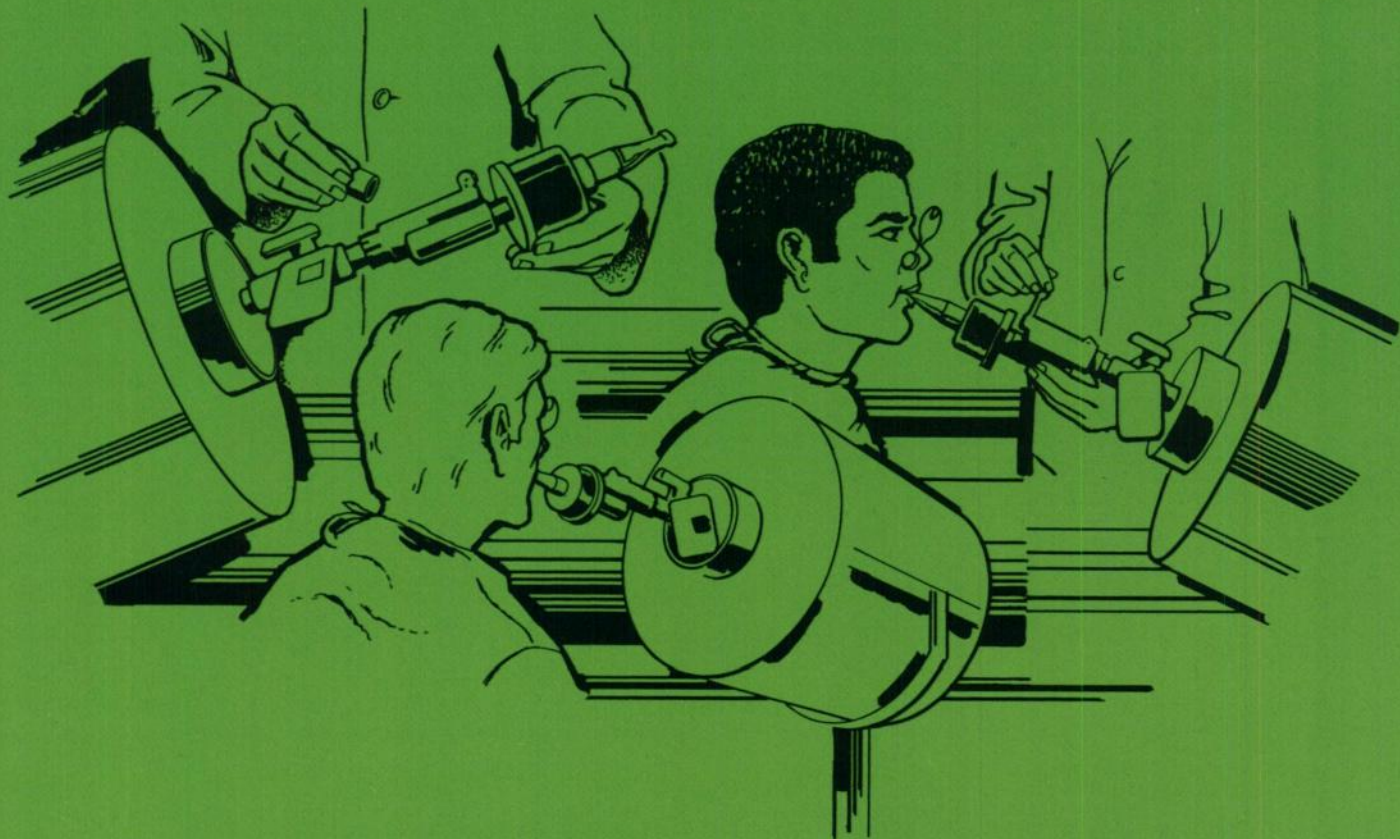

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Please see complete Package Insert before prescribing; a Brief Summary is included on the following page.

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

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DESCRIPTION: The Xenon Xe 133-Ventilation Study System consists of a sealed frangible capsule containing 10 millicuries $\pm 20\%$ of Xenon Xe 133 gas at calibration time and date with less than 1% carrier xenon in air.

INDICATIONS AND USAGE: Study of pulmonary ventilation.

WARNINGS: Xenon Xe 133 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 radio-pharmaceuticals, especially those elective in nature, of a woman of child-bearing capability should be performed during the first few (approximately 10) days following the onset of menses.

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. There are no well-controlled studies in pregnant women which allow any conclusions as to the safety of Xenon Xe 133 for the fetus. Xenon Xe 133 should be used in pregnant women only when clearly needed.

PRECAUTIONS: Xenon Xe 133 gas, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to clinical personnel and to patients consistent with proper patient management.

Exhaled Xenon Xe 133 gas should be controlled in a manner that is in compliance with the appropriate regulations of the government agency authorized to license the use of radionuclides.

Xenon Xe 133 gas delivery systems, i.e., respirators or spirometers, and associated tubing assemblies must be leak-proof to avoid loss of radioactivity into the laboratory environs not specifically protected by exhaust systems.

Xenon Xe 133 adheres to some plastics and rubber and should not be allowed to stand in tubing or respirator containers for such unrecognized loss of radioactivity from the dose for administration may render the study non-diagnostic.

ADVERSE REACTIONS: Adverse reactions specifically attributable to Xenon Xe 133 have not been reported.

DOSAGE AND ADMINISTRATION: The recommended activity range for pulmonary ventilation studies in the average patient (70 kg) is 2 to 20 millicuries (0.03 to 0.3 millicuries/kg).

HOW SUPPLIED: Each Ventilation Study System (V.S.S.) contains Xenon Xe 133 in a sealed frangible capsule containing 10 millicuries $\pm 20\%$ at calibration time and date stated on the label.

The sealed capsule is enclosed in a metal valve-shield which is sealed with a plastic shrink-band to prevent accidental loss of xenon during shipping. A Key is provided to remove the end plugs of the valve-shield and to turn the valve fitting which breaks the sealed capsule of Xenon Xe 133. The V.S.S. also includes a disposable filter/mouthpiece assembly and a breathing-collection bag with an attached CO₂ absorber canister.



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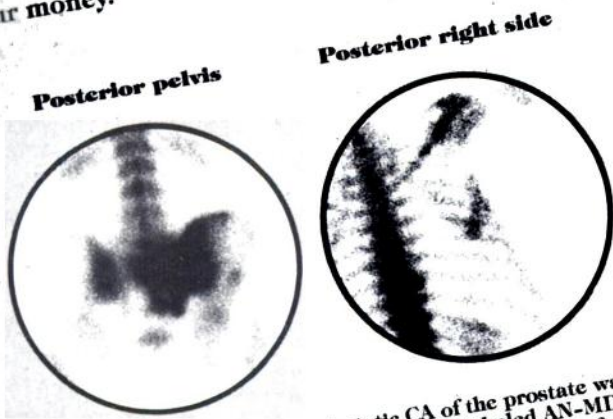
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A 54-year-old male with metastatic CA of the prostate was administered 15 mCi technetium Tc 99m-labeled AN-MDP. The images were recorded at 500K counts. Courtesy of Century City Hospital, Los Angeles.

For complete prescribing information, consult the package insert, a summary of which follows.

AN-MDP™ Technetium Tc 99m Medronate Kit

Indications and usage. Technetium Tc 99m Medronate may be used as a bone imaging agent to delineate areas of altered osteogenesis.

Contraindications. None known.

Warnings. This class of compounds 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. Contents of the vial are intended only for use

in the preparation of Technetium Tc 99m Medronate and are NOT to be administered directly to the patient. Technetium Tc 99m Medronate, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize radiation exposure to patients consistent with proper patient management.

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

Technetium Tc 99m Medronate should be formulated within six (6) hours prior to clinical use. Optimal imaging results are obtained 1-4 hours after administration.

Carcinogenesis, mutagenesis, impairment of fertility. No long-term animal studies have been performed to evaluate

carcinogenic potential or whether Technetium Tc 99m Medronate affects fertility in males or females.

Pregnancy category C. Animal reproductive studies have not been conducted with Technetium Tc 99m Medronate. It is also not known whether Technetium Tc 99m Medronate can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Technetium Tc 99m should be given to a pregnant woman only if clearly needed. 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.

Nursing mothers. Technetium Tc 99m is excreted in human milk during lactation; therefore formula feedings should be substituted for breast feedings.

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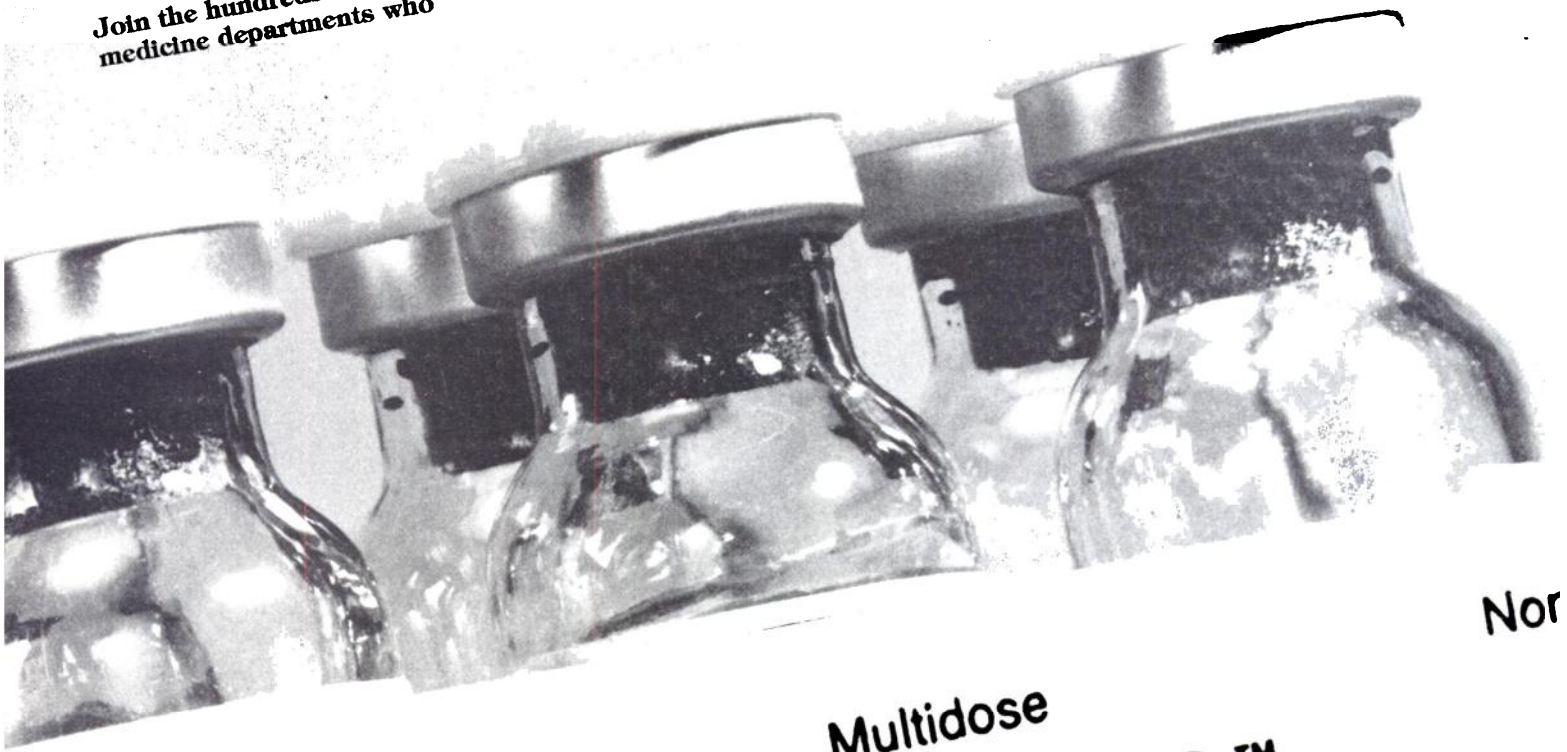
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1. Davis MA, and Jones AG: **Sem Nucl Med** 6:19, 1976
2. Subramanian G, McAfee JG, Blair RJ, Kalfelz FA, and Thomas FD: **J Nucl Med** 16:744, 1975

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AN - MDP™ MEDRONATE

Pediatric use: Safety and effectiveness in children have not been established.

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.

Adverse reactions. No adverse reactions specifically attributable to the use of Technetium Tc 99m Medronate have been reported.

Dosage and administration. The suggested dose range for i.v. administration, after reconstitution with oxidant-free sodium pertechnetate Tc 99m Injection, to be employed in the average patient (70 kg) is:

Bone imaging: 10-20 mCi Technetium Tc 99m Medronate

Scanning is optimal at about 1-4 hours post-injection. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

How supplied. AN-MDP™ is supplied both in the single-dose and multidose form. Both are available in sets of 6 or 30 sterile and nonpyrogenic vials. Each nitrogen-flushed vial contains, in lyophilized form:

	Single dose	Multidose
Medronic acid	5.0 mg	10.0 mg
Stannous chloride (minimum)	0.25 mg	0.51 mg
Maximum total stannous and stannic chloride	0.51 mg	1.01 mg

The pH is adjusted to 5.0-5.5 with HCl and NaOH prior to lyophilization. Included in each 6-vial kit is one package insert and 12 radiation labels. In each 30-vial kit is one package insert and 60 radiation labels. Refrigeration is not necessary.

Description	Catalog Number
Single dose 6-vial kit	K-401-S
Single dose 30-vial ECONO-PAK	K-402-S
Multidose 6-vial kit	K-401
Multidose 30-vial ECONO-PAK	K-402

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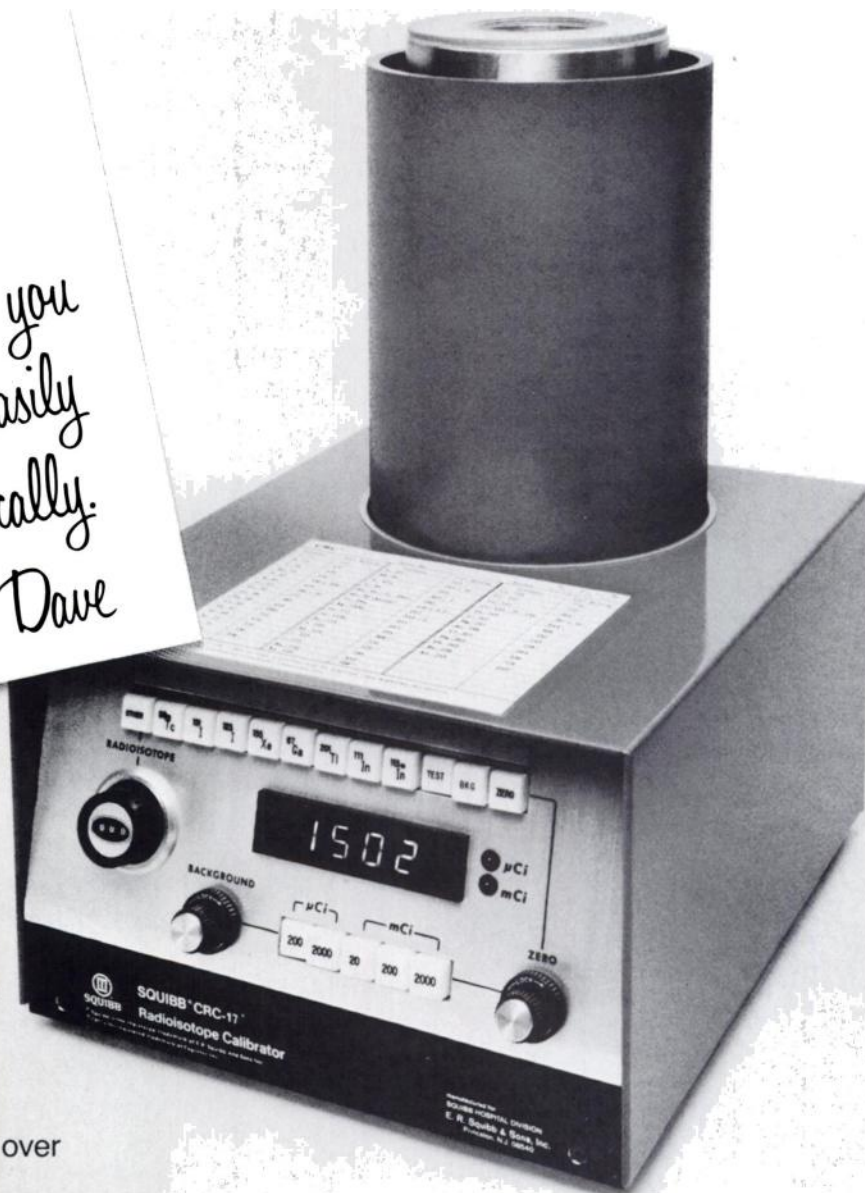
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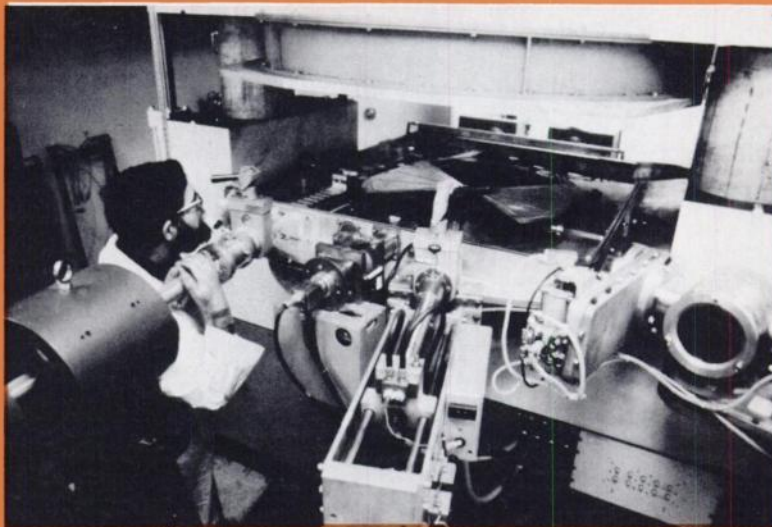
- Send CRC-17 information.
- Have representative call.



