One of the safest decisions you'll ever have to make ... and as easy as 1,2,3.

Consider the benefits of MPI-Iodine-123 and your course of action becomes clear. Don't you and your patients deserve these important benefits?

Greater patient safety because of reduced radiation absorbed dose. Substitution of I 131 with MPI-Iodine-123 reduces the absorbed radiation dose more than 24 times to the thyroid gland. Compare.

Maximal Thyroid Uptake %	Rads/100μCi MPI-Iodine-123	Rads/100μCi I 131
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.

Images that demonstrate true thyroid function. MPI-Iodine-123 is organified by the thyroid so images obtained will depict total thyroid function – not the trapping mechanism alone.

You save money when MPI-Iodine-123 is delivered with other Medi-Physics products. Your Medi-Physics representative will be glad to show you how you can receive MPI-Iodine-123 without delivery charges in certain areas. For full information about MPI-Iodine-123, our reliable shipping procedures and other products you can receive along with MPI-Iodine-123, please use the appropriate toll-free number: Outside California 800-227-0483; Inside California 800-772-2446.

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 by 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.

T3 uptakes...

30 minutes, 50 µl and the Resin Strip.

Does your test have these time-saving, serum-saving, trouble-saving features?

Specifically, the credentials of the *Res-O-Mat T3 MICRO* Test are: Rotation of reaction vials has been cut to 30 minutes. Only 50 microliters of serum are required, freeing you from QNS problems. Using the Mallinckrodt resin strip for separation eliminates four troublesome steps: centrifuging, column preparation, decanting of radioactivity and repeated rinsing of resin binding sites.

Available in bulk and pre-dispensed test kits.

The *Res-O-Mat T3 MICRO* Test gives you accurate determination of liothyronine binding capacity of serum protein using either bulk or pre-dispensed test kits.

You'll find the test to be precise, reliable and convenient. And, since standard serum (from a pool of approximately 5000 euthyroid patients) is provided in all kits, the advantage of "always relating the test to a known 'normal' serum is an automatic 'quality control' on each sample."[1] By counting the serum, the available thyro-binding proteins are measured directly, an advantage over other systems which measure the percent uptake on a secondary binding site.

Pre-dispensed radioactivity is furnished in 15- and 50-test sizes. An economical 250-test size is also available for large-volume laboratories.

For more information, write or call Mr. Art Zarchy, 800-325-8980, or contact your Mallinckrodt representative for a demonstration without obligation.

Mallinckrodt® NUCLEAR

RADIOPHARMACEUTICALS

Mallinckrodt, Inc., 675 Brown Rd.
Hazelwood, Missouri 63042

The Res-O-Mat® T3 *Micro* Test.

1. Brucer, Marshall, M.D., Thyroid Radioiodine Clinical Testing, 2nd Edition. St. Louis, Mo., Mallinckrodt, Inc. 1973, p. 38.

Mallinckrodt's RIA-Mat® T4 I 125 Test

with improvements that...

Just as RIA accuracy and precision advanced the state of the art in measuring total T4, the *RIA-Mat T4 I 125* Test offers another step forward. Its improvements add up to sizeable progress in determining total T4 levels by radioassay.

1. No extraction step—hands-on time, test time and chance of error have been reduced by eliminating extraction.
2. Only a 10 μl serum requirement—This reduction in volume offers a distinct advantage when only limited serum is available. To facilitate the procedure, 10 μl pipettes are provided with the 100-test kit.
3. Resin strip separation—This unique Mallinckrodt system offers a clean, efficient method of separation. The chance for decanting inequities is eliminated, along with the need for decanting or centrifuging.
4. Accurate measurement up to 40 μg%—The ability to give accurate, precise answers to the physician is extended by this higher range for direct T4 measurement. Also, the need to rerun the test for determining high values is essentially eliminated.
5. 30-minute separation and incubation—Another improvement which reduces technologist time.

For more information on advancing your measurement of total T4 to a higher level, write or call Bob Sheppard (314) 731-4141, 675 Brown Road, Hazelwood, Mo. 63042.

add up to a sizeable advancement in T4 testing.

Mallinckrodt NUCLEAR

RADIOPHARMACEUTICALS

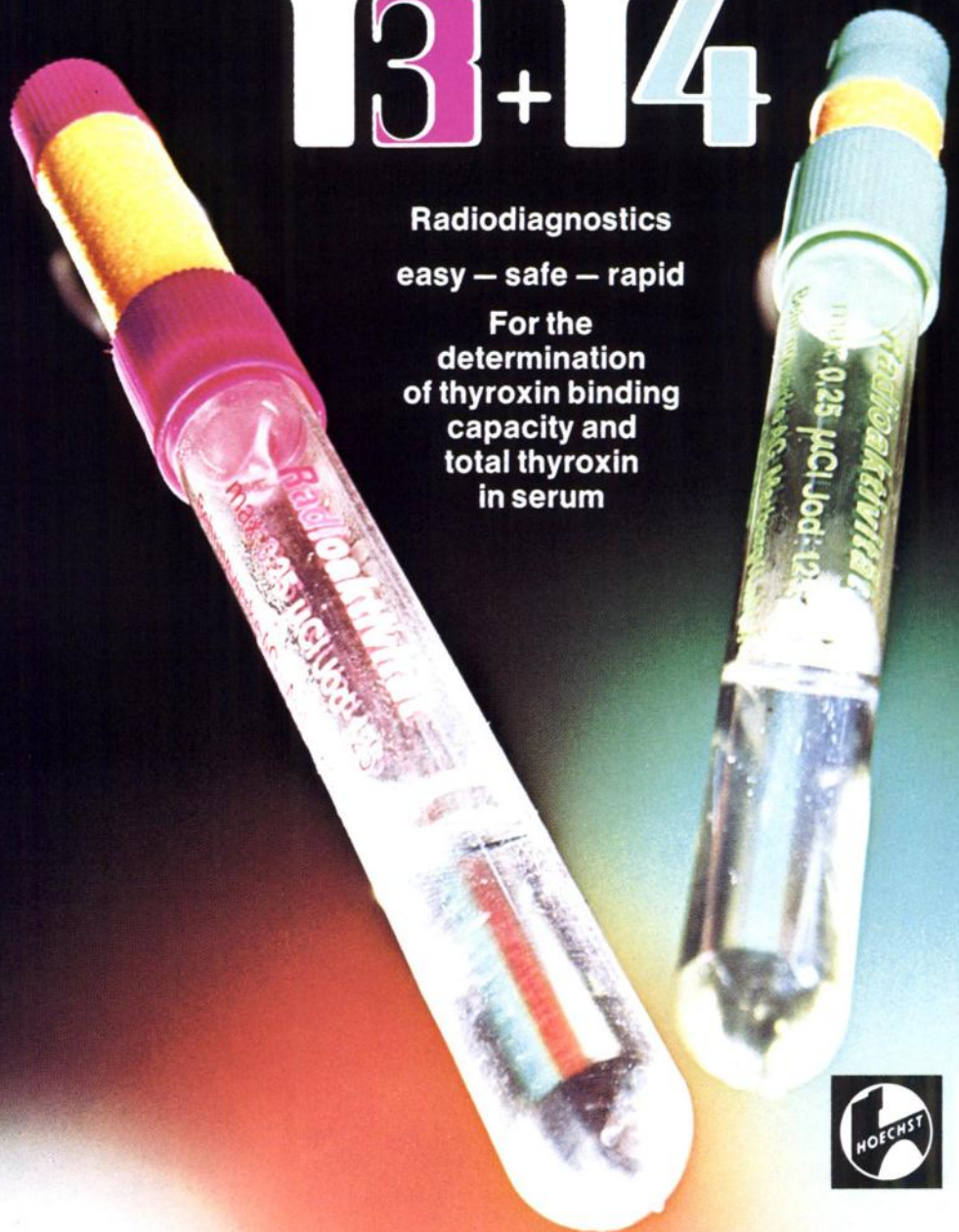
Ultragnost®

T3+T4

Radiodiagnostics

easy – safe – rapid

For the determination of thyroxin binding capacity and total thyroxin in serum



Two time-saving tests for your lab.: pipette once, incubate for one hour, automatic phase separation, measure.

Contents T 3 kit: 12 calibrating tubes with 3.5 ml thybon® (J-125)-solution each • total activity: 3 µCi J-125 • preservative: 0,02 % sodium azide • 12 adsorption tubes • 1 ml standard serum of defined TBG capacity •

Contents T 4 kit: 12 calibrating tubes with 3.3 ml TBG-T 4-(J-125)- solution each • total activity: 1 µCi J-125 • preservative: 0,02 % sodium azide • 12 adsorption tubes • 1 standard serum of defined T 4-concentration •

Storage: store protected from light in the refrigerator at +4° to +6° C
Stability: 8 weeks at proper storage. The expiry date is indicated on the package.

Order No.: J 5113 for T 3 1 package 12 tests	Order No.: J 5114 for T 4 1 package 12 tests

Lh 82159

HOECHST AG · 6230 Frankfurt (Main) 80 · Behring Department

Film Star.

With Cameray II, the new 37-tube scintillation camera from Raytheon, you get what you'd expect from a star: Performance. Total System Performance. TSP.

Any scintillation camera that's a top performer has to put a lot of good operating characteristics together. System and energy resolution. Uniformity. Linearity. Count rate. Price. Consider all these together and you'll find Cameray II at the top. There are other reasons too. Choice of 8 x 10 or 14 x 17 film size. Whole body capability. Full range of accessories. Together they add up to TSP. And TSP is what makes Cameray II a film star.

See for yourself how Cameray II measures up. Let your Raytheon representative show you a TSP comparison chart. Then, if you choose the star, we'll give you a director's chair. For more information contact the Marketing Manager, Raytheon Company, Medical Electronics Operation, Fourth Avenue, Burlington, Massachusetts 01803. Telephone (617) 272-7270.

RAYTHEON

WHAT'S NOW SQUIBB?

On the current nuclear medicine scene

MINITEC® (Technetium 99m) Generator

The Technetium 99m Generator using fission product molybdenum to produce technetium 99m. MINITEC is unlike any generator you've ever used—made small to make sense.

Designed for easy handling

- MINITEC has its own handle for easy lifting, easy carrying and reduced hand exposure
- Weighs only 24½ lbs., less than 5" in diameter, under 8½" high

Designed for easy elution

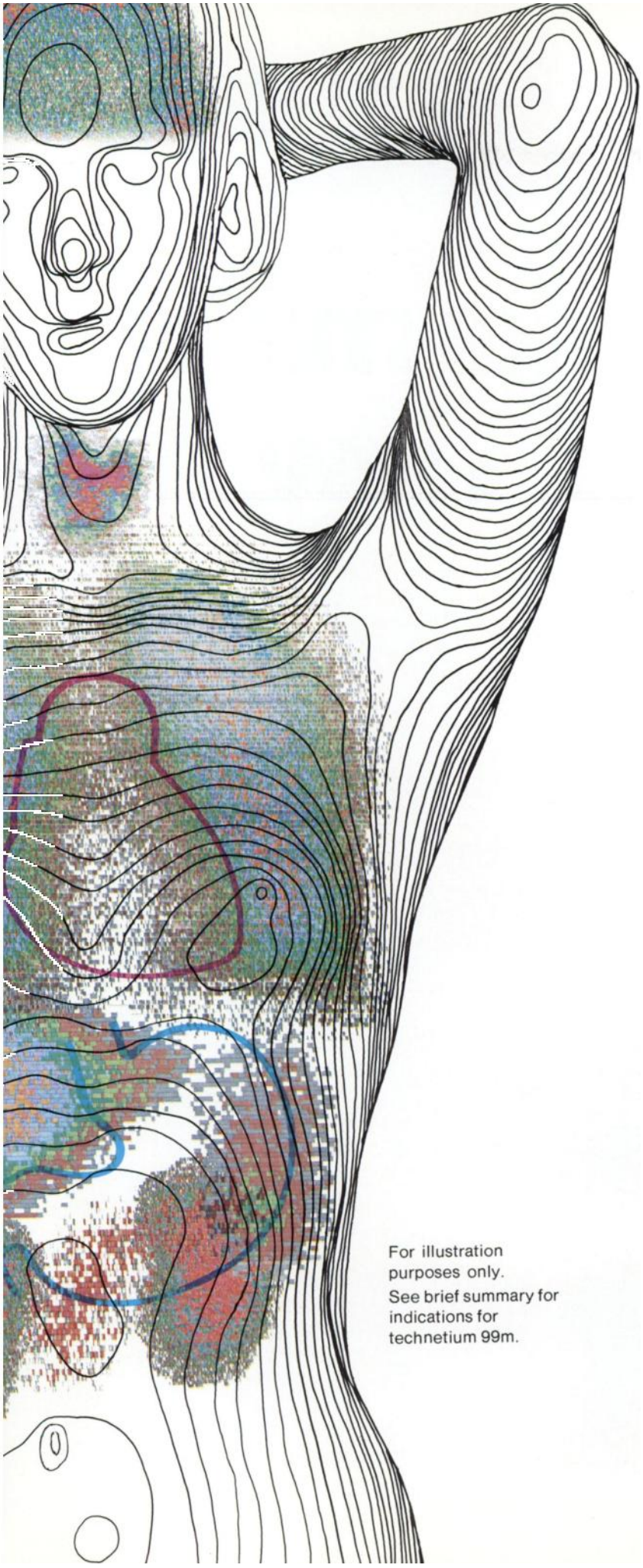
- Sets up in seconds
- Elutes in only 3 minutes after eluent vial has emptied

Designed for safety

- No exposed tubing when eluting
- 1⅝" lead surrounds the MINITEC column
- 1½" of extra lead protection from MAXI-SHIELD™. Base, cap and interlocking half rings easily assembled on site . . . only the cap is removed for elution. (You get MAXI-SHIELD free with your first MINITEC Generator purchase.)

Designed for convenience

- MINITEC Generator is available in 50,100, 200, 300, 400 and 500 mCi potencies. Delivery on Monday AM (precalibrated through Thursday) and Wednesday (precalibrated through Monday) provides maximum versatility to satisfy technetium requirements of your lab's work load.



For illustration purposes only.
See brief summary for indications for technetium 99m.

Minitec®
(Technetium 99m)
Generator

Minitec® (Technetium 99m) Generator provides a means of obtaining a sterile, non-pyrogenic supply of technetium 99m (^{99m}Tc) as sodium pertechnetate ^{99m}Tc.

Indications: Sodium pertechnetate ^{99m}Tc is indicated for brain imaging, thyroid imaging, salivary gland imaging, blood pool imaging, and placenta localization.

Contraindications: At present, there are no known contraindications to the use of sodium pertechnetate ^{99m}Tc.

Warnings: Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and safe handling of radionuclides, produced by nuclear reactor or cyclotron, and whose experience and training have been approved by the appropriate federal or state agency authorized to license the use of radionuclides.

This radiopharmaceutical should not be administered to women who are pregnant or who may become pregnant or during lactation unless the information to be obtained outweighs the possible potential risks from the radiation exposure involved. 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.

Since radioactive pertechnetate is secreted in milk during lactation, formula-feedings should be substituted for breast-feedings.

Important: Since material obtained from the generator may be intended for intravenous administration, aseptic technique must be strictly observed in all handling. Only the eluent provided should be used to elute the generator. Do not administer material eluted from the generator if there is any evidence of foreign matter.

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.

At the time of administration, the solution should be crystal clear.

Adverse Reactions: At present, adverse reactions have not been reported following the use of sodium pertechnetate ^{99m}Tc.

For complete prescribing information, consult package insert.

How Supplied: Minitec (Technetium 99m) Generator is available in potencies of 50, 100, 200, 300, 400, and 500 mCi. Supplied with the generator are vials of eluent containing 5 ml. of a sterile, non-pyrogenic solution of 0.9% sodium chloride in water for injection. Also supplied is suitable equipment for eluting, collecting, and assaying the technetium 99m.

Medotopes®

SQUIBB HOSPITAL DIVISION
E. R Squibb & Sons, Inc.
Princeton, N.J. 08540

Pho/Gamma® LFOV™

Three peaks make a beautiful view

Searle's large field of view scintillation camera, in its standard configuration, is the only instrument of its type which allows you to set window width and energy level on 3 independent analyzers for unique isotopes and special studies...*the only one* which lets you take full advantage of the diagnostic potential in multi-peak nuclides such as Gallium 67. This is a great advantage in soft tissue studies where high sensitivity and superior resolution are vital.

LARGE SELECTION OF COLLIMATORS

To sharpen your images even more, the Pho/Gamma LFOV offers a large assortment of converging and parallel hole collimators designed and developed by Searle Radiographics. There is a significant improvement in the resolution of deep-seated structures with converging collimation. In renal studies, for example, the images possess such clarity that it is possible to obtain even *oblique* views of diagnostic quality. Converging collimation also brings enhanced sensitivity to the imaging of small organs.

The large field of view with parallel hole collimation can simultaneously image both kidneys or both lungs. Thus, where a standard field of view camera requires 2 studies, the Pho/Gamma LFOV routinely does the job with only one.

EASE OF OPERATION

The Pho/Gamma LFOV has eleven factory pre-set isotope windows for operator convenience. Automatic peaking assures remarkable reproducibility from study to study and from day to day.

IMPROVED ELECTRONIC DESIGN

New ratio correction circuitry allows wider window widths, shortens study times, reduces motion artifact and increases patient throughput. Other electronic innovations include pulse-pair pile-up rejection and event buffering circuitry. As a result, the Pho/Gamma LFOV is capable of count rates up to 200,000 cps, which is sufficient for even highly specialized techniques such as dynamic cardiac studies.

The introduction of the Pho/Gamma LFOV in 1975 was a milestone in nuclear imaging. Since then, this advanced instrument has earned a reputation as the finest, most versatile scintillation camera you can buy. Today, clinicians rely on the Pho/Gamma LFOV for improved diagnostic clarity, shortened study times and greater patient comfort in lung, brain, whole body bone, renal and abdominal (liver) blood flow studies.

INSTRUMENTATION BACKED BY SUPERIOR SERVICE

Searle Service is one of the largest, highly trained Service Organizations in the nation. This trained and knowledgeable group is dedicated to maintaining highest quality instrument performance in your laboratory.

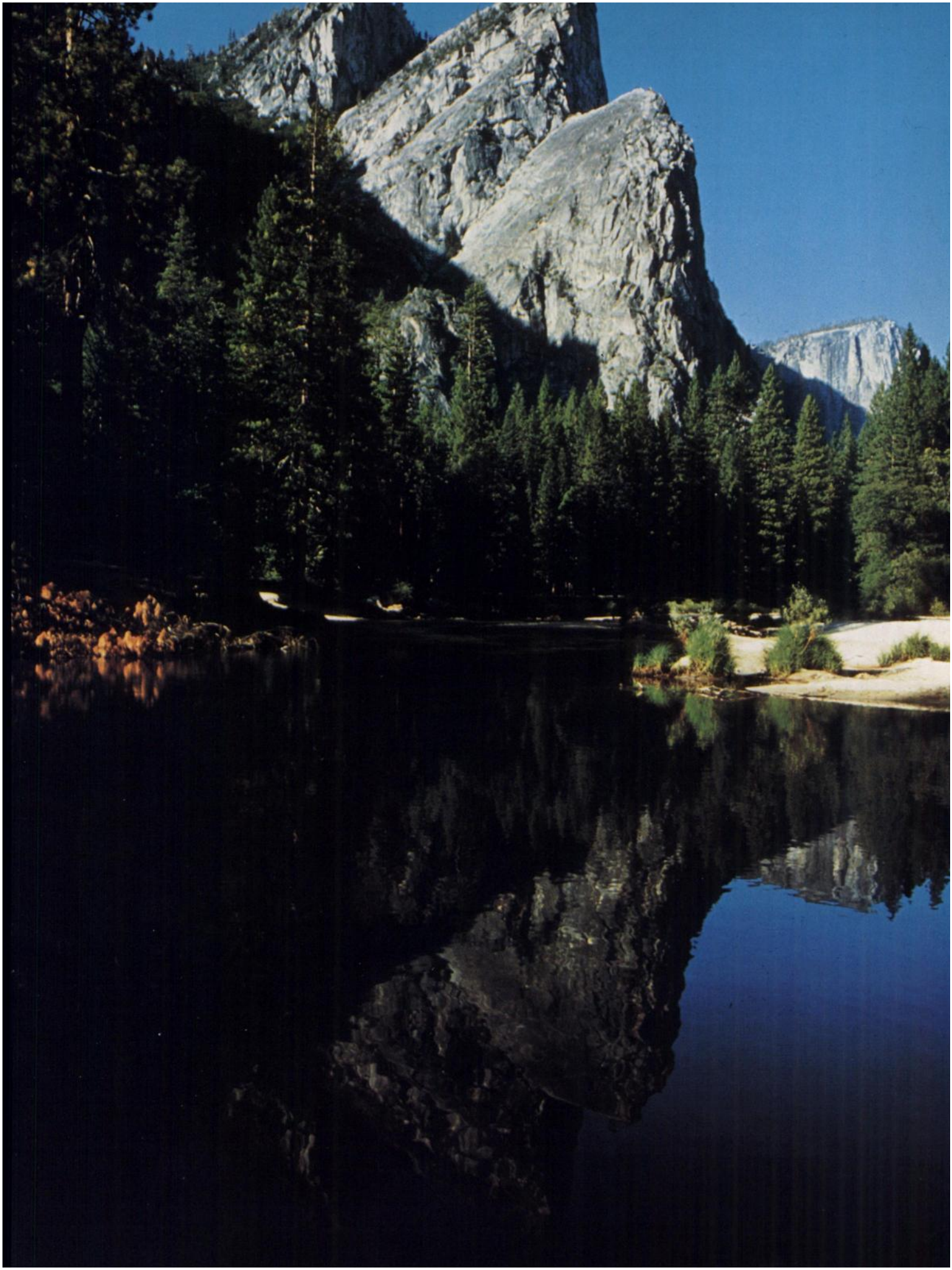
For more information about the Pho/Gamma LFOV system, including the unique Micro Dot™ Imager and Scintiscan™ Whole Body Table, call your Searle representative or write: Searle Radiographics, Inc., 2000 Nuclear Drive, Des Plaines, IL 60018. Telephone: (312) 298-6600.

SEARLE

Searle Radiographics, Inc.
Subsidiary of G. D. Searle & Co.

IMAGING:
The Living Art

SR 535



Advances in Plain Language Control of Data Systems

```
:


NEXT PROGRAM NAME ? DEFI:
(VIEW,)ROI NUMBER ? 5,1:
QUADRANT? 2:

BUG READY....
    NUMERIC TO MOVE BUG
    SHIFT TO GO FAST
    SPACE TO FIX POINT
    CR TO CLOSE ROI


ROI INSIDE OR OUTSIDE LINE? 1:
ROI INSIDE OR OUTSIDE LINE? I:
REPEAT? N:


NEXT PROGRAM NAME ? _
```

Interactive R.O.I. selection dialogue.

```
:


NEXT PROGRAM NAME ? DROI:
ERASE ? N:
QUADRANT? 2:
(VIEW,)ROI NUMBER ? 5,1:
ROI NUMBER? :
REPEAT? :


NEXT PROGRAM NAME ? DISP:
VIEW NUMBER(,FIRST,LAST)? 1:
BACKGROUND SUBTRACT ? :
SATURATION LEVEL? :
CYCLES OF GRAY? :
ERASE ? :
QUADRANT? :
REPEAT? :


NEXT PROGRAM NAME ? _
```

Display program dialogue.

```
NEXT PROTOCOL NAME? LIVER:

CURRENT PATIENT IS: ROBINSON-CRUSOE  D              SS56789
THIS PROTOCOL COLLECTS THREE STATIC VIEWS, THE FIRST
IS THE ANTERIOR, THE NEXT THE RIGHT LATERAL AND THE
LAST THE POSTERIOR.
NORMALISATION IS DONE WITH THE 'DIV' CORR. MTX.


     STUDY NUMBER (12)? 127/74:
             NAME (30)? JONES D:
  NUMBER (SS ETC) (14)? SS345:

CURRENT PATIENT IS: JONES D                         SS345

ADD, DELETE, LIST OR SELECT ? :

NOW POSITION THE PATIENT SUPINE WITH THE LIVER AND
SPLEEN VISIBLE ON THE PERSISTENCE 'SCOPE.

TYPE CR TO GO ? :
HIT SPACE BAR TO STOP EARLY
AGAIN, RESTART, KILL OR STOP? S:
VIEW NUMBER =   1; NUMBER OF MATRICES =   1

NOW POSITION THE PATIENT LYING ON THE LEFT SIDE.

TYPE CR TO GO ? _
```

Typical protocol control dialogue (customer prepared).

```
G  = GENERATE PROTOCOL
R  = RUN PROTOCOL
T  = TAPE STORAGE OF DATA
S  = SEARCH FOR DATA ON TAPE
N  = NAME NEXT PROGRAM
U  = USER PROGRAM DEVELOPMENT
L  = LEAVE SYSTEM
H  = HELP


ACTION? :


NEXT PROGRAM NAME ? MXOP:
+ - * OR /? -:
FIRST VIEW
VIEW NUMBER(,FIRST,LAST)? 1:
PERCENTAGE OF FIRST ? 56:
SECOND VIEW
VIEW NUMBER(,FIRST,LAST)? 2:
PERCENTAGE OF SECOND? 67:
VIEW NUMBER =   7; NUMBER OF MATRICES =   1


NEXT PROGRAM NAME ? _
```

Matrix mathematical operations program dialogue.

VARICAM's operator dialogue is designed to require the minimum of operator initiative and expertise, whilst preserving flexibility.

In the manual mode of operation modules are specified in reply to the question "next program name?" These are named obviously such as "MXOP" for matrix operations or "ERASE" for erase. Subsequent parameters of operation are requested by VARICAM as required in plain language.

In the protocol mode, modules are chained together and fixed (or variable) parameters are specified. Protocols are used to automate routine workloads; the comment facility enabling the principle user to ensure that consistent procedures are used by all operators.

Ease of use is an extremely important factor often overlooked—at its least it can allow an expert user to work at optimum speed, at its best it can make the difference between a 'computer-lay' technician's enthusiasm or complete inability to drive the system at all.

varian
Radiation Division

611 Hansen Way, Palo Alto, California 94303, USA.
Telephone: (415) 493-4000

European Enquiries: Molesey Road, Walton-on-Thames, Surrey, England. Telephone: (093 22) 28971 Telex: 261351

Contains 0.9% benzyl alcohol as a preservative. Made isotonic with sodium chloride. Supplied at a concentration of 100 μCi/ml and a specific activity of 1 to 6 mCi/mg. Sodium hydroxide or hydrochloric acid may be present for pH adjustment.

Mallinckrodt's L-Selenomethionine Se 75 Injection The *controlled* process product–the No. 1 choice.

At Mallinckrodt we produce Selenomethionine Se 75 through a process of chemical synthesis. We believe this method allows us to institute better "control" over the production process. We also believe that this extra "control" minimizes final product variation from lot to lot and should aid in obtaining more consistent imaging results.

Will you experience greater success in pancreas visualization or observe greater detail with our product? Clinical data does not exist which would allow us to make such a claim. We are only sure of one thing—nuclear medicine personnel order our Selenomethionine 75 more often than any other—by a substantial margin. We believe that our production know-how is an important reason for this popularity.

For ordering information contact your Mallinckrodt representative or call direct to our Order Department 800-325-3688—Missouri customers call 314-291-5574.

Mallinckrodt®
NUCLEAR
RADIOPHARMACEUTICALS
675 Brown Rd.
Hazelwood, Missouri
63042

L-Selenomethionine Se 75 Injection

DESCRIPTION
Selenomethionine Se 75 Injection is supplied as a sterile non-pyrogenic aqueous solution containing 0.9% benzyl alcohol as a preservative. The solution is made isotonic with sodium chloride and may contain hydrochloric acid or sodium hydroxide for pH adjustment.

INDICATIONS
Selenomethionine Se 75 is indicated for pancreas scanning as an aid in the diagnosis of suspected pancreatic disease.

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, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

The transplacental transport and long biologic half-time of this agent may result in significant radiation exposure to the fetus. Since Selenomethionine Se 75 is secreted in milk during lactation, formula feeding should be substituted.

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.

Fasting prior to administration of Selenomethionine Se 75 may enhance hepatic uptake of the agent which may result in degradation of pancreatic image quality.

ADVERSE REACTIONS
Adverse reactions have not been reported following the administration of Selenomethionine Se 75 Injection.

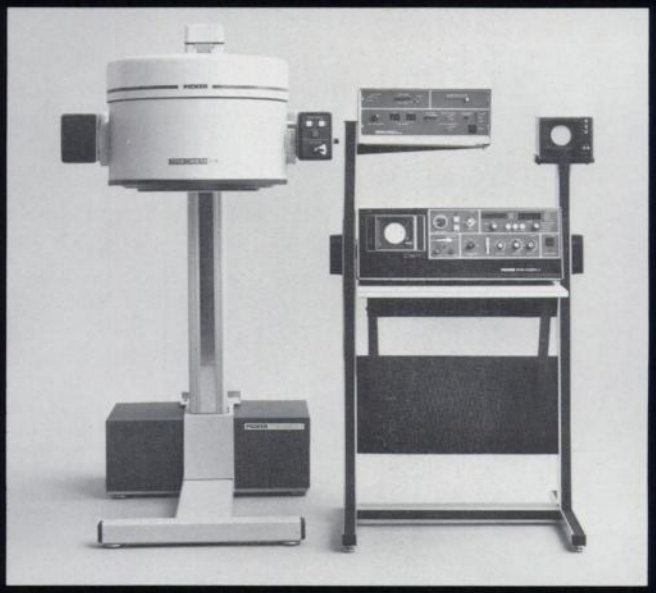
See package labeling for information on dosage and administration, physical characteristics and radiation dosimetry.

Mallinckrodt, Inc.
675 Brown Rd.
Hazelwood, Missouri 63042

Mallinckrodt NUCLEAR

RADIOPHARMACEUTICALS

Think results.



Think dynamite.

Picker's dynamite Dyna® Camera family of nuclear equipment—featuring the exceptional DynaCamera 4/15 Large Field Detector—achieves diagnostic results second to none.

