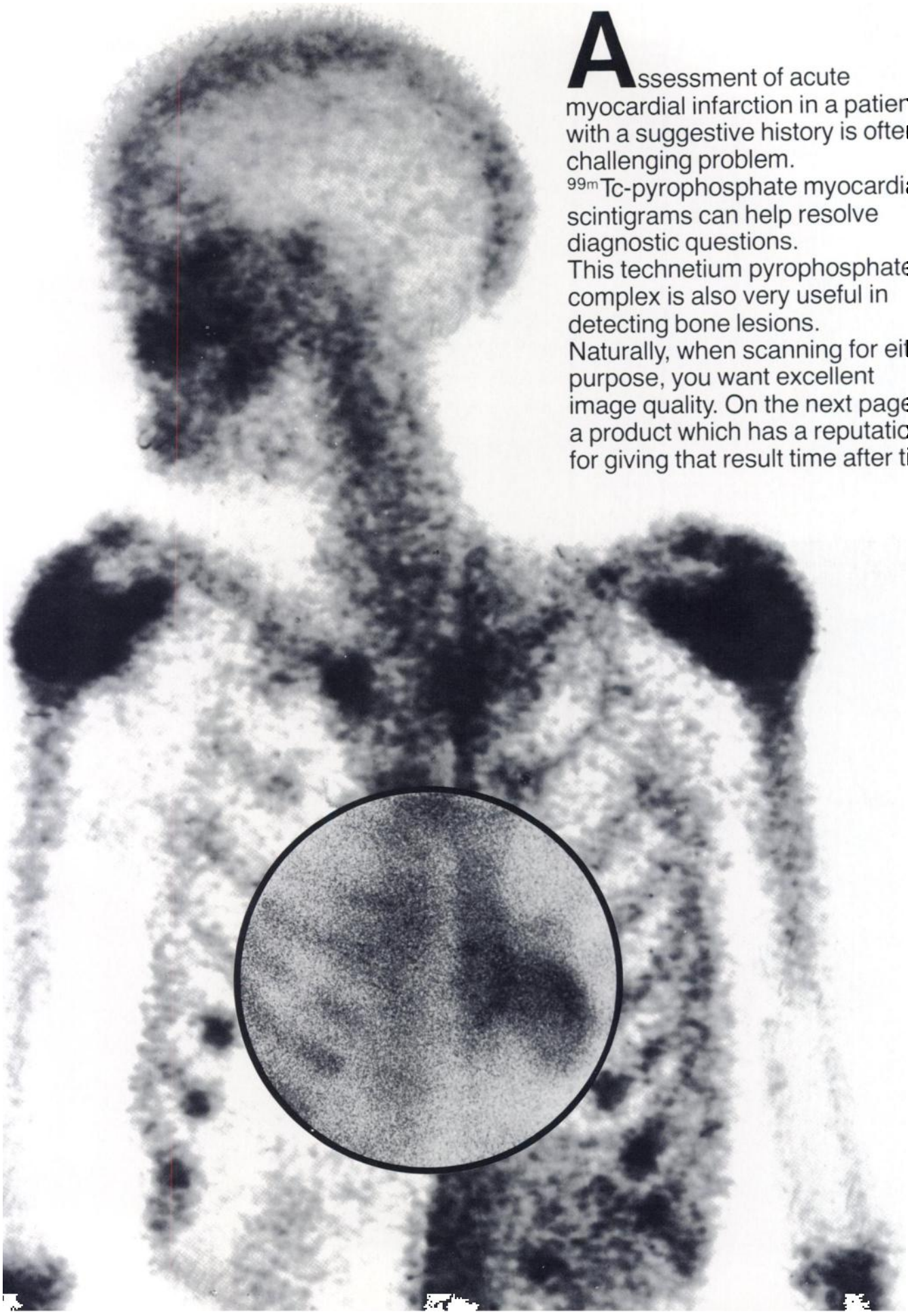
ACTIVITY MEAS'D: 1.49 mCi

TIME OF ADMINISTRATION: 2:30 AM PM

SIGNATURE(S): Jane Smith

CAPINTEC, INC.

136 SUMMIT AVENUE • MONTVALE, NEW JERSEY 07645
(201) 391-3930



Assessment of acute myocardial infarction in a patient with a suggestive history is often a challenging problem. ^{99m}Tc-pyrophosphate myocardial scintigrams can help resolve diagnostic questions. This technetium pyrophosphate complex is also very useful in detecting bone lesions. Naturally, when scanning for either purpose, you want excellent image quality. On the next page is a product which has a reputation for giving that result time after time.

If you want images as good as these–

order Phosphotec®

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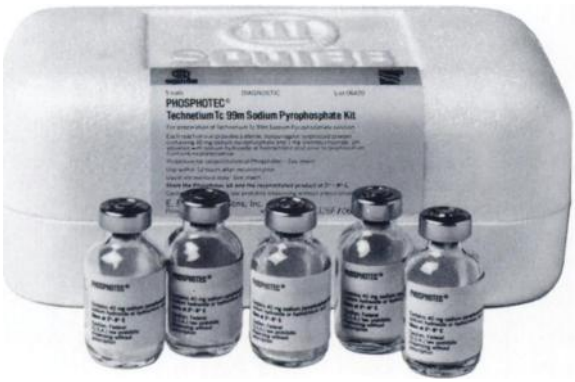
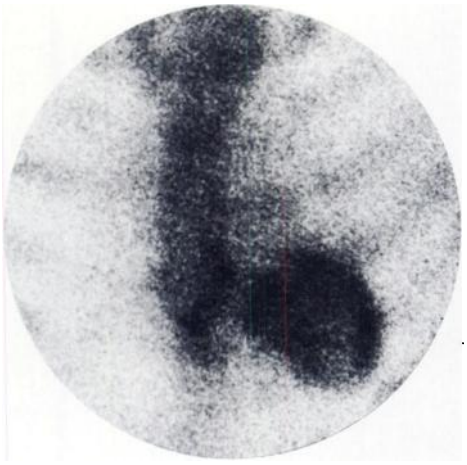
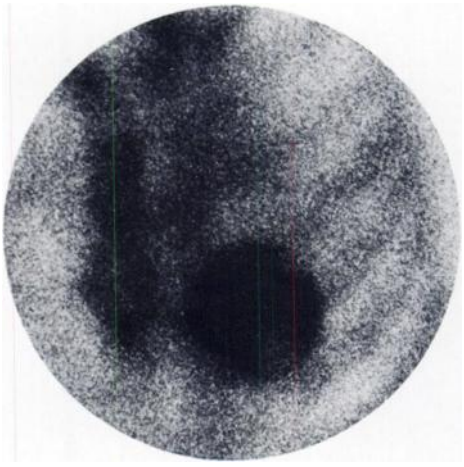


Imaging with ^{99m}Tc-pyrophosphate is an extremely sensitive technique, useful as an adjunct in determining the presence, location and extent of acute myocardial infarctions.

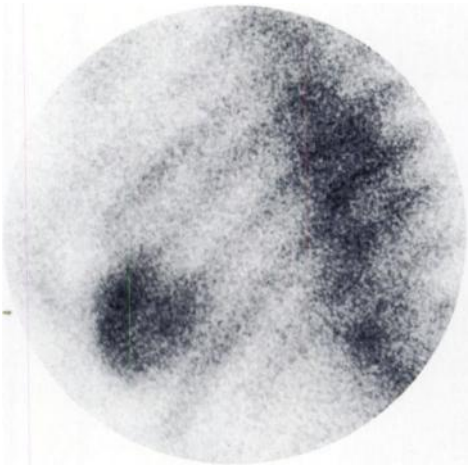
- ☐ Particularly useful in detecting recent infarcts when ECG's are equivocal when imaging is performed within 24 hours to 6 days after onset of suggestive symptoms.
- ☐ Myocardial scintigrams can help confirm the presence of infarction in cases where ECG's and serum enzymes are not specifically diagnostic.
- ☐ Cardiac imaging can be performed 45-60 minutes postinjection.



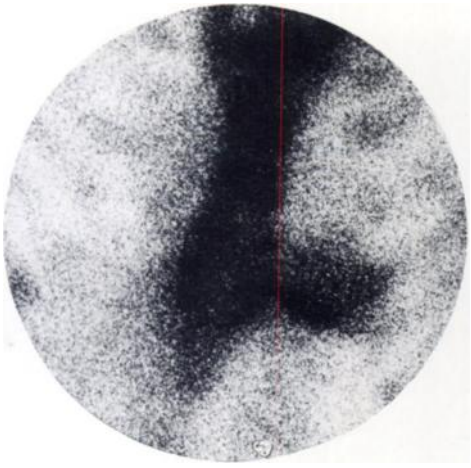
41-year-old male. Scans reveal marked abnormality of the anterior, inferior and posterior walls. Above: anterior.



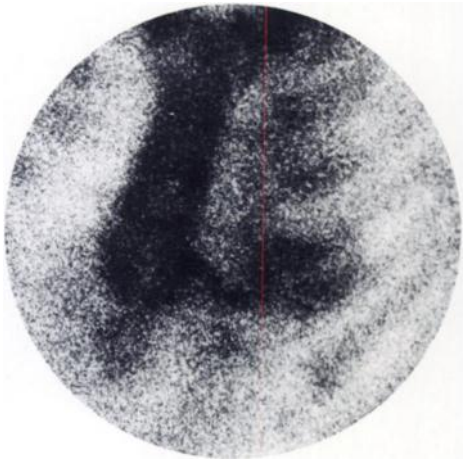
Left anterior oblique.



