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 Pre-set count for 10,000; read the required time from the NIXIE tubes.
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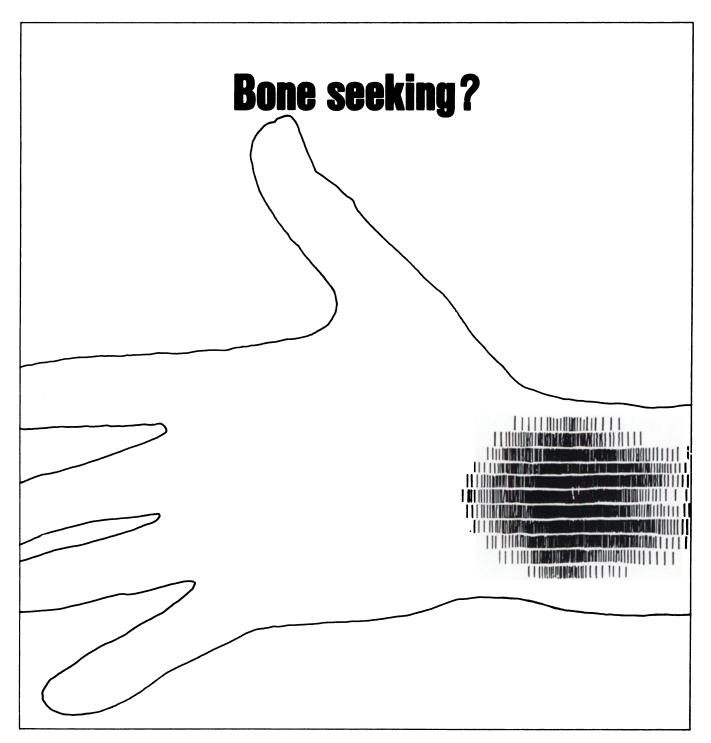
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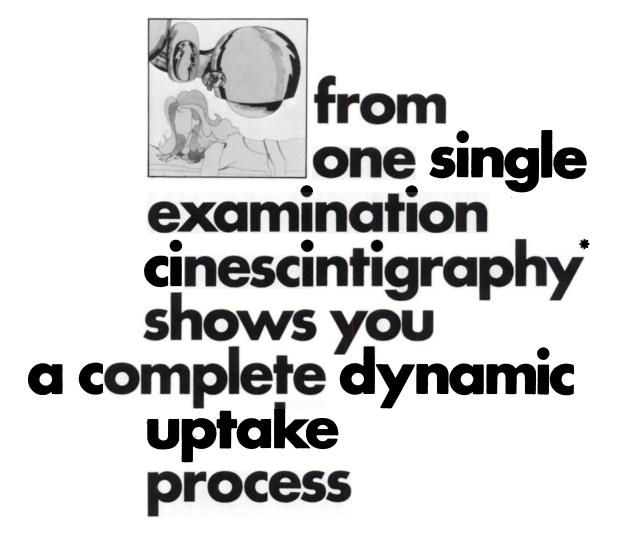
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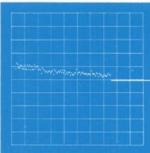
Volume 12, Number 10 IX

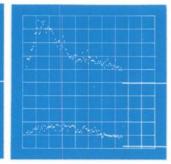


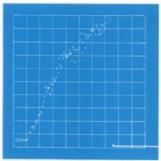
Below is a renogram picture on which 4 regions of interest have been selected by light pen.

Replay of the digital magnetic tape gives, on the oscilloscope screen, the dynamic uptake curves for each region: activity versus time. Successive elementary images, corresponding to each point of the curves, could also be displayed.











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The RENOTEC (Technetium 99m-Diethylenetriamine Pentaacetic Acid [DTPA]) Kit includes: 1) 5 vials (2 cc. each) of Sterile Reaction Solution providing 5 mg, ferric chloride per cc. and 2.5 to 5 mg. ascorbic acid per cc.; 2) 5 Unimatic® Disposable Syringes (2 cc. each) containing Sterile 0.07N Sodium Hydroxide Solution providing 2.8 mg. sodium hydroxide per cc.; and 3) 5 Unimatic Disposable Syringes (2 cc. each) containing Sterile DTPA Solution providing 2.5 mg. diethylenetriamine pentaacetic acid per cc. The TESULOID (Technetium 99m-Sulfur Colloid) Kit includes: 1) 5 vials (3 cc. each) of Sterile Sulfur Colloid Reaction Mixture providing 4 mg. sodium thiosulfate, 3 mg. gelatin, 8.5 mg. potassium phosphate, and 0.93 mg. disodium edetate per cc.; 2) 5 Unimatic Disposable Syringes (2 cc. each) containing Sterile 0.25N Hydrochloric Acid Solution providing 9 mg. hydrochloric acid per cc.; and 3) 5 Unimatic Disposable Syringes (2 cc. each) containing Sterile Buffer Solution providing 35 mg. sodium biphosphate and 10 mg. sodium hydroxide per cc.

TECHNETOPE II (Technetium 99m) Sterile Generator and TECHNETOPE <u>HiCon</u> (Technetium 99m) Sterile Generator provide a means of obtaining a sterile, non-pyrogenic supply of technetium 99m as sodium pertechnetate.

Warnings: The contents of the syringes in the Renotec Kit and the Tesuloid Kit should <u>not</u> be injected directly into a patient.

Usage in pregnancy—These agents should not be administered to women who are pregnant or who may become pregnant and during lactation unless the indications are exceptional and the need for the agent outweighs the possible potential risk from the radiation exposure involved.

Since sodium pertechnetate **Tc may be taken up by the fetus and excreted in human milk, administration of the preparation during pregnancy and lactation is not recommended.

Formula feedings should be substituted for breast feedings if these agents must be administered to the mother during lactation.

9°aTc-DTPA, 9°aTc-S colloid, and sodium pertechnetate 9°aTc should not be administered to persons less than 18 years of age unless the expected benefit outweighs the hazards. It should be noted that although radiopharmaceuticals are not generally used in individuals under 18, procedures using 9°aTc-DTPA or 9°aTc-S colloid are occasionally necessary in such patients. The low internal radiation dosage of ^{99a}Tc-DTPA makes it a very satisfactory agent when scans of the kidney are necessary in young patients. The low internal radiation dosage of ^{99a}Tc-S colloid makes it a very satisfactory agent when liver or spleen scans are necessary in young patients.

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

When obtaining elutions from Technetope II (Technetium 99m) Sterile Generator and TECHNETOPE <u>HiCon</u> (Technetium 99m) Sterile Generator proper radiation safety precautions should be maintained at all times. The column containing ⁹⁹Mo must not be removed from the lead shield at any time. There is a high radiation field surrounding an unshielded column. Solutions of sodium pertechnetate ^{99m}Tc withdrawn from the generator should always be adequately shielded. The early elutions from the generator are highly radioactive.

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. Use a fresh milking tube and collecting vial for each elution; sufficient equipment is provided for this purpose. Do not administer material eluated from the generator if there is any evidence of foreign matter. NOTE: The Renotec (Technetium 99m-Diethylenetriamine Pentaacetic Acid [DTPA]) Kit and the Tesuloid (Technetium 99m-Sulfur Colloid) Kit are not radioactive. However, after the eluted 99 Tc is added, adequate shielding of the resulting preparation should be maintained.

Precautions: When using radioactive material. care should be taken to insure minimum radiation exposure to the patient (i.e., by using the smallest dose of radioactivity consistent with safety and validity of data) as well as to all personnel directly or indirectly involved with the patient. Before a test is repeated in the same patient, the need should be carefully evaluated; this is especially true in younger patients. Each elution from Technetope II (Technetium 99m) Sterile Generator and TECHNETOPE HiCon (Technetium 99m) Sterile Generator should be assayed before use for 99mTc activity and for the possible presence of 99Mo. Material containing more than 5 microcuries of ⁹⁹Mo per dose of ^{99a}Tc pertechnetate exceeds Atomic Energy Commission limits and should not be administered. Poor gastrointestinal absorption of an oral dose of pertechnetate and resultant low blood radioactivity levels have been observed in the postprandial state, in seriously ill patients, and in a small number of normal, fasting individuals.



Since pertechnetate is concentrated by the gastric mucosa and the salivary glands, secretions of the digestive tract are radioactive and may cause artifacts on the cranial scan. Therefore, all possible care should be taken to avoid extracranial contamination, not only for the protection of patients and of hospital personnel but also to avoid obtaining a falsely positive scan due to extracranial radiation. Any condition which alters the blood-brain barrier or the normal cranial vasculature may cause abnormal areas of increased radioactivity. The brain scan with sodium pertechnetate 99mTc is therefore likely to be abnormal in patients with scalp confusions or acute head injuries. Following a craniotomy, uptake of radioactivity is increased throughout the operative field, usually for only a few weeks but in some instances for prolonged periods. Since cerebral radiographic techniques temporarily affect the blood-brain barrier, brain scanning with sodium pertechnetate 99mTc should precede cerebral angiography when possible, or should be postponed for several days thereafter. A negative brain scan does not rule out the possibility of a lesion and should therefore never be considered diagnostically conclusive. Because the normal vascular structures are more apparent on a 99mTc pertechnetate scan than on a radiochlormerodrin scan, and because the choroid plexus may be visible, it is particularly important to recognize the appearance of a normal brain scan when 99 Tc pertechnetate is used, in order to avoid incorrect interpretation.