The nuclear suite equipped with the DynaCamera 4 with 10, 12 or 15" detector, Clinical Analyzer data processing and storage system, Omniview® 4, full range of collimators and accessories is assured of possessing today's state-of-the-art nuclear imaging system.

This flexible system of nuclear capabilities is another example of Picker's synergy—the complete interfacing of systems and services for improved diagnostic visualization.

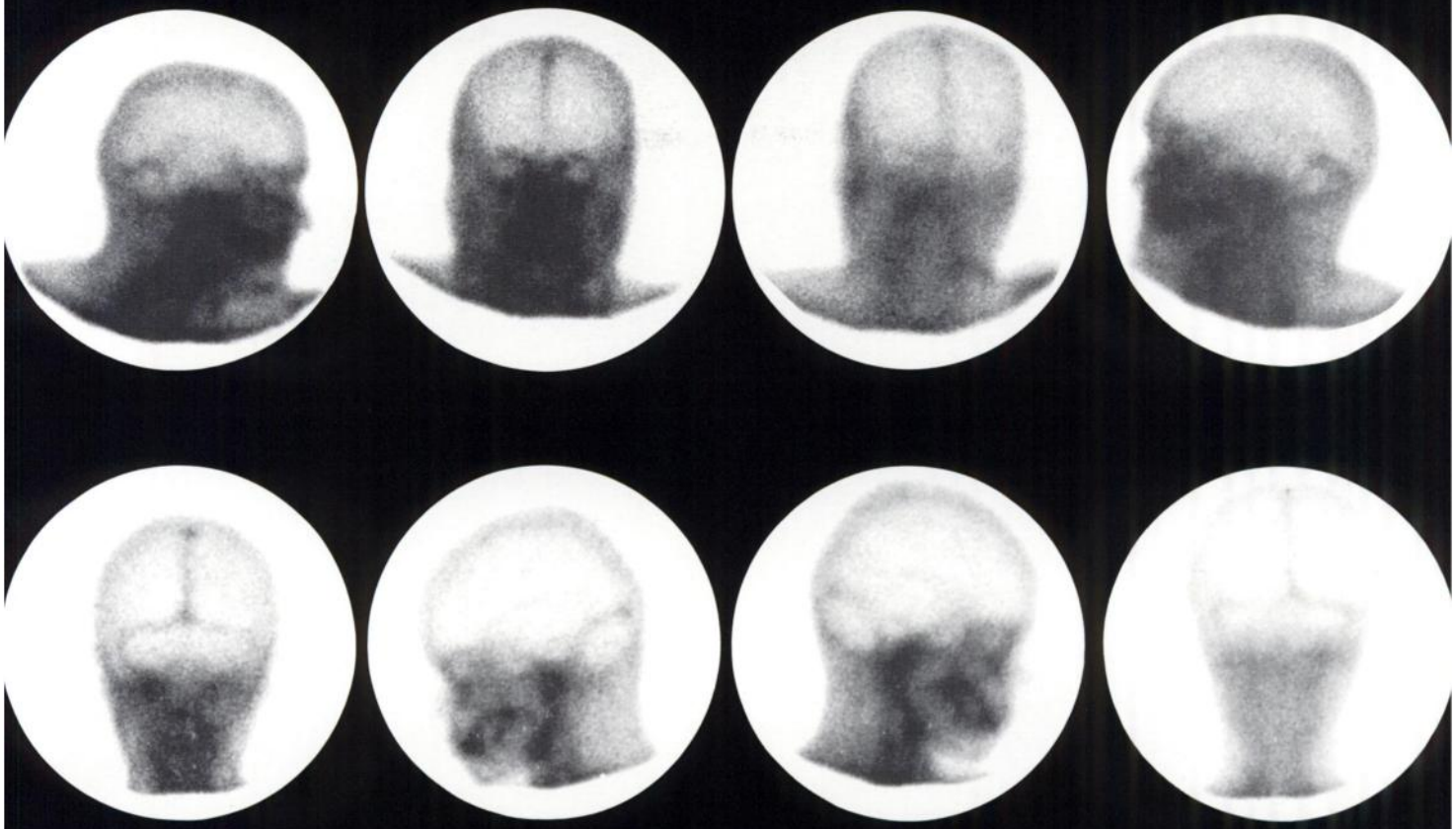
Discuss the dynamite nuclear family with your local Picker representative. Or write Picker Corporation, 12 Clintonville Road, Northford, CT 06472.

The results speak for themselves.

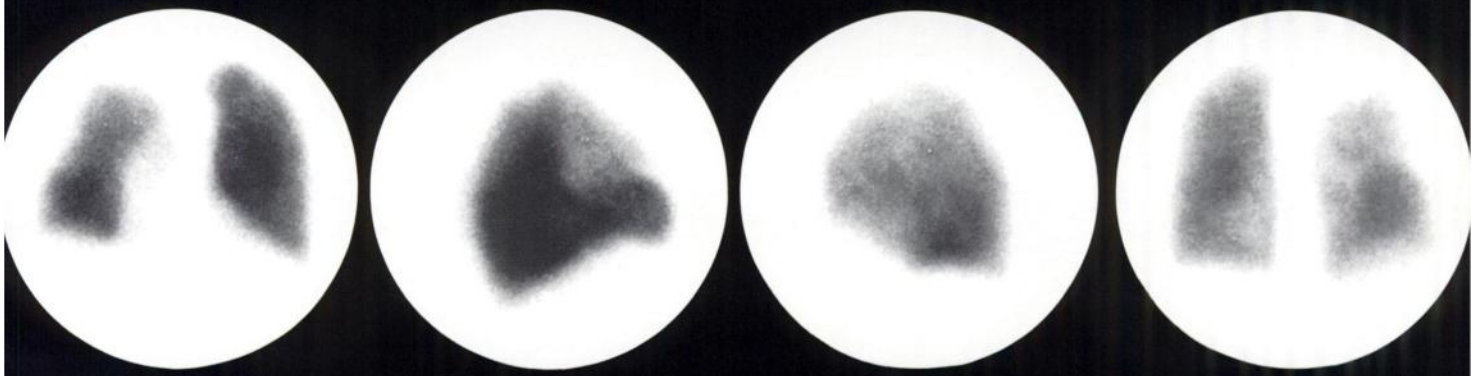
PICKER®

ONE OF THE C.I.T. COMPANIES

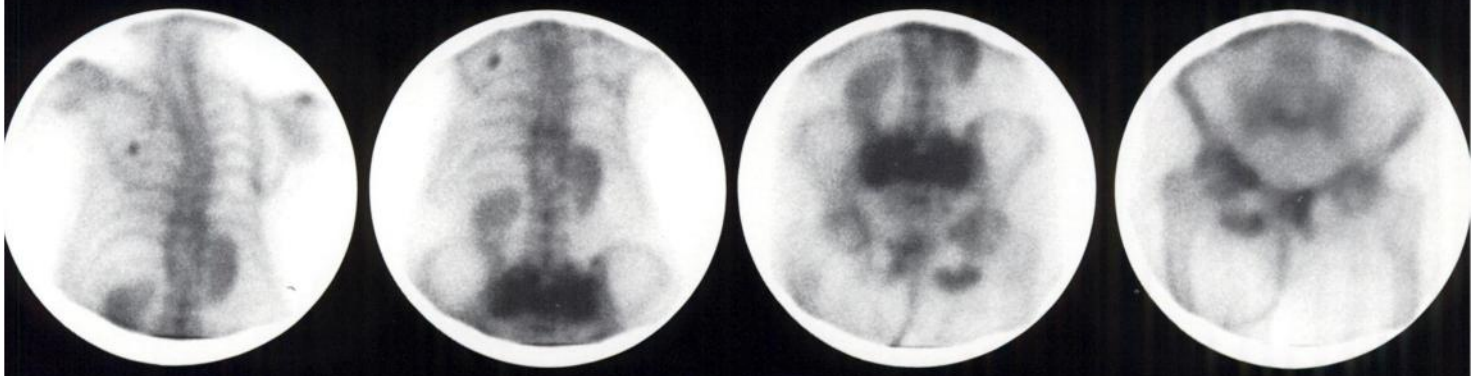
Picker Large Field (15″ diameter) Detector



BRAIN STUDIES
99^{m} Tc Sodium Pertechnetate



LUNG STUDY
99^{m} Tc MAA



BONE STUDY
99^{m} Tc Diphosphonate

Picker synergy

Summary of PRODUCT INFORMATION

ALBUMIN MICROSPHERES (HUMAN) (10-35μ, DRIED) INSTANT MICROSPHERES FOR LABELING WITH TECHNETIUM 99m

INDICATIONS

Scintillation imaging of the lungs with ^{99m}Tc labeled Albumin Microspheres is indicated as an adjunct to other diagnostic procedures whenever information about pulmonary circulation is desired (4,5). The most useful clinical applications of lung imaging are in the diagnosis of 1) pulmonary embolism, 2) chronic obstructive pulmonary diseases such as emphysema and chronic bronchitis, 3) pathological conditions which impede pulmonary blood flow, 4) other pulmonary diseases such as pneumonia and tuberculosis.

CONTRAINDICATIONS

The safety of Albumin Microspheres in patients with a known right-to-left cardiac shunt has not been established and its use in such patients is contraindicated.

WARNINGS

Radiopharmaceuticals should not be administered to patients who are pregnant, or during lactation, unless the benefits to be gained outweigh 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.

Since ^{99m}Tc is excreted in milk during lactation, formula-feedings should be substituted for breast-feedings.

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.

ADVERSE REACTIONS

Although no anaphylactoid reactions have been reported in patients following the administration of Albumin Microspheres, the possibility should be considered that hypersensitivity reactions may occur rarely in patients who, after the initial administration, receive additional doses a number of weeks after the initial dose.

3M COMPANY

3M Brand Instant Microspheres

THE PARTICLE OF DIFFERENCE!

Accurate diagnosis requires consistency, and there is no particle more consistent than microspheres.

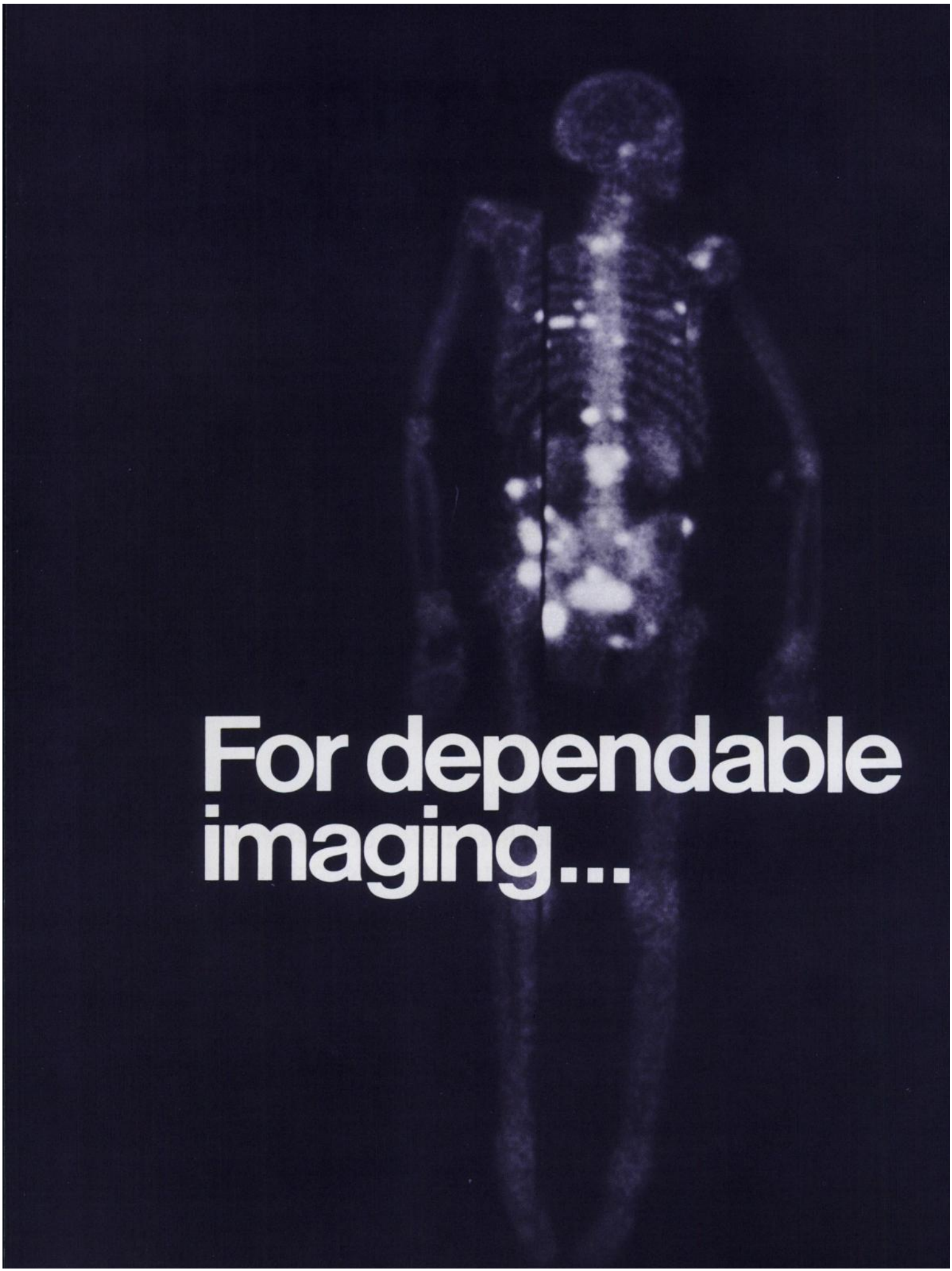
The particles in each vial of 3M Brand Instant Microspheres are controlled in size (15-35μ), number (925,000), and shape. This consistency is reproducible from lot to lot and offers you imaging excellence available from no other lung agent at any price.

High efficiency labeling (>99%) and the albumin microspheres provide superior images with no liver shadow and no hot spots—in short—diagnostic excellence from patient to patient.

3M COMPANY MAKES THE DIFFERENCE

For Summary of Product Information, see adjacent column.
For information, phone Nuclear Products for Medicine 1-800-328-1671

3M COMPANY


For dependable
imaging...

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

PRODUCT INFORMATION

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.

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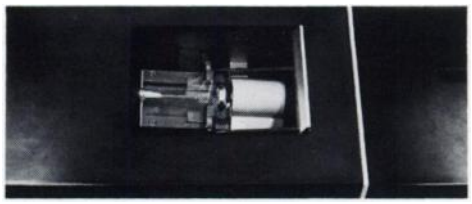
Automated ^{99m}Tc Unit-Dose Delivery System

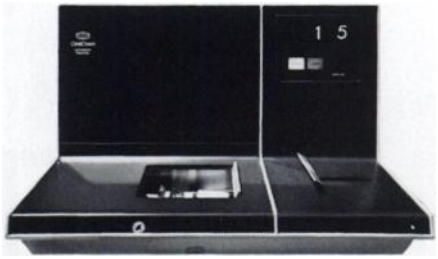
Systematically safer.

Organ-specific agents for optimum imaging of brain, kidney, bone and lung, and for glomerular filtration rate studies, are provided in kits containing 10 unit-dose vials. Each kit is single step, requiring only addition of technetium to produce the scanning agent.



Preselected amount of ^{99m}Tc activity is automatically dispensed into vial, then diluted with saline to 1.3 ml. Entire dispense/dilute cycle is automatic and shielded, and is completed within 75 seconds.

Unit-dose vial is entered only once for technetium delivery, once for agent withdrawal. Shielded syringe assembly automatically centers disposable syringe with vial. A 1.0-ml patient injection is reproducibly withdrawn into syringe.



Dispenser fully automates isotope measurement, reagent transfer and dose calibration. Eliminates time-consuming manual steps, computations and potential radiation exposure.

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The CINTICHEM System includes: an automated technetium dispenser, a high-yield molybdenum 99/technetium 99m generator, organ-specific kits and a unique unit-dose shielded syringe assembly. All integrated for the preparation of sterile, pyrogen-free radiodiagnostic agents—precisely, reliably and with greatly reduced radiation burden to the user.

The CINTICHEM Dispenser automatically delivers a preselected amount of ^{99m}Tc activity (TcO_4^- in saline) into a single-use unit-dose vial. Vial contents are transferred to a disposable syringe via a shielded syringe assembly that permits reproducible withdrawal of a 1.0-ml patient dose.

The CINTICHEM Generator is an optimized, advanced-technology ^{99m}Tc generator. It offers exceptionally high yields and is available in 500-, 1,000-, 1,500- and 2,000-mCi sizes. (Sodium pertechnetate ^{99m}Tc in isotonic saline.)

A series of organ-specific CINTICHEM Agents incorporates optimum current formulations for organ specificity. Each kit contains 10 unit-dose vials. (Kits containing five multidose vials are also available.) Each kit is single step. Requires only the addition of technetium to produce the imaging agent. And the CINTICHEM Dispenser performs this step automatically.

Kits currently available include: DTPA (diethylene triamine pentaacetic acid [calcium trisodium salt]). For brain and kidney imaging, and glomerular filtration rate (GFR) studies. Unit dose contains 3.3 mg $CaNa_3$ DTPA, 0.17 mg $SnCl_2$-$2H_2O$, pH adjusted to 4 with HCl. HEDSPA (1-hydroxy-ethylidene-1,1 disodium phosphonate). For bone imaging. Unit dose contains 0.75 mg HEDSPA, 0.08 mg stannous ion as tartrate, pH adjusted to 4 with HCl. MAA (macroaggregated albumin). For lung perfusion studies. Unit dose contains 0.11 mg MAA ($0.3\text{-}1.3 \times 10^6$ particles), 0.09 mg stannous tartrate, isotonic saline. HCl and NaOH may be present for pH adjustment. Additional radiopharmaceuticals will also be offered.

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Indications: Ionic Indium Chloride In 113m eluted from the NEN Indium In 113m Generator may be used directly as a blood pool imaging agent or as the radioactive label in the synthesis of other Indium In 113m radiopharmaceuticals.

Contraindications: Radiopharmaceuticals containing Indium In 113m should not be used in patients with a history of allergy to such agents.

Warnings: Indium Chloride In 113m 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.

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

Precautions: In order to assure the sterility and non-pyrogenicity of the eluate, the Generator must be eluted according to the operating instructions. It is essential that the user adhere to strict aseptic procedure. The eluate should be crystal clear and any eluate appearing hazy or containing particulate material should not be used. Testing of the eluate for tin breakthrough and zirconium breakthrough should be performed after each elution. Periodic recertification of the sterility of the eluate is recommended beginning two (2) weeks after the calibration date.

Indium Chloride In 113m is eluted in acid solution. Therefore, slow intravenous injection over at least 30 seconds of no more than 1.0cc is advised. Indium In 113m remains in solution at a pH below 3.0; raising the pH above that level results in the formation of a colloidal hydroxide.

Each patient dose should be determined by a suitable radioactivity calibration system immediately prior to administration.

Adverse Reactions: To date, no adverse reactions based on the use of this agent have been reported. However, several reports have been published documenting the occurrence of transient hypotensive episodes after prolonged patient recumbency for placental imaging. This is probably due to physiologic compression of the inferior vena cava by pelvic contents and has been completely reversible spontaneously without the necessity for pharmacologic intervention.

Dosage and Administration: Ionic Indium Chloride In 113m is administered intravenously for blood pool imaging. The suggested dose for the average 70 kg patient is 0.5-4.0mCi and imaging can be performed within minutes after injection.

Indium Chloride In 113m can also be incorporated into radiopharmaceuticals according to procedures determined and approved by each user institution to assure sterility and non-pyrogenicity of the final product.

How Supplied: The NEN Indium In 113m Generator is available with column loadings of 5mCi to 100mCi of Tin Sn 113 on the day of calibration, yielding sterile, non-pyrogenic In 113m as the chloride upon elution. Expiration date is 6 months after calibration.

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Telephone 617-667-9531
Los Angeles: 213-321-3311 Miami: 305-592-0702

Canada: NEN Canada Ltd., Lachine, Quebec, H7T 3C9, Tel: 514-636-4971, Telex: 05-821808
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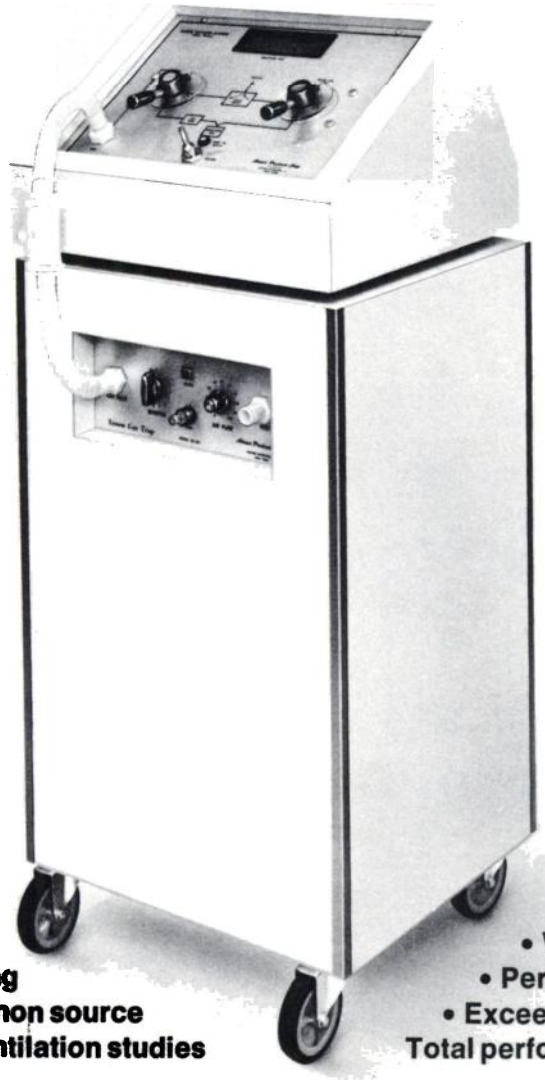

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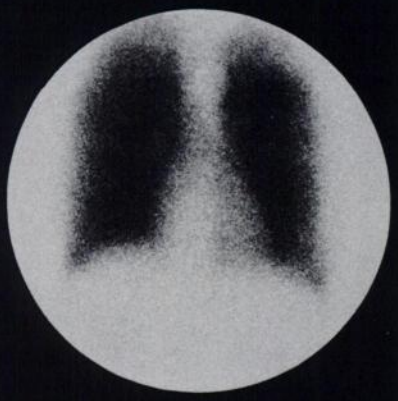
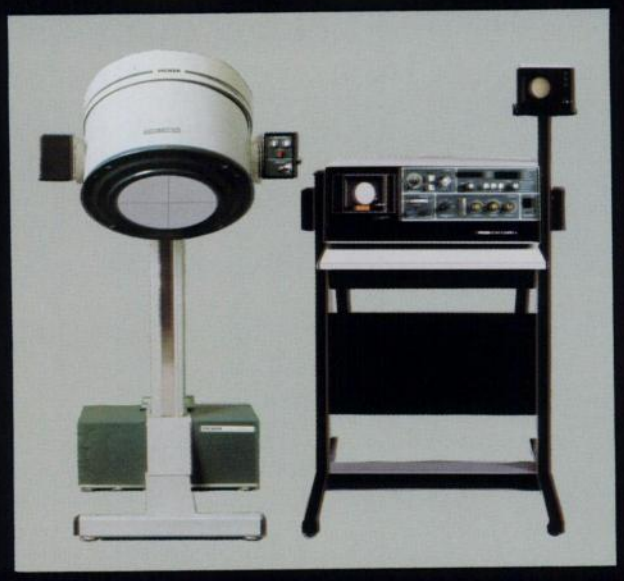


Lung View, Anterior



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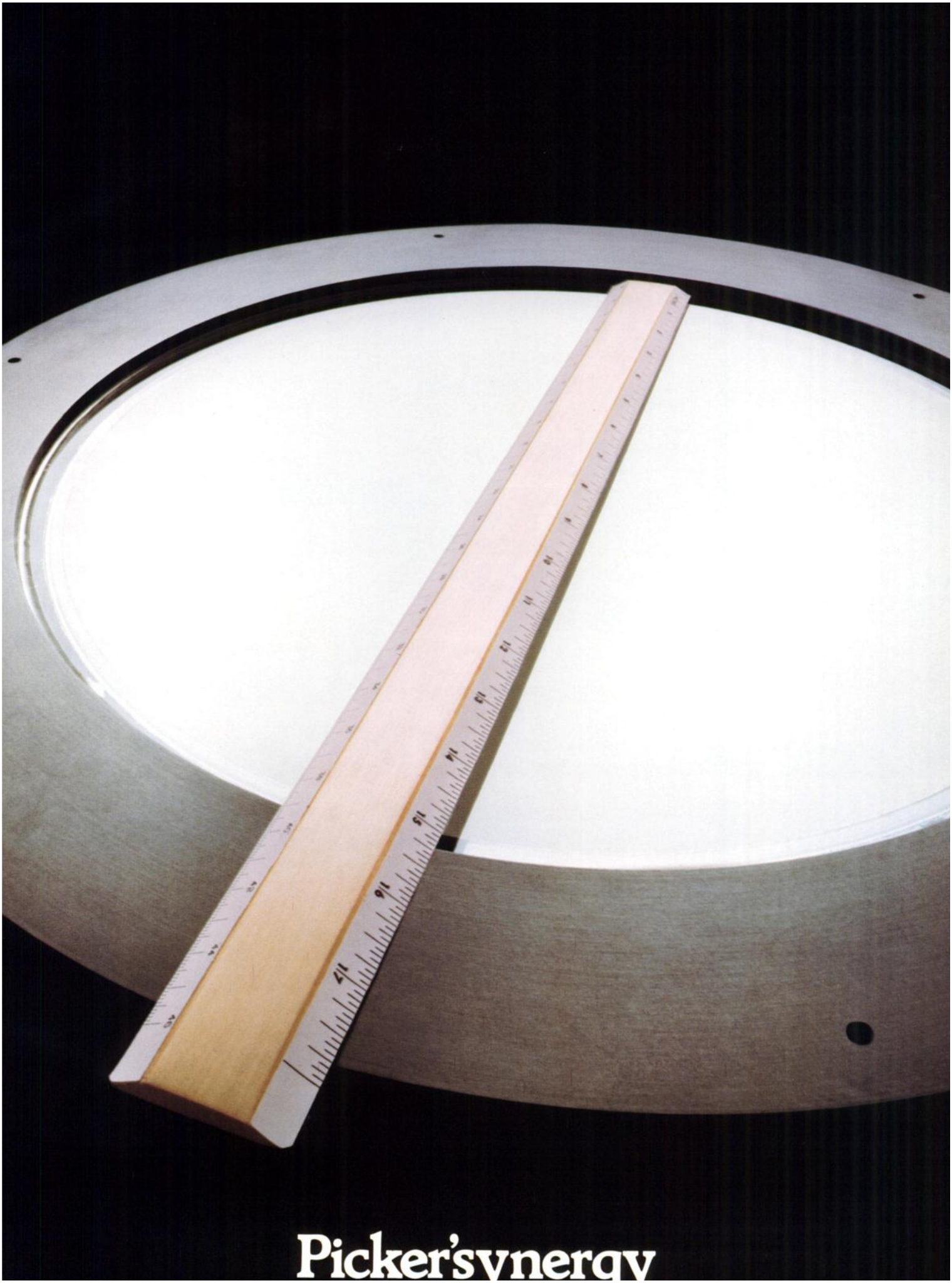
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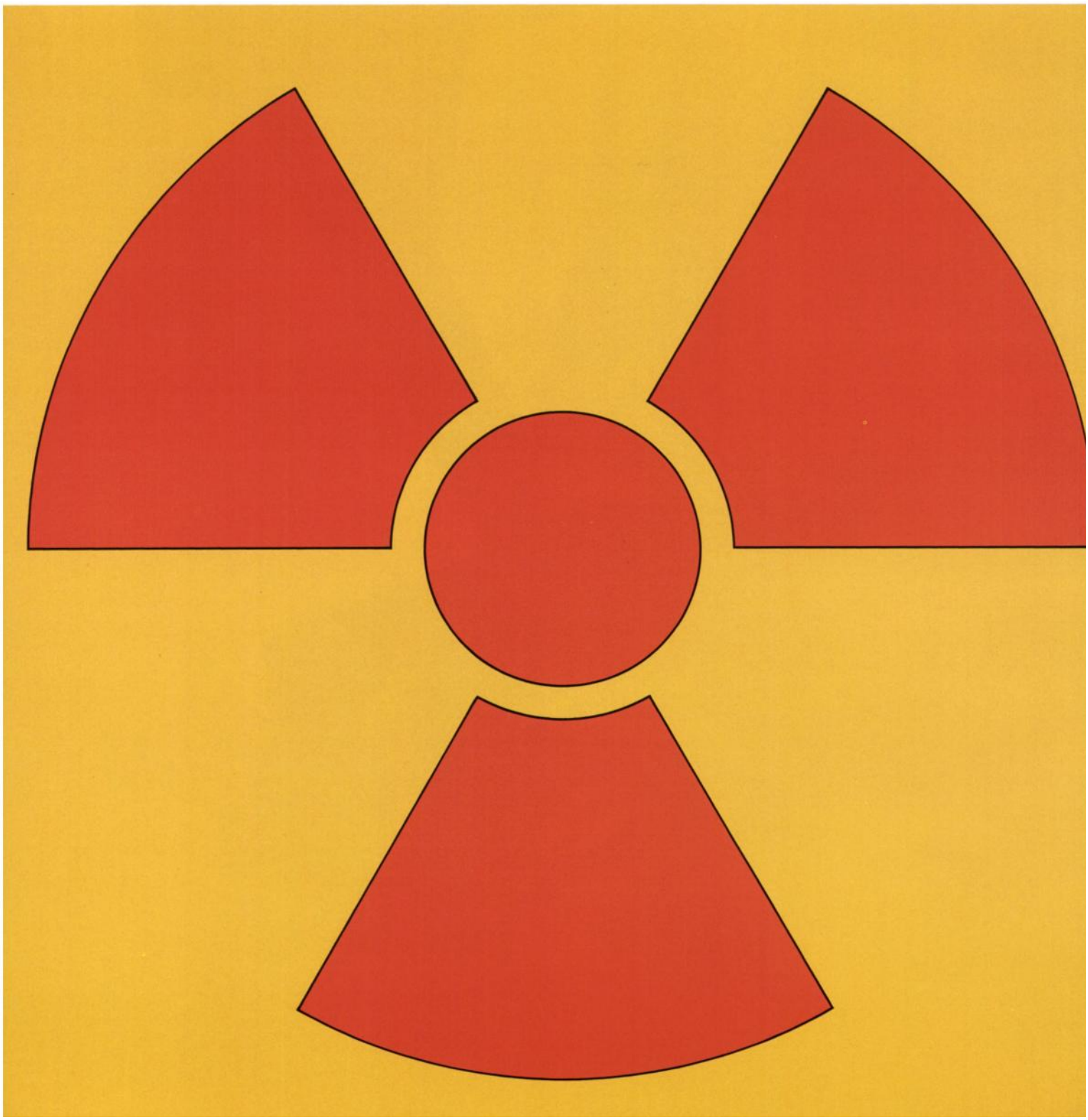

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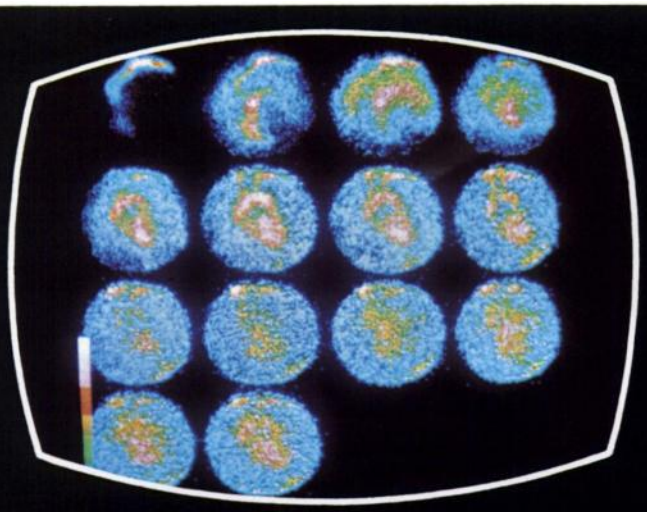
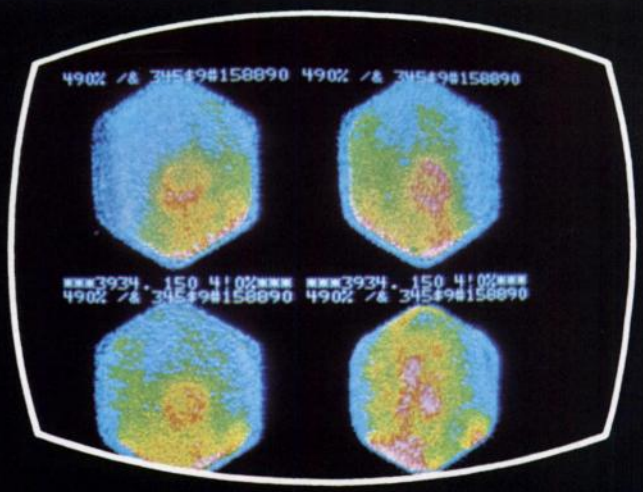


1. Nuclear angiocardiogram. A series of frames showing the passage of a bolus of technetium-99m albumin through the heart. The patient is in a left anterior oblique position.