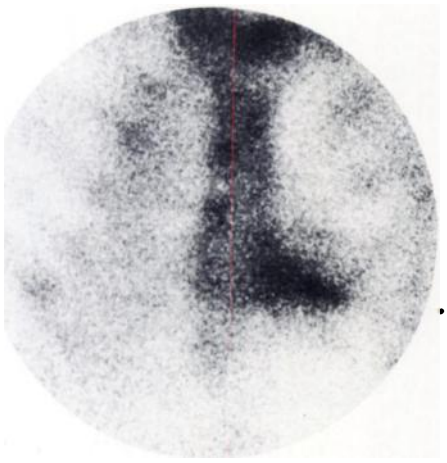
Left lateral.



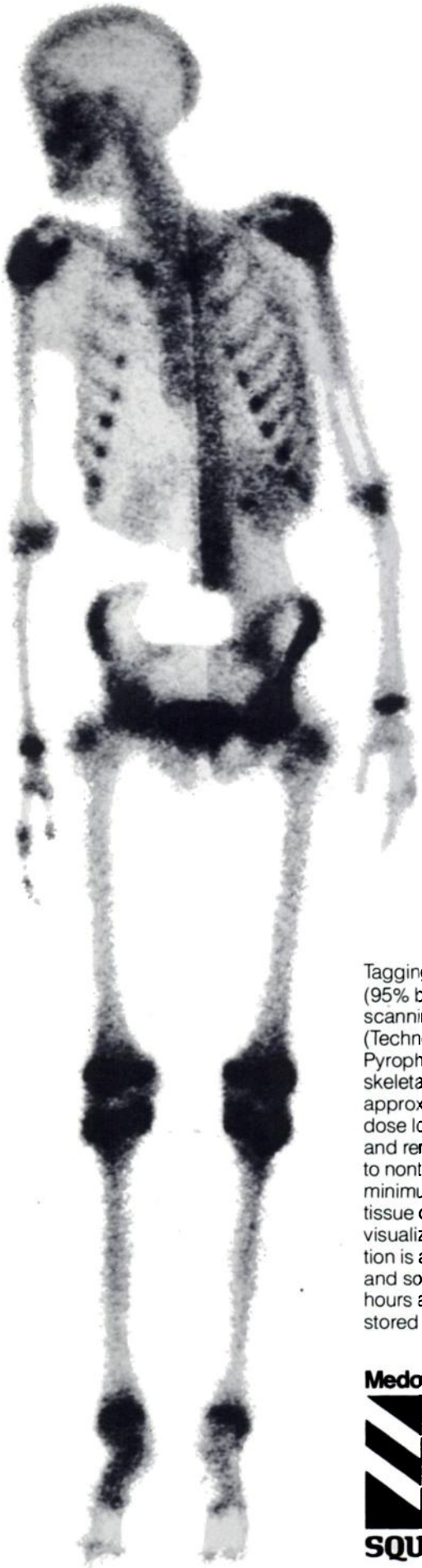
58-year-old male. Scans indicate inferior and posterior damage.
Above: Anterior.



Left anterior oblique.



Right anterior oblique.

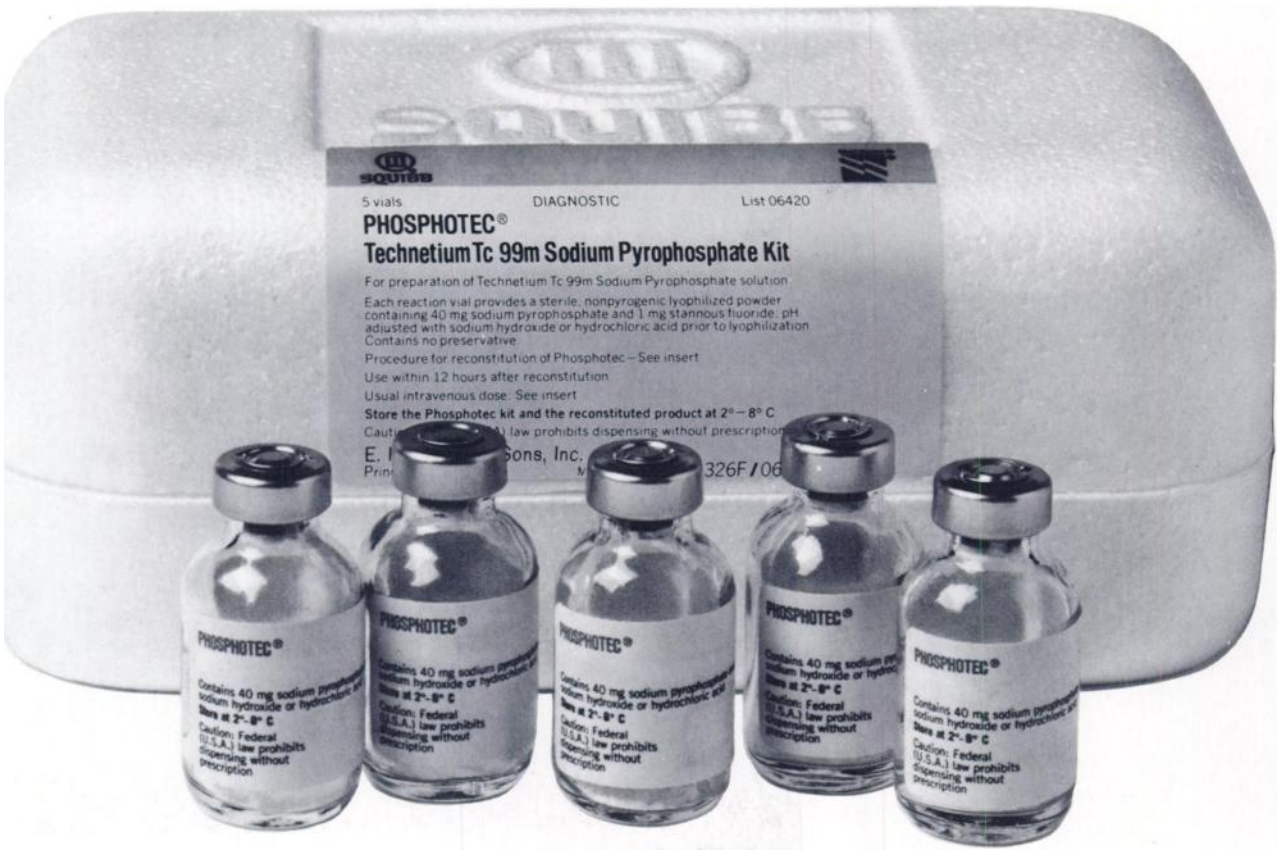


Tagging efficiency is excellent (95% bound at optimum time for scanning) when Phosphotec (Technetium Tc 99m Sodium Pyrophosphate Kit) is used for skeletal imaging. After two hours, approximately 55% of injected dose localizes in the bone; blood and renal clearance is rapid. Target to nontarget ratio is high, with a minimum amount of uptake in soft-tissue organs and little urinary tract visualization. Preparation of solution is a simple, two-step procedure, and solution may be used up to 12 hours after reconstitution when stored at 2°-8°C.

Medotopes®

SQUIBB®

See next page for brief summary.



PHOSPHOTEC®
Technetium Tc 99m Sodium Pyrophosphate Kit

DESCRIPTION: Phosphotec provides all the nonradioactive components required to prepare a sterile, nonpyrogenic technetated (^{99m}Tc) pyrophosphate-tin complex. Each reaction vial contains 40 mg sodium pyrophosphate (equivalent to 23.9 mg anhydrous sodium pyrophosphate) and 1 mg stannous fluoride; the product does not contain a preservative. When sterile, nonpyrogenic sodium pertechnetate Tc 99m is added to the reaction vial, a technetated (^{99m}Tc) pyrophosphate-tin complex is formed.

INDICATIONS AND USAGE: Technetated (^{99m}Tc) pyrophosphate-tin complex may be used as a bone imaging agent to delineate areas of altered osteogenesis. It is also a cardiac imaging agent used as an adjunct in the diagnosis of acute myocardial infarction.

CONTRAINDICATIONS: None known.

WARNINGS: This product should not be administered to patients who are pregnant or to nursing mothers unless the benefit to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approx. 10) days following the onset of menses.

It has been reported that false-positive or false-negative brain scans may result when brain scans using sodium pertechnetate Tc 99m are performed after a bone scan has been done using an agent containing stannous ions, e.g., a pyrophosphate bone agent. This is thought to be due to the interaction of Tc 99m with stannous ions inside red blood cells. Therefore, in those cases where brain scans are indicated along with imaging of bone or myocardial imaging, the brain scan should be performed first, if feasible. Alternatively, another brain imaging agent, such as Tc 99m DTPA, may be employed. False-positive and false-negative myocardial scans may occur; therefore, the diagnosis of acute myocardial infarction depends on the overall assessment of laboratory and clinical findings.

The contents of the Phosphotec reaction vial are intended to be used only for preparation of the I.V. solution and are **not** to be directly administered to the patient. Any sodium pertechnetate ^{99m}Tc solution which contains an oxidizing agent is **not** suitable for use with Technetium Tc 99m Sodium Pyrophosphate Kit. The contents of the kit are not radioactive. However, after sodium pertechnetate ^{99m}Tc is added, adequate shielding of the final preparation must be maintained. Technetated (^{99m}Tc) pyrophosphate-tin complex must be used within 12 hours after reconstitution.

PRECAUTIONS: In the use of any radioactive material, care should be taken to minimize radiation exposure to the patient and occupational workers consistent with proper patient management. Both prior to and following administration of the technetated (^{99m}Tc) preparation, the patient should be encouraged to drink fluids and to void as often as possible thereafter to minimize radiation exposure to the bladder and background interference during imaging if not contraindicated by the patient's cardiac status. The patient's cardiac condition should be stable before beginning the cardiac imaging procedure. Interference from chest wall lesions such as breast tumors and healing rib fractures can be minimized by employing three projections (e.g., anterior, lateral, and left anterior oblique).

