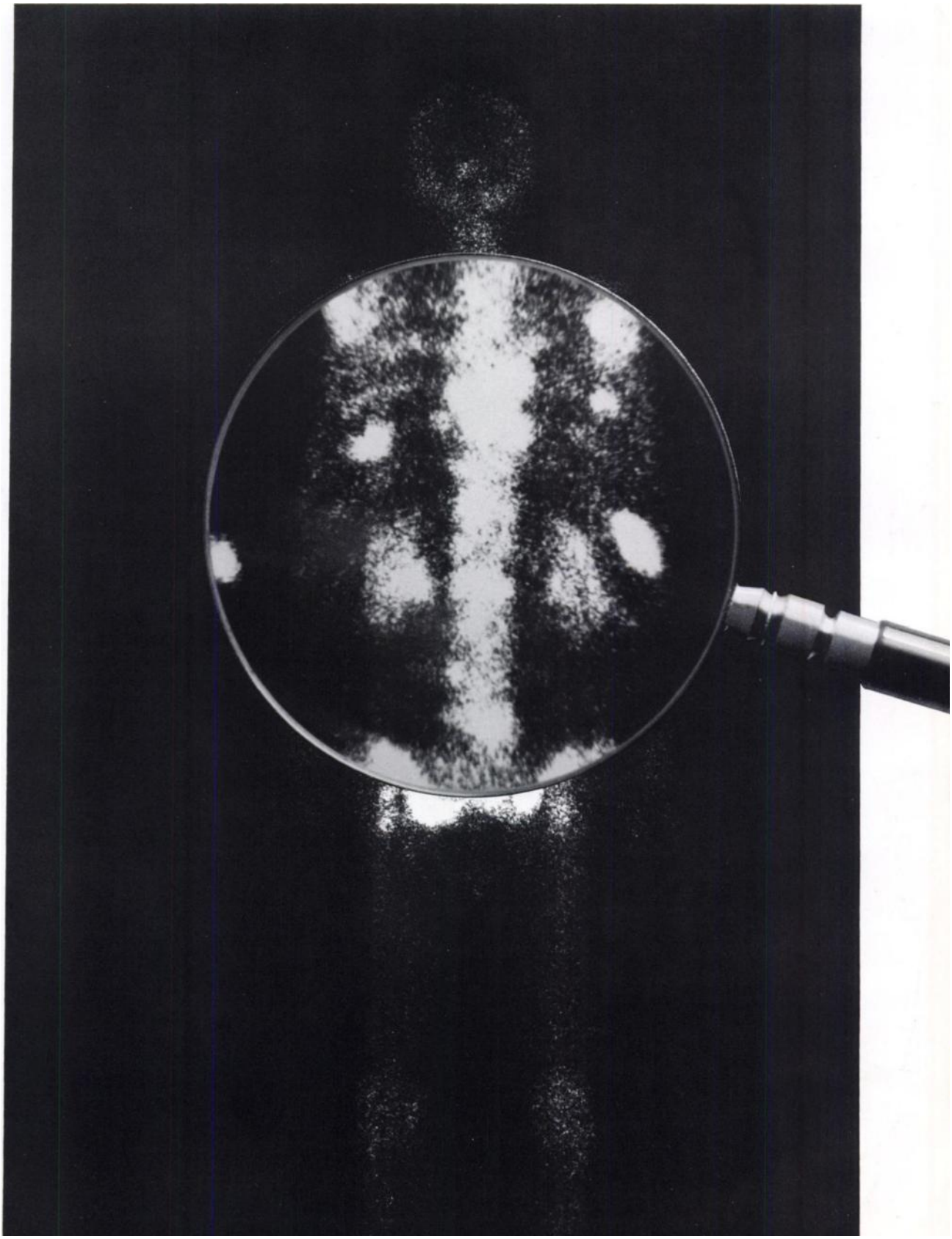
The Bone



Seeker

MPI STANNOUS DIPHOSPHONATE (TECHNETIUM Tc 99m ETIDRONATE KIT) CONSISTENTLY SEEKS BONE... AND BONE LESIONS.

MPI Stannous Diphosphonate targets areas of diagnostic significance. Its reliability is magnified with:

Rapid Blood Clearance. The P-C-P bond of diphosphonate resists hydrolysis; clears the kidneys rapidly. Optimum imaging time is in two to four hours.

Increased Stability. Ascorbic acid within the reagent aids in maintaining tin in its reduced state. The ^{99m}Tc pertechnetate stays where it belongs...tagged to the reagent.

Optimum Tin Levels. The Sn(II) level provides high labeling efficiency, with minimum interference with subsequent brain scans.

Investigate the economy of MPI Stannous Diphosphonate

You can use up to 8 ml of 5 to 15 mCi ^{99m}Tc in each vial. The reagent is usable for six hours after labeling.

You also have no delivery charges when you order MPI Stannous Diphosphonate with any other MPI products.

Ask your Medi-Physics representative about our economical, reliable delivery procedures ....or call toll free:

(800) 227-0483—Outside California
(800) 772-2446—Inside California

medi+physics™

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

MPI Stannous Diphosphonate
Technetium Tc 99m Etidronate Kit-Diagnostic

DESCRIPTION: Each ampul contains a total of 1.54 mg of the sodium salt of etidronate, 0.42 mg stannous chloride, and 3.87 mg ascorbic acid in a 2.2-ml sterile, pyrogen-free aqueous solution. Hydrochloric acid and/or sodium hydroxide may have been added to adjust the pH to 2.5-5.0. The solution is under a nitrogen atmosphere. A complex is formed with the addition to the reagent of sterile, pyrogen-free sodium pertechnetate Tc 99m in isotonic saline.

INDICATIONS: Technetium Tc 99m etidronate is used as a bone imaging agent to delineate areas of altered osteogenesis.

CONTRAINDICATIONS: None known.

WARNINGS: This radiopharmaceutical should not be administered to children, pregnant women, or nursing mothers unless the expected benefit outweighs the potential risk. Radiopharmaceutical examinations of women of childbearing capability should be performed during the first few days following the onset of menses.

PRECAUTIONS: To minimize radiation dose to the bladder, the patient should be encouraged to drink fluids and void when the examination is completed and as often thereafter as possible for the next 4-6 hours. Where feasible, brain scans should precede bone imaging procedures. Technetium Tc 99m etidronate should be formulated, following aseptic procedures, within 6 hours prior to clinical use.

ADVERSE REACTIONS: Seven suspected reactions to technetium Tc 99m etidronate were reported in more than 22,500 clinical reports. There were two instances each of headaches and allergic reactions and one each of vomiting, rheumatoid arthritis flare-up, and skin rash.

DOSAGE AND ADMINISTRATION: The suggested adult dose is 5-15 mCi administered by slow I.V. injection. Do not administer more than 2.0 ml of unlabeled reagent per patient. Measure the patient dose with a suitable radioactivity calibration system immediately prior to administration. Scanning post-injection is optimal at 2-4 hours.

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

HOW SUPPLIED: Each kit package contains five sealed glass ampuls as described above, five sterile, pyrogen-free mixing vials, five each of mixing-vial and record labels and one package insert. Store at 5°-8°C; protect from light.

TECHNETIUM-99M DTPA(TIN)

Brief summary of package insert. Before using, please consult the full package insert included in every kit.

DESCRIPTION

The kit contains 10 vials, each vial containing 5 mg sterile, pyrogen-free Sodium salt of Diethylenetriamine-pentaacetic Acid (DTPA) and 0.25 mg Stannous Chloride.

Administration is by intravenous injection for diagnostic use. The product as supplied is sterile and pyrogen-free.

When sterile, pyrogen-free Sodium Pertechnetate Tc 99m is added to the vial, a chelate, Technetium Tc 99m DTPA is formed.

HOW SUPPLIED

Diagnostic Isotopes' Technetium Tc 99m DTPA Kit (Chelate) is supplied as a sterile, pyrogen-free kit containing 10 vials. Each vial contains 5 mg of Sodium salt of DTPA and 0.25 mg of $SnCl_2$. The pH is adjusted with HCl or NaOH prior to lyophilization. Following lyophilization the vials are sealed under a nitrogen atmosphere.

CLINICAL PHARMACOLOGY

Following its intravenous administration, Technetium Tc 99m DTPA rapidly distributes itself throughout the extracellular fluid space from where it is (promptly) cleared from the body by glomerular filtration. There should be little or no binding of the chelate by the renal parenchyma. A variable percentage of the Technetium Tc 99m DTPA binds to serum proteins; this ranges from 3.7% following the single injection to approximately 10% if the material is continuously infused. Although the chelate gives useful information on the glomerular filtration rate, the variable percent which is protein bound leads to a measured glomerular filtration rate which is lower than the glomerular filtration rate as determined by inulin clearances.

Technetium Tc 99m DTPA tends to accumulate in intracranial lesions with excessive neovascularity or an altered blood-brain barrier. The chelate does not accumulate in the choroid plexus.

Since Technetium Tc 99m DTPA is excreted by glomerular filtration, the images of the kidneys obtained in the first few minutes after injection represent the vascular pool within the kidney. Subsequent images of the kidneys represent radioactivity which is in the urine of both the collecting system and the renal pelvis.

INDICATIONS AND USAGE

Technetium Tc 99m DTPA may be used to perform kidney imaging, brain imaging, to assess renal perfusion, and to estimate glomerular filtration rate.

CONTRAINDICATIONS

None known.

WARNINGS

Technetium Tc 99m DTPA 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, of a woman of child-bearing capability should be performed during the first few (approximately 10) days following the onset of menses.

PRECAUTIONS

Technetium Tc 99m DTPA 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 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.

Pregnancy Category C: 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. Technetium Tc 99m DTPA 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 DTPA have been reported.

DOSAGE AND ADMINISTRATION

The suggested dose range for I.V. administration to be employed in the average patient (70 kg) is:

Kidney imaging and glomerular filtration rate estimation: 3 to 5 mCi.

Brain imaging or renal perfusion: 10 to 20 mCi.

diagnostic isotopes incorporated
123 Pleasant Ave., Upper Saddle River, New Jersey 07458

By the time some people can say:

"DIETHYLENETRIAMINEPENTA-ACETIC ACID AND STANNOUS CHLORIDE IN A LYOPHILIZED STATE UNDER NITROGEN"

You've got it mixed and ready to use!

Unless you're in the business, this tongue-twister may tie you up for some time. However, it only takes one minute of mixing time to prepare Diagnostic Isotopes' one-step Technetium-99m DTPA agent for injection.

DTPA becomes Technetium-99m DTPA (Tin) after adding sodium pertechnetate Tc-99m. Technetium-99m DTPA may be used to perform kidney imaging, brain imaging, to assess renal perfusion and to estimate glomerular filtration rate.

Each DTPA kit contains 10 vials. The product is sterile, pyrogen-free, has a labeling efficiency of over 95% and a shelf life of one year . . . all good reasons for ordering now.

See opposite page for a brief summary of the package insert.

diagnostic isotopes incorporated

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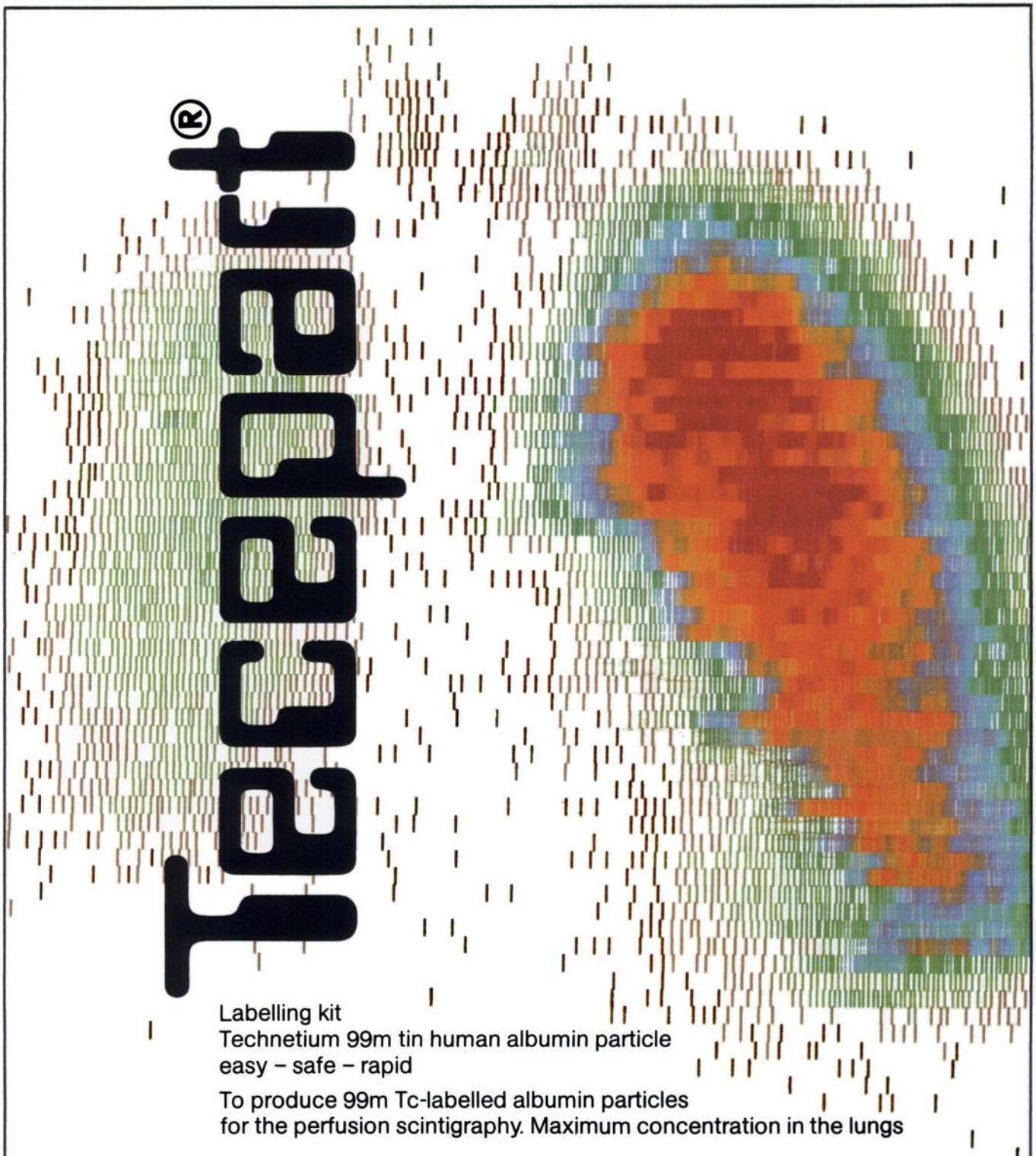
Telex 134408 • Phone: (201) 825-2310 (Call toll free — 800-631-7020)
"OUR QUALITY HELPS YOUR IMAGE"

Kits Available: *DTPA, Polyshosphate, Diphosphonate.*
Prepared Radiopharmaceuticals Available: *Selenium-75, Xenon-133 (solution or gas)*



Labelling kit
Technetium 99m tin human albumin particle
easy – safe – rapid

To produce 99m Tc-labelled albumin particles
for the perfusion scintigraphy. Maximum concentration in the lungs

Storage:
at room temperature up to 25°C

Labelling kit:
12 ml vial with tin-II-human albumin particles, lyophilized

Specifications of the injection solution:

Volume: 1–10 ml
Human albumin: 0.25–2.5 mg/ml
Sn^{2+}: 0.0045–0.045 mg/ml
NaCl: 9.2–10.8 mg/ml

Technetium-99m: approx. 10^{-6} mg/ml
pH: 5–6
Stability: approx. 8 hours
Content of 99m TcO_4^- : < 1% of total activity.

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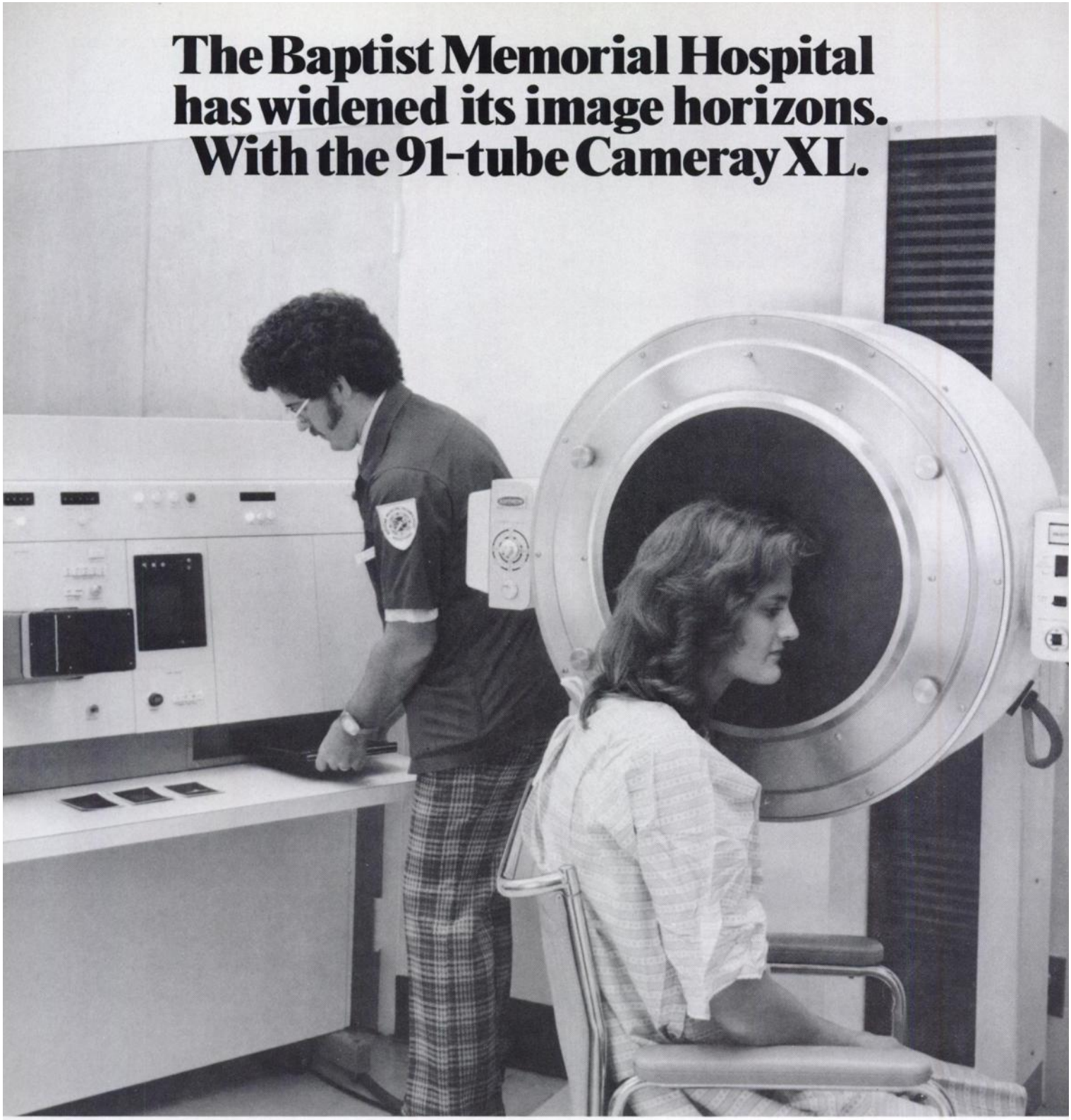
The Baptist Memorial Hospital has widened its image horizons. With the 91-tube Cameray XL.



The Baptist Memorial Hospital in Memphis, one of the nation's biggest and busiest medical institutions, is getting more patient per scan these days. At the same time, the nuclear medicine section, under Doctors John Rockett and Mohammed Moinuddin, is getting high resolution images with every reading. The Cameray XL-91 is on the scene.

Cameray XL-91 just might be the ultimate gamma camera. Because it offers you the widest undistorted field of view you can get. A big 16½ inches. And it's the first wide field gamma camera to produce high resolution images equivalent in all respects to smaller field cameras.

And Cameray XL-91 offers you a choice of console combinations. Or, if you're already a Cameray II owner, a quick conversion. So widen your image horizons. With Cameray XL-91. Contact Raytheon's Medical Electronics Operation, Fourth Avenue, Burlington, Mass. 01803. (617) 272-7270.

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A flood field you can trust.

High speed, simple operation and fast setup.

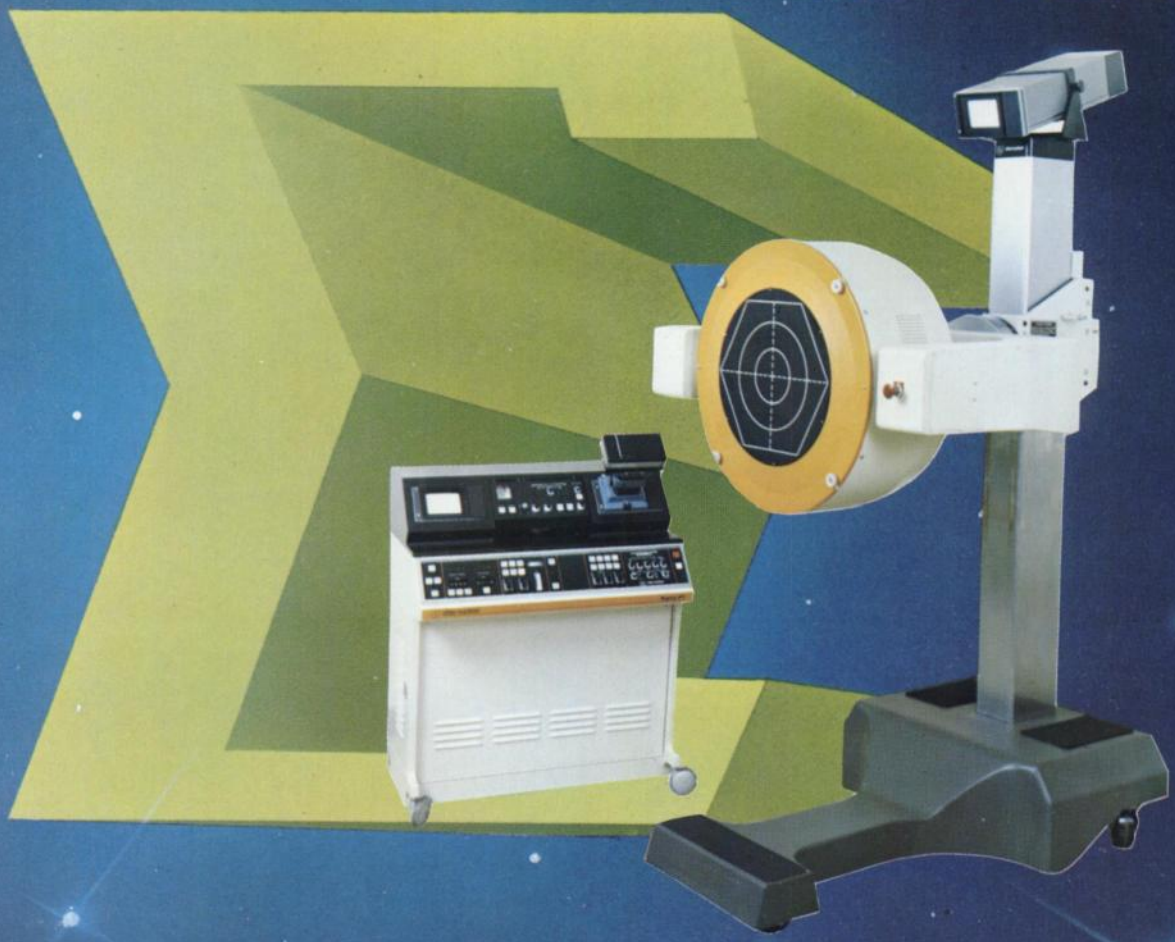
High quality images, consistently reproducible.

We Have Responded With

Σ 410 Wide Field Camera

With MPC (Micro Processor Control)

± 5% Flood Field, 200,000 cps
5mm full width half-max Resolution



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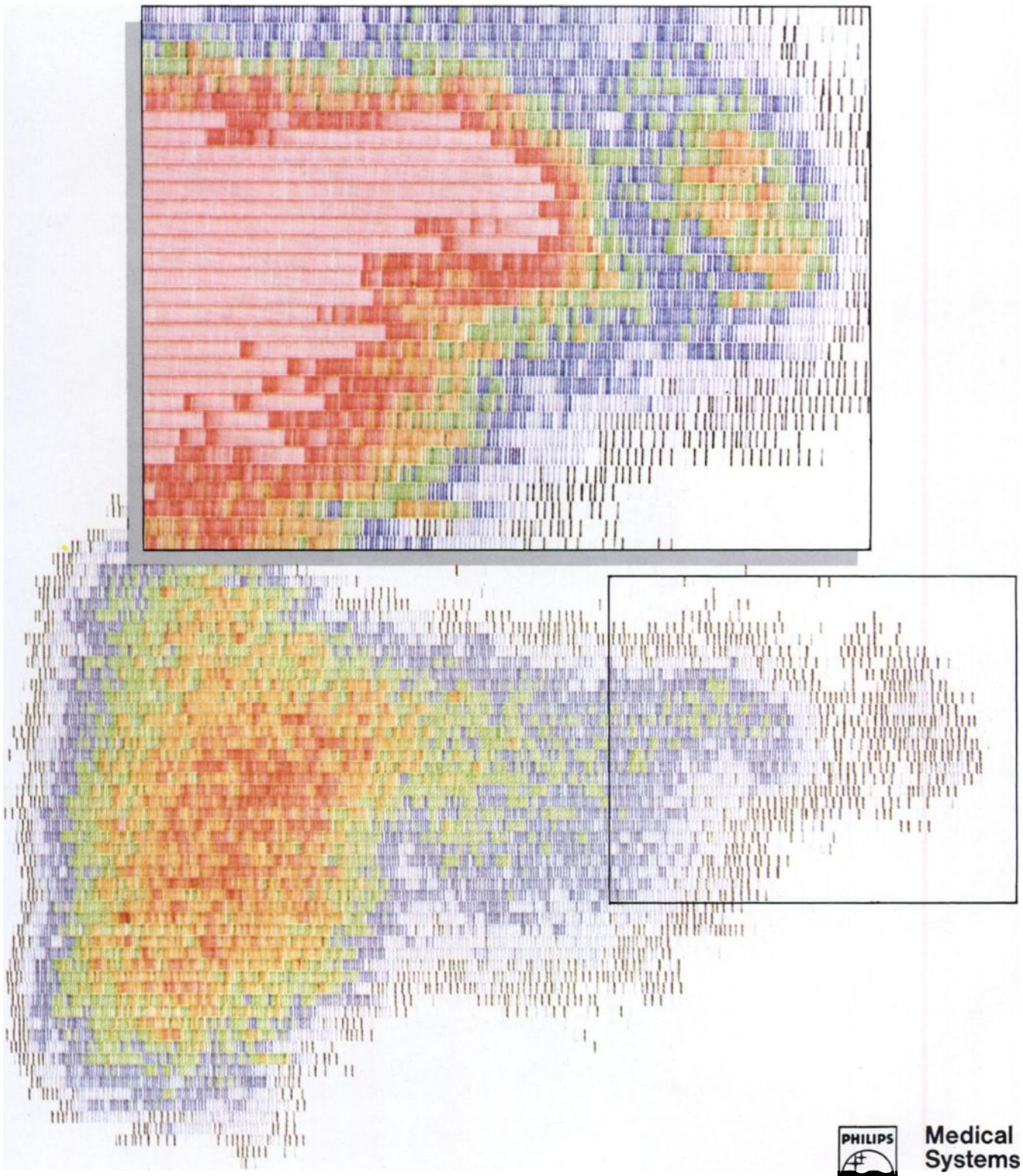
Rapid evidence

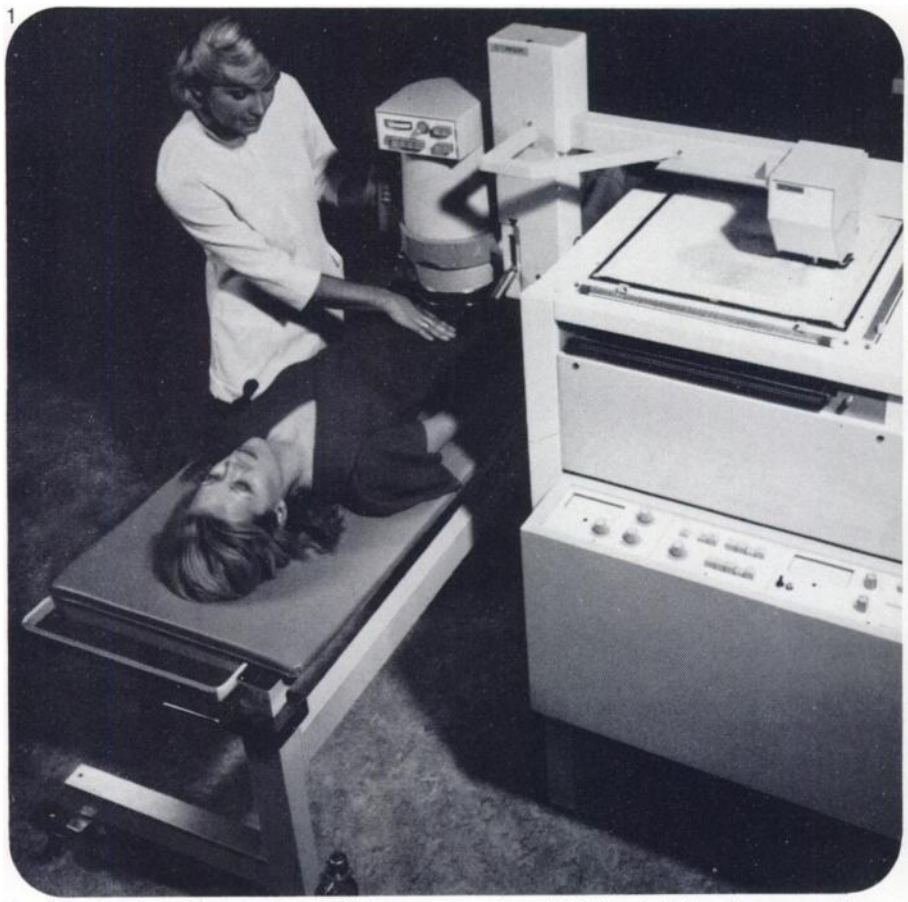


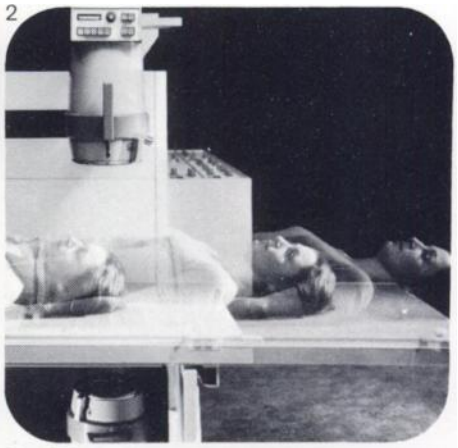
PHILIPS Medical Systems

The lower of the two scintigrams shown here is a 42 x 42 cm liver scan. The other is a detail of that scan, reproduced to the same field size and with enhanced contrast to reveal otherwise indiscernable evidence of the spleen. Rapidly. Both scintigrams were made on a Philips Universal Scintillation Scanner.

