

If you know get to know



Triosorb®-125 T-3 Diagnostic Kit*

The in vitro test unmatched for reproducibility, convenience and accuracy.

Reproducible. Over 15 million tests conducted over the past eight years have made Triosorb® the standard of T-3 tests.

Convenient. The disposable Triosorb® Kit is ready for immediate use at room temperature making it one of the simplest, most convenient thyroid function tests available.

Accurate. Approximately 15 drugs and conditions produce misleading Triosorb®-T-3 test results, compared with over 200 factors which affect PBI.

* Also available as Triosorb®-131.



Tetrasorb®-125 T-4 Diagnostic Kit

An improved, simplified method for measuring total *serum* thyroxine with diagnostic accuracy equal to or better than any currently used measures of thyroid function. Unlike other tests, exogenous iodines don't affect Tetrasorb® results.

one of these, them all.

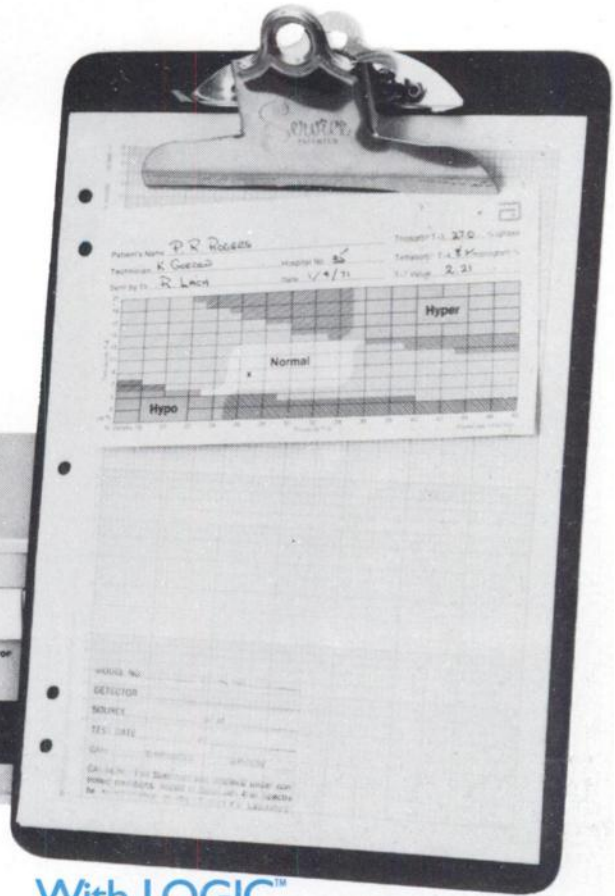


The T-7 value completes
the thyroid profile.

It's the Abbott method for determining the in vitro free thyroxine index.

T-7 is not a test but a numerical value derived from the multiplication of T-3 and T-4 test values. Because it is a product of two other numbers, the *T-7 value* will move only when both the T-3 and T-4 values move in the *same direction*. There are *only two* physiological conditions which cause this to occur, *hypothyroidism* and *hyperthyroidism*. With the exception of those patients receiving liothyronine or d-thyroxine therapy, all other factors which affect thyroid function tests will cause the T-3 and T-4 values to move in opposite directions, and the T-7 value to remain in the normal range.

When you provide the Abbott T-3, T-4 and T-7 values you furnish a complete thyroid profile with unparalleled clinical accuracy.



With LOGIC™
your final step is as easy as 1,2,3.

1. Establish a baseline.
Pre-set count for 10,000; read the required time from the NIXIE tubes.
2. Take a post-wash reading.
Pre-set *timer* for the baseline established in step 1.
3. **Read the percentage uptake** directly from the NIXIE tubes.
LOGIC™ provides direct ratio readout in percentage.
No conversions or calculations needed.
Minimal chance for error.



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With every shipment of a Raytheon isotope scanner, you get a free Mike Bono.

Mike is our customer assurance specialist. And wherever our isotope scanning equipment goes, so goes Mike.

Not a salesman, not a serviceman, he's something more. A bonus for you, really. It's his job to insure that every Raytheon nuclear scanner is operating at peak efficiency in its new environment. That includes supervising the installation, training the staff, even running response curves and grey scales if need be. In short, Mike is the link between our equipment's arrival and

your acceptance.