Adequate reproductive studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. This drug should be used in pregnant women only when clearly needed. It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on the drug since many drugs are excreted in human milk. Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: No adverse reactions specifically attributable to the use of this radiopharmaceutical have been reported.

For full prescribing information, see package insert.

HOW SUPPLIED: In a kit containing five reaction vials (5 ml size).

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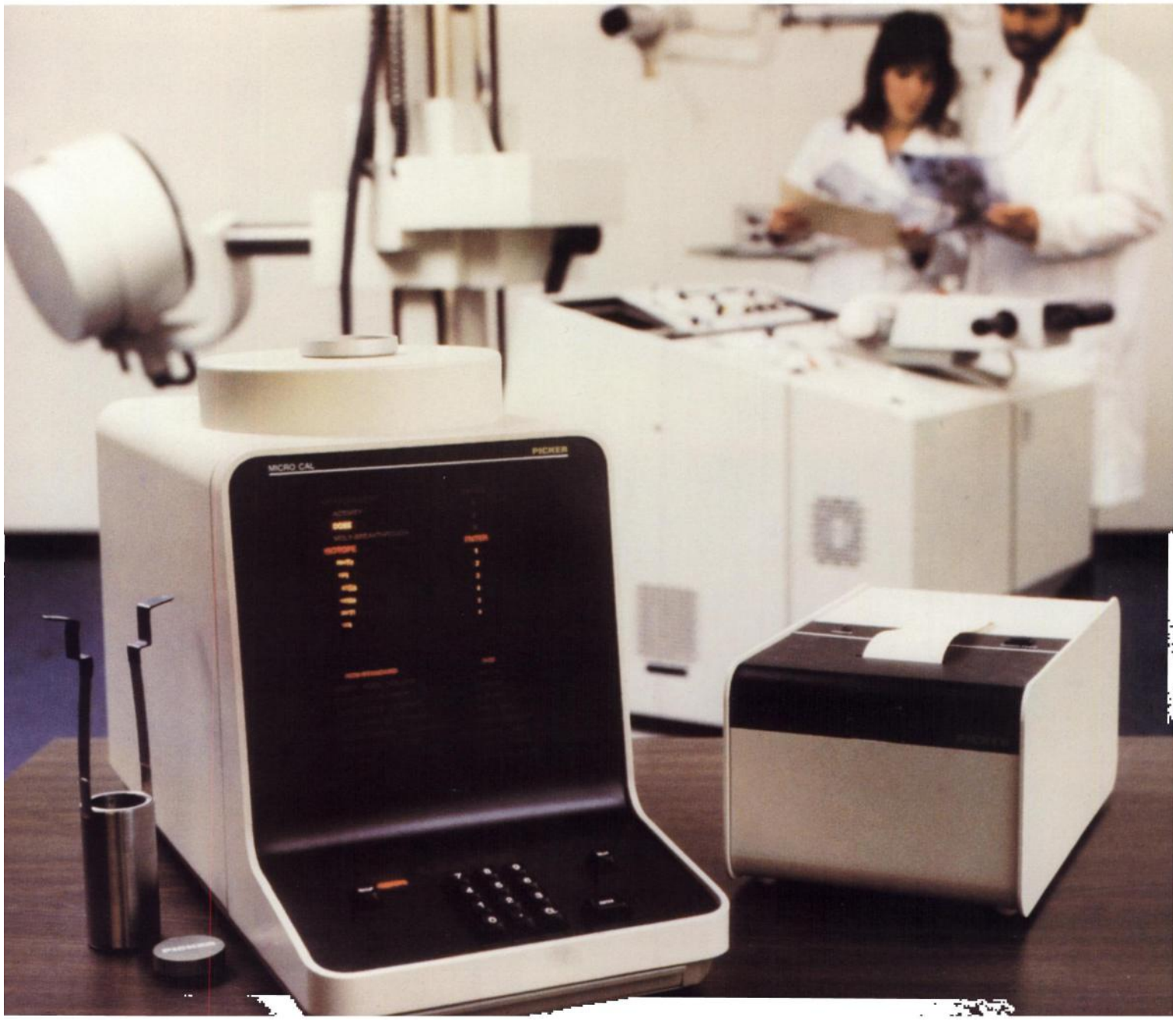

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OSTEOLITE bone imaging in metabolic disease

The superior technique: "...the bone scan is a more sensitive indicator of abnormal metabolic activity than the X-ray..."

The superior agent: OSTEOLITE
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OSTEOLITE bone imaging in orthopedics

The superior technique: "The bone scan may be the only technique capable of locating sites of suspected or unsuspected (bone) trauma."

The superior agent: OSTEOLITE
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OSTEOLITE bone imaging in oncology

The superior technique: "Perhaps the greatest contribution of bone imaging is its superiority over conventional radiography in the detection of metastatic bone tumors."

The superior agent: OSTEOLITE
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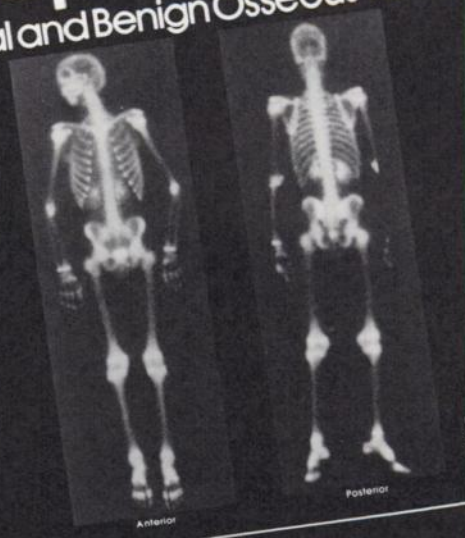
Radioisotope Bone Imaging

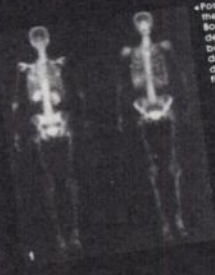
Normal and Benign Osseous Variants



Anterior

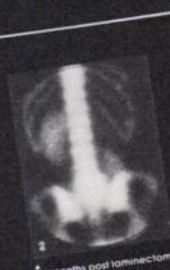
Posterior

Normal anterior and posterior studies in a young male adult



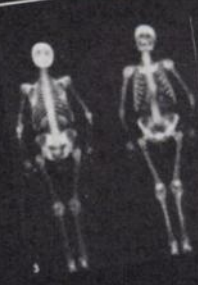
1

•Post radiation therapy to thorax. Bone uptake is decreased due to bone marrow destruction and decreased blood flow



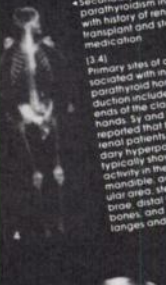
2

•Six months post laminectomy. Fusion of L - S



3

•Primary hyperparathyroidism. Note the increased calvarial uptake

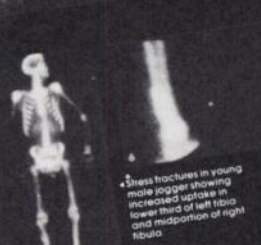


4

•Secondary hyperparathyroidism in patient with history of renal transplant and steroid medication

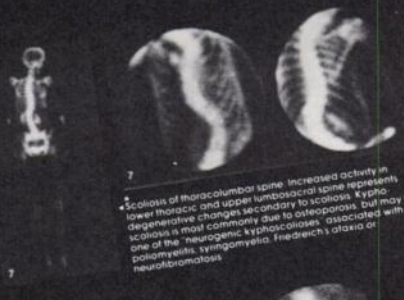
[3,4]
Primary sites of osteitis associated with increased parathyroid hormone production include the skull, ends of the clavicles, and hands. Sy and Mittal have reported that bone scans in renal patients with secondary hyperparathyroidism typically show increased activity in the calvaria, mandible, acromioclavicular area, sternum, vertebrae, distal thirds of long bones, and the phalanges and metacarpals.

5



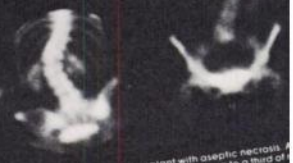
6

•Stress fractures in young male jogger showing increased uptake in lower third of left tibia and midportion of right fibula



7

•Scoliosis of thoracolumbar spine. Increased activity in lower thoracic and upper lumbosacral spine represents degenerative changes secondary to scoliosis. Kyphoscoliosis is most commonly due to osteoporosis, but may be one of the "neurogenic kyphoscolioses" associated with poliomyelitis, syringomyelia, Friedreich's ataxia or neurofibromatosis



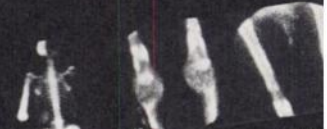
Transplant with aseptic necrosis. A... posttransplantation, up to a third of ... patients have been reported to have ... complaints. Avascular necrosis may ... affecting hip and shoulder joints, and ...