The ability to reproduce comparable scans of total organs, with optimum contrast for regions of interest and without the necessity for time-consuming operational adjustment, is a unique feature of the Philips scintillation scanner.

Based on modular design principles, add-on facilities considerably extend the scanner's basic capabilities to suit a wide variety of applications in nuclear medicine – from routine to research. Here's how:





1 **The basic unit** comprises a 5in. overtable detector with motor-driven vertical adjustment of the detector head allowing virtually any patient table or hospital bed to be used.
Ten preselected nuclide settings are provided as well as line interval selection and colour printer and photo scan adjustment and metering. A light beam pointer in the collimator enables the central axis to be accurately positioned. Scanning speed adjustment is continuously variable up to 75mm/s (450 cm/min or approx. 3in./s). All control functions are optimised and strategically positioned to ensure an exceptionally high degree of operational efficiency and safety.

2 **Total body and profile scanning** can also be performed by means of an optional motor-driven tabletop. This enables two-speed longitudinal movement of 100mm/min (approx. 4in./min) and 200mm/min (approx. 8in./min) and facilitates profile scanning using slit collimators. With the total body version the scanning area is 400 x 1600mm (15¾in. x 63in.); scintigram reduction factor being 4 : 1.
An optional under-table measuring head can be added which, together with a scan control unit, enables pulse sum scanning and β + coincidence scans to be obtained.

3 **A second colour printer and photo scan unit** considerably extends the versatility of the Philips Universal Scintillation Scanner by enabling other original scans, based on different parameters, to be obtained. Furthermore, recording and storage of original scanning data can be achieved by means of a four track compact-cassette recorder. In the playback mode recordings can be reproduced using different scanner settings, i.e. different colour printer control signals.

Part of a complete programme of nuclear medicine equipment and systems, and fully supported by an international service organisation, the Philips Universal Scintillation Scanner represents the perfect integration of operational simplicity and efficiency with applicational flexibility and reliability.

COUPON

If you would like further evidence on Philips Scintillaton Scanner, or on any other equipment in our nuclear medicine programme, complete the coupon and send to: Philips Industries Medical Systems Division, Building QM, Room 326, Eindhoven, The Netherlands

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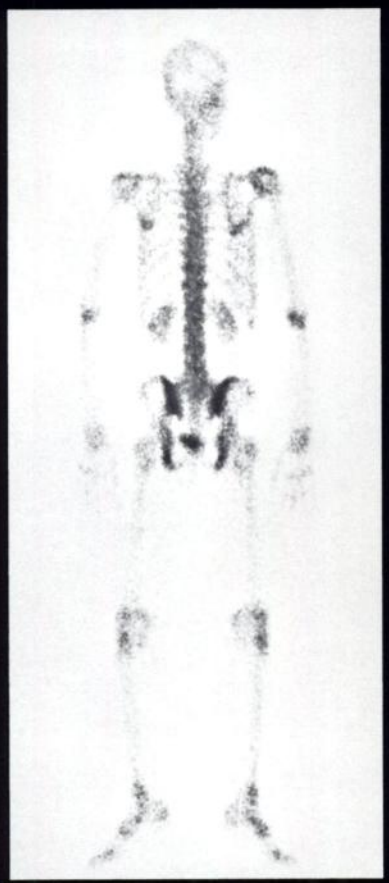
PHILIPS

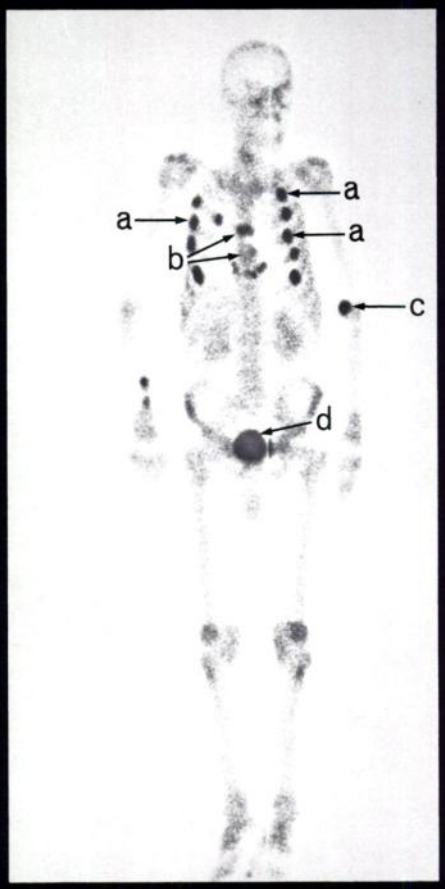
Skeletal Scintigraphy

With the advent of the bone-seeking complexes of ^{99m}Technetium has come a revolution in the early identification of innumerable osteoarticular conditions. Because the technic is nonspecific, the clinical history is of paramount importance.

The following bone scans were obtained using intravenous ^{99m}Technetium pyrophosphate (^{99m}Tc PyP). Like ^{99m}Technetium polyphosphate or diphosphonate, ^{99m}Technetium pyrophosphate has an affinity for increased vascularity, altered exchange processes, and new bone or new collagen in the skeleton which can render bone scans positive days, weeks, even months before related roentgenograms demonstrate the same abnormality.

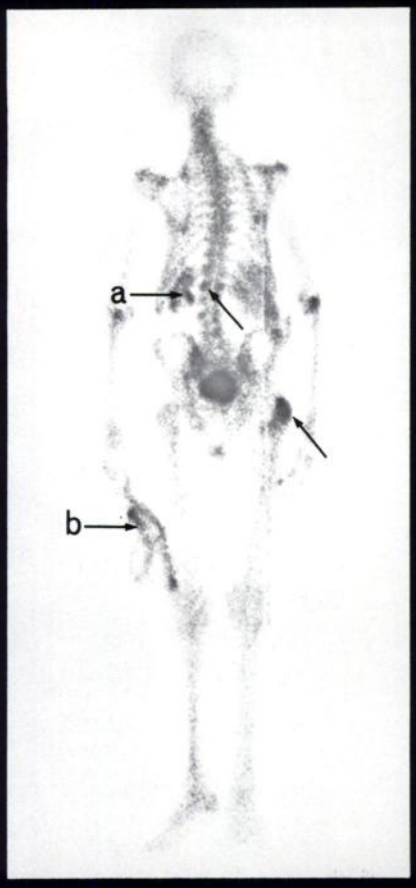


Healthy young adult (18 years) demonstrates the normal affinity of ^{99m}Tc PyP for growth areas in the axial skeleton and ends of long bones.

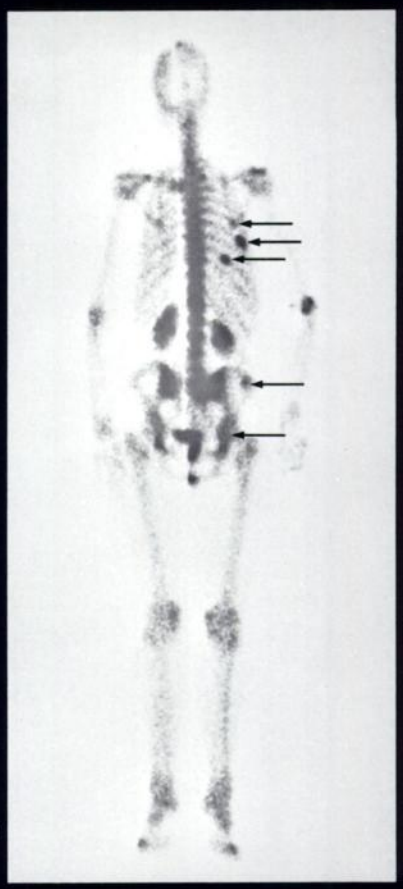


Numerous fractures of ribs (a) and sternum (b) following aggressive treatment for cardiac arrest. Site of intravenous injection (c) and collection of radionuclide in the bladder (d) are obvious.

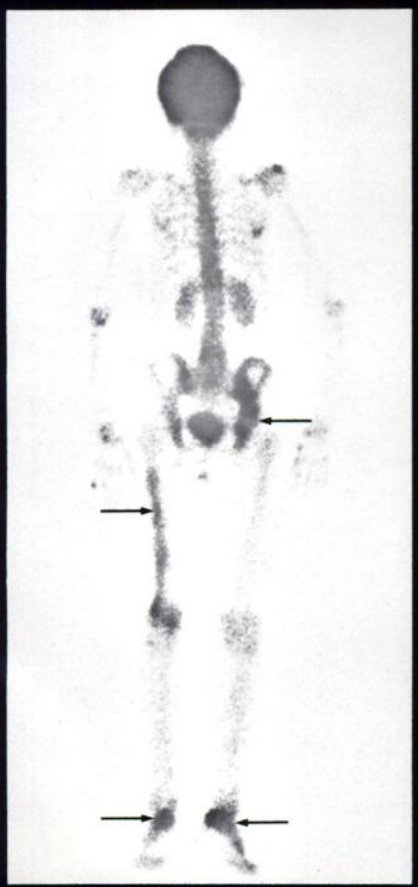
Nuclear images and caption material from the Division of Nuclear Medicine, Department of Radiology, the School of Medicine, University of Miami, Miami, Florida. Reprints of this and subsequent reports available upon request. Please write Eastman Kodak Company, Dept. 740B, Radiography Markets Division, Rochester, New York 14650. (M3-304)



Metastatic Prostatic Carcinoma. This patient's routine skeletal roentgen study was normal. The arrows reveal metastatic foci demonstrated by ^{99m}Tc PyP the day the patient was examined roentgenographically. Note the hydronephrotic kidney (a) and the plastic container of urine (b) draining the bladder.



Metastatic Breast Cancer. Metastatic disease in the axial skeleton had been demonstrated roentgenographically. It remained for the scintigraphic study the following day to demonstrate metastases (arrows) in the ribs and pelvis.



Paget's Disease. Routine roentgen studies demonstrated the involvement of the skull and axial skeleton. What was not appreciated, until the rectilinear whole body ^{99m}Tc PyP scans were obtained, were the massive changes in the femur and pelvis (arrows). Despite the ^{99m}Tc PyP evidence of Paget's disease in the feet (arrows), no changes were demonstrated roentgenographically.

NIH/TUNGSTEN SYRINGE SHIELD®

Optimum Shielding Minimum Weight

The NIH/Tungsten Syringe Shield:

- **Reduces exposure from ^{99m}Tc by a factor exceeding 200.**
- **Weighs less than 3-ounces—good balance.**
- **Retracts for dose calibration.**
- **Virtually unbreakable.**
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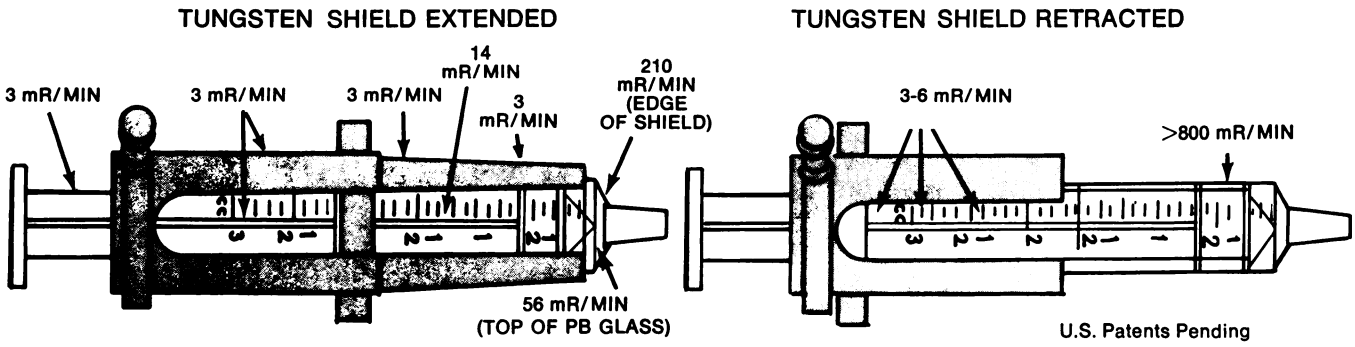
FILM EXPOSURE AT THE SURFACE 29.2 mCi for ^{99m}Tc in 1cc of a 3cc PLASTIC SYRINGE



U.S. Patents Pending

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*CONCEIVED and DESIGNED BY: J. Howley, H. Tipton, A. Jones, M. Dickinson, M. Green, and G. Johnston. National Institutes of Health, Bethesda, Md.

SHIELDING PERFORMANCE CHART COMPLIMENTS OF: J. Howley, Radiation Safety Services, National Institutes of Health, Bethesda, Md.

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This is the calibrator that remembers, computes and puts it in writing.

The CRC-20 dose calibrator incorporates a micro-processor which stores time and activity information for up to 19 formulations of 9 radionuclides.

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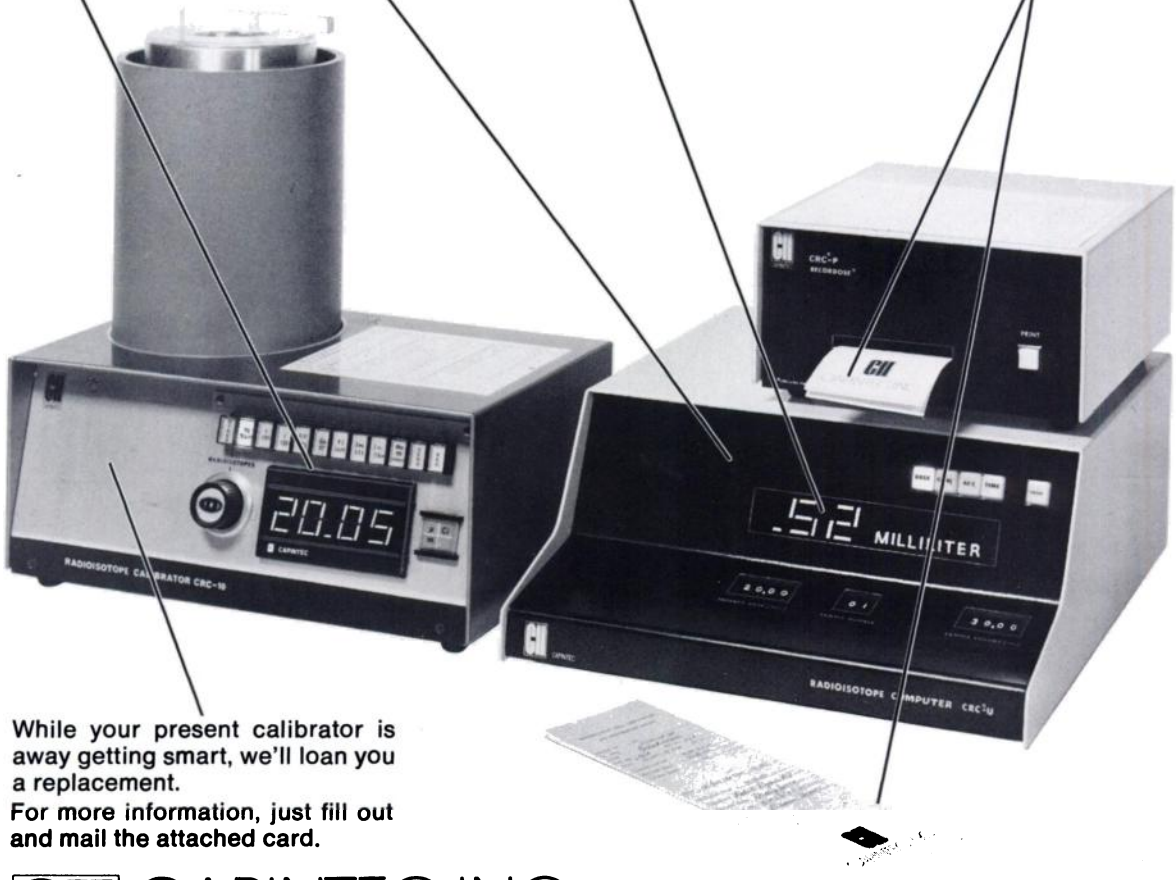
We'll even teach it to print neatly a three-copy Radionuclide Dose Computation/Measurement Record; one for the patient's chart, the second for NRC accountability, the third for billing.



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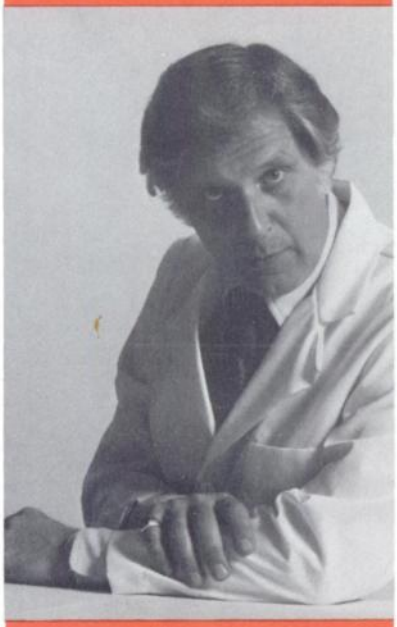
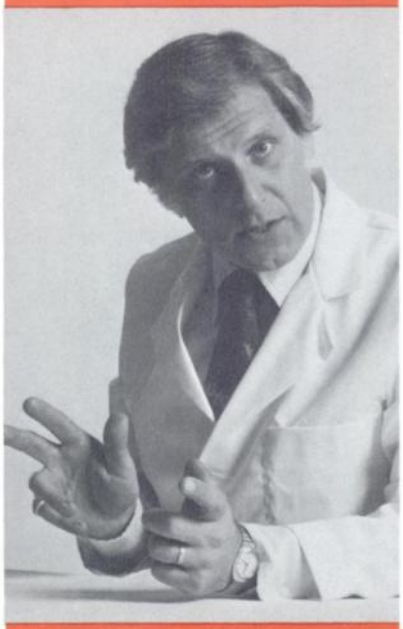
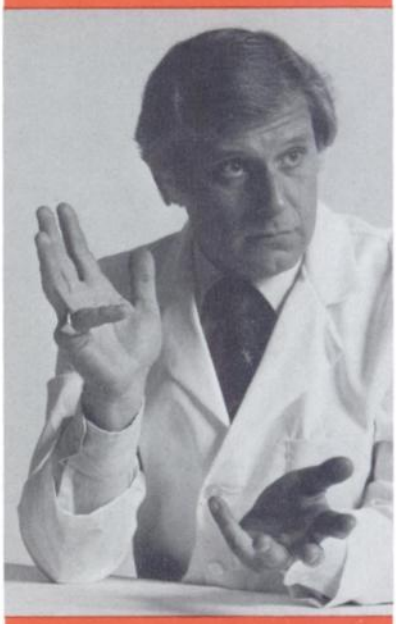
"Some of my patients just can't tolerate 90 minutes on a scanning table."



"For them, I prefer a Cleon scan."



"But then, Cleon does a better, faster job on all my patients."



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for maximum patient throughput in whole-body imaging.

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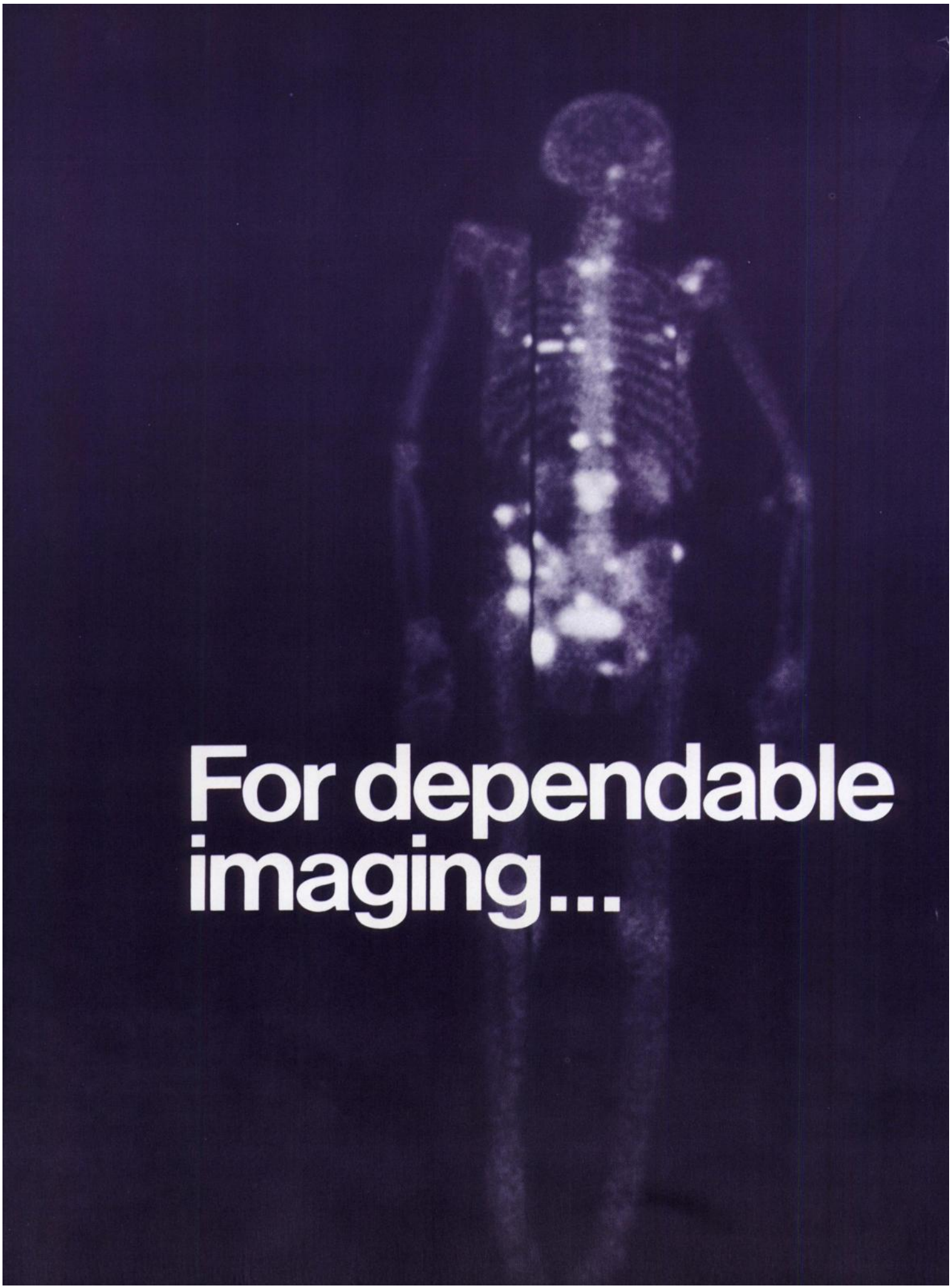
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imaging...

Dependable imaging of skeletal lesions —that's what bone scanning is all about. And that's what the unique, dry-mix formulation and stable PCP bond of Osteoscan assure. Osteoscan's diphosphonate formulation, when labeled with ^{99m}Tc, provides:

- ☐ dependably high tagging efficiency
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For further information about Osteoscan, please contact: Arnold Austin, Technical Manager, Professional Services Division, Procter & Gamble (513) 977-8547.

the dependable diphosphonate

PROCTER & GAMBLE

OSTEOSCAN®

(5.9 MG DISODIUM ETIDRONATE, 0.16 MG STANNOUS CHLORIDE)

SKELETAL IMAGING AGENT

In Europe, contact: Philips-Duphar B.V., Cyclotron and Isotope Laboratories, Petten, Holland.

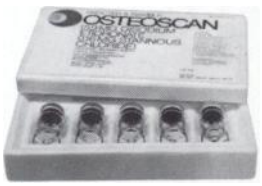
See following page for a brief summary of package insert.

PROCTER & GAMBLE

OSTEOSCAN®

(5.9 MG DISODIUM ETIDRONATE, 0.16 MG STANNOUS CHLORIDE)

SKELETAL IMAGING AGENT



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 disodium etidronate and 0.16 mg stannous chloride as active ingredients. Upon addition of ADDITIVE-FREE ^{99m}Tc-pertechnetate, these ingredients combine with ^{99m}Tc to form a stable soluble complex.

ACTIONS (CLINICAL PHARMACOLOGY)

When injected intravenously, ^{99m}Tc-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 ^{99m}Tc-labeled OSTEOSCAN.

Three hours after intravenous injection of 1 ml ^{99m}Tc-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 ^{99m}Tc-labeled OSTEOSCAN excreted in the feces is below the level detectable by routine laboratory techniques.

INDICATIONS

OSTEOSCAN is a skeletal imaging agent used to demonstrate areas of altered osteogenesis.

CONTRAINDICATIONS

None.

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.

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.

The ^{99m}Tc-generator should be tested routinely for molybdenum breakthrough and aluminum. If either is detected, the eluate should not be used.

PRECAUTIONS

Both prior to and following ^{99m}Tc-labeled OSTEOSCAN administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the ^{99m}Tc-labeled OSTEOSCAN injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation.

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.