Image courtesy of The Johns Hopkins Medical Institutions
Baltimore, Maryland



2. Left anterior oblique view in upper left and lower left. Anterior view in upper right. All three are thallium-201 views of a patient with a myocardial infarction. The lower right is the technetium-99m albumin blood pool study in the same patient. The gated blood pool study showed an area of akinesis that corresponded to the area of diminished thallium-201 uptake.

Image courtesy of The Johns Hopkins Medical Institutions
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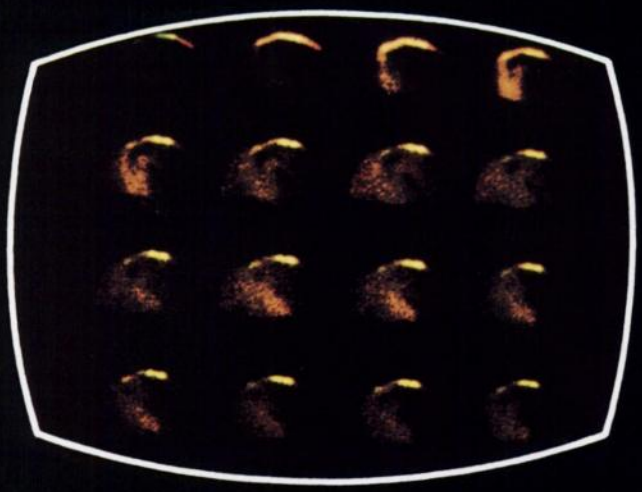

3. Angiogram – anterior view. The outline of the heart is shown as a green background. The dynamic study is superimposed on it in red, showing the passage of the bolus in the right heart, lungs, left heart.

Image courtesy of University of Illinois
at the Medical Center
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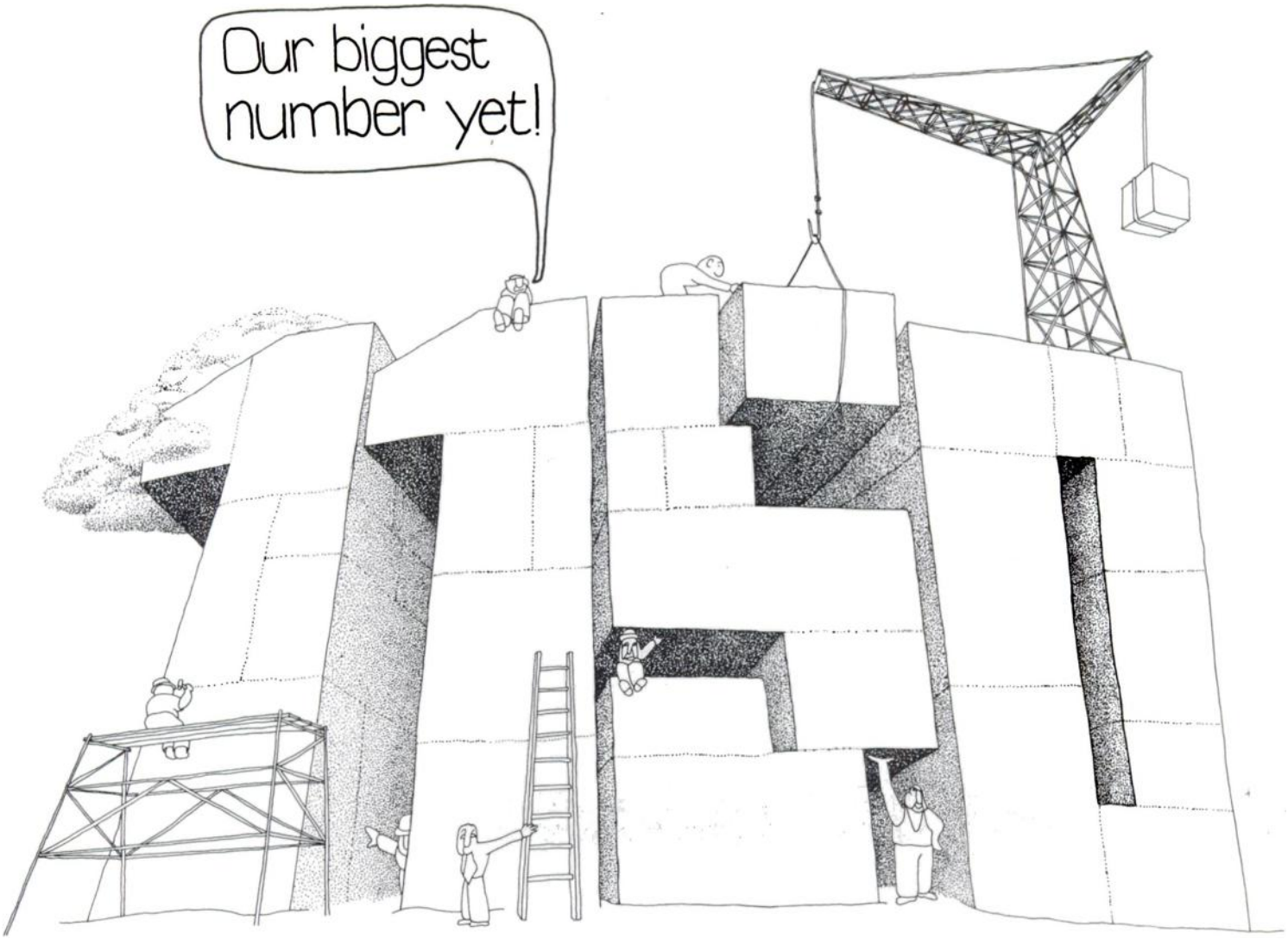

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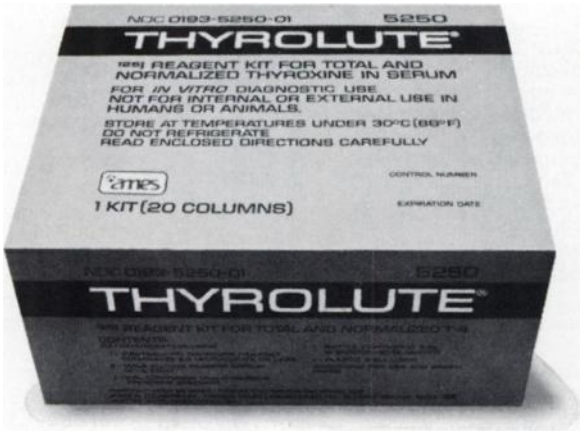

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"This is the second edition of CLINICAL SCINTILLATION SCANNING, which was published in 1969. The change in title is a reflection of the advances that have occurred in the field of nuclear medicine during the past six years. The book is composed of 18 chapters written by 31 contributors. The authors are all well recognized experts in their fields and have combined their talents to produce what is undoubtedly the best current text in the area of radionuclide imaging.

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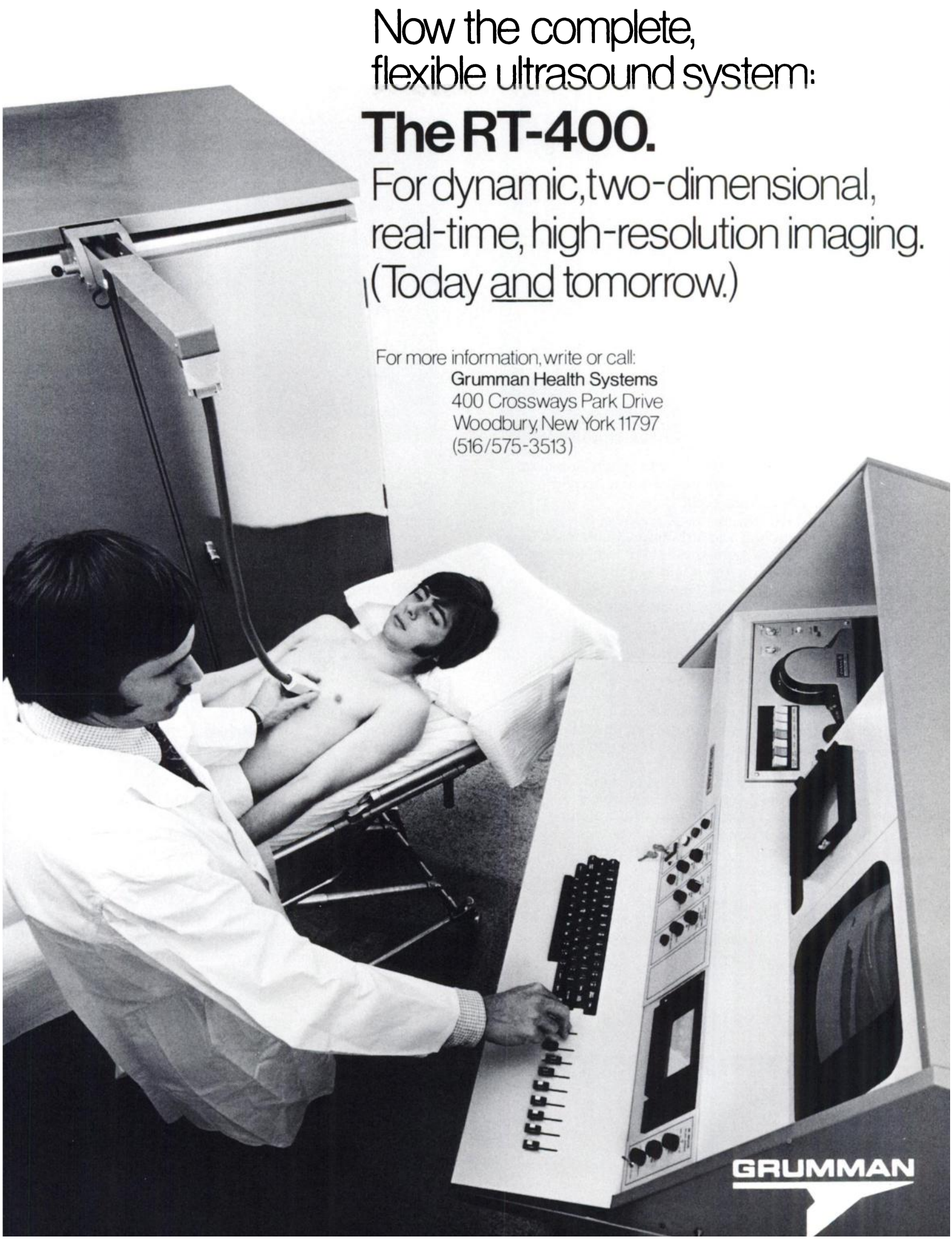
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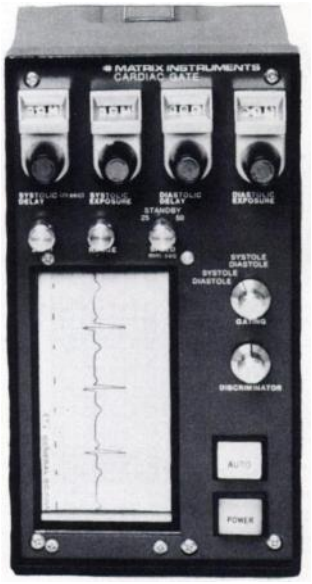

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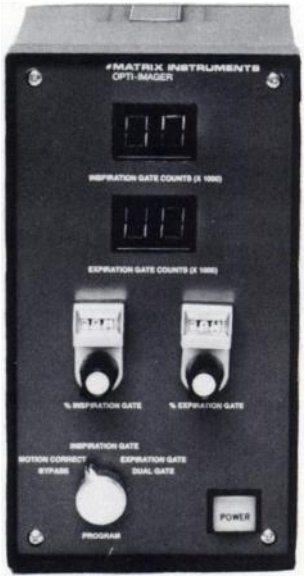

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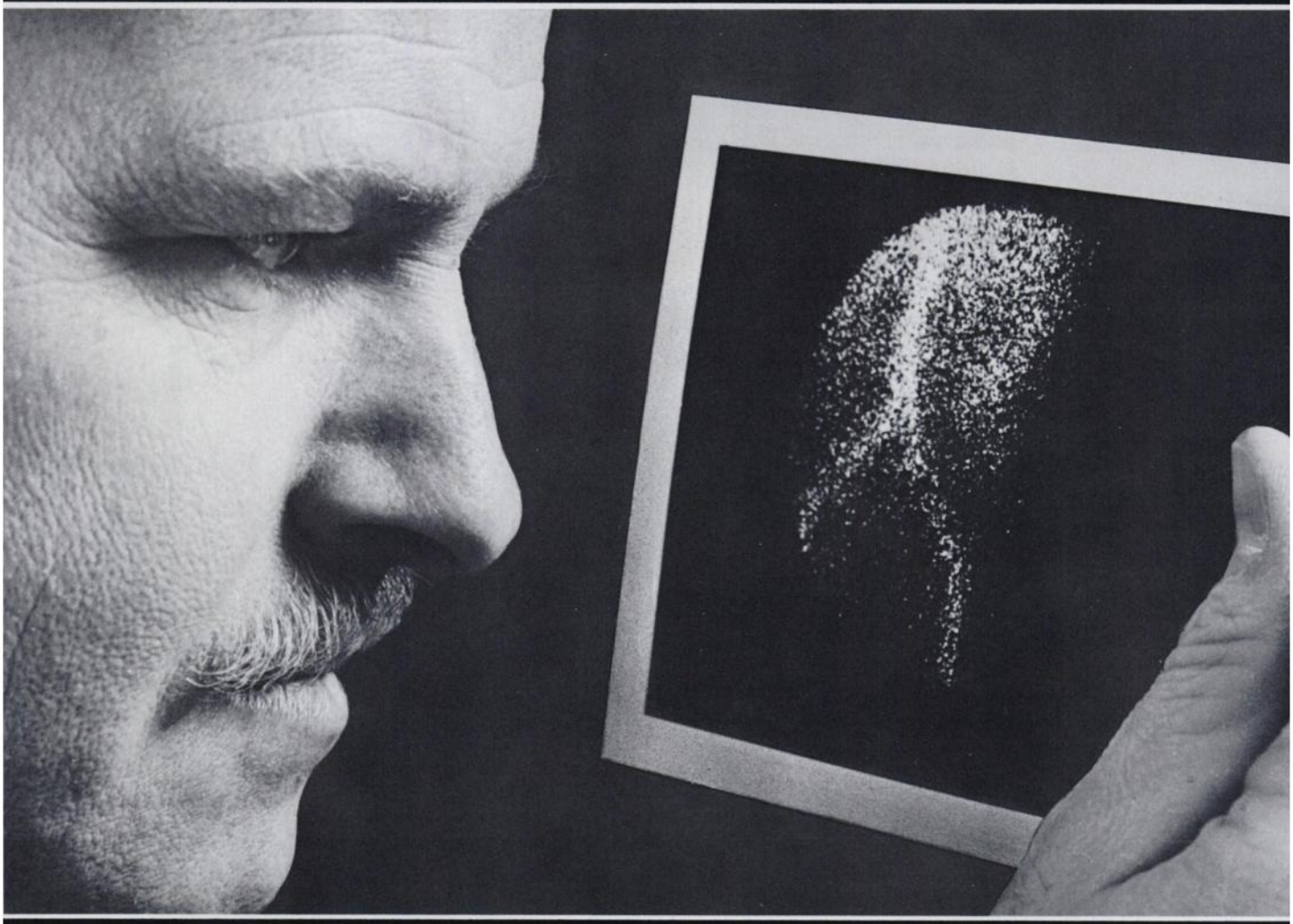

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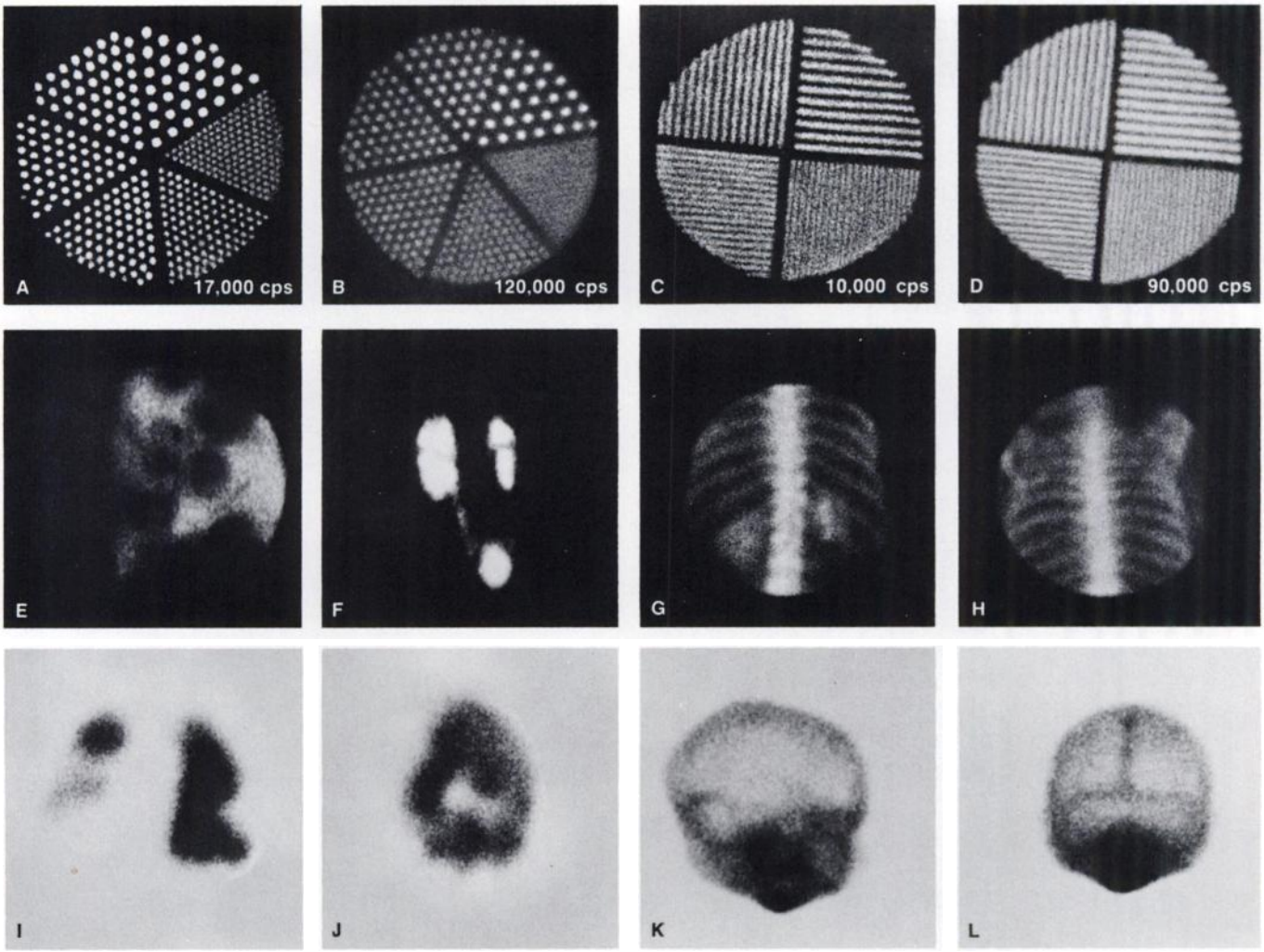

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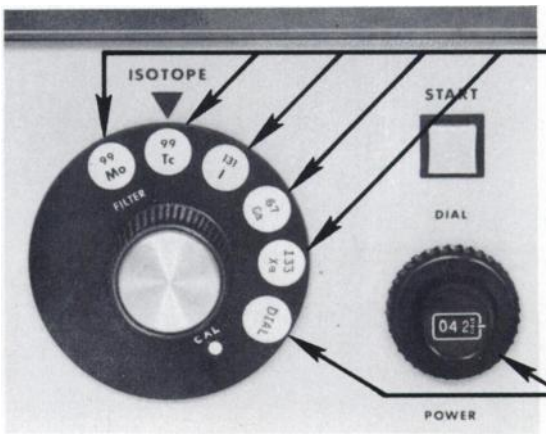

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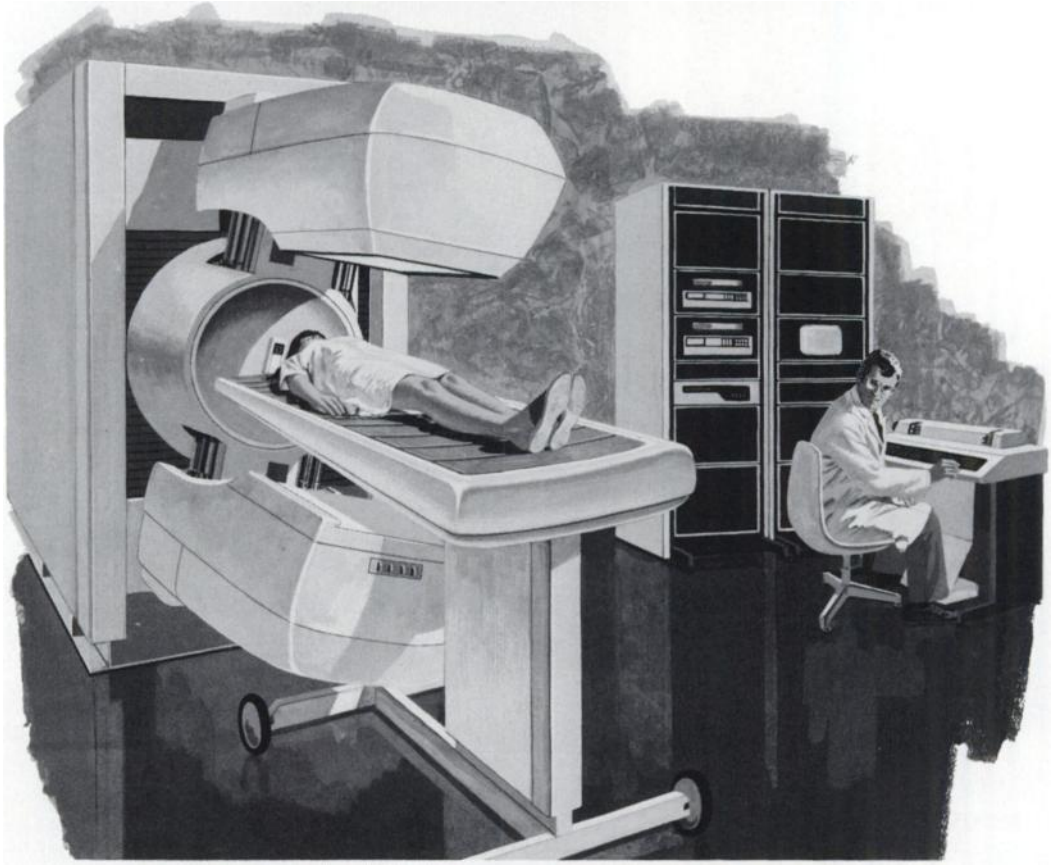

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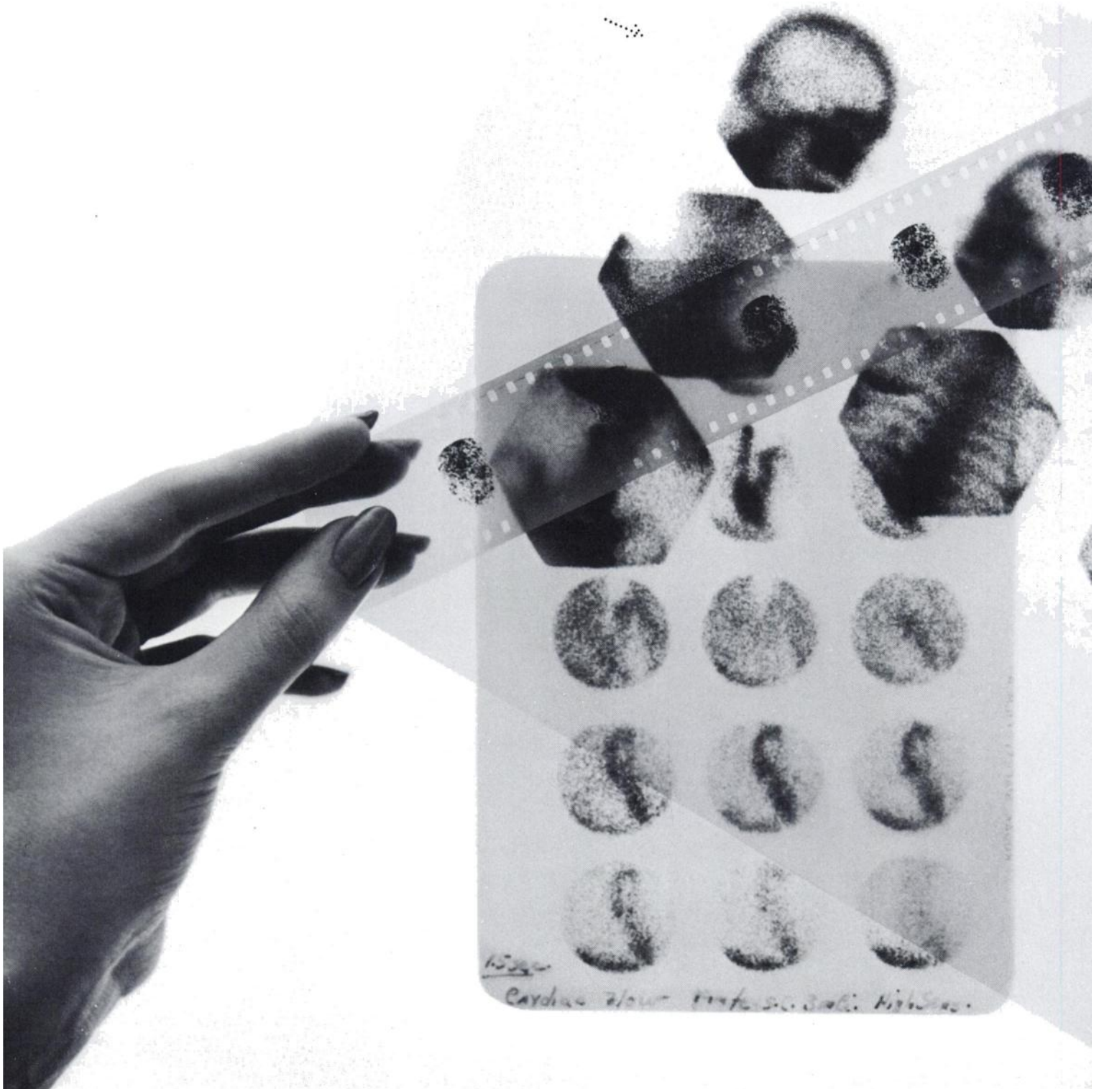

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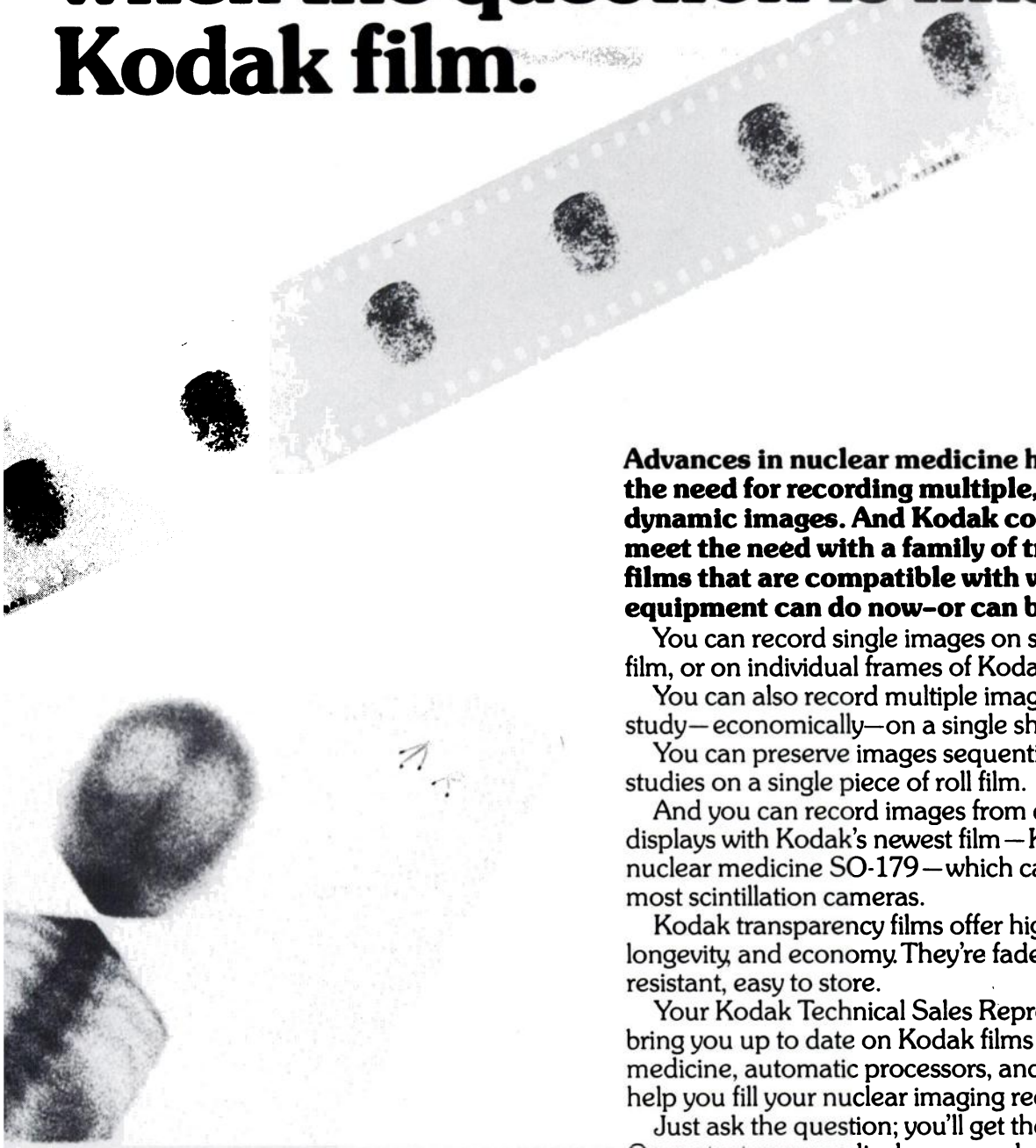

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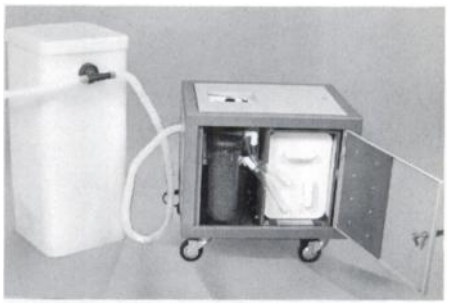

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1. Obrist, W. D. et al, "Determination of Regional Cerebral Blood Flow by Inhalation of Xenon-133", Circulation Research, XX, 124-134, January 1967.