9

10

•Coccygeal tr... no fracture

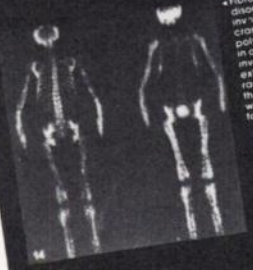
Paget's disease with markedly increased activity • in the entire left humerus -- conforming to the bone shape -- occiput, thoracic and lumbar spine, and pelvis. Proceeding from an early osteoporotic phase dominated by bone resorption and hypervascularity, Paget's lesions progress to hard, dense sclerotic formations. Involved bone shows enlargement, irregularity widened cortex and increased density. The pelvic bones are most commonly involved, followed by the femur, skull and tibia



11

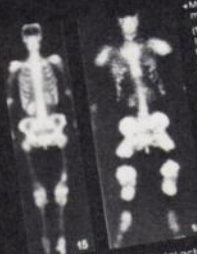
12

•Hypertrophic pulmonary osteoarthrop... showing symmetric, increased uptake ... long bones. Hypertrophic osteoarthropa... is normally characterized by periosteal ... inflammation, new bone formation and ... digital clubbing. This disorder may also ... affect the distal ends of long bones of ... wrists and ankles and the distal ends of ... metacarpals or metatarsals. It may be ... associated with primary lung cancer, ... chronic suppurative pulmonary disease, ... cyanotic cardiac disease



14

•Fibrous dysplasia. In this disorder, monostotic involvement usually affects craniofacial bones and ribs. Polyostotic lesions may occur in any bone, with frequent involvement of the lower extremities. The typical radiologic appearance is that of a radiolucent area with smooth borders and focal cortical thinning



15

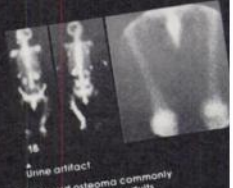
16

•Enchondroma of femur. Distal activity represents increased blood flow secondary to primary

•Maffucci's syndrome -- multiple enchondromatosis

[15, 16]
In enchondromatosis the failure to absorb hypertrophic growth plate cartilage results in disorderly masses of cartilage located in the metaphyses of long bones and the pelvis. Ribs, sternum and skull are rarely involved. The association of enchondromatosis and cavernous hemangiomas in soft tissue is known as Maffucci's syndrome

17



18

•Urine artifact

•Osteoid osteoma of left tibia. Osteoid osteoma commonly occurs in the long bones of children and young adults. The x-ray characteristically shows peripheral hypertrophic bone surrounding a small area of relative radiolucency. The central lesion consists of a small nodule of highly vascular connective tissue in which varying amounts of osteoid have been deposited.

...this new wall chart

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By now, most nuclear medicine specialists have seen first-hand the reasons why more bone scans are performed with OSTEOLITE

- **most rapid blood clearance**[1]
- **lowest soft tissue activity**[1,2]
- **highest target-to-background differential**[3]
- **convenient storage and preparation**

New England Nuclear can provide you with a giant (24 x 37 inch) wall chart that shows your referring physicians the clinical appearance of OSTEOLITE images in patients with commonly seen normal and benign osseous variants. This wall chart, compiled from OSTEOLITE images provided by leading practitioners, clearly illustrates a wide range of findings, with a brief discussion of each condition.

To find out how you may receive your copy of this attractive and educational wall chart, just fill out and mail the reply card below, or ask your NEN representative on his next visit.

And to keep getting outstanding bone images, keep using OSTEOLITE!

References:

1. Subramanian G et al: *J Nucl Med* **16:**744, 1975
2. Forstrom L et al: Data on file at New England Nuclear, Medical Diagnostics Division, North Billerica, MA
3. Davis MA, Jones AG: *Sem Nucl Med* **6:**19, 1976

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I'd like information on how to obtain the OSTEOLITE wall chart.

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OSTEOLITE™

October 1977

Technetium Tc 99m Medronate Sodium Kit (Formerly Known as MDP)

DESCRIPTION: New England Nuclear's OSTEOLITE™ Technetium Tc 99m Medronate Sodium Kit (formerly known as MDP), is supplied sterile and non-pyrogenic in lyophilized kit form suitable for reconstitution with sodium pertechnetate Tc 99m to form a diagnostic skeletal imaging agent for intravenous administration. Each vial contains 10mg medronate disodium and 0.85mg stannous chloride dihydrate; pH is adjusted to between 7.0–7.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial are lyophilized and stored under nitrogen.

PHYSICAL CHARACTERISTICS

Technetium Tc 99m decays by isomeric transition with a physical half-life of 6.02 hours. (SOURCE: Martin, M. J. Nuclear Data Project, Oak Ridge National Laboratory, March, 1976.) Photons that are useful for imaging studies are listed in Table 1.

Table 1. Principal Radiation Emission Data—Technetium Tc 99m

Radiation	Mean %/ Disintegration	Mean Energy (keV)
Gamma-2	88.96	140.5

To facilitate correction for physical decay of Technetium Tc 99m, the fractions of initial activity that remain at selected intervals after the time of calibration are shown in Table 2.

Table 2. Physical Decay Chart: Technetium Tc 99m Half-Life 6.02 Hours

Hours	Fraction Remaining	Hours	Fraction Remaining
0*	1.000	8	.398
1	.891	9	.355
2	.794	10	.316
3	.708	11	.282
4	.631	12	.251
5	.562	18	.126
6	.501	24	.063
7	.447		

*Calibration Time

EXTERNAL RADIATION

The specific gamma ray constant for Technetium Tc 99m is 0.8R/mCi-hr. at 1cm. The half value layer is 0.2mm of Pb. To facilitate control of radiation exposure from millicurie amounts of Technetium Tc 99m, the use of a 6.35mm thick standard radiation elution lead shield will attenuate the radiation emitted by a factor greater than 10^{-5}.

Table 3. Radiation Attenuation By Lead Shielding

Shield Thickness (Pb)mm	Coefficient of Attenuation
0.2	0.5
0.95	10^{-1}
1.8	10^{-2}
2.7	10^{-3}
3.6	10^{-4}
4.5	10^{-5}
5.4	10^{-6}
6.3	10^{-7}

CLINICAL PHARMACOLOGY: Upon intravenous injection, Technetium Tc 99m OSTEOLITE exhibits a specific affinity for areas of altered osteogenesis. In humans, blood levels fall to 4-10% of the injected dose by two hours post-injection and to 3-5% by three hours. During the first 24 hours following its administration in patients with normal renal function, 50-75% of the radioactivity is excreted into the urine and less than 2% of the injected dose remains in the vascular system.

Uptake of the Technetium Tc 99m in bone appears to be related to osteogenic activity and to skeletal blood perfusion. The deposition in the skeleton is bilaterally symmetrical, with increased accumulation in the axial structure as compared to the appendicular skeleton. There is increased activity in the distal aspect of long bones as compared to the diaphyses. In pediatric patients, in whom the epiphyseal centers are still open, there is more marked accumulation of the radiopharmaceutical in the distal aspects of long bones than is seen in adults in whom the epiphyseal centers are closed. Localized areas of abnormal accumulation of the radiopharmaceutical may be seen in primary skeletal malignancies, metastatic malignancies to bone, acute or chronic osteomyelitis, arthritides, recent fractures, areas of ectopic calcification, Paget's disease, regional migratory osteoporosis, areas of aseptic necrosis and, in general, any pathological situation involving bone in which there is increased osteogenic activity or localized increased osseous blood perfusion. Since increased osteogenic activity and localized increased osseous blood perfusion are not usually present in chronic bone diseases, bone imaging agents, in general, are not effective in detecting such diseases. Localized areas of decreased accumulation of the radiopharmaceutical may be noted in areas of bone which have received localized fields of external radiation or to which blood flow has been interrupted. OSTEOLITE has also been noted to accumulate in areas of acute myocardial infarction from one to fourteen days after the pathologic event.

INDICATIONS AND USAGE: Technetium Tc 99m OSTEOLITE may be used as a bone imaging agent to delineate areas of altered osteogenesis.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the OSTEOLITE vial are intended only for use in the preparation of Technetium Tc 99m medronate sodium and are NOT to be directly administered to the patient.

Ideally, examinations using radiopharmaceuticals—especially those elective in nature—of women of childbearing capability should be performed during the first ten days following the onset of menses.

PRECAUTIONS: A thorough knowledge of the normal distribution of intravenously administered Technetium Tc 99m medronate sodium is essential in order to accurately interpret pathologic studies.

Technetium Tc 99m medronate sodium, as well as any radioactive agent, must be handled with care. Once sodium pertechnetate Tc 99m is added to the kit, appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Care should also be taken to minimize radiation exposure to patients in a manner consistent with proper patient management.

The Technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m medronate sodium depends on the maintenance of tin in the divalent state. Any oxidant present in the sodium pertechnetate Tc 99m employed may adversely affect the quality of the prepared agent. Thus, sodium pertechnetate Tc 99m containing oxidants should not be used without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The use of bacteriostatic sodium chloride as a diluent for sodium pertechnetate Tc 99m may adversely affect the biologic distribution of the prepared agent, and its use is not recommended.

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m medronate sodium should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule nursing should not be undertaken when a patient is administered radioactive material.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: None reported.

DOSAGE AND ADMINISTRATION: The recommended dose for the average 70kg adult patient is 15mCi with a range of 10-20mCi. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Optimal imaging results are obtained within one to four hours after administration.

OSTEOLITE should be used within six hours after aseptic reconstitution with sodium pertechnetate Tc 99m. For optimum results this time should be minimized.

The vial contains no bacteriostat.

Radiopharmaceuticals should be used by persons who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate governmental agencies authorized to license the use of radionuclides.

RADIATION DOSIMETRY

The estimated absorbed radiation dose to an average patient (70kg) from an intravenous injection of a maximum dose of 20 millicuries of Technetium Tc 99m OSTEOLITE is shown in Table 4.

Table 4. Absorbed Radiation Dose

Organ		Technetium Tc 99m Medronate Sodium (rads/20mCi)
Total Body		0.13
Bone Total		0.70
Red Marrow		0.56
Kidneys		0.62
Liver		0.16
Bladder Wall	2 hr void	2.60
	4.8 hr void	6.20
Ovaries	2 hr void	0.24
	4.8 hr void	0.34
Testes	2 hr void	0.16
	4.8 hr void	0.22

Method of calculation: A Schema for Absorbed-Dose Calculations For Biologically Distributed Radionuclides, Supplement No. 1, MIRD Pamphlet No. 1, p. 7, 1968.