ADVERSE REACTIONS

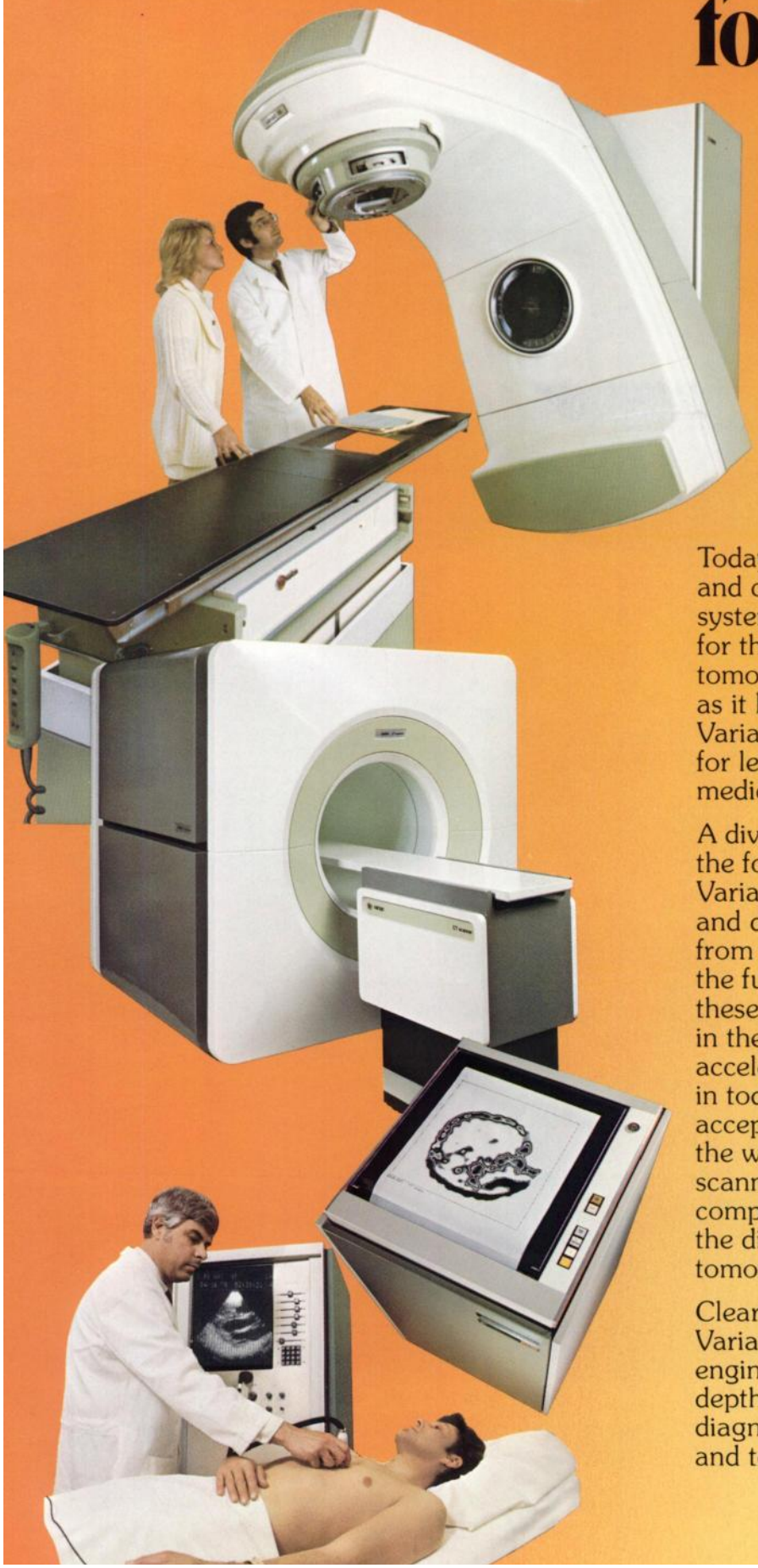
None.

DOSAGE AND ADMINISTRATION

The recommended adult dose of ^{99m}Tc-labeled OSTEOSCAN is 1 ml with a total activity range of 10-15 mCi. ^{99m}Tc-labeled OSTEOSCAN should be given intravenously by slow injection over a period of 30 seconds within eight (8) hours after its preparation. Optimum scanning time is 3-4 hours postinjection.

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

Varian...The Right Company for the Times.



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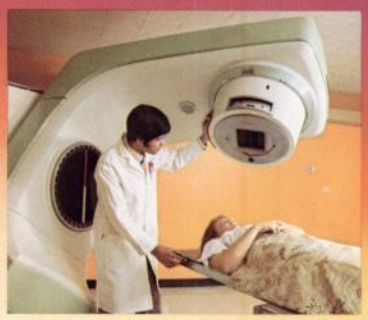
Today's remarkable growth in the capability and complexity of advanced medical systems makes Varian the right company for the times, a company that can deliver tomorrow's medical systems today, just as it has for the past 15 years! Since 1961, Varian has built a worldwide reputation for leadership in high-technology medical products.

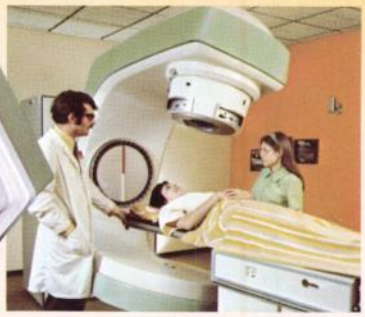
A diversified international corporation at the forefront of the electronics industry, Varian leadership in advanced therapeutic and diagnostic medical systems comes from its established depth of expertise in the fundamental technologies forming these systems. Varian was an early leader in the development of electron linear accelerators for radiation therapy, resulting in today's Clinacs,® the most widely accepted radiation therapy accelerators in the world. Comparable leadership in CT scanners, real-time ultrasound and clinical computation systems is already producing the diagnostic equipment of choice for tomorrow.

Clearly, the right company for the times, Varian's continuing record of creative engineering, commitment, and technological depth assure superior therapeutic and diagnostic systems for both today and tomorrow!

Clinac® Radiotherapy Linear Accelerators

Continuous Leadership for 15 Years





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Large photograph – Clinac 18
Upper insert – Clinac 6X
Lower insert – Clinac 4

Varian Clinac accelerators have established the performance standard for advanced radiotherapy equipment. Clinac leadership began in 1961 and has been marked by a record of innovation and achievement.

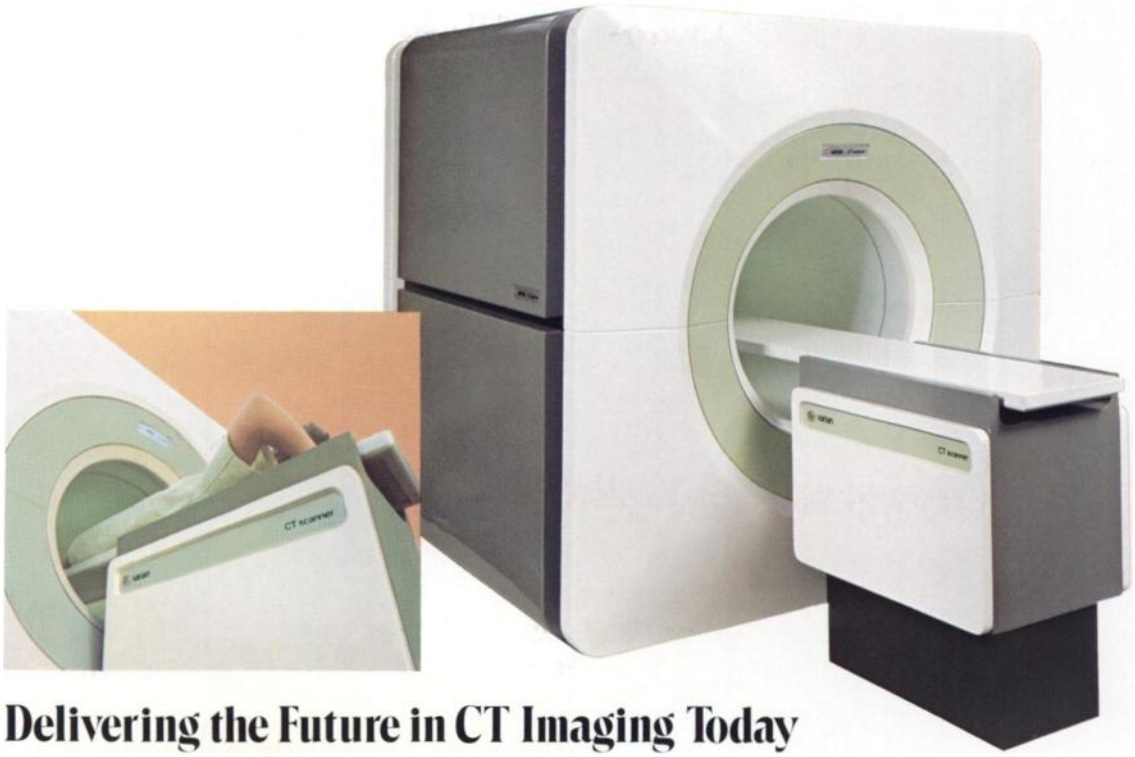
The record includes:

- ☐ Clinac 6, the first 360° isocentric bent-beam therapy accelerator without floor pit;
- ☐ Clinac 4, the first 360° isocentric standing-wave non-bent beam therapy accelerator;
- ☐ Clinac 6X, the first 360° isocentric non-bent beam standing-wave therapy accelerator producing 6 MV X-rays;
- ☐ Clinac 18, the most widely accepted high-energy, multi-modality therapy accelerator in routine standardized production.

Varian's success has produced major benefits to Clinac customers, allowing machine standardization, assuring widespread experienced service support, providing training courses, symposia, and other educational aids, and making possible an extensive program of continuing engineering and refinement on all Clinac models.

The Clinacs are a pronounced example of how technological excellence and medical need can be combined to provide a reliable, utilizable clinical tool.

Whole-Body CT Scanners



Delivering the Future in CT Imaging Today

Varian's Whole-Body CT scanner, now in production, is engineered for tomorrow's state of the art in CT imaging. Anticipating the future, Varian has incorporated three important design features: continuous, non-stop gantry rotation; an extremely powerful Varian V-76 computer system; and an extra large patient aperture. These features plus the superior head and body images already achieved on the Varian CT Scanner, project it far beyond the dimensions of current CT technology.

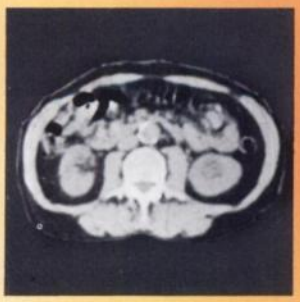
Design Features of the Future

6-Second Scan. The Varian CT Scanner collects over 108,000 data points through 360° in six seconds. It uses a precisely collimated fan beam detected by a Varian-designed linear array of 301 optimized Xenon-Krypton detectors.

Continuous Rotation via Slip Ring. The slip ring construction allows simple, trouble-free continuous gantry rotation for single or multiple rotation examinations or, as a standard feature of the Varian unit, triggered physiological gating of data collection.

Customized Scanning. By virtue of the power and speed of the Varian V-76 computer, the operator can easily adjust pixel size, field size, algorithm parameters or other major system parameters at the control console to achieve optimum displays for a variety of clinical situations. Optimization can be carried out virtually simultaneously with data collection and reconstruction of images.

90 cm (36") Diameter Patient Aperture. The extra large patient aperture gives unique flexibility in patient positioning, and use of clinical accessories during scanning.



Abdominal scan showing both kidneys and extensive gas in the bowels. Calcification has occurred around the aorta and in a small region of the intestines.

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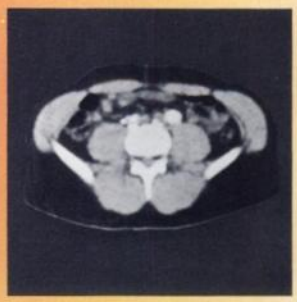
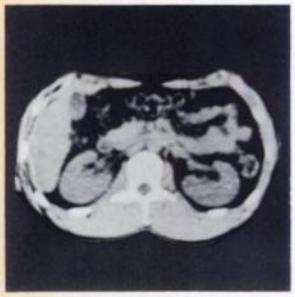


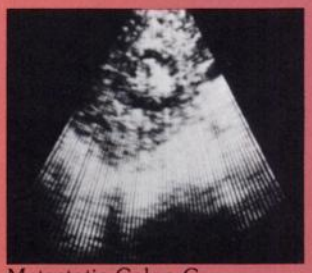
Scan through the pelvis showing bowel gas (black) and contrast agent (white) from a lymphangiography.



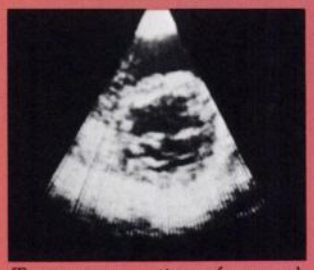
Scan through the renal pelvis of both kidneys showing renal vasculature.

Leadership in Real-Time Ultrasound

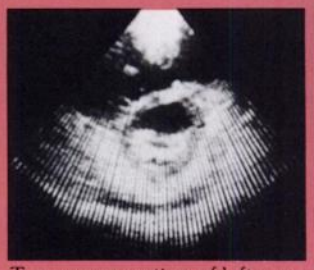
The V-3000 establishes Varian leadership in the fast growing field of real-time ultrasound. This instrument greatly extends non-invasive diagnostic capabilities in medical applications such as adult and pediatric cardiology, obstetrics, and abdominal scanning.



Metastatic Colon Cancer.



Transverse section of normal left ventricle at level of mitral valve.



Transverse section of left ventricle with stenotic mitral valve.

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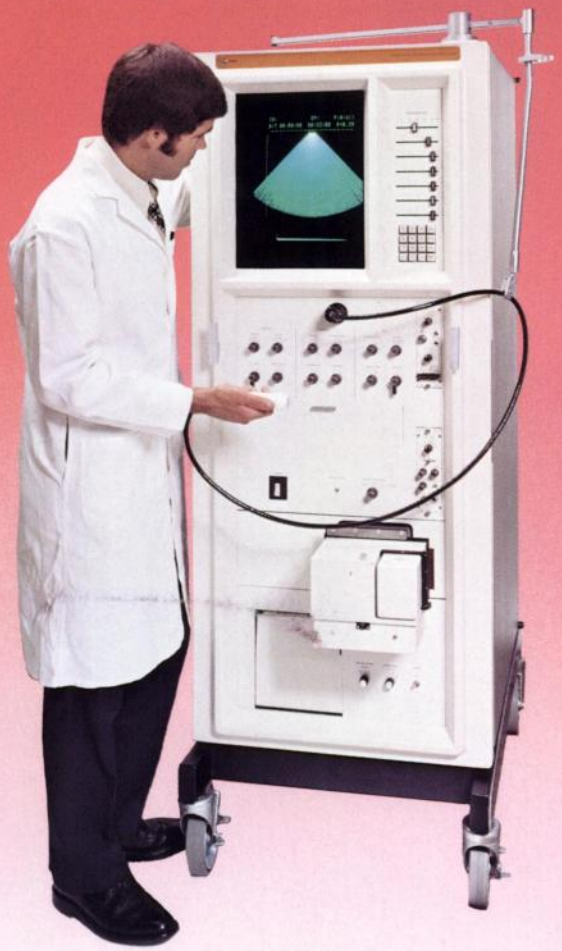
The V-3000 scans an 80 degree two-dimensional section at 30 frames per second. When the transducer is positioned to direct the ultrasound beam between the patient's ribs, it can give an unobstructed field of view large enough to image the entire left ventricle of an average adult heart. Or, moved freely across the abdomen, the same transducer produces instantaneous high resolution images, permitting a fast yet meaningful ultrasonic examination, the ultrasonic equivalent to fluoroscopy.

Images are displayed in gray scale on a cathode ray tube and can be recorded on video tape for stop-action or slow-motion viewing. For cardiological applications, standard M-mode and ECG triggering can be included.



V-3000 Phased Array Ultrasonograph

Real-Time Two-Dimensional Imaging with Ultrasound

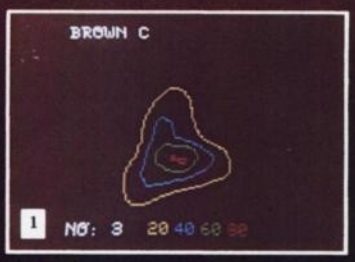
Varian Clinical Computation Systems

New Dimensions in Advanced Computer Applications

The fast and flexible Varian V-70 series minicomputers and supporting software have, through application in the Varian CT scanner and other medical equipment, proven to be ideal for clinical use. Varian's real-time, multi-task operating systems VORTEX and BETA give wide flexibility and ease of use for busy, patient-oriented environments. Combined with Varian special application software, Varian systems put the most advanced digital data-processing tools at the medical staff's fingertips.

The first standardized clinical system introduced by Varian was VARICAM, a comprehensive nuclear medicine data processing system, now in use in many hospitals around the world. Gamma camera raw-data are directly input to VARICAM and submitted to data processing procedures according to simple operator instructions. VARICAM gives the user unique options for developing his own processing protocols and manipulating data output format. VARICAM processed data are displayed in video black and white, color, or as life-sized hard-copy by the remarkable Varian STATOS® electro-static printer/plotter.

Varian digital computers are used in major medical centers for many other applications including radiotherapy planning, ultrasound image processing, infra-red image processing, electro-cardiology diagnosis, and intensive care monitoring.

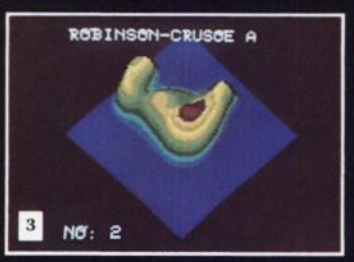


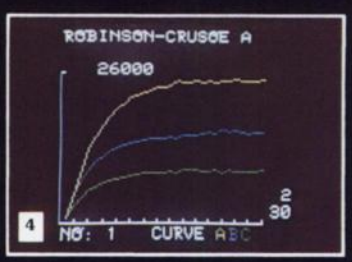
1 Contour map of embolized lung in left lateral view.

2 Dynamic liver examination showing Regions of Interest as defined by operator.

3 Isometric view of summed matrix of dynamic liver examination.

4 Curves formed from each Region of Interest shown in 2.

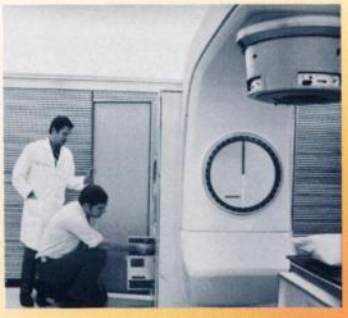




Varian Therapeutic and Diagnostic Medical Systems... Leadership in Advanced Technology

Varian leadership and experience in advanced therapeutic and diagnostic medical systems has resulted in modern systems designed for years of reliable operation... human engineering that pays attention to utility, operator ease and patient comfort... customer support and service that start even before the installation.

VARIAN ASSOCIATES, Palo Alto, California



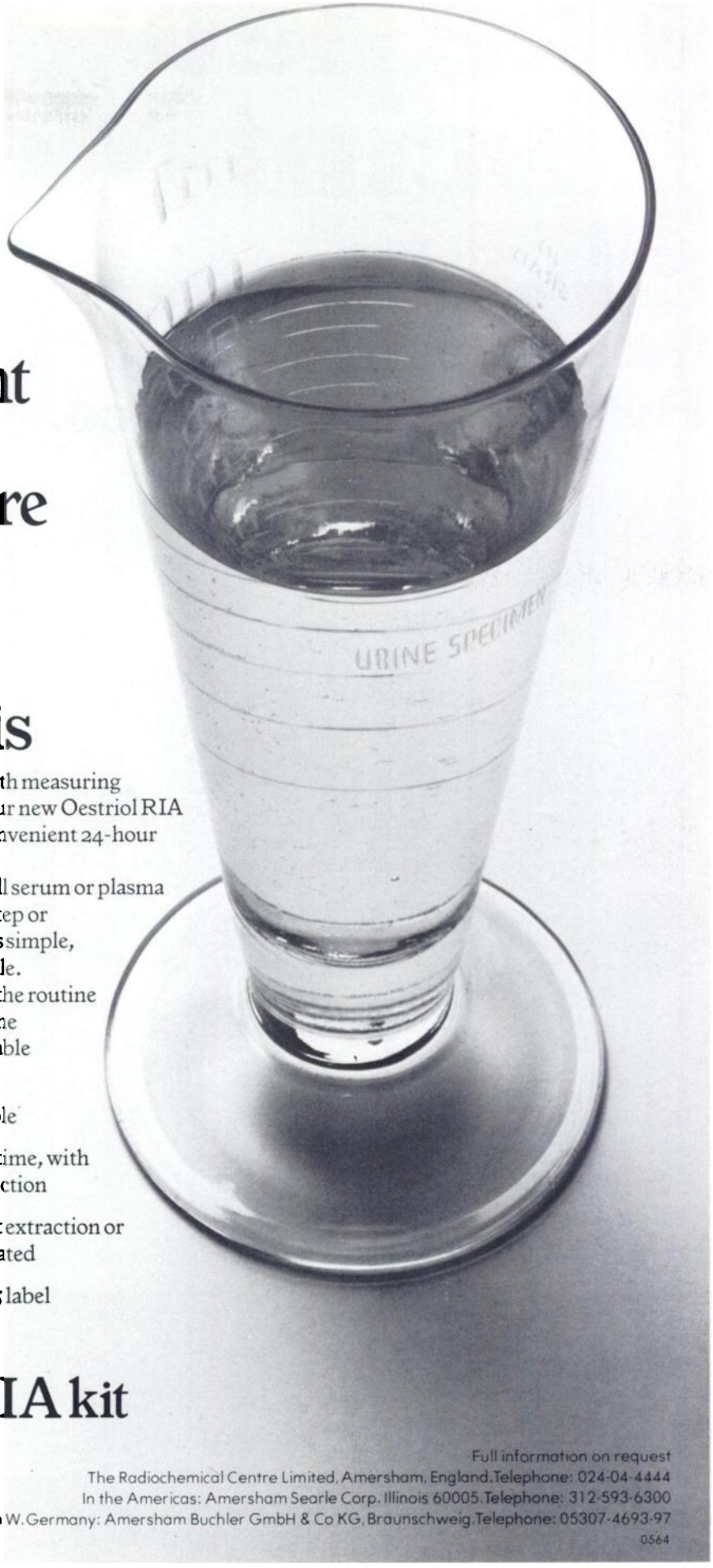
Built-In Quality and Reliability
Varian quality and reliability are the result of both design and workmanship. Varian design engineers have developed a high degree of expertise in incorporating modularity, easy component access and system reliability. Production workmanship is just as vital for quality and long term reliability. At Varian's modern, highly specialized facilities in Palo Alto, California, therapeutic and diagnostic systems are produced by a quality conscious staff.

Customer Support From the Beginning
A medical system is bought to be used. Varian installation experts give support that expedites installation planning and smooths the necessary steps of actual installation. After installation, continuing engineering and service support help assure proper performance. Varian maintains close communication with customers to promote proper utilization of the equipment. For example, Varian's Clinac training courses in Palo Alto teach aspects of equipment operation, preventative maintenance, trouble-shooting, and many routine repair procedures.

Worldwide Service
Varian's service organization is one of the largest in the world for medical linear accelerators. This organization is the base of service support for the Varian CT and ultrasound medical systems. Skilled service personnel are located in Field Offices throughout the United States and overseas. These offices are strategically located for rapid response to emergency calls and for routine preventative maintenance.

varian

Varian Radiation Division
611 Hansen Way, Palo Alto, CA 94303
Phone: 415/493-4000



There ought to be a better way to measure oestriol

Now there is

There's only one thing wrong with measuring oestriol in urine, and that's the urine. Our new Oestriol RIA kit avoids the time-consuming and inconvenient 24-hour urine collection.

The method requires only a small serum or plasma sample. Because no solvent extraction step or chromatography are needed, the assay is simple, easily automated and highly reproducible.

Our kit brings oestriol RIA into the routine laboratory for the first time, providing the obstetrician with a fast, flexible and reliable service, and saving 24 hours too!

- Only 50µl serum or plasma sample
- Rapid results – 3 to 4 hour assay time, with no 24 hour delay for sample collection
- Simple RIA method – no solvent extraction or chromatography; readily automated
- Easy γ-counting with iodine-125 label

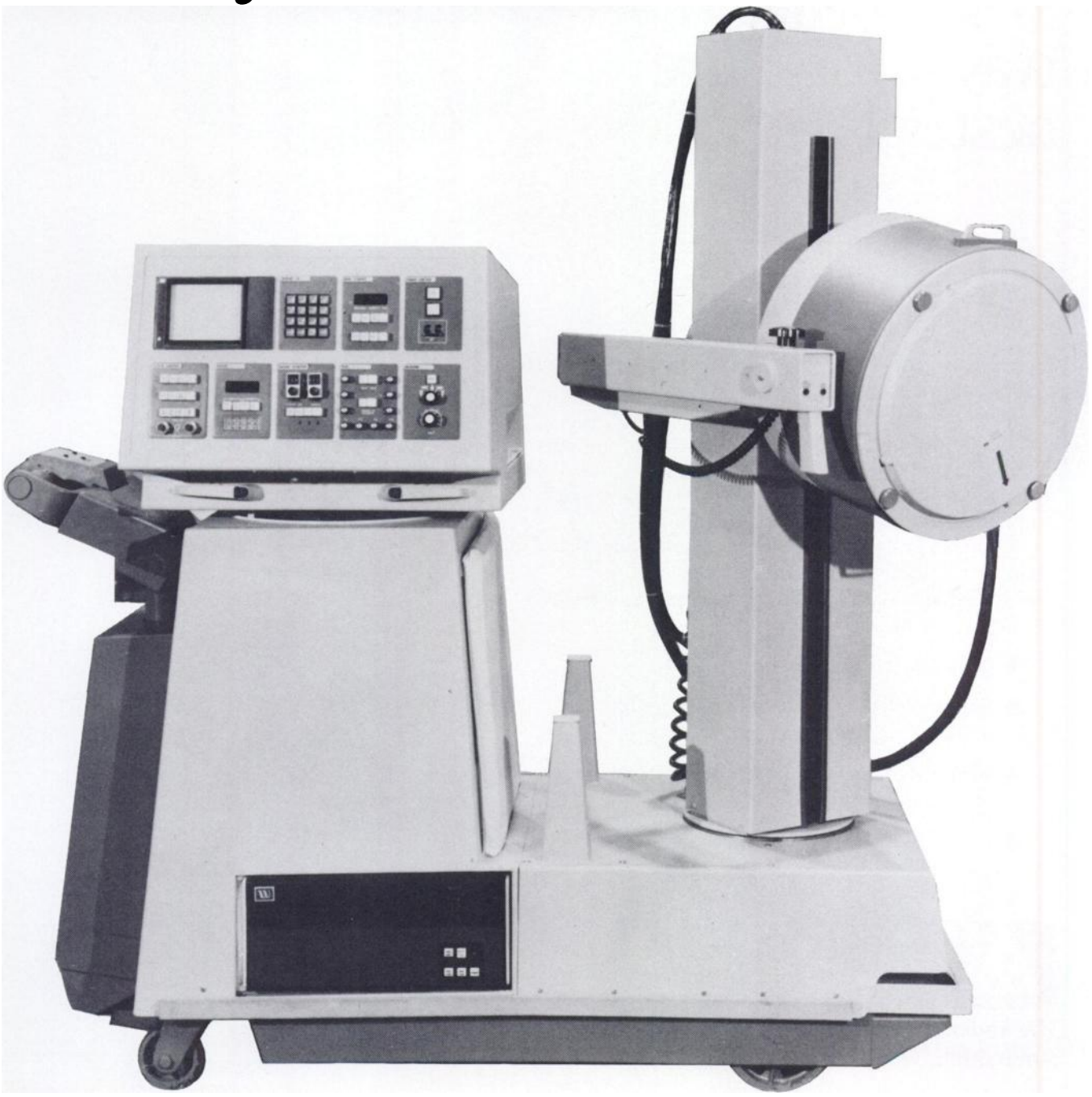
Oestriol RIA kit

The Radiochemical Centre Amersham

Full information on request
The Radiochemical Centre Limited, Amersham, England. Telephone: 024-04-4444
In the Americas: Amersham Searle Corp. Illinois 60005. Telephone: 312-593-6300
In W. Germany: Amersham Buchler GmbH & Co KG, Braunschweig. Telephone: 05307-4693-97
0564

The new Elscint Mobile 1

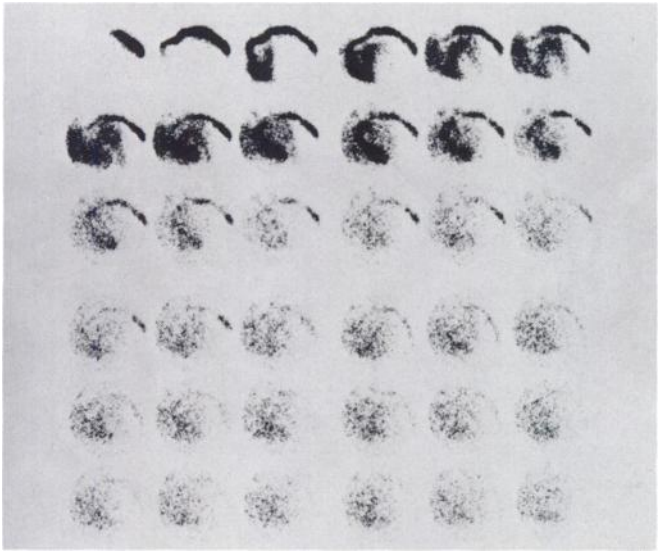
Gentle as a pussycat.
Yet powerful.
For every clinical need.