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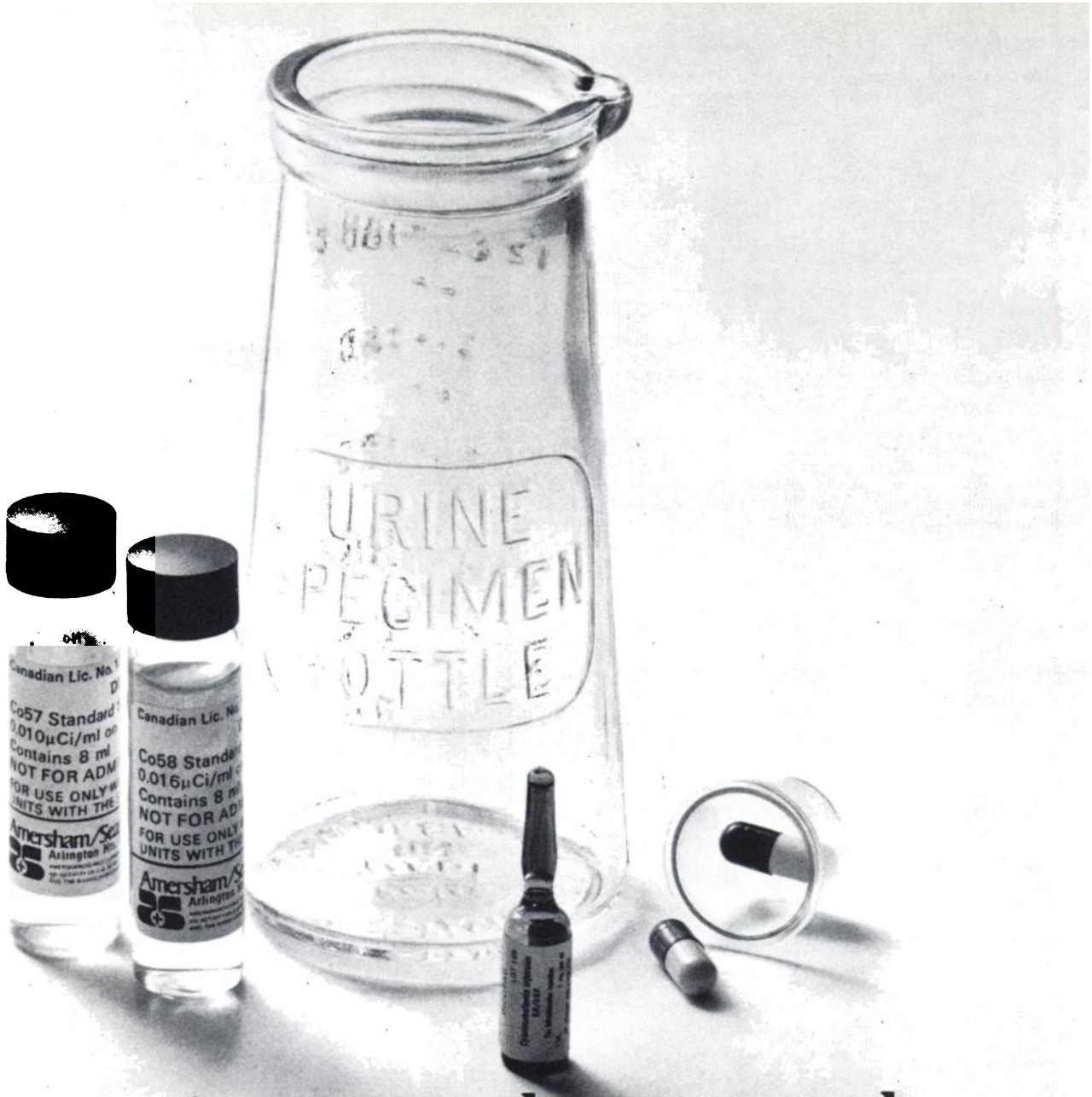

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DESCRIPTION: Each Dicopac® Kit consists of five single-test cylinders, a vial of Cobalt 57 (Co 57) standard, and a vial of Cobalt 58 (Co 58) standard. Each test cylinder contains a capsule of cyanocobalamin Co 58 (vitamin B_{12} Co 58), a capsule of 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.

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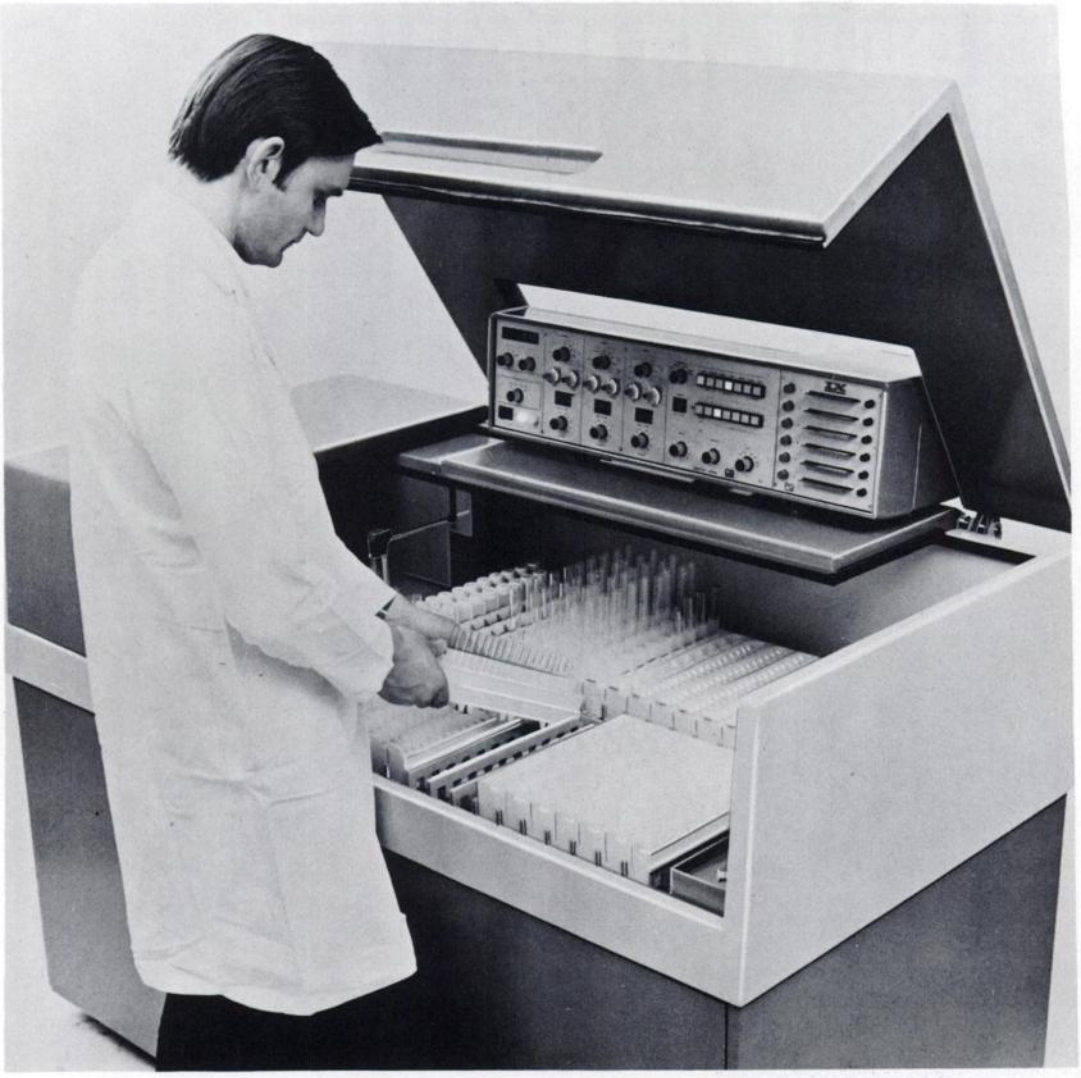

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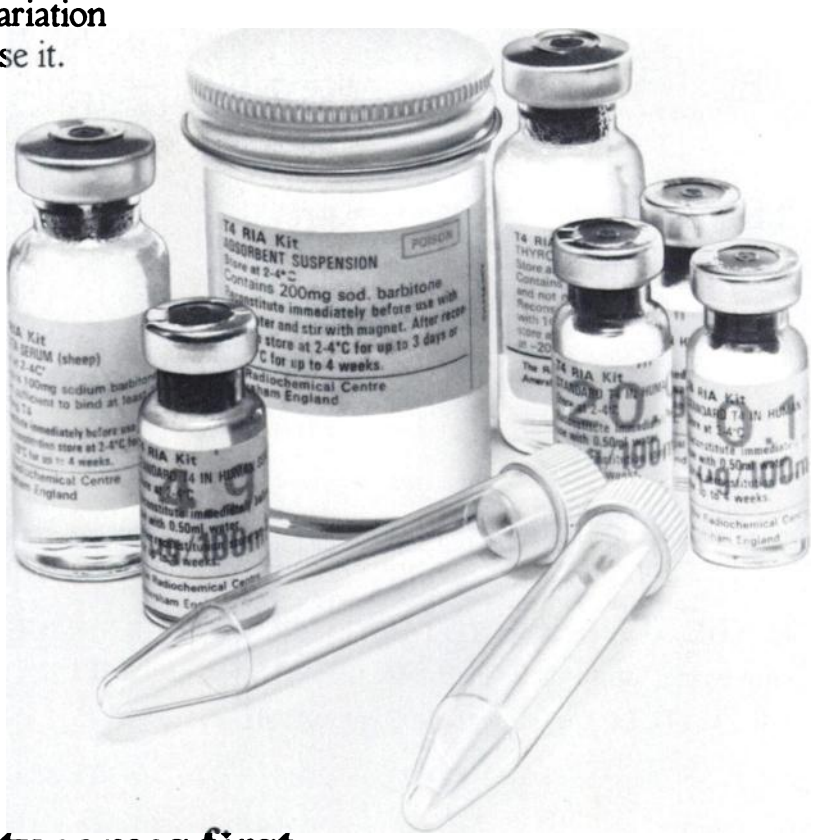

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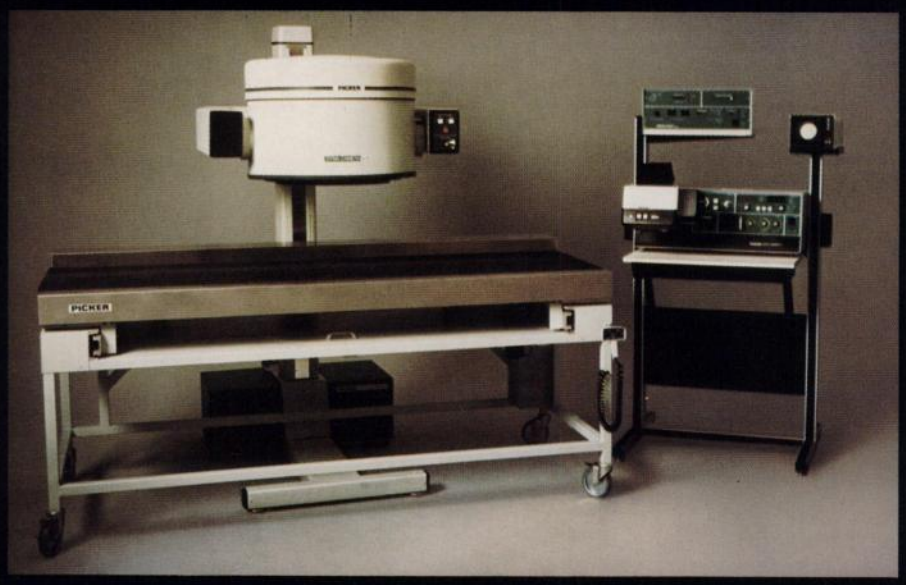

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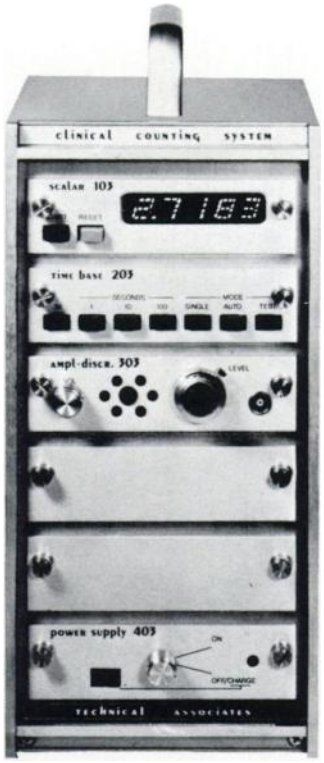

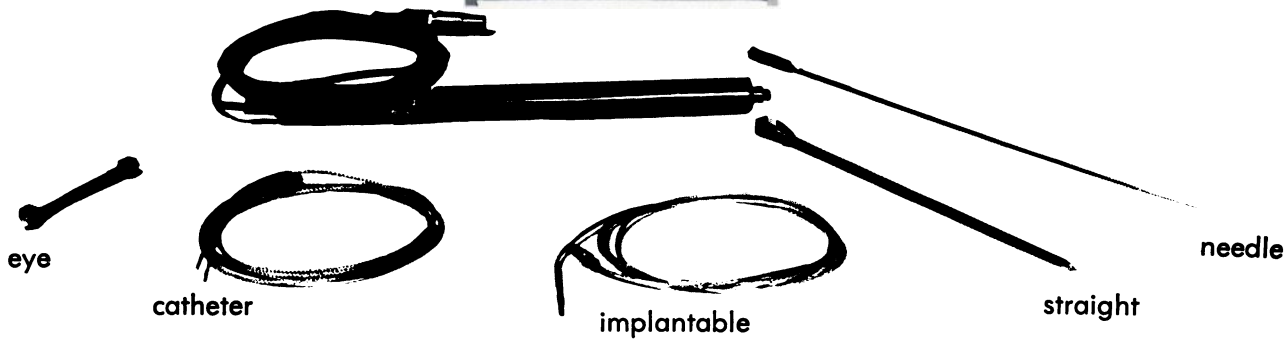

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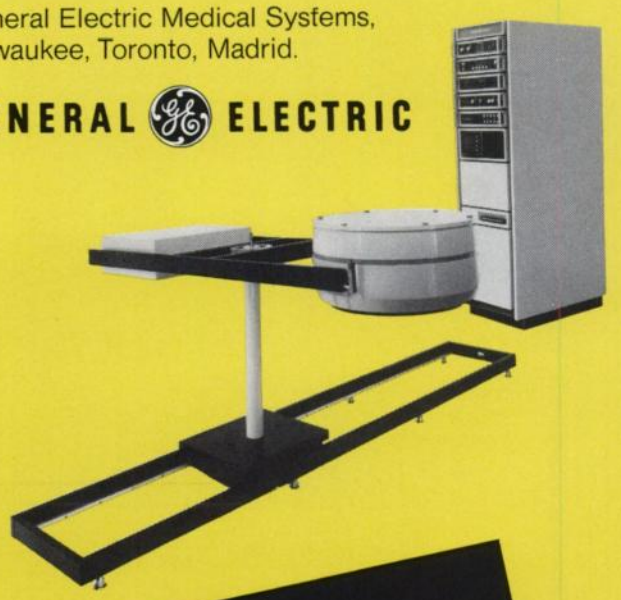

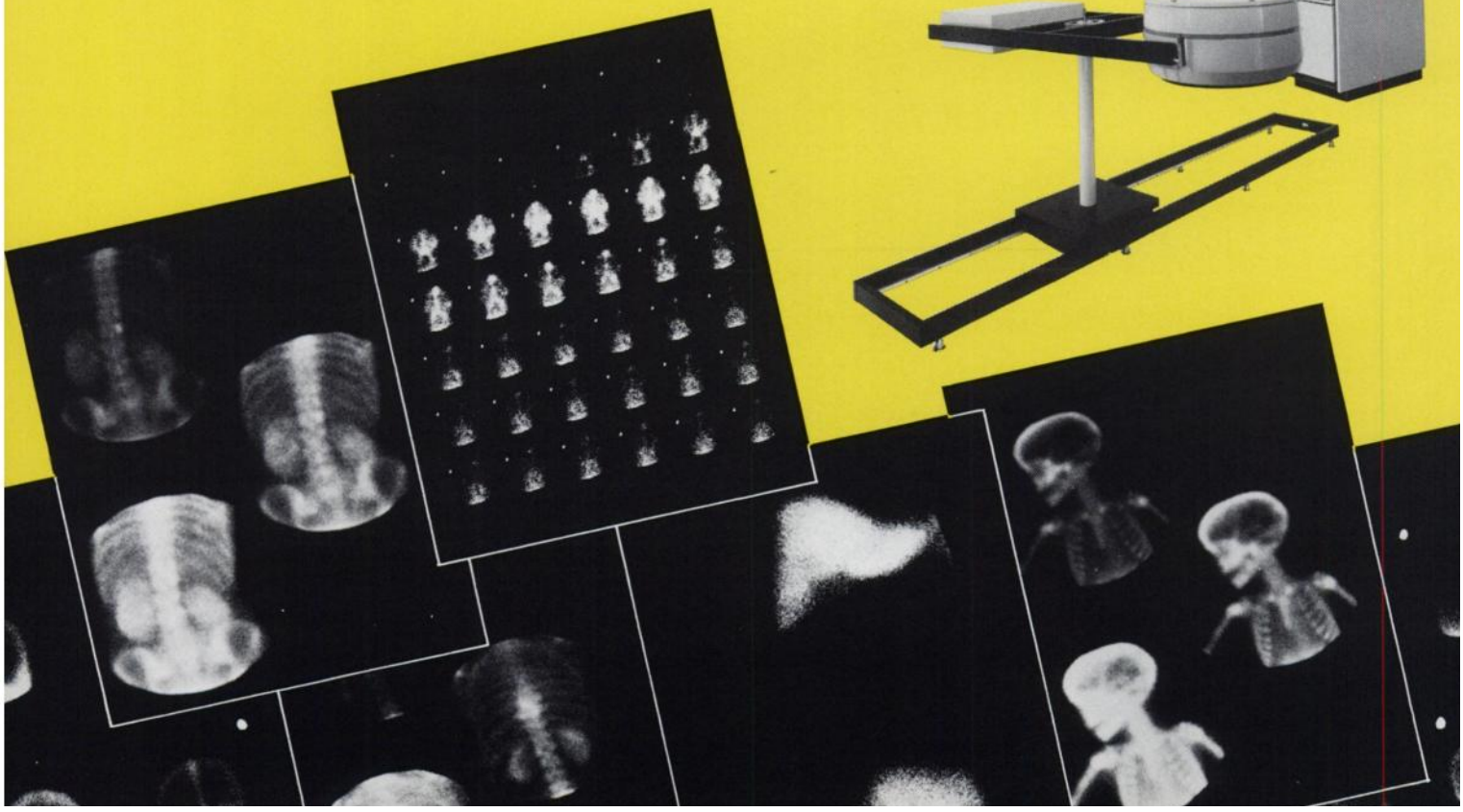

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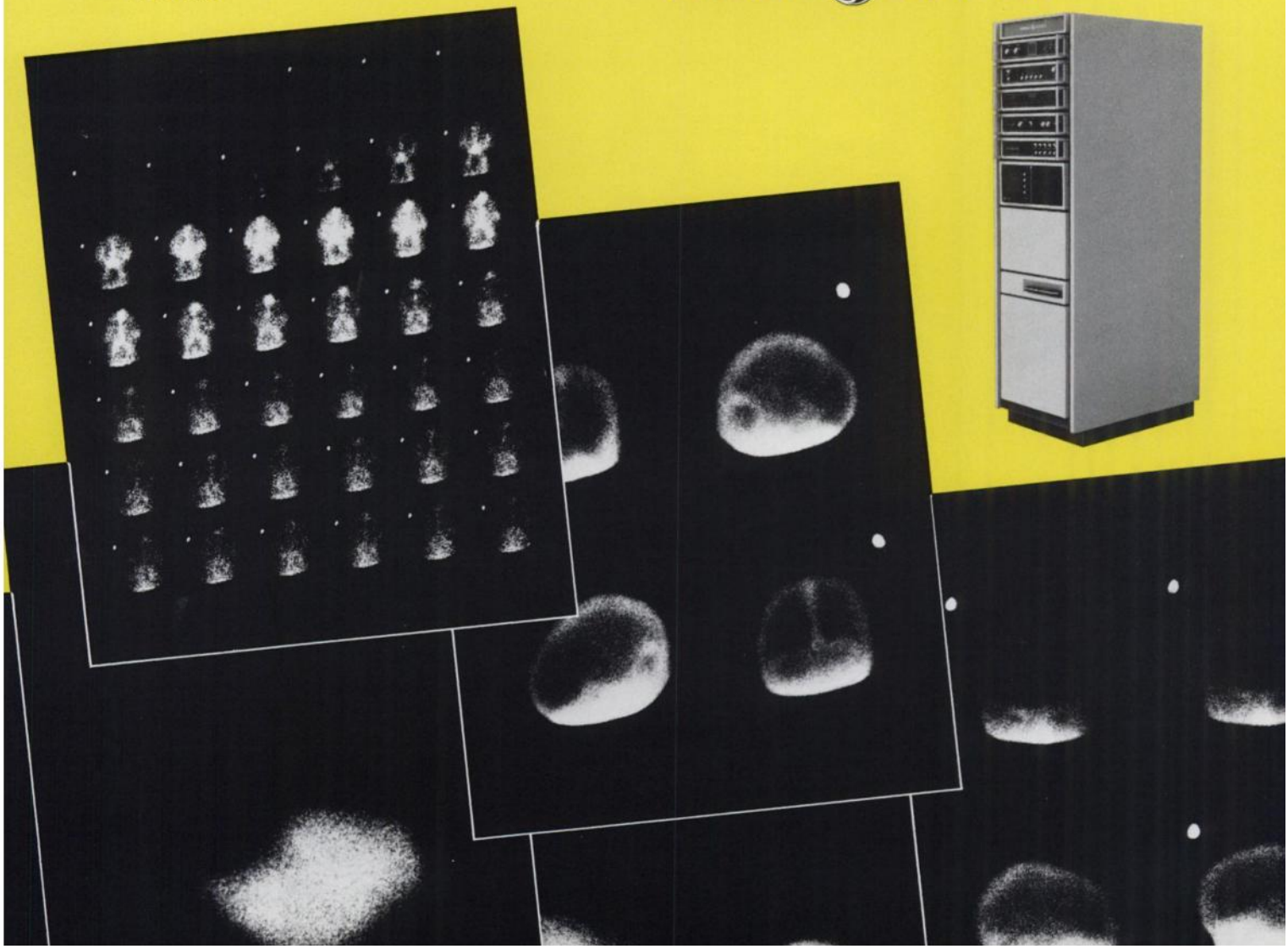

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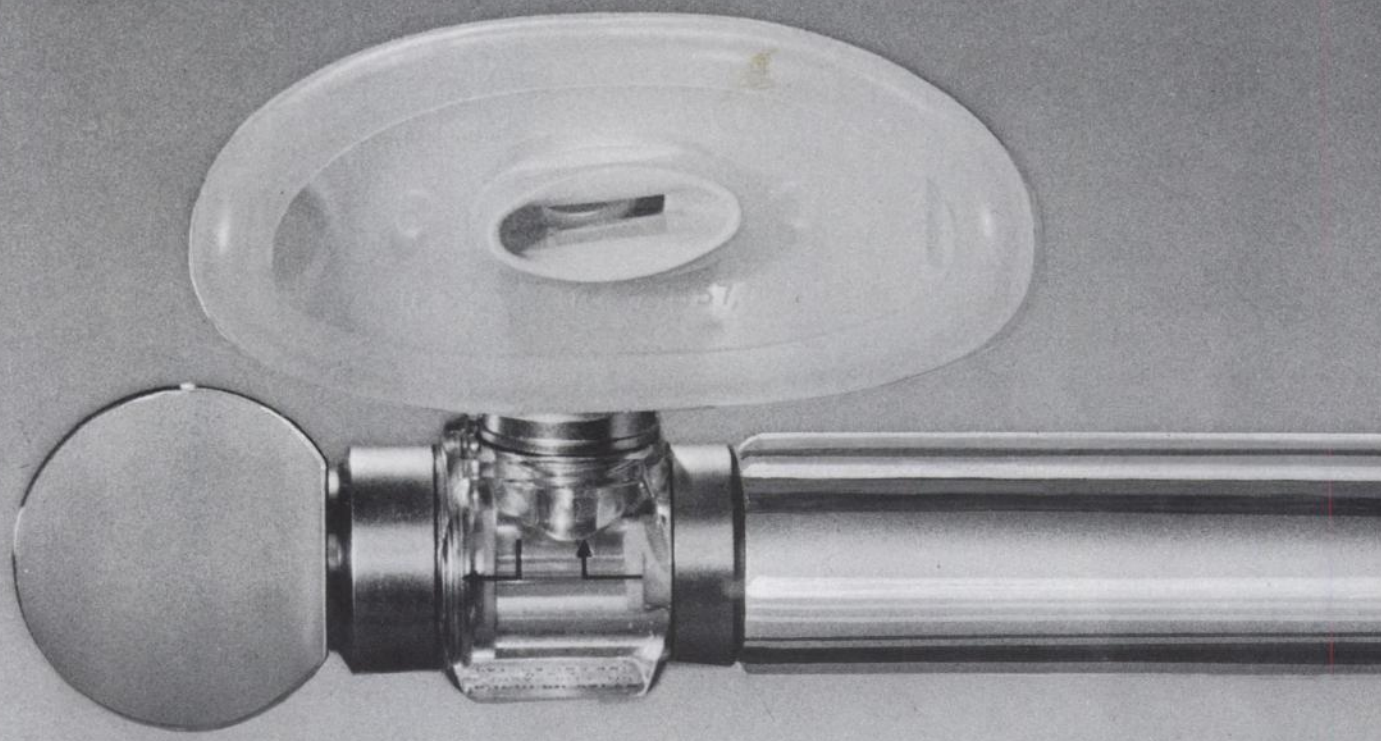

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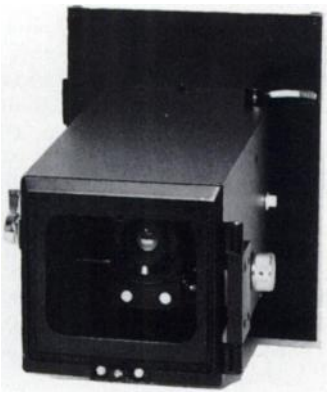