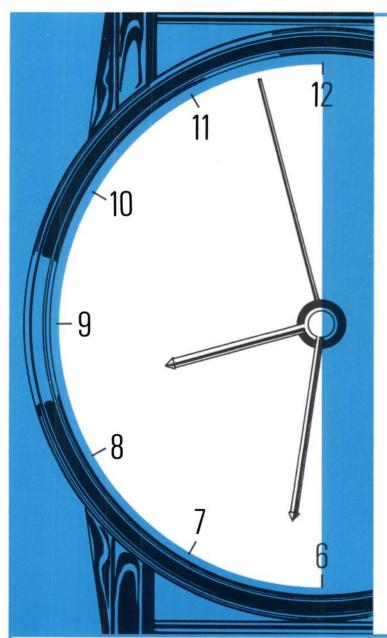
NOTE: The Renotec (Technetium 99m-Diethylene-triamine Pentaacetic Acid [DTPA]) Kit and the Tesuloid (Technetium 99m-Sulfur Colloid) Kit were designed for use with the sodium pertechnetate eluate obtained from a Technetope Sterile Generator. It is recommended that only Technetope Generators be used as the source of sodium pertechnetate with the Renotec Kit and the Tesuloid Kit unless the user has demonstrated that other sources of 99 Tc are consistently compatible and meet the standards of Technetope (Technetium 99m) Generators.



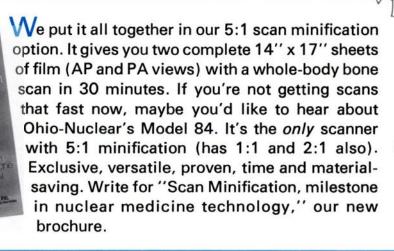
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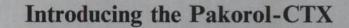
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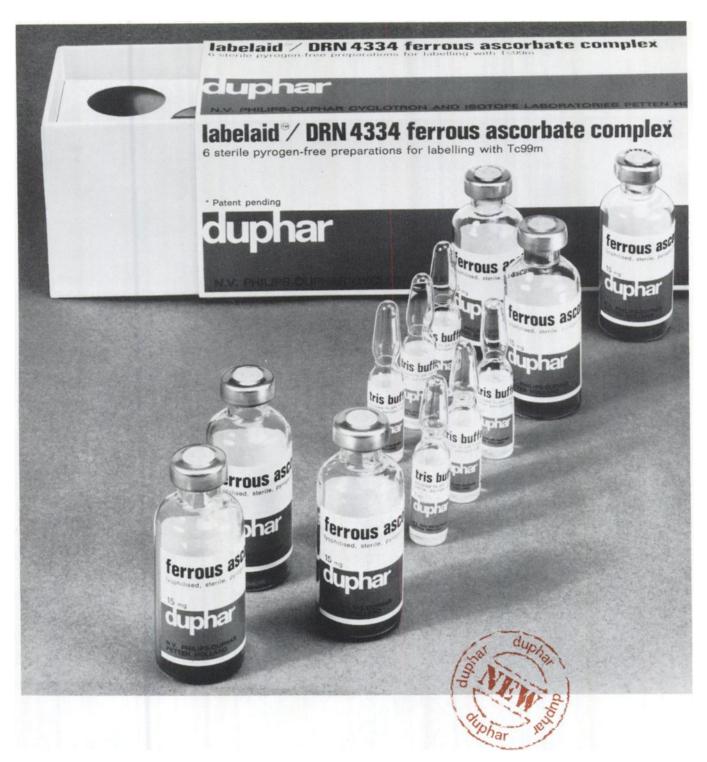
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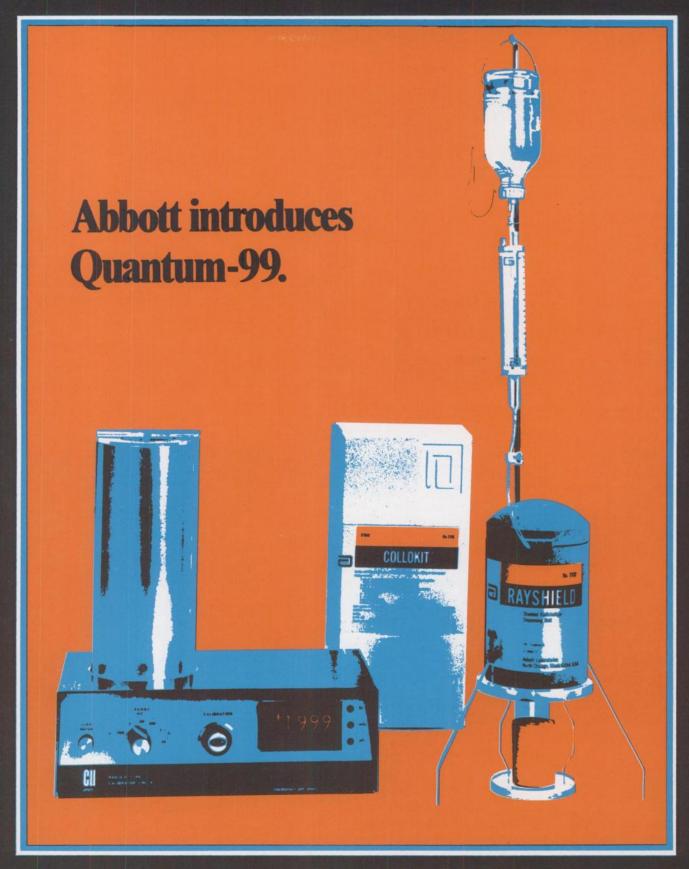


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With Collokit[™]there's never any doubtthe suspension's clear.



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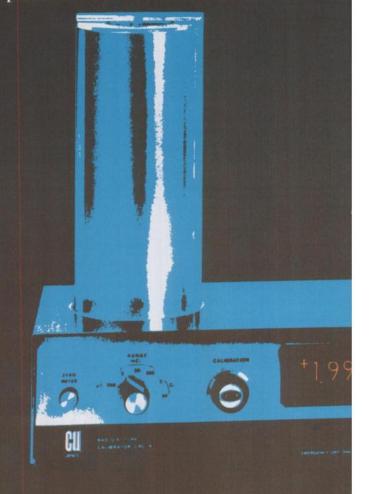
And Collokit^M offers other advantages. There are fewer entries into the reaction chamber than with competitive products and this means the procedure is safer. The suspension is not vented during the heating/cooling cycle, so no outside air is drawn in and the product remains sterile. Convenient, economical individual units contain the components needed for one day's use.

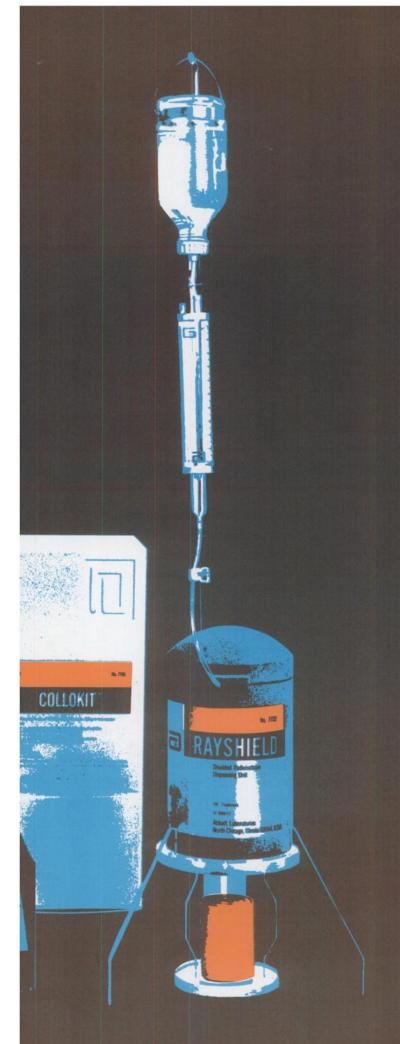
Collokit^{IM} is not recommended for systems with eluates containing oxidizing agents such as sodium hypochlorite. It is intended for use with the PERTGEN®-99 Technetium Generator Kit.



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PERTGEN® is a "Think Thursday" program product, so you save duplicate shipping charges when you order it together with pre-filled, pre-calibrated in vivo "Think Thursday" diagnostic products.





The Capintec CRC-4, the ultimate Dose Calibrator.



Like most Dose Calibrators, the Capintec CRC-4 eliminates the two most common problems, determination of Mo-99 breakthrough and accurate measurement of Tc-99m activity. The similarity ends there.

The CRC-4 offers more features than any previous Dose Calibrator to make it more accurate, more reliable, and easier to use. For instance, a ten turn digital readout potentiometer gives almost unlimited isotope capabilities.

The CRC-4 offers the most advanced Mo assay system currently available, and it handles whole vial assay.