His credentials? Over ten years' experience in nuclear medicine, including the teaching of various aspects of the science. Now if all this sounds like our equipment needs the help, it's just not so. The truth is though you didn't order Mike, and you may not even need him at all, we just thought you deserved the extra assurance. Raytheon Company, Medical Electronics, 190 Willow Street, Waltham, Mass. 02154. Telephone: 617-899-5949.

In medical electronics . . . Raytheon makes things happen.

RAYTHEON

all this...and a generator too.

What you want is Technetium-99m. What you get from New England Nuclear is that and a lot more.

The can opener we supply for example. Other extras are more important. Like the fractional elution and assay kits and the MOLY-CODDLE™ radiation reducer.

Then there are things you don't see, like our testing of every generator we ship for sterility, non-pyrogenicity, Molybdenum-99, aluminum, and alumina and other particulates. And perhaps most important, the people at NEN, who are dedicated to getting your generator to you when you want it, and who are there when you need them.

NEN New England Nuclear
Radiopharmaceutical Division

Atomlight Place, North Billerica, Mass. 01862
Telephone (617) 667-9531



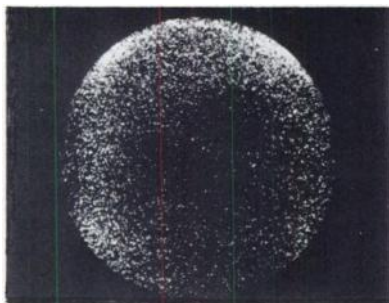
Why should you consider an image-data handling system for your nuclear medicine department?

You probably shouldn't! — Unless you agree with the following:

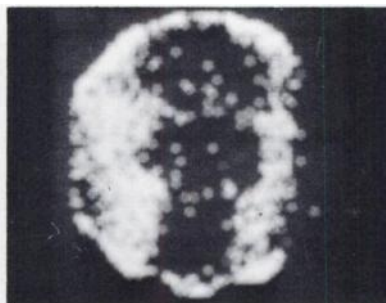
Is it clinically useful?

Intertechnique Model 33 Digital Cinescintigraphy Systems, for example, have been operating in clinical laboratories for well over a year. And, as such, both the static- and dynamic-image visual-

ization and manipulation capabilities have been demonstrated to be clinically useful, as concisely illustrated by the static studies below:



Placental localization viewed on a Picker Dynacamera (L) and on an Intertechnique DCS (R). Interpretation of low-lying, right-sided placenta confirmed at surgery.



Pancreas visualization performed using ^{75}Se to obtain liver-pancreas image followed by $^{99\text{m}}\text{Tc}$ image subtracted from the composite.

Courtesy of the Nuclear Medicine Dept., J.F.K. Community Hospital, Edison, N.J.

But, much of the systems' value lies with dynamic study analysis capability. Here, it is possible to record flow-study image data as blocks (similar to frames in cineradiography) on digital tape. The recorded study can be subsequently replayed: as it was originally recorded (similar to a motion picture); with blocks added together to effectively change, in retrospect, the store time per frame; with all or just selected blocks summed to gen-

erate a cumulative image; or as curves of activity vs. time from selected areas of any shape. Of course, the displayed image can be manipulated in the same way as static images.

Clearly, then, this system serves not only as a tool to reduce false positives, but also as a means for earlier detection of abnormalities.

Who would ultimately pay for the cost of a DCS?

Certainly, the patient would bear part of the expense, but it need not be through an increase in the cost of each study. If you now have a gamma camera, consider the number of additional studies you will be able to perform with a gamma camera/DCS combination: For example, consider studies such as cardiac and cerebral flow; dynamic function studies such as ventilation-perfusion and renal uptake. Consider also that you will now be able

to perform dual-isotope studies such as pancreas visualization, illustrated above. Further, the ability to resolve fine detail, especially since it is in retrospect, can help to make studies such as placental localization a standard procedure.

So it can be seen that just a few additional studies per week would easily offset the cost of, say, a Model 33 DCS.