Elscint's new MOBILE 1 gamma camera offers you the quality and performance of a stationary camera with the fluid mobility of a cat. It moves rapidly yet safely wherever needed. The detector head raises smoothly into position with fully automated two speed controls. Over *or under* the patient. Swings to either side or in front. The new MOBILE 1 camera is quiet and efficient to give you high quality results with maximum flexibility.

Mobile 1: Exceptional performance in a mobile camera

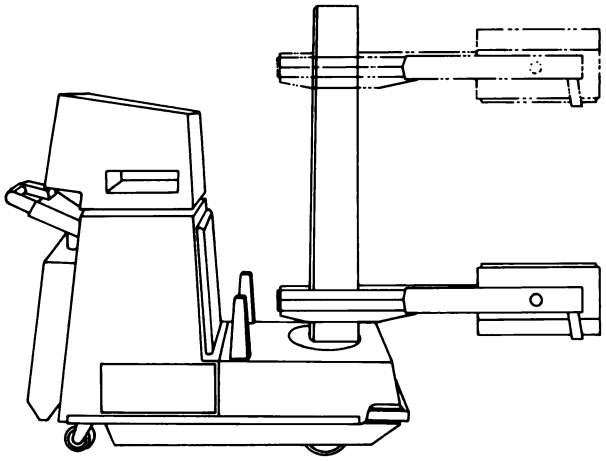
Results, of course, must be the ultimate measure of any diagnostic system. Here, Elscint is second to none. The MOBILE 1 provides a full 12″ FOV with bar resolution better than 3.2 mm. It images at rates



to 200,000 cps. (less than 1.5 μs deadtime) and its usable energy range extends beyond 200 KeV for use with 81^m Kr (190 KeV), 99^m TC (140 KeV) or 201 Tl (70 KeV), or other usable radionuclides within this range. It thus performs as a regular stationary camera for both static and dynamic studies as well as a mobile patient bedside unit. An optional data storage/replay system acquires and records at up to 150,000 cps for later replay or processing, adding time marks for reframing as fast as 100 frames/sec.

Mobile 1: Maximum maneuverability

Extreme ease and convenience of movement are major features of the MOBILE 1. Its under-30″ width and compact overall size enable passage through any doorway or narrow hall. Its low profile facilitates excellent forward visibility while in motion and its low center of gravity produces high stability even with full detector extension. Three speed forward and reverse drive and short-turning-radius power steering permit rapid long distance travel as well as precise



Designed for over *and under* patient imaging

positioning at bedside with safety interlocks provided to prevent accidental bumping into objects or people. The MOBILE 1 can pass over a 20 mm obstacle and climb a 10% slope rapidly yet will not run away on downslopes. Positive-locking brakes assure firm positioning and are automatically applied upon release of the control handle.

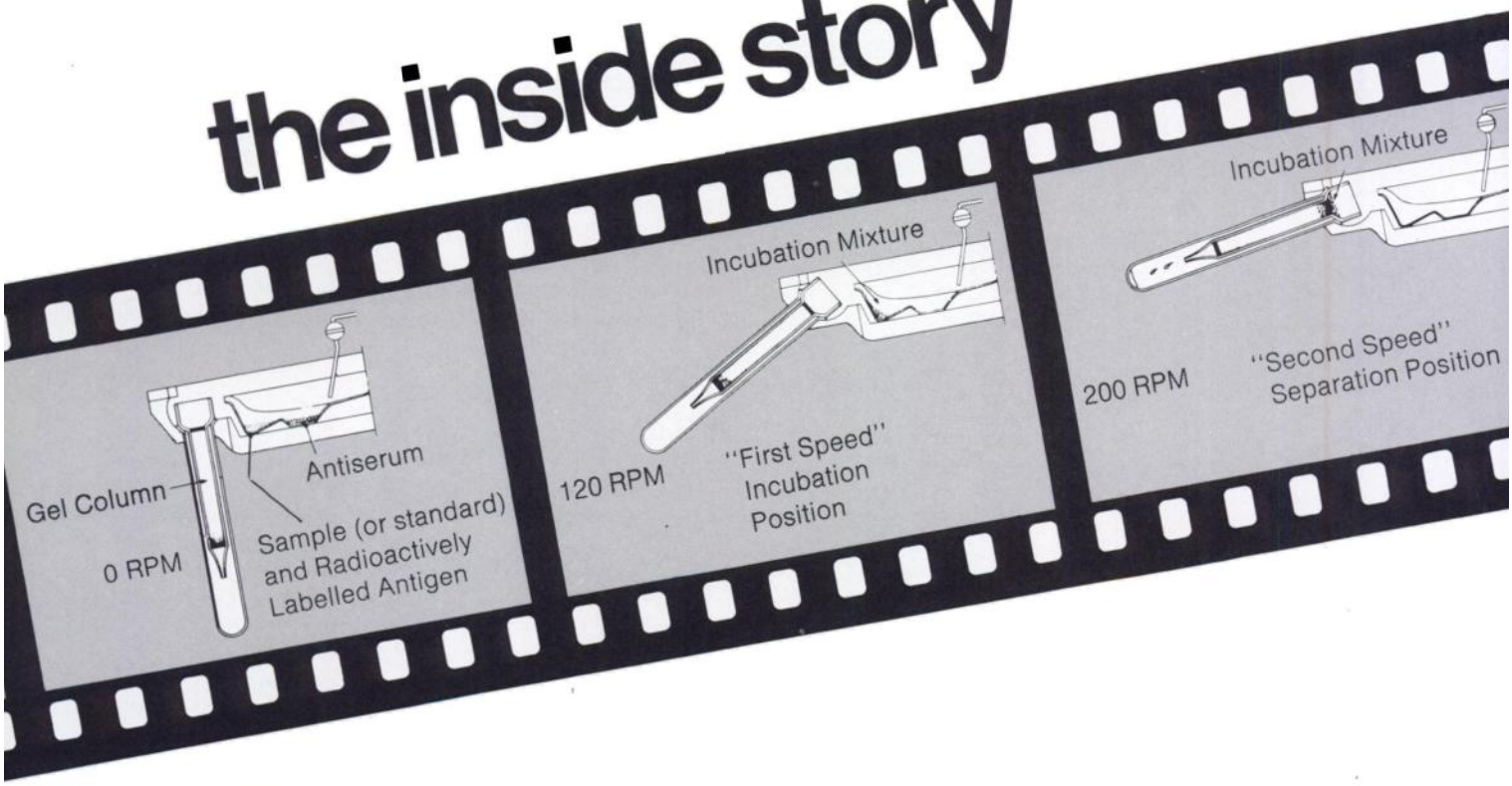
Mobile 1: Convenient controls for easy operation

All of the operating features employed in our latest stationary cameras are provided in the Mobile 1 with the added convenience of a swivel-mounted operating console. Pushbuttons ease input of patient information, data recording, display control, scaler operation, and isotope selection. Patient rotation selection and region of interest are conveniently controlled as well. The camera's persistence scope faces the detector and moves with it for easy patient setup. Dual isotope operation is available as is a selection of up to 3 single-channel analyzers.

When it's safer, faster and easier to move the camera to the patient, you'll get maximum performance with the Elscint MOBILE 1 Gamma Camera.

RIA with simultaneous incubation/separation...

the inside story



Automated RIA
The Centria® System . . . the only RIA system that assures simultaneous incubation and separation. It offers unmatched precision and accuracy, faster determinations and less tedium for the technologist. It increases efficiency and lowers total cost per assay.

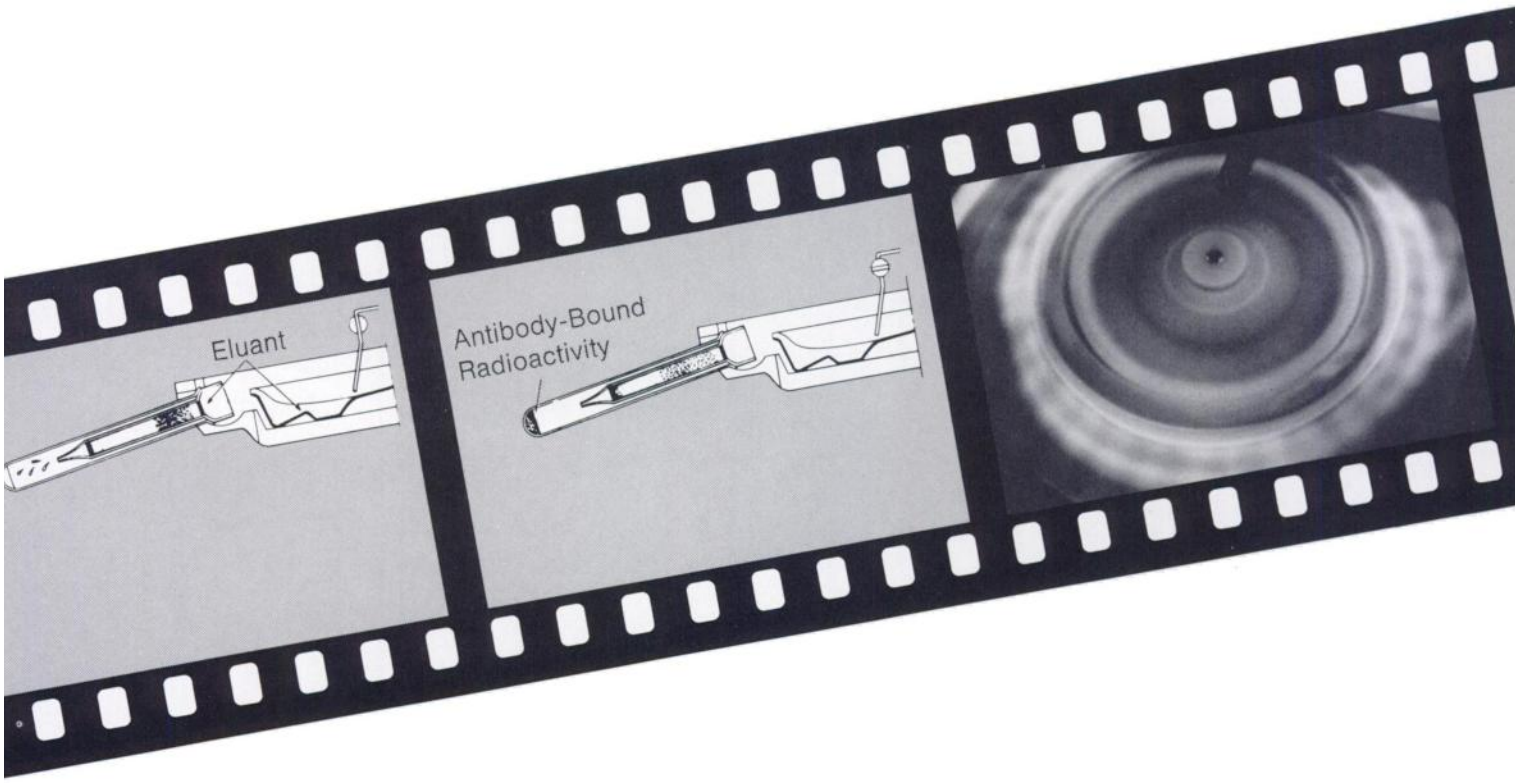
The Centria System is a total system. The three automated modules — Pipettor, Incubator/Separator, Counter/Computer — are integrated . . . yet can be operated simultaneously and independently.

Parallel incubation/separation
The unique ability to incubate and separate simultaneously means no first-to-last tube differences. And no waiting for equilibrium.

Here's how it works. The frames above (from our new film) show one of the 36 simultaneously processed tubes. As rotation begins, antiserum flows from inner to outer cavity . . . simultaneously in all 36 positions. Instantaneously, reactants are combined and held for a preset time. After incubation, rotation automatically accelerates to a higher speed . . . transferring the entire incubate to a specially designed column where it imbeds in the separating medium. The bound flows to the bottom of the tube, the free remains in the column.

Speed
Since there's no waiting for equilibrium, tests now taking up to 4 hours can be completed in 30 minutes. Up to 800 tubes can be processed in an 8-hour shift.

Reproducibility
Test-to-test, hour-to-hour, day-to-day . . . the standard curve remains virtually identical.



A total package
The Centria System includes much more than instrumentation and specially formulated kits (available for over 75% of today's RIA volume). Our world-wide Clinical Diagnostics team offers nearby technical and field service, a methods development group, training, full warranty, and evaluation programs.

Get the inside story. You'll see for yourself why we say "Centria® . . . it's about time."

UNION CARBIDE **Clinical Diagnostics**

Centria®. . .
it's about time

401 Theodore Fremd Ave.
Rye, New York 10580
914 967 7800

Union Carbide Corp., Clinical Diagnostics
401 Theodore Fremd Avenue, Rye, N.Y. 10580

I'd like to see:
☐ your 10 minute film ☐ your representative
☐ a demonstration ☐ a free cost analysis

Name Position

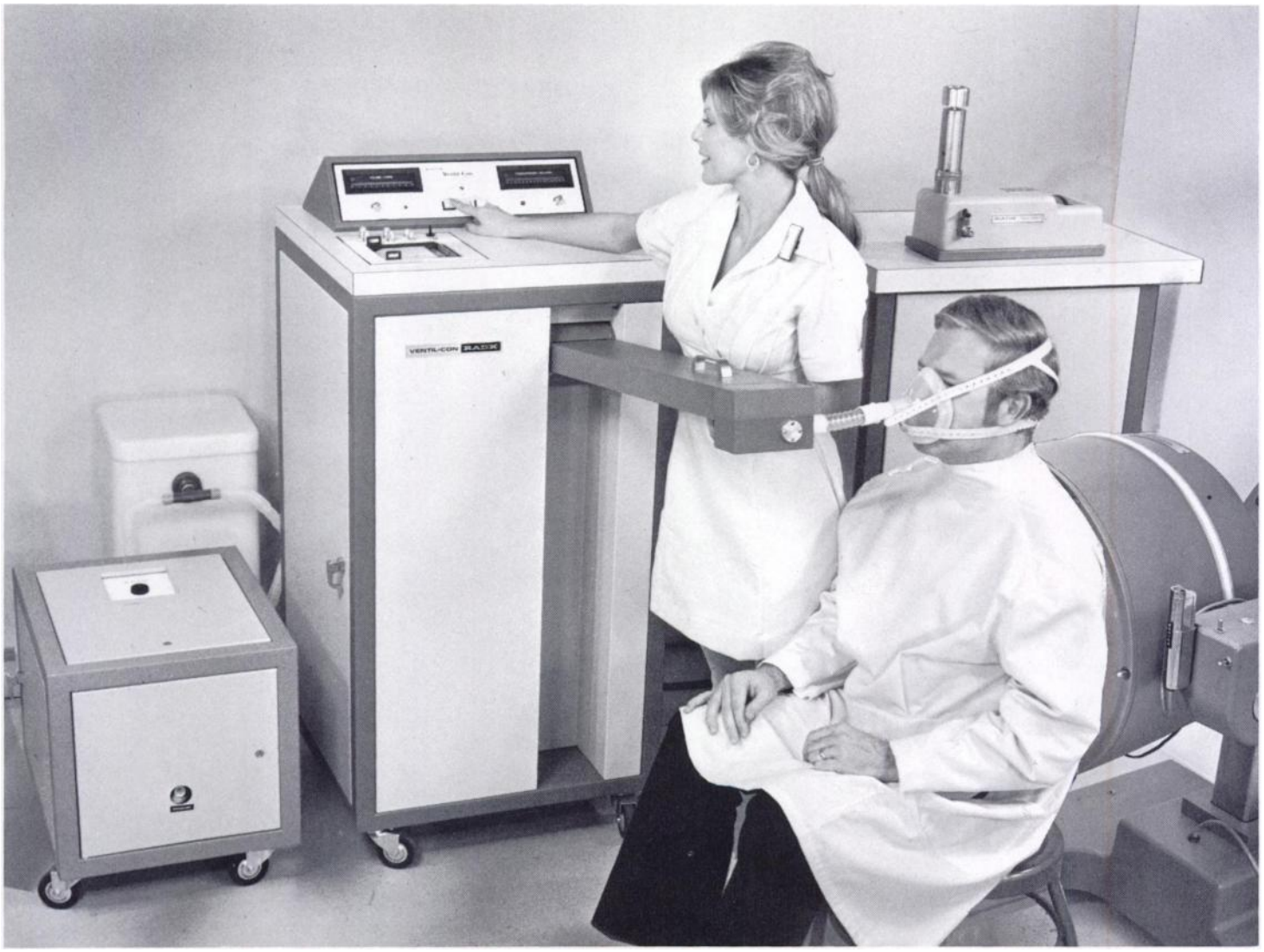
Institution

Address

City State Zip

Phone No. beds NM117

From START to FINISH...



The Complete System for Lung Ventilation Studies

Now you can dispense, administer and dispose of ^{133}Xe safely and economically under controlled conditions with a complete system from Radx. The system is designed to protect the user as well as the environment.

Patient comfort, safety and ease of breathing are primary concerns.

a ^{133}Xe Gas Control System from RADX

The START
Xenon-Kow II

^{133}Xe is most economically obtained in curie quantity glass ampules. The Xenon-Kow II was designed to safely and conveniently crush the ampule and dispense ^{133}Xe in smaller doses. The dynamic volume storage chamber provides for constant concentrations (decay excepted), and transfer efficiencies exceed 98%. The economies realized will pay for the entire system, usually in the first year. Let us analyze and compare your current cost with our system cost.

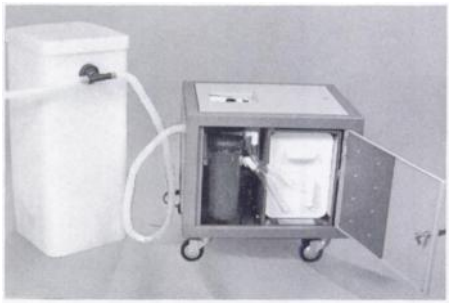
The HEART of the System
Ventil-Con

The Ventil-Con controlled gas delivery system is used for patient administration of ^{133}Xe. You may administer the ^{133}Xe as a bolus or homogenous mixture with air and oxygen to perform the single breath, equilibrium and washout phases of lung ventilation studies.

Major features are:

- GM detector for ^{133}Xe concentration determinations
- Automatic O_2 replenishment
- Manual O_2 replenishment
- Emergency O_2 assist
- Swivel adapter for multiple views available
- In line, autoclavable, bacteriological filter
- Wide variety of face mask and mouthpieces available
- 10 liter dry spirometer
- Volume meter
- Dual channel strip chart recorder (optional)
- Breathing resistance less than 0.05-0.1 inches of water
- Arm adjustable for 0-60 inches
- Large CO_2 adsorber

We also make special Ventil-Cons for ^{127}Xe and cerebral perfusion studies by the Obrist technique[1].



The FINISH
Xenon Trap

The Radx Xenon Trap is the only activated charcoal trap with a built-in ^{133}Xe saturation detector/alarm. When the charcoal reaches its saturation point, (because there is no such thing as a "life-time" trap) an audio/visual alarm is activated indicating it's time to replace the 6-cylinder cartridge pack. Other features are a large desiccant jar for moisture removal, a "flame isolated"pumping system and an optional expandable interface (pictured).

Actually, the Xenon Trap is not the finish because with every piece of Radx equipment goes our one-year warranty, and our commitment to the future needs of nuclear medicine.

1. Obrist, W. D. et al, "Determination of Regional Cerebral Blood Flow by Inhalation of Xenon-133", Circulation Research, XX,124-134, January 1967.

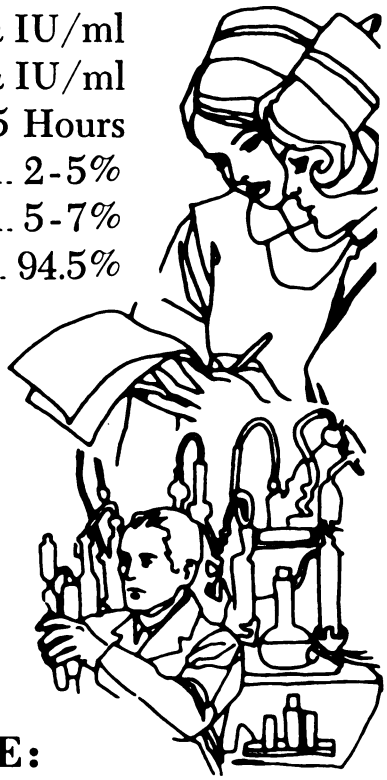
RADX

P.O. Box 19164, Houston, Texas 77024 • (713) 468-9628

NEW RIA TEST FOR TSH WITH DPC's HIGH SENSITIVITY KIT

FEATURING:

- SUPERSENSITIVITY ..... 2μ IU/ml
- LINEAR RANGE ..... 2-100μ IU/ml
- TOTAL INCUBATION TIME ..... 5 Hours
- PRECISION (within-run) 2-5%
- PRECISION (run-to-run) 5-7%
- RECOVERY OVER ASSAY RANGE 94.5%
- SECOND ANTIBODY PEG SEPARATION
- LYOPHILIZED REAGENTS
- LOWEST CROSS-REACTIVITY WITH HCG, LH and FSH
- INDIVIDUAL CALIBRATORS
- RELIABILITY AND ECONOMY
- LINEAR PLOT (log-logit paper provided)



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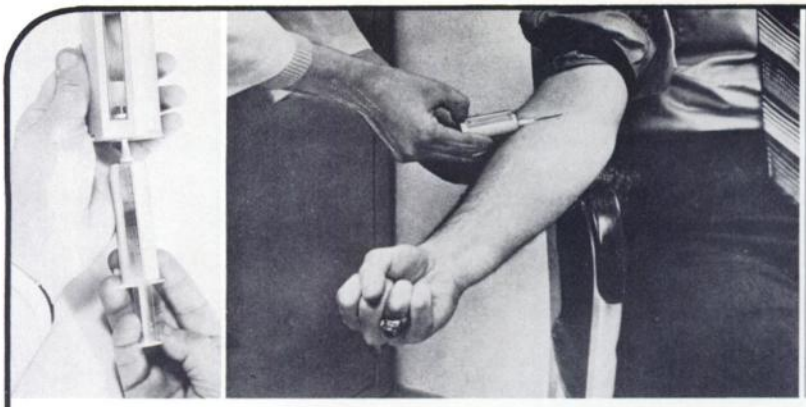
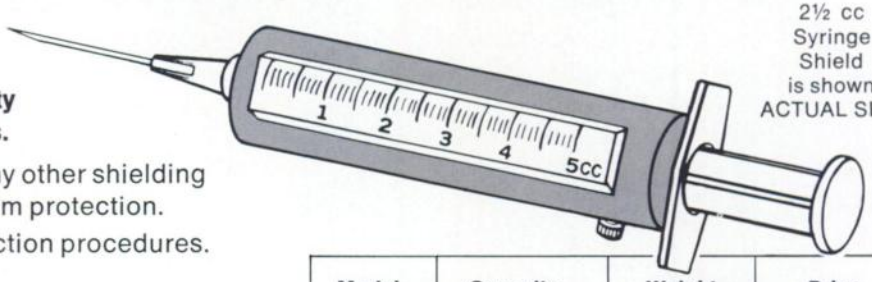


NEW...

Added protection against excessive radiation levels from radionuclides

ULTRA-LITE SYRINGE SHIELD

The LIGHTEST and SMALLEST syringe shield ever made



2½ cc Syringe Shield is shown ACTUAL SIZE

Permits unparalleled dexterity when handling radionuclides.

- 40% to 60% lighter than any other shielding material, yet offers maximum protection.
- Slim design facilitates injection procedures.
- Virtually indestructible.

So light and easy to use, you'll check twice to see if it's in your hand.

Model	Capacity	Weight	Price
56-292B	2½ to 3 cc	1.4 oz.	$149.50
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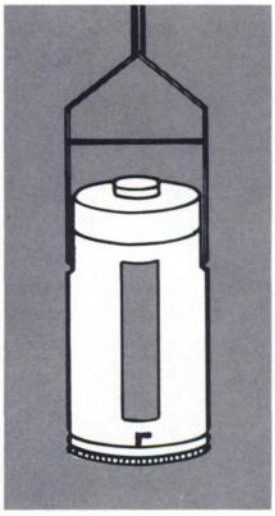

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Assures total exposure-free control, from milking through measurement and ultimate use...simply, safely, conveniently.

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*Patent Pending

Need more information? Ask for Bulletin 216-B.