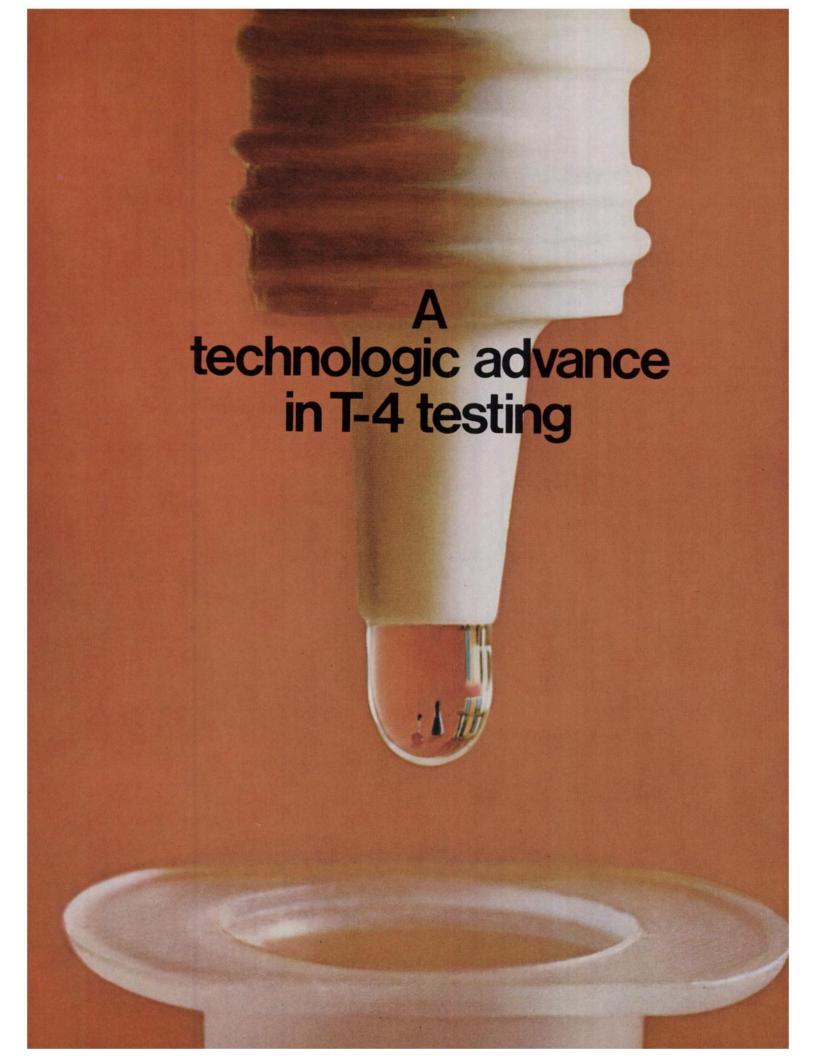
To make it more accurate, an individual background suppression control is built-in to allow you to eliminate background. And your results read out in microcuries, millicuries, or curies on an easy-to-read four digit display panel.

We've designed Quantum-99 to give you more accuracy, convenience and value than any other Tc-99m generator system available. If you want to clear up your doubts about contamination, dosage or breakthrough, talk to your Abbott representative about Quantum-99.



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In a comparative study, results obtained with TETRALUTE showed a correlation coefficient of 0.95 with results obtained with the Murphy-Pattee T-4 method.* Compared to such T-4 tests, however, TETRALUTE eliminates three time-consuming steps and the need for laboratory equipment to perform them. TETRALUTE obviates the need for centri-

fuging of specimens, evaporation to dryness plus incubation and subsequent cooling.

For T-3 testing

TRILUTE® requires fewer manipulations than most other T-3 methods. No timing or incubation is required, and a complete test takes only 20 to 25 minutes, compared to one to two hours with older methods.

Certain clinical conditions and treatment with certain drugs can affect the results of thyroid tests so that a euthyroid patient may appear to be hyper- or hypothyroid. When interfering factors are suspected, a "free thyroxine index" which is more representative of true thyroid status, should be calculated from T-3 and T-4 results.

One of the easiest-to-use counting instruments

For added convenience and reliability, both TETRALUTE and TRILUTE may be used advantageously with THYRIMETER—a self-calculating gamma counting instrument, which displays percent retention automatically and presets all adjustments.

*Braverman, L. E.; Vagenakis, A. G.; Foster, A. E., and Ingbar, S. H.: Evaluation of a Simplified Technique for the Specific Measurement of Serum Thyroxine Concentration, J. Clin. Endocrinol., in press.

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The Pediatric Renal Study

Simplifying Difficult Renogram-Renal Scintiphoto Studies with the Nuclear-Chicago Pho/Gamma® Scintillation Camera Data-Store/Playback System

The methodology for simultaneously producing renograms and renal scintiphotos with ¹³¹I hippuran has been well described. Occasionally the upper urinary tracts may be in proximity to the bladder or an ilial conduit. Positioning with the split-crystal technique then becomes difficult. This is particularly so in infants, or in patients with ilial conduits, cutaneous ureterostomies, or transplanted kidneys. An answer to these problems, however, exists in the area-of-interest specification capabilities of the Nuclear-Chicago Pho/Gamma Data-Store/Playback System. Data may be collected and stored on magnetic tape and then graphically recorded from selected regions of interest to exclude activity from unwanted regions in the resultant renograms.

SETTING UP. The camera is positioned so that the organ of interest is closest to the collimator face. Thus, in renal studies, the detector head would normally be located posteriorly. In renal transplants, however, the detector head may be placed anteriorly. The field of view when using the Data-Store/Playback System may include not only the upper urinary tracts but also the bladder or ilial conduit.

ISOTOPE AND DOSE. For renal transplant evaluation, the vascular phase is recorded with 99 mTc pertechnetate administered in a bolus of 125 μ Ci/lb.

For the renogram-renal scintiphoto study, ¹³¹l hippuran (50-100 μ Ci for children and 100-250 μ Ci for adults) is given intravenously after blocking the thyroid with a single dose of Lugol's solution.

DATA ACCUMULATION. In the renal transplant evaluation, pertechnetate transit through the transplant is recorded within the first two minutes following injection. After this time, background activity may prohibit adequate delineation of the kidney. This phase of the examination is recorded on magnetic tape which is subsequently played back to make Polaroid scintiphotos.

In the renogram-renal scintiphoto study, data is also recorded on the Data-Store/Playback System. While recording patient data, activity within the kidney can be simultaneously monitored on the system's Persistence Scope and recorded on Polaroid film from the "A"-scope of the Pho/Gamma. The

recording is terminated when the majority of the radionuclide has been excreted or there is obvious retention of the radionuclide within the renal collecting system.

Areas of interest are chosen to encompass the kidney or kidneys and to exclude the ureters or urinary bladder. The relative count rates within these defined areas of interest can then be graphically displayed by using the Dual-Pen/Chart Recording System.

CASE HISTORIES. Case Study No. 1: A four-month-old male infant was admitted with a severe electrolyte imbalance following prolonged diarrhea. A cardiac arrest occurred and, subsequently, diminished renal function and a urinary tract infection were documented. While renal function was gradually returning to normal, an intravenous urogram was unsuccessful due to the collecting system being obscured by overlying gastrointestinal debris and gas. A radionuclide renogram was therefore requested.

The proximity of activity within the upper urinary tracts to that within the bladder is illustrated in Figure 1. Split-crystal technique yielded the renogram shown in Figure 2. The irregularity of the tracing is due in part to patient motion. The flatness of the excretion curve results from activity within the bladder. The study was simultaneously recorded on the Nuclear-Chicago Data-Store/Playback System for later evaluation. Electronically selected areas of interest were then positioned over the image of the upper urinary tracts in order to exclude the bladder area (Figure 3). The renogram was then recorded (Figure 4) and a definite excretion pattern is recognized.

Case Study No. 2: This 12-year-old female with chronic pyelonephritis experienced renal failure necessitating hemodialysis. Renal transplant was subsequently performed. During the initial post-operative evaluation of the transplant, the integrity of the vascular anastomosis is demonstrated with a ^{99 m} Tc pertechnetate transit study. The kidney is well outlined during the vascular phase (Figure 5).

The ¹³¹I hippuran study of the transplant was recorded with the Data-Store/Playback System and

An exchange of information on topics related to nuclear medicine, sponsored by: NUCLEAR-CHICAGO



which has more than a passing interest in the field and the people who work in it. then reproduced through a chart recorder. The defined area of interest (Figure 6) resulted in a satisfactory post-transplant renal-function renogram (Figure 7). There is some retention, however, within the slightly dilated ureter. Routine positioning with the split-crystal technique would have led to recording of activity not only from within the kidney, but also from a portion of the dilated ureter (in spite of exclusion of the bladder by oblique positioning of the patient) and an unnecessary artifact would have thus been introduced into the renogram.

DISCUSSION. The technique of simultaneous recording of renograms and renal scintiphotos with the Pho/Gamma has proven to be a versatile method for examining the kidneys. With conventional split-crystal techniques, the existence of data from the bladder presents difficult positioning problems when making renograms. This is also the case with infants within whom the upper urinary tracts are relatively close to the bladder; in ectopically located kidneys, whether congenital or iatrogenic; or when collecting devices such as cutaneous ureterostomies or ilial conduits make routine positioning impossible. However, the Data-Store/Playback System, with its area-of-interest analysis capabilities, provides a means of obviating such positioning difficulties. Only data from pertinent, selected areas are displayed in the renograms.

The transit study through a transplanted kidney has proven of use in the immediate post-operative period. It permits evaluation of the vascular integrity of the renal transplant. In instances where a normal renal outline is not visualized, contrast arteriography should be performed for further evaluation. In addition to vascular obstructions, acute rejection phenomena may slow circulation within the kidney sufficiently to prevent a normal vascular appearance with the radionuclide transit study, regardless of intact vascularity.

CONCLUSIONS. The Data-Store/Playback System minimizes positioning considerations when recording renograms and renal scintiphotos. Areas of interest can be selected to exclude unnecessary and distorting data, thus providing a more significant study for interpretation.

CASE STUDY NO. 1. SIMULTANEOUS RENOGRAM-RENAL SCINTIPHOTO STUDY.

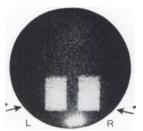


COUNTRY TIME ---

FIGURE 1.

131 SCINTIPHOTO.
POSTERIOR VIEW.

FIGURE 2. SPLIT-CRYSTAL RENOGRAM.



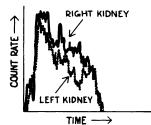


FIGURE 3. AREA-OF-INTEREST SCINTIPHOTO. POSTERIOR VIEW.

FIGURE 4. AREA-OF-INTEREST PLAYBACK RENOGRAM.

CASE STUDY NO. 2. RENAL TRANSPLANT EVALUATION.



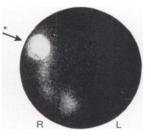


FIGURE 5.
99mTc SCINTIPHOTO.
ANTERIOR VIEW.