But how can this instrument fit into your expanding nuclear medicine department — in fact will it even fit in the room?

This brings up another important consideration. Since all the studies performed on your gamma camera (and, if you wish, your rectilinear scanner as well) can be recorded on digital tape with coding related to patient name, your staff can perform a day's work more quickly and efficiently. The clinician can then review each case at a time convenient to his schedule and evaluate each study with all the power of image-data manipulation at his disposal. The diagnoses of a day's studies, then, are obtained with the same degree of efficiency as recording of the studies, but the image-handling time is greatly reduced. In fact, replay can be in as little as about 1/500th the recording time, although 1/20 or

1/30 is more common. Also, Polaroids for the patient's file can be snapped, when deemed necessary, from selected images without time exposure, rather than taking time exposures of raw data. Certainly this indicates that an increased patient load can be handled, and the daily routine will be smooth and efficient.

But, what about space? Well, if your department has either a Nuclear-Chicago Pho Gamma or a Picker Dynacamera, we can install the camera electronics in the same console as the DCS. The whole system, including camera and operator, will then fit into less than 50 ft.²

If you agree (or even if you don't agree) with these points, come and see for yourself just what a Digital Cinescintigraphy System can do for your nuclear medicine department; we'll be in booths F61, F62, F68 and F69 in the main exhibit hall (Rex Room) at the Society of Nuclear Medicine Meeting in Los Angeles.

If you would like details in the meantime, please call or write us and we will be happy to provide them.



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SQUIBB

TESULOID™

Technetium 99m - Sul

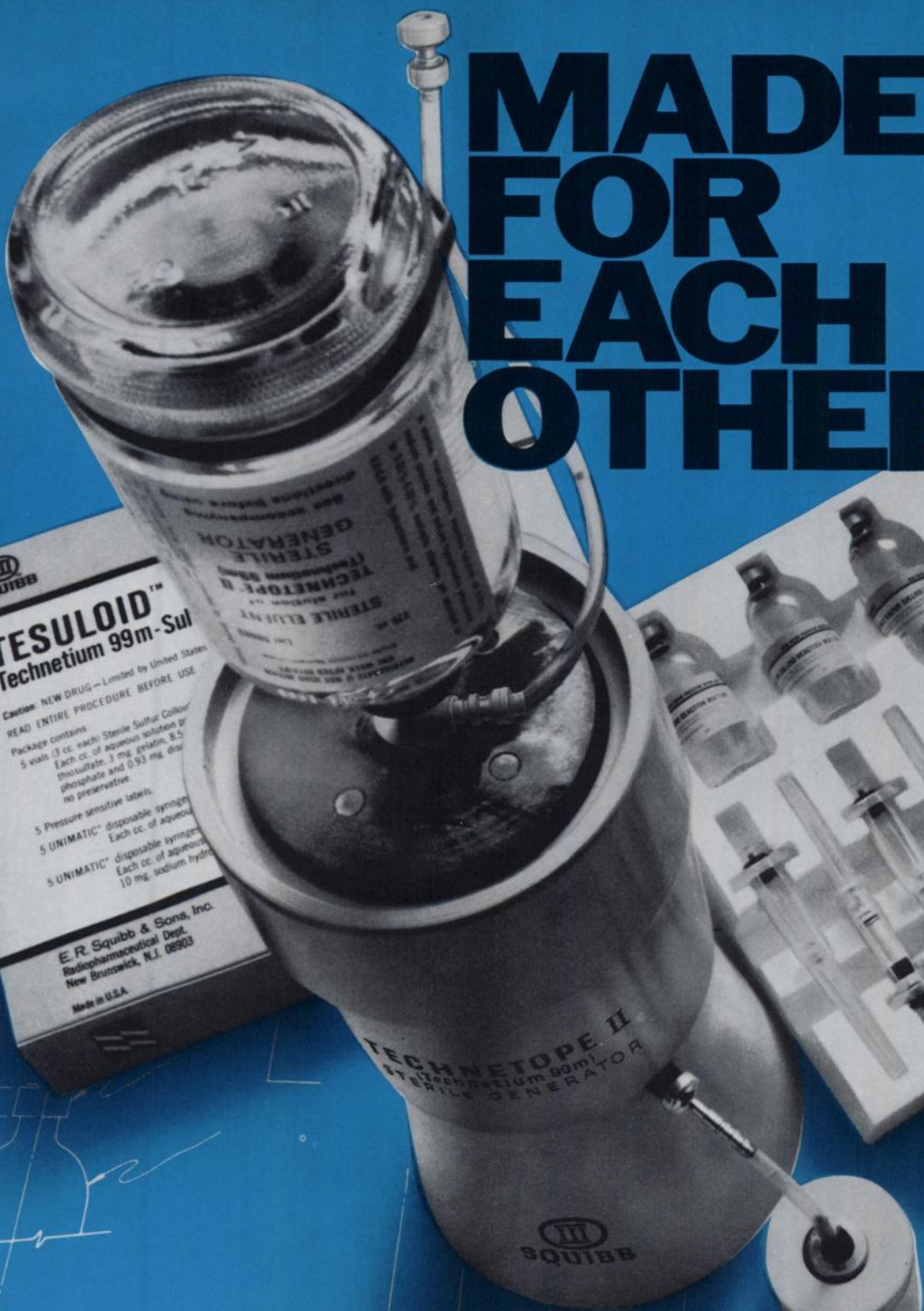
Caution: NEW DRUG — Limited by United States
READ ENTIRE PROCEDURE BEFORE USE