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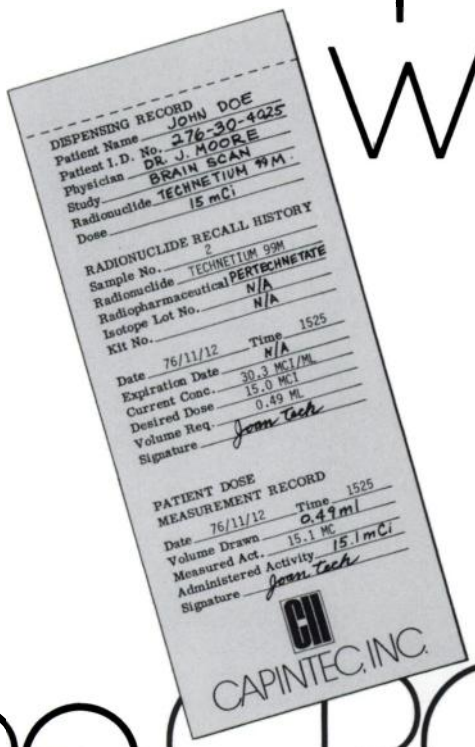

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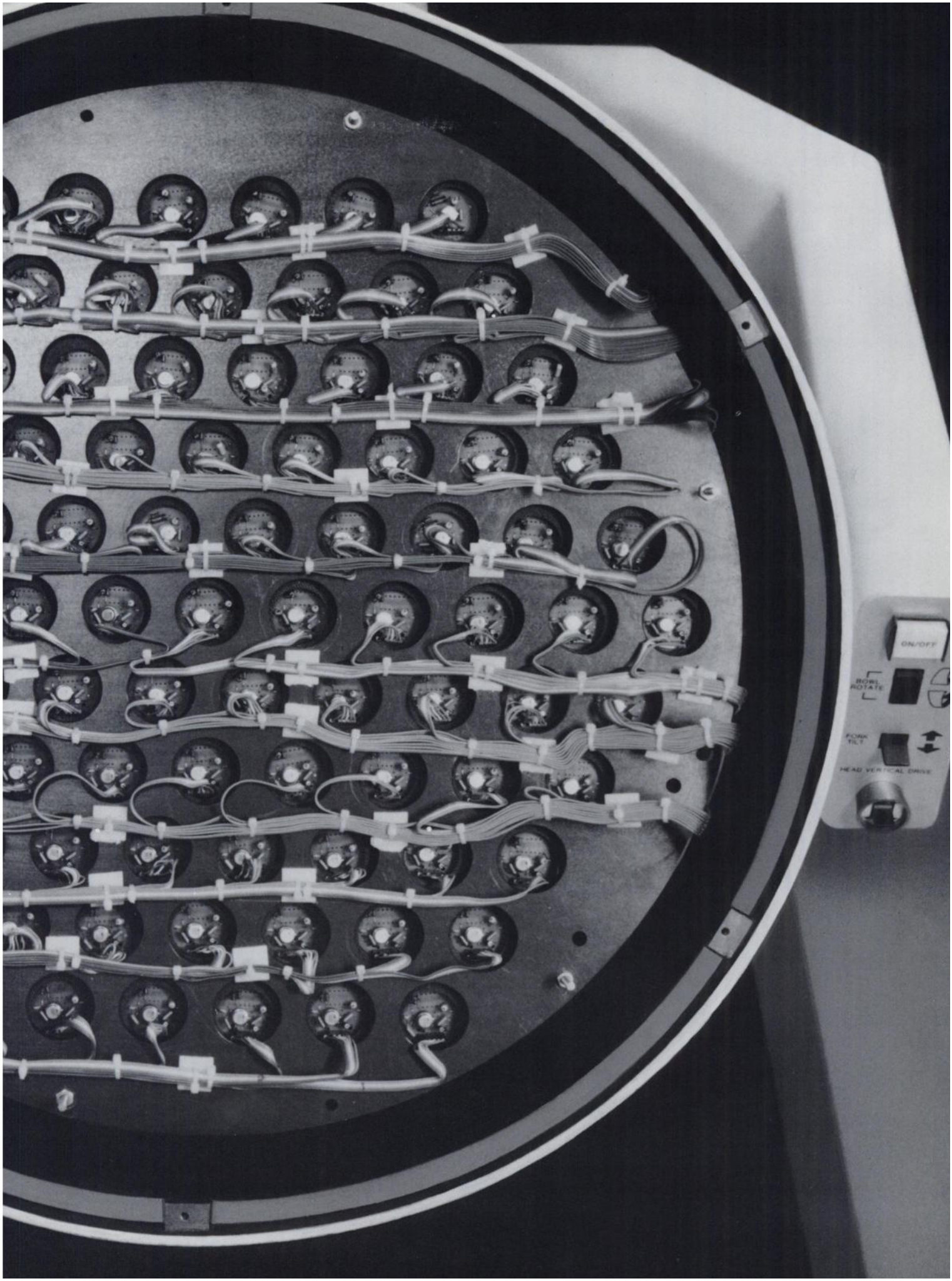
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POST-GRADUATE DESIRES TO JOIN Nuclear Medicine Department or training center in USA as staff technologist or student. Willing to join as Doctoral student in development of radiopharmaceuticals, clinical imaging or radioimmunoassays. Experience in radioisotopes, scanning and thyroid work; blood collection, intravenous injections and clinical biochemistry. (Papers published) Reply to Box 606, Society of Nuclear Medicine, 475 Park Ave., South, New York, N.Y. 10016.

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 607, Society of Nuclear Medicine, 475 Park Ave. South, New York, N.Y. 10016.

Topics in Nuclear Medicine. The Eighth Annual Seminar in Nuclear Medicine will be held at Colby College and the Mid-Maine Medical Center in Waterville, Maine, August 16–20, 1976. Thirty hours of mini-symposia along with lectures, workshops, and interesting cases will be presented by Drs. Henry N. Wagner, Leonard Rosenthal, Steven M. Larson, Thomas G. Mitchell, H. William Strauss, and Mr. James Langan. Accredited Category I, AMA's Physician Recognition Award.

For further information, contact **Dr. Robert Kany, Director of Special Programs, Colby College, Waterville, Maine 04901.**

The GE commitment to nuclear medicine: complete equipment, software and service.

GE: new ideas solve nuclear needs.

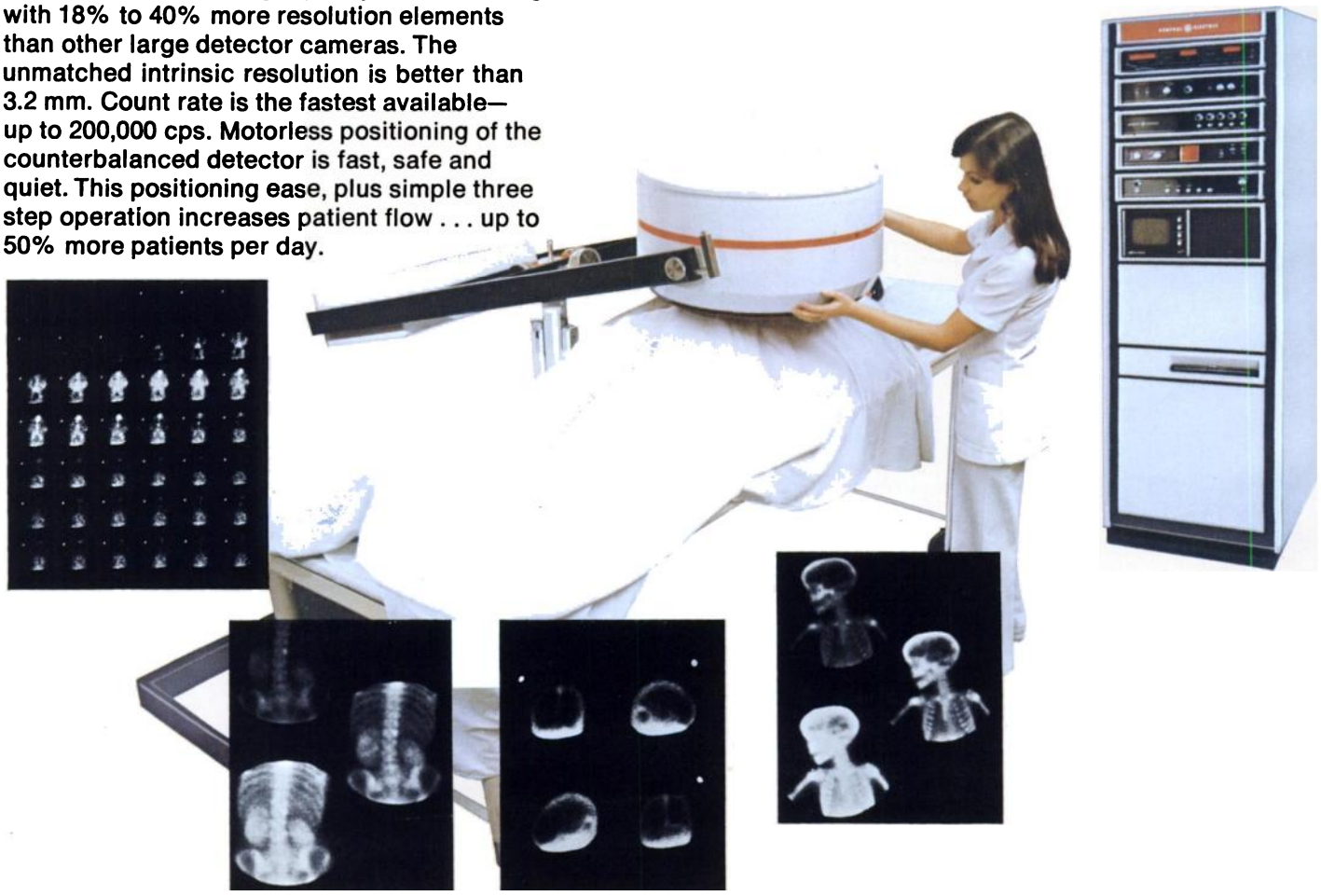
Innovative systems are needed to meet the many needs of today's nuclear departments. That's why GE has combined new product ideas with proven concepts to provide the latest in nuclear capability.

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 units 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.

Nuclear parts and service in 8 hours or less.

When your nuclear equipment needs service, GE will provide parts and professionals . . . fast. Our highly trained nuclear service specialists are strategically located throughout the country. One is located near you, for fast response. And General Electric has developed a new computerized parts inventory system. This new service links over 30 GE parts depots nationwide, and keeps them fully stocked at all times. You receive parts from the nearest depot, usually within 8 hours. Transportation costs are minimized, and your nuclear equipment is back serving patients sooner.

Unmatched equipment; the latest diagnostic software; and prompt, reliable service: that's the GE commitment to nuclear medicine. Find out how that commitment can benefit your department. Talk to your GE representative about the systems shown here and our full line of nuclear equipment.

General Electric Medical Systems,
Milwaukee, Toronto, Madrid.

GE: for the newest in nuclear.

GENERAL ELECTRIC

YOU BE THE JUDGE

EXAMINE THE EVIDENCE

EXHIBIT "B"

COLLEGE OF AMERICAN PATHOLOGISTS
1975 LABORATORY SET Y-A
ADVANCED RADIORECEPTOR ASSAY

Constituent/Method	No. Labs	Mean	S.D.	C.V.	Median	Low Value	High Value
HUMAN THYROID STIMULATING HORMONE - uU/ml				Specimen Y-1			
Beckman	36	2.94	0.53	18.1	3.0	1.6	5.0
Bio-RIA	2	6.45	1.25	19.4		5.2	7.7
Nuclear Medical Systems	3	2.53	0.13	4.9	2.5	2.4	2.7
Pantex	1	3.60					
Pharmacia	12	1.97	0.88	44.5	2.0	0.0	3.0
Serono	1	2.90					
Other, Not Listed	9	4.52	2.26	50.0	4.5	1.6	9.3
All Methods	64	3.15	1.37	43.6	2.8	0.0	9.3

EXHIBIT "A"

Constituent/Method & System	No. Labs	Mean	S.D.	C.V.	Mean	S.D.	C.V.
THYROXINE - mcg/dl - With Extraction		Specimen C-11			Specimen C-12		
Murphy-Pattee	26	9.17	1.81	19.7	9.77	2.15	22.0
Tetrasorb (Abbott)	138	9.21	1.19	12.9	9.38	1.12	11.9
Res-O-Mat T-4 (Mallinckrodt)	169	10.64	1.41	13.2	11.05	1.29	11.7
Tetra-Tab (Nuclear Medical Laboratories)	307	8.73	.91	10.4	8.95	.92	10.3
Tetralute (Ames)	113	8.13	1.05	12.9	8.58	1.00	11.7
Tetra Count T-r (Bio Rad)	65	9.00	.76	8.5	9.30	.74	8.0
Thyrostat-4 (Squibb)	23	9.43	2.83	30.0	9.73	3.26	33.6
T-4 RIA (Nuclear Medical Systems) (without extraction)	24	8.85	.72	8.1	9.17	.76	8.3
All Methods	953	9.23	1.47	15.9	9.55	1.51	15.8
Number of "Outliers" Excluded	11	1.2%			11	1.2%	

OWEST C.V.'s

ghest Qualities RIA Systems & Components

AILABLE: T_3, T_3u, T_4, TBG, TSH, Estriol-I^{125}, E_2, E_1, Gentamicin-I^{125}, Tobramycin-I^{125} & others.
Multi-level RIA Controls — each vial has over 30 constituents (peptides, steroids, drugs, CEA) rigorously analyzed by RIA.

For Technical Information Call: Dr. V. Tuli

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We make eleven kits now, and there are more on the way.

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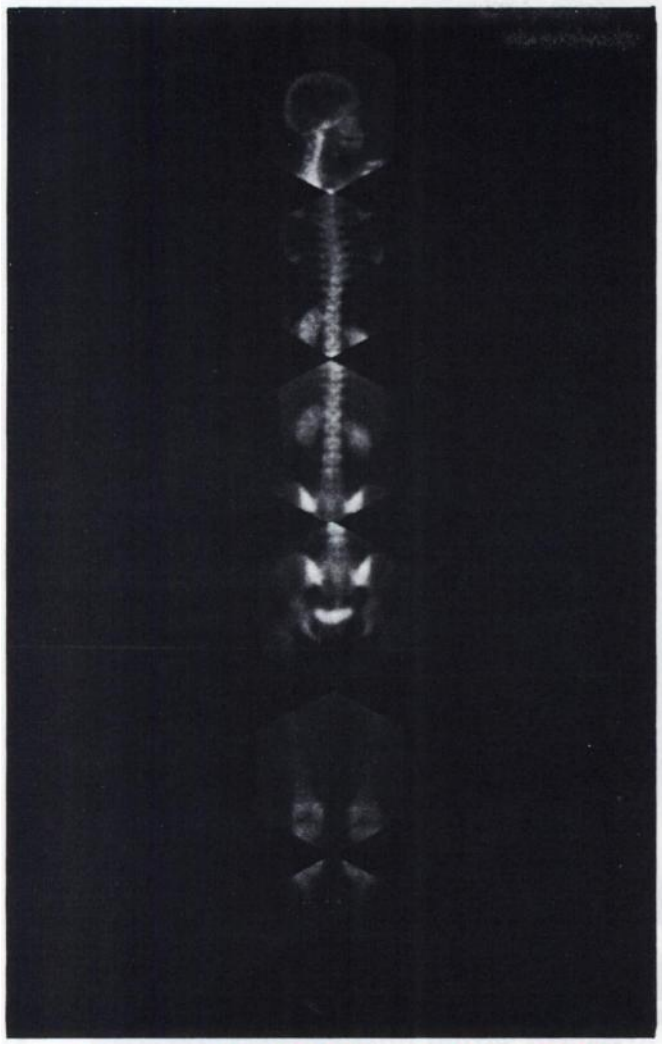
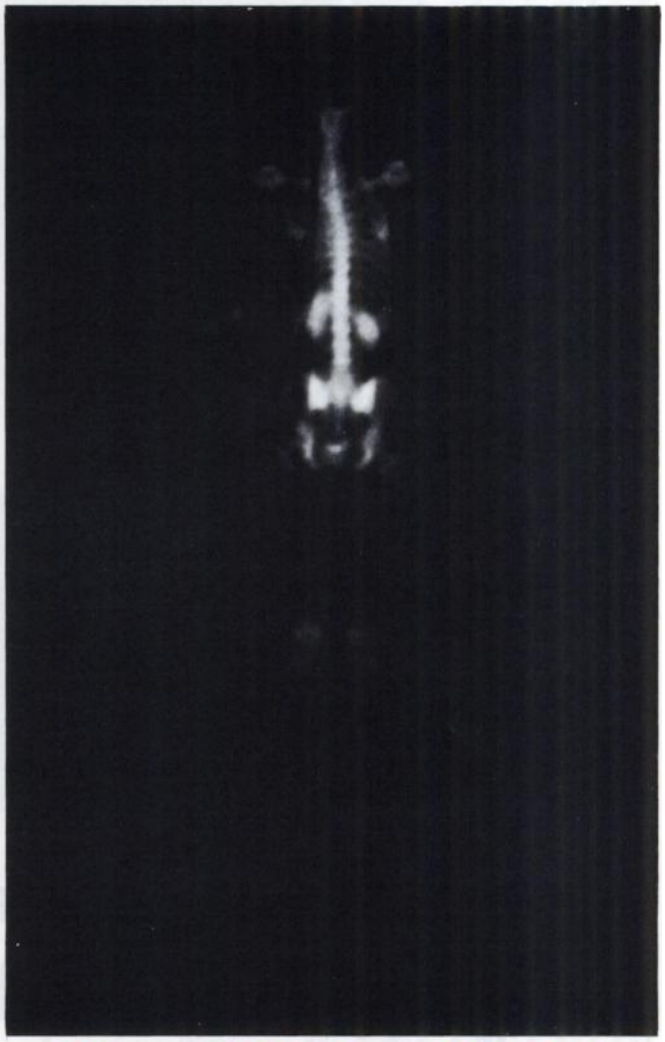
An Unbiased Comparison





Our Wide Field

Study performed with Ohio-Nuclear Series 110 Wide Field Radioisotope Camera.

Our Wide Field

Study performed with Ohio-Nuclear Series 110 Wide Field Radioisotope Camera equipped with Series 110-8 AreaScan.

35 year old female: normal scan
Study was performed in supine position with posterior view taken from beneath the table
Collimator: medium resolution (Model 14W11013)
Centerline: 140 keV
Window: 20%
Isotope: 20mCi ^{99m}Tc Pyrophosphate
Time Begun: 4 hours post dose

Composite View
700,000 counts per view except legs were 100,000 counts per view
Total Scan Time: 30 minutes (included positioning)

AreaScan

Total Scan Time: 12.2 minutes

ohio-nuclear, inc.
A subsidiary of Technicare Corporation
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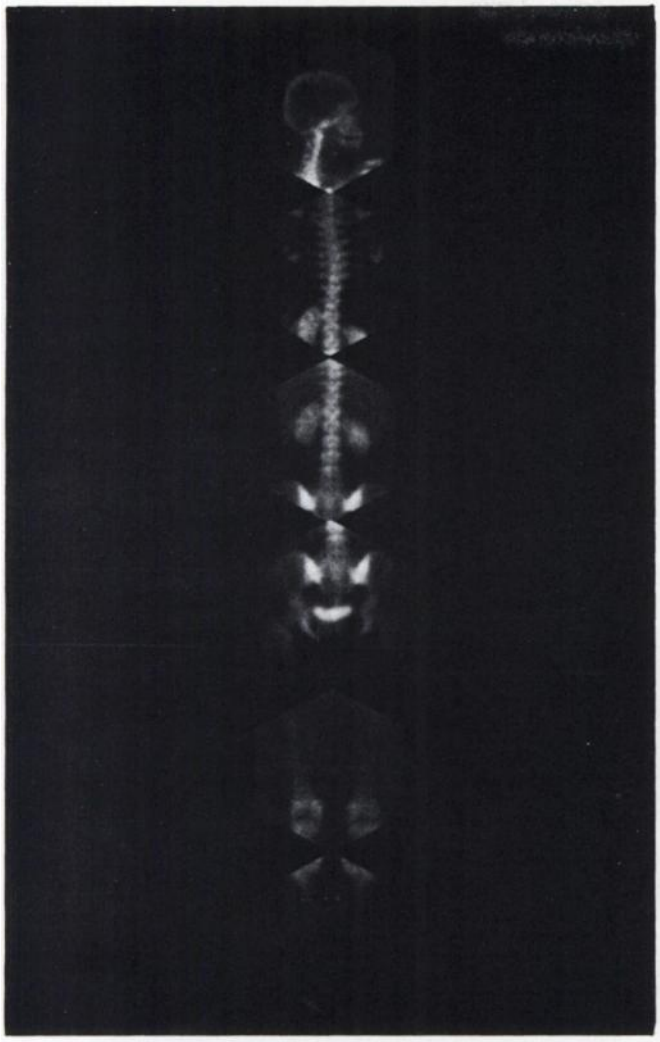
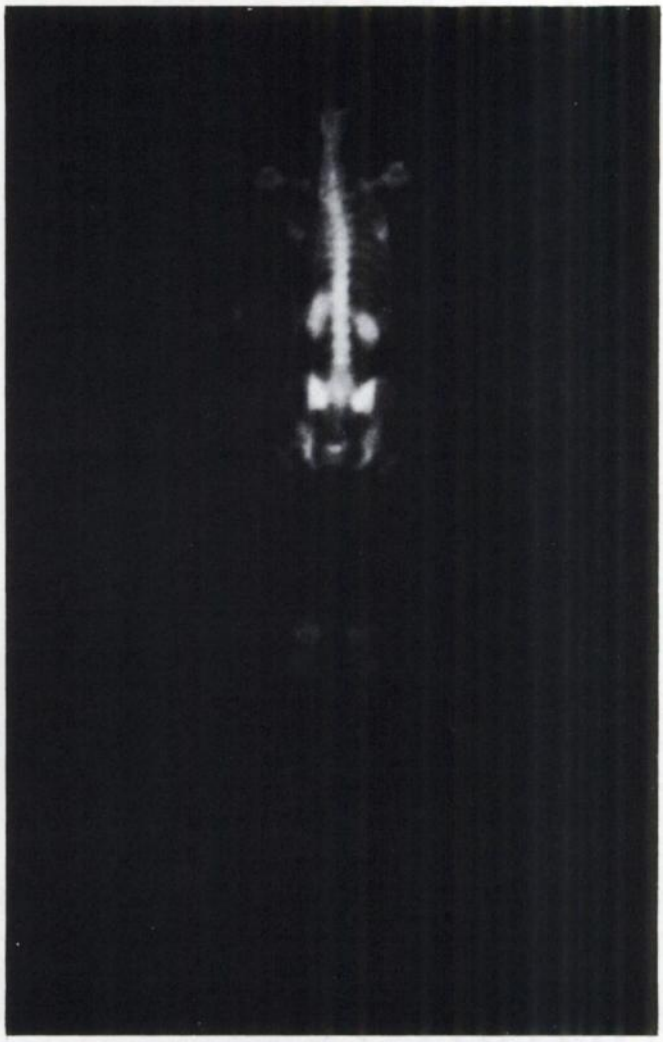
Count on it.

An Unbiased Comparison





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Now you can assay, compute dose, and get an instrument-verified printout—in just 30 seconds.

Melétron—Programmed sequenced instruction eliminates operator errors. All you do to assay a radionuclide is insert the proper key—from the 33 isotope keys now available, with others to come as they are needed—your insurance against instrument obsolescence.

The melétron calculates the volume to administer (in 0.1 ml increments from 0.1 to 99.9) for all patient doses (in 10 uCi increments from 10 uCi to 99.99 mCi.) Accuracy is ± 5%, traceable to a reference dosecalibrator calibrated against 16 known standards at the National Bureau of Standards June 20, 1975.

Range capability is up to 10 curies. Lets you handle high-activity Mo 99/Tc 99m generators. Melétron's automatic ranging eliminates manual selection—and another chance for operator error. Background subtraction is also automatic, and design of the ionization chamber will allow a 3/16" lead shield. The large chamber accommodates all standard size vials and syringes, and even an entire generator eluate for checking Mo 99 breakthrough.

Melécord prints permanent copies of all functions—the vital part of your record keeping system. You get hard copy in triplicate. Saves time. Prevents errors. Makes NRC (AEC) accountability far easier.

Melécord also prints the exact time and date of each assay automatically, while it alternately displays them on a digital calendar/clock on the front panel, and Melécord can be factory programmed to generate three lines for printing institution identification on each data card.

To find out how easy it is to solve your dosecalibration and record-keeping problems, call RADX—the innovators in nuclear medicine.

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Count on it.

Gammacord® II

Gammacord II System: Multi-isotope gamma counter with optional automated printer and sample handler. *Central Processing Unit:* 6 preset windows for commonly used gamma emitters, variable window to read any isotope in 15 to 2,000 KEV range; sequenced "memory" for up to 50 samples; direct readout in CPM and % retention; automatic background subtraction; counts for preset time or accuracy level. *Automatic Printer:* gives hard-copy results: ID number, % retention, CPM and % CV for each sample. *Automatic Sample Handler:* up to 50 samples per interchangeable carousel; self-contained drainage; easily accessible external mechanism.

Available for purchase or rental directly from Ames Company.

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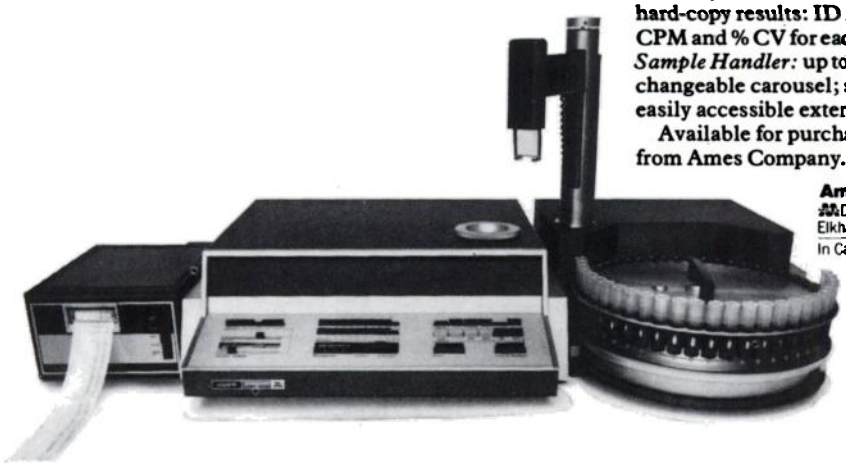
Elkhart Indiana 46514
In Canada: 77 Belfield Rd., Rexdale, Ontario



Need a lot of gamma counting? Need a little? Expanding your capacity? This is the only modular system you can tailor to handle *your* work load.

The Ames Gammacord II does everything the more expensive counters can do ... and less. So, you're never locked into *more* automation than you need.

Versatile. Sophisticated. Compact. Easy to operate. Gammacord II can "grow" with the small and medium-size lab. Offers rapid throughput sufficient for high-volume needs. Flexible enough for more specialized RIA procedures, plus backup, stats and weekend duty.

We've got a trial instrument waiting for you. With or without the "add-on" sample handler or the hard-copy printer. Gammacord II ... you can do a lot with it. Best of all, you can count on it.

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7403/2372726

Rheumatic diseases: a diagnostic problem?

Diagnosis of individual rheumatic diseases can present problems. Our simple test, the anti-DNA Kit, can give vital information to aid that diagnosis.

The kit provides the first standardized assay to consistently and reliably measure anti-DNA antibodies. High circulating levels of these antibodies are closely linked with systemic lupus erythematosus (SLE). In doubtful cases, the kit offers excellent discrimination between SLE and rheumatoid arthritis and is particularly valuable as a follow-up to ANF tests. Results show that the kit is also useful as a means of monitoring disease activity, providing the physician with guidance on drug therapy.

The kit is a simple radioassay – a matter of routine for any clinical laboratory with a gamma counter. Please write or 'phone for further information.

Anti-DNA kit

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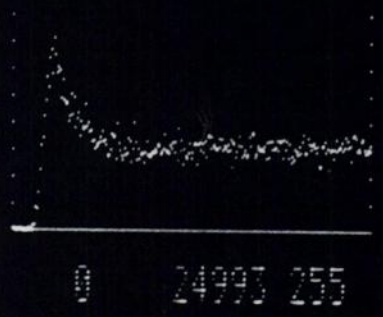
Product described in '76 CLR page 213.

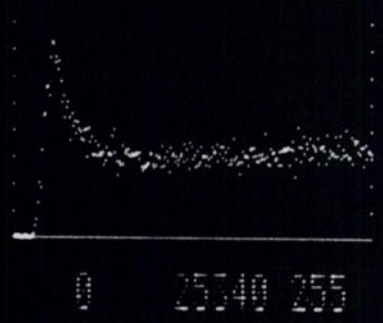
Think dynamic functions.

Cerebral Flow Study
^{99m}Tc Sodium Pertechnetate



Cerebral Flow Curve, right hemisphere

Anterior Cerebral View, showing position of regions of interest in right and left hemispheres



Cerebral Flow Curve, left hemisphere

Think Clinical Analyzer, the data processing and tape storage and replay system designed specifically for nuclear medicine static and dynamic function imaging applications.

Applications include (1) cerebral and carotid uptake, (2) cardiac flow for measuring transit time, left ventricular ejection fraction, and cardiac output, (3) renal function, (4) lung ventilation and perfusion. In short, any clinical imaging study requiring quantification of image data in specific organ areas.

Clinical Analyzer offers three independent and adjustable size and shape regions of interest for dynamic function analysis of organ areas.

Curves can be displayed separately, overlapping or side-by-side, with the time per data point as short as 0.01 second. Clinical Analyzer records and replays data at 100,000 counts/sec. in a 512 x 512 point image matrix for excellent image resolution.

For static studies, Clinical Analyzer offers two profile slices for simultaneous count versus distance curves showing count levels in any segment of an organ. An automatic file search feature can search a 1-hour tape from end to end in 2-3 minutes.

The Clinical Analyzer is another example of Picker's synergy — the complete interfacing of systems and services for improved diagnostic visualization. Contact your local Picker representative. Or write direct to the Picker Corporation, 12 Clintonville Road, Northford, CT 06472.