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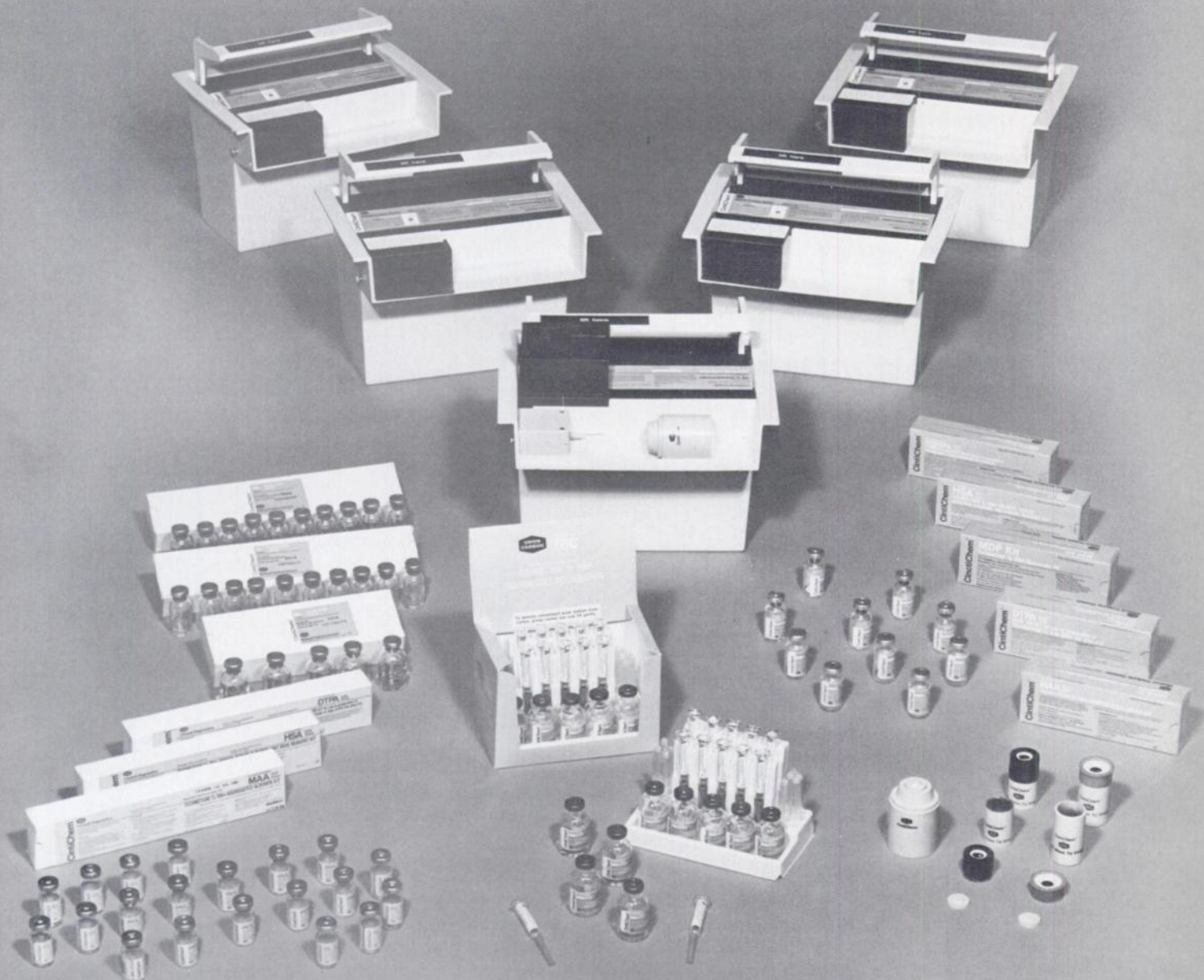
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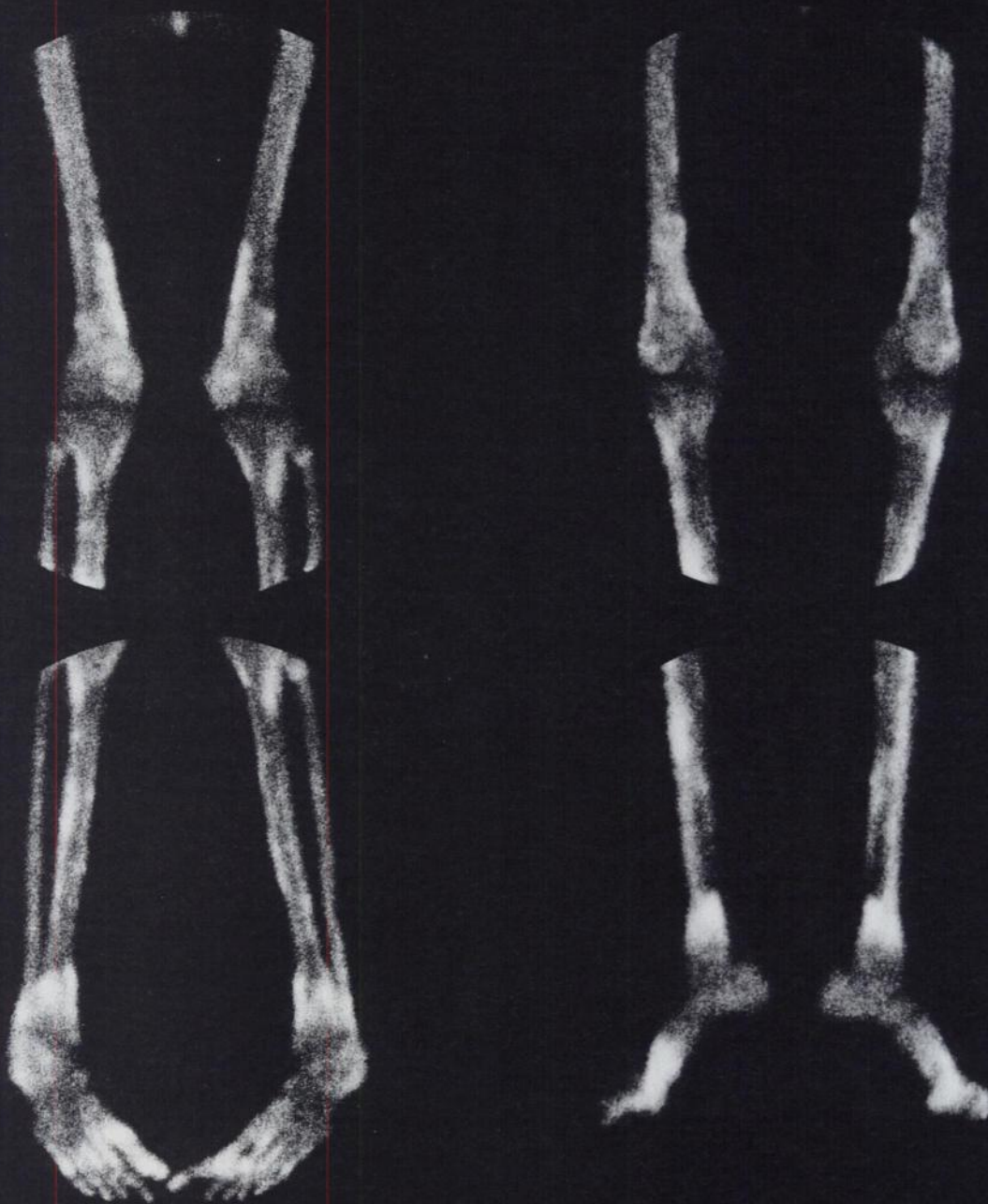
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Bone



Diagnosis: hypertrophic
pulmonary osteoarthropathy

Imaging information: *Instrument:* GE MaxiCamera™ 535 *Dose:* 20 mCi OSTEOLITE
Scan time: 2.5-3.0 hours postinjection *Acquisition time:* 6 minutes/view

OSTEOLITE™
Technetium Tc 99m Medronate Sodium Kit (MDP)

NEN New England Nuclear®

Please see following page for brief prescribing information.

OSTEOLITE™

Technetium Tc 99m Medronate Sodium Kit (MDP)

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.

Since 50–75% of the administered dose is renally excreted, good patient hydration and frequent voiding for 4–6 hours post-injection will significantly reduce the bladder wall dose.

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 medro-

nate 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.

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.

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.**

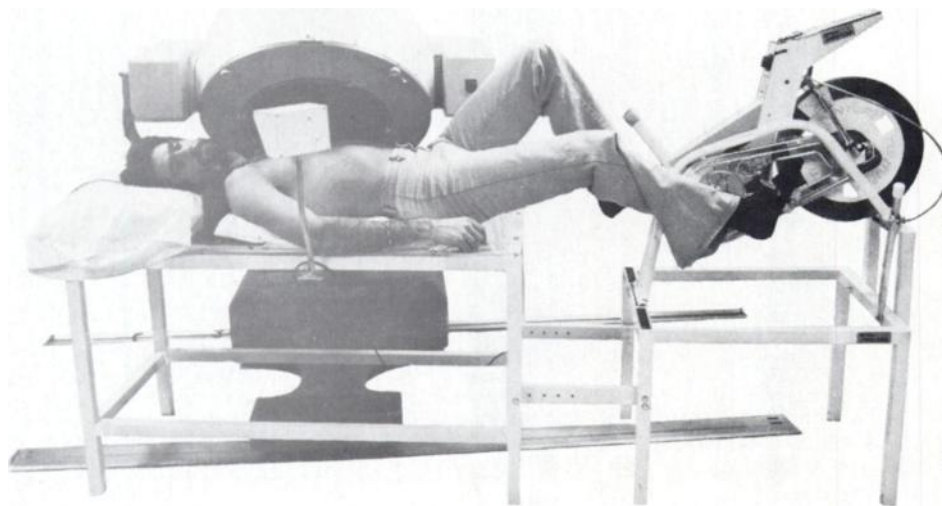
Do not use if there is a vacuum in the immediate drug container or if air is injected into the container when the dose is withdrawn.

Catalog Number NRP-420 (5 vial kit)

Catalog Number NRP-420C (30 vial kit)

April 1978

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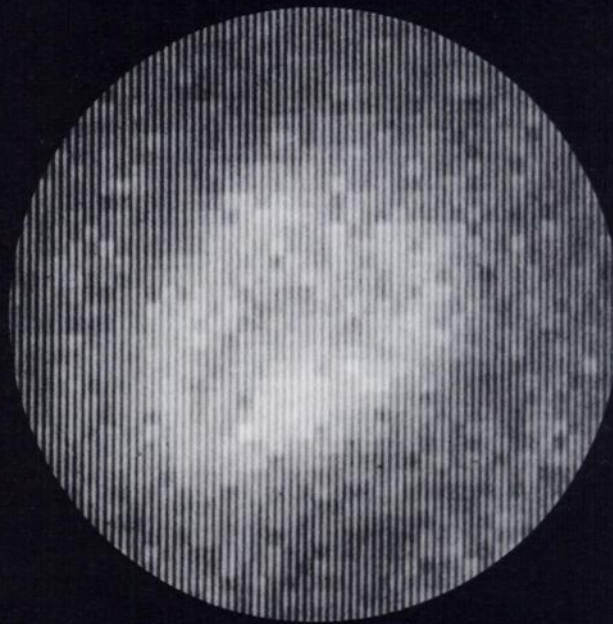
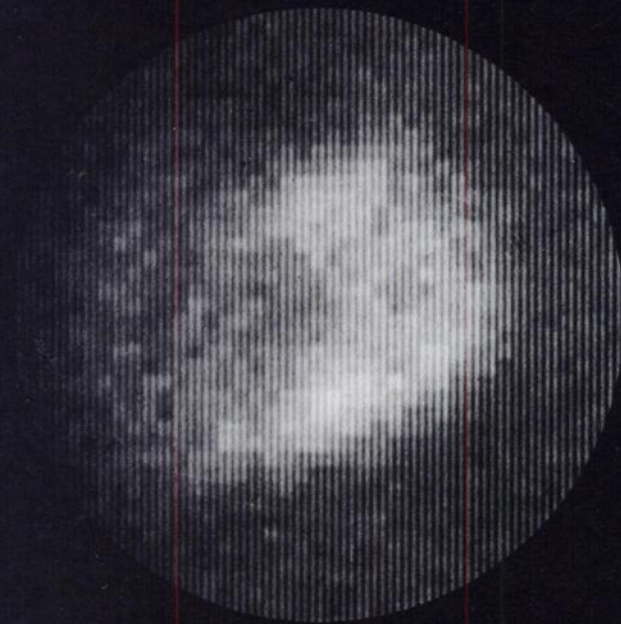
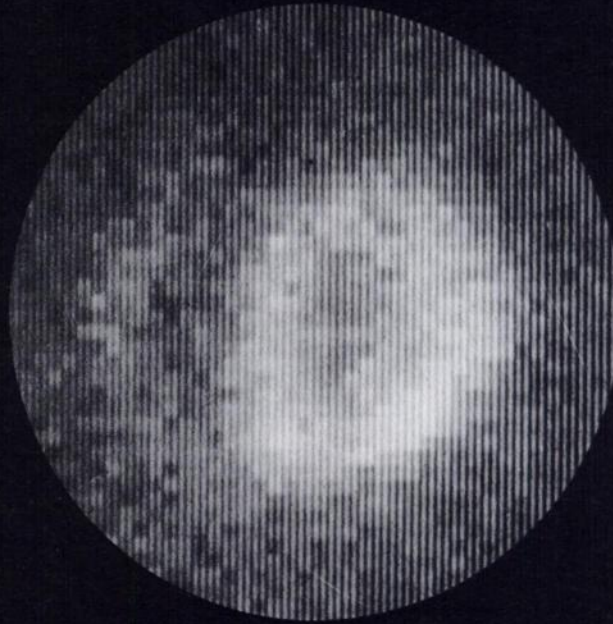
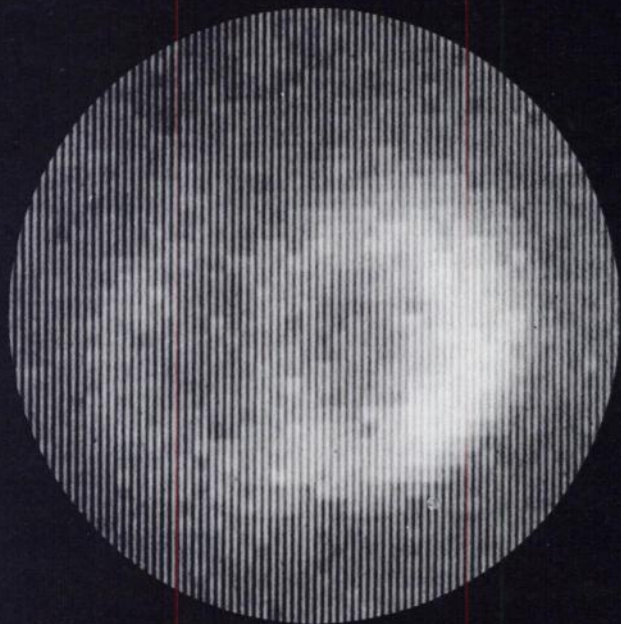
(patient studies with camera shown, available upon request)

O'NEILL ENTERPRISES 221 FELCH ST. ANN ARBOR MICHIGAN 48103 (313) 973-2335

Heart

Exercise

Redistribution



Diagnosis: reversible ischemia, apical, septal, anterior segments

Imaging information: *Instrument:* Ohio Nuclear Sigma 400 Gamma Camera, VIP 450
Dose: 1.5 mCi thallous chloride TI 201
Acquisition time: 10 minutes

Collimator: General, all purpose
Scan time: exercise — 4 minutes postinjection, redistribution — 4 hours

Thallous Chloride TI 201

NEN New England Nuclear®

Please see following page for brief prescribing information.

Thallous Chloride TI 201

INDICATIONS AND USAGE: Thallous Chloride TI 201 may be useful in myocardial perfusion imaging for the diagnosis and localization of myocardial infarction.

It may also be useful in conjunction with exercise stress testing as an adjunct in the diagnosis of ischemic heart disease (atherosclerotic coronary artery disease).

CONTRAINDICATIONS: None known.

WARNINGS: In studying patients in whom myocardial infarction or ischemia is known or suspected, care should be taken to assure continuous clinical monitoring and treatment in accordance with safe, accepted procedure. Exercise stress testing should be performed only under the supervision of a qualified physician and in a laboratory equipped with appropriate resuscitation and support apparatus.

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

PRECAUTIONS: Data are not available concerning the effect of marked alterations in blood glucose, insulin, or pH (such as is found in diabetes mellitus) on the quality of thallium TI 201 scans. Attention is directed to the fact that thallium is a potassium analog, and since the transport of potassium is affected by these factors, the possibility exists that the thallium may likewise be affected.