Package contains:
5 vials (3 cc. each) Sterile Sulfur Colloid
Each cc. of aqueous solution of
thiosulfate, 3 mg. gelatin, 8.5
phosphate and 0.93 mg. dis-
no preservative.

5 Pressure sensitive labels.
5 UNIMATIC® disposable syringes
Each cc. of aqueous
5 UNIMATIC® disposable syringes
Each cc. of aqueous
10 mg. sodium hydroxide

E.R. Squibb & Sons, Inc.
Radiopharmaceutical Dept.
New Brunswick, N.J. 08903

Made in U.S.A.





TECHNETOPE® II

Technetium 99m
STERILE GENERATOR

the generator for preparing
a sterile, non-pyrogenic
supply of technetium 99m



TESULOID™

Technetium 99m-Sulfur Colloid
KIT

the complete, easy-to-use kit for
preparing technetium 99m-sulfur
colloid in minutes, as you need it



**perfect combination for making
^{99m}Tc-S colloid "when you need it"
for liver and spleen scanning**

Units designed to complement each other are more likely to produce a better end product. When the Technetope II eluate (with its low concentration of polyvalent cations) is utilized in the Tesuloid Kit, the result is a ^{99m}Tc-S colloid which is well suited for liver and spleen scanning.

Other sources of technetium having a higher concentration of polyvalent cations may produce an unsuitable non-colloid preparation, evidenced by a flocculent precipitate.

Thus, the Technetope II Generator and the Tesuloid Kit provide the perfect combination that gives reproducible results time after time.

See next page for brief summary.

MADE FOR YOUR INDEPENDENCE

now you can make your own ^{99m}Tc-sulfur colloid when you want it...

- utilize ^{99m}Tc eluate from your Technetope II (Technetium 99m) Sterile Generator
- make as many doses as you want when you want

with ease, convenience, and economy...

- keep dollar loss from product decay to a minimum
- store kit anywhere—it's not radioactive

for liver and spleen scanning

- on the basis of 350 case reports from 11 investigators,¹ the technetium-sulfur colloid prepared in this manner was found to be highly satisfactory, and produced liver and spleen scans of good diagnostic value
- no side effects or adverse reactions occurred in any of the cases reported; there was no evidence of pyrogenic or other reactions

the colloid contains no dextran . . . no rhenium nor other added cation material

Reference: 1. Unpublished data on file at The Squibb Institute for Medical Research.

TECHNETOPE II (TECHNETIUM 99m) STERILE GENERATOR provides a means of obtaining a sterile, non-pyrogenic supply of Technetium 99m (^{99m}Tc), a versatile scanning agent that can be administered intravenously or orally. ^{99m}Tc, the short-lived daughter ($T_{1/2} = 6$ hours) of Molybdenum 99 (⁹⁹Mo, $T_{1/2} = 67$ hours), is obtained from the generator by periodic elution. The amount (in millicuries) of ^{99m}Tc obtained in the initial elution will depend on the original potency of the generator, while the activity obtained from subsequent elutions will depend on the time interval between elutions.