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A brief summary of
PRODUCT INFORMATION
3M BRAND YTTERBIUM Yb 169 DTPA (Pentetate Calcium Trisodium Yb 169) FOR CISTERNOGRAPHY

INDICATIONS AND USES

Ytterbium Yb 169 DTPA is indicated for use in the diagnostic scintigraphic evaluation of the cerebrospinal fluid pathways. This includes diagnoses related to cerebral atrophy, hydrocephalus, subarachnoid obstructions, shunt patency and extracranial drainage of cerebrospinal fluid.

CONTRAINDICATIONS

None.

WARNINGS

Since the drug is excreted by the kidney, caution should be exercised in patients with severely impaired renal function.

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

Extreme care must be exercised to assure aseptic conditions in intrathecal injections.

PRECAUTIONS

General:
Ytterbium Yb 169 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.

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. Ytterbium Yb 169 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 a drug since many drugs are excreted in human milk.

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

ADVERSE REACTIONS

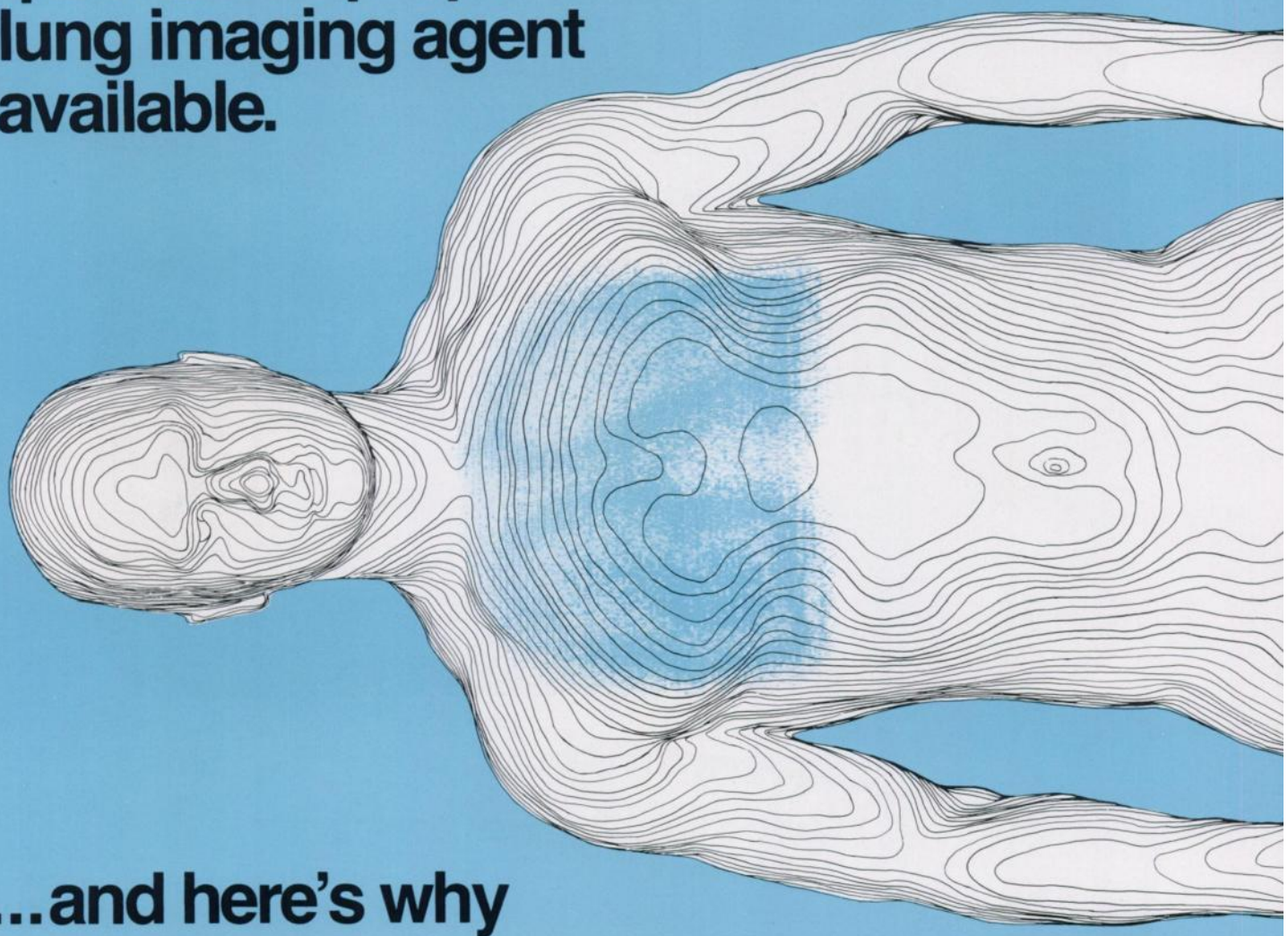
Aseptic meningitis and pyrogenic reactions have been rarely observed following cisternography with Ytterbium Yb 169 DTPA (two cases were reported in 4415 patients).

3M COMPANY

Macrotec®

Aggregated Albumin (Human)
for labeling with technetium 99m

STILL! the simplest, quickest to prepare lung imaging agent available.



...and here's why

Simple, two-step procedure. Not an ampul, not a frozen material. No waiting, no complicated procedures or specialized equipment required. Just two easy steps and you're ready to assay and inject.

Uniform particle size, excellent labeling efficiency. Particle size meets or exceeds Bureau of Biologics standards; 90% in 5-60 micron range. Excellent labeling efficiency when reconstituted with a compatible technetium 99m.

Won't agglomerate in the vial, loses virtually no labeling for 8 hours (if stored between 2°C. and 8°C.).

Ideal for the busy lab. Recommended amount of 99mTc for reconstitution high enough to allow numerous scans from a single vial.

BASIC STEPS IN PREPARING FOUR TECHNETIUM

Squibb Macrotec® Aggregated Albumin (Human)	**1. Add 1-3 ml. of 99mTc*.* Maintain shielding at all times.**	**2. Shake vigorously for 10-15 seconds.**
Mallinckrodt TechneScan™ MAA Aggregated Albumin (Human)	**1.** Remove reaction vial from *freezer* and *wait approximately 5 minutes* for contents to come to room temperature.	**2.** Add 99mTc*.* Maintain shielding at all times.
3M Albumin Microspheres (Human)	**1.** Add 4-10 ml. of 99mTc*.*	**2.** Shield completely and vigorously shake for 5-15 seconds.
Medi+Physics Lungaggregate™ Reagent Aggregated Albumin (Human)	**1.** Shake *ampul* vigorously to suspend particles.	**2.** Open ampul.

Emphasis added by Squibb to point out certain differences in procedures.

MACROTEC® (Aggregated Albumin [Human])

Macrotec (Aggregated Albumin [Human]) is a sterile, non-pyrogenic, lyophilized preparation of aggregated albumin. Each vial of the preparation contains 0.08 mg. tin as chloride, 1.5 mg. denatured human serum albumin, and 10 mg. Normal Serum Albumin (Human).

INDICATIONS: For use in perfusion lung imaging as an adjunct to other diagnostic procedures.

CONTRAINDICATIONS: At present there are no known contraindications to the use of this product.

WARNINGS: Radiopharmaceuticals should not be administered to patients who are pregnant, or during lactation, unless the benefits to be gained outweigh 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.

Since ^{99m}Tc is excreted in milk during lactation, formula-feedings should be substituted for breast-feedings.

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.

Note: Macrotec (Aggregated Albumin [Human]) is not radioactive. However, after ^{99m}Tc is added, adequate shielding of the resultant preparation should be maintained.

PRECAUTIONS: In the use of any 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.

Aseptic technique is essential in the preparation of Technetated (Tc-99m) Aggregated Albumin (Human).

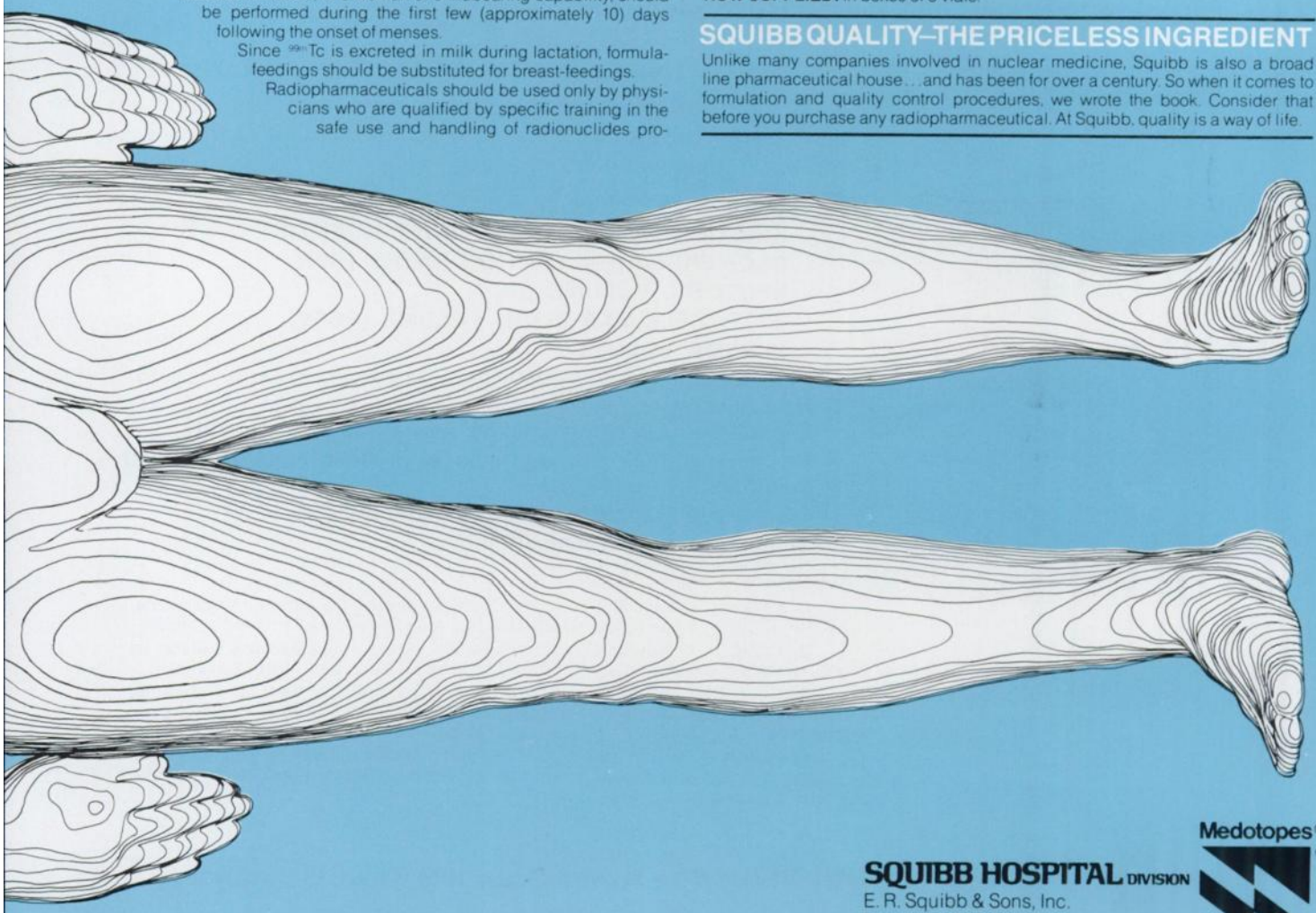
ADVERSE REACTIONS: At present, adverse reactions have not been reported following the administration of this product.

For full prescribing information, consult package insert.

HOW SUPPLIED: In boxes of 5 vials.

SQUIBB QUALITY—THE PRICELESS INGREDIENT

Unlike many companies involved in nuclear medicine, Squibb is also a broad line pharmaceutical house...and has been for over a century. So when it comes to formulation and quality control procedures, we wrote the book. Consider that before you purchase any radiopharmaceutical. At Squibb, quality is a way of life.



Medotopes®

SQUIBB HOSPITAL DIVISION
E. R. Squibb & Sons, Inc.
Princeton, N.J. 08540

99m-LABELED LUNG IMAGING AGENTS*

 H606-504

**Recommended maximum activity: 50 mCi.

3. Gently agitate vial for few seconds. **4.** *Allow to stand for 15 minutes* at room temperature. **5.** Visually inspect vial for presence of large aggregates. *If present, do not use.* **6.** *Agitate* to effect homogenous suspension of the aggregated albumin.

**Recommended maximum activity: 60 mCi.

3. Remove vial from shield (with forceps) and place in center of operating *ultrasonic bath* containing 3/4" of water. Bath should be protected by *lead glass or bricks.*
Ultrasound for 5 minutes.

**Recommended maximum activity: 30 mCi.

3. Withdraw (very slowly) 1.5-2.0 ml. of aggregate from ampul with *syringe.* **4.** Inject (very slowly) syringe contents into *mixing vial.* **5.** Wrap mixing vial in *absorbent paper disc* and place in lead shield. **6.** Add 0.5-2.0 ml. of 99mTc** in saline into shielded mixing vial. Shake vigorously for at least 30 seconds. *Incubate* at room temperature *for 2-5 minutes.* **7.** Shake contents vigorously just before removing aliquot intended for patient use.

**Recommended maximum activity: 25 mCi/ml.

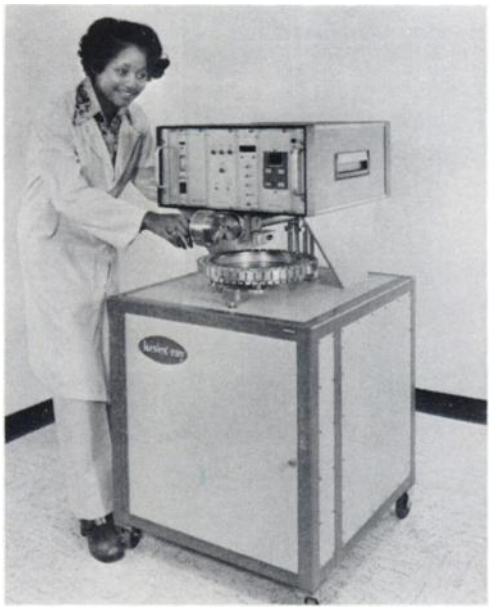
*Based on manufacturers' product information. **NOTE: See manufacturers' package inserts before the preparation of any of these products.**

"radioisotopes" that you can turn ON-and OFF?

Yes, you can-in effect-with these new

KEVEX-RAY FLUORESCENCE ANALYSIS SYSTEMS

- for clinical, diagnostic, and investigative medicine



IN VITRO: The Kevex-Ray Stable Tracer Analyzer

X-ray fluorescence analysis in vitro affords tracer studies in new and conventional areas *without* the use of radioactive tracers, i.e. replacing them with *stable tracers.*

☆ Established applications in—

KINETICS OF X-RAY CONTRAST AGENTS
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☆ High specificity and sensitivity, wide dynamic range (ppm to %)

☆ No radiation exposure to patient or personnel, with increased capabilities for serial studies and studies of normals.

☆ No storage, handling, or disposal of short halflife radioactive materials.

☆ Off-the-shelf stable tracers (i.e. Conray-60 for GFR)

☆ Simple, accurate, cost effective.

References

1. Kaufman, L. Price DC (eds): Semiconductor Detectors in Medicine, CONF-730321, Washington, D.C., U.S. Atomic Energy Commission, 1973.
2. Kaufman L, Wilson CJ: Determination of extracellular fluid volume by flourescence excitation analysis of bromine. J Nucl Med 14:812, 1973.
3. Price DC, Swann SJ, Hung S, et al: The measurement of circulating red cell volume using nonradioactive cesium and fluorescent excitation analysis. J Lab Clin Med Vol. 87, p. 535-543 (March 1976)
4. Guesry P, Kaufman L, Orloff S, et al: Measurement of glomerular filtration rate by fluorescent excitation of nonradioactive meglumine iothalamate. Clin Nephrol 3:134, 1975.

IN VIVO: The Kevex-Scan IIIB Thyroid Analyzer

☆ High resolution thyroid imaging *without* radioactive tracer.

☆ Quantitative total iodine information with calibration.

☆ Very low local radiation dose - zero whole body dose.

☆ Complementary and unique information of thyroid disease state via the endogenous iodine distribution.

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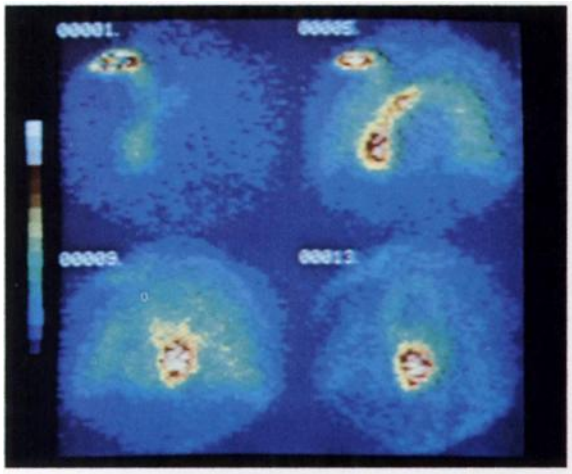

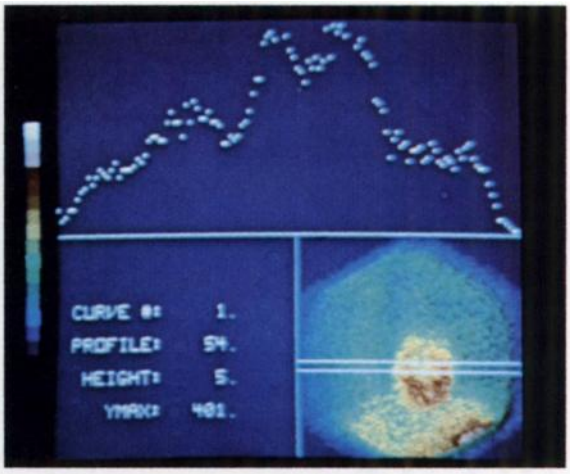

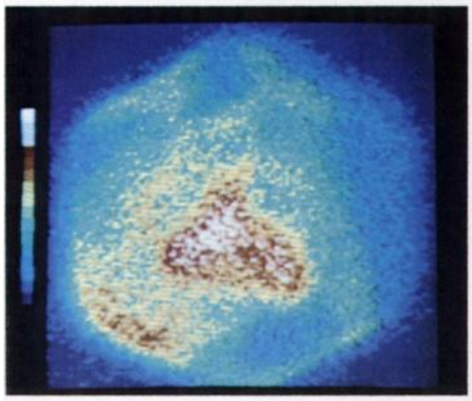

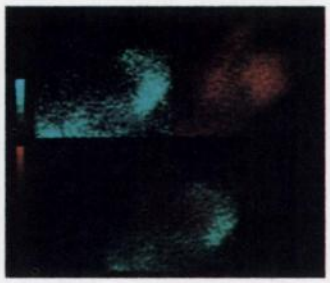

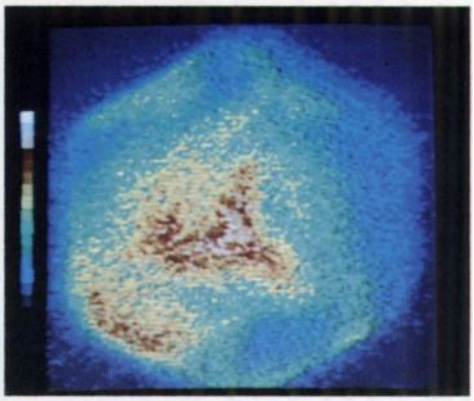

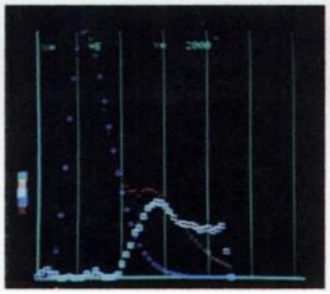

MEDICAL DATA SYSTEMS CORPORATION
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STRETCHING THE BOUNDARIES

Since the beginning of digital Nuclear Medicine, Medical Data Systems Corporation has been an innovator immediately responsive to the needs of the Nuclear Medicine practitioner.

We were the first to develop a software-based system.

We are the inventors and implementors of the concept of acquiring and processing data simultaneously.

MODUMED™ is still the only system capable of acquiring and processing data from three sources simultaneously.

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Innovation in the field of Nuclear Medicine requires constant effort and insight. Our latest expansions are the following.

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Our color video also has its own memory. This assures that computer time and disk space is devoted to data processing and analysis.

Our matrix size is the largest available: 256 x 256, enabling increased display information.

And color coding is possible. For example, a color coded gated cardiac image with a Thallium image can help delineate akinesis of the wall.

256 x 256

Medical Data Systems has expanded the matrix size for Nuclear Medicine imaging. The larger the matrix size, the more specific the image resolution. Greater delineation leads to greater precision in your analysis.

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You know your system is only as good as its programmers. An experienced clinical programmer has enough clinical knowledge to enable you to use your system advantageously and expeditiously.

Medical Data Systems' programmers are clinically oriented. Our programs excel in two ways:

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A special program enables acquisition parameters to be predefined so that only the study name need be entered to perform an entire protocol. Programs can be linked together to establish totally automated procedures. Patient name and study information are automatically recorded on a directory for your convenience.

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Clinical protocols are provided which delineate the precise procedure by which you can obtain the best clinical results from your studies. The Cardionuclear Analysis Workbook, for example, includes step-by-step procedures for defining Regions of Interest and examining curves; correcting for dead-time losses; calculating cardiac output; left to right shunt detection and quantitation; ejection fraction determination; and other image analysis procedures.

There Are Many More

Some of our innovations are technical. They enable you to process and analyze Nuclear Medicine studies with greater efficiency. The Census program, for example, lists demographic data for 32,000 patients and is addressable in seven seconds.

Some of our innovations are clinical; our Cardionuclear Analysis Package and our RIA interpreter, for example.

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We support the largest group of digital Nuclear Medicine users who meet regularly to discuss clinical insights and new digital applications.

Whether domestic or international, over 150 members from 108 current clinical sites share with us their observations to assure that we remain responsive to your needs.

Our communication is enhanced through NUCOMM, our data transmission network which stretches across continents and enables world-wide consultation.

Medical Data Systems stretches the boundaries because, very simply, we know Nuclear Medicine will continue to grow and we are committed to support your growth. That's why our systems are expandable.

Medical Data Systems designs and builds digital image processing systems; we are the innovators and leaders of the field.

We have set the standards for digital Nuclear Medicine with our State of the Art MODUMED Series of digital image processing systems.

And we will continue to support the science and art of Nuclear Medicine as its own boundaries are stretched.

For complete information on the Modumed Series of digital imaging processors or for information on specific projects or products, please write to Medical Data Systems.

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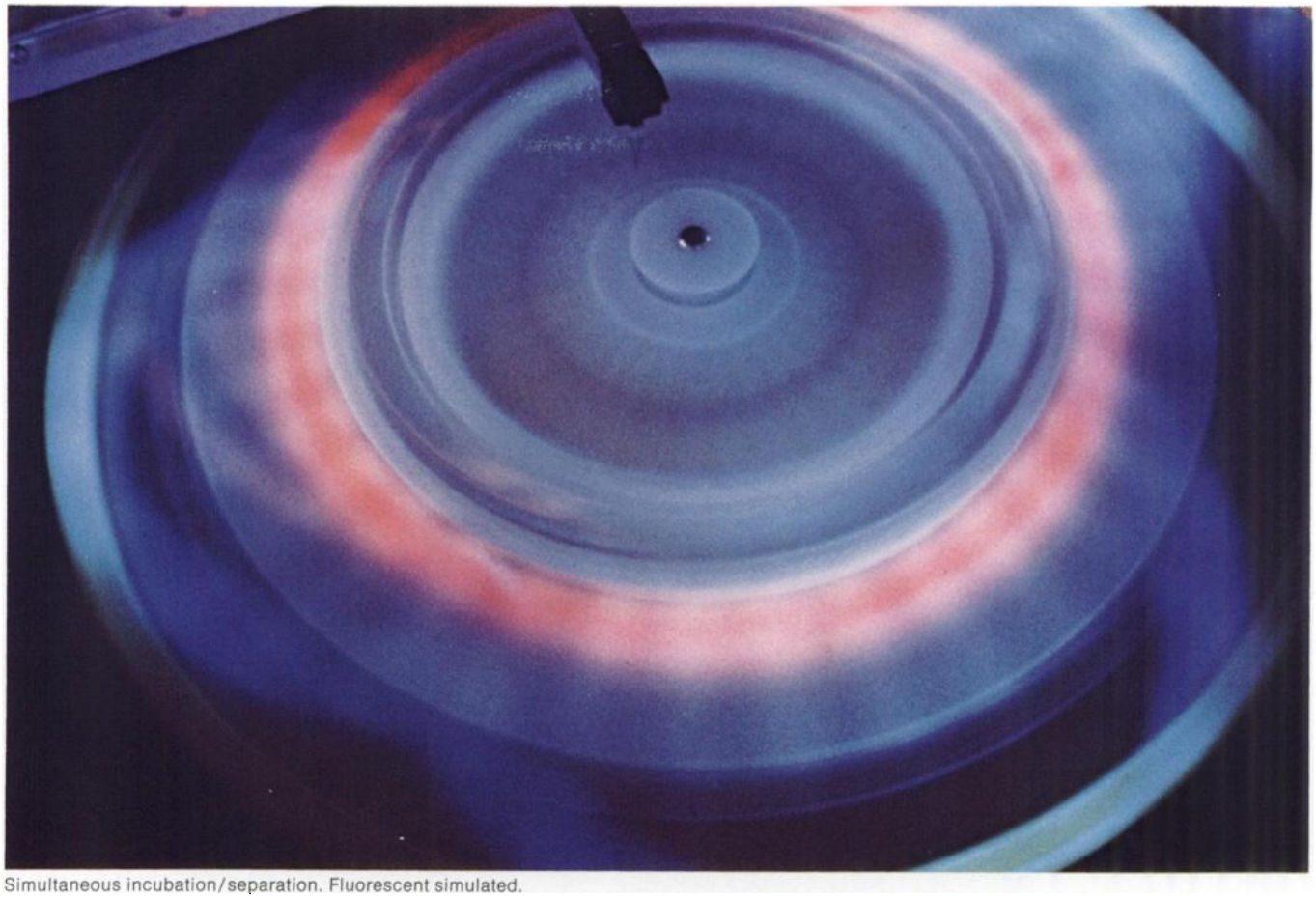

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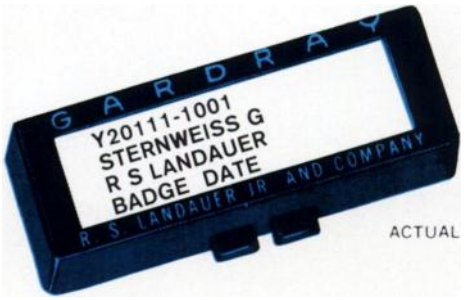

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The L.E.M. has the same high-speed electronics as Searle's proven Pho/Gamma LFOV. It has six factory pre-set isotope windows for operator convenience. Automatic peaking assures remarkable reproducibility from study to study and from day to day. Window width and energy level can be set independently on 2 analyzers for dual-peak isotopes and special studies.

INCREASED PATIENT THROUGHPUT
New ratio correction circuitry allows wider window widths, shortens study times and increases patient throughput. Other electronic innovations include pulse-pair pile-up rejection and event buffering circuitry. As a result, the L.E.M. is capable of count rates up to 200,000 cps.

CHOICE OF COLLIMATORS
The L.E.M. offers a wide selection of lightweight collimators for optimum resolution under any conditions. With its converging collimation capabilities, it offers significant improvement in resolution of deep-seated structures. Renal studies, for example, yield images of such clarity that it is possible to obtain even oblique views of diagnostic quality.

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In heart imaging, the L.E.M. can be "gated" for systolic or diastolic studies, and the high count rate capability makes it suitable for advanced techniques such as dynamic cardiac imaging. The L.E.M. reveals midline brain lesions with unequalled clarity in static studies with the converging collimator. Parallel-hole and diverging collimation is used for large-area studies, such as lung imaging for pulmonary emboli.

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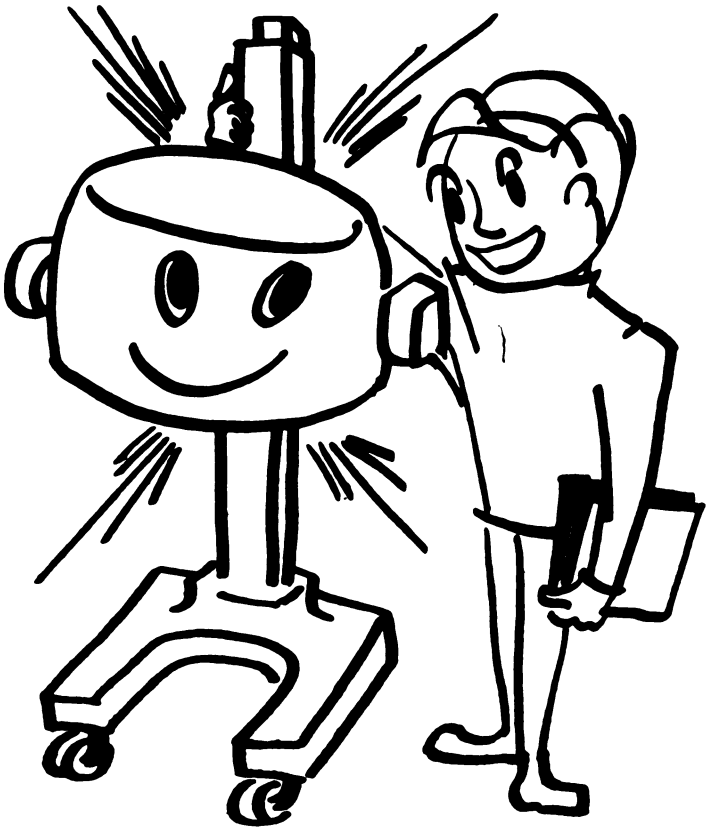

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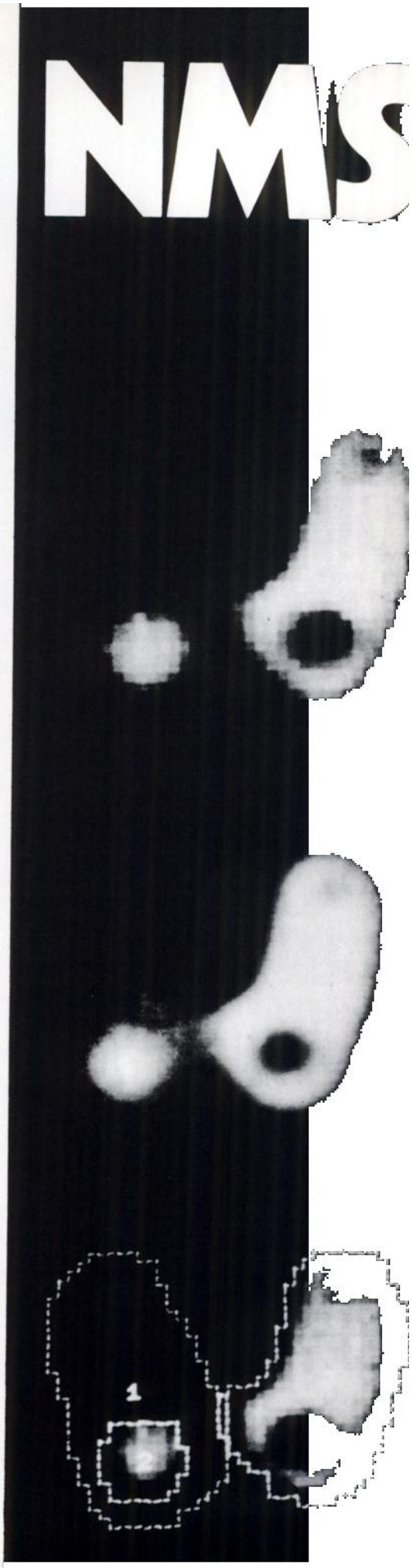

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NMS is the computer system for the acquisition and analysis of gamma camera image data.