Thallous Chloride TI 201, as all radioactive materials, must be handled with care and used with appropriate safety measures 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. 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. Thallous Chloride TI 201

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: Adverse reactions related to use of this agent have not been reported to date.

DOSAGE AND ADMINISTRATION: The recommended adult (70kg) dose of Thallous Chloride TI 201 is 1-1.5mCi. Thallous Chloride TI 201 is intended for intravenous administration only.

For patients undergoing resting thallium studies, imaging is optimally begun within 10-20 minutes after injection. Several investigators have reported improved myocardial-to-background ratios when patients are injected in the fasting state, in an upright posture, or after briefly ambulating.

Best results with thallium imaging performed in conjunction with exercise stress testing appear to be obtained if the thallium is administered when the patient reaches maximum stress and when the stress is continued for 30 seconds to one minute after injection. Imaging should begin within ten minutes post-injection since target-to-background ratio is optimum by that time. Several investigators have reported significant decreases in the target-to-background ratios of lesions attributable to transient ischemia by two hours after the completion of stress testing.

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

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 government agencies authorized to license the use of radionuclides.

HOW SUPPLIED: Thallous Chloride TI 201 for intravenous administration is supplied as a sterile, non-pyrogenic solution containing at calibration time, 1mCi/ml of Thallous TI 201, 9mg/ml sodium chloride, and 9mg/ml of benzyl alcohol. The pH is adjusted to between 4.5-6.5 with hydrochloric acid and/or sodium hydroxide solution. Vials are available in the following quantities of radioactivity: 1.5, 3.0, 4.5, 6.0, and 9.0 millicuries of Thallous TI 201.

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

Catalog Number NRP-427

November 1977

Gallium Citrate Ga67

INDICATIONS AND USAGES: Gallium Citrate Ga-67 may be useful in demonstrating the presence and extent of the following malignancies: Hodgkins disease, lymphomas and bronchogenic carcinoma. Positive Ga-67 uptake in the absence of prior symptoms warrants follow-up as an indication of a potential disease state.

Gallium Citrate Ga 67 may be useful as an aid in detecting some acute inflammatory lesions.

CONTRAINDICATIONS: None known.

WARNINGS: Gallium Citrate Ga 67 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 radiopharmaceutical drug products, especially those elective in nature of a woman of childbearing capability should be performed during the first few (approximately ten) 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 findings 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. Gallium Citrate Ga 67 is intended for use as an adjunct in the diagnosis of certain neoplasms. Certain pathologic conditions may yield up to 40% false negative gallium studies. Therefore a negative study cannot be definitively interpreted as ruling out the presence of disease.

Lymphocytic lymphoma frequently does not accumulate Gallium Ga 67 sufficiently for unequivocal imaging; and the use of gallium with this histologic type of lymphoma is not recommended at this time.

Gallium Citrate Ga 67, 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.

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.

Gallium Ga 67 localization cannot differentiate between tumor and acute inflammation; and other diagnostic studies must be added to define the underlying pathology.

The expiration date of the drug is seven days after the date of calibration.

ADVERSE REACTIONS: Severe itching, erythema and rash were observed in one patient of 300 studied.

DOSAGE AND ADMINISTRATION: The recommended adult (70kg) dose of Gallium Citrate Ga 67 is 2-5mCi. Gallium Citrate Ga 67 is intended for intravenous administration only.

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 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.

Studies indicate the optimal tumor to background concentration of ratios are often obtained about 48 hours post-injection. 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.

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

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 government agencies authorized to license the use of radionuclides.

HOW SUPPLIED: Gallium Citrate Ga 67 is supplied sterile and non-pyrogenic for intravenous use. Each ml contains 2mCi of Gallium Ga 67 on the calibration date, as a complex formed from 9ng gallium chloride Ga 67, 2mg of sodium citrate, 6.8mg sodium chloride, and 0.9% benzyl alcohol w/v as preservative. The pH is adjusted to between 4.5-7.5 with hydrochloric acid and/or sodium hydroxide solution.

Vials are available from 3mCi to 18mCi in increments of 3mCi on calibration date.

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

Catalog Number NRP-121

December 1979



New England Nuclear

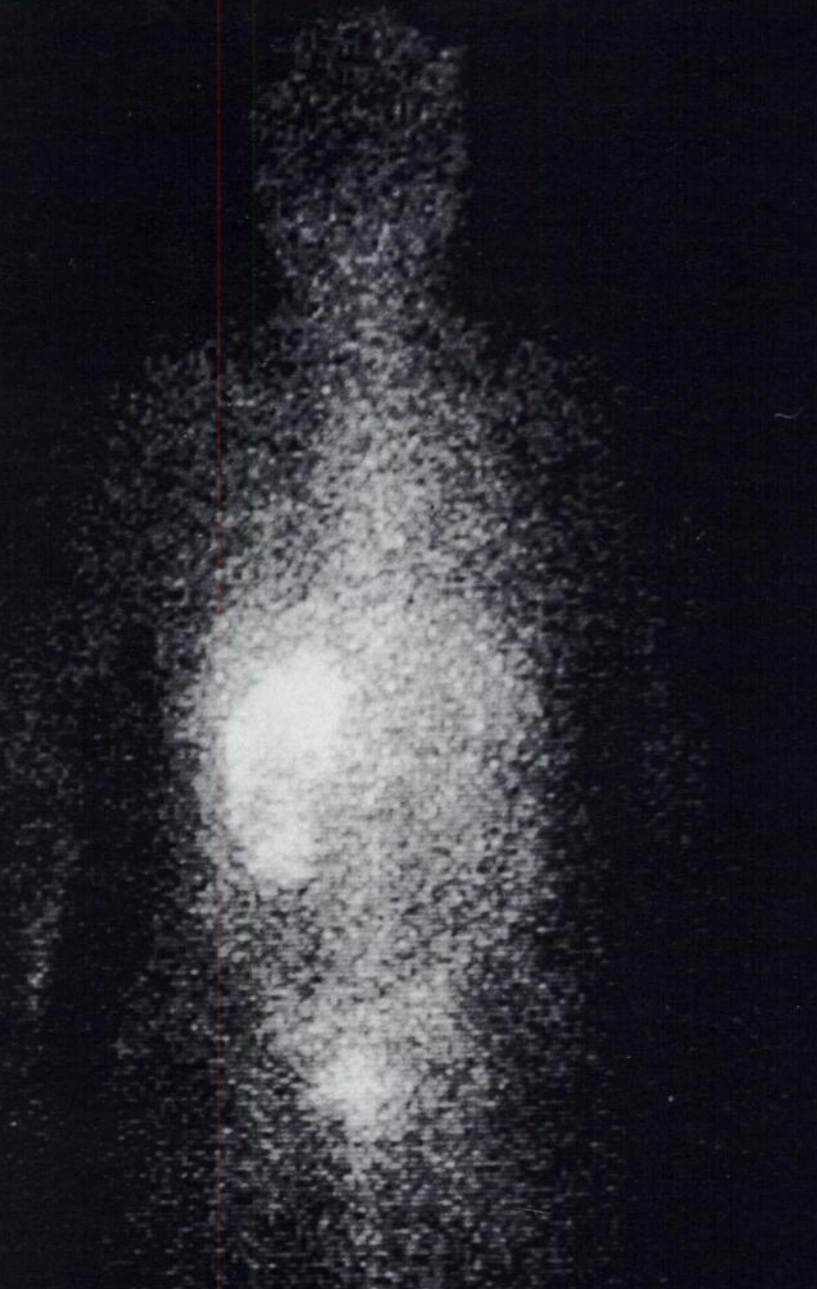
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Europe: NEN Chemicals GmbH, D-6072 Dreieich, W. Germany, Postfach 401240 Tel: (06103) 85034 Order Entry: (06103) 81011

Abscess



Diagnosis: intraneuric abscess

Imaging information: Instrument: Cleon 760 Whole Body Imager
Scan time: 48 hours postinjection Speed: 5 cm/min

Dose: 5 mCi Gallium Citrate Ga 67

Gallium Citrate Ga67



Please see preceding page for brief prescribing information.



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The Assayer 1 by Radx

The never ending struggle for product popularity often leads a manufacturer to add gadgets. It's called "one-upmanship." We sometimes lose sight of what YOU, the user, wants.

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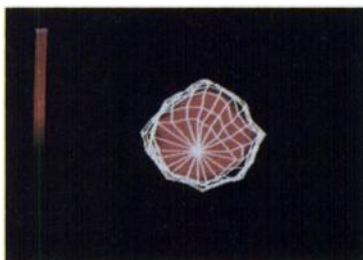
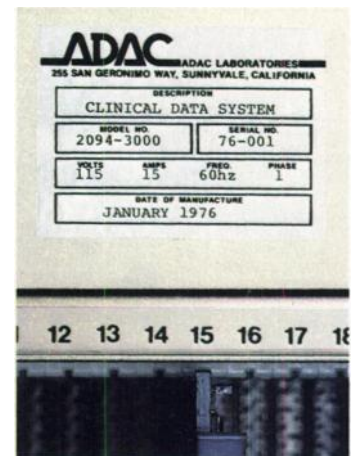
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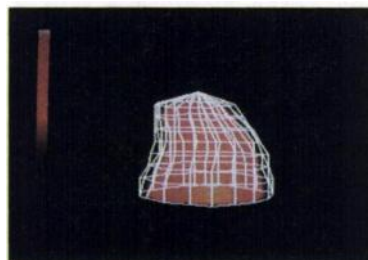
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Unlike non-ADAC owners. Who suffer the significant disadvantages of clinical obsolescence.

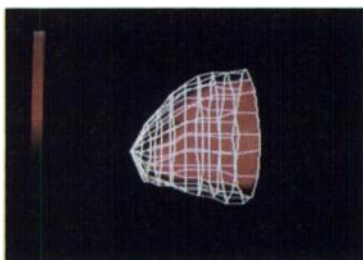
This is only one reason doctors have called the ADAC Nuclear Medicine Computer the finest system of its kind in the world.



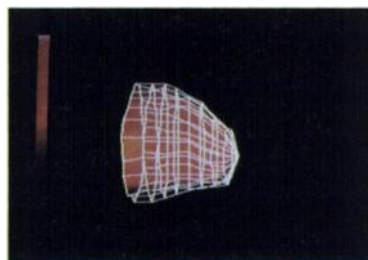
LAO



Inferior



LPO



RAO

Shade Program:

A three dimensional representation of the left ventricle is constructed for each segment using the 8 areas of interest of each plane in each segment. The even spacing of the planes is known since it was specified to perform the reconstruction; therefore, the areas of interest, x and y dimensions, can be connected to create the depth, z dimension. The operator can specify the projection for the constructed three dimensional image or "birdcage." Rotation can be done on the heart's x, y and z axis. Clinically, it is very valuable to rotate to the RAO, LPO, Superior Aspect, and Inferior Aspect. For example, the RAO projection allows the viewing of the long axis of the left ventricle without the right ventricle superimposed, since the edge detection did not include the right ventricle.

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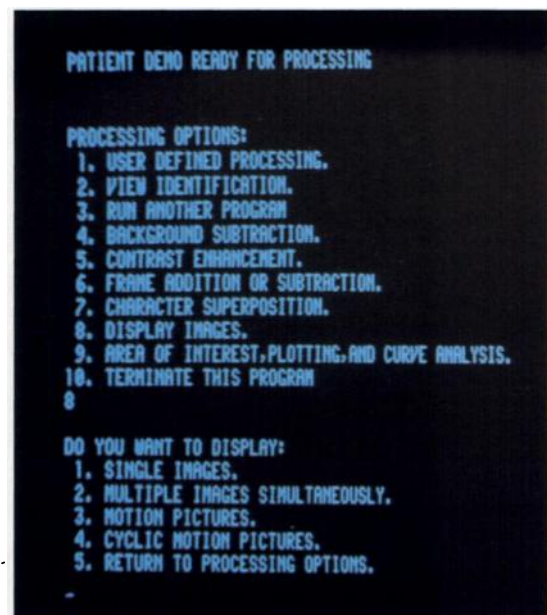
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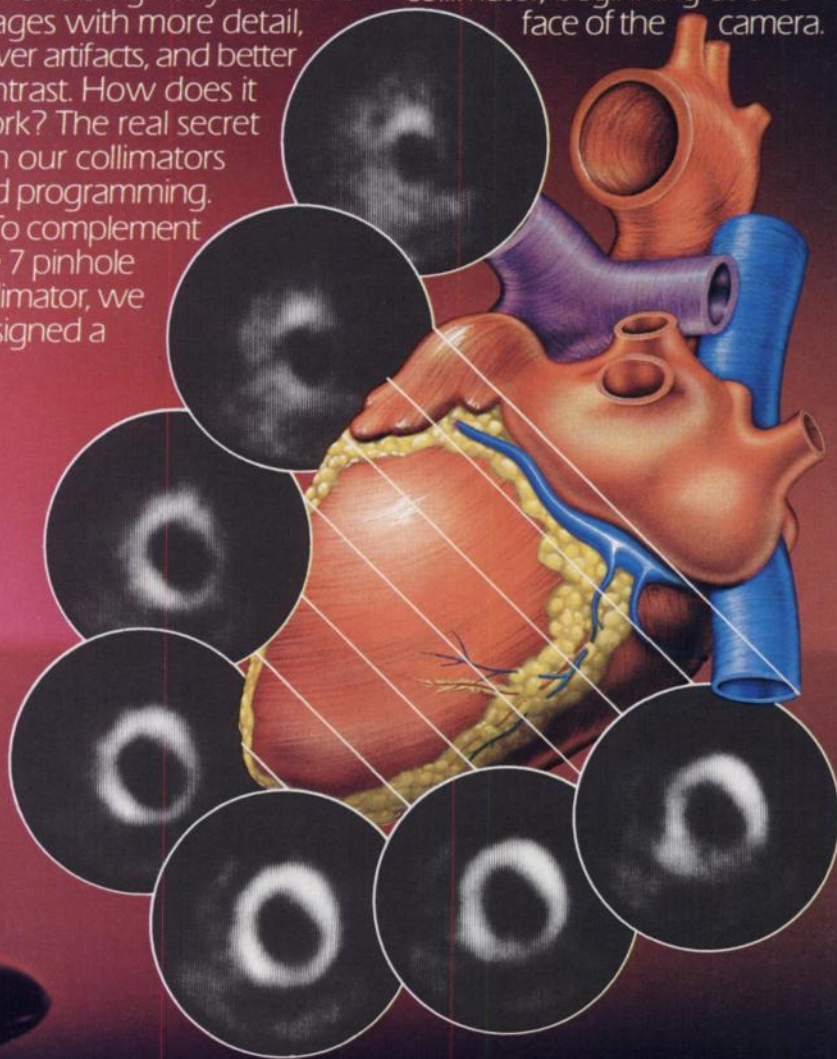