HOW SUPPLIED: NEN's OSTEOLITE™ Technetium Tc 99m Medronate Sodium Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each nitrogen-flushed vial contains in lyophilized form:

Medronate Disodium—10mg
Stannous Chloride Dihydrate—0.85mg

The pH is adjusted to between 7.0–7.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial were lyophilized under nitrogen. Store at room temperature (15°-30° C). Included in each five (5) vial kit is one (1) package insert and six (6) radiation labels. Included in each thirty (30) vial kit is one (1) package insert and thirty-six (36) radiation labels.

INSTRUCTIONS FOR PREPARATION OF TECHNETIUM Tc 99m OSTEOLITE: Aseptically inject 2 to 8ml of sodium pertechnetate Tc 99m (pertechnetate in isotonic saline without a bacteriostat) into the supplied vial of OSTEOLITE enclosed by a radiation shield. Swirl for at least ten seconds to dissolve completely. Label appropriately. Suitable labels have been supplied with each OSTEOLITE Kit. Use within six hours after reconstitution. For optimum results, this time should be minimized.

Using proper shielding, the vial containing the reconstituted solution should be visually inspected to insure that it is clear and free of particulate matter.

The contents of the kit vials are not radioactive; however, **after reconstitution with sodium pertechnetate Tc 99m the contents are radioactive and adequate shielding and handling precautions must be maintained.**

Do not use if there is a vacuum in the immediate drug container or if air is injected into the container when the dose is withdrawn.

Catalog Number NRP-420 (5 vial kit)
Catalog Number NRP-420C (30 vial kit)

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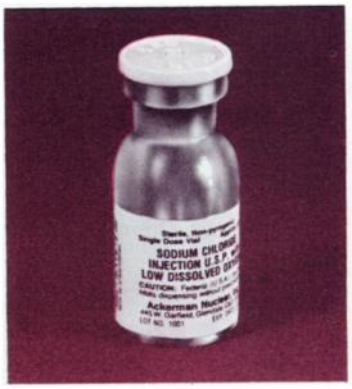

- ELUTION:
  Use for eluting Technetium-99m generators.
- DILUTION:
  Use for diluting high specific concentrations of Technetium-99m.

SODIUM CHLORIDE INJECTION U.S.P.
with LOW DISSOLVED OXYGEN
pH 4.5 to 7.0

DESCRIPTION:
SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN is a sterile isotonic solution of sodium chloride in water for injection. It contains no antimicrobial agent. It contains 0.9% sodium chloride and is packaged in single dose vials. The osmolarity is 300 mOsm/1, the dissolved oxygen content is less than 5 ppm.

INDICATIONS:
SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN is indicated for eluting, preparing and/or diluting pharmaceuticals that specify oxidants may cause adverse effects on the final product. SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN is also used as a fluid and electrolyte replenisher or as an irrigating solution.

WARNING:
Excessive amounts of sodium chloride by any route may cause hypopotassemia and acidosis. Excessive amounts by the parental route may precipitate congestive heart failure and acute pulmonary edema, especially in patients with cardiovasular disease, and in patients receiving corticosteroids or corticotropin drugs that may give rise to sodium retention. No antimicrobial agent has been added.

PRECAUTIONS:
Unused amounts should be discarded immediately following withdrawal of any portion of the contents.

HOW SUPPLIED:

Catalog No.	Product	Packaging
S-25	SODIUM CHLORIDE INJECTION U.S.P. with LOW DISSOLVED OXYGEN	25/10 ml vials

Each 10 ml single dose vial contains approximately 6 ml. Each ml contains 9 mg sodium chloride providing 0.154 mEq each of sodium and chloride ions. Total osmolarity 300 mOsm/1; pH between 4.5 and 7.0. Dissolved oxygen content less than 5 ppm. Contains no preservatives.

ACKERMAN NUCLEAR, INC.
445 W. Garfield Avenue
Glendale, Calif. 91204

1/78

Decrease the amount of oxygen you add daily and reduce the effect of one more variable from your radiopharmacy. Use Low Dissolved Oxygen saline when preparing kits containing any stannous tin products.

*less than 5 ppm

For additional information call or write to:

ACKERMAN NUCLEAR, INC.

Pharmaceuticals for Nuclear Medicine
445 W. Garfield Ave.
Glendale, CA 91204, USA
(213) 240-8555

PLACEMENT

POSITIONS OPEN

CONFIDENTIAL SERVICE NATIONWIDE
We are a search firm dealing nationwide in the Health Care Industry. All Fees Paid By Employer. Forward resume with salary requirements and location preferences to BMI, Health Care Division, P.O. Box 6457, Columbia, SC 29260, (803) 787-8710.

NUCLEAR MEDICINE RESIDENCY 830-bed VA general hospital offers AMA approved two year program. Two positions available July 1980. Located in San Fernando Valley 15 minutes from affiliated hospitals (UCLA and Wadsworth VA). Program covers isotope and ultrasound imaging, in vivo and in vitro procedures, including RIA, and all recent cardiology procedures. Prerequisite: one-two years post graduate training in medicine, radiology, or pathology. Minimum stipend: $20,000. Contact: Marvin B. Cohen, M.D. Chief, Nuclear Medicine Service. Non-discrimination in employment. VA Medical Center, 16111 Plummer Street, Sepulveda, CA 91343.

NUCLEAR MEDICINE TECHNOLOGIST
Immediate opening for technologist in fully accredited 370-bed community and university affiliated hospital, situated in scenic northcentral Pennsylvania. Proficiency required in radioimmunoassay work, imaging, dynamic studies and computer applications. Department is equipped with cameras, rectilinear scanners, automated will counters, pipetter and a computer. Good salary and full benefits. Contact Ruth R. Hargrave, Assoc. Director of Personnel, The Williamsport Hospital, 777 Rural Avenue, Williamsport, PA. 17701. Equal Opportunity Employer.

RADIOPHARMACEUTICAL CHEMIST:
The University of Maryland is soliciting applicants for a joint appointment in the departments of Medicinal Chemistry/Pharmacognosy and Medicine. Applicants must be experienced in the development of new radiopharmaceuticals. Salary and academic rank dependent on background and experience. Please send curriculum vitae to Dr. Ralph Blomster, Chairman, Department of Medicinal Chemistry and Pharmacognosy, School of Pharmacy, University of Maryland at Baltimore, 636 W. Lombard Street, Baltimore, Maryland 21201.

NUCLEAR MEDICINE PHYSICIAN. THE
Department of Nuclear Medicine at the University of Tennessee Center for the Health Sciences has opening at Instructor or Assistant Professor level, depending upon qualifications. The department serves City of Memphis Hospital, LeBonheur Children's Hospital, and University of Tennessee Hospital. Proven ability in teaching and research and knowledge and practical experience in all major categories of Clinical Nuclear Medicine are necessary. ABNM certification or eligibility required. Send C.V. and references to Martha McDonald, M.D., Acting Chairman; Department of Nuclear Medicine; University of Tennessee; 865 Jefferson, Room 150C, Chandler Building; Memphis, Tennessee 38163. The University of Tennessee is an Equal Opportunity/Affirmative Action employer.

RADIOLOGIST, BOARD CERTIFIED IN
Nuclear Medicine, to join large multi-specialty pre-paid medical group. Opportunity to expand department and plan department for new hospital in 1982. Salary negotiable. Liberal Fringe Benefits. Contact: Hawaii Permanente Medical Group, Inc., 1697 Ala Moana Boulevard, Honolulu, Hawaii 98615. An Equal Opportunity Employer.

NUCLEAR MEDICINE TECHNOLOGIST
Immediate opening in department presently being organized in 99 bed general hospital in very NW corner of Arkansas. Submit resume to: John R. Rhine, administrator, P.O. Drawer I, Gravette, Arkansas 72736.

FLORIDA REGION COMPANY IS LOOKing for Registered Radiopharmacists to develop the cities in the Southeastern United States. Competitive salaries for positions are offered to the self initiating candidates. If you are interested please send resume and inquiries to: American Professional Services, 1813 Ridgewood Drive, N.E., Atlanta, GA 30307.

NUCLEAR MEDICINE TECHNICIAN
The Baptist Medical Center-Montclair is accepting applications for the position of Nuclear Medicine Technician. The department is equipped with three cameras and two scanners; addition of a computer is planned. Must be graduate of an AMA approved School of Nuclear Medicine and have up to two years experience in a wide range of related procedures. Excellent salary and employee benefits. Send resume in confidence to: Department of Human Resources, The Baptist Medical Center-Montclair, 800 Montclair Road, Birmingham, Alabama 35213. An equal opportunity employer.

ACADEMIC/PROFESSIONAL OPENING
for Radiochemist to supervise campus isotopes laboratory for radioactive and stable isotopes, to instruct and supervise users of the laboratory in safe techniques, to develop a short course on safety practices with radioactive isotopes in the laboratory, and to provide laboratory instruction in a one-semester graduate course in methods of introducing and recovering radioactive and stable isotopic labels in organic compounds. Active research program not required but encouraged. Applicants need Phd or comparable experience in radiochemistry or related field. Appointment to begin by January 15, 1980. Salary dependent on qualification. Send curriculum vitae and names of three references to K.L., Rinehart, School of Chemical Sciences, University of Illinois, Urbana, IL 61801. Phone (217) 333-0627. To be assured of full consideration applications should be received by September 30, 1979. The University of Illinois is an Affirmative Action/Equal Opportunity Employer.

NUCLEAR MEDICINE PHYSICIAN
Joint appointment, V.A. Medical Center, New Orleans,LA. Affiliated with Tulane University Medical School. Nuclear Cardiology and Ultrasound Experience Required. Body CT Facilities - 700-bed complex. Send Curriculum Vitae to Personnel Service, V.A. Medical Center, 1601 Persiso Street, New Orleans, LA.70146. Attn: Ms. Peggy Yeates.