NMS accommodates the high data rates of today's fastest gamma cameras.

Utilizing a fully programmable interactive computer system, NMS brings the latest in computer technology to nuclear medicine. Image data can be stored on either magnetic tape or disk, and images are viewed with a dual video-image display console. The display console provides interactive analysis with both keyboard and joystick controls. Hardcopy outputs include Polaroid, hardcopy video, plotter, and line printer.

NMS is comprehensive with a complete selection of built-in analysis features. Innovative as well as standard studies can be accomplished. It is easy to use, having both a general-purpose programming language (FORTRAN) and a special purpose image processing control language (IPCOL).

Visit Artronix at the 23rd Annual Meeting of the Society of Nuclear Medicine, Dallas. BOOTH NOS. 1140 and 1142.

System Operation Features

- Dual interactive control console with video-image display screen and high-contrast alphanumeric display screen
- Convenient and affordable patient study storage on magnetic tape or magnetic diskette
- Programmable computer with 32K-word memory
- High-speed floating point processor for computational speed
- Flexible timing specification for complex dynamic studies
- Ultra high-speed data acquisition rates

Data Analysis Features

- Comprehensive data corrections
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One simple step to a bone imaging agent

It's quick—it's convenient. Add the sodium pertechnetate Tc 99m into a vial of NEN Stannous Polyphosphate and swirl. Now you have a bone imaging agent that provides a high target/non-target ratio, excellent lesion detection and consistent results.

Our unique formulation—Pyrophosphate and Trimetaphosphate—has long shelf life—1½ years. Low Stannous Chloride content—1 mg/vial. No refrigeration required...a truly effective bone imaging agent.

Indications: Technetium Tc 99m Stannous Polyphosphate is primarily used as a skeletal imaging agent to evaluate areas of altered osteogenesis.

Contraindications: None.

Warnings: This radiopharmaceutical preparation should not be administered to pregnant or lactating women or to children under 18 years of age unless the benefits to be gained outweigh 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 the menses.

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

The contents of the Stannous Polyphosphate vial are intended only for use in the preparation of Tc 99m Stannous Polyphosphate and are not to be directly administered to the patient.

Medical judgment appropriate for any agent should be maintained. As polyphosphates are known to complex cations such as calcium, particular caution should be used with patients potentially suffering from hypocalcemia.

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

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

Precautions: Use within 8 hours after aseptic reconstitution with Pertechnetate Sodium Tc 99m. Contains no bacteriostat.

In the use of any radiopharmaceutical, care should be taken to insure minimal radiation exposure to the patient as well as to personnel involved in the procedure, by using the smallest dose of radioactivity consistent with safety and the relative value of the diagnostic information. The bladder dose may be minimized by encouraging the patient to drink fluids immediately before and after the administration of the radiopharmaceutical, and to void approximately 0.5 hours after the administration and then as frequently as it is convenient. If the pelvic region is to be imaged, it is recommended that the patient be encouraged to void immediately prior to the imaging procedure in order to visualize the bony detail of the pelvis and to minimize the bladder contribution to the image.

Adverse Reactions: One investigator noted that out of 340 cases he studied within one year, 4 patients reported a mild faintness and numbness of one of the limbs within one hour of dose administration. In all cases the symptoms disappeared after several hours.

Dosage and Administration: Technetium Tc 99m Stannous Polyphosphate may only be administered by intravenous injection. In making dosage calculations, corrections must be made for radioactive decay. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

The recommended intravenous dose in the average patient (70kg) is 10mCi with a range of 5-15mCi. Optimal imaging results are obtained within 1-6 hours after administration.

How Supplied: The NEN Stannous Polyphosphate Kit is supplied as a set of five vials, sterile and nonpyrogenic. Each nitrogen-flushed vial contains in lyophilized form:

Sodium Pyrophosphate	– 10mg
Sodium Trimetaphosphate	– 30mg
Stannous Chloride	– 1mg

The kit may be stored at room temperature.

New England Nuclear
Radiopharmaceutical Division
Atomlight Place, North Billerica, Mass. 01862
Telephone 617-667-9531
Los Angeles: 213-321-3311 Miami: 305-592-0702

Canada: NEN Canada Ltd., Lachine, Quebec, H7T 3C9, Tel: 514-636-4971, Telex: 05-821808
Europe: NEN Chemicals GmbH, D-6072 Dreieichenhain, W. Germany, Daimlerstrasse 23, Postfach 1240. Tel: (06103) 85034.

Mallinckrodt TechneScan® PYP™ Kit (Stannous Pyrophosphate) for the preparation of Technetium Tc 99m Stannous Pyrophosphate.

15.4 mg Sterile Stannous Pyrophospho

What others have said about the performance of pyrophosphate is more relevant than anything we could say!

(Excerpts from literature on stannous pyrophosphate:)

"With the rectilinear scanner, ^{18}F appeared to be the best bone scanning agent. Technetium-99m-phosphate compounds were favorable for clinical use because of availability and usefulness in studies with the gamma camera. Quality of scan with polyphosphate was most variable. Sometimes phosphate compounds and ^{87m}Sr showed considerable interference with bone scan due to soft-tissue radioactivity. Diphosphonate might be regarded as the agent of choice because of its low concentration in the soft tissue. **Pyrophosphate appeared to be most favorable agent considering ease of preparation, reproducibility, and quality of scan."**[1] (Bold-face added.)

"While the physical properties of ^{18}F are poor, the biological properties are still superior for bone imaging. The biological properties of polyphosphate made from this kit are significantly worse than the pyrophosphate or EHDP prepared from kits. The latter two are more similar to ^{18}F in blood clearance and soft-tissue uptake."[2]

"The introduction of ^{99m}Tc-labeled phosphate complexes has given the nuclear medicine physician a wide choice of agents for skeletal imaging. Both polyphosphate and pyrophosphate are biodegradable and have P-O-P linkage. Because of the complex nature of the molecule, one cannot be certain of the chain length in any given batch of polyphosphate. In contrast, ^{99m}Tc-labeled diphosphonate has a discrete chain length and P-C-P linkage. Concern is expressed in the literature about the importance of exact chain length and biodegradability. One author has suggested waiting until more is known about the toxicity of diphosphonate before using it in man. Another author replies that biodegradability should not be equated with toxicity. In our previous study we concluded that there was no reason to be concerned about toxicity with the amount of diphosphonate used for skeletal imaging. **Now the introduction of technetium-labeled pyrophosphate by Perez, et al., should satisfy both protagonists for it has a discrete chain length and is biodegradable."**[3] (Boldface added.)

The TechneScan PYP Kit is an excellent bone imaging agent for several reasons—

- **Its discrete chain length contributes to consistent performance**
- **It clears the bloodstream quickly**
- **It gives high bone-to-tissue ratios**
- **It seldom produces liver visualization**
- **It provides for a variable dose-to-scan time**
- **It gives high initial tagging efficiencies**
- **It is highly stable, both in-vitro and in-vivo**

REFERENCES

1. Hosain F, Hosain P, Wagner HN, Dunson GL, Stevenson JS: Comparison of ^{18}F, ^{87m}Sr, and ^{99m}Tc-Labeled Polyphosphate, Diphosphonate, and Pyrophosphate for Bone Scanning. J. Nucl. Med. 14: 410, 1973 **Abst.**
2. Ackerhalt RE, Blau M, Bakshi S, Sondel JA: A Comparative Study of Three ^{99m}Tc-Labeled Phosphorous Compounds and ^{18}F-Flouride for Skeletal Imaging. J. Nucl. Med. 14: 375, 1973 **Abst.**
3. Krishnamurthy GT, Huebotter RJ, Walsh CF, et al: Kinetics of ^{99m}Tc-Labeled Pyrophosphate and Polyphosphate in Man. J. Nucl. Med. 16: 114-115, 1975.

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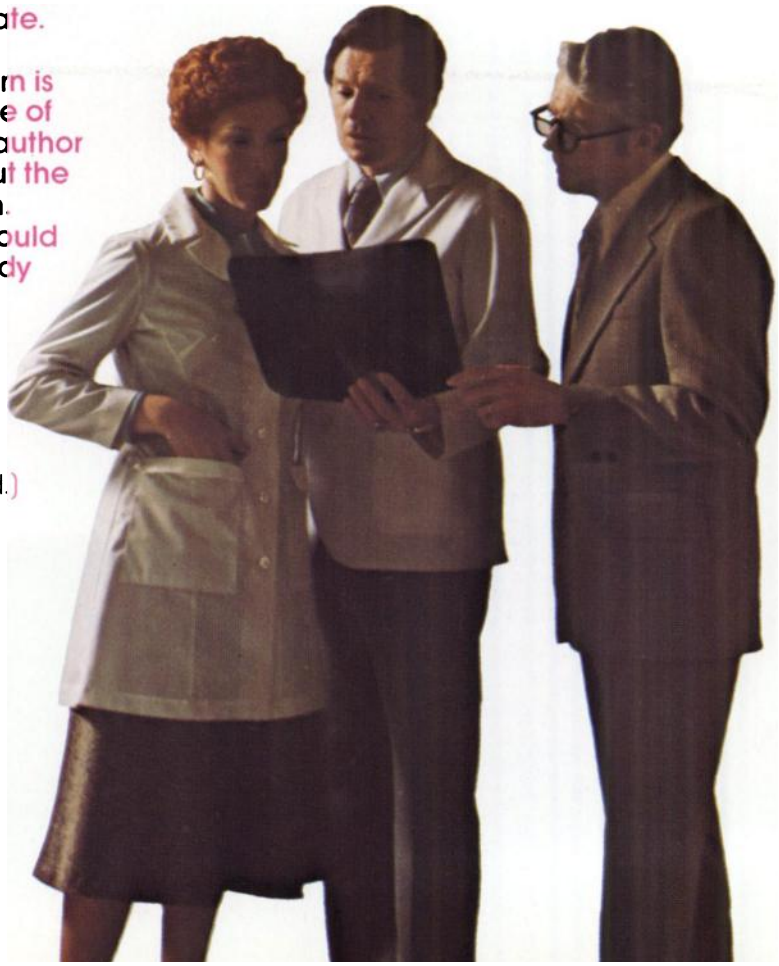

TechneScan® PYP™ Kit (Stannous Pyrophosphate)

BEFORE USING, PLEASE CONSULT COMPLETE PRODUCT INFORMATION, A SUMMARY OF WHICH FOLLOWS:

DESCRIPTION

The **TechneScan PYP** reaction vial contains all of the non-radioactive reagents required to prepare a sterile, non-pyrogenic solution of Technetium Tc 99m Stannous Pyrophosphate (**TechneScan PYP** Tc 99m) for intravenous injection.

Each 10-milliliter reaction vial contains a total of 15.4 milligrams of stannous pyrophosphate in the lyophilized state in a nitrogen gas atmosphere. The pH of the solution is adjusted with **hydrochloric** acid prior to lyophilization.

ACTION

When injected intravenously, **TechneScan PYP** Tc 99m has a specific affinity for areas of altered osteogenesis.

One to two hours after intravenous injection of **TechneScan PYP** Tc 99m, an estimated 40-50% of the injected dose has been taken up by the skeleton. Within a period of one hour, 10 to 11% remains in the vascular system, declining to approximately 2 to 3% twenty-four hours post injection. The average urinary excretion was observed to be about 40% of the administered dose after 24 hours.

INDICATIONS

TechneScan PYP Tc 99m 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.

Preliminary reports indicate impairment of brain scans using Tc-99m pertechnetate which have been preceded by a bone scan. The impairment may result in false positives or false negatives. It is recommended, where feasible, that brain scans precede bone imaging procedures.

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 **TechneScan PYP** Kit must be maintained at refrigerator temperature until use.

The contents of the **TechneScan PYP** reaction vial are intended only for use in the preparation of Technetium Tc 99m Stannous Pyrophosphate and are not to be directly administered to the patient.

Sodium pertechnetate Tc 99m solutions containing an oxidizing agent are **not** suitable for use with the **TechneScan PYP** Kit.

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

The **TechneScan PYP** Tc 99m should not be used more than six hours after preparation.

PRECAUTIONS

Both prior to and following **TechneScan PYP** Tc 99m administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the **TechneScan PYP** Tc 99m 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.

See package insert for procedural and dosimetry information.

Mallinckrodt, Inc.
675 Brown Rd.
Hazelwood, Missouri 63042

Mallinckrodt NUCLEAR

RADIOPHARMACEUTICALS

Count on Picker's Isotope Calibrator.

Picker's digital Isotope Calibrator is easy to operate. Select calibration factor, position sample and push one button. Digital readout is ready in usually less than one second. There are no calculations and no zeroing. The Picker Isotope Calibrator covers all clinically used isotopes from 2μCi to 999mCi.

You can be sure of $\pm$5% accuracy, $\pm$3% short-term repeatability and $\pm$1% long-term stability. A molybdenum breakthrough kit helps assure patient safety. And Picker certifies in writing that each Isotope Calibrator has been checked and calibrated to meet regulatory agencies' recommendations.

Like all Picker equipment, the Isotope Calibrator is backed by Picker service. It's another example of Picker's synergy — the complete interfacing of systems and services for better diagnoses.

Contact your Picker representative. Or write Picker Corp., Clinical Laboratory Dept., 12 Clintonville Road, Northford, CT 06472.

PICKER®

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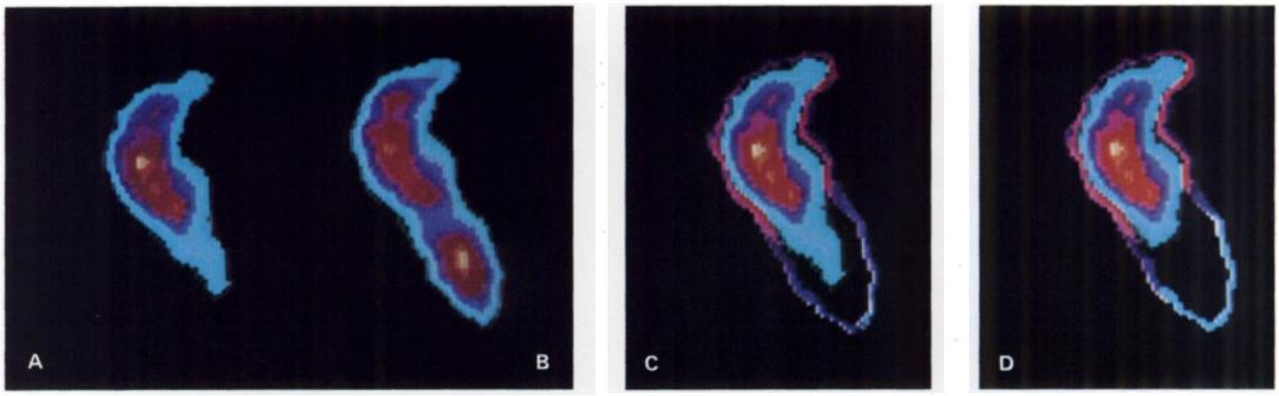
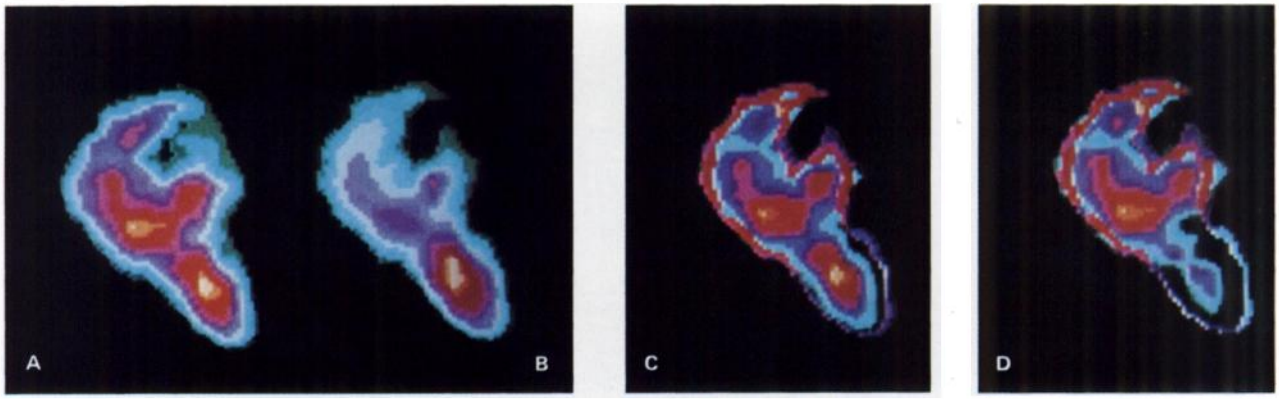
SEVENTY SEVEN REASONS:

1. Comprehensive, first-pass dynamics of cardiac wall motion



NORMAL PATIENT. Anterior View. Ejection Fraction 63%. (A) Image at End Systole shows volume displacement flow is maximum in the aorta and volume is minimum in the ventricle. (B) Image shows that volume displacement flow is minimum in the aorta and volume is maximum in the ventricle at End Diastole. (C) ES, with perimeter at ED superimposed, shows normal volume displacements and symmetric wall motion band due to motion of the septal and lateral walls. (D) Subtraction of stroke volume from ES, with ED perimeter superimposed, shows that all volume displacements in the stroke volume exceed volume components in residual distribution at ES.



ABNORMAL PATIENT. Anterior View. Ejection Fraction 34%. (A) ES, showing spatial distribution of volume components. Abnormally high residual volume at ES in the ventricle compared to volume flow components in the aorta. (B) ED, showing distribution of left heart volume components. Comparison with ES suggests relative lack of ventricular volume displacement during systole. (C) Lack of wall motion is indicated by very narrow wall motion band between ED perimeter and the ES distribution along the septal wall to the apex. Wall motion of the lateral wall is closer to normal. (D) Volume component in ES distribution exceeds stroke volume displacement because of reduced anterior or posterior wall motion proximal to the septal wall.

Shown here are stop-action data extracted from the representative cycle of first-pass images showing hemodynamics of the left heart, including volume distribution of end systole, end diastole, end systole with the end diastolic perimeter superimposed, stroke volume subtracted from end systole with end diastolic perimeter superimposed. These images provide the basis for the clinical diagnosis of ventricular wall motion, in addition to providing data for a closer examination of specific areas for evidence of hypokinesia, akinesia, or dyskinesia.

Because of the high count rate of System Seventy Seven's multicrystal matrix detector, no ECG gating was required. These studies are therefore unique in nuclear medicine and, because of the computer built into the system, remarkably fast and easy to perform. There is simply no other gamma camera that can do all that you see here.

BAIRD-ATOMIC

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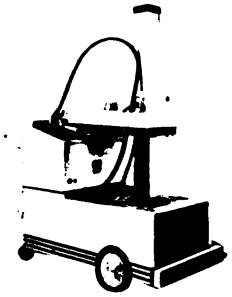
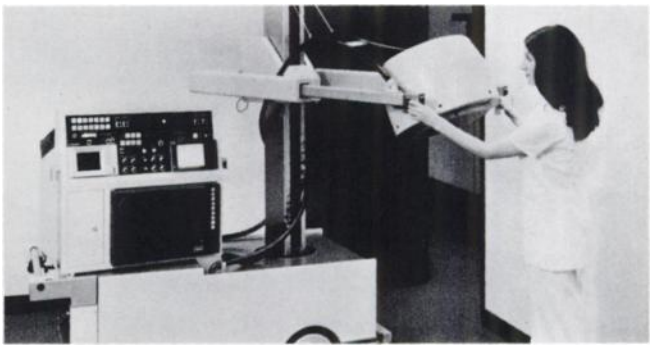
mobility and dependability

with no loss in resolution

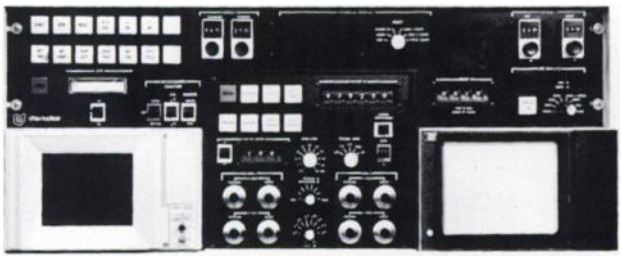
Wherever the need arises, in ICU, CCU, the Emergency Room, or within the NM Department, the Series 120 Mobile Camera is immediately available to generate high quality diagnostic information. And like all Ohio-Nuclear equipment, it is simple to operate.



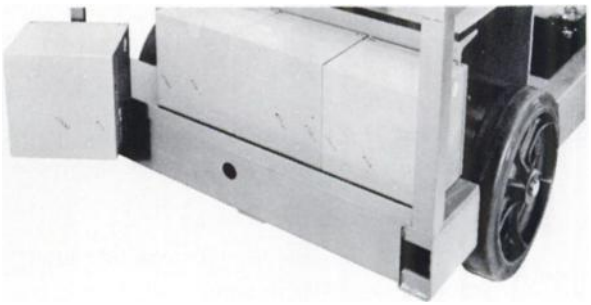
Mobility. The self-propelled Series 120 will travel at about 150′ per minute, and negotiate a 10% incline under its own power, or it will creep for accurate patient positioning, all while maintaining full HV power to its photomultiplier tubes. This permits operation as soon as the unit is in place.



Positioning. Column, yoke, and head rotation movements are all performed manually. Yoke extension is also manual, to a maximum "reach over bed" distance of 22″ (to center of collimator). Vertical yoke movement is motor driven, two speed, and controlled by the hand grips on the hand control.



Capabilities. The Series 120 is virtually identical to our well-known Series 100 Camera. And the 120 may be equipped with an optional Series 75M storage and retrieval system. This combination permits later re-evaluation, manipulation, and diagnosis of data sometimes captured under critical conditions.



Battery Power. Spill Proof Gel Cell Batteries, with negligible production of hydrogen, are automatically maintained by the system, charging whenever needed, as long as the AC line is plugged in. The batteries, DC, constantly maintain HV supply to the PM tubes, independently of the AC power.

Collimators. All collimators are insert type and weigh approximately 23 pounds each. A variety of collimators is available. They may be easily and quickly changed by your technologist.

ohio-nuclear, inc.

6000 COCHRAN ROAD • SOLON, OHIO 44139
PHONE (216) 248-8500 • TWX NO. 810-427-2696
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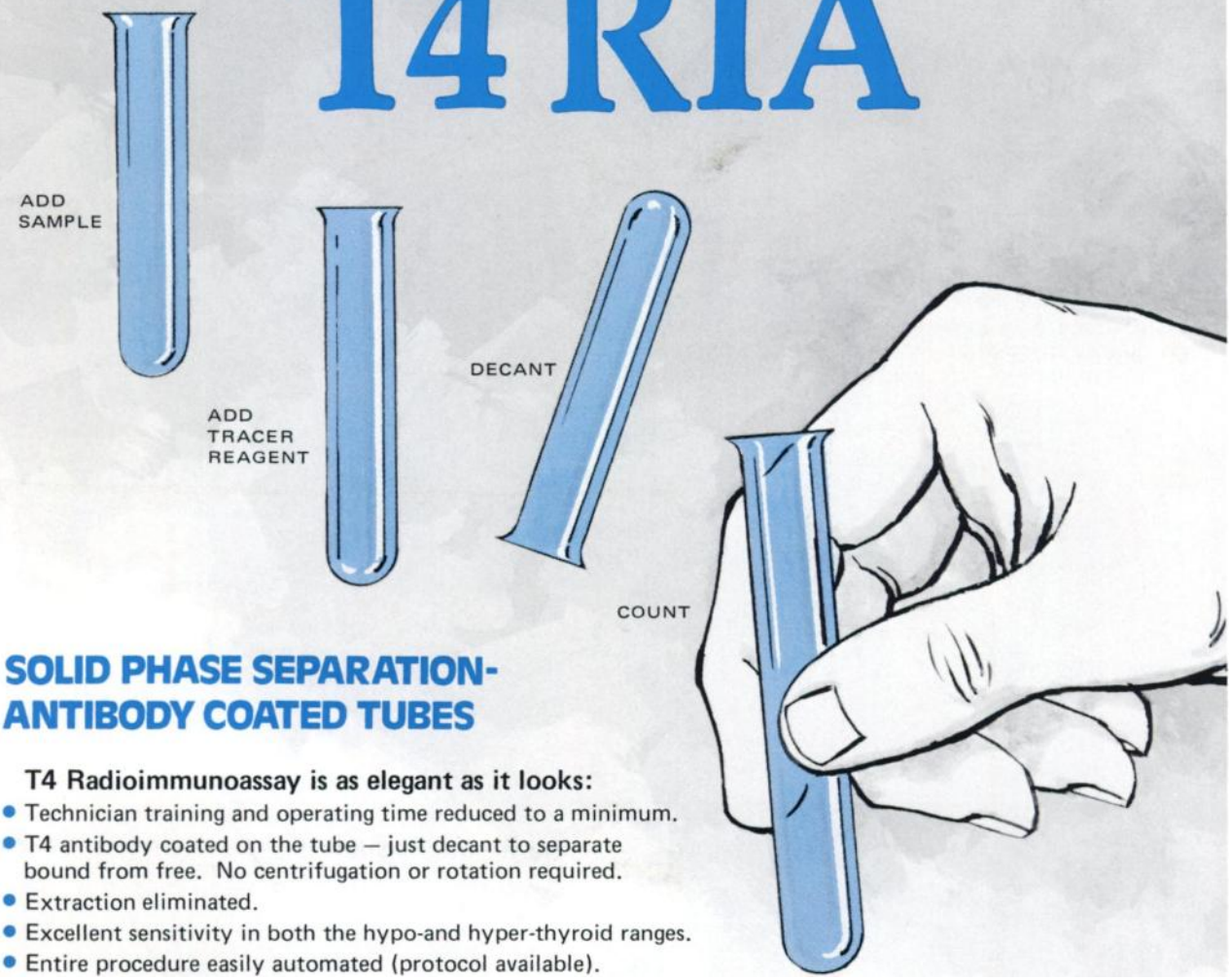
Clinical Assays GammaCoat™

T4 RIA



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T4 Radioimmunoassay is as elegant as it looks:

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- T4 antibody coated on the tube — just decant to separate bound from free. No centrifugation or rotation required.
- Extraction eliminated.
- Excellent sensitivity in both the hypo-and hyper-thyroid ranges.
- Entire procedure easily automated (protocol available).

Protocol:

- Add sample directly into GammaCoat tube.
- Add Tracer-Buffer Reagent.
- Incubate — for 45 minutes at room temperature.
- Decant or Aspirate.
- Count — the tube is counted for as little as 30 seconds.

For further information call toll free at 1-800-225-1241 (in Massachusetts call collect 617-492-2526) or TWX (710-320-6460) or write:

Clinical Assays, Inc.

237 BINNEY STREET
CAMBRIDGE, MASS. 02142
(617) 492-2526

Don't get milked by a cow.

Don't let the "cow" salesman throw in just any isotope calibrator until you compare it to Picker's Isotope Calibrator.

Picker's digital Isotope Calibrator is easy to operate. Select calibration factor, position sample and push one button. Digital readout is ready in usually less than one second. There are no calculations and no zeroing. The Picker Isotope Calibrator covers all clinically used isotopes from 2μCi to 999mCi.

You can be sure of $\pm$5% accuracy, $\pm$3% short-term repeatability and $\pm$1% long-term stability. A molybdenum breakthrough kit helps assure patient safety. And Picker certifies in writing that each isotope calibrator has been checked and calibrated to meet regulatory agencies' recommendations.

Like all Picker equipment, the isotope calibrator is backed by Picker service. It's another example of Picker'synergy — the complete interfacing of systems and services for better diagnoses.

For information contact your Picker representative. Or write Picker Corporation, Clinical Laboratory Department, 12 Clintonville Road, Northford, CT 06472, or Picker International Operations Gmbh, 6201 Auringen b. Wiesbaden, Feldbergstrasse 6, West Germany.

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TRACOR NORTHERN'S **TN-1705**

A new low cost portable PHA/MCS Analyzer

The TN-1705 offers more standard features per dollar than other portable systems. In fact, many TN-1705 features were previously found only in much costlier large analyzers. The base price of the TN-1705 includes these outstanding features . . .