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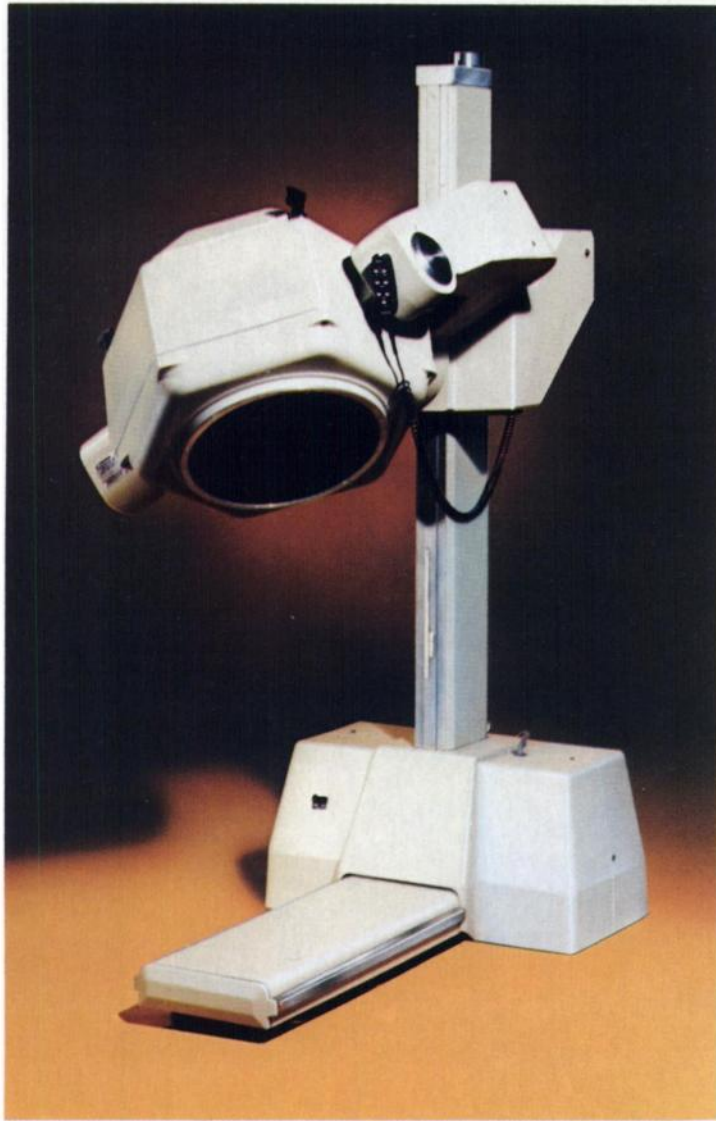
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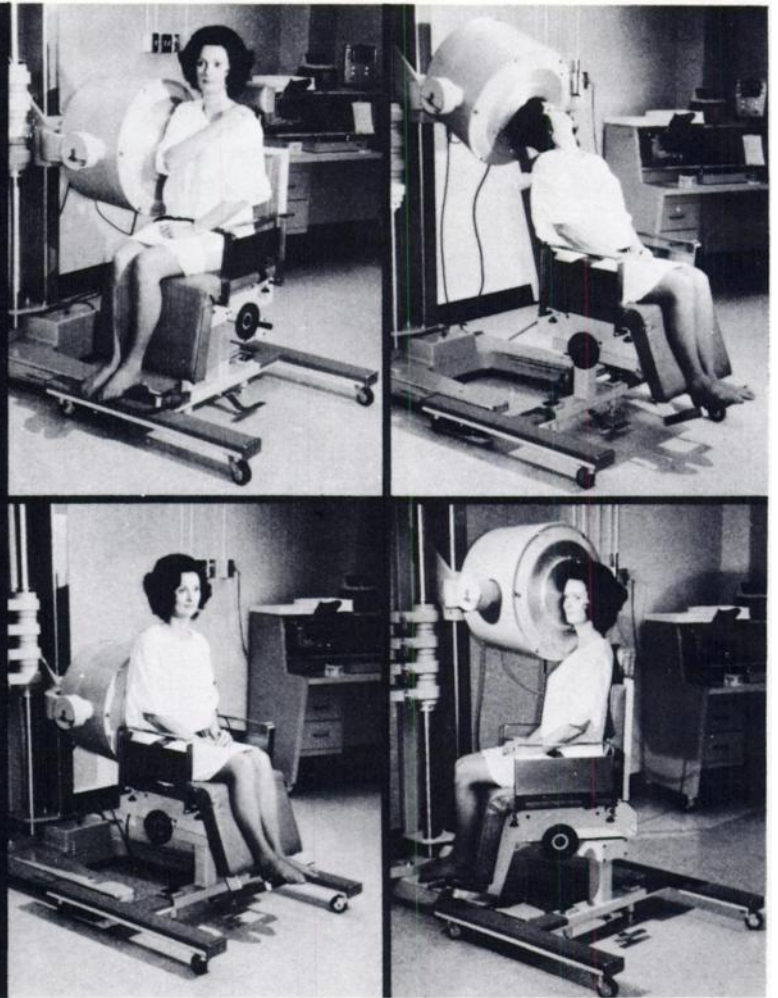
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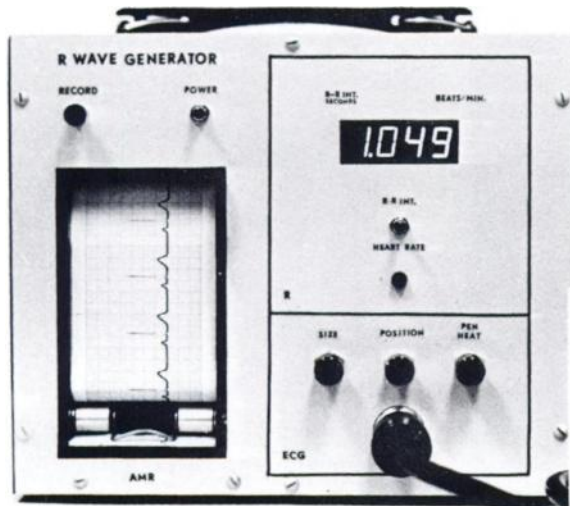
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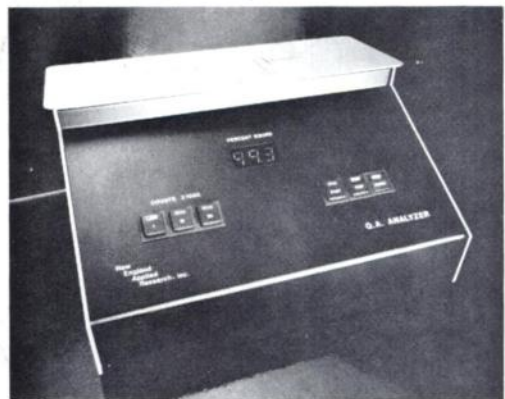
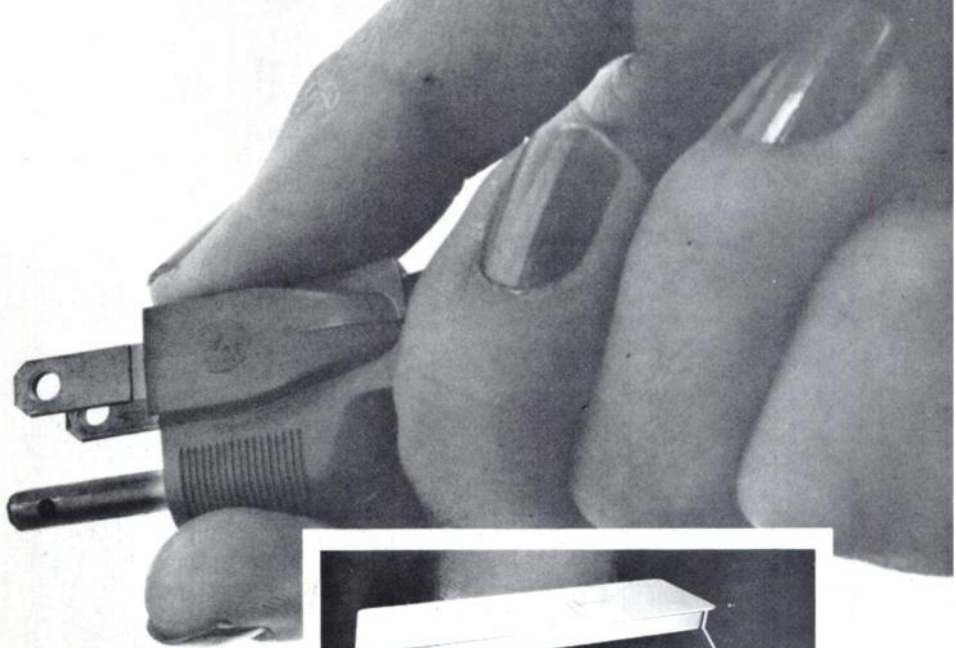
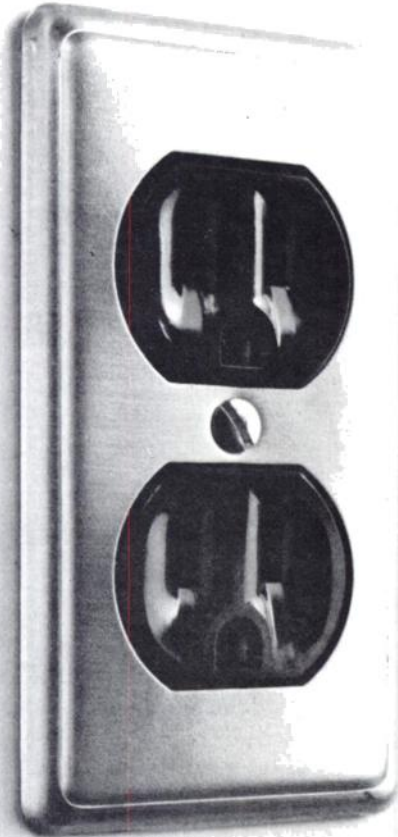
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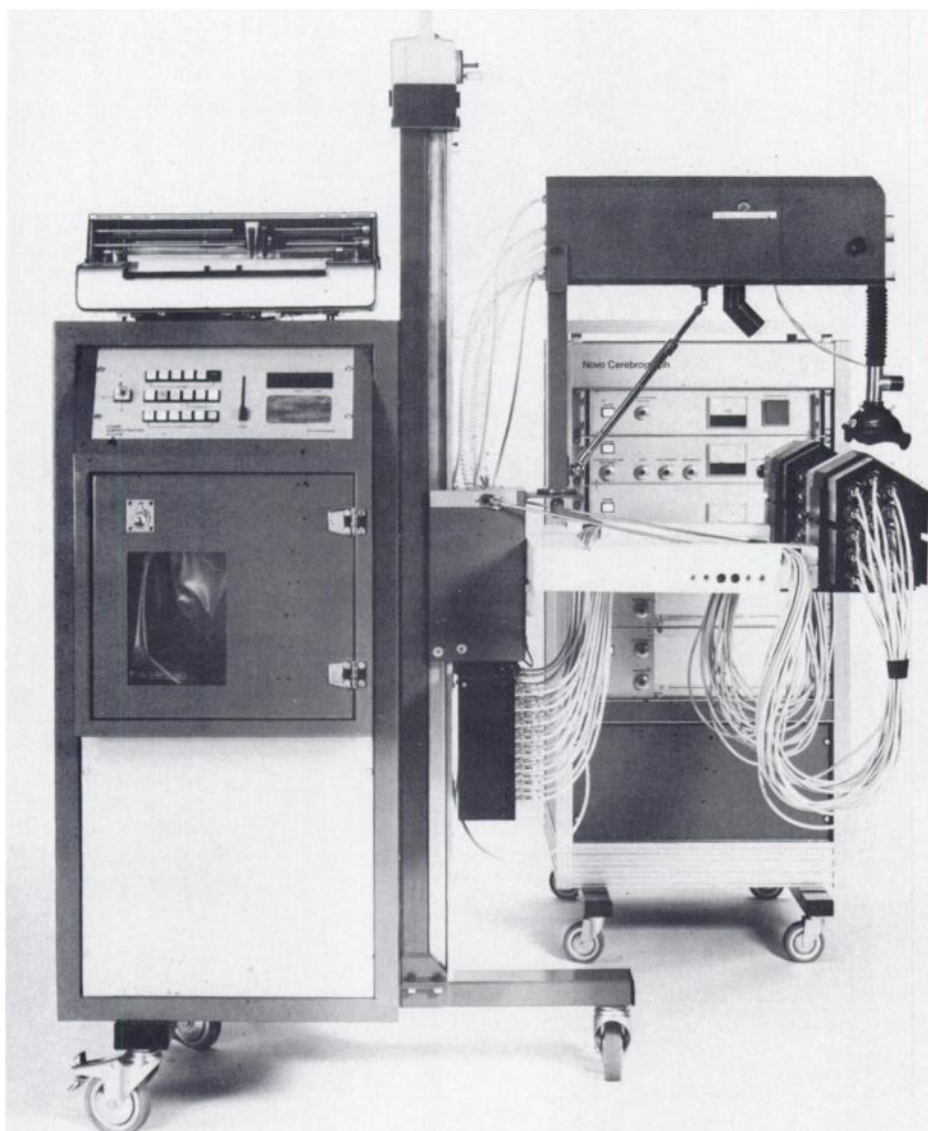
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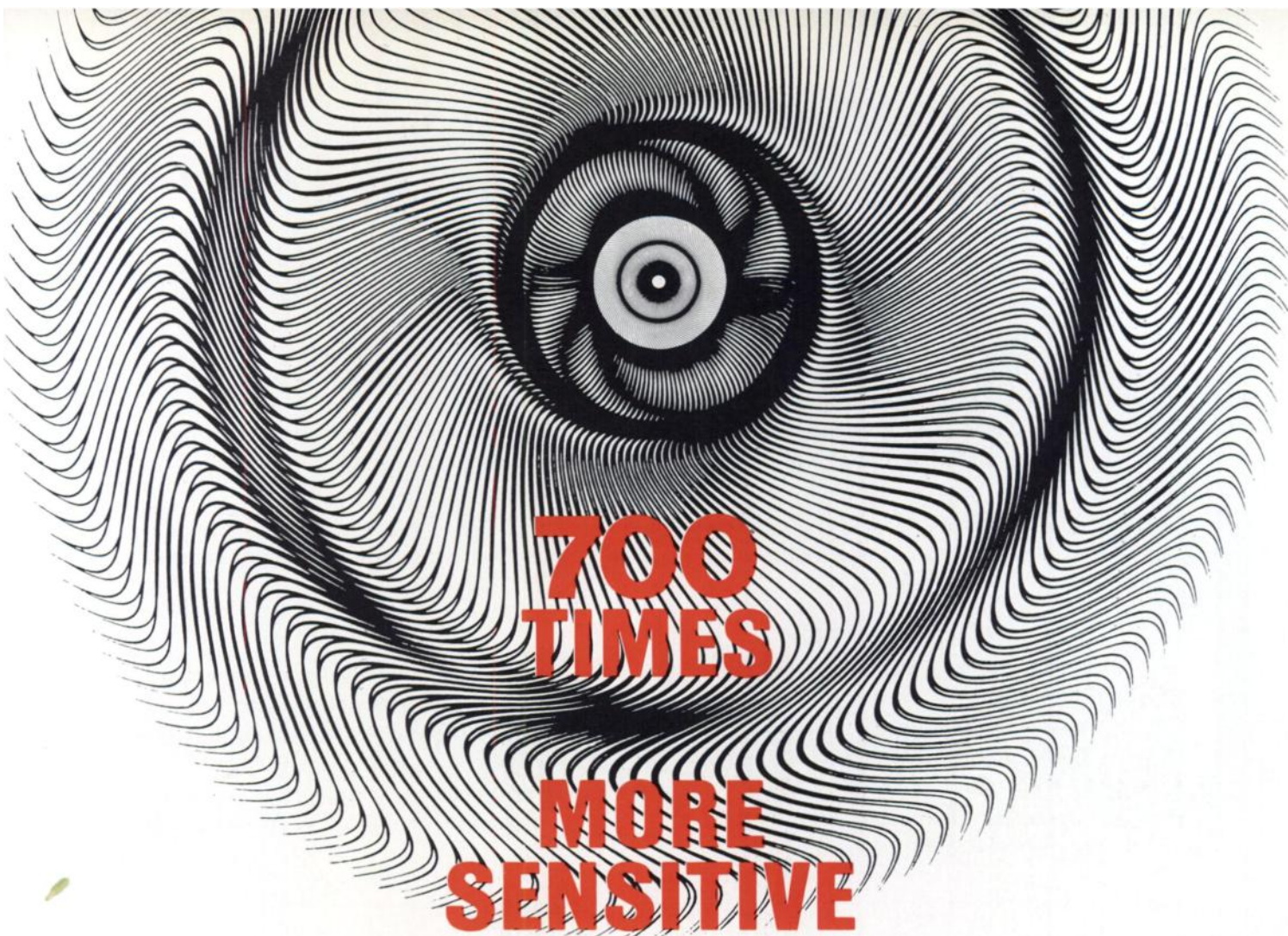
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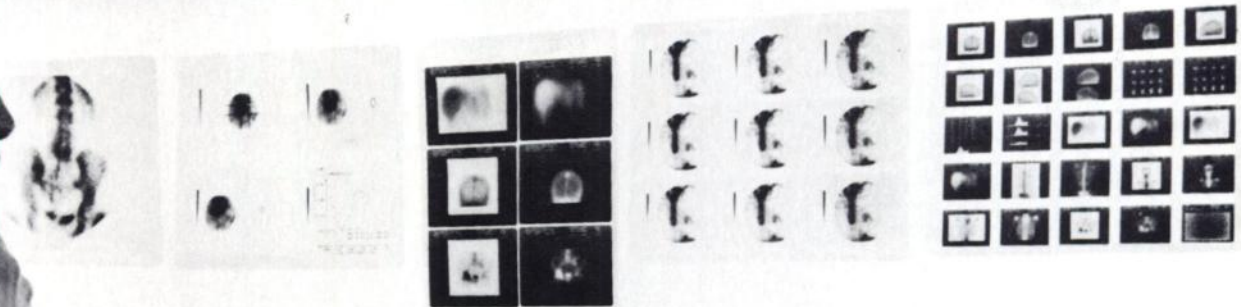
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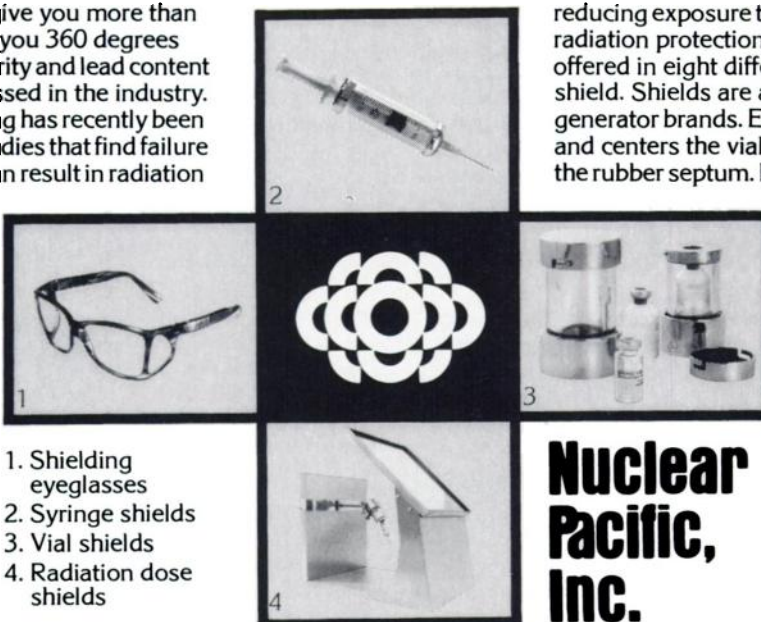
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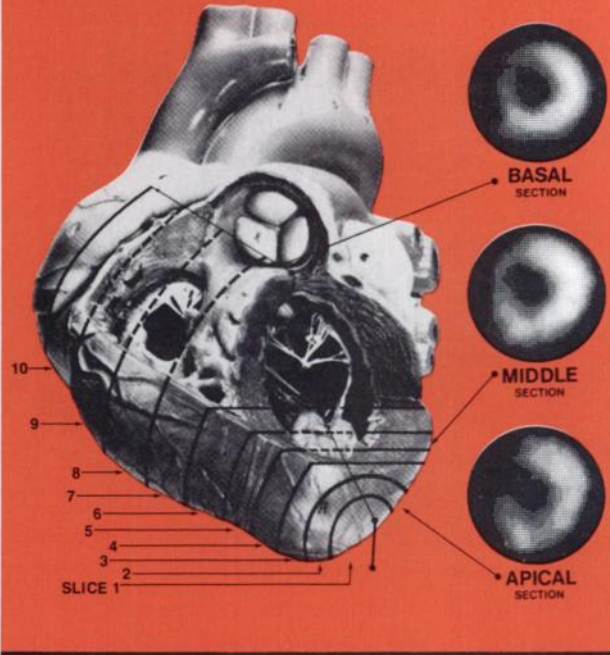
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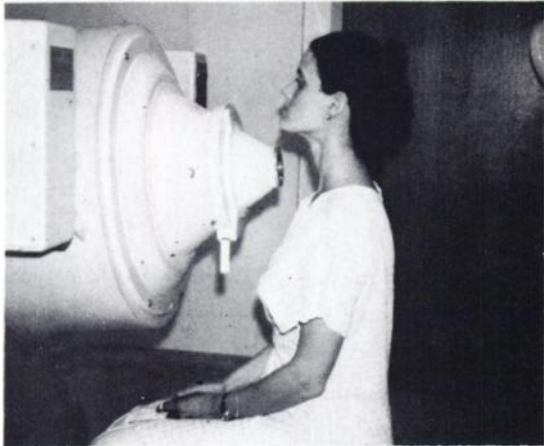
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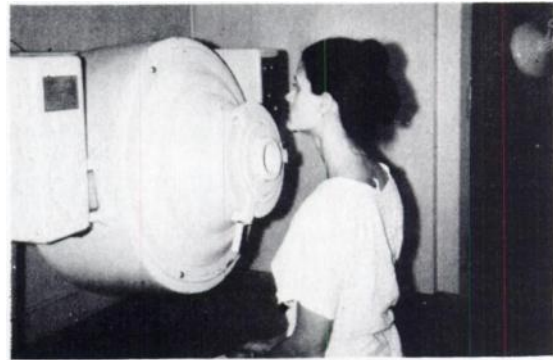