FIGURE 6.
AREA-OF-INTEREST

1311 SCINTIPHOTO.
ANTERIOR VIEW.

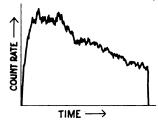
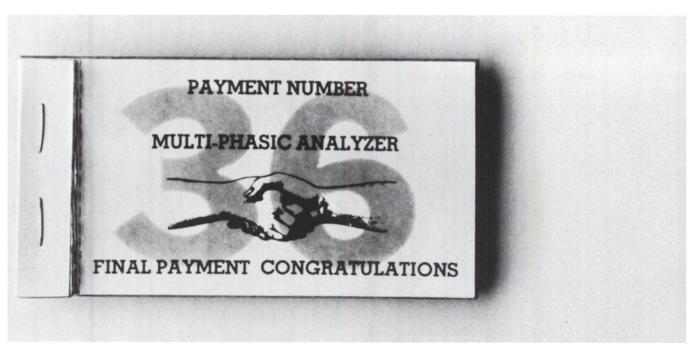


FIGURE 7. AREA-OF-INTEREST RENOGRAM. FULL-CRYSTAL PLAYBACK.

^{*}Arrows indicate the electronically generated areas of interest. Note varied sizes and shapes.

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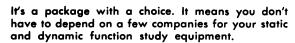
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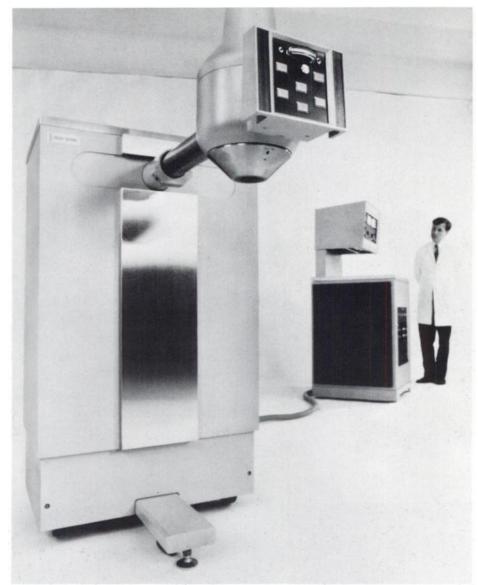
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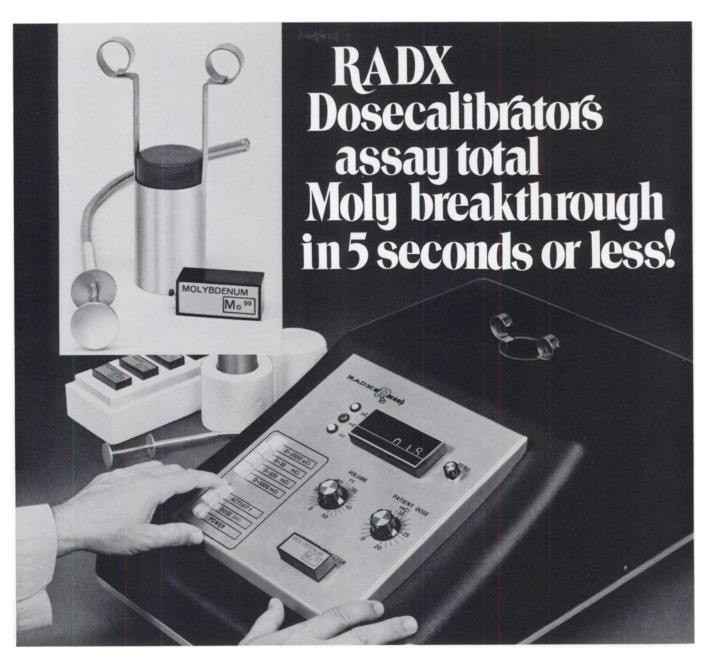
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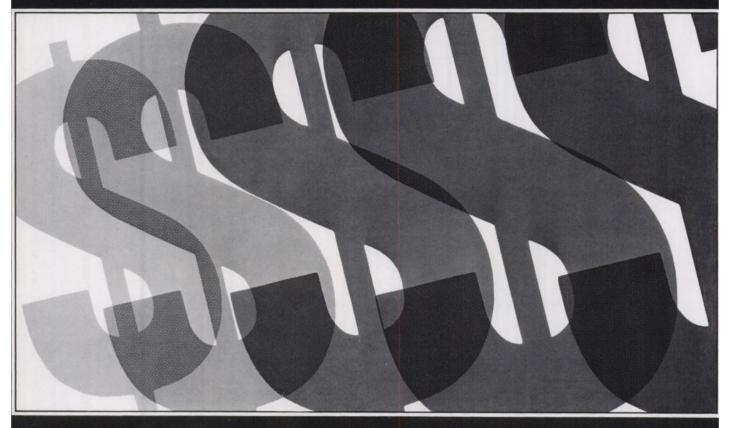


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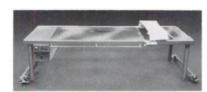
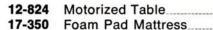


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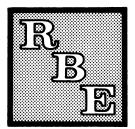
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Now, more than ever in the history of personnel dosimetry, you can use one service because it incorporates all the best features of the present state of the art. We are referring, of course, to Landauer's Gardray⁸ film badge service.

With vapor barrier film wrapping, molded in filters, plus scores of other technical features, today, Gardray⁸ service gives you the key advantages of computerization and automation while delivering the complete benefits of Landauer style attention and concern . . . R. S. Landauer, Jr. & Company, Glenwood Science Park, Glenwood, Illinois 60425 (312) 755-7000

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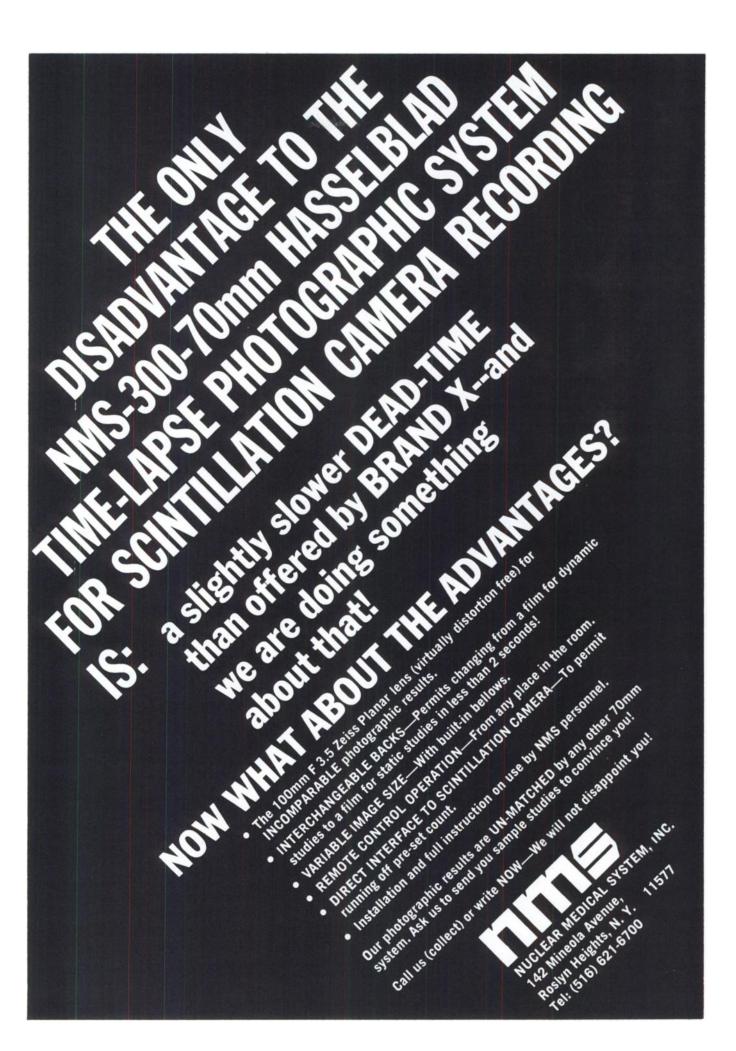
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The difference is critical. The image above shows the result of unbalanced photomultipliers which might necessitate a repeat scan. NEN flood sources provide a clean and efficient method of daily camera check which can easily be performed by a technician.

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The first item is our Technetium-99m Sterile Generator with its specially designed auxiliary shield which provides a total of 3 full inches of lead shielding. Then there's the Mediac® Dose Calibrator which enables you to conveniently assay the technetium and to check for molybdenum. A radium standard is also included to check instrument function and to calibrate the instrument. Also included is a Portable Area Monitor that continually monitors the radiation level in your hot lab. All this for a low weekly service charge—not much more than the cost of the Tc-99m Generator alone.

An extra bonus: after approximately 2 years, all the components become yours! Your only expense after that is for your weekly Technetium Generator.