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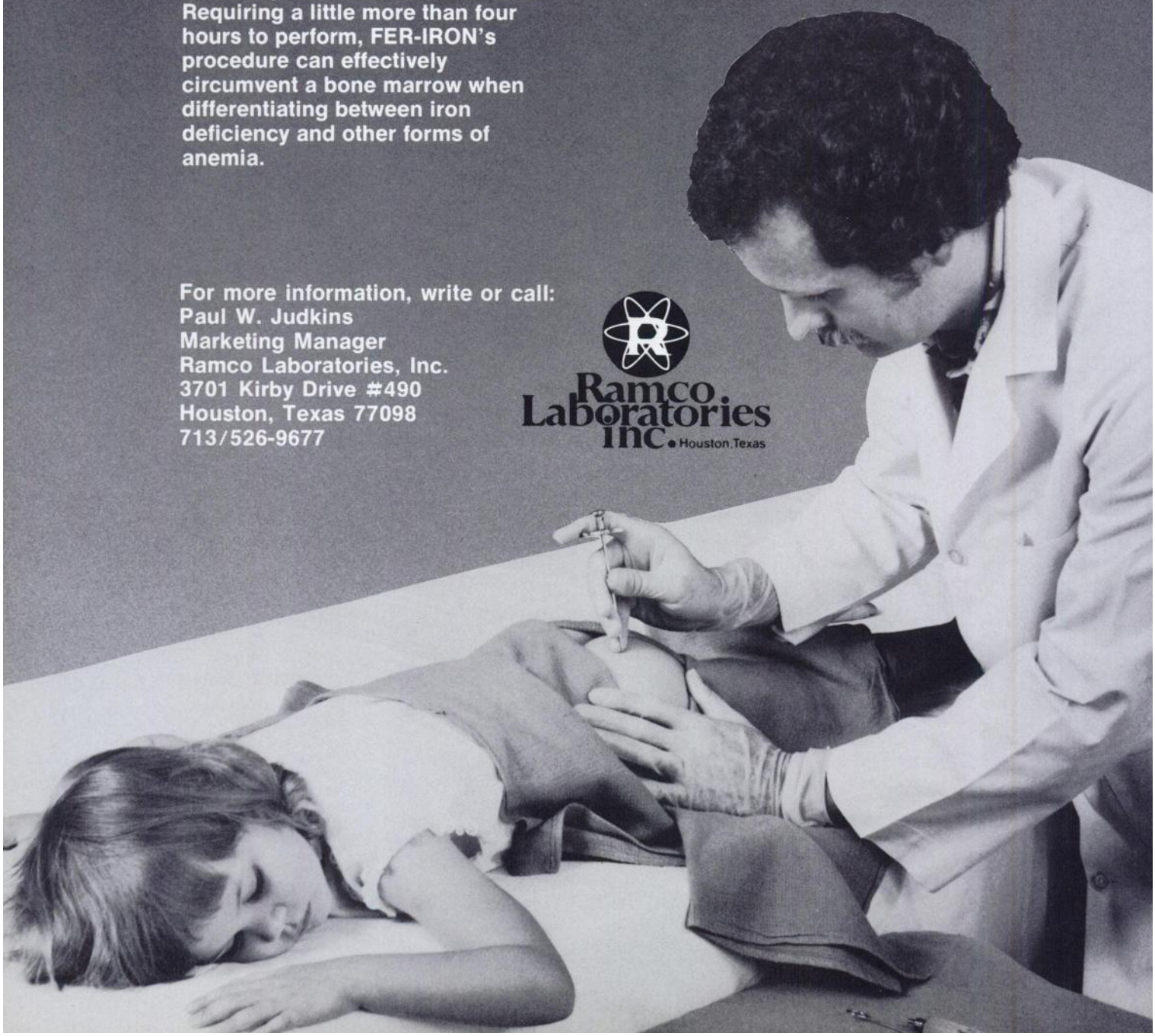

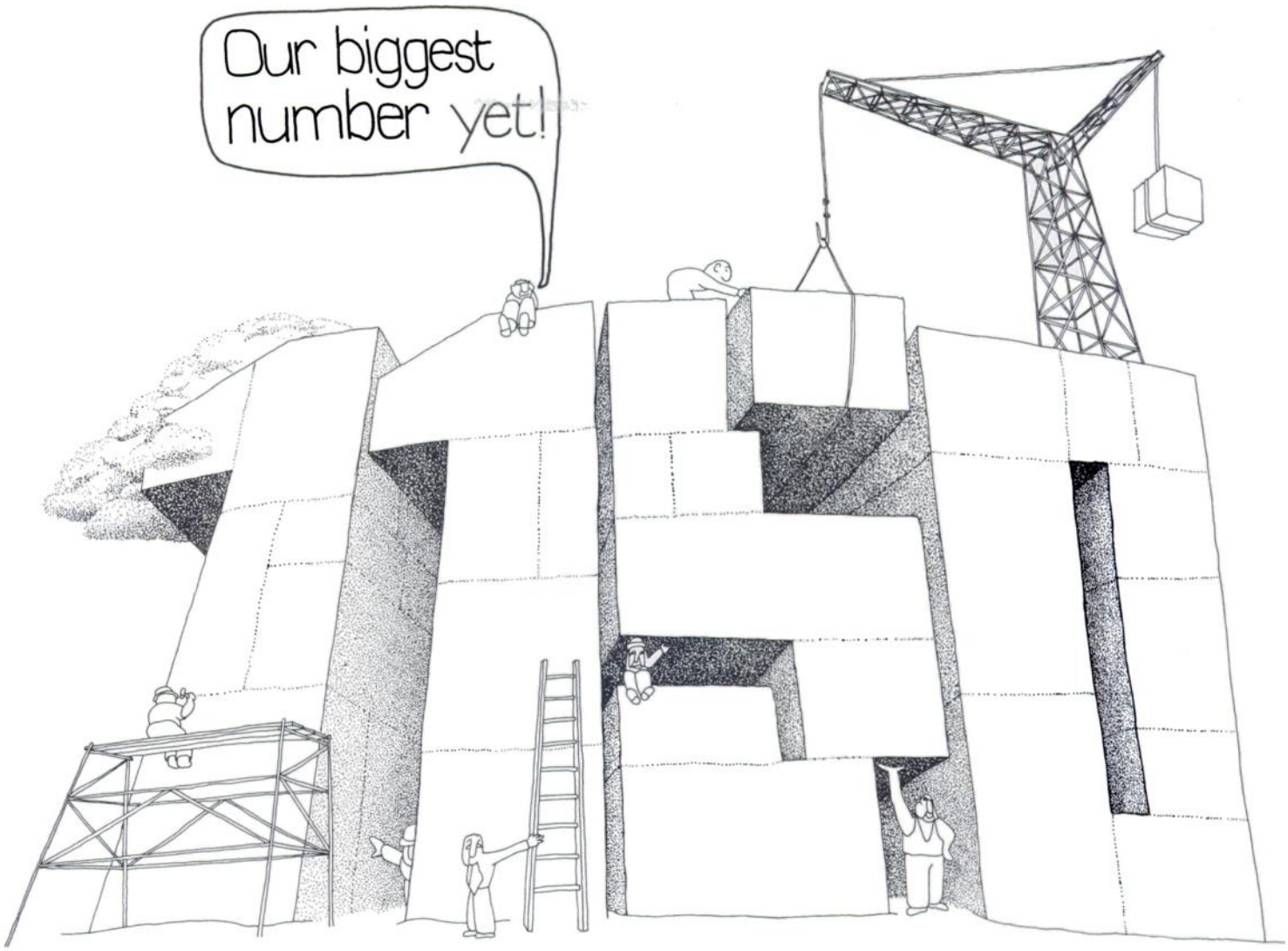

What's an 1150? That's what you get when you combine our 750-04 Electronic Programmer and 400 Oscilloscope Camera. So why not call it an 1150-04? Well, we didn't want *that* big a number.

But seriously, our big number gives you an incredible combination of versatility and for very little money produces some of the sharpest dots available in Nuclear Medicine. Your choice of formats (1,4,9,12, 16,19,21,34,64, etc.) with the 1150 is practically unlimited. Not to mention all the benefits derived from the 8x10 x-ray film format such as availability, gray-scale, group viewing, familiarity, and economy. And not to forget our 750-01 users out there, you can upgrade to 1150 capabilities simply with additional electronics and our 400 Oscilloscope Camera.

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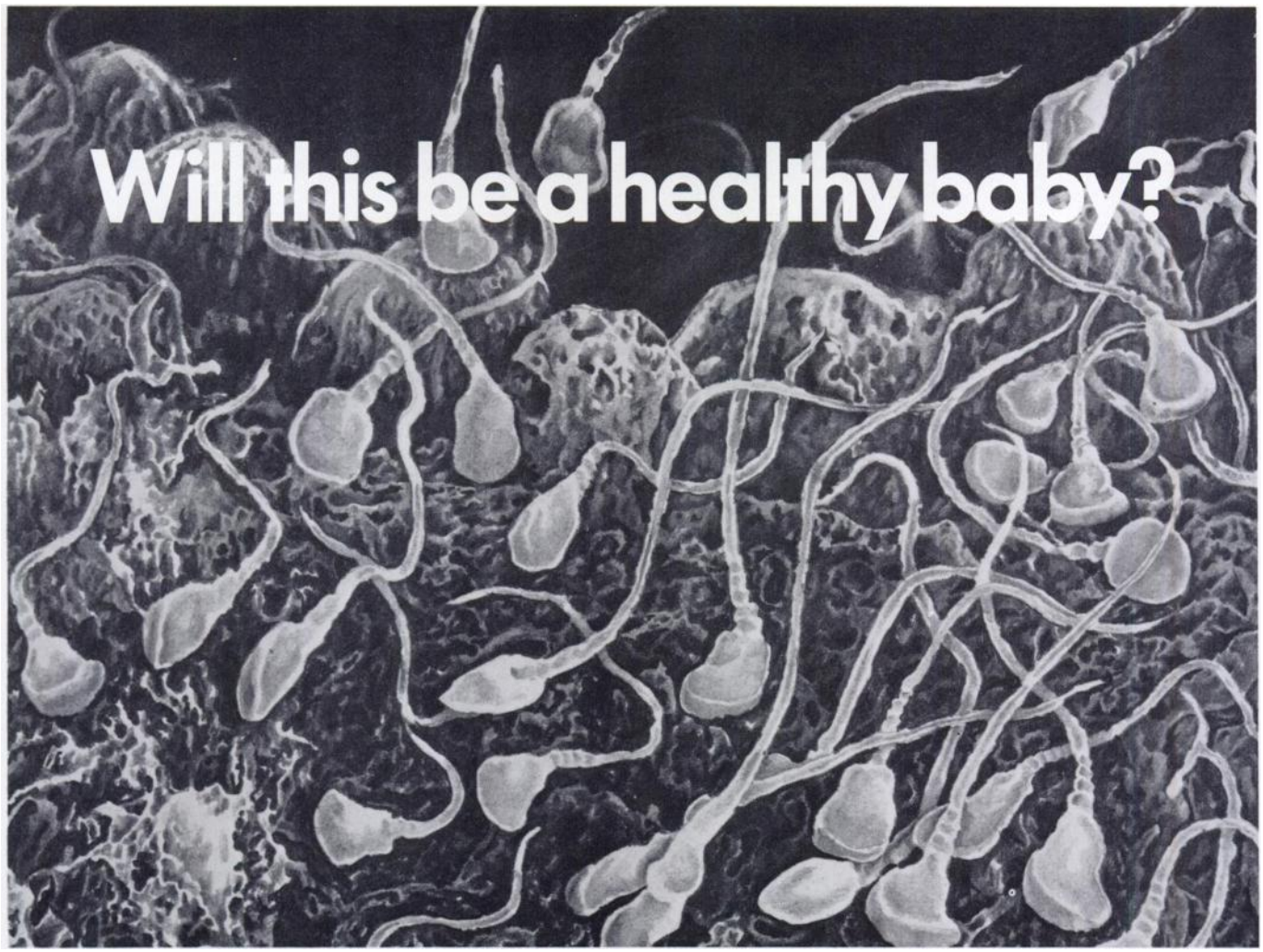

Representation of Spermatozoa at the surface of an ovum magnified approximately 2000 times.

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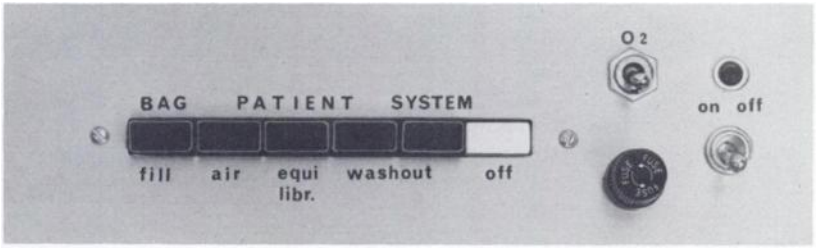
- Push-button control.
- All functions facilitated by two internal blowers.
- Resistance-free patient breathing.
- Uses 20-liter breathing bags in fully-shielded chamber.
- Accepts any radioactive xenon... ^{133}Xe, ^{127}Xe, ^{125}Xe.

XDS makes lung function studies easier for both the patient and the technologist. With "up-front" push-button controls and two internal blowers doing the work, the patient enjoys resistance-free breathing; the technologist has full control of each programmed function at his fingertips. Studies are fast, efficient and effortless.

XDS— the system with the versatility and performance features of more-expensive systems.



Control Panel

Each programmed function is controlled by two in-system blowers which are independent of the patient's breathing efforts. From "Fill" to "System Washout" the blowers automatically balance the breathing circuits, providing resistance-free patient breathing and complete system clearance.

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All this in a complete camera and console system which occupies a mere 50" x 60" of floor space.

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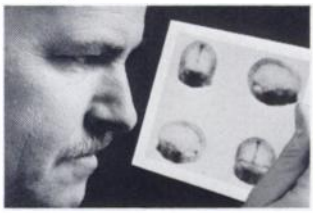

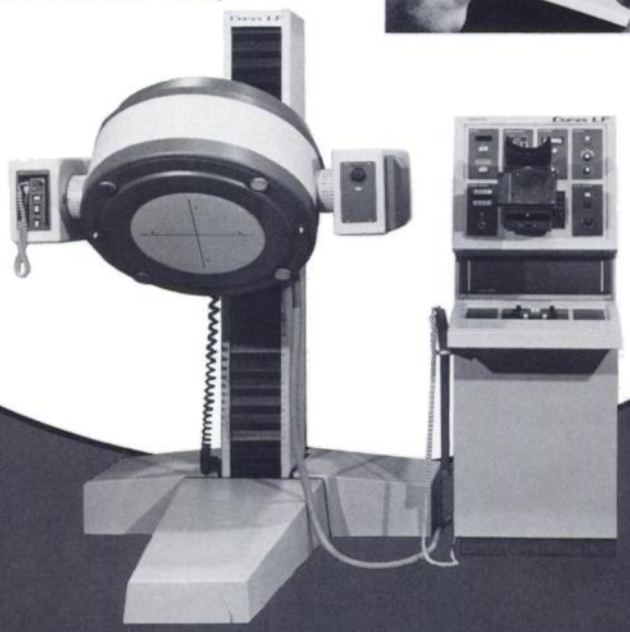

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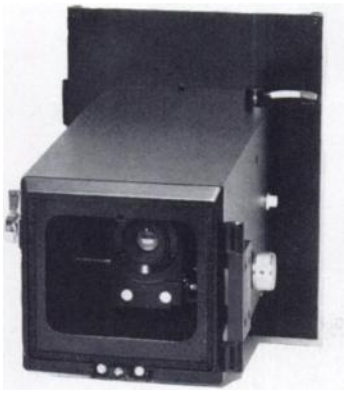
State of the art in gamma camera hard copy recording.



Multi-Imager 1

Multi-Imager 1 employs the CRT of the gamma camera to record static, dynamic, and whole body imaging procedures on transparency format. The highly versatile Multi-Imager 1 offers film size formats of 5x7 and 8x10, yielding superior quality transparency scintiphotos recorded on a wide range of x-ray film processor compatible films. Up to 30 images can be recorded on a single sheet of film in ten different formats. In addition to the usual 1, 4, and 16 image formats, Multi-Imager 1 offers seven further choices to yield the exact diagnostic format required. For example, Multi-Imager 1 offers a 6 image format to allow recording of static studies that require a fifth and sixth view, and a 30 image format for dynamic studies that require more than sixteen frames. For whole body imaging, the 2 image format records side by side AP and PA views on the same sheet of film. Static, dynamic, and different size images can be mixed on the same sheet of film.

Multi-Imager 4

Multi-Imager 4 yields unmatched performance in gamma camera hard copy recording. A built in high resolution CRT, state of the art microprocessor technology, and electronically synchronized multiple lens optics provide a very small dot size on 8x10 format without increasing the pulse pair resolution dead time of the gamma camera system. The fast lens system of Multi-Imager 4 is compatible with both conventional x-ray film and the slower single emulsion radiographic films that provide the best image quality. Up to 64 images can be recorded in ten different formats. The dual intensity recording mode allows simultaneous acquisition of whole body or static views at two different intensity levels. Positive patient indentification is achieved through a nine digit keyboard LED system.

Both Multi-Imager 1 and Multi-Imager 4 can provide thousands of dollars in annual film cost savings and are compatible with all gamma cameras. Mail coupon to receive detailed information and sample clinical studies.

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GE: new ideas solve nuclear needs.

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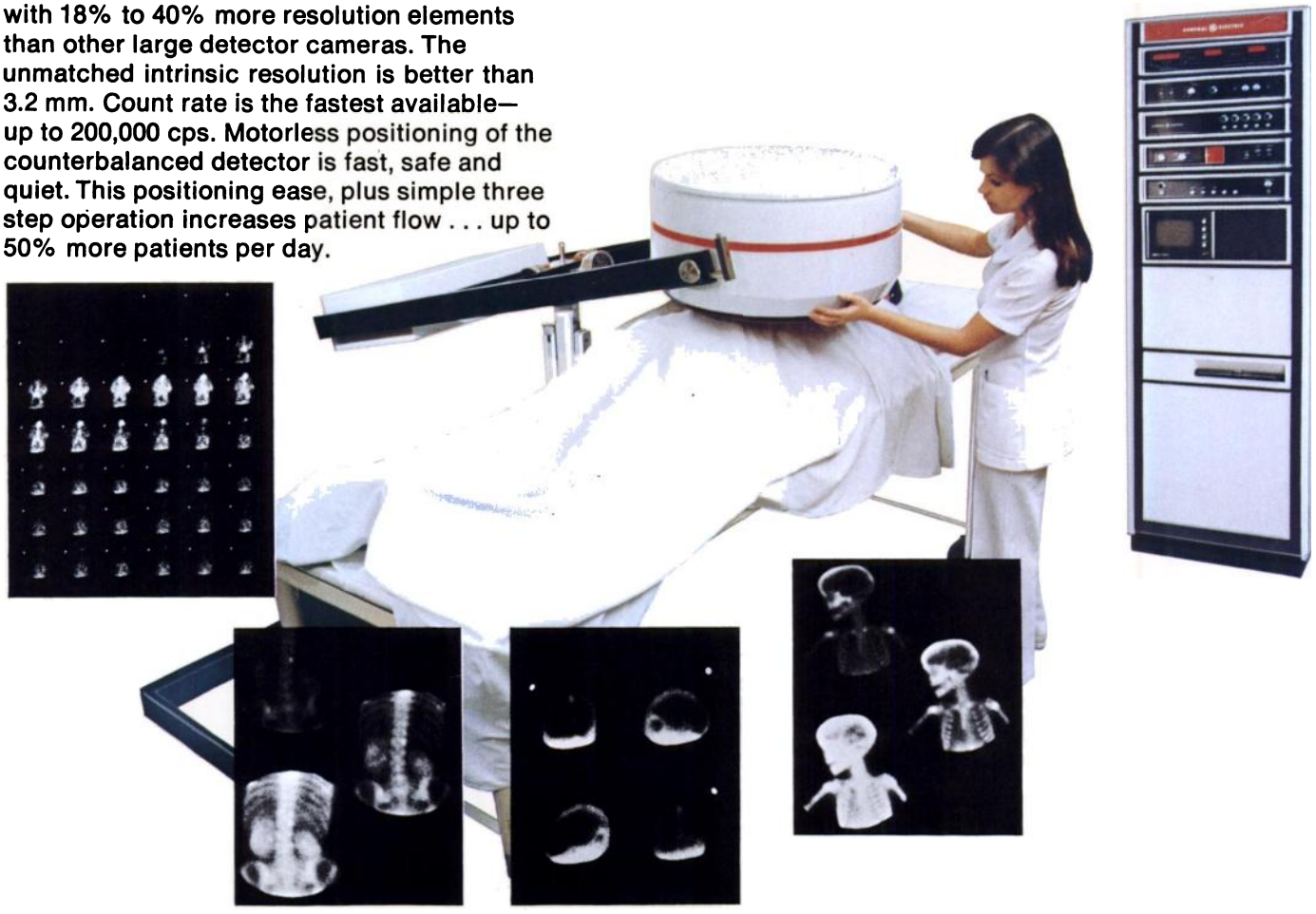
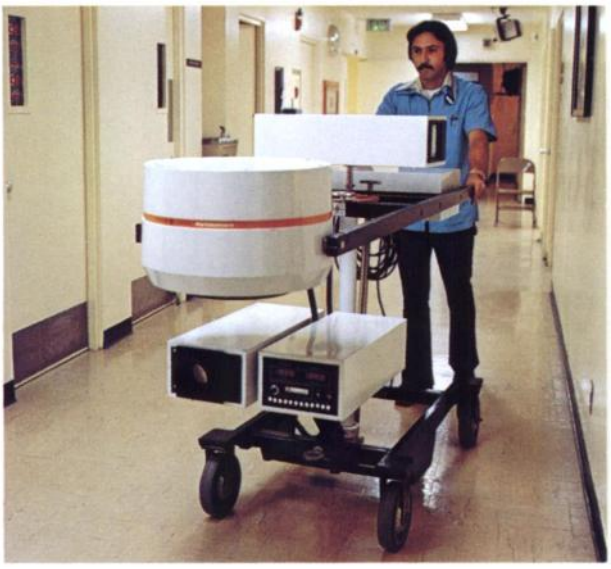
MaxiCamera system: largest field of view delivers unprecedented image quality.

MaxiCamera™ system's 400 mm field of view—the largest of any scintillation unit—offers nuclear departments important new advantages. The big field allows imaging of both lungs at the same time—reducing lung study time by more than 30%. Large livers can also be imaged rapidly and easily. MaxiCamera system handles whole body scanning, yet the unit requires only a 6 x 12 foot area. Image quality is outstanding, with 18% to 40% more resolution elements than other large detector cameras. The unmatched intrinsic resolution is better than 3.2 mm. Count rate is the fastest available—up to 200,000 cps. Motorless positioning of the counterbalanced detector is fast, safe and quiet. This positioning ease, plus simple three step operation increases patient flow . . . up to 50% more patients per day.

GE Formatter system: records much faster with no data loss.

During dynamic studies, valuable diagnostic information may be lost if the formatter cannot keep pace with the camera. Now General Electric offers a formatter that records data as fast as the camera detects it, with no data loss. GE Formatter system records up to 10 frames per second . . . many times faster than any other unit. This makes the GE Formatter the system of choice for dynamic studies. You can record up to 42 dynamic images on one 8 x 10 film, using economical, standard photographic cassettes. Standard multiple formats are available: 35, 70 and 105 mm. Valuable floor space is conserved because all formatter and camera controls are combined in one compact cabinet, occupying just 4½ square feet.





PortaCamera system: nuclear department on wheels.

This compact, mobile scintillation unit is easily wheeled throughout the hospital to facilitate studies on immobile patients. The PortaCamera™ system weighs less than 1,000 lbs., about half the weight of most other portable cameras. The counterbalanced detector allows fast, precise positioning at a touch. A conveniently located, integral console includes all controls and oscilloscope. Easy two-step operation increases patient throughput potential. PortaCamera system also serves as an excellent, low-cost backup unit for ICU, CCU, surgery and emergency rooms.

GE computer capability improves diagnostic data.

Med II™ is a complete image processing and data analysis system. It allows the physician to use the latest GE computer capability to maximize diagnostic information. The Med II system is a second-generation, push-button operated unit with a comprehensive library of nuclear medicine programs: left ventricular ejection fraction, left to right shunt, cardiac output, renal function, gated blood pool studies, ventricular volume, and many more. Combined, the Med II, MaxiCamera and GE Formatter provide the most powerful nuclear diagnostic system available today.

MedStor™ is a moderately priced image storage and processing system which can be used with any scintillation camera, including the PortaCamera. The MedStor system provides computer-controlled playback of static and dynamic data, allows selection of up to four regions of interest, and simultaneously generates up to 4 time/activity histograms. The system is pre-programmed, with easy-to-operate push-button control. Image information can be accessed as rapidly as 6 images per second.

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Portable Radioisotope Monitor

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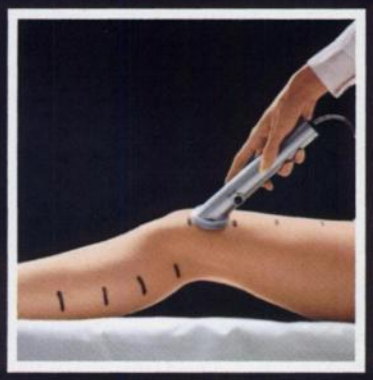

THE IBRINITOR

The IBRINITOR is a dramatic breakthrough in DVT detection and monitoring. It is ideally suited for use with Radionuclide I-125 labeled fibrinogen in monitoring patients for deep-vein thrombosis. It is designed to assure accumulation of procedurally and statistically valid data. The IBRINITOR features a design that insures that monitoring be performed in the correct sequence, while accumulating statistically valid counting data plus eliminating most procedural errors, before displaying and printing results. Visual and audio warning systems indicate operator error or procedural error.

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OPERATOR CONVENIENCE

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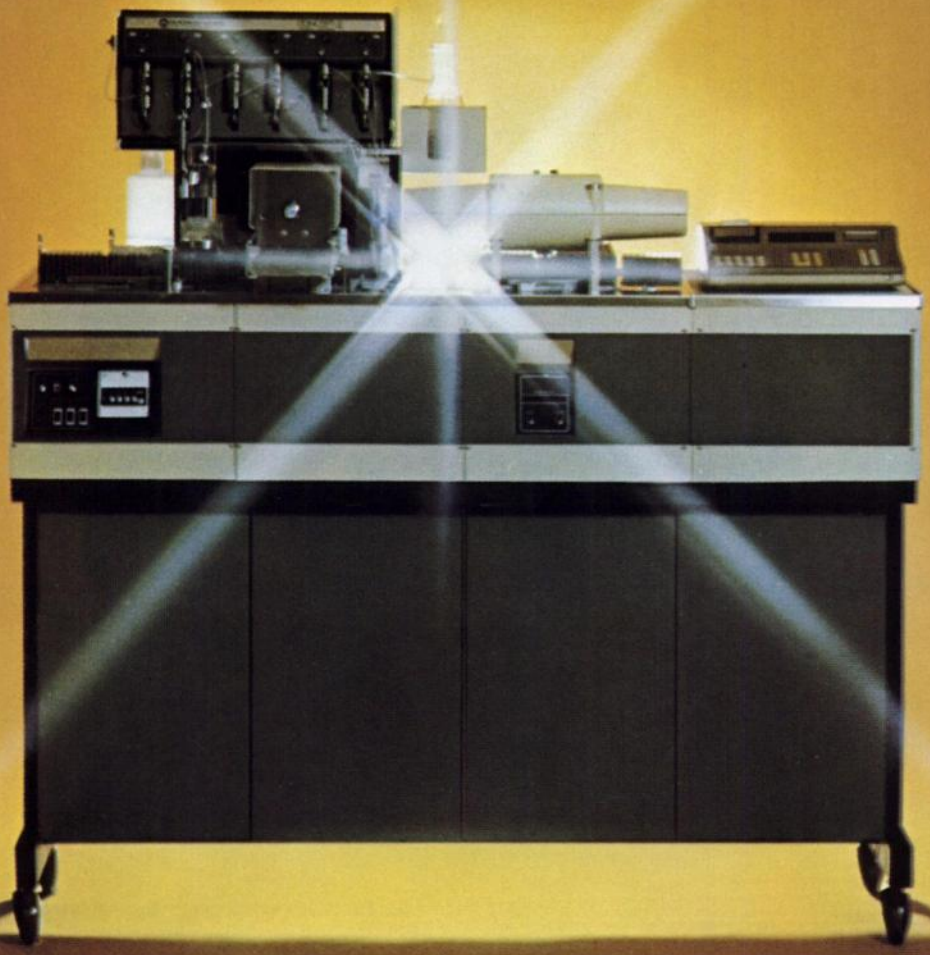

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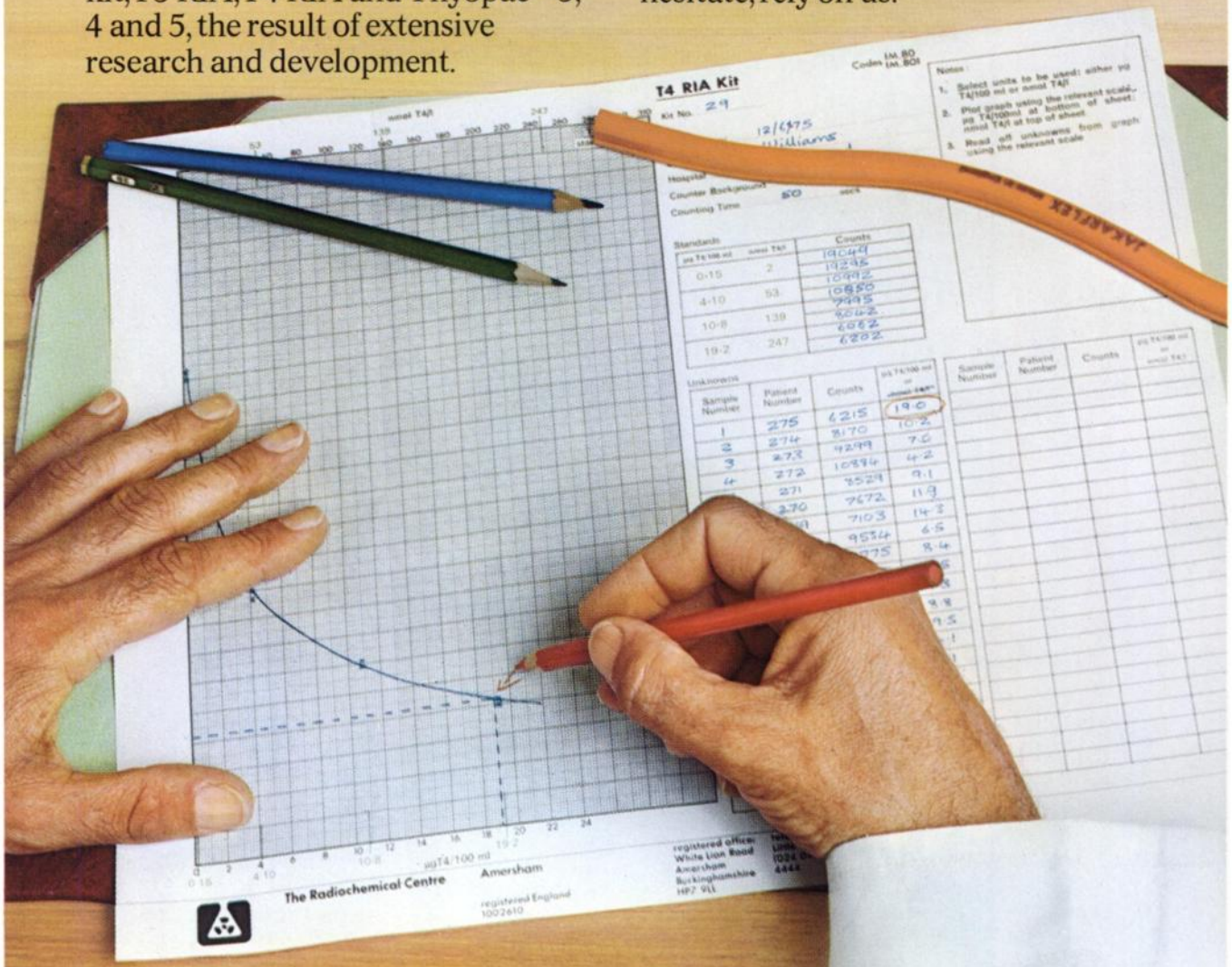