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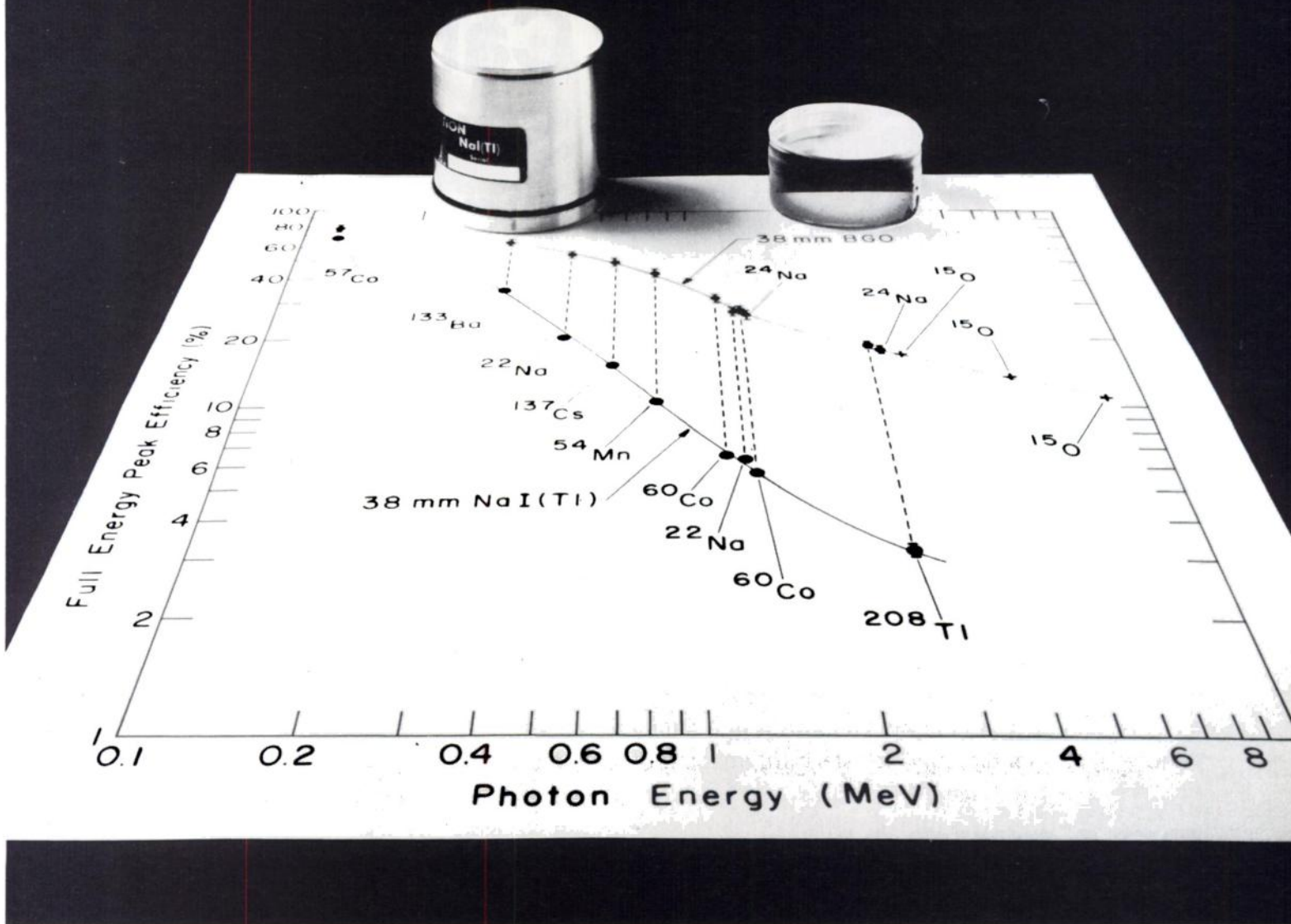
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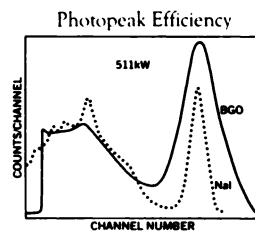
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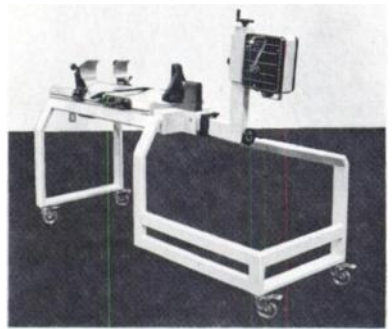


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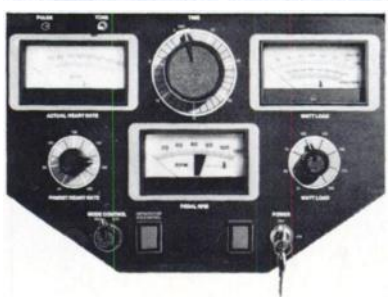
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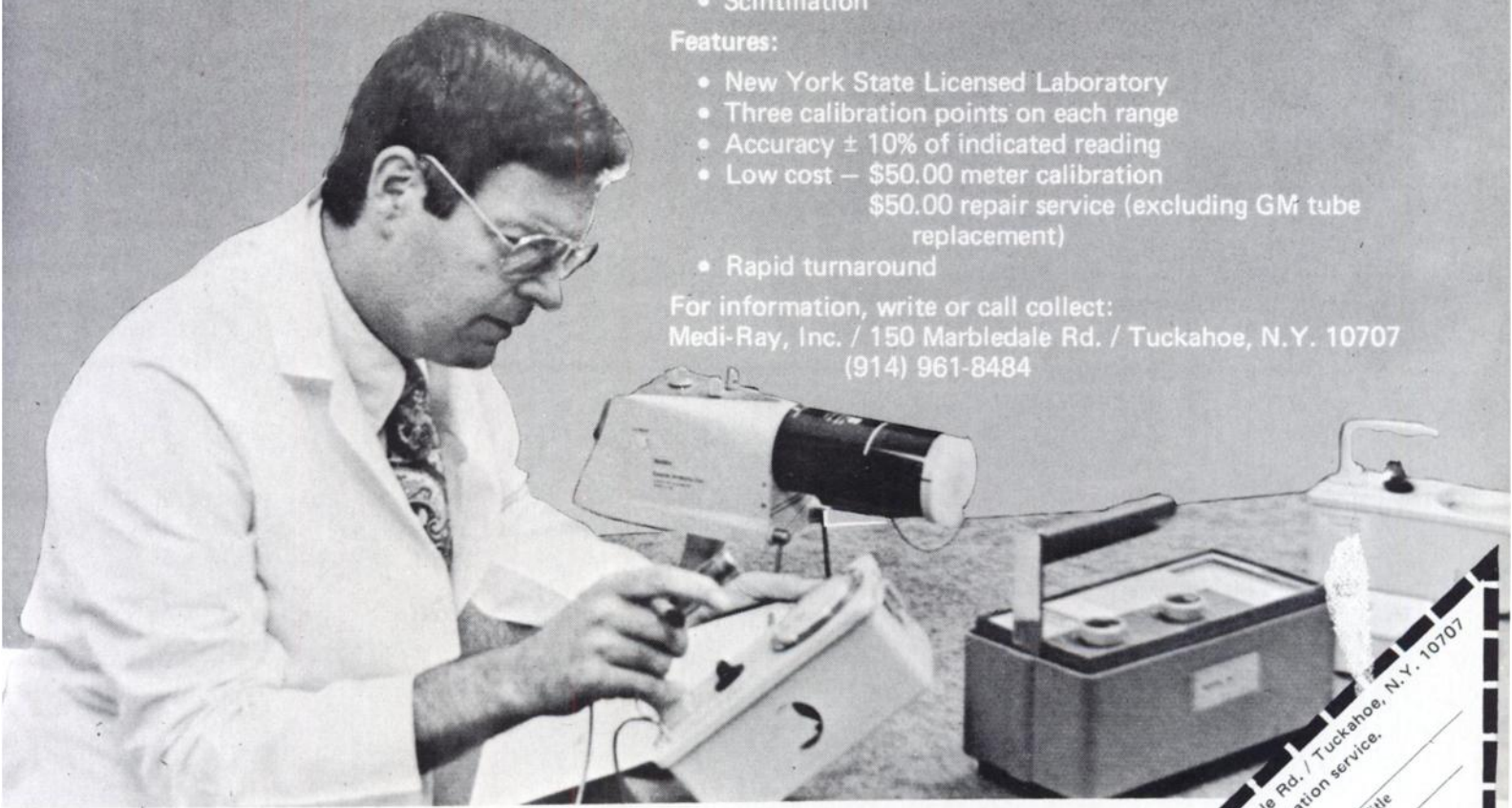
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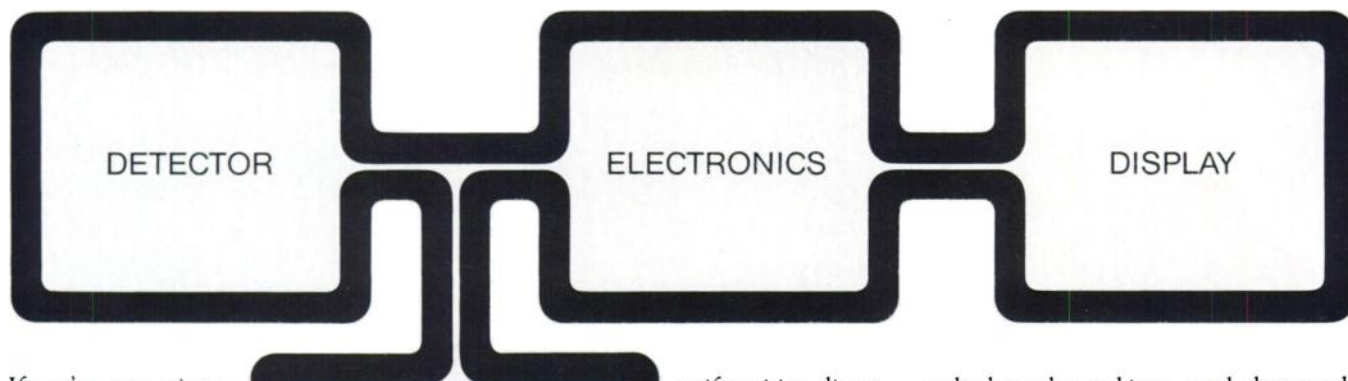
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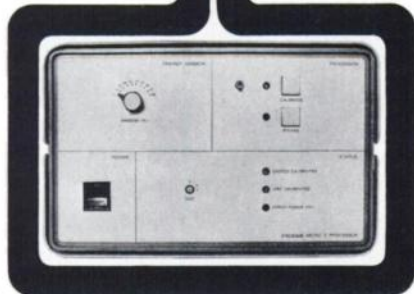
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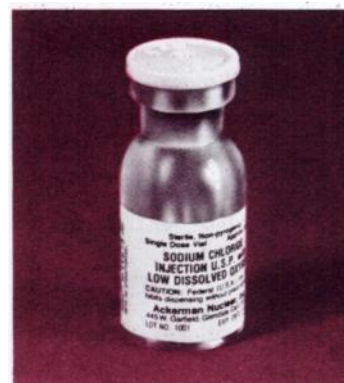
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1/78

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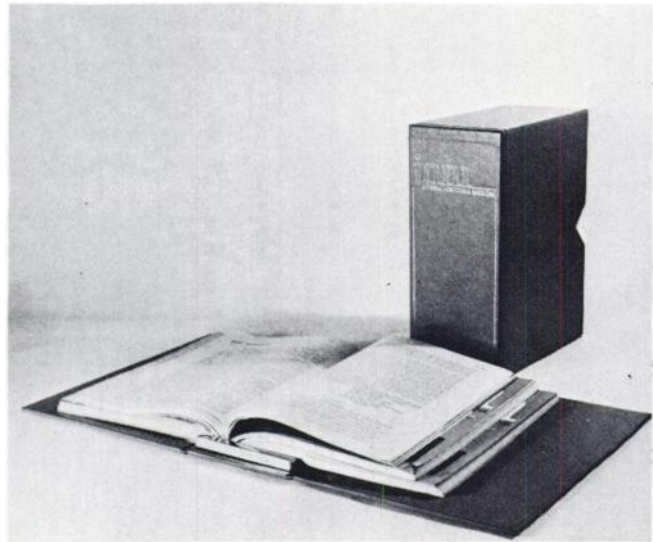
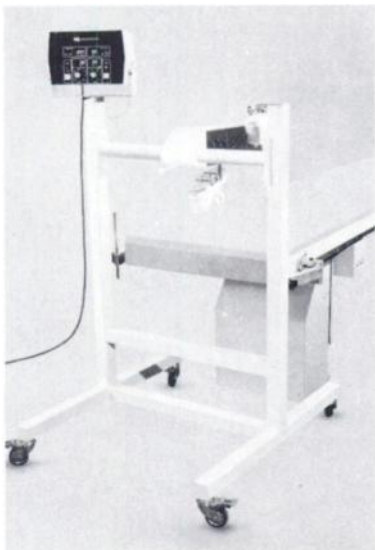
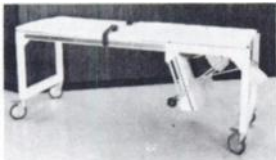