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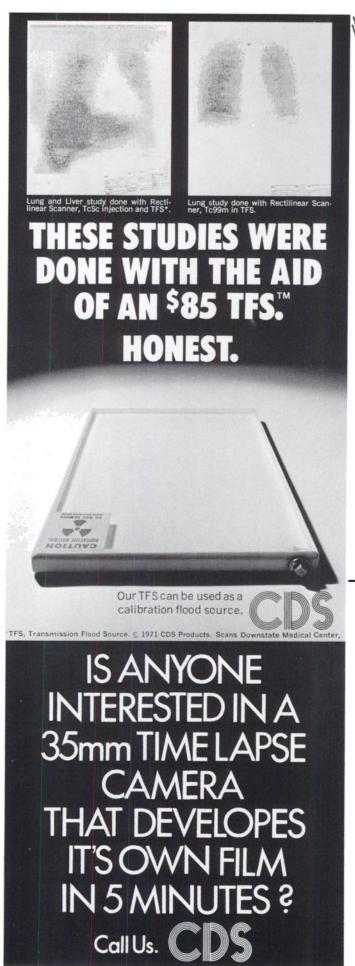
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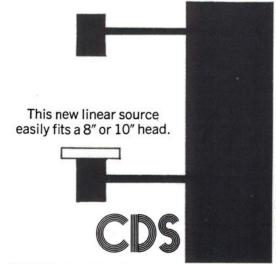
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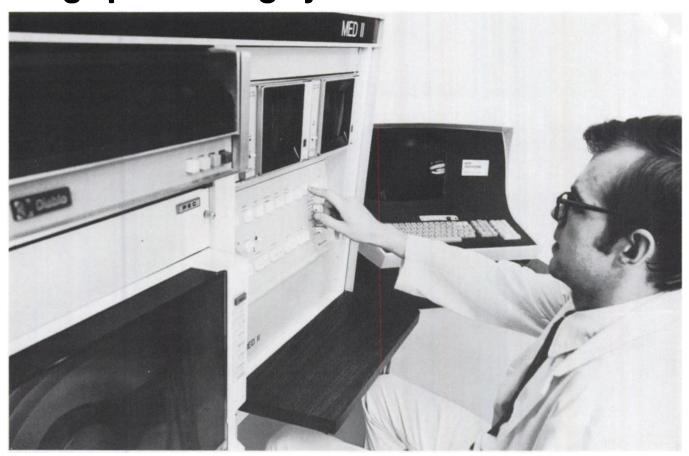


This new Collimat was developed to prevent any artifacts from coming into contact with the collimater face. It's applied as easy as a bandaid. Strip off backing and adhere to collimater face. \$30 per 100.

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MED II has all the clinical capabilities you expect from a computerized image processing system.



But you don't have to be a computer man to use it.

MED II: what it is

MED II is a data acquisition, storage and playback system. But it is also much more. MED II is a diagnostic image enhancer, a clinical data processor, plus a curve analyzer and a fully programmable 16k computer.

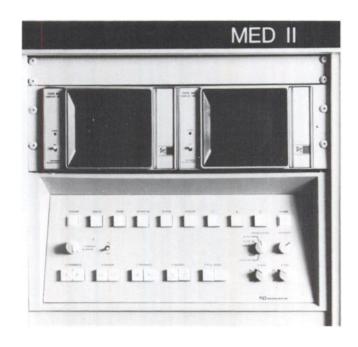
MED II and you

With the MED II, you can record dynamic and static gamma camera images. You can enhance these images in accordance with several clinically tested protocols. You can generate time/activity histograms, and derive data, which cannot otherwise be visualized, from the resultant curves. In addition, you can correct for camera response non-uniformities, add and subtract either sequential or non-sequential images from each other; and perform several additional image manipulation routincs which yield improved visualization and higher confidence levels.

MED II: its different

First, the MED II is pre-programmed. To execute a complex clinical protocol, the operator has only to type in the appropriate two letter command.

Second, image enhancement has been vastly simplified. For example, contrast manipulation is now achieved with continuous action pushbuttons.



Third, the image data are now recorded on a high-speed disc. After a given frame or frame sequence is specified, it can be displayed within milliseconds. And magnetic tape continues to be available for bulk storage.

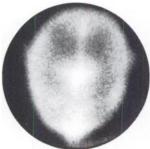
Fourth, the comprehensive image data analysis capability available in Nuclear Data's earlier systems has been extended still further with the MED II. Extraction of exponentials, normalization, curve smoothing and the many additional data analysis routines available with MED II are more refined than ever. And they are easier to execute.

MED II as a storage retrieval system

As a storage device, the MED II records complete studies on a rapid access disc. While acquiring data, frame rates of up to 8 frames-per-second may be specified. If desired, the frame rate may be more rapid during some intervals of the study than others. For example, in a renal function study, it may be desirable to have a rapid frame rate during the first few minutes, and a slower rate during the more gradually changing excretory phase. Another important feature: with the MED II, a recorded frame or frame sequence can be accessed for replay in a matter of milliseconds.

MED II as a static image processor

MED II can be considered a "perception extender." Image enhancement, for instance, allows one to elaborate subtle differences in displayed activity to the point where they can be discerned. Improved delineation of organ contours, lesion boundaries, and other abnormalities are prominant advantages to be gained with the MED II.







Initial analog scintigraph Same data processed by MED II

MED II as a dynamic image data processor

As a dynamic processor, the MED II brings a wide range of data quantification and enhancement into the clinician's repertoire.

Renograms, cerebral blood transit, cardiac and pulmonary function studies are all included among the major dynamic study applications of the MED II. For example, separate areasof-interest within a recorded renal execretion study may be specified by the clinician. These areas-of-interest may be assigned to correspond only to the right and left renal contours, or to regions within the kidneys. Then, after appropriate brief instructions, complete right and left renograms appear on the MED II oscilloscope. Since the renograms represent activity only within the defined areas-of-interest, distorting background data, as well as activity within the ureters and bladder, do not mask renal activity. And in pulmonary function analyses, the ability of the MED II to generate dynamic function curves for up to twelve areas-of-interest means that right versus left lung activity comparisons can be made for six different regions simultaneously. Dynamic activity curves for comparing comparable regions within the cerebral hemispheres and right versus left carotid blood transit can also be available for your evaluation within seconds.



MED II as a fully programmable 16k computer

Nuclear Data has incorporated its own fully programmable ND812 minicomputer into the MED II System. As a result, you can program the MED II to include new protocols.

To enable you to establish additional programs, to modify existing ones, and to apply the ND812 in solving other data analysis problems, Nuclear Data has developed NUTRAN (a variant of FORTRAN). NUTRAN is a powerful programming language originated exclusively for nuclear medicine image data processing. It's designed to let you, the clinician, write your own programs, in English, using a minimum number of instruction steps.

And more!

New technics for obtaining increased diagnostic clinical data through image enhancement and analysis are constantly being developed by ND Data System users. And, with their help, ND has found several ways to make the communication between diagnostician and clinical computer a productive and rewarding interaction.

Write, or call:



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Meet the new fast scanners from Picker.

Why new scanners?

We asked hundreds of people what they liked about scanners. "Resolution," they said. And what didn't they like? "Too slow." Okay, here are two new fast scanners from Picker: the fast Magnascanner® and the fast Dual Magnascanner®. They're improved in other ways, too, as you'll soon see.

What's been changed?

These new Magnascanners are fast instruments because they're computerized. The implication of this is that the entire setting-up procedure has been radically simplified and

speeded. These machines respond to your commands by making many of the decisions (consistent with the desired output, of course) automatically. Since most of the calculations and adjustments are eliminated, the calibration is virtually instantaneous: these Magnascanners can actually be set up for use in a matter of seconds.

Does the computer limit the user's options?

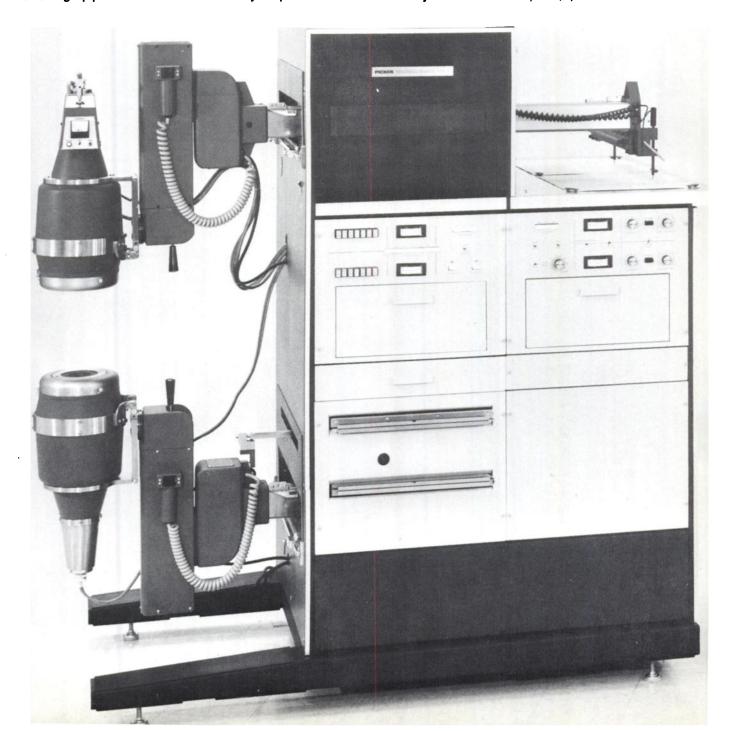
Suppose that you wish to set the scan parameters individually for a specific application. Simple. An alternative manual control overrides the computer and provides maximum flexibility.

What else?

Here are some of the other major user benefits inherent in these new digital Magnascanners.

Consistent scans: with the scan parameters automatically optimized, overall scan quality and consistency are superior and interpretation is improved.

Repeats minimized: automatic calibration provides more consistently usable scans and, hence, minimizes the



annoyance, time, and cost of retakes for you and your patients.

Productivity improved: rapidity of set-up, coupled with the reduction in the need for retakes, significantly reduces total study time.

Training simplified: another obvious advantage of automatic calibration.

Color printer improved: the new color dot scans are simply the highest quality color scans obtainable at any scanning speed. And color ranges are set up automatically.

How about the new, fast Dual Magnascanner?