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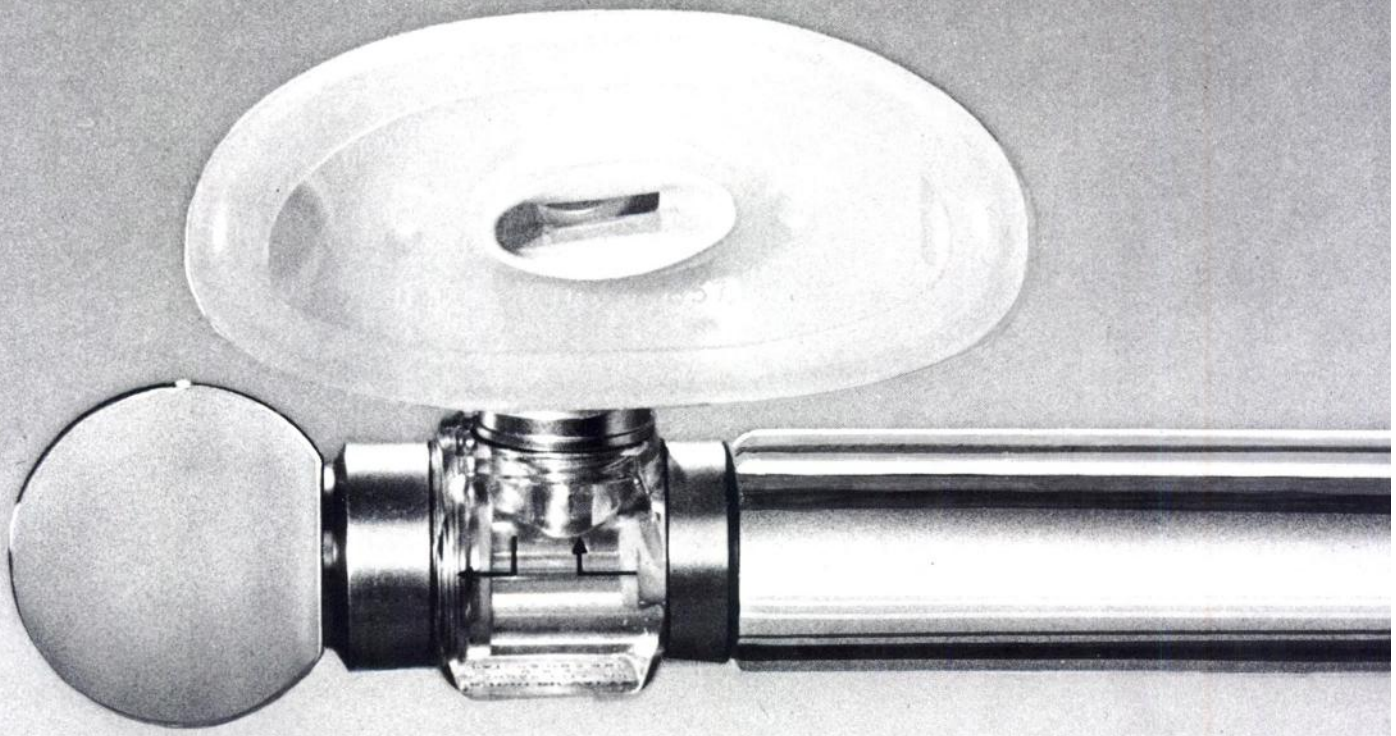

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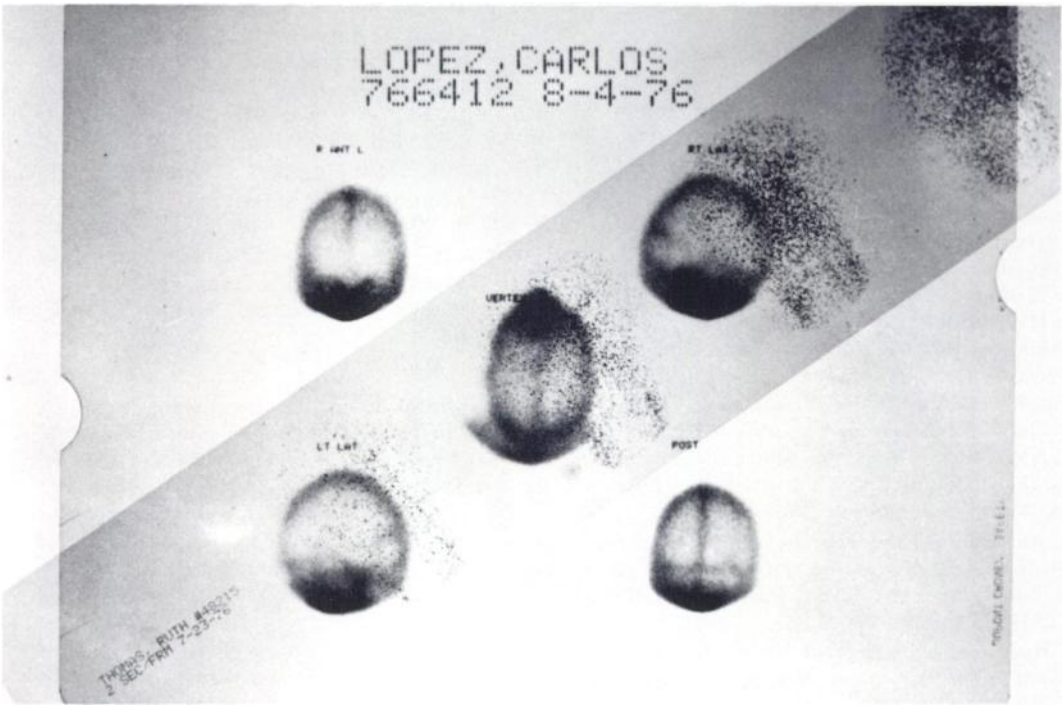

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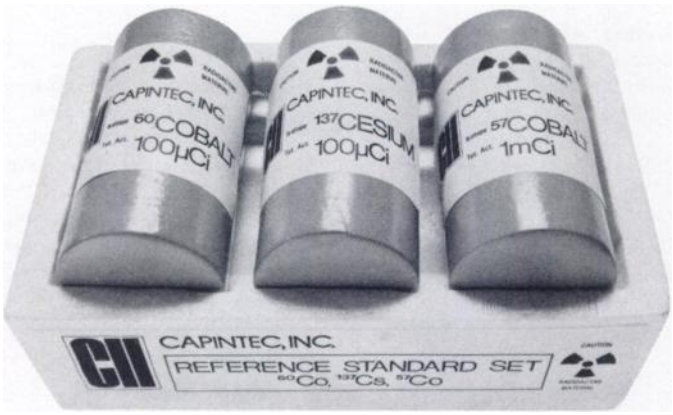

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RESIDENCY IN NUCLEAR MEDICINE (AMA Approved)—800-bed VA general hospital offers two year program closely affiliated UCLA and Wadsworth VA Hospital Center; two positions available July 1977, located San Fernando Valley, 15 minutes from UCLA. Program covers isotope and ultrasound imaging, in vivo and in vitro procedures including RIA; pre-requisite one year approved residency Radiology, Pathology, or Internal Medicine; nondiscrimination in employment. Contact Marvin B. Cohen, M.D., Chief, Nuclear Medicine Service, VA Hospital, 16111 Plummer St., Sepulveda, CA 91343.

NUCLEAR MEDICINE RESIDENT. Two year Residency Program in Nuclear Medicine at The New York Hospital-Cornell Medical Center. Position available July 1, 1977. Contact Jerome G. Jacobstein, M.D., Division of Nuclear Medicine, The New York Hospital-Cornell Medical Center, 525 East 68th Street, New York, N.Y. 10021.

ILLINOIS: NUCLEAR MEDICINE Technologist, ASCP, registered or eligible, to fill position as Staff Technologist, in 250 bed JCAH community hospital, located in North Shore Suburb, 25 miles north of Chicago. Duties will include imaging procedures, both dynamic and static, as well as a full complement of RIA and CPB testing in a modern fully equipped laboratory. Salary commensurate with education and experience, modern on-site apartments available for a nominal rent, congenial working conditions, plus comprehensive benefits program. Send detailed resume including salary requirements to Mr. J. J. Grant, AEP, Director of Personnel, Highland Park Hospital, 718 Glenview Ave., Highland Park, Ill. 60035. An equal opportunity employer M/F

CHIEF TECHNOLOGIST, NUCLEAR Medicine, In progressive 200 + bed community hospital, San Francisco Bay Area. Duties include responsibilities for in vitro and in vivo studies plus administrative functions as department head. Developing lab is equipped with two cameras, total body table, rectilinear scanner and computer. Position requires ARRT-NMT or ASCP-NM registration, at least five years experience (one to two supervisory) and preferably some administrative background. Salary and benefits are highly competitive. Please submit resume with salary history to: P.O. Box 1100, Society of Nuclear Medicine, 475 Park Ave. So., New York, N.Y. 10016.,

SUPERVISORY POSITION—EXPANDing 217 bed hospital offers growth position to a registered technologist. Supervisory experience is preferred. Palm Springs offers a unique opportunity to combine resort living and professional growth in a progressive and well equipped Nuclear Medicine Department. Attractive salary and benefits. Contact Desert Hospital, Personnel. P.O. Box 1627, Palm Springs, CA 92262.

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NUCLEAR MEDICAL TECHNOLOGIST. Large 1,000 bed teaching hospital in Columbus, Ohio seeks registered or eligible technologist. Advanced clinical procedures with full range of cameras, scanners, and computers. Outstanding employee benefits include paid insurance and vacation, accumulative sick leave, ten paid holidays, and other University benefits. For further information, please contact: Mr. Terry Vanderhoof, Assistant Director of Radiology, University Hospital, Room N-214, 410 West Tenth Avenue, Columbus, Ohio 43210. An Equal Opportunity/Affirmative Action Employer.

NUCLEAR MEDICINE INSTRUCTOR. Hillsborough Community College, a 13,000 student multi-campus institution serving the Tampa area, is seeking candidates for an Instructor in a two-year associate degree program in Nuclear Medicine Technology. Position to start January 1977. Master's degree and teaching or applied technical experience related to Nuclear Medicine Technology preferred. Salary dependent upon experience and education. Application deadline: November 15, 1976. Send letter and complete resume to: Director of Personnel, Hillsborough Community College, P.O. Box 22127, Tampa, Fla. 33622. An Equal Opportunity Employer.

NUCLEAR MEDICINE RESIDENCY—Extensive clinical base of imaging, in-vitro testing, in-vivo testing, and therapy in combined University Hospital/VA Hospital program. Opportunities for clinical and laboratory research. Write: W. N. Tauxe, MD, Professor of Radiology and Pathology (Nuclear Medicine), University of Alabama Hospitals, Birmingham, AL 35233. An Equal Opportunity/Affirmative Action Employer.

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EXPERIENCED RIA TECH WANTED. ASCP or ARRT, for expanding modern in vitro lab. Automated equip. Computer analysis. Approved Nuc. Med. tech training program. Competitive salary based on experience, education. Fringe benefits. City of 85,000, stable economy, 90 mi. to San Francisco. Ample sports, recreation. Contact W. R. Metge, M.D., Gould Medical Group, Inc., 600 Coffee Road, Modesto, CA 95355. (209) 524-1211.

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CHIEF NUCLEAR MEDICINE TECHnologist, ARRT registered. Eight years experience. Capabilities include in vivo and in vitro applications. Expert with most equipment and procedures. Interested in planning, organizing and managing established or new facilities. Prefer to relocate north west of north east U.S. Reply to Box 1103, Society of Nuclear Medicine, 475 Park Ave. South, New York, N.Y. 10016.

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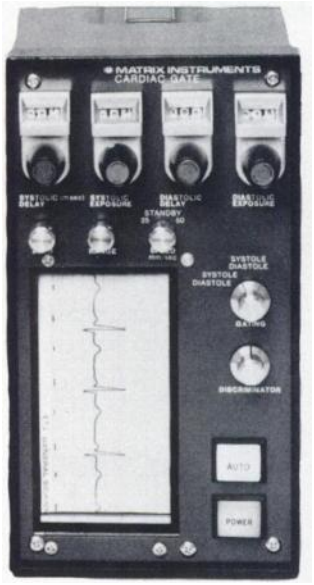


Cardiac Gate is designed to synchronize the cardiac image exposure with predetermined phases of the cardiac cycle.

The Cardiac Gate has two modes of operation: manual and automatic. In the manual mode, delay and exposure time parameters are set manually, using the R wave of the electrocardiogram as a reference. In the automatic mode, microprocessor circuitry automatically tracks the cardiac cycle and computes the position of end-systole and end-diastole. In the automatic mode, end-systole and end-diastole exposures are made without any calibration settings.

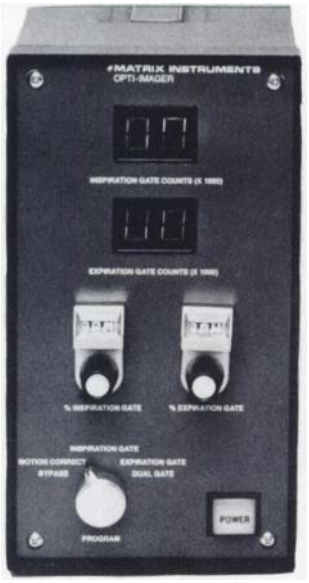
The dual gating operation mode allows recording of both end-systole and end-diastole simultaneously in a split screen two image format.

The cardiac cycle can even be divided into nine equal time segments and the image corresponding to each displayed simultaneously in a nine image format.

The Cardiac Gate includes a complete electrocardiograph module. The built in heated stylus strip chart recorder records both the ECG trace and the gating intervals.

The Cardiac Gate provides both ECG and gating outputs for computer interface.

Opti Imager



Opti-Imager is designed to provide an organ image with effects due to respiratory motion minimized. Opti-Imager has two distinct modes of operation: continuous motion correction and respiratory gating. In the continuous motion correction mode, the motion of the organ is tracked and corrected electronically without the need to attach any sensors to the patient. The distribution of counts within the organ image is monitored and corrections are applied to continuously shift the image before it is displayed to compensate for organ motion. Correction is made for motion in both the X and Y direction. Thus, the gamma camera is not gated and all the counts provided by the detector are recorded. The time required to attain a statistically satisfactory image is the same for both a motion corrected and an uncorrected image. In the gating mode, inspiration plateau and expiration plateau images are recorded. The dual gating operation mode allows recording of both inspiration and expiration plateau images simultaneously in a split screen two frame format. Dual scalers record the number of counts in each image.

The Cardiac Gate and Opti-Imager can be synchronized to yield a combination of both cardiac and respiratory gating. Mail coupon to receive detailed information and sample clinical studies.

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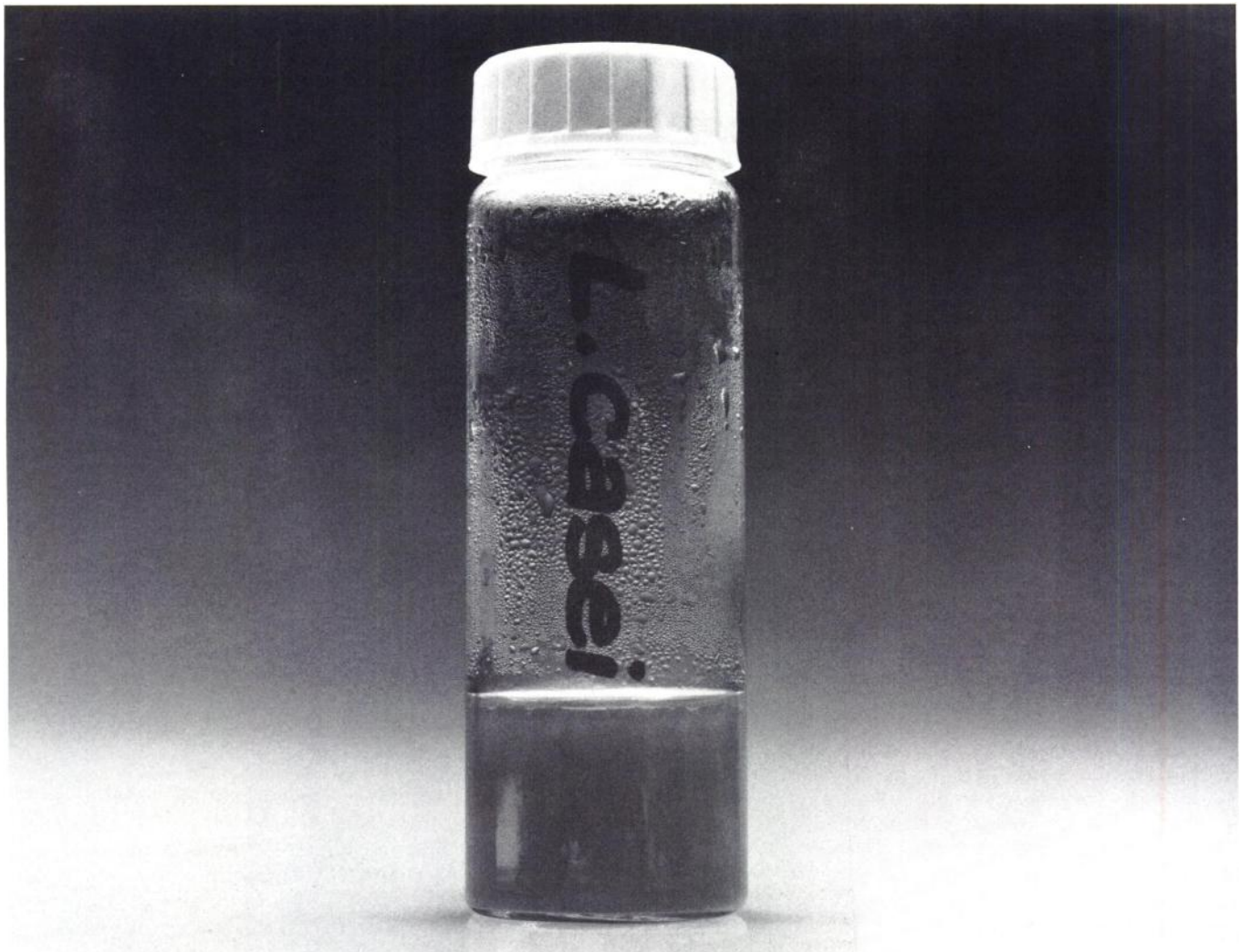

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J&S Model 145A Portable Localization Monitor for I-125 Labeled Fibrinogen Scanning.

Early detection of deep vein thrombosis of the legs can be accomplished using I-125 labelled fibrinogen and the Model 145A. The leg is scanned after intravenous injection of the labelled fibrinogen. As a thrombosis develops, the radio-active fibrinogen is detected at predetermined points and measured directly as a percentage of the pre-cordial count.

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- Powered by 3 flashlight batteries (No A.C. Hazards)
- Unlimited Isotope Selection

Specifications

Range: Percent Scale — 0-120%
CPS Scale — 30, 100, 300, 1000, 3000 CPS

Meter Response: Fast — 2 seconds
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Dimensions: 4½″ H × 5½″ W × 8″ L (exclusive of handle)

Recorder Output: 10 mv

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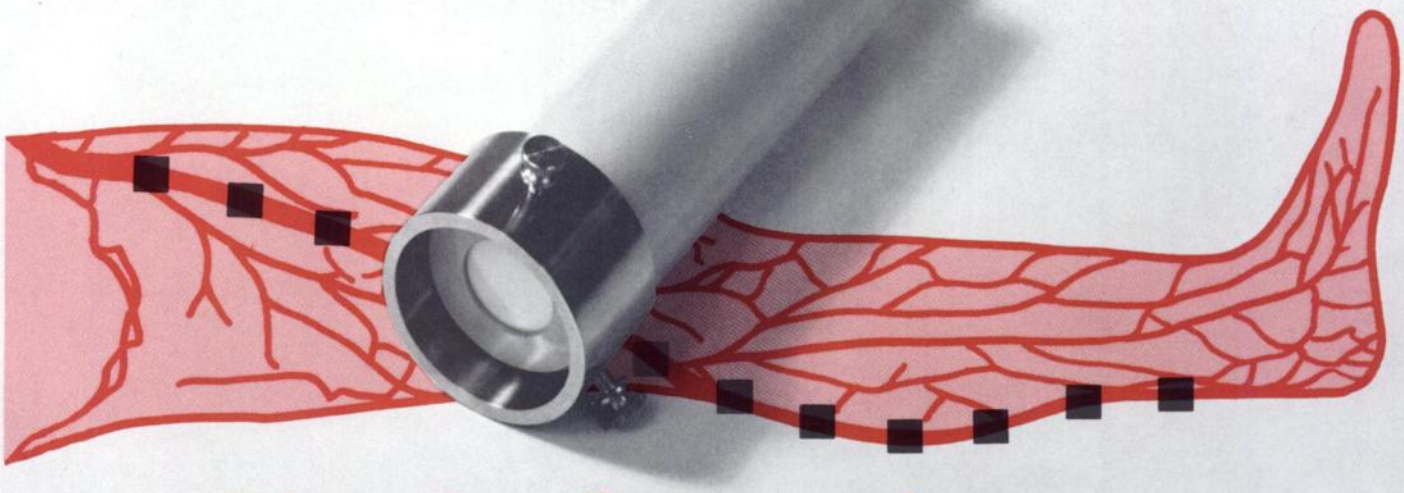

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? Lymphoma
? Hodgkin's disease
? Bronchogenic carcinoma

Gallium Ga 67:

Now available for routine use as
a non-invasive adjunct in diagnosis.

Indications and Usage: Gallium Citrate Ga 67 may be useful to demonstrate the presence and extent of certain malignancies such as Hodgkin's 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.

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:

General

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. 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.

Carcinogenesis

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

Pregnancy Category C

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.

Nursing Mothers

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

Pediatric Use

Safety and effectiveness in children have not been established.

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.

CAUTION: Federal (U.S.A.) law prohibits dispensing without prescription.

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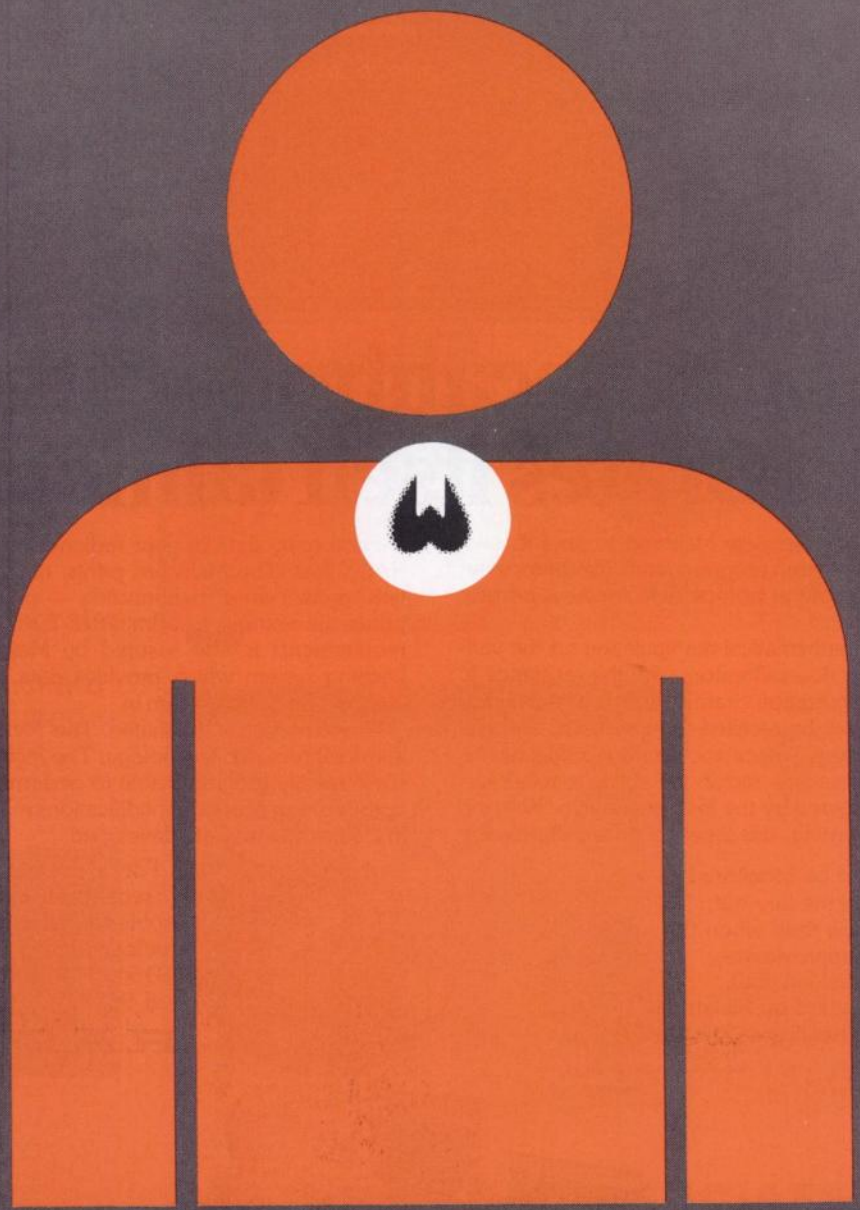

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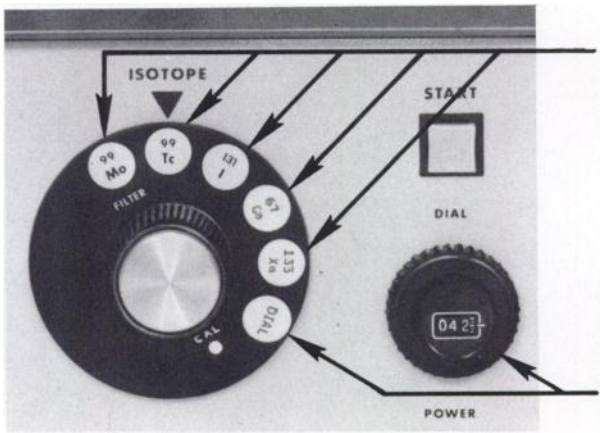

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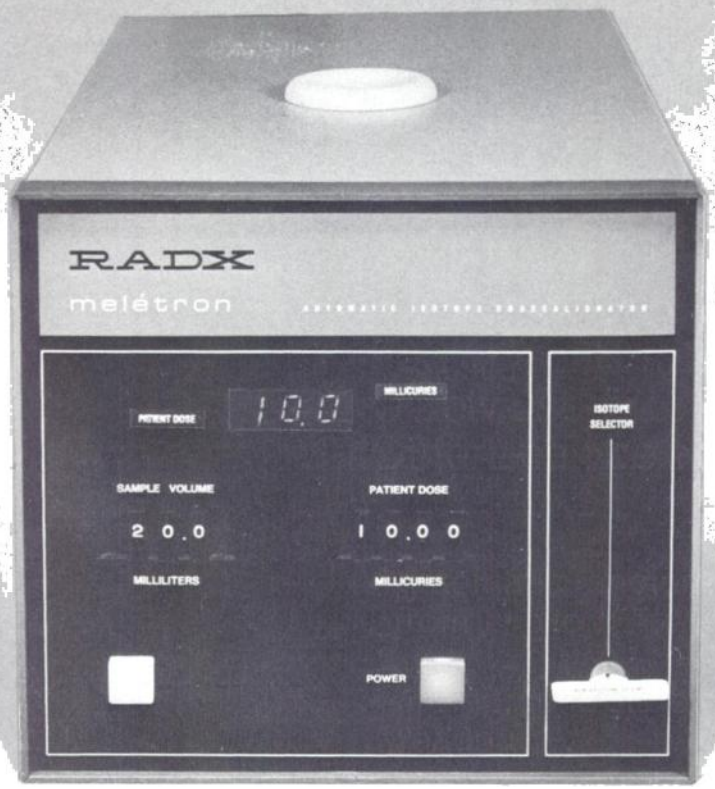

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Radx has now programmed its new Meletron to read its own calibration factors. The Meletron programmable microprocessor allows you to check each of the Isotope Selector Keys for proper multiplication factors.