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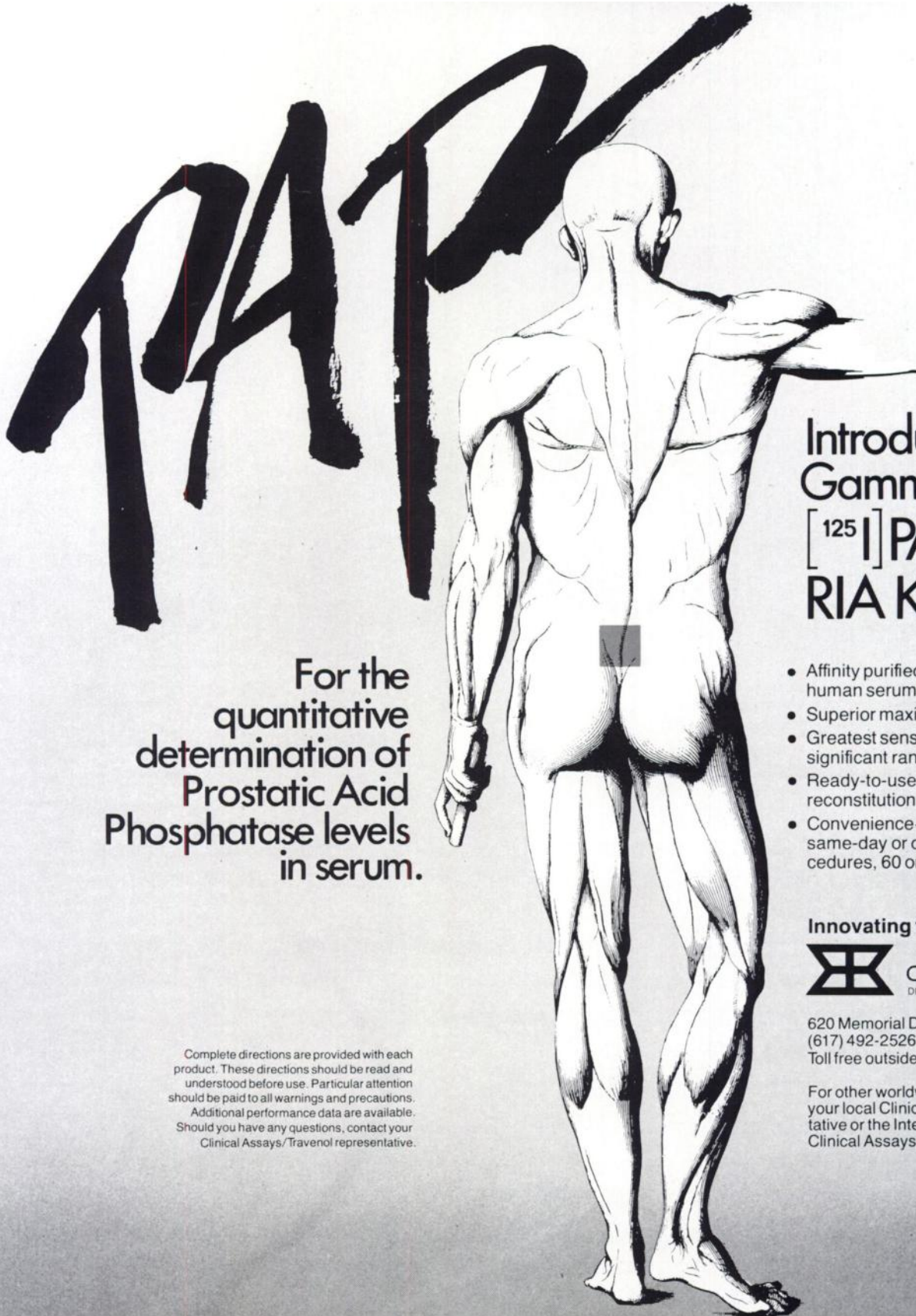
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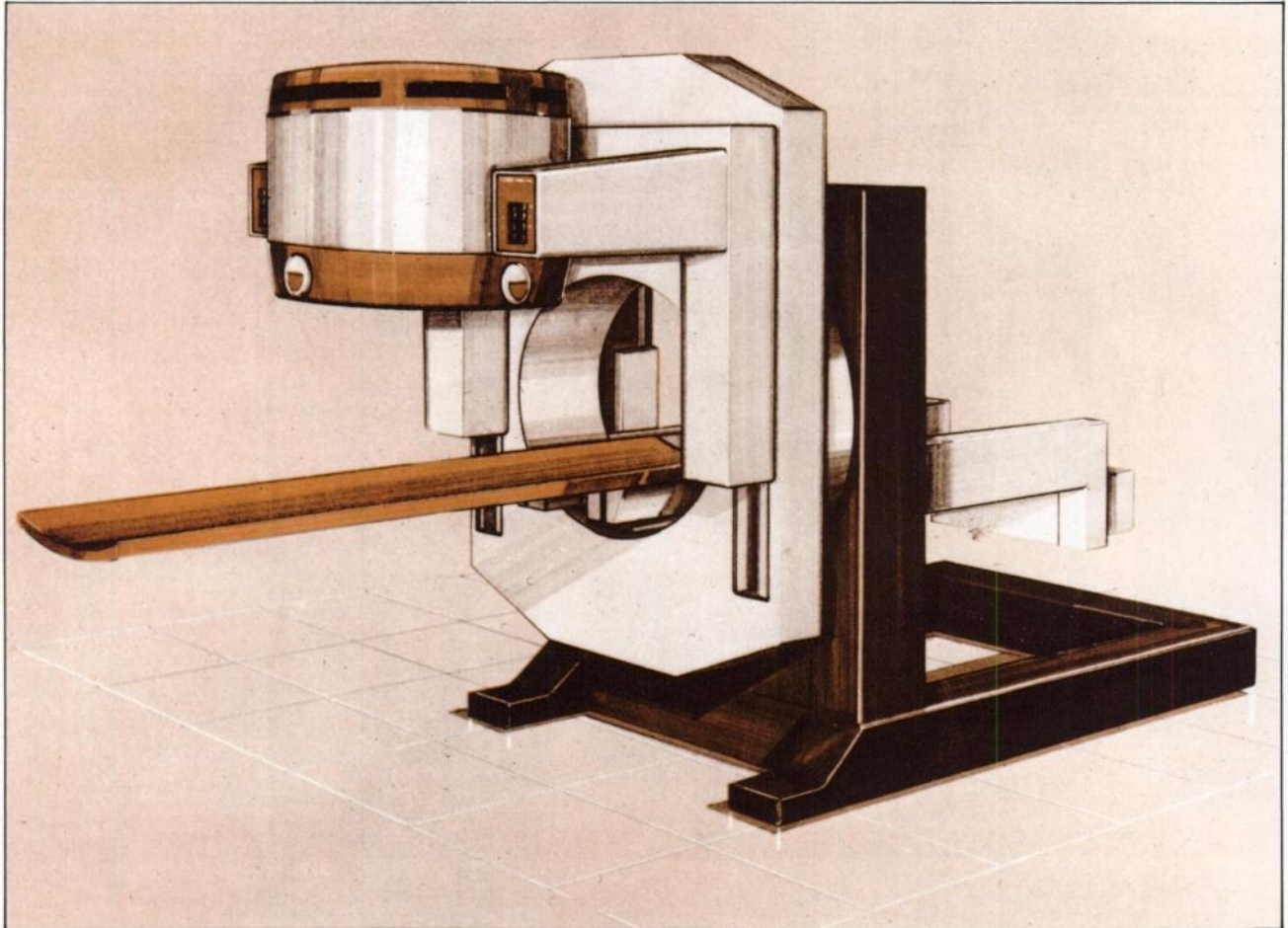


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Gammatome T 9000

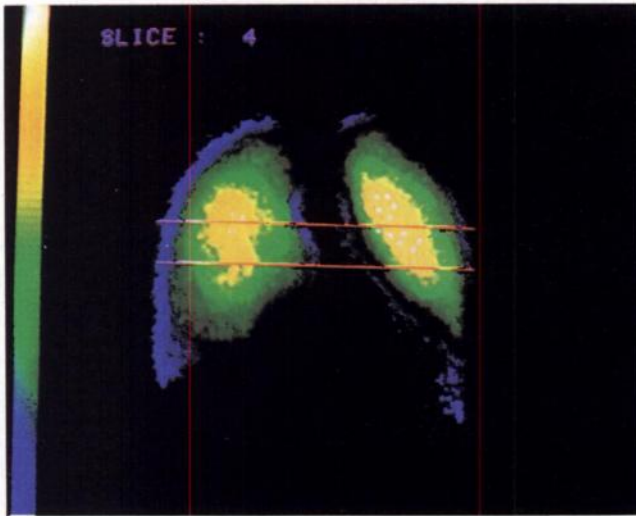
tomographic system

Typical tomographic applications examples

LUNGS

- Dose 4 mCi - Albumin serum ^{99m}Tc
- Examination performed 5' after injection

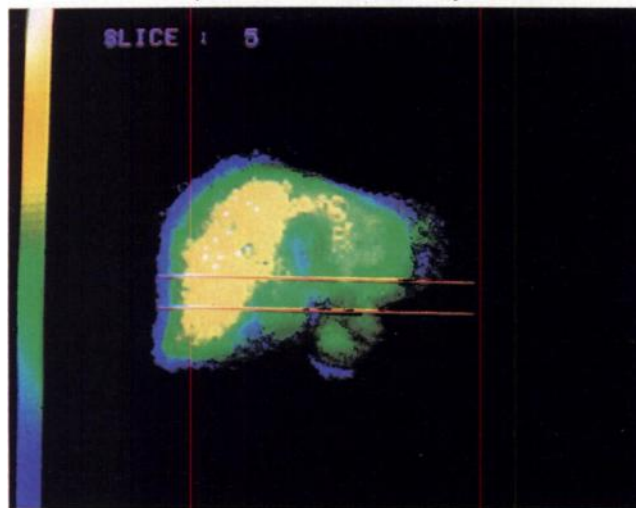
- Examination duration 4'
- Slice thickness 20 mm
- Pulmonary embolism.



LIVER

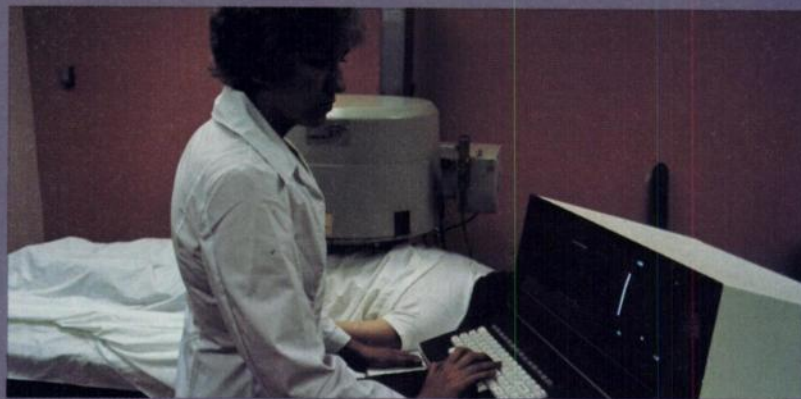
- Dose 4 mCi - Colloidal ^{99m}Tc sulphide
- Examination performed 5' after injection

- Examination duration 4'
- Slice thickness 20 mm
- Pathologic liver.



DOCUMENTS : Service des Isotopes Hôpital COCHIN - Pr. J.-C. ROUCAYROL - PARIS . Institut d'Optique - ORSAY - FRANCE

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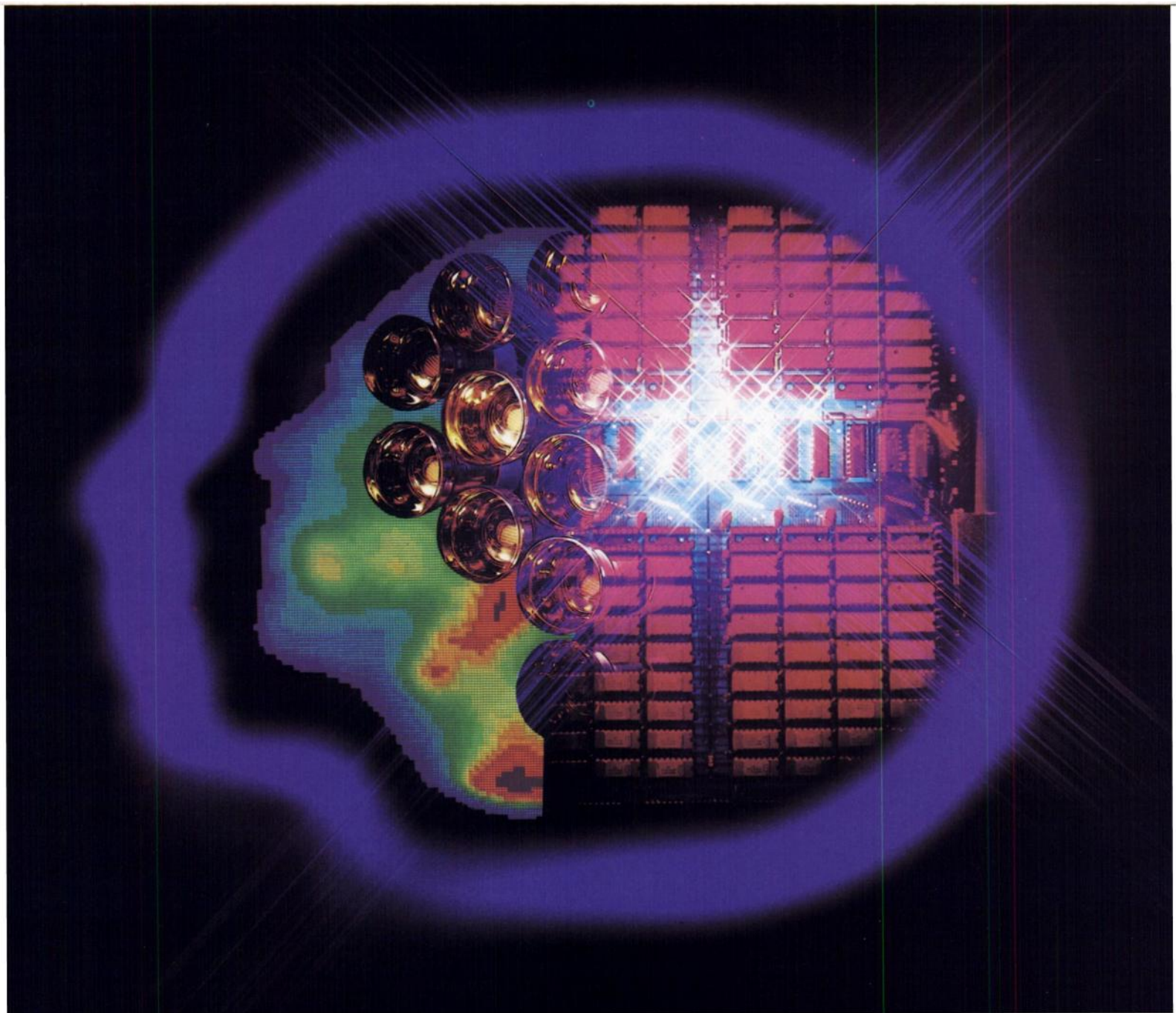
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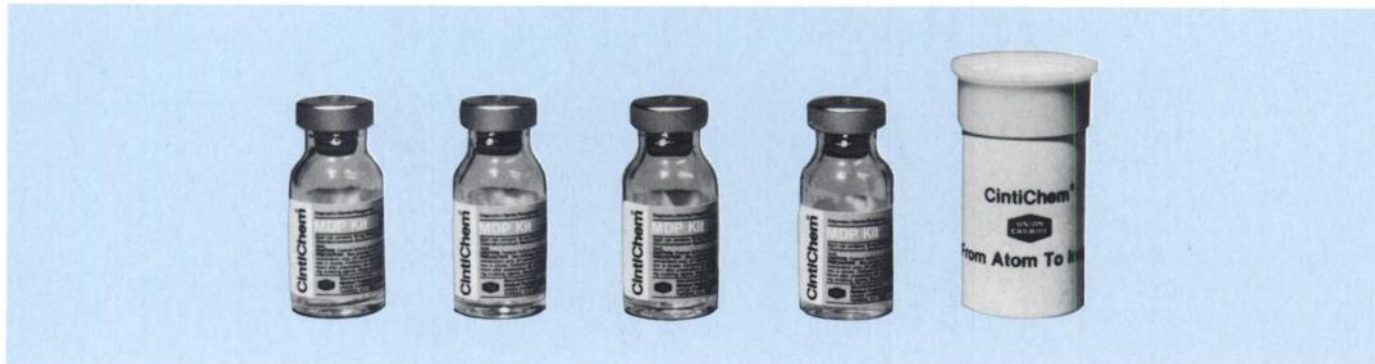
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BRIEF SUMMARY OF PRESCRIBING INFORMATION

indications and usage

Technetium Tc 99m Medronate may be used as a bone imaging agent to delineate areas of altered osteogenesis.

contraindications

None known.

warnings

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).

This radiopharmaceutical drug product should not be administered to children, to pregnant women, or to nursing mothers, unless the expected benefit to be gained outweighs the potential risk.

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

general

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

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

This preparation contains no bacteriostatic preservative. Technetium Tc 99m Medronate should be formulated within six (6) hours prior to clinical use.

pregnancy category C

Adequate reproductive studies have not been performed in animals to determine whether this drug affects fer-

tility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Medronate 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

No adverse reactions specifically attributable to the use of Technetium Tc 99m Medronate have been reported.

how supplied

Union Carbide's Technetium Tc 99m Medronate Kit is supplied as a sterile, pyrogen-free kit containing 5 vials.

Each 10 ml vial contains 10 mg medronic acid, 0.17 mg (minimum) stannous chloride (maximum stannous and stannic chloride 0.29 mg), and 2 mg ascorbic acid. The pH has been adjusted to 4-8 with either HCl or NaOH prior to lyophilization. Following lyophilization, the vials are sealed under a nitrogen atmosphere.

Product #17500502 Multidose vial shield with cap and retainer ring available separately.