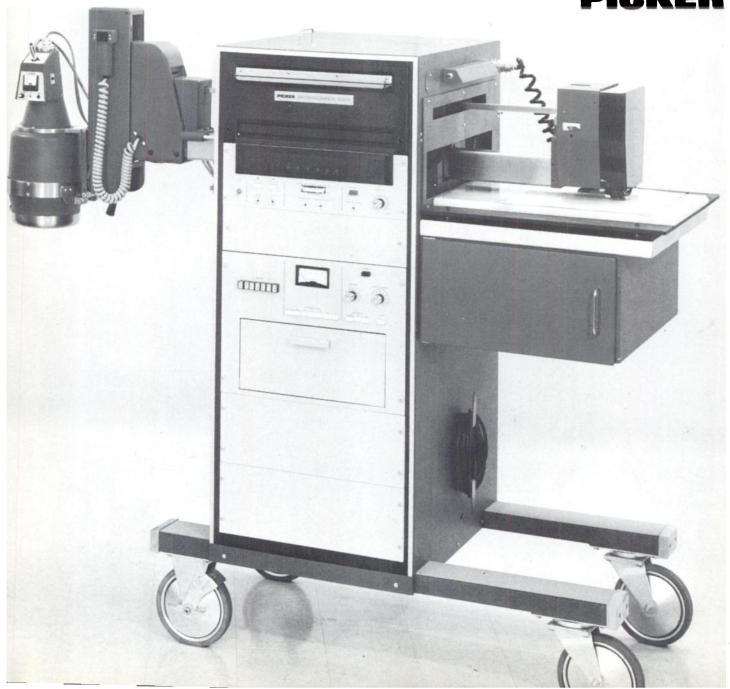
All of the improvements described above are shared by both the new Magnascanner and the new Dual Magnascanner. In addition to these, the Dual Magnascanner also features: dual isotope and subtraction, improved uniformity, and matching of scans between the lower and upper probes.

How do I learn more?

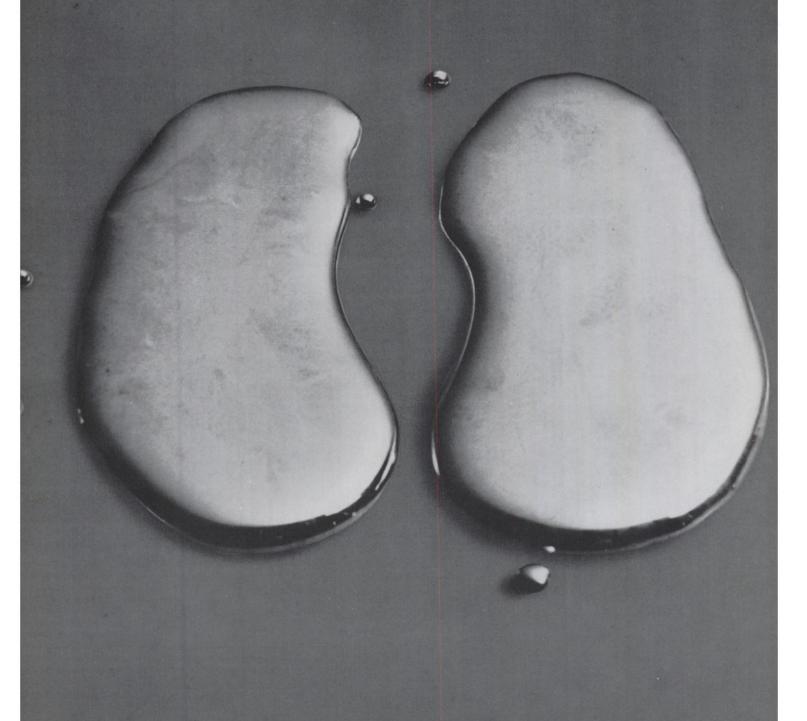
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Squibb takes the mercury out of kidney scanning.



The new Renotec[™] Kit.

(Technetium 99m-Diethylenetriamine Pentaacetic Acid [DTPA])

The Non-Mercurial Renal Scan

A convenient, easy-to-use kit for preparing technetium 99m-DTPA-a renal scanning compound that gives you all these advantages:

 low radiation exposure to the kidnev

 sustained activity in the kidnev for conventional rectilinear scans

 doses prepared in minutes, utilizing 99m Tc eluate from your Squibb generator.

After intravenous injection, 99mTc-DTPA is rapidly cleared by the normal kidney. Sufficient activity remains in the kidney, however, to permit conventional scans at two hours after injection.

Unlike radiomercurial compounds for renal scanning, the much shorter physical halflife of technetium 99m (only six hours) greatly reduces the radiation exposure to the kidney. Toxicity due to DTPA is not a major problem with the dose of chelate administered in subiects with either normal or depressed renal function.

With Renotec, doses can be prepared in minutes, as you need them, utilizing the 99mTc eluate from your Technetope® II (Technetium 99m) Sterile Generator.

New Versatility For Your Squibb Generator

The Technetope II (Technetium 99m) Sterile Generator provides a means of obtaining a sterile, non-pyrogenic supply of technetium 99m for use with two different Squibb diagnos-

netium 99m-DTPA) Kit and the Tesuloid (Technetium 99m-Sulfur Colloid) Kit (an easy-to-use kit for preparing technetium 99m-sulfur colloid solution for liver and spleen scanning).

See next page for brief summary.



New Renotec[™] Kit (Technetium 99m-Diethylenetriamine Pentaacetic Acid [DTPA]) The non-mercurial renal scan.

The RENOTEC (Technetium 99m-Diethylenetriamine Pentaacetic Acid [DTPA]) Kit includes: 1) 5 vials (2 cc. each) of Sterile Reaction Solution providing 5 mg. ferric chloride per cc. and 2.5 to 5 mg. ascorbic acid per cc.; 2) 5 Unimatic® Disposable Syringes (2 cc. each) containing Sterile 0.07N Sodium Hydroxide Solution providing 2.8 mg. sodium hydroxide per cc.; and 3) 5 Unimatic Disposable Syringes (2 cc. each) containing Sterile DTPA Solution providing 2.5 mg. diethylenetriamine pentaacetic acid per cc.

The TESULOID (Technetium 99m-Sulfur Colloid) Kit includes: 1) 5 vials (3 cc. each) of Sterile Sulfur Colloid Reaction Mixture providing 4 mg. sodium thiosulfate, 3 mg. gelatin, 8.5 mg. potassium phosphate, and 0.93 mg. disodium edetate per cc.; 2) 5 Unimatic Disposable Syringes (2 cc. each) containing Sterile 0.25N Hydrochloric Acid Solution providing 9 mg. hydrochloric acid per cc.; and 3) 5 Unimatic Disposable Syringes (2 cc. each) containing Sterile Buffer Solution providing 35 mg. sodium biphosphate and 10 mg. sodium hydroxide per cc.

TECHNETOPE II (Technetium 99m) Sterile Generator provides a means of obtaining a sterile, non-pyrogenic supply of technetium 99m as sodium pertechnetate.

Warnings: The contents of the syringes in the Renotec Kit and the Tesuloid Kit should not be injected directly into a patient.

Usage in pregnancy—These agents should not be administered to women who are pregnant or who may become pregnant and during lactation unless the indications are exceptional and the need for the agent outweighs the possible potential risk from the radiation exposure involved.

Since sodium pertechnetate **omTc may be taken up by the fetus and excreted in human milk, administration of the preparation during pregnancy and lactation is not recommended.

Formula feedings should be substituted for breast feedings if these agents must be administered to the mother during lactation.

omTc-DTPA, omTc-S colloid, and sodium pertechnetate omTc should not be administered to persons less than 18 years of age unless the expected benefit outweighs the hazards. It should be noted that although radiopharmaceuticals are not generally used in individuals under 18, procedures using omTc-DTPA or omTc-S colloid are occasionally necessary in such patients. The low internal radiation dosage of omTc-DTPA makes it a very satis-

factory agent when scans of the kidney, brain, or blood vessels are necessary in young patients. The low internal radiation dosage of **Tc-S colloid makes it a very satisfactory agent when liver or spleen scans are necessary in young patients.

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

When obtaining elutions from Technetope II (Technetium 99m) Sterile Generator, proper radiation safety precautions should be maintained at all times. The column containing "Mo need not be removed from the lead shield at any time. There is a high radiation field surrounding an unshielded column. Solutions of sodium pertechnetate ** Tc withdrawn from the generator should always be adequately shielded. The early elutions from the generator are highly radioactive. Important: Since material obtained from the generator may be intended for intravenous administration, aseptic technique must be strictly observed in all handling. The stoppers of the eluent bottle, of the elution tube, and of the collecting vial, as well as both rubber closures in the generator column, should be swabbed with a suitable germicide before each entry. All entries into the generator column must be made aseptically with sterile needles. Only the eluent provided should be used to elute the generator. Use a fresh milking tube and collecting vial for each elution; sufficient equipment is provided for this purpose. All equipment used to collect or administer sodium pertechnetate Tc must be sterile. Do not administer material eluted from the generator if there is any evidence of foreign matter. NOTE: The Renotec Kit and the Tesuloid Kit are not radioactive. However, after the eluted **omTc is added. adequate shielding of the resulting preparation should be maintained.

Precautions: When using radioactive material, care should be taken to insure minimum radiation exposure to the patient (i.e., by using the smallest dose of radioactivity consistent with safety and validity of data) as well as to all personnel directly or indirectly involved with the patient. Before a test is repeated in the same patient, the need should be carefully evaluated; this is especially true in younger patients.