Warning: Proper radiation safety precautions should be maintained at all times. The column containing ⁹⁹Mo need not be removed from the lead shield at any time. The radiation field surrounding an unshielded column is quite high. Solutions of ^{99m}Tc withdrawn from the generator should always be adequately shielded. The early elutions from the generator are highly radioactive. For radiation protection, a lead shield for the collecting vial is included with Technetope II.

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, the elution tube, the evacuated collecting vial, and both rubber closures in the generator column should be swabbed with a suitable germicide before entry. All entries into the generator column must be made aseptically. 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 the ^{99m}Tc must be sterile.

Do not administer material eluted from the generator if there is any evidence of foreign matter.

Contraindications: Radiopharmaceuticals should not be administered to pregnant women or patients under 18 unless the indications are very exceptional. Since Technetium may be excreted in human milk, it should not be administered to nursing mothers.

TESULOID (TECHNETIUM 99m-SULFUR COLLOID) KIT contains 5 vials (3 cc. each) Sterile Sulfur Colloid Reaction Mixture, 5 Unimatic® Disposable Syringes (2 cc. each) containing Sterile 0.25N Hydrochloric Acid Solution (Syringe A), and 5 Unimatic Disposable Syringes (2 cc. each) containing Sterile Buffer Solution (Syringe B). Each cc. of the Sterile Colloid Reaction Mixture provides 4 mg. sodium thiosulfate, 3 mg. gelatin, 8.5 mg. potassium phosphate, and 0.93 mg. disodium edetate. Each cc. in Syringe A provides 9 mg. hydrochloric acid. Each cc. in Syringe B provides 35 mg. sodium biphosphate and 10 mg. sodium hydroxide.

Warnings: The contents of the syringes (A and B) are intended only for use in the preparation of the ^{99m}Tc-S colloid and are **NOT** to be directly injected into a patient.

As with all radiopharmaceuticals, ^{99m}Tc-S colloid should not be administered to women who are pregnant or who may become pregnant, during lactation, or to patients under the age of 18 years unless the indications are exceptional and the need for the agent outweighs the possible potential risk from the radiation exposure involved. It should be noted that although radiopharmaceuticals are not generally used in individuals under 18, procedures using such agents are occasionally necessary in young patients. Because of the low internal radiation dosage of ^{99m}Tc-S colloid, it should be used in preference to other agents when the liver or spleen scans are necessary.

Formula feeding should be substituted for breast feeding if the agent must be administered to the mother during lactation.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the use and safe handling of radioisotopes and whose experience and training have been approved by an individual agency or institution already licensed in the use of radioisotopes.

Note: The Tesuloid Kit is not radioactive. However, after the eluted ^{99m}Tc is added, adequate shielding of the resulting preparation should be maintained.

Precautions: As in the use of any other radioactive material, care should be taken to insure minimum radiation exposure to the patient as well as to all personnel directly or indirectly involved with the patient.

Note: The Tesuloid Kit was designed to be used with the sodium pertechnetate eluate obtained from a Technetope II (Technetium 99m) Sterile Generator. The low concentration of polyvalent cations in the Technetope II eluate results in a ^{99m}Tc-S colloid which is suitable for liver-spleen scanning. Use of other sources of sodium pertechnetate having a higher concentration of polyvalent cations may produce an unsuitable ^{99m}Tc-S preparation which is not a colloid; this is evidenced by the formation of a flocculent precipitate. If such a precipitate occurs, the preparation should not be used. It is, therefore, recommended that only Technetope II be used as the source of sodium pertechnetate with Tesuloid unless the user has demonstrated that other sources of ^{99m}Tc are consistently compatible and meet the standards of Technetope II.

For further information, contact your Squibb Representative or the Manager of Customer Service, E. R. Squibb & Sons, Div. of Nuclear Med., Georges Rd., New Brunswick, New Jersey 08903.