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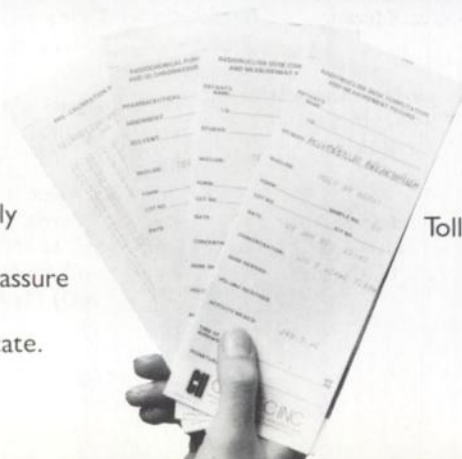


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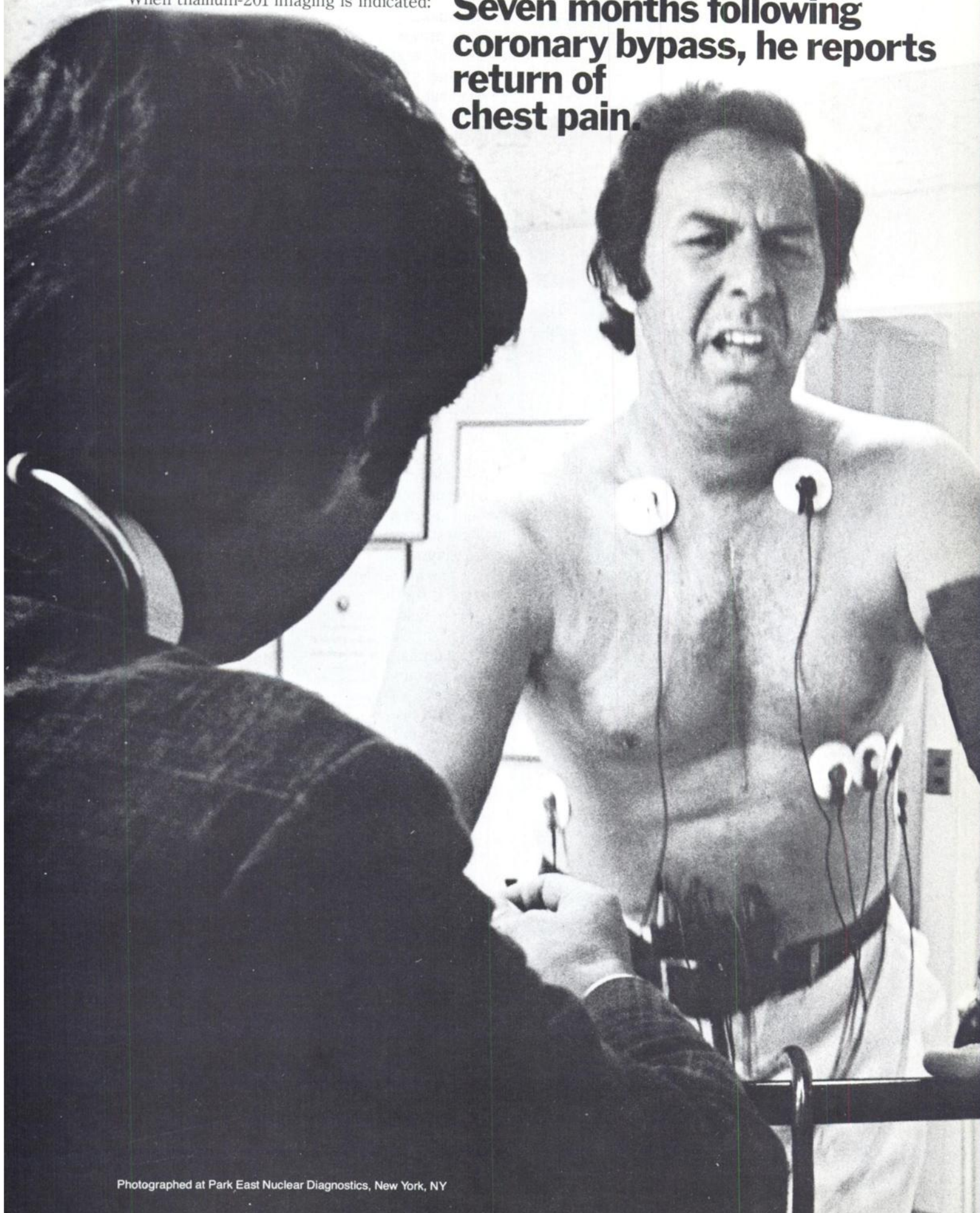


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When thallium-201 imaging is indicated:

**Seven months following
coronary bypass, he reports
return of
chest pain.**



As the population of successful coronary bypass patients continues to grow, physicians will encounter an increasing number who report a return of chest pain after varying postoperative periods.

Complaints of chest pain in post-bypass patients deserve thorough, progressive workup... usually including exercise electrocardiography. Without exercise ECG evidence of myocardial ischemia, the clinician must decide on symptoms alone whether or not to suggest repeat coronary angiography. In such a setting, myocardial perfusion imaging with thallium-201 may rule out—or confirm—the possibility of electrically silent graft occlusion or extension of disease.

Localizes in perfused myocardium

Thallium-201 is a radioactive isotope that, following intravenous injection, distributes within myocardial cells in proportion to regional perfusion. Nuclear medicine imaging performed following injection will display relative regional perfusion and myocardial cell viability.

When used in conjunction with stress electrocardiography, thallium-201 has proven successful in demonstrating regional ischemia that may escape detection by ECG. A region that appears "cold" following exercise and injection, but "fills in" on repeat imaging a few hours later, suggests stress ischemia secondary to fixed stenosis that restricts perfusion during exercise. A region that remains persistently "cold" generally indicates irreversible myocardial scarring.

Reveals graft patency/occlusion

Many institutions routinely perform preoperative and postoperative stress thallium studies to obtain functional evidence of graft-mediated reperfusion of formerly ischemic regions. This sequence of studies can serve as a valuable baseline in the event that the patient returns with a complaint of chest pain:

- If a repeat thallium study discloses ischemia in the regions formerly perfused by the grafts, occlusion may be suspected.
- If the repeat study suggests new areas of ischemia, progression of atherosclerotic disease may have occurred.
- If the repeat study is essentially unchanged from the postoperative findings, nonischemic etiology should be explored.

Useful with/without baseline

Even if baseline stress-thallium studies are not available, this procedure can still provide valuable diagnostic guidance—particularly if it is negative, or displays clear evidence of ischemia in the grafted regions.

Information, teaching program available

New England Nuclear offers an extensive range of journal reprints on the use of thallium-201 imaging, and provides teaching rounds material and reference monographs at no charge, as a service to the profession. For more information on thallium-201, use the coupon below, or call **800-225-1572, ext 2234** toll free.

Thallous Chloride TI 201

See following page for full prescribing information.



Teaching Program Administrator

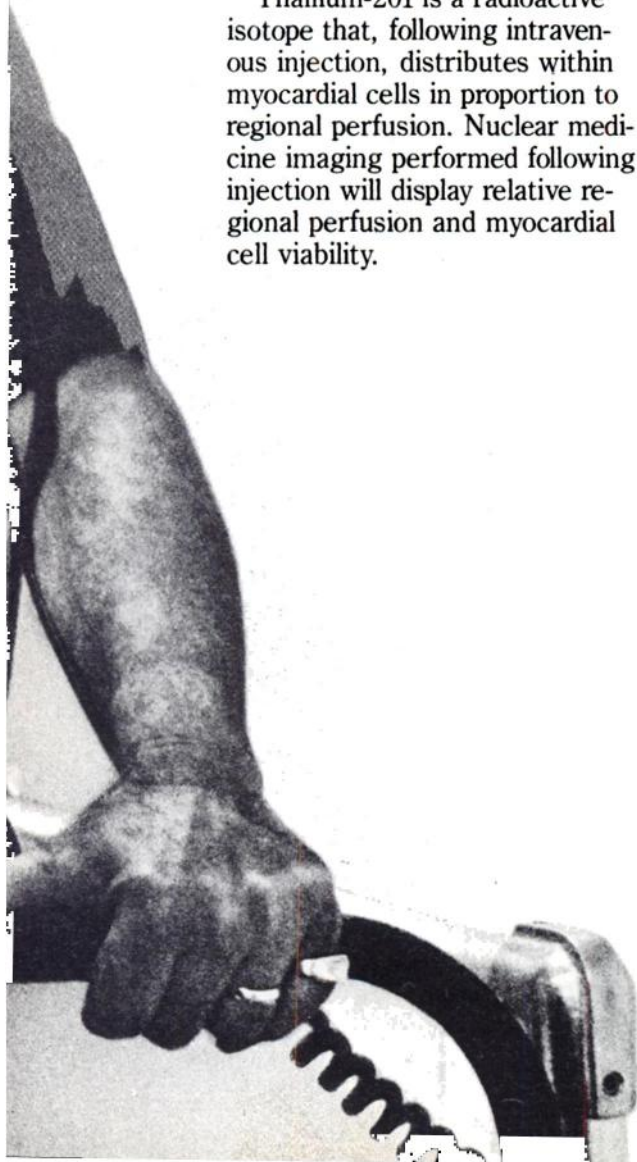
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**New England Nuclear
Medical Diagnostics Division**

549 Albany St.
Boston, MA 02118

- Please send me: Journal reprints on the clinical use of thallium-201 imaging
 Home-study monograph on thallium-201 imaging
 Scheduling information on thallium-201 teaching slide program

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Title/Specialty
Institution
Address
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Thallous Chloride TI 201

For Diagnostic Use

November 1977

Indications and Usage: Thallous Chloride TI 201 may be useful in myocardial perfusion imaging for the diagnosis and localization of myocardial infarction. It may also be useful in conjunction with exercise stress testing as an adjunct in the diagnosis of ischemic heart disease (atherosclerotic coronary artery disease).

Contraindications: None known.

Warnings: In studying patients in whom myocardial infarction or ischemia is known or suspected, care should be taken to assure continuous clinical monitoring and treatment in accordance with safe, accepted procedure. Exercise stress testing should be performed only under the supervision of a qualified physician and in a laboratory equipped with appropriate resuscitation and support apparatus.

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

Precautions: Data are not available concerning the effect of marked alterations in blood glucose, insulin, or pH (such as is found in diabetes mellitus) on the quality of thallium TI 201 scans. Attention is directed to the fact that thallium is a potassium analog, and since the transport of potassium is affected by these factors, the possibility exists that the thallium may likewise be affected.

Thallous Chloride TI 201, as all radioactive materials, must be handled with care and used with appropriate safety measures 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. 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. Thallous Chloride TI 201 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: Adverse reactions related to use of this agent have not been reported to date.

Dosage and Administration: The recommended adult (70kg) dose of Thallous Chloride TI 201 is 1-1.5mCi. Thallous Chloride TI 201 is intended for intravenous administration only.

For patients undergoing resting thallium studies, imaging is optimally begun within 10-20 minutes after injection. Several investigators have reported improved myocardial-to-background ratios when patients are injected in the fasting state, in an upright posture, or after briefly ambulating.

Best results with thallium imaging performed in conjunction with exercise stress testing appear to be obtained if the thallium is administered when the patient reaches maximum stress and when the stress is continued for 30 seconds to one minute after injection. Imaging should begin within ten minutes post-injection since target-to-background ratio is optimum by that time.

Several investigators have reported significant decreases in the target-to-background ratios of lesions attributable to transient ischemia by two hours after the completion of stress testing.

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

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 government agencies authorized to license the use of radionuclides.

How Supplied: Thallous Chloride TI 201 for intravenous administration is supplied as a sterile, non-pyrogenic solution containing at calibration time, 1mCi/ml of Thallous TI 201, 9mg/ml sodium chloride, and 9mg/ml of benzyl alcohol. The pH is adjusted to between 4.5-6.5 with hydrochloric acid and/or sodium hydroxide solution. Vials are available in the following quantities of radioactivity: 1.5, 3.0, 4.5, 6.0, and 9.0 millicuries of Thallous TI 201.

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

Catalog Number NRP-427



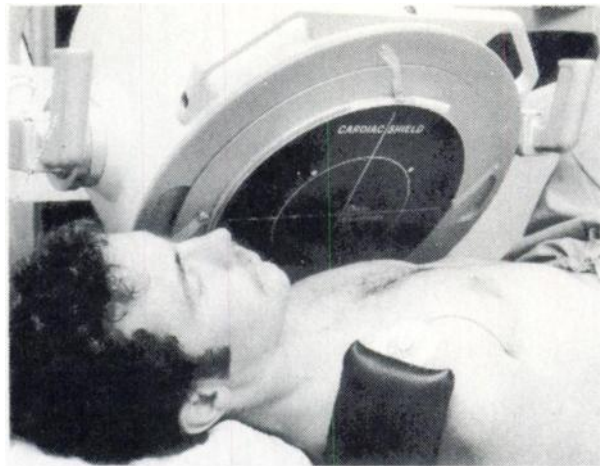
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JNM CLASSIFIED PLACEMENT SERVICE SECTION

This section in the *Journal of Nuclear Medicine* contains "Positions Open", "Positions Wanted", and "For Sale" listing. Nondisplay "Positions Wanted" ads by members of the Society are billed at 60¢ per word for each insertion with no minimum rate. Nondisplay "Positions Wanted" ads by nonmembers and all nondisplay "Positions Open" and "For Sale" ads by members and nonmembers are charged at 85¢ per word. Display advertisements are accepted at \$125 for 1/4 page, \$185 for 1/2 page, \$295 for 3/4 page, and \$510 for a full page. Closing date for each issue is the 1st of the month preceding publication. Agency commissions and cash discounts are allowed on display ads only. Box numbers are available for those who wish them.

All classified ads must be prepaid or accompanied by a purchase order. Send orders to:

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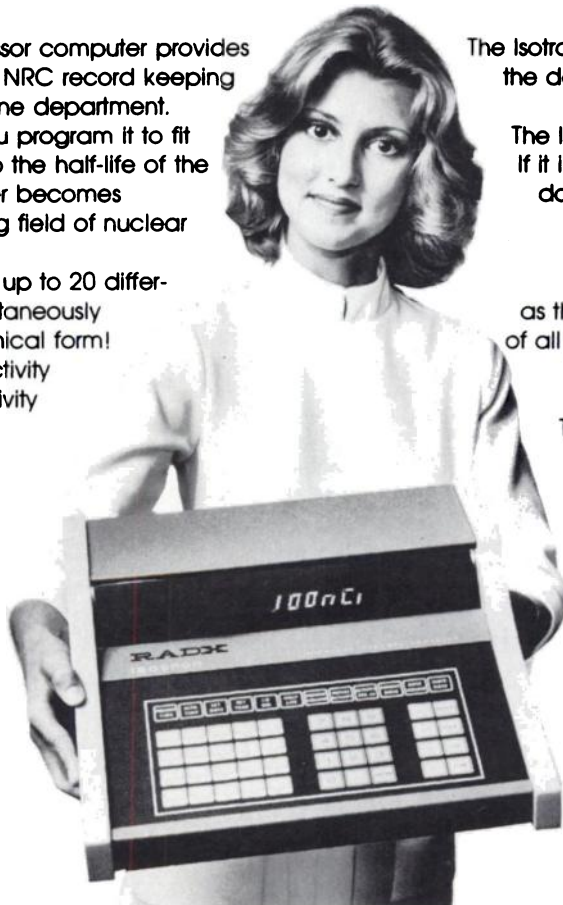
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PLACEMENT

POSITIONS OPEN

A TWO YEAR TRAINING PROGRAM in nuclear medicine leading to certification by the American Board of Nuclear Medicine or one year training program leading to certification in nuclear radiology by the American Board of Radiology is offered in an AMA approved integrated program offered by Vanderbilt University Hospital and the Veteran's Administration Hospital in Nashville, Tennessee. Five full-time board certified nuclear medicine physicians and eight full-time nuclear medicine Ph.D.'s participate in the didactic as well as clinical experience in the program. Equipment includes three large field scintillation cameras, three small field scintillation cameras, the PhoCon tomographic scanner, a solid state scanning tomographic camera, a proportional wire chamber, a fluorescent scanner, a portable camera and five computer systems. The clinical experience includes a complete spectrum of all imaging procedures for adults as well as the pediatric population. Particular emphasis is placed on nuclear cardiology, renal evaluation, pulmonary function studies and tumor evaluation. The program includes rotations through CT and ultrasound and has heavy emphasis on correlation between these two modalities and nuclear medicine procedures. A complete experience in a large radioimmunoassay laboratory and radiopharmacy is included. Requests for further information should be directed to F. David Rollo, M.D., Ph.D., Director, Division of Nuclear Medicine, Department of Radiology and Radiological Sciences, Vanderbilt University Hospital, Nashville, Tennessee 37232.

ASSISTANT CHIEF, NUCLEAR MEDICINE SERVICE. The Minneapolis Veterans Administration Medical Center seeks candidate for the position of Assistant Chief, Nuclear Medicine Service effective July 1, 1980. Requirements include certification by the ABNM, a strong patient orientation and expertise in all phases of clinical nuclear medicine, including imaging, radioassay and internal radionuclide therapy. In addition, the Assistant Chief, Nuclear Medicine Service will have specific responsibilities in research and education. Applications from all qualified candidates are welcome. Inquiries, including a curriculum vitae and an autobiographical letter, should be sent to: Rex B. Shafer, M.D., Chief, Nuclear Medicine Service (115), Veterans Administration Medical Center, 54th Street & 48th Avenue South, Minneapolis, MN, 55417. An Equal Opportunity Employer.