CHIEF-NUCLEAR MEDICINE SECTION:
Physician, Board Certified in Nuclear Medicine (or eligible), wanted to head established Division in major affiliated teaching hospital. Three cameras, computer, stress testing equipment. 4,000 scans per year of which 500 are nuclear cardiology procedures. Immediate opening for progressive person. Contact: Director, Department of Radiology, Shadyside Hospital, Pittsburgh, PA 15232 (412) 622-2083.

NUCLEAR MEDICINE SUPERVISOR
Supervisory position available in Nuclear Medicine Department of expanding 650-bed teaching hospital affiliated with UNC Medical School. ARRT registered and two years supervisory experience required. Excellent benefit plan. Send resume and salary requirement to: Employment Manager, N.C. Memorial Hospital, Chapel Hill, NC 27514. An Equal Opportunity Affirmative Action Employer.

NUCLEAR MEDICINE TECHNOLOGST
Needed to perform variety of complex nuclear medicine diagnostic and instrument procedures for treatemnt of veteran patients. Bachelors degree including courses in nuclear medicine science plus 2 years of professional experience required. $15,920 per year plus excellent federal civil service benefits. Call (213) 824-3255 for further information. V.A. Wadsworth Medical Center, West Los Angeles, California. Equal opportunity employer.

NUCLEAR MEDICINE TECHNOLOGIST
Immediate opening for Registered or Registry eligible Nuclear Medicine Technologist in 53 bed hospital. Department equipped with Searle Pho-Gamma V with Microdot: app. 60 studies per month. Good salary and benefits. Hospital is located in rural central California with easy access to mountains, desert, ocean, and metropolitan areas. Send resume or call: Sierra View District Hospital, 465 West Putnam Avenue, Porterville, CA. 93257. (209) 781-0885

NUCLEAR MEDICINE TECHNOLOGIST
Registered or registry eligible Nuclear Medicine Technologist to perform imaging procedures in a progressive 250-bed hospital affiliated with the Brown University Medical Program. Present equipment includes Searle Isographics Updated Camera, Picker LFOV 4/15 Camera, and a Picker Rectillinear Scanner. Planned department renovations and the addition of a DEC Computer system for Nuclear Cardiology procedures should provide an interesting opportunity for a dedicated technologist. Please submit resume to: Roger Williams General Hospital, 825 Chalkstone Avenue, Providence, RI 02908 Attention: Personnel Department

RADIOLOGICAL PHYSICIST: A PHYSIcist at the M.S. or B.S. level wishing to practice all aspects of applied radiological physics required for a professional consulting firm. Experience in radiation therapy treatment planning desired. Our activities include service in (1) Radiation Therapy Planning, (2) Nuclear Medicine, (3) Diagnostic Radiology, and (4) Radiation Protection. Excellent salary and benefits. Please Protection. Excellent salary and benefits. Submit resume to Box 901, Society of Nuclear Medicine, 475 Park Ave. South, New York, NY 10016.

NUCLEAR MEDICINE TECHNOLOGIST Challenging full-time opening for a nuclear medicine technologist. Must be ARRT or ASCP. We offer an excellent salary and liberal fringe benefits. Please contact: W.A. Foote Memorial Hospital, Inc. 524 Lansing Avenue, Jackson, Michigan 49201.

NUCLEAR MEDICINE RESIDENT. TWO year Residency Program in Nuclear Medicine at The New York Hospital-Cornell Medical Center. Position available July 1, 1980. Contact Jerome G. Jacobstein, M.D., Division of Nuclear Medicine, The New York Hospital-Cornell Medical Center, 525 East 68th Street, New York, NY 10021.

POSITIONS WANTED

NUCLEAR MEDICINE PHYSICIAN. ABNM, ABIM. Experienced and competent in all phases of Nuclear Medicine (Imaging, RIA, Computers) and Diagnostic Ultrasound. Private practice an academic background. Have established several laboratories. Age under 40. Seek directorship position with large progressive hospital, multispecialty clinic or radiology group. Write for C.V. and further information: Reply Box 906, Society of Nuclear Medicine, 475 Park Ave. So., NY, NY 10016.

BOARD CERTIFIED INTERNIST completing University Residency in Nuclear Medicine July 1980. Age 48. Strong Computer background. Seeks position where he can be in charge and set his own hours, so that interest in Internal Medicine and Computers can be pursued secondarily. Reply Box: 900. Society of Nuclear Medicine, 475 Park Ave. So., New York, NY 10016

M.S. RADIOPHARMACIST SEEKS hospital position—routine operation, teaching and research. Relocation no problem. Reply Box 902, Society of Nuclear Medicine, 475 Park Ave. South, New York, NY 10016

M.D., Ph.D., ABNM CERTIFIED, WITH varied experience, seeks new position, preferably in association with one or more other full-time nuclear physicians in a teaching hospital. Reply: Box 903, Society of Nuclear Medicine, 475 Park Ave. So., New York, NY 10016.

NUCLEAR RADIOLOGIST, ABR CERtified Diagnostic Nuclear, University trained. Early 30's. Computer, Nuclear Cardiology, Angiography, CT, and Ultrasound experience. Reply box 904, Society of Nuclear Medicine, 475 Park Avenue So., New York, NY 10016.

NUCLEAR PHYSICIAN Ph.D. M.D. ABNM certified over 60 publications considerable Administrative experience. Seeks position as Dept. Chairman. Academic or Clinical. East or West coast. Reply Box 905. Society of Nuclear Medicine, 475 Park Avenue South, New York, NY 10016.

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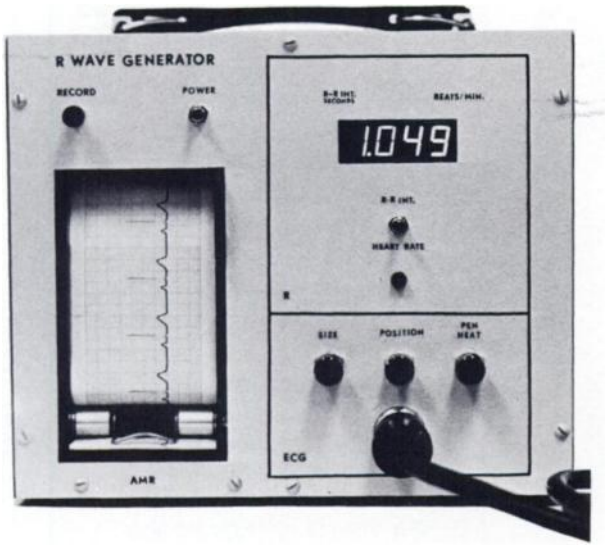

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NUCLEAR MEDICINE: MAJOR EXPANSION OF ESTABLISHED PROGRAM

OPPORTUNITIES FOR NM PHYSICIANS, MEDICAL SCIENTISTS, SUPERVISORY AND STAFF TECHNOLOGISTS, MEDICAL WRITER

A major expansion of an established program in NM is being developed in conjunction with the opening of a total health care center. The new program has created the need for qualified physicians, medical scientists and technologists to provide NM services for a 2500-bed hospital complex that includes 2 large cardiovascular centers.

Positions are immediately available for:

(1) 3 NM physicians with clinical expertise in all aspects of nuclear medicine and interest in clinical research
(2) 2 medical scientists with interest in instrumentation, computer science, and radiation physics
(3) Several technologists, both staff and supervisory levels, for the imaging and RIA sections
(4) Medical writer

For information contact John A. Burdine, M.D., Chief, Nuclear Medicine Section, Departments of Internal Medicine and Radiology, 6720 Bertner Avenue, Houston, TX 77030; phone 713/521-2272.

EXPERIENCED NUCLEAR PHYSICIAN
Massachusetts General Hospital
Harvard Medical School
Nuclear Medicine Division
Department of Radiology

ABNM Certification Required. Clinical and Research Competency Emphasized.

CONTACT: Juan M. Taveras, M.D., Radiologist-in-Chief or H. William Strauss, M.D., Nuclear Medicine Division, Department of Radiology, Massachusetts General Hospital, Boston, Massachusetts 02114.

EQUAL OPPORTUNITY EMPLOYER

NUCLEAR MEDICINE PHYSICIAN

Challenging opportunity available for a nuclear medicine physician with experience in computerized studies and interest in pediatric nuclear medicine. Position would be as chief of the division with clinical, research, and teaching responsibilities in a 300 bed pediatric and teaching facility for the Ohio State University. The laboratory, fully equipped, has developed and applied computerized programs in every aspect of pediatric nuclear medicine. Salary commensurate with experience. Please send complete resume in confidence to:

Grant Morrow III., M.D., Medical Director
Children's Hospital
700 Children's Drive
Columbus, Ohio 43205

STANFORD UNIVERSITY SCHOOL OF MEDICINE

Nuclear Medicine Residency Program. Resident positions are available beginning September 1, 1980, for a 2-year program at Stanford University Medical Center and affiliated Veteran's Adm. Medical Center. Patients from the Children's Hospital at Stanford are also studied or treated at the University Hospital.

The program, approved by the AMA and satisfying the requirements of the American Board of Nuclear Medicine, includes didactic instruction in radiologic mathematics and physics, radiation safety, dosimetry, electronics, and nuclear medicine instrumentation. A major portion provides practical experience in dynamic and static imaging, computer-assisted manipulation, radioimmunoassay methodology, other in vitro test procedures, and radiopharmacy as part of an integrated patient care program, both diagnostic and therapeutic.

Prerequisite for entry into program: 2 years prior training in AMA-approved program in internal medicine, radiology, pathology or pediatrics.

Stanford is an equal opportunity affirmative action employer.