Each elution from Technetope II (Technetium 99m) Sterile Generator should be

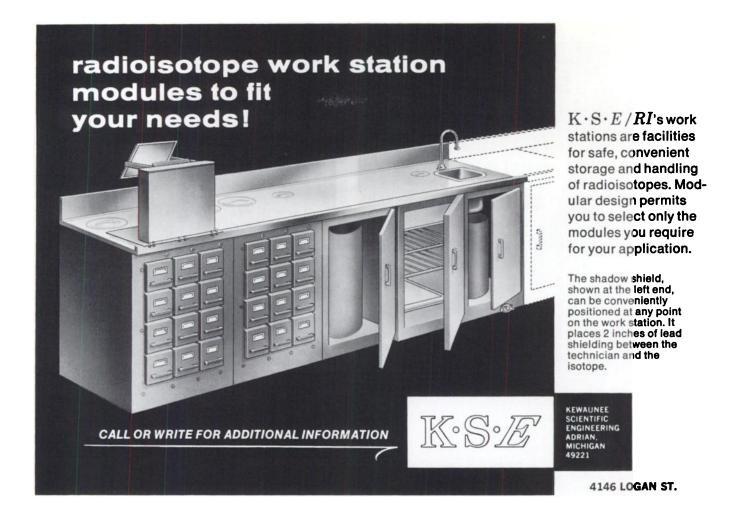
assayed before use for 90m Tc activity and for the possible presence of "Mo. Material containing more than 5 microcuries of ⁹⁰Mo per dose of ⁹⁰mTc pertechnetate exceeds Atomic Energy Commission limits and should not be administered. Poor gastrointestinal absorption of an oral dose of pertechnetate and resultant low blood radioactivity levels have been observed in the postprandial state, in seriously ill patients, and in a small number of normal, fasting individuals. Since pertechnetate is concentrated by the gastric mucosa and the salivary glands, secretions of the digestive tract are radioactive and may cause artifacts on the cranial scan. Therefore, all possible care should be taken to avoid extracranial contamination, not only for the protection of patients and of hospital personnel but also to avoid obtaining a falsely positive scan due to extracranial radiation. Any condition which alters the blood-brain barrier or the normal cranial vasculature may cause abnormal areas of increased radioactivity. The brain scan with sodium pertechnetate ** Tc is therefore likely to be abnormal in patients with scalp contusions or acute head injuries. Following a craniotomy, uptake of radioactivity is increased throughout the operative field. usually for only a few weeks but in some instances for prolonged periods. Since cerebral radiographic techniques temporarily affect the blood-brain barrier. brain scanning with sodium pertechnetate ** Tc should precede cerebral angiography when possible, or should be postponed for several days thereafter. A negative brain scan does not rule out the possibility of a lesion and should therefore never be considered diagnostically conclusive. Because the normal vascular structures are more apparent on a 90mTc pertechnetate scan than on a radiochlormerodrin scan, and because the choroid plexus may be visible, it is particularly important to recognize the appearance of a normal brain scan when som Tc pertechnetate is used, in order to avoid incorrect interpretation.

NOTE: The Renotec Kit and the Tesuloid Kit were designed for use with the sodium pertechnetate eluate obtained from a Technetope II Sterile Generator. It is recommended that only Technetope II be used as the source of sodium pertechnetate with the Renotec Kit and the Tesuloid Kit unless the user has demonstrated that other sources of Technetope II.

SQUIBB

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To check the performance of your Scintillation Camera or Scanner, you need...

HINE REFERENCE PHANTOM

Offers the simplest, most efficient means of securing optimum camera or scanner performance with respect to depth resolution, uniformity of response, and sensitivity. Changes in instrument output can be delineated quickly, and the best operating conditions can be established readily. The spectrometer window, the display system, the collimator performance, and the total counts can be optimized for a particular application.

Has a 9" diameter and simulates the physical conditions prevalent for large-organ scanning. With a volume of about 730 ml, it approximates the scattering which has a great effect on the performance of cameras and scanners.

The Phantom can be filled with a solution of a radionuclide chosen according to the application for which the camera or scanner should be tested. Typically, 300 μ Ci of I-131 or 1 mCi of Tc-99m are used most frequently.

76-800 Hine Reference Phantom \$150.00

FLOOD PHANTOM

For obtaining optimum scintillation camera performance with respect to uniformity of response over the entire crystal area. Consists of a square plastic form, 15" x 15" x 1" thick that has a circular cavity 13.5"D. x 0.5" deep. A solution containing approximately 1 mCl of Technetium-99m, or any other suitable radioisotope, may be placed in the cavity via a filling port.

76-805 Flood Phantom \$90.00

BAR PHANTOM

Provides a simple and effective means of checking a scintillation camera's intrinsic resolution, collimator spatial resolution, field size and linearity. Consists of four sets of lead bars, 1/2", 3/8", 1/4" and 3/16" wide respectively, embedded in a 16" x 16" x 1/2" lucite holder.

76-808 Bar Phantom.....\$195.00



Hine Phantom



Flood Phantom



Bar Phantom

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For more details, ask for Bulletin 88-B



NUCLEAR ASSOCIATES, INC.



The ruggedized meter has an easy-to-read four-decade logarithmic scale. This log read-out prevents scale "searching" in rapid-change situations and greatly reduces the likelihood of reading errors. Operation is simple.

There are three LOG-SERIES models to choose from, depending on the kind of sensitivity you need. You also have a choice of charge/alarm bases. Clicker (one click for every radiation event detected) or warbler (pulsating alarm tone at the level you preselect, plus a red warning light).

And remember, our portable LOG-SERIES is also an area monitor. Very practical. Very efficient. And not very expensive. For complete details and specifications, write for our 9100 Series data sheet. 1-216



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No competition.

Elscint 5" scanner with 26 <u>new</u> advantages!

We say the new 5" Elscint scanner has no competition because it cannot be compared with any existing scanners. It is not a "me too" approach, with minor improvements here and there. It is a major breakthrough in scanner design. There are at least 26 new performance advantages that simplify operation, improve scan quality and deliver better information for quicker, more accurate diagnoses.

Elscint advances range from the important benefit of closed-loop position

control with optical encoders to the simple convenience of a warning signal when the dot printer's carbon ribbon has less than one full scan capacity left!

Another typical Elscint breakthrough is the production of photoscans with film exposure in direct linear proportion to the count rate . . . you can actually scale radiation intensity, where always before film density was a vague approximation of the count!

You'll want to know what all the other Elscint advantages are — and the many spectacular new options available, including telephone transmission of scans to save your time and energy. Fill out the coupon and we'll provide details promptly. You can be using the 'no-competition' scanner in 90 days if you order right away!

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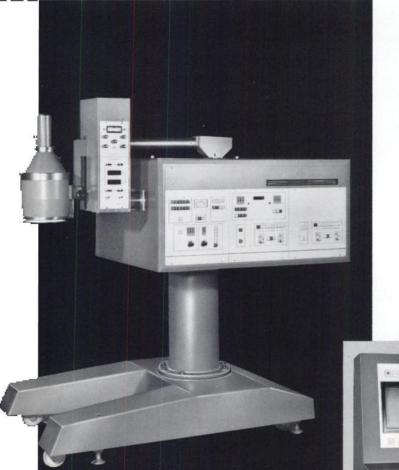
ELSCINT INC.

INSTRUMENTATION FOR NUCLEAR MEDICINE 469 Fullerton Avenue, Elmhurst, Illinois 60126

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Scan reading and manipulation takes on an entirely new dimension! Digital count can be manipulated without scan loss for profiles, isocounts, areas of interest, hot and cold spots . . . all pushbutton operated! Get details with coupon.

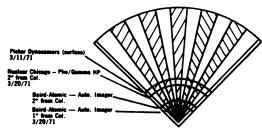


The Camera with the Scanner image.

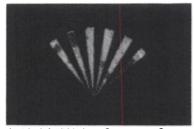
A closer look at the old image surrounding Cameras, and at the new images being generated at Baird-Atomic.

By Johan Govaert and Frank Troiani

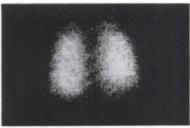
Star Phantom⁵⁷ Co 1 mc



Drawing of Star Phantom (Separation of radiants imaged all the way down to the separation of 2 to 2.5mm by Autofluoroscope)



1. Model 5700 Autofluoroscope® 140,000 counts, 80 seconds 2 inches from Standard Collimator (All defects — bubbles — are accurately imaged. Separation of radiants imaged by Autofluoroscope at 2 to 2.5mm)



4. Model 5700 Autofluoroscope Positive Mode: lungs



2. Pho/Gamma-HP 50,000 counts, 70 seconds 2 inches from High Resolution Collimator

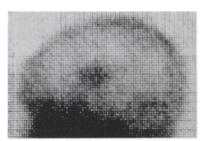


3. Dynacamera™ On surface of Collimator



5. Model 5700 Autofluoroscope Positive Mode: liver/spleen

Positive Brain Study



1. Model 5700 Autofluoroscope Left lateral 0% BS



3. 5 inch Rectilinear Scanner Left lateral



2. Model 5700 Autofluoroscope Anterior 0% BS



4. 5 inch Rectilinear Scanner Anterior

Patient: 66 year old male. CVA. Isotope: 10 mc 99mTc.

Traditionally, of course, Cameras have been valuable because of their through-put capabilities. That certainly is not an insignificant contribution to nuclear medicine. But one which we here at Baird (and no doubt elsewhere) have not been willing to leave alone. After all, there is a lot more to the picture — if you will — than that.

All of which has led B/A to several years of intensive and extensive work. Our Camera, the Autofluoroscope®, has always done a satisfactory job in the area of statics. But there, too, we were far from satisfied.

What we wanted was better image. Or, if possible, a whole new kind of image. We became determined to make our Camera produce images which were a significant order of magnitude better. We wanted images that could approach those obtainable by the Scanner.

And as of now, we've got it.

This comparative Star Phantom study shows that. Picture number 1 shows Baird's Model 5700 Autofluoroscope's image compared to those of the Nuclear Chicago Pho/Gamma HP® and the Picker Dynacamera™ in pic- SVC

tures 2 and 3, respectively.

One thing which you'll notice right off is the accuracy with which the Autofluoroscope has imaged all defects—eg bubbles. And that the star radiants are imaged all the way down to the separation of 2 to 2.5mm.

Now take a look at pictures number 4 and 5. They show the Autofluoroscope's ability to image large organs – lungs and liver/spleen – in the

positive mode.