NUCLEAR MEDICINE, FRESNO, CALIFORNIA. The University of California (San Francisco) Medical Education Program seeks a Nuclear Medicine Physician for a rapidly expanding service at its affiliated Veterans Administration Medical Center in Fresno, California. Certification (or eligibility) by ABNM is necessary. Strong existing programs in Cardiology and Pulmonary Disease make a background in Internal Medicine highly desirable. The position combines active clinical teaching and patient care in an academic setting with opportunity for private practice. Inquiries should be addressed to Malcolm Jones, M.D., Chief of Radiology, Veterans Administration Medical Center, 2615 E. Clinton Avenue, Fresno, CA 93703. The University of California is an Equal Opportunity Employer.

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, S.C. 29260, (803) 787-8710.

A NUCLEAR MEDICINE PHYSICIAN IS being sought for a challenging and rewarding position in an active department in a 411 bed community hospital affiliated with the University of Southern California. Computer experience is desired. Please address inquiries and curriculum vitae to: Leonard A. Swanson, M.D., Department of Nuclear Medicine, Hospital of the Good Samaritan, 616 South Witter Street, Los Angeles, California 90017.

ACADEMIC POSITION AT THE ASSOCIATE or Assistant Professor level available in the Nuclear Radiology Division of the Department of Radiology at the University of Texas Medical School at Houston. Certification in Radiology and Nuclear Medicine, or in Radiology with Special Competence in Nuclear Radiology is required. Applicant should have a sincere interest and a performance record in relevant clinical or basic nuclear research. Please send curriculum vitae to Robert W. McConnell, M.D., Director, Division of Nuclear Radiology, Department of Radiology, The University of Texas Medical School at Houston, 6431 Fannin Street, Houston, Texas 77030.

FLORIDA MEDICAL CENTER. A 400-bed acute care facility has positions available in its progressive nuclear medicine department. Equipment includes SEARIF, IFOU, IFM, PHO CON, PG-4 CAMERA and a TRANS AXII SCANNER. Cardiac and computer experience recommended but not essential. Excellent salary and benefits. Inquire to Director of Personnel, Florida Medical Center Hospital, 5000 West Oakland Park Boulevard, Fort Lauderdale, Florida 33313, (305) 735-6000.

NUCLEAR CARDIOLOGIST, FULL TIME academic position in UCLA affiliated hospital. Board eligible or board certified. Experience in research and teaching desirable. Well equipped, busy department, with multiple cameras, computers and stress testing equipment. Excellent salary and fringe benefits. Send replies and C.V. to Marvin B. Cohen, M.D., Chief, Nuclear Medicine Service, VA Medical Center, 16111 Plummer Street, Sepulveda, CA 91343. An equal opportunity employer.

NUCLEAR MEDICINE RESIDENT POSITION available beginning July 1, 1980 for a 2-year program at Georgetown University Hospital. This is a dynamic program which affords the resident primary responsibility for active clinical and research training in all aspects of nuclear medicine. The program is approved by the AMA and satisfies the requirements of the American Board of Nuclear Medicine. Requests for further information (include CV) should be directed to: John C. Harbert, M.D., Director, Division of Nuclear Medicine, Georgetown University Hospital, Washington, D.C. 20007.

SENIOR IMAGING TECHNOLOGIST for expanded 5 camera, 2 computer department, active in nuclear cardiology. Responsible for supervision of imaging and computer processing. Also involved with training program and clinical research. Salary commensurate with experience. Warm climate. Reply P.O. Box 302, Society of Nuclear Medicine, 475 Park Avenue South, New York, NY 10016.

NUCLEAR MEDICINE TECHNOLOGIST Immediate opening for technologist in fully accredited 400-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 well counters, pipetter and a computer. Good salary and full benefits. Contact Ruth R. Hargrave, Assoc. Director of Personnel, The Williamsport Hospital, 77 Rural Avenue, Williamsport, PA (717) 322-7861. Equal Opportunity Employer.

NUCLEAR MEDICINE TECHNOLOGIST. Available June 1st. Full time position in 138 bed acute care general hospital. Should be experienced with Rectilinear Scanner, Gamma Camera and computer for cardiology studies. Competitive salary and excellent benefits. Send resume to Personnel Department, St. Luke's Memorial Hospital, S. 711 Cowley, Spokane, WA 99210.

POSITION AVAILABLE IN A DOWNTOWN office a registered Nuclear Medicine technician experienced in nuclear cardiology. Competitive salary. Liberal fringe benefits. Call or write: G. William Bretz, M.D., R. 520 IBM Bldg. 33 W. First Street, Dayton, Ohio 45402 Telephone (513) 222-5841

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RADIOCHEMIST / RADIOPHARMACIST-Position available for a qualified individual with training in chemistry & handling of radioactive material. Position includes responsibility for operation of departmental radiopharmacy & participation in related research activities. Forward summary of training & experience & a statement of career interest to: Stanley J. Goldsmith, M.D., Director, Andre Meyer Department of Physics-Nuclear Medical, THE MOUNT SINAI MEDICAL CENTER, One Gustave L. Levy Place, New York, N.Y. 10029. An Equal Opportunity Employer.

POSITION FOR RESEARCH ORGANIC chemist. Experience with radionuclide chemistry for syntheses of positron labelled biologically active agents. Extensive experience desirable, excellent research opportunity for collaborative work at U. of P. Contact: Martin Reivich, M.D. Cerebrovascular Research Center, 36th & Spruce Streets, Philadelphia, PA. 19104.

NUCLEAR MEDICINE TECHNOLOGIST Immediate opening in 832-bed teaching hospital affiliated with the Peoria School of Medicine. The department is equipped with 2 large field cameras, 1 microprocessor, 1 portable camera and 1 Pho/cm. Planned additions include another large field of view camera and MDS computer systems. Excellent benefits with salary to commensurate with experience. To apply or for further information, contact Gary W. Schaer, Personnel Office, St. Francis Hospital-Medical Center, 530 N.E. Glen Oak Avenue, Peoria, Illinois 61637, Ph. (309) 672-2301. An Equal Opportunity Employer.

NUCLEAR MEDICINE TECHNOLOGIST Phoenix, Arizona. Large 695-bed hospital has immediate opening for permanent full time registered Nuclear Medicine Technologist. ASCP, ARRT, or NMTCB. Openings in both RIA and Imaging. For further information send your resume to: Maria Martinez, Personnel Department Good Samaritan Hospital, 1033 E. McDowell Rd., Phoenix, Arizona 85006 or call (602) 257-4247. Equal Opportunity Employer.

RADIOLOGIST, NUCLEAR MEDICINE board certified/eligible, university trained, with nuclear cardiology experience, to join 14-man private diagnostic radiology group in South-eastern United States. Prefer physician knowledgeable in general diagnostic radiology, including computed tomography and ultrasound. Contact: D. Mills, M.D., Suite 100, Memorial Medical Bldg Chattanooga, TN 37404, phone (615) 698-3511.

RIA TECHNOLOGIST— REGISTERED or eligible. In vitro section of large nuclear medicine department in 1200 bed hospital complex affiliated with medical school in Texas Medical Center. Modern well-equipped lab located on 26th floor with a panoramic view of Houston. Equipment includes several gamma counters, automated RIA system and computer. Call collect, Mrs. Smith, (713) 791-2237, or send resume to St. Luke's Episcopal Hospital, Texas Children's Hospital, Texas Heart Institute, P.O. Box 20269, Houston, Texas 77025. EOE/MF/Handicapped.

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PHYSICIST FOR NUCLEAR CARD —iology Laboratory. Position open for person with Ph.D or masters (or equivalent) with experience in physics, computer science or bioengineering and with a strong background and interest in image processing and computer programming to direct Nuclear Cardiology computer operations at the New York Hospital-Cornell Medical Center. Previous biomedical related experience in research is desirable. The successful candidate will be required to organize the existing computer operation and staff of the Nuclear Cardiology laboratory for the acquisition, storage, analysis and retrieval of nuclear data relating to patients with heart disease and high blood pressure. He/She will work closely with the Nuclear Cardiology Physicians in systems development. Academic rank at Cornell University Medical College will depend on background and experience. Salary is highly competitive. For further information contact either: Jerome G. Jacobstein, M.D. or Jeffrey S. Borer, M.D. co-directors, Nuclear Cardiology, The New York Hospital, 525 East 68th Street, New York, N.Y. 10021.

NUCLEAR MEDICINE TECHNOLOGIST Pediatric research and teaching hospital located in Chicago seeks and experienced Nuclear Medicine Technologist familiar with initial Gamma Camera, radio/immuno assays and imaging. Registry desirable. We offer an excellent salary and comprehensive benefit package, including three weeks vacation and tuition assistance plan. For prompt consideration, send resume in complete confidence to: The Childrens Memorial Hospital, 2300 Childrens Plaza, Chicago, IL 60616. Equal Opportunity Employer M.F.

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INTERNIST-CERTIFIED IN INTERNAL Medicine Nuclear Medicine Endocrinology. University appointment-Associate Professor. 43 Twelve years experience in large group practice. Wish to relocate-Western USA. CV on request. Reply box #300. Society of Nuclear Medicine. 475 Park Avenue South, New York, NY 10016.

ACADEMIC INTERNIST/NUCLEAR Physician, ABIM, ABNM, seeks opportunity to practice both specialties. Reply Box # 402, Society of Nuclear Medicine, 475 Park Avenue South, New York, N.Y. 10016.

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NUCLEAR MEDICINE TECHNICIAN

Immediate position available in active 700 bed teaching hospital. Registry and two years experience preferred. In vivo, in vitro and computer rotations available. Contact:

Shan Marlette, M.S.
Nuclear Medicine Service (115)
V.A. Medical Center
54th Street & 48th Avenue S.
Minneapolis, MN 55417
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POSITION ANNOUNCEMENT

Chairperson, Department of Radiologic Technology position available July 1, 1980 for a 12 month appointment negotiated annually. Position includes administration and supervision of the activities and personnel in a multidisciplinary department of Radiologic Technology offering degree options in Radiography, Radiation Therapy, Nuclear Medicine Technology and Medical Diagnostic Ultrasound. Person is expected to participate in teaching, research and service activities in the Department, College, University and Community. Minimum qualification are master's degree in a health related field; certification/credentialing as an ARRT, ASCP, ARDMS or NMTCB; teaching, administrative and leadership experience in an institution of higher learning; and evidence of continuing education and professional participation. Doctoral degree, evidence of research activity, and multiple disciplinary certification are preferred. Salary and rank are negotiable depending on qualifications and experience. Send application, resume and references by May 25, to Terry Curtis, Chairperson, Search Committee, P.O. Box 26901, College of Health, Oklahoma City, Oklahoma 73190. The University of Oklahoma is an Affirmative Action Employer.

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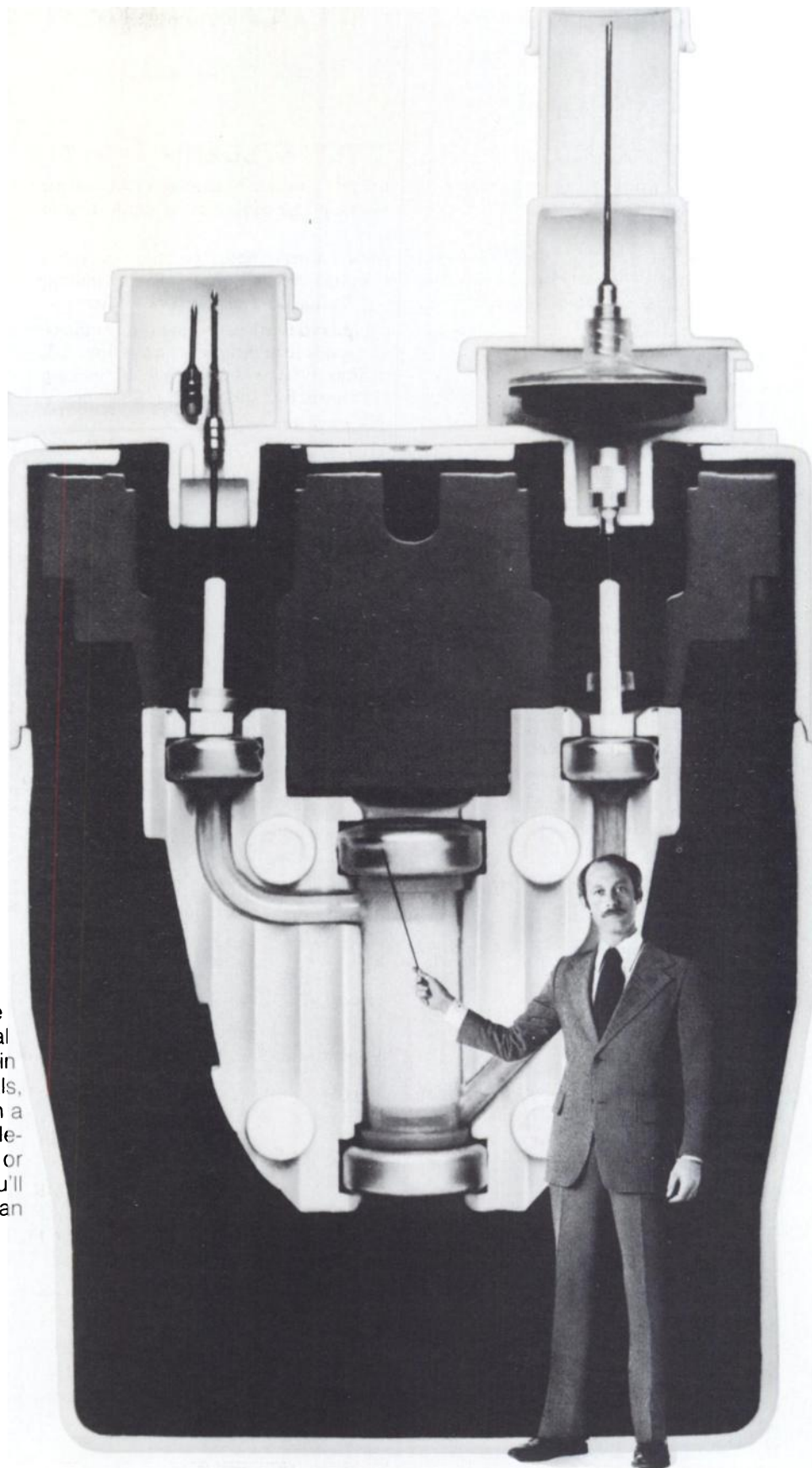
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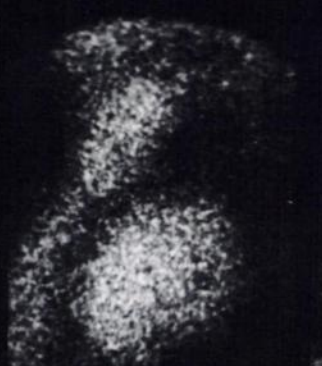
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RAO, SYSTOLE



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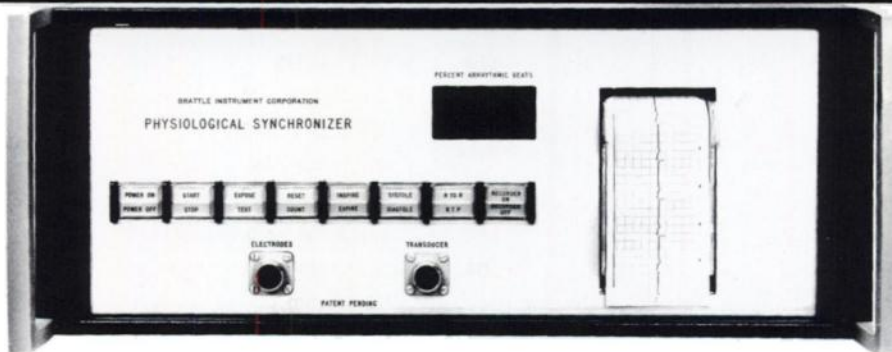


LAO, SYSTOLE

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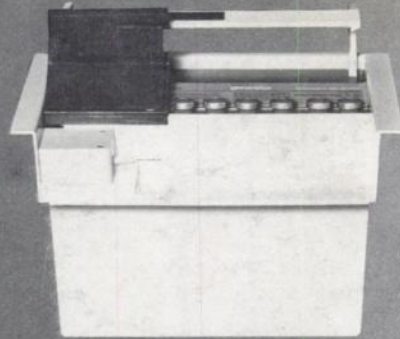
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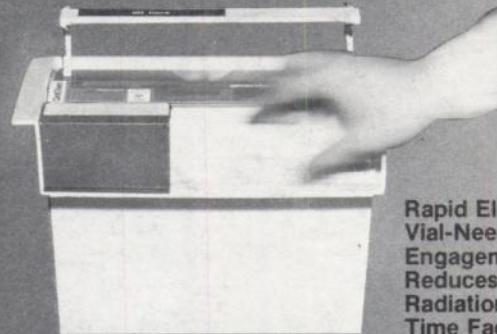
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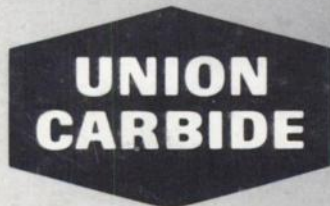
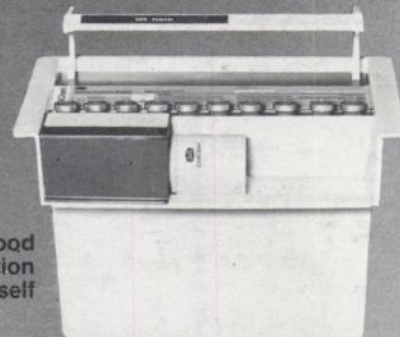


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