Requests for further information (include C.V. and reference list) should be directed to:

Joseph P. Kriss, M.D.
Director, Div of Nuclear Medicine
Stanford University Medical Center
Stanford, CA 94305

CHIEF TECHNOLOGIST NUCLEAR MEDICINE

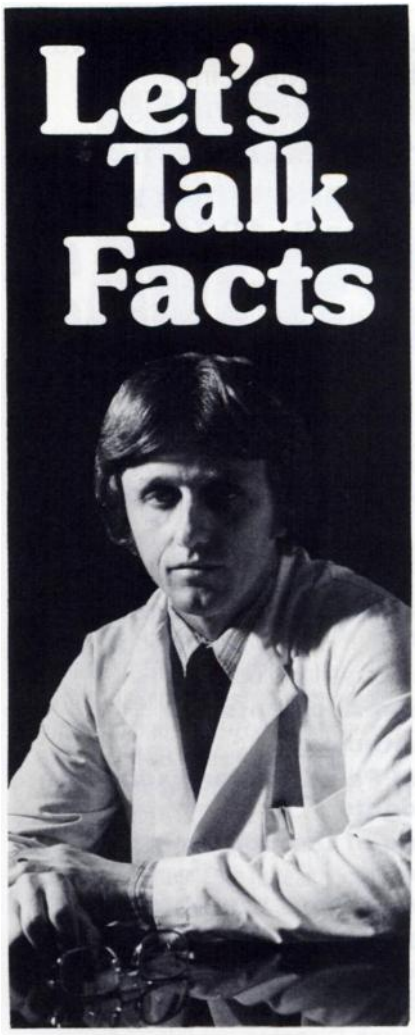
Large teaching hospital has an immediate opening for a Chief Technologist in Nuclear Medicine. Responsibilities include: general clinical supervision of four staff technologists and students from the School of Nuclear Medicine Technologies, teaching clinical courses, in-service training, and operation of the clinical computer.

Position requires a B.S. degree and registry in Nuclear Medicine with a minimum of 2 years' supervisory experience and clinical computer systems experience. Teaching experience helpful. Excellent salary and benefit package.

Submit resume including salary requirements to:

Employee Relations Department
PRESBYTERIAN-UNIVERSITY HOSPITAL
DeSoto at O'Hara Sts.
Pittsburgh, PA 15213

Equal Opportunity Employer M/F/H



There is only one test for early and specific pregnancy detection, and that's Choriogonadotropin —Beta (HCG-B) by RIA

And for HCG-B RIA, NMS is the method of choice.

Test	Sensitivity* mIU/ml
Slide	800-4000
Tube	500-1000
Radioreceptor	200
NMS (Qualitative) HCG-B	10
NMS (Quantitative) HCG-B	5

Set to minimize cross-reactivity with physiological LH

NMS
NUCLEAR MEDICAL SYSTEMS, INC.
1533 Monrovia Avenue
Newport Beach, CA 92663
(714) 645-2111

800-854-3002

STANFORD UNIVERSITY SCHOOL OF MEDICINE

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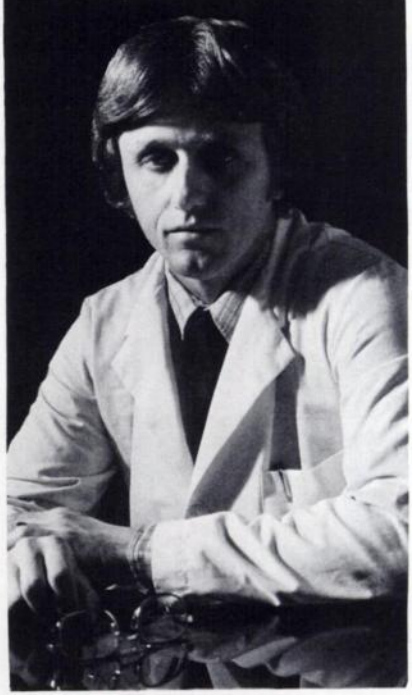
PRESBYTERIAN-UNIVERSITY HOSPITAL
DeSoto at O'Hara Sts.
Pittsburgh, PA 15213

Equal Opportunity Employer M/F/H

Let's Talk Facts



There is only one test for early and specific pregnancy detection, and that's Choriogonadotropin —Beta (HCG-B) by RIA

And for HCG-B RIA, NMS is the method of choice.

Test	Sensitivity* mIU/ml
Slide	800-4000
Tube	500-1000
Radioreceptor	200
NMS (Qualitative) HCG-B	10
NMS (Quantitative) HCG-B	5

Set to minimize cross-reactivity with physiological LH

NMS

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PASQUA HOSPITAL
REGINA, SASKATCHEWAN, CANADA

NUCLEAR MEDICINE PHYSICIAN

Applications are invited for the position of head of the Department of Nuclear Medicine at Pasqua Hospital in Regina, Saskatchewan. This 400-bed general hospital provides a broad spectrum of medical and surgical services as the cancer treatment centre for the southern half of the Province of Saskatchewan. The hospital is seeking an individual with the desire to participate in designing and equipping a new department in an area of approximately 5,200 sq. ft. The entire hospital is currently involved in the construction phase of an ambitious expansion program.

Applicants must possess or be eligible to sit the Canadian certification or U.S. Specialty Board Examination. The successful applicant will be offered a teaching appointment at an appropriate academic rank in the University of Saskatchewan.

Please Reply in writing to:

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Administration Office
Pasqua Hospital
4101 Dewdney Avenue
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NUCLEAR MEDICINE TECHNOLOGIST I

$1140.91 to $1422.55

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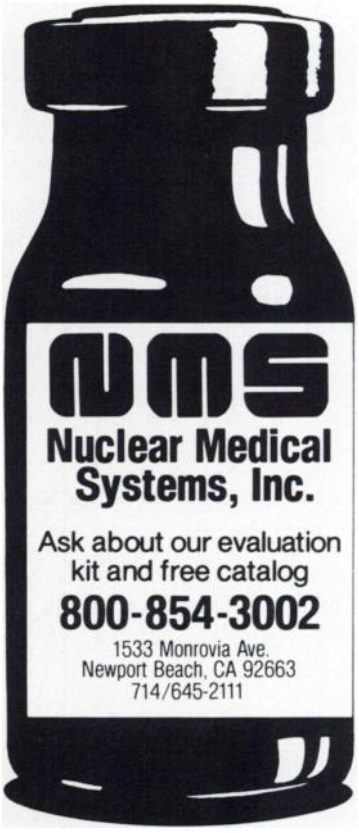

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gaḿ·mȧ·flō, *n.*

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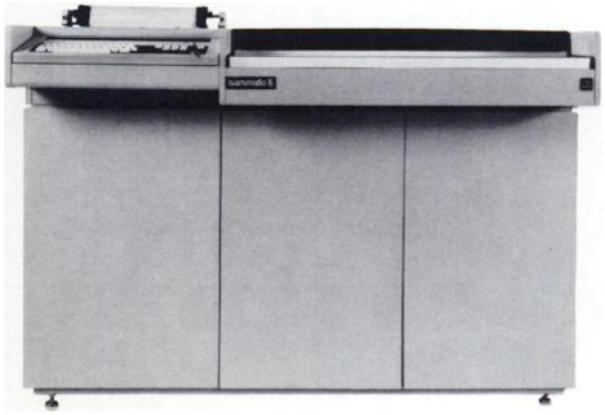

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For futher definitions, see page 26A

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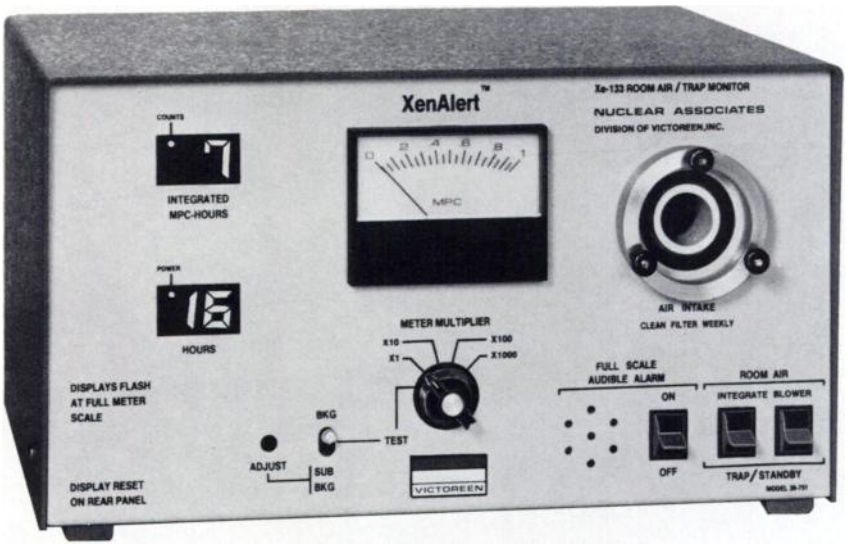

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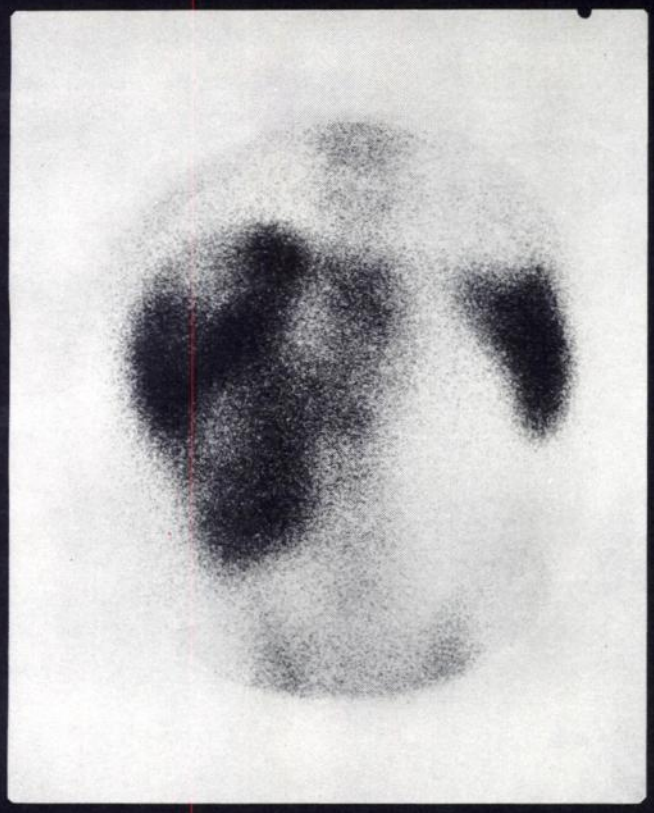