All right. From there, let's pass on to a Positive Brain Study. This is of a 66 year old male, CVA. The isotope dosage is 10mc 99mTc. Pictures 1 and 2 are made by the Model 5700 Autofluoroscope. Pictures 3 and 4 are of the same man, same data, but made by the 5-inch Rectilinear Scanner.

Quite frankly, we never expected the Camera to come along quite this far. We're getting the imaging capability, the clarity, the resolution from the Autofluoroscope that you'd only expect from the Scanner. With none of the narrow-focus problems. None of the concern for missing a lesion by being at the wrong depth.

Study the definition. Especially in the posterior fossa area. See how the

skull shows up.

Quality of image. Depth of image. All the way through the head. The implications are fantastic.

But that's not all.

Finally, let's look into serial imaging. We have proven capability in quantitative function studies. Now, as you can see, we also offer exceptional clarity visualization of dynamic events. This cardiac study pretty much speaks for itself. It's a radio isotopic angiocardiogram, anterior view, of a normal subject.

It represents a Camera advance that's almost too good to be true. And, as a matter of fact, we could hardly believe it ourselves when we saw what we'd done.

But it is true.

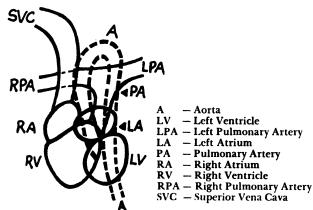
What this means is that Baird-Atomic has taken the Autofluoroscope and compounded its value by giving it imaging capabilities like those of the Scanner. In both statics and dynamics.

And the whole point is that, as of now, the Autofluoroscope isn't like any other Camera. It's virtually a new kind of instrument (incidentally, all the capabilities that we've talked about here can be readily installed in existing Autofluoroscopes).

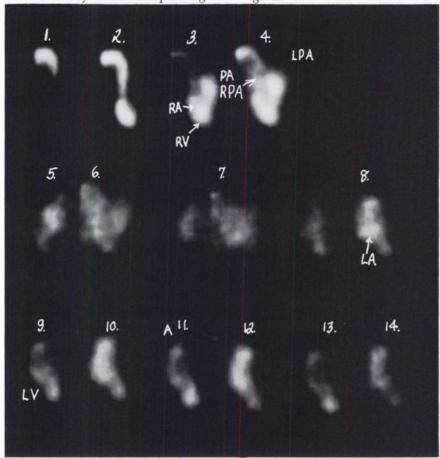
Write us, or call us. Because there's a lot more to be said.

$\frac{B}{A}$ baird-atomic, inc.

125 Middlesex Turnpike Bedford, MA 01730. (617) 276-6208 Baird-Atomic Limited, Braintree, Essex, England. Baird-Atomic (Europe) N.V., The Hague, The Netherlands.

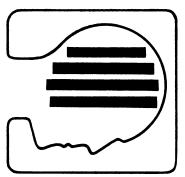


Cardiac Study. Radioisotopic Angiocardiogram



1. Radioactive bolus enters superior vena cava. Frames 157-160, .0-.8 secs. 2. Bolus continues onto right atrium and right ventricle. Frames 161-164, .8-1.6 secs. 3. Clear visualization, right atrium, right ventricle and main pulmonary artery. Frames 165-168, 1.6-2.4 secs. 4. Bolus branches into right and left pulmonary arteries. Frames 169-172, 2.4-3.2 secs. 5. & 6. Bolus completes passage from heart to lung. Frames 173-176, 3.2-4.0 secs; frames 177-180, 4.0-4.8 secs. 7. Bolus in the lung field. Frames 185-188, 5.6-6.4 secs. 8. Bolus, now strung out, enters left side of heart (left atrium) clearly visualized. Frames 193-196, 7.2-8.0 secs. 9. Bolus in left ventricle, and passing up aorta. Frames 197-200, 8.0-8.8 secs. 10, 11, 12, 13, 14. Continuing passage of the activity through left atrium, left ventricle and aorta. Increased activity in left ventricle (11 and 13) and corresponding activity-increase in aorta (10 and 12) suggest delineation of heart contractions. Frames 201-220, 8.8-12.8 secs.

Anterior view, normal subject. 12.4 mc 99m Tc. I.V. Accumulation time .2 sec. per frame.



Isotope tomography is here.

Here's what Nuclear-Chicago's Pho/Gamma

Tomocamera™ System offers you (in addition to full, conventional capabilities of the Pho/Gamma Scintillation Camera):

Four equally spaced, in-focus planes simultaneously displayed.

Variable spacing of equally separated focal planes—from 1/2 to 1-1/2 inches.

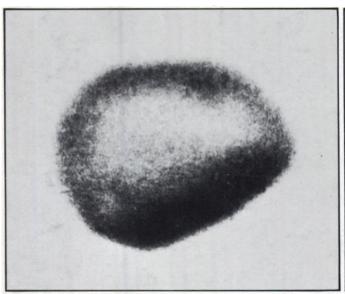
Distance from collimator to farthest focal plane is variable to 7-3/4 inches.

Pho/Gamma tomographic images can be recorded, replayed, and analyzed with the Pho/Gamma Data-Store/Playback-System.

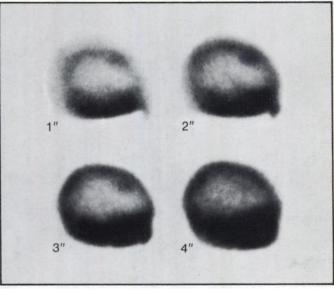
Obscuring events above and below each plane of focus are effectively "tuned out."

And much more.

Your Nuclear-Chicago Sales Engineer has all the details. Or write us. 0-240



Brain, right lateral view. Standard scintiphoto.



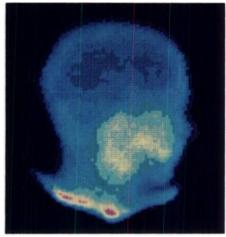
Brain, right lateral views presented simultaneously in a single tomographic scintiphoto. Lesion in right frontal region is delineated best at 2- and 3-inch depths. Surgery revealed well differentiated adenocarcinoma.





2000 Nuclear Drive, Des Plaines, Illinois 60018, U.S.A. Donker Curtiusstraat 7, Amsterdam W. The Netherlands CM-203

If you were the patient, you wouldn't want less.



Unenhanced Scintigram

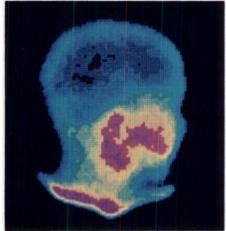


Image enhancement range: 8-70% of maximum count

That is, you wouldn't want less than Picker's Image Enhancement System. This system, coupled to our Dynacamera™ 2, provides diagnostic information that just cannot be matched by any other nuclear medicine imaging system of any kind. Anywhere.

When the lesion is elusive, it is this system that provides the wherewithal for its confident visualization.
What "couldn't quite be seen" with other gamma imaging systems, becomes discernible with this one.
And certainly this is the ultimate challenge for any such system.

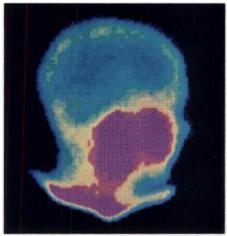


Image enhancement range: 3-55% of maximum count

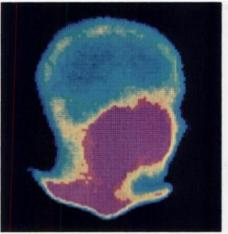


Image enhancement range: 5-50% of maximum count

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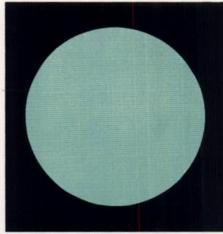


Picker's Image Enhancement System. How does it work?

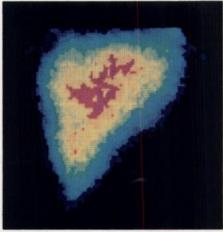
Basically, by providing complete uniformity correction, contrast enhancement, background suppression, and color readout. These features, functioning in concert, provide the mechanism for differentiating the frequently too subtle gradations between normal and pathologic tissue and for eliminating the false positives caused by instrument artifacts.

In effect, this computerized system improves the "target-to-nontarget ratio." Actually, by using two image views (e.g., AP and lateral), one achieves a form of electronic or "computer tomography." The two views accurately locate the lesion and enhancement removes the interfering counts of nontarget tissue in order to permit clearer visualization of the target tissue. (It is worth noting that conventional tomographic techniques cannot suppress these superfluous counts and, hence, cannot improve the target-to-nontarget ratio.)

A word about the computer part of this system. This is fiddle-free computerization because we've done all of the programming work. The clinician spends his time diagnosing, not engineering. And this system can



Uniformity corrected flood field



A P Liver

be plugged in and used immediately because all the required programming is supplied. Further, user entry of essential data is simple because the programming format involves a logical sequential dialogue between the user and the instrument.

Finally, we offer two intriguing accessories for this Image Enhancement System. One is a Pulmonary Analysis Accessory that actually computes and anatomically relates xenon ventilation/perfusion indices automatically. Other applications of this accessory include time-compressed storage and playback of gamma images. The second accessory that's generating excitement is a Dynamic Function Study Accessory that achieves two things: it is the most flexible method for studying and quantitating organ dynamics; it also functions as an image bank capable of storing 2,000 images per tape (typically two months' work).

These are the highpoints. The complete story is available from your local Picker representative. Or write to Picker, 333 State Street, North Haven, Connecticut 06473. Or complete the attached Reply Card.

☐ Image Enhancement System.	
☐ Dynacamera 2.	□ Dynamic Function Study Accessory
☐ Please have your representative call for	an appointment.
Name	
Title	
Department	
Institution	
Address	
	Zip
Phone	