Squibb Division of Nuclear Medicine
New Brunswick, New Jersey 08903



GENERAL DIAGNOSTICS
 Division
 Warner-Lambert Pharmaceutical Company

a new breakthrough


*fast*T₃TM

**Reagent system for laboratory determination
 of T3 (TBG) uptake
 as a measurement of thyroid function**

EASY?

- 1 just add sample and water**
- 2 shake and allow to stand
(10 minutes)**
- 3 centrifuge and count**

SURE!

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|  GENERAL DIAGNOSTICS | <input type="checkbox"/> 12 TEST VIALS PLUS 1 STANDARD 20.00 <input type="checkbox"/> 70 TEST VIALS PLUS 2 STANDARDS 85.00 <small>(PRICES SUBJECT TO SERVICE CHARGE)</small> |
| | <input type="checkbox"/> STANDING ORDER BEGINNING (TO BE REPEATED MONTHLY) _____ Date _____ <input type="checkbox"/> HAVE SALESMAN CALL |
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| CITY _____ STATE _____ ZIP _____ | |
| I am familiar with the AEC/State regulations governing my use, storage and disposal of radioactivity. | |
| Signed _____ Date _____ | |

Now available from General Diagnostics
 201 Tabor Rd., Morris Plains, N.J. 07950
 (201) 285-3226



Lung scanning?

All macroaggregated serum albumins are not the same. Macroscan-131 offers all 5 of these benefits:

- **Uniformity of particle size distribution**
- **Minimal free iodide**
- **Superior manufacturing technique** (supernatant is removed in the manufacturing process)
- **Safety** (no recorded reactions to date in thousands of scans)
- **Cost** (lowest of the 3 leading products)

Macroscan-131 is aseptically prepared and non-pyrogenic. It is ready to use and should not be heated prior to use.

INDICATIONS: For scintillation scanning of the lungs to evaluate total, unilateral, and regional arterial perfusion of the lungs.

WARNINGS: Radio-pharmaceutical agents should not be administered to pregnant or lactating women, or to persons less than 18 years old, unless the information to be gained outweighs the hazards. There is a theoretical hazard in acute cor pulmonale, because of the temporary small additional mechanical impediment

to pulmonary blood flow. The possibility of an immunological response to albumin should be kept in mind when serial scans are performed. If blood is withdrawn into a syringe containing the drug, the injection should be made without delay to avoid possible clot formation.

PRECAUTIONS, ADVERSE REACTIONS: Care should be taken to administer the minimum dose consistent with patient safety and validity of data. The thyroid gland should be protected by prophylactic administration of concentrated iodide solution. Urticaria and acute cor pulmonale, possibly related to the drug, have occurred.



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MACROSCAN®-131

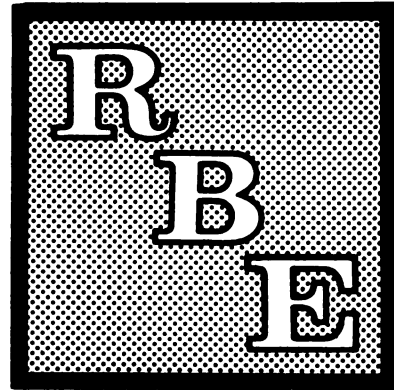
AGGREGATED RADIO-IODINATED (¹³¹I) ALBUMIN (HUMAN)

Each milliliter contains 1 to 3 mg. aggregated human serum albumin labeled with Iodine 131, with benzyl alcohol, 0.9%, as preservative. Radioactivity is usually between 800 and 1300 microcuries per ml. on first day of shipment. For full prescribing information, see package insert.

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Image Recorder - Records camera signals at 3 speeds on 1/4" tape - less than 1% data losses at 400K CPM - - model 600M

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Dual Area Generator - Quantify two independent areas of interest from tape or directly from the camera - model 500M

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Once again,
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We've added still
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Albumin (Human)
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• **10-day Sterility Test**

We now subject all our material to a 10-day sterility test, before shipping it to you. This is simply another of our ongoing efforts to assure you of optimum product performance and safety.