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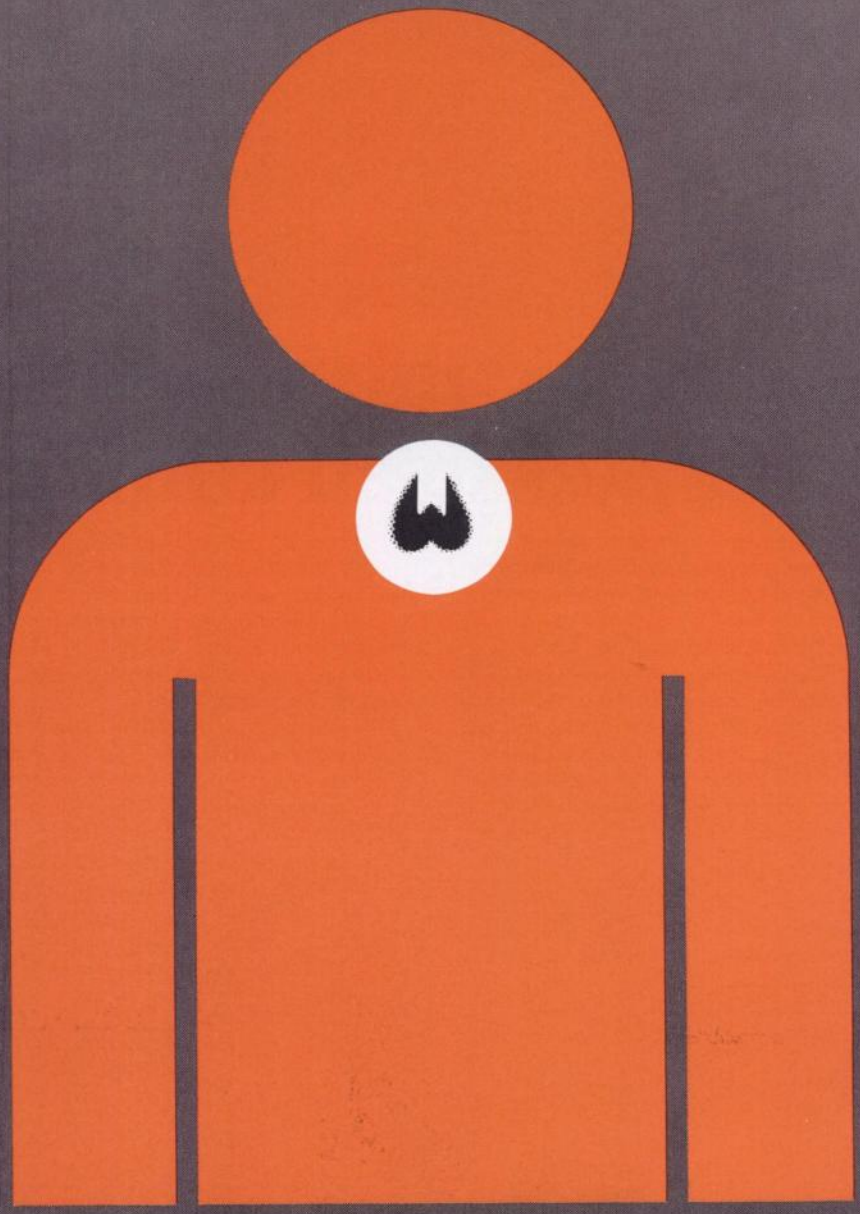
Sodium Iodide I 123

for thyroid studies



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5	1.05	26.0
15	3.19	80.0
25	5.36	130.0

High counting statistics. MPI-Iodine-123 159 keV gamma rays are detected more than 3 times as efficiently on Anger-type cameras as the 364 keV gamma rays emitted by I 131. You get a higher count rate with MPI-Iodine-123 than with equivalent amounts of I 131 on gamma cameras. Therefore, scintiphotos can be obtained more rapidly.

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

SODIUM IODIDE I 123
CAPSULES AND SOLUTION FOR ORAL ADMINISTRATION
DIAGNOSTIC

DESCRIPTION: Sodium iodide I 123 for diagnostic use is supplied as capsules and in vials as an aqueous solution for oral administration. At calibration time each capsule has an activity of 100 microcuries and each vial contains solution with a total specific concentration of 2 millicuries per ml at calibration time.

INDICATIONS: Sodium iodide I 123 is indicated for use in the diagnosis of thyroid function and imaging.

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 childbearing capability should be performed during the first few (approximately 10) days following the onset of menses. However, when studies of thyroid function are clinically indicated for members of these special population groups, use of I 123 would be preferable to the use of I 131 in order to minimize radiation dosage.

PRECAUTIONS: Sodium iodide I 123 as well as other radioactive drugs must be handled with care, and appropriate safety measures should be taken to minimize radiation exposure to the patient consistent with proper patient management. The prescribed I 123 dose should be administered as soon as practicable in order to minimize the fraction of radiation exposure due to relative increase of radionuclidic contaminants with time. The uptake of I 123 may be decreased by recent administration of iodinated contrast materials, by intake of stable iodine in any form, or by thyroid, anti-thyroid and certain other drugs. Accordingly, the patient should be questioned carefully regarding diet, previous medication, and procedures involving radiographic contrast media.

ADVERSE REACTIONS: There were nine adverse reactions reported in a series of 1,393 administrations. None of these were attributed to I 123. Five adverse reactions, consisting of gastric upset and vomiting, were attributed to a filler in the capsule. Two cases of headache and a case of nausea and weakness were attributed to the fasting state. One case of garlic odor in the breath was presumed to be attributable to the presence of tellurium.

DOSAGE AND ADMINISTRATION: The recommended oral dose range for diagnostic studies of thyroid function in the average adult patient (70 kg) is from 100 to 400 microcuries. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration. Concentration of I 123 in the thyroid gland should be measured in accordance with standardized procedures.

SPECIAL CONSIDERATION: 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: Sodium iodide I 123 for oral administration is supplied in glass vials and in capsules.

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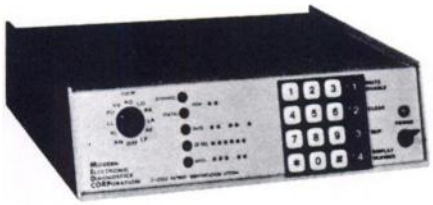
- ☐ neatly and permanently label each patient's record
- ☐ minimize mislabelling errors while saving technologists' time
- ☐ display study parameters to enhance diagnostic value

The initial frame lists pertinent patient data and is easily viewed without magnification. Each static study is permanently labelled with the proper view; each dynamic exposure with a sequential number. Data is entered via keyboard and is displayed on the "B" scope for photography. Cables are included for direct connection to Gamma Camera CRT x,y,z input.



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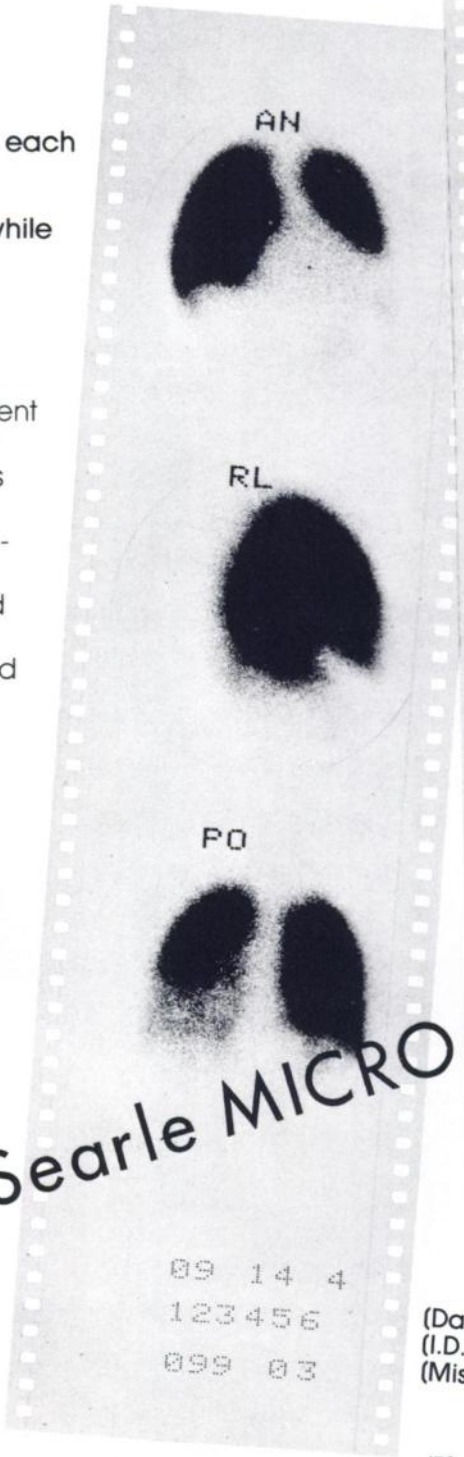

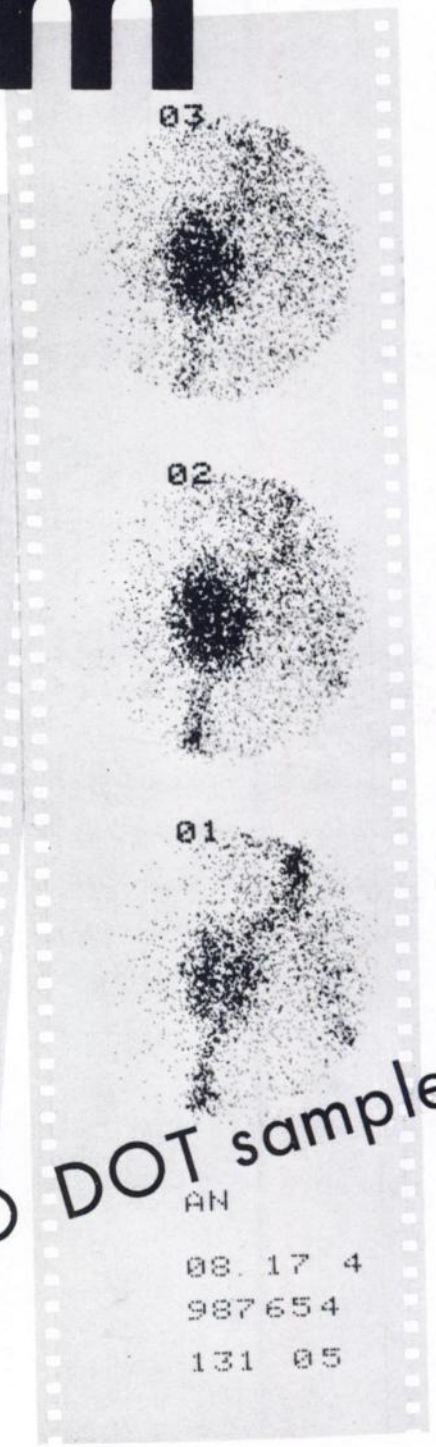

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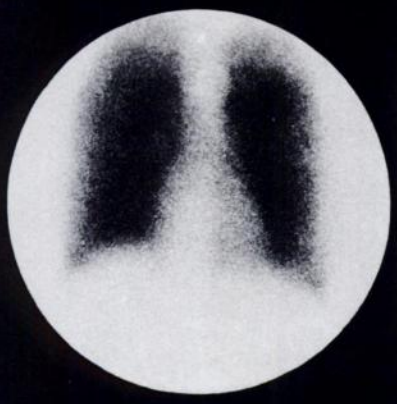
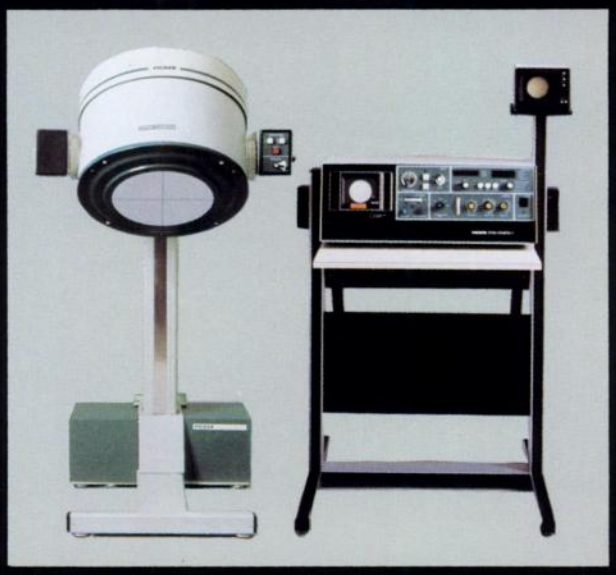
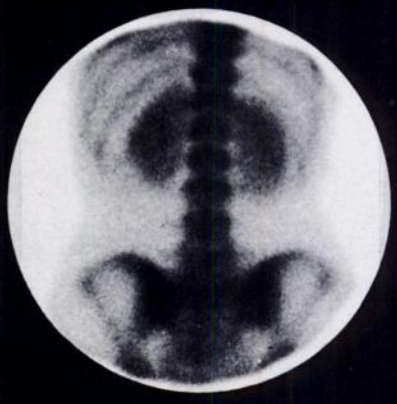


Lung View, Anterior





Bone View, Posterior

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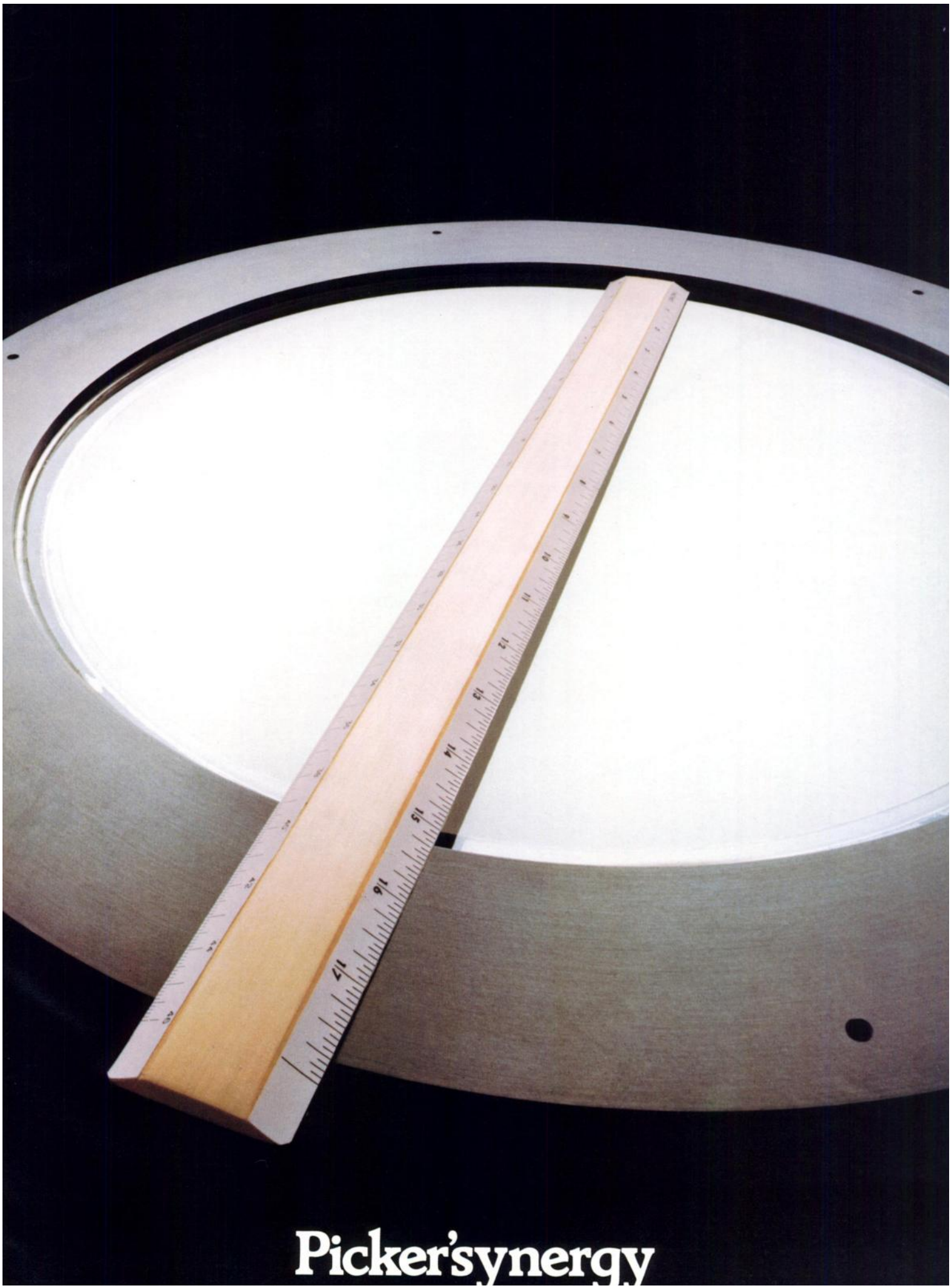
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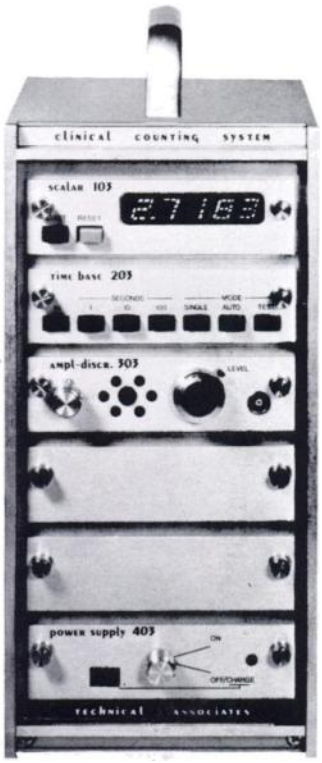

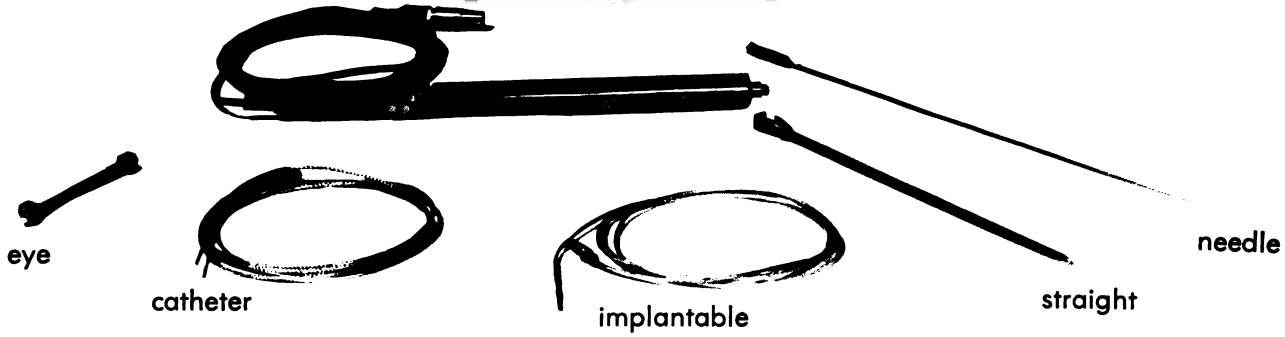

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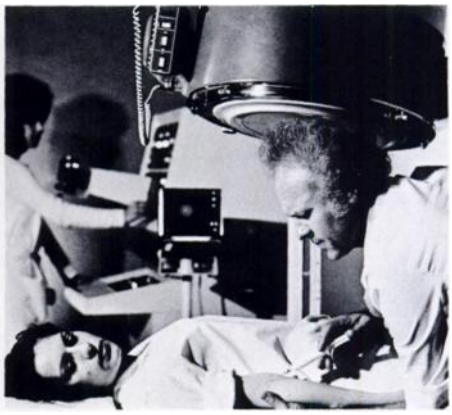

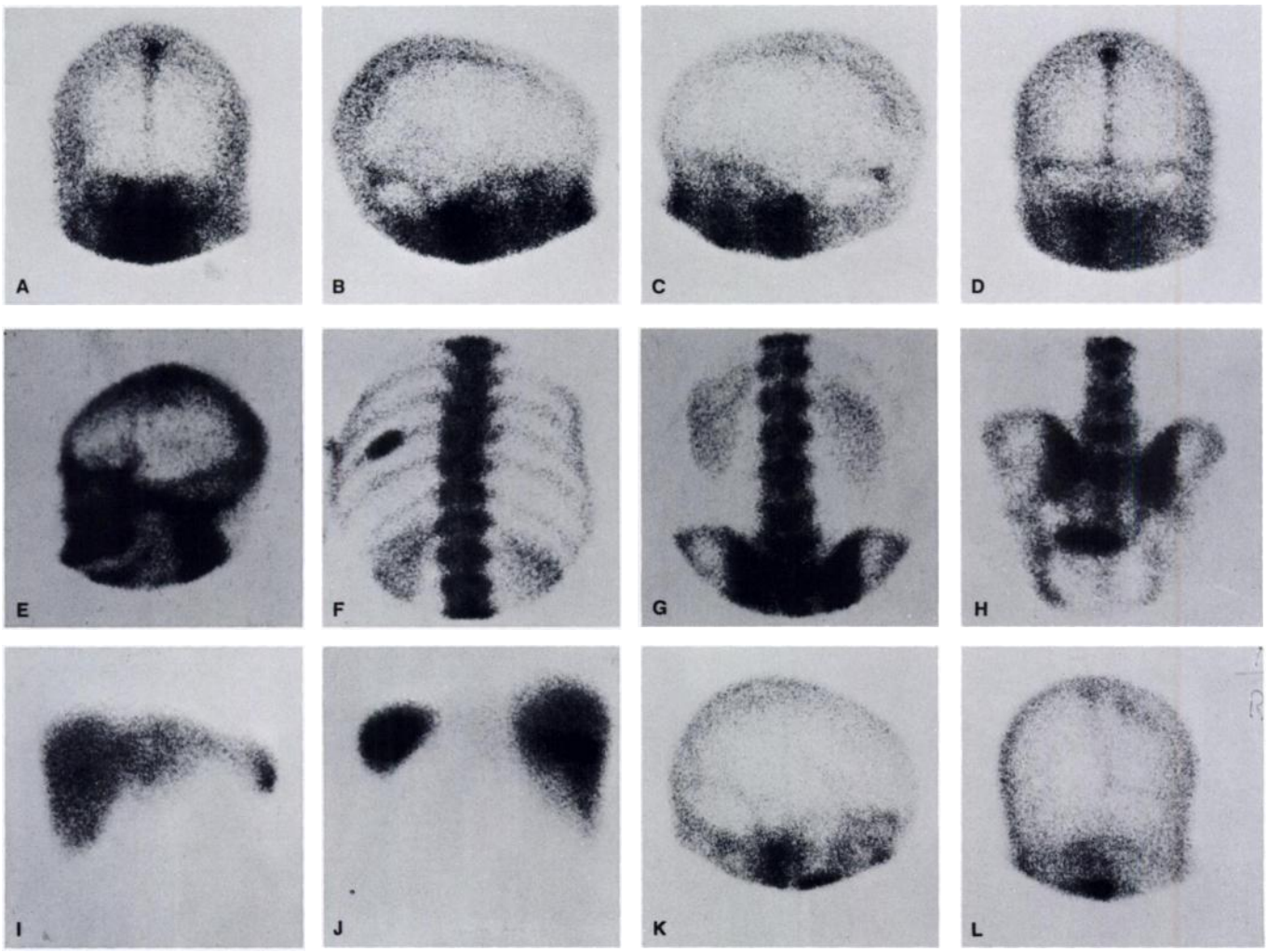

A, B, C, D. Normal brain scan multi-image display with CE-1-7 (37 p.m.t.) camera.

E, F, G, H. Positive bone scan patient: CCL-4 Ultrafine — resolution collimator; 400,000 counts accumulated in 90-220 seconds per view; 15 mCi ^{99m}Tc pyp; 5 hours post injection.

I, J. Anterior and posterior liver scans: CCL-4 Ultrafine — resolution collimator; 400,000 counts; 3 mCi ^{99m}Tc sulfur colloid; ½ hour post injection. 56 sec. for anterior; 66 sec. for posterior.

K, L. Right lateral and posterior brain scans with Elscint CE-1-7 (37 p.m.t.) camera: CCL-4 Ultrafine — resolution collimator; 400,000 counts; 15 mCi ^{99m}Tc; 2 hours post injection. 172 sec. for posterior; 169 sec. for right lateral. History: head trauma 2 months prior to brain scan.

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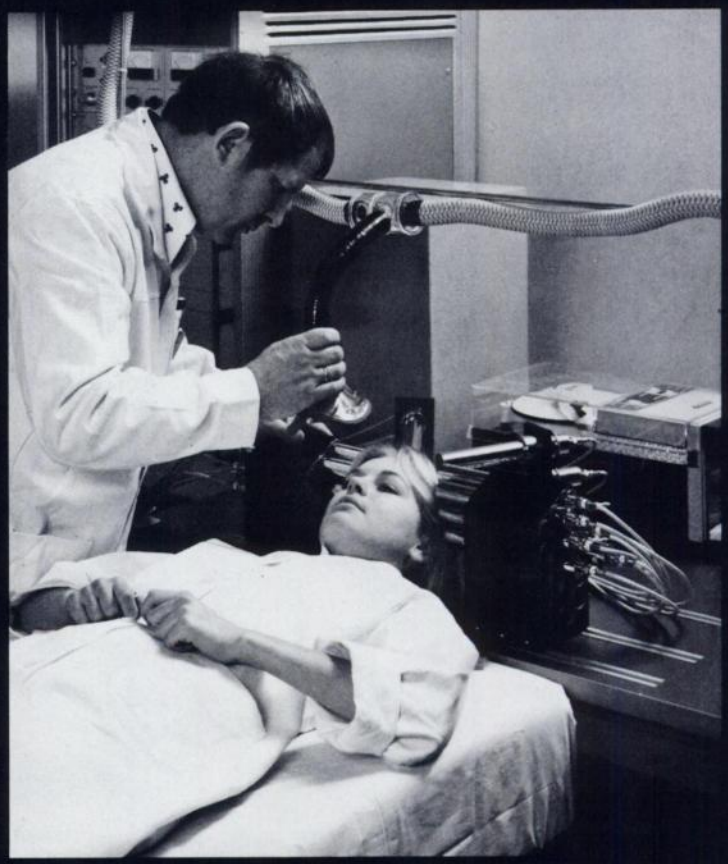
The XENON-133 INHALATION METHOD for measurement of regional cerebral blood flow (rCBF) offers the advantage of a quick, simple, atraumatic and safe procedure, which eliminates the carotid artery puncture of the Xenon injection method. The inhalation method allows simultaneous bilateral measurements, thus enabling an unaffected hemisphere to serve as reference to an affected one. The atraumatic nature of this investigation makes it possible to perform frequent measurements over prolonged periods on a broad patient spectrum as well as on normal volunteers.

MEDITRONIC has been manufacturing multidetector rCBF-equipment for over 10 years, with numerous installations all over the world. This extensive experience along with the recent development and clinical verification of appropriate computer programs has made possible the development of the MEDITRONIC INHALATION CEREBROGRAPH.



This is a complete system, including the Xenon administration system, a digital data collection system with 8, 16, 24 or 32 brain detectors, an air curve scintillation detector with associated electronics and a computer interface with punched paper tape or casette tape output. The modular design allows easy system expansion in the field. Off-line calculation and presentation of rCBF-values can be performed on any computer able to process the Fortram programs developed by OBRIST et al (1975) and RISBERG et al (1975). The digital output of the MEDITRONIC INHALATION CEREBROGRAPH can also be interfaced to other peripheral devices or on-line connected to a computer.