- **1024 channels with 10^6-1 counts per channel.**
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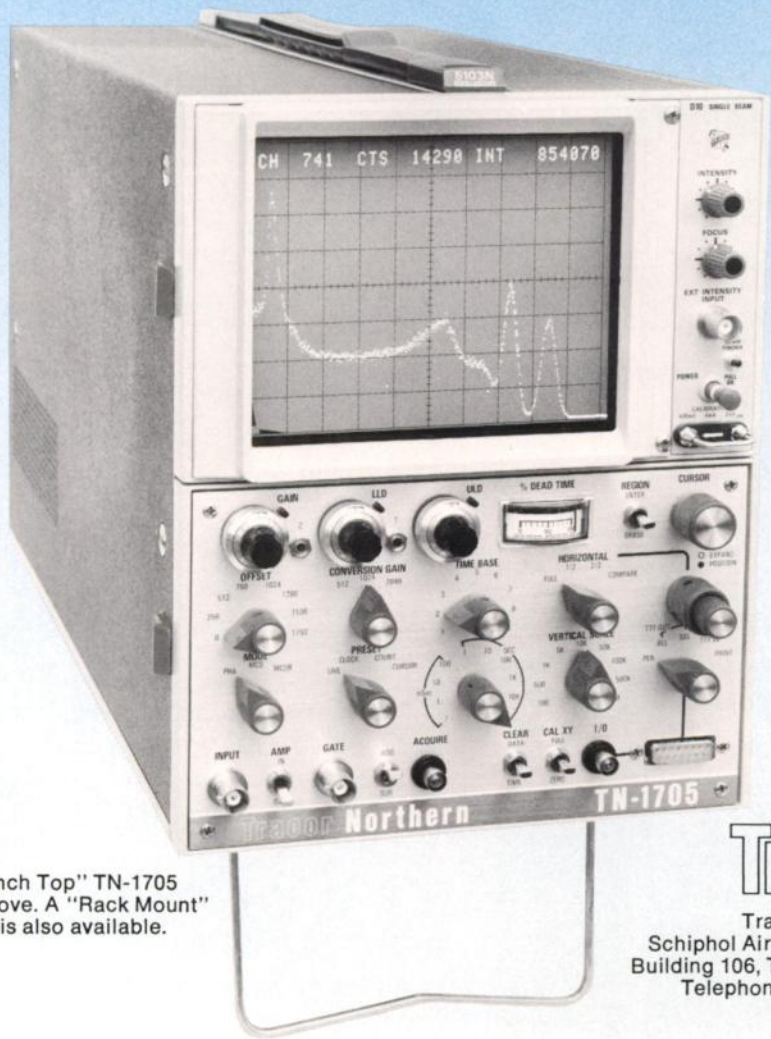
- **"Cursor" for channel and data intensity identification.**
- **Teletype I/O to ASR-33.**
- **50 MHz crystal controlled ADC.**
- **Standard Tektronix 5103 Oscilloscope with 6.5″ CRT.**
- **Full alpha numeric character generator.**
- **X-Y recorder and X-Y plotter output.**

Optional features include region of interest and integration. Call or write to find out how the TN-1705 can work in your PHA/MCS application.



The "Bench Top" TN-1705 is shown above. A "Rack Mount" version is also available.

Special Ge(Li) Detector/Analyzer System prices now available for a limited time only.

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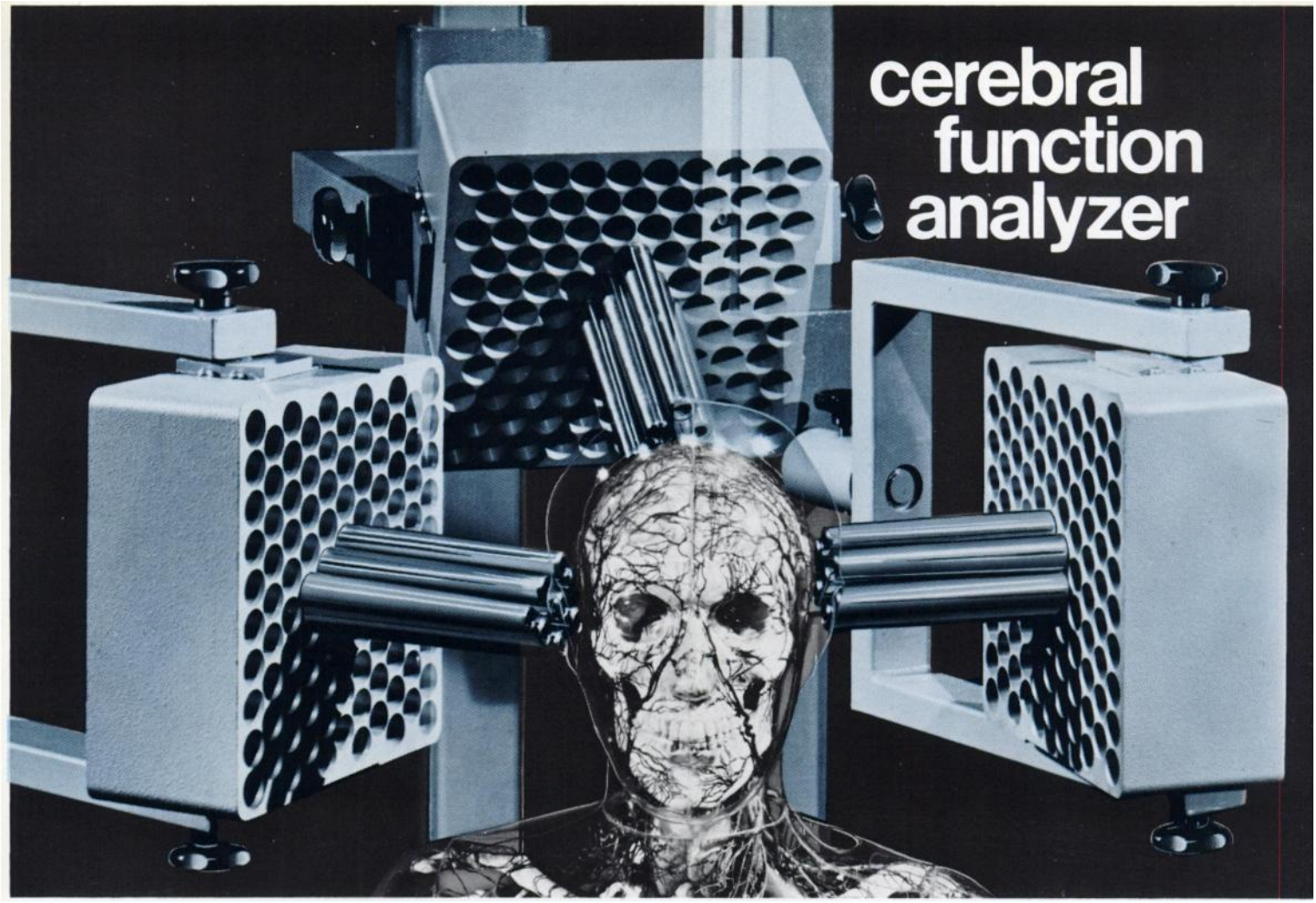
Send for your copy of our new "Applications of Multichannel Pulse Height Analyzers in Nuclear Medicine."



Harshaw's TASC-5 multi-probe system is a new clinical research instrument for the acquisition of quantitative data on regional alterations of cerebral blood flow utilizing Xenon-133.

TASC-5 offers the clinical investigator these advantages—

- **True modular design allows system expansion at any time and at minimum cost.**
- **Adaptable to all isotopes.**
- **Probes easily positioned —Collimators readily interchanged.**
- **Minimum probe diameter allows maximum number of probes over area of interest.**
- **Stabilization circuitry maintains probe sensitivity.**
- **Provisions for both analog and/or digital data handling.**

Our new 8-page brochure discusses TASC-5 in detail. Write or call us for a fast reply.

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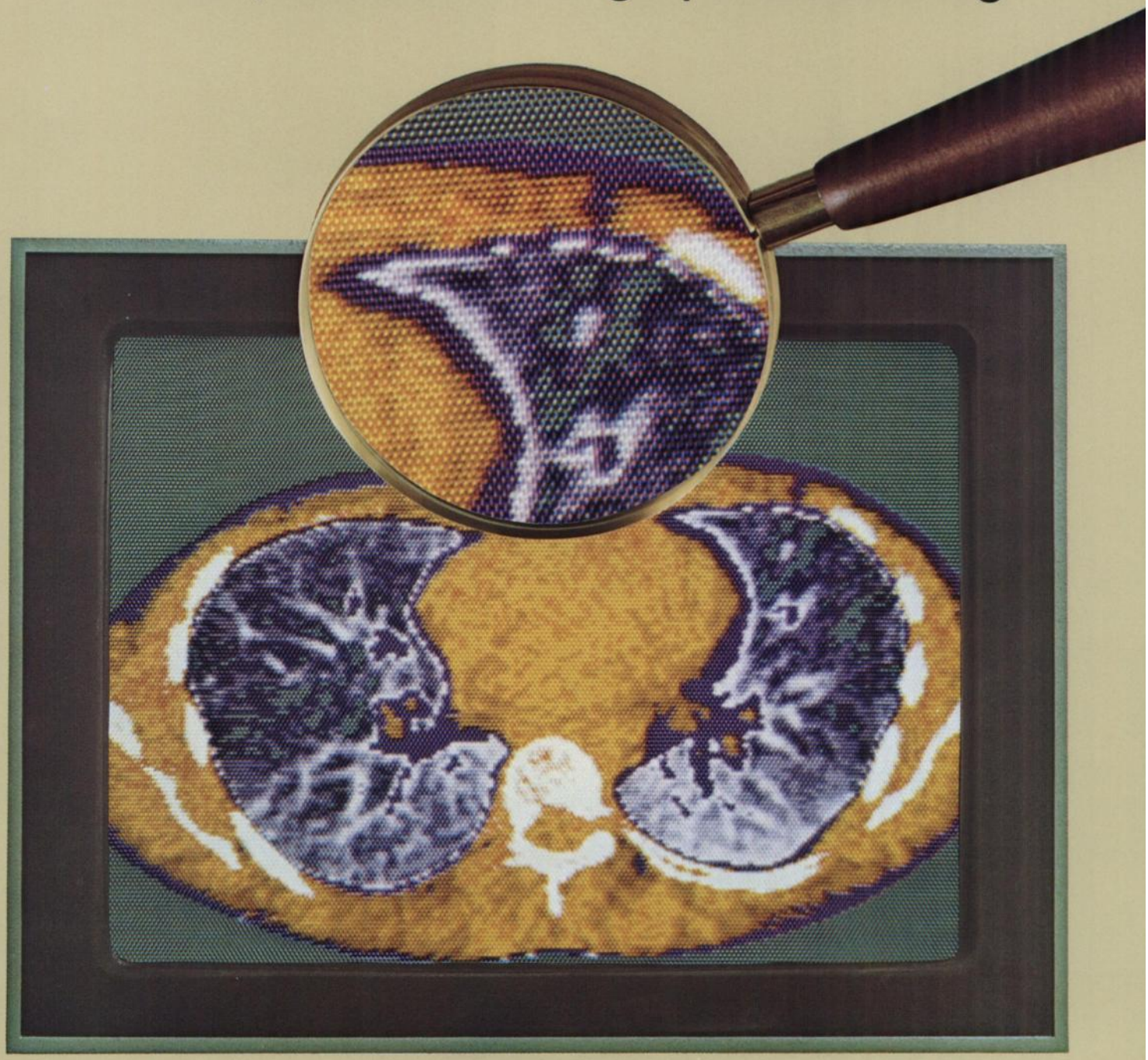
Pfizer Medical Systems, Inc. announces 57,600 reasons why the

ACTA-SCANNER®

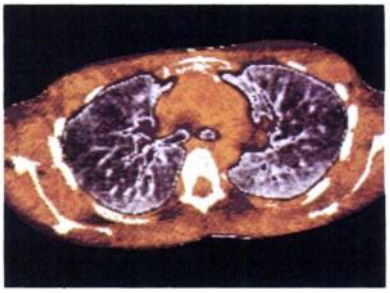
provides superior resolution and image clarity in whole body computerized tomographic scanning



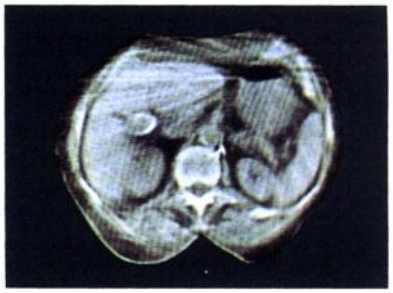
The new matrix improves image quality

Up to 57,600 absorption values are now actually measured for translation into the finished ACTA-scan with the recently developed 320 matrix.

This means a large, high-resolution display (1.5 mm) with greater clarity and true detail—important in extracranial scanning.



Thoracic 320 Scan. (Normal Chest)

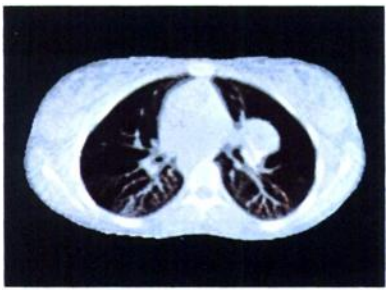


Abdominal 320 Scan. "Porcelain" Gallbladder

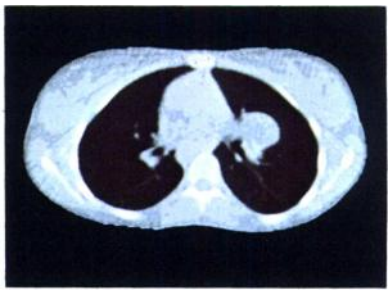
Multiple windows let you see more

With the Pfizer ACTA-Scanner, multiple windows can be imposed upon the image, allowing tissues with great density differences to be viewed at the same time in a single ACTA-scan.

This capability greatly facilitates interpretation of scans in the thoracic and abdominal areas.



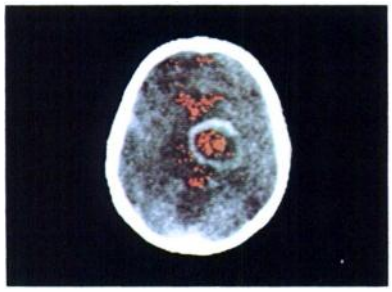
Thoracic scan with multiple windows. Mass in right lung.



Same area as scanned at left, without imposition of the multiple window capability.

And you can enlarge selected areas

A special cursor—or movable dot—allows the operator of the ACTA-Scanner to enlarge selected areas of interest by a factor of 2 in diameter (4 in area).

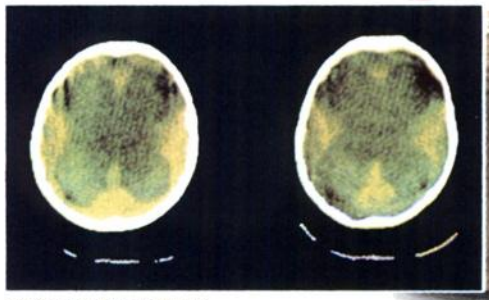


Pituitary Adenoma

Pituitary Adenoma. Instantaneous enlargement of pathologic area.

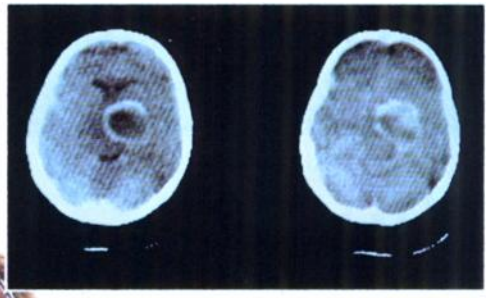
Pathology in virtually any part of the body can be visualized and evaluated.

Thoracic 320 Scan.
(Normal Chest)

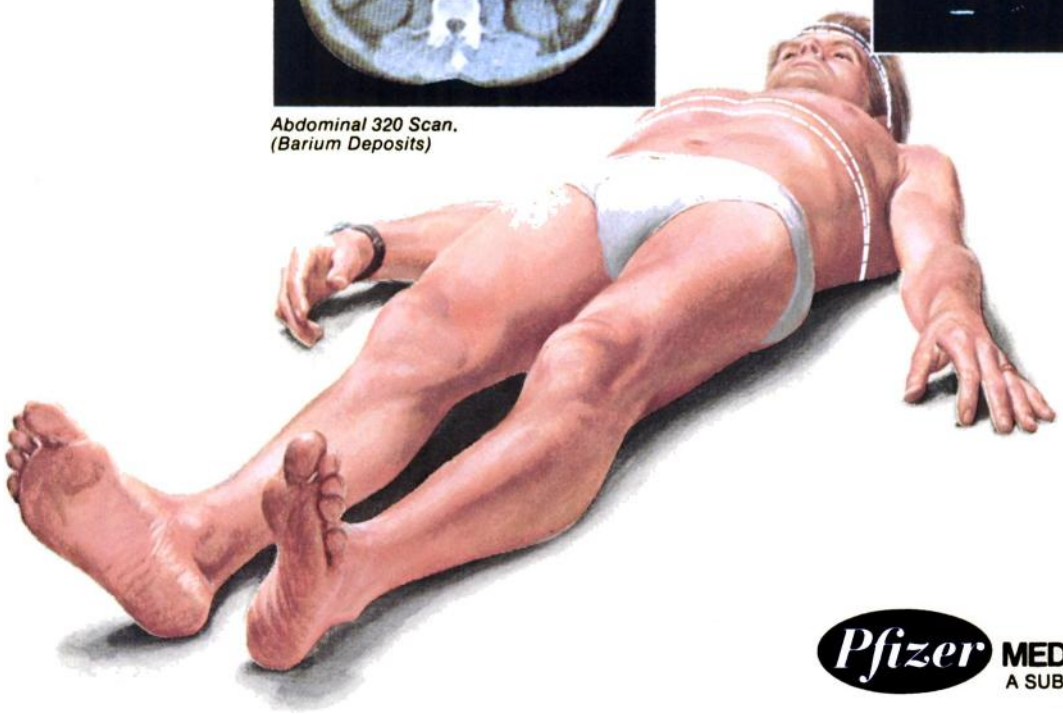


Marked Hydrocephalus

Abdominal 320 Scan.
(Barium Deposits)



Pituitary Adenoma



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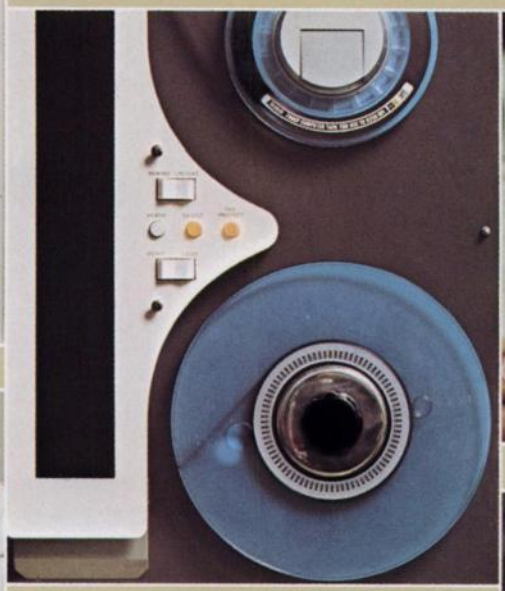
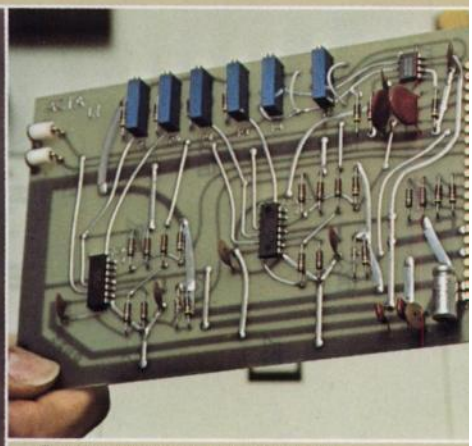
Field engineer readily available



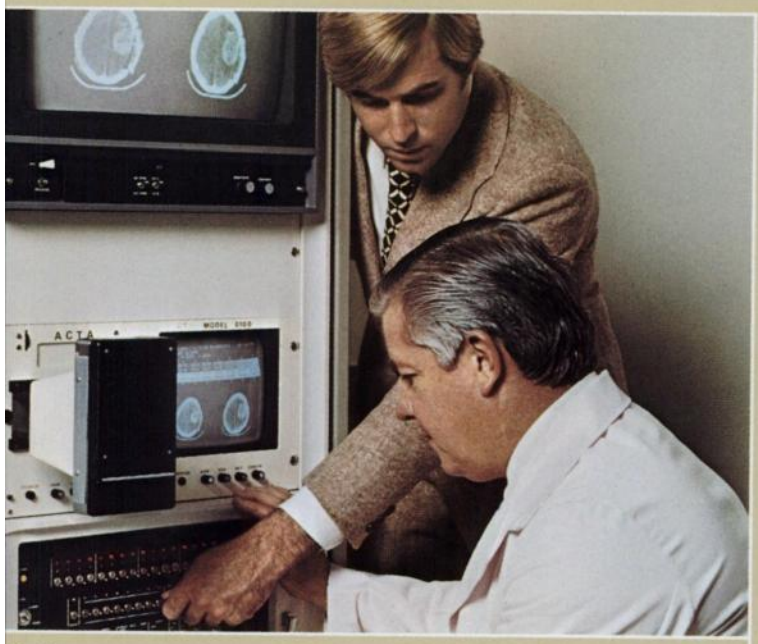
All data stored on magnetic tape for future recall



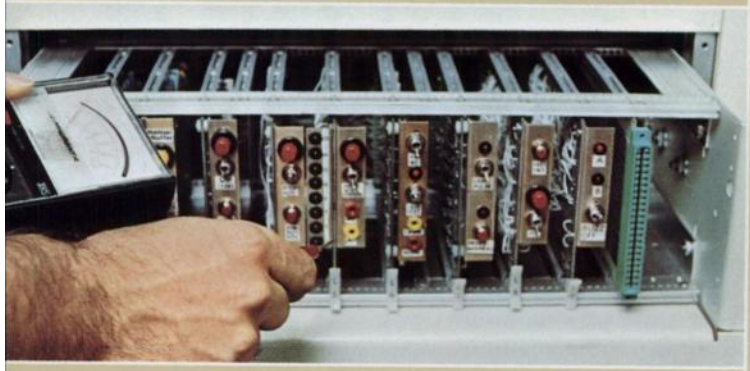
Replacement parts, if needed, are readily available

Minimal patient preparation before scan

Instant display following completion of scan



Field engineer provides continued updating on capabilities



Frequent visits by field engineer keep ACTA-Scanner at peak performance

Automation with Representation

A team of highly qualified field engineers is on standby duty to respond to your needs when necessary.

Warranty: No charges for all parts and service support during normal working hours. Any necessary maintenance can be done at night or during nonpeak hours, as requested.

Continuous inspection: Frequent visits, at your convenience, will be made to assure optimum performance.

Direct link to research and development: Your representative will keep you apprised of the activities of the Pfizer physicists and x-ray and computer experts who are dedicated to providing ever greater performance and more features on your ACTA-Scanner.

Pfizer MEDICAL SYSTEMS, INC.
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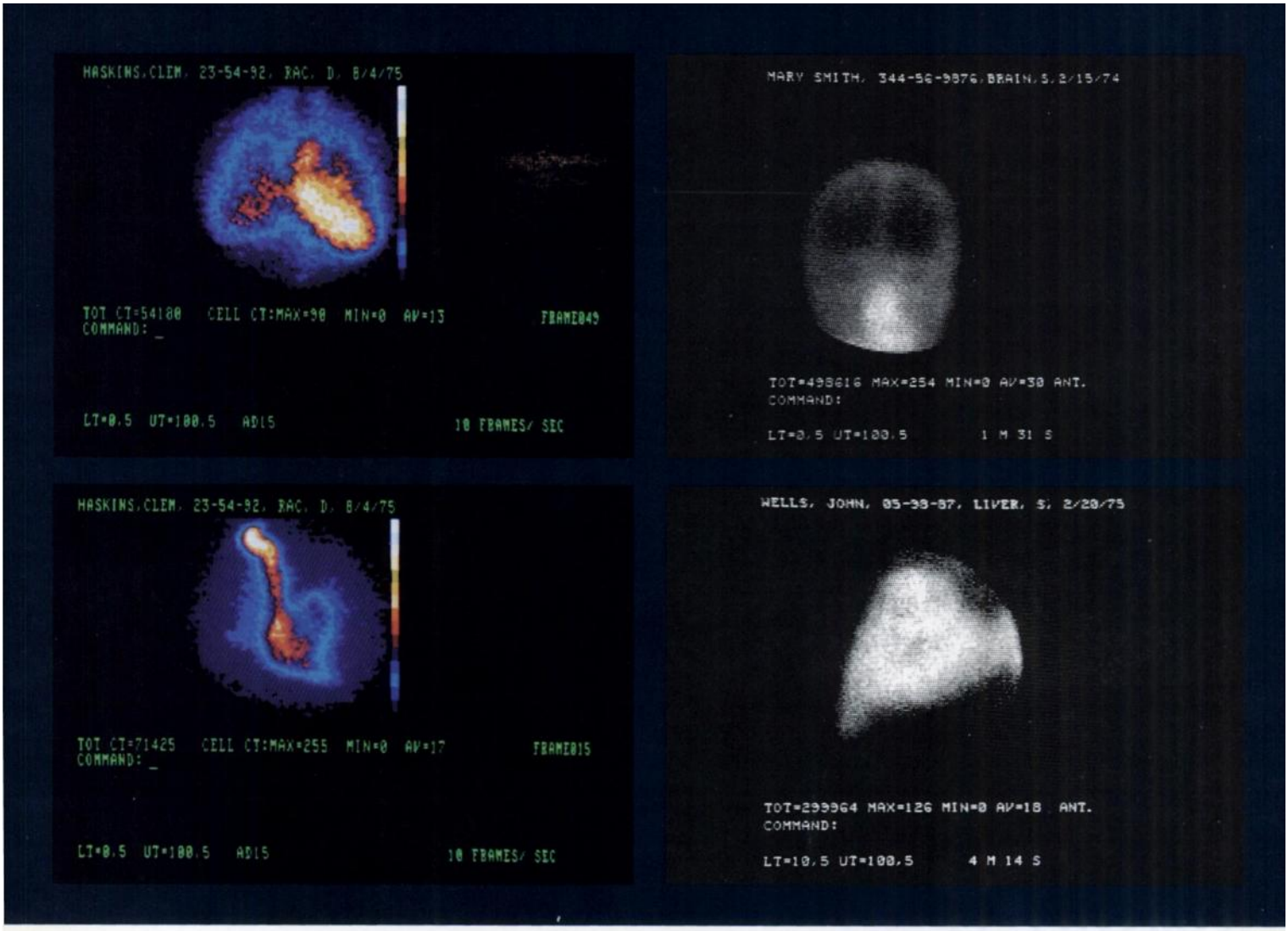

Digital's Gamma-11. It's the most powerful nuclear medicine system you can buy.

Digital's Gamma-11 gives you more performance than any other system on the market.

The proof? Gamma-11 lets you acquire and analyze information from single or multiple gamma cameras. Simultaneously. Gamma-11 also lets you choose from more than 150 different data acquisition and analysis functions. What's more, you can display that data in either black-and-white or color. And replay high speed dynamic studies up to 16 frames/second with no flicker.

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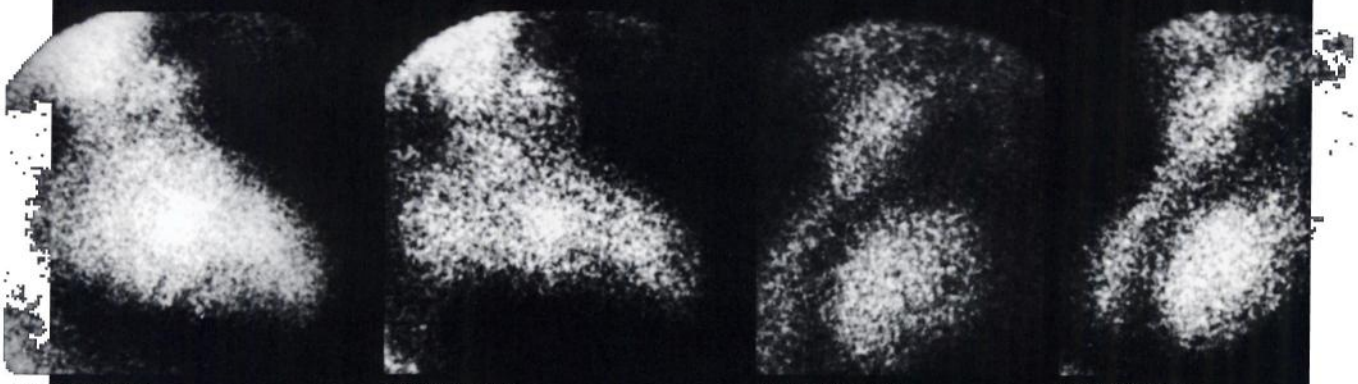
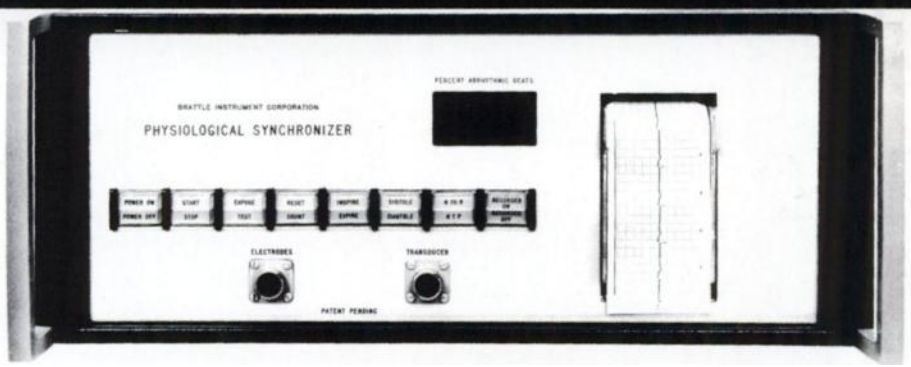
Help your cardiologist study heart kinetics non-invasively with Brattle-gated scintiphotos.



RAO, DIASTOLE — RAO, SYSTOLE — LAO, DIASTOLE — LAO, SYSTOLE

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



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

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

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

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

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

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

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

Brattle Instrument Corporation

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