Since 1968, Squibb improvements in Albumotope-LS have included:

- **Reducing Protein Content**
Squibb reduced the amount of protein by 50% while maintaining good lung scans.
- **Reducing Supernatant Activity**
Squibb sharply reduced the amount of radioactivity in the supernatant, decreasing the possibility of liver interference with the lung scan.
- **Reducing Unbound Iodine**
Squibb substantially reduced the amount of unbound iodine 131, effectively reducing the problem of blood background radioactivity.

CONTRAINDICATIONS:

Radiopharmaceuticals should not be administered to pregnant women or to persons under the age of 18 years unless the indications are very exceptional. Because iodide is excreted in human milk, aggregated radioalbumin should not be administered to nursing mothers.

ADVERSE REACTIONS:

Although the immunological properties of serum albumin are believed to be virtually unaltered by the iodination process, there is a possibility that hypersensitivity reactions may occur in patients receiving additional doses a number of weeks after an initial dose.

The hypothetical possibility that particles of large size might induce deleterious cardiovascular or cerebrovascular effects, postulated by some investigators, has not been borne out in extensive clinical use with Aggregated Radio-Iodinated (¹³¹I) Albumin (Human).

For full prescribing information, see package insert.

AVAILABLE:

As a sterile, nonpyrogenic, aqueous suspension. Each cc. contains approximately 0.5 mg. aggregated human serum albumin labeled with iodine-131. Not less than 90% of the aggregates are between 10 and 90 microns and none are more than 150 microns in size. The preparation also contains 0.9% (w/v) benzyl alcohol as a preservative. The potency ranges from 250 to 450 microcuries per cc. on date of assay.

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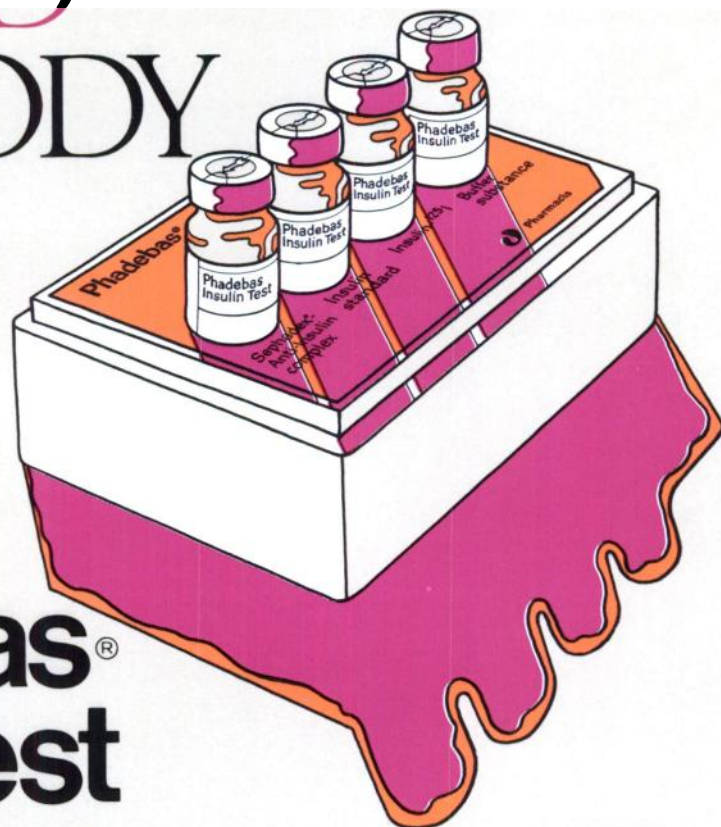


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35mm, Motor Driven Nikon Camera with extreme resolution lens. Allows up to 36 exposures.

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70mm, Motor Driven Hasselblad 500 EL/70m. Allows up to 75 exposures.