Exclusive distributor in the U.S.A. and Canada: Victoreen Instrument Division, Sheller-Globe Corporation, 10101 Woodland Avenue, Cleveland, Ohio 44104.

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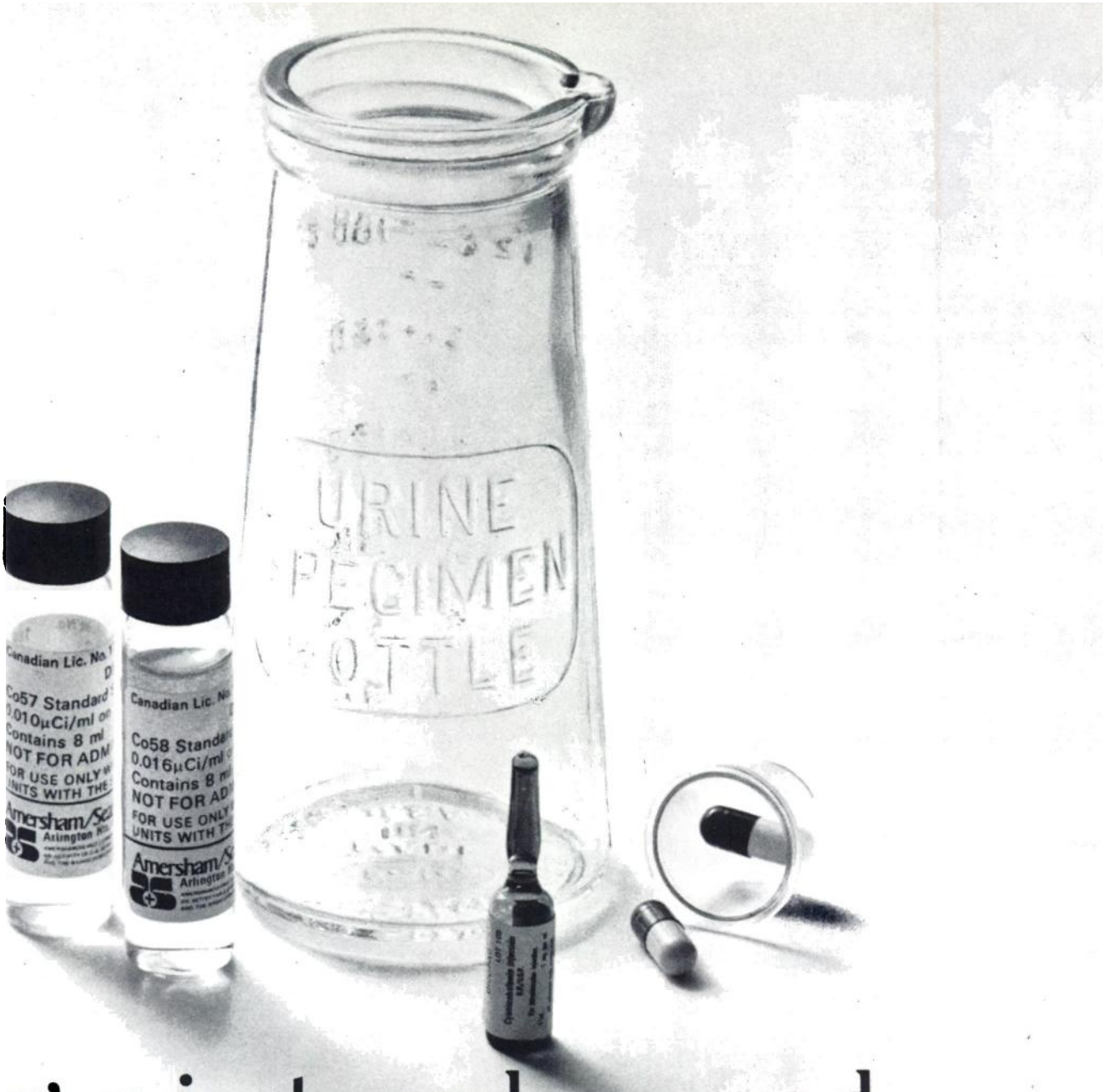


we've just made a good test easier.

Don't separate both parts of the Schilling test by three days. With Dicopac both parts are performed at the same time. The results are derived in less time, because the two labelled forms of vitamin B_{12} (free cyanocobalamin Co-58 and cyanocobalamin Co-57 bound to [human] gastric juice) are administered simultaneously.

The results are expressed as a percentage of each nuclide excreted and, more importantly, as a ratio of Co-57 to Co-58. An incomplete urine collection will affect the absolute amounts of each nuclide collected, but not the ratio of Co-57 to Co-58. Therefore, the test is not necessarily invalidated by incomplete urine collection.

For convenience, the flushing dose of unlabelled vitamin B_{12} (1 mg) is supplied in individual single dose ampules.

For more detailed information, please refer to the next page of this advertisement or contact our Customer Service Department.

Dicopac for diagnosis of vitamin B_{12} malabsorption.

Dicopac®

(0.25 μg cyanocobalamin Co-57 bound to [human] gastric juice, 0.25 μg cyanocobalamin Co-58)

DESCRIPTION: Each Dicopac® Kit consists of five single-test cylinders, a vial of Cobalt 57 (Co 57) standard, and a vial of Cobalt 58 (Co 58) standard. Each test cylinder contains a capsule of cyanocobalamin Co 58 (vitamin B_{12} Co 58), a capsule of cyanocobalamin Co 57 (vitamin B_{12} Co 57) bound to human gastric juice, and an ampule of unlabelled cyanocobalamin for injection.

ACTIONS: Oral vitamin B_{12} is normally coupled with intrinsic factor (IF) contained in the gastric juice secreted by the stomach and the vitamin B_{12} combined with intrinsic factor is absorbed in the terminal ileum. Only intrinsic factor bound vitamin B_{12} is absorbed by this route. Following parenteral administration or gastrointestinal absorption, cyanocobalamin is bound to plasma proteins and distributed to the liver and blood forming organs.

INDICATIONS: Dicopac Kit consisting of cyanocobalamin Co 58 and cyanocobalamin Co 57 combined with human intrinsic factor is used to assess vitamin B_{12} absorption in the diagnosis of malabsorption due to the lack of intrinsic factor, e.g. Addisonian (pernicious) anemia, and as a diagnostic adjunct in other defects of intestinal absorption.

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

DOSAGE AND ADMINISTRATION: One purple/white capsule containing 0.25 μg cyanocobalamin Co 57 (nominal activity 0.5 μCi at activity date) bound to human gastric juice for oral administration.

One red/ivory capsule containing 0.25 μg cyanocobalamin Co 58 (nominal activity 0.8 μCi at activity date) for oral administration.

One ampule of unlabelled cyanocobalamin (1 mg) for intramuscular injection.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration. Care must be taken when measuring the activity in the Co 57 and Co 58 capsules because of the small amount of radioactivity present.

ADMINISTRATION AND TEST PROCEDURE*: The Dicopac test is performed in a manner similar to the Schilling test, however, with this test both Co 58 cyanocobalamin and Co 57 cyanocobalamin bound to intrinsic factor are administered simultaneously. Thus, both vitamin B_{12} absorption and response to intrinsic factor are measured with the Dicopac test.

Both Dicopac capsules are orally administered to a fasting patient, who is instructed to collect all urine for the next 24 hours. An intramuscular injection of non-radioactive vitamin B_{12} is administered to the patient up to two hours after the radioactive capsules are administered.

After the total volume of urine is measured, aliquots are taken for counting. The urine samples and the Co 57 and Co 58 standards provided with the Dicopac Kit are counted using dual isotope counting procedures. This data is used to calculate the percent excretion of each radionuclide and the ratio of the percent excretion of Co 57 to the percent excretion of Co 58.

*Refer to "The Technical Information for the Performance of the Dicopac Test" brochure provided with the Dicopac Kit for further information on procedural techniques.

INTERPRETATION OF RESULTS: The usual percent excretion values and the ratios obtained with Dicopac are presented in Table I.

Table I. Results of 24-hour urine excretions and $\frac{\text{Co 57}}{\text{Co 58}}$ ratios with Dicopac:

Diagnosis	Mean values % (usual range) Co 57 + I.F.	Co 58	$\frac{\text{Co 57}}{\text{Co 58}}$ ratio
Normals	18 (10-42)	18 (10-40)	0.7-1.3
Pernicious anemia and certain gastric lesions	9 (6-12)	3 (0-7)	>1.7
Malabsorption syndromes not caused by lack of I.F.	<6	<6	0.7-1.3

A small number of patients have been found to excrete a "normal" (i.e., >10%) amount of Co 58, but these individuals exhibit elevated ratios (>1.4). The clinical significance of these findings is presently unclear.

PHYSICAL CHARACTERISTICS: Cobalt-57 decays by electron capture with a physical half life of 270 days. The primary gamma energy of Co 57 is about 122 KeV. Cobalt-58 decays by electron capture and positron and gamma emissions with a physical half life of 71 days. The primary gamma energy of Co 58 is 811 KeV. Photons that are useful for counting are listed in Table I.[1,2]

Table I. Principal Radiation Emission Data

	Radiation	Mean %/disintegration	Mean Energy (KeV)
Co 57	Gamma -2	87.1	121.9
	Gamma -3	9.6	136.3
Co 58	Beta -1	15.0	203.7
	Gamma -1	99.4	810.5
Annihilation Radiation		30.0	511.0

[1]Dillman, L.T., Radionuclide Decay Schemes and Nuclear Parameters for Use in Radiation-Dose Estimation, Supplement No. 2. MIRD pamphlet No. 4, *J Nucl. Med.*, p. 27, 1969.

[2]Dillman, L.T., Radionuclide Decay Schemes and Nuclear Parameters for Use in Radiation-Dose Estimation, part 2, Supplement No. 4, MIRD pamphlet No. 6, *J. Nucl. Med.*, p. 16, 1970.

The specific gamma ray constant for Co 57 is 1.0 R/mCi-hr at 1 cm. For Co 58 it is 5.5 R/mCi-hr at 1 cm. The half value layer for Co 57 is 0.2mm of Pb. For Co 58 it is 9mm of Pb.

To correct for physical decay of these radionuclides, the fractions that remain at selected time intervals before and after the day of calibration are shown in Table II.

This table is not needed for routine calculation, as all counting is relative to the standards which have been prepared from the same batch of each of the radionuclides as the corresponding cyanocobalamin capsules.

Table II. Physical Decay Chart: Co 57, half life 270 days; Co 58, half life 71 days

Weeks Before Activity Date	Co 57 μCi	Co 58 μCi	Weeks After Activity Date	Co 57 μCi	Co 58 μCi
10	0.60	1.48			
9	0.59	1.38	1	0.49	0.75
8	0.58	1.38	2	0.48	0.70
7	0.57	1.29	3	0.47	0.65
6	0.56	1.21	4	0.47	0.61
5	0.55	1.13	5	0.46	0.57
4	0.54	1.05	6	0.45	0.53
3	0.53	0.98	7	0.44	0.50
2	0.52	0.92	8	0.43	0.46
1	0.51	0.86	9	0.43	0.43
0*	0.50	0.80	10	0.42	0.40

*Activity date

RADIATION DOSIMETRY: The estimated absorbed radiation doses[1] to an average patient (70 kg) following the oral administration of one Dicopac capsule of Co 57 and one of Co 58 at calibrated nominal activities of 0.5 μCi and 0.8 μCi, respectively, are shown in Table I.

Table I. Radiation Doses

Tissue	Absorbed Radiation Dose (rads/0.5 μCi Co 57 + Intrinsic Factor) Normal	Pernicious Anemia	(rads/0.8 μCi Co 58) Normal	Pernicious Anemia
Liver*	0.065		0.14	0.03
Stomach	0.000041		0.00027	0.00042
Small Intestine	0.00007		0.00043	0.0013
Upper Large Intestine	0.00013		0.00070	0.0021
Lower Large Intestine	0.00030		0.0018	0.0053
Testes*	0.0026		0.0074	0.00037
Ovaries*	0.0033		0.010	0.0021
Whole-body*	0.0050		0.012	0.0022

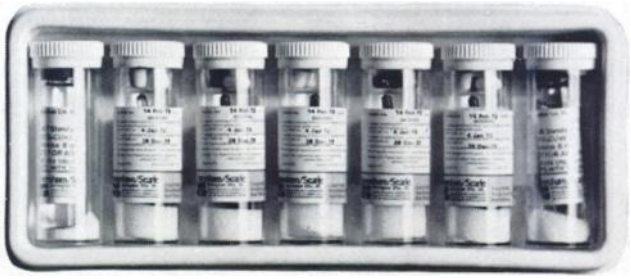
*The administration of a flushing dose of non-radioactive B_{12} will decrease the dose to the liver, gonads, and whole-body from Co 57 and Co 58 by about 30%.

[1]Method of Calculation: A Schema for Absorbed-Dose Calculation for Biologically Distributed Radionuclides, Supplement No. 1, MIRD pamphlet No. 1, *J. Nucl. Med.*, p. 7, 1968.

HOW SUPPLIED: Each Dicopac Kit consists of five single-test cylinders and two 8 ml vials containing the standard solutions. The vial containing the blue solution is the Co 57 standard and the vial containing the yellow solution is the Co 58 standard. Each standard solution is prepared so that 1 ml of solution is equivalent to 2% of the total activity of each of the corresponding capsules.

Each cylinder contains two capsules and an ampule of unlabelled cyanocobalamin (1 mg). The red/ivory capsule contains 0.25 μg Co 58 cyanocobalamin (nominal activity 0.8 μCi at activity date). The purple/white capsule contains 0.25 μg Co 57 cyanocobalamin (nominal activity 0.5 μCi at activity date) bound to human gastric juice.

Dicopac Kits should be stored at 4°C and not used after the expiry date stated on the label.



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An activity of G. D. Searle & Co. and the Radiochemical Centre

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C747101

DESCRIPTION: Each Dicopac® Kit consists of five single-test cylinders, a vial of Cobalt 57 (Co 57) standard, and a vial of Cobalt 58 (Co 58) standard. Each test cylinder contains a capsule of cyanocobalamin Co 58 (vitamin B_{12} Co 58), a capsule of cyanocobalamin Co 57 (vitamin B_{12} Co 57) bound to human gastric juice, and an ampule of unlabelled cyanocobalamin for injection.

ACTIONS: Oral vitamin B_{12} is normally coupled with intrinsic factor (IF) contained in the gastric juice secreted by the stomach and the vitamin B_{12} combined with intrinsic factor is absorbed in the terminal ileum. Only intrinsic factor bound vitamin B_{12} is absorbed by this route. Following parenteral administration or gastrointestinal absorption, cyanocobalamin is bound to plasma proteins and distributed to the liver and blood forming organs.

INDICATIONS: Dicopac Kit consisting of cyanocobalamin Co 58 and cyanocobalamin Co 57 combined with human intrinsic factor is used to assess vitamin B_{12} absorption in the diagnosis of malabsorption due to the lack of intrinsic factor, e.g. Addisonian (pernicious) anemia, and as a diagnostic adjunct in other defects of intestinal absorption.

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

DOSAGE AND ADMINISTRATION: One purple/white capsule containing 0.25 μg cyanocobalamin Co 57 (nominal activity 0.5 μCi at activity date) bound to human gastric juice for oral administration.

One red/ivory capsule containing 0.25 μg cyanocobalamin Co 58 (nominal activity 0.8 μCi at activity date) for oral administration.

One ampule of unlabelled cyanocobalamin (1 mg) for intramuscular injection.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration. Care must be taken when measuring the activity in the Co 57 and Co 58 capsules because of the small amount of radioactivity present.

ADMINISTRATION AND TEST PROCEDURE*: The Dicopac test is performed in a manner similar to the Schilling test, however, with this test both Co 58 cyanocobalamin and Co 57 cyanocobalamin bound to intrinsic factor are administered simultaneously. Thus, both vitamin B_{12} absorption and response to intrinsic factor are measured with the Dicopac test.

Both Dicopac capsules are orally administered to a fasting patient, who is instructed to collect all urine for the next 24 hours. An intramuscular injection of non-radioactive vitamin B_{12} is administered to the patient up to two hours after the radioactive capsules are administered.

After the total volume of urine is measured, aliquots are taken for counting. The urine samples and the Co 57 and Co 58 standards provided with the Dicopac Kit are counted using dual isotope counting procedures. This data is used to calculate the percent excretion of each radionuclide and the ratio of the percent excretion of Co 57 to the percent excretion of Co 58.

*Refer to "The Technical Information for the Performance of the Dicopac Test" brochure provided with the Dicopac Kit for further information on procedural techniques.

INTERPRETATION OF RESULTS: The usual percent excretion values and the ratios obtained with Dicopac are presented in Table I.

Table I. Results of 24-hour urine excretions and $\frac{\text{Co 57}}{\text{Co 58}}$ ratios with Dicopac:

Diagnosis	Mean values % (usual range) Co 57 + I.F.	Co 58	$\frac{\text{Co 57}}{\text{Co 58}}$ ratio
Normals	18 (10-42)	18 (10-40)	0.7-1.3
Pernicious anemia and certain gastric lesions	9 (6-12)	3 (0-7)	>1.7
Malabsorption syndromes not caused by lack of I.F.	<6	<6	0.7-1.3

A small number of patients have been found to excrete a "normal" (i.e., >10%) amount of Co 58, but these individuals exhibit elevated ratios (>1.4). The clinical significance of these findings is presently unclear.

PHYSICAL CHARACTERISTICS: Cobalt-57 decays by electron capture with a physical half life of 270 days. The primary gamma energy of Co 57 is about 122 KeV. Cobalt-58 decays by electron capture and positron and gamma emissions with a physical half life of 71 days. The primary gamma energy of Co 58 is 811 KeV. Photons that are useful for counting are listed in Table I.[1,2]

Table I. Principal Radiation Emission Data

	Radiation	Mean %/disintegration	Mean Energy (KeV)
Co 57	Gamma -2	87.1	121.9
	Gamma -3	9.6	136.3
Co 58	Beta -1	15.0	203.7
	Gamma -1	99.4	810.5
Annihilation Radiation		30.0	511.0

[1]Dillman, L.T., Radionuclide Decay Schemes and Nuclear Parameters for Use in Radiation-Dose Estimation, Supplement No. 2. MIRD pamphlet No. 4, *J Nucl. Med.*, p. 27, 1969.

[2]Dillman, L.T., Radionuclide Decay Schemes and Nuclear Parameters for Use in Radiation-Dose Estimation, part 2, Supplement No. 4, MIRD pamphlet No. 6, *J. Nucl. Med.*, p. 16, 1970.

The specific gamma ray constant for Co 57 is 1.0 R/mCi-hr at 1 cm. For Co 58 it is 5.5 R/mCi-hr at 1 cm. The half value layer for Co 57 is 0.2mm of Pb. For Co 58 it is 9mm of Pb.

To correct for physical decay of these radionuclides, the fractions that remain at selected time intervals before and after the day of calibration are shown in Table II.

This table is not needed for routine calculation, as all counting is relative to the standards which have been prepared from the same batch of each of the radionuclides as the corresponding cyanocobalamin capsules.

Table II. Physical Decay Chart: Co 57, half life 270 days; Co 58, half life 71 days

Weeks Before Activity Date	Co 57 μCi	Co 58 μCi	Weeks After Activity Date	Co 57 μCi	Co 58 μCi
10	0.60	1.48			
9	0.59	1.38	1	0.49	0.75
8	0.58	1.38	2	0.48	0.70
7	0.57	1.29	3	0.47	0.65
6	0.56	1.21	4	0.47	0.61
5	0.55	1.13	5	0.46	0.57
4	0.54	1.05	6	0.45	0.53
3	0.53	0.98	7	0.44	0.50
2	0.52	0.92	8	0.43	0.46
1	0.51	0.86	9	0.43	0.43
0*	0.50	0.80	10	0.42	0.40

*Activity date

RADIATION DOSIMETRY: The estimated absorbed radiation doses[1] to an average patient (70 kg) following the oral administration of one Dicopac capsule of Co 57 and one of Co 58 at calibrated nominal activities of 0.5 μCi and 0.8 μCi, respectively, are shown in Table I.

Table I. Radiation Doses

Tissue	Absorbed Radiation Dose (rads/0.5 μCi Co 57 + Intrinsic Factor) Normal and Pernicious Anemia	(rads/0.8 μCi Co 58) Normal	Pernicious Anemia
Liver*	0.065	0.14	0.03
Stomach	0.000041	0.00027	0.00042
Small Intestine	0.00007	0.00043	0.0013
Upper Large Intestine	0.00013	0.00070	0.0021
Lower Large Intestine	0.00030	0.0018	0.0053
Testes*	0.0026	0.0074	0.00037
Ovaries*	0.0033	0.010	0.0021
Whole-body*	0.0050	0.012	0.0022

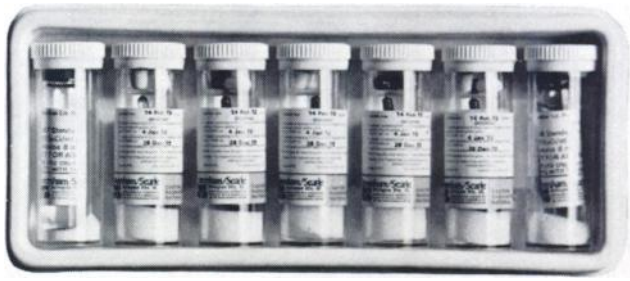
*The administration of a flushing dose of non-radioactive B_{12} will decrease the dose to the liver, gonads, and whole-body from Co 57 and Co 58 by about 30%.

[1]Method of Calculation: A Schema for Absorbed-Dose Calculation for Biologically Distributed Radionuclides, Supplement No. 1, MIRD pamphlet No. 1, *J. Nucl. Med.*, p. 7, 1968.

HOW SUPPLIED: Each Dicopac Kit consists of five single-test cylinders and two 8 ml vials containing the standard solutions. The vial containing the blue solution is the Co 57 standard and the vial containing the yellow solution is the Co 58 standard. Each standard solution is prepared so that 1 ml of solution is equivalent to 2% of the total activity of each of the corresponding capsules.

Each cylinder contains two capsules and an ampule of unlabelled cyanocobalamin (1 mg). The red/ivory capsule contains 0.25 μg Co 58 cyanocobalamin (nominal activity 0.8 μCi at activity date). The purple/white capsule contains 0.25 μg Co 57 cyanocobalamin (nominal activity 0.5 μCi at activity date) bound to human gastric juice.

Dicopac Kits should be stored at 4°C and not used after the expiry date stated on the label.



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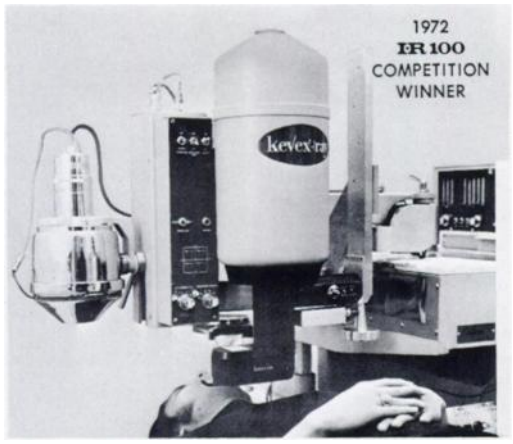
References

1. Kaufman L., Price, D. C. (Eds): *Semiconductor Detectors in Medicine*, CONF-730321, Washington, D. C., U. S. Atomic Energy Commission, 1973.
2. Kaufman L., Wilson C. J.: Determination of extracellular fluid volume by fluorescence excitation analysis of bromine., *Journal of Nuclear Medicine* 14:812, 1973.
3. Price, D. C., Swann S. J., Hung S., et al: The measurement of circulating red cell volume using nonradioactive cesium and fluorescent excitation analysis., *Journal of Laboratory and Clinical Medicine* (in press).
4. Guesry P., Kaufman L., Orloff S., et al: Measurement of glomerular filtration rate by fluorescent excitation of nonradioactive meglumine iothalmate., *Clin Nephrol* 3:134, 1975.



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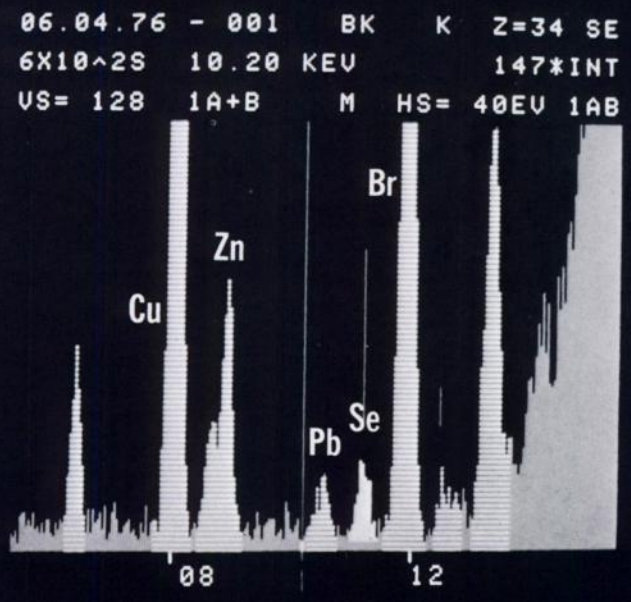
C&EN May 3, 1976

Heart disease, cancer linked to trace metals

The possibility that variations in dietary and environmental levels of selenium, copper, zinc, and perhaps other metals



Spectrum for copper, zinc and selenium obtained from two microliters of human breast fluid.

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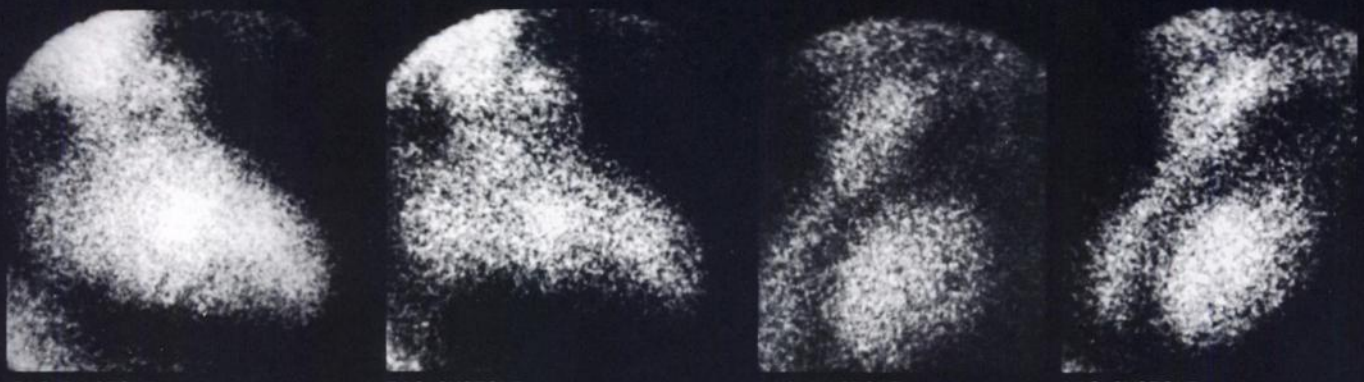
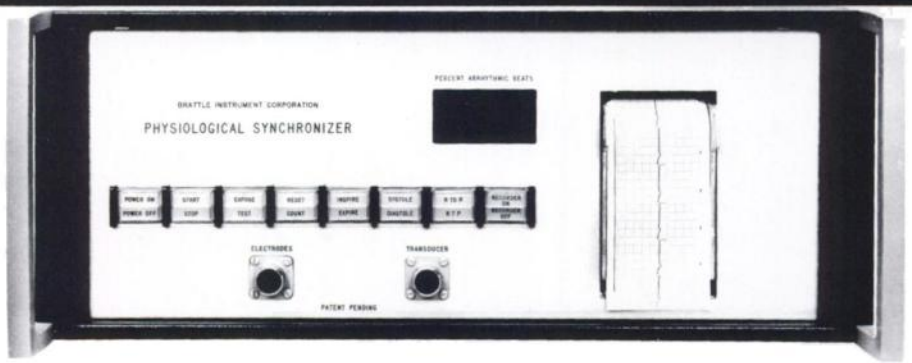


RAO, DIASTOLE | RAO, SYSTOLE | LAO, DIASTOLE | LAO, SYSTOLE

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.



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