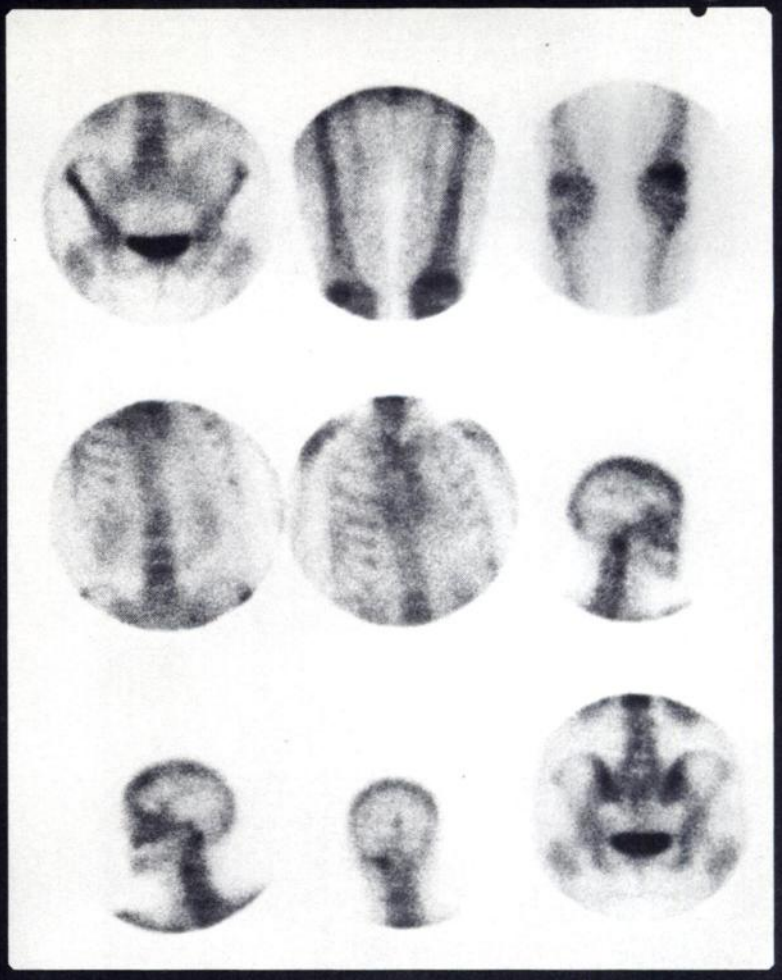

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Sharp. Kodak NMB (blue base) and NMC (clear base) films feature single-coated emulsions to eliminate parallax. Since they are orthochromatic and, therefore, sensitive to both blue and green CRT phosphors, they record all the information on blue or green cathode-ray tubes. The built-in halation control provides for the imaging of crisp sharp dots, resulting in images with clearly defined edges.

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CONTRAINDICATIONS - None.

WARNINGS

This radiopharmaceutical should not be administered to patients who are pregnant or during lactation unless the information to be gained outweighs the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, on a woman of childbearing capability should be performed during the first few (approximately 10) days following onset of menses.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

PRECAUTIONS

As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient, consistent with proper patient management, and to insure minimum radiation exposure to occupational workers.

The test should not be started within 24 hours of a therapeutic dose (1000 μg) of vitamin B_{12} or within 24 hours of a loading dose of vitamin B_{12} given for the Schilling test.

If bone marrow examinations are to be done, they should precede the administration of this test, as the flushing parenteral dose of vitamin B_{12} may alter the bone marrow picture.

ADVERSE REACTIONS - None.

One day test for Vitamin B_{12} malabsorption

Conveniently packaged in 2-test or 5-test kits

Amersham

AMERSHAM CORPORATION:
A SUBSIDIARY OF THE RADIOCHEMICAL CENTRE

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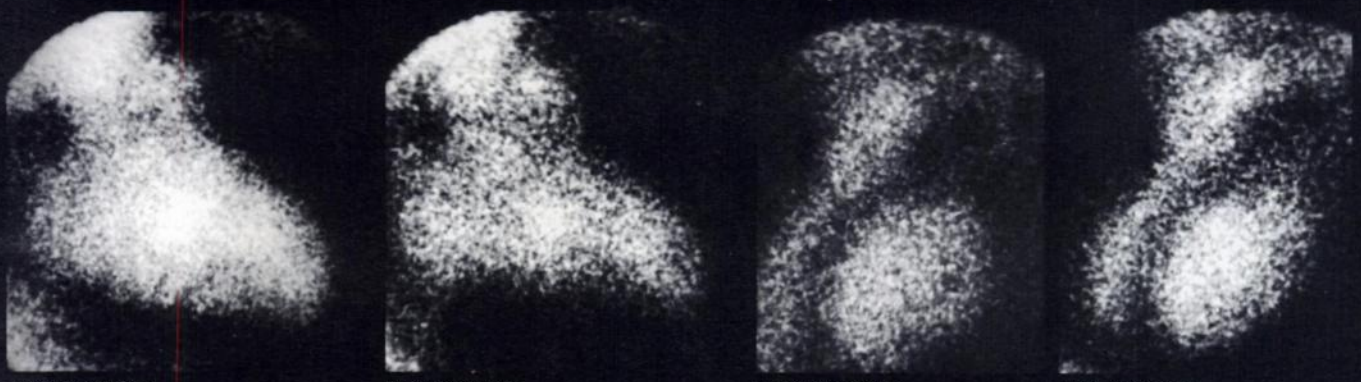
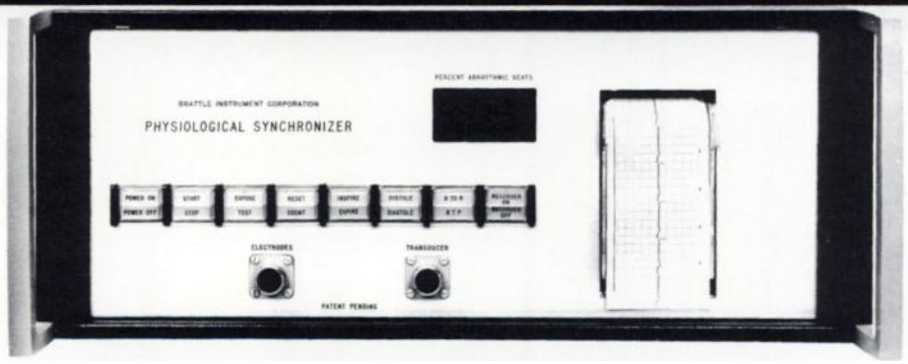
Help your cardiologist study heart kinetics non-invasively with Brattle-gated scintiphotos.



RAO, DIASTOLE | RAO, SYSTOLE | LAO, DIASTOLE | LAO, SYSTOLE

The RAO view shows akinesis of the lower antero-lateral wall and apex; and contraction of the inferior wall and high up the antero-lateral wall. The LAO view shows good contraction posteriorly and akinesis of the septal aspect of the chamber. Patient was injected IV with 20mCi of ^{99m}Tc-labelled Human Serum Albumin. The agent was prepared using the New England Nuclear Electrolysis Kit for labelling HSA. Write or call for a portfolio of Brattle-gated lung, liver and heart studies.



No knobs, no meters, no errors
The spartan panel above tells the second-best part of our story. If you want to photograph peak systole, press the SYSTOLE button. If, say, you want systole only at full expiration, press the EXPIRATION button as well. If only breathing is relevant, don't press the heart button.

The Brattle is connected to the patient and to your gamma (or x-ray or ultrasonic) camera. Whenever the patient is in the selected phase, both the scope and the scaler on your gamma camera are gated ON, and film is exposed. Otherwise, they are OFF.

Brattles lock onto patients—and stay locked on
It doesn't matter if the patient's heart rate and breathing depth change while he's under the collimator because we stay right with him. Brattles contain an ECG to track heart, a plethysmograph to track respiration, and a tiny computer to deduce systole and diastole times from the heart signal. And because it's all built in, your operator need not be a physiologist.

We don't cover our tracks—we print them
The panel lights flash whenever the patient reaches the selected phases; and pushing the RECORDER-ON button gets you an ECG tracing marked with breathing and camera-on times. You can verify function before, during and after exposure.

A single pair of axillary electrodes captures both heart and breath
It's easy. And we supply disposable, pre-filled electrodes.

Some Brattles have been in clinical use for over three years—in community and major hospitals
More than half of our instruments are in community hospitals and the list is growing rapidly. Upon request, we'll supply names of happy users in your area.

What's the next step? Get in touch
Ask your NEN man about Brattles and HSA Kits. He can show you a portfolio of clinical pictures and arrange to have one of our people give you a demo. Or write or call us direct. We'll send you brochures on this and other models, and will give you your own set of clinical pictures and a bibliography on gated scintigraphy. If you wish, we'll even make you a Brattle owner. (This is the best part of our story.)

Brattle Instrument Corporation

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