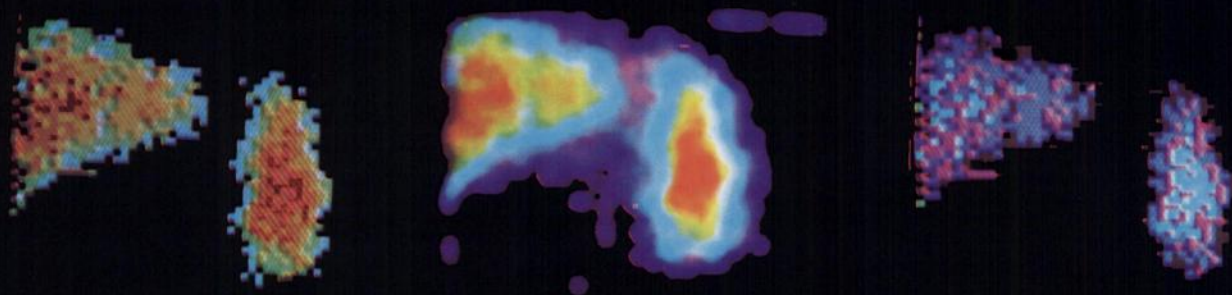
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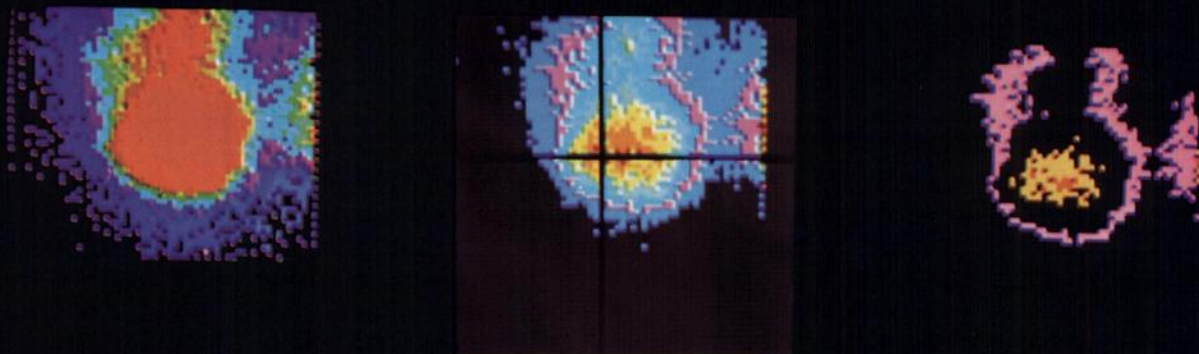
For further information contact: **nms**

Nuclear Medical Systems, Inc.
142 Mineola Avenue, Roslyn Heights, N.Y. 11577

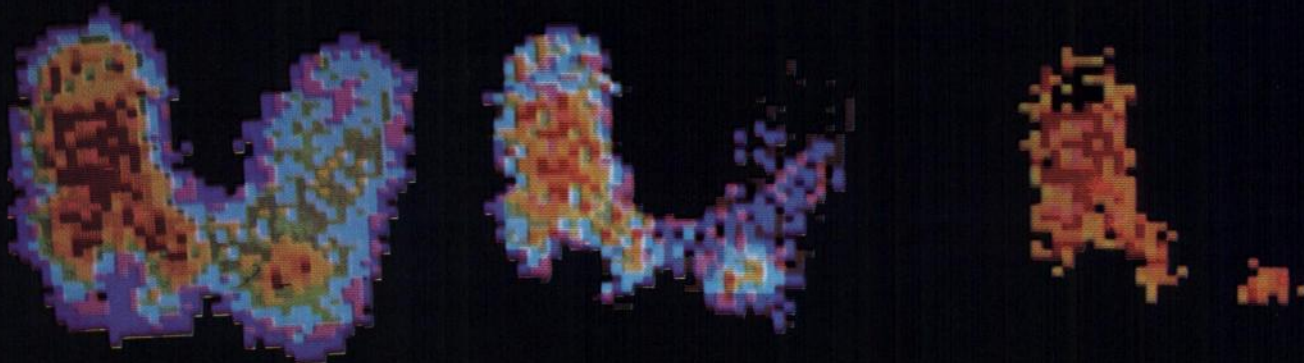
if you thought of



SPLENOMEGALY (^{198}Au)



LIVER ABSCESS ($^{113\text{m}}\text{In}$)



THYROID PHANTOM (^{125}I)

**buying
a scanner...
don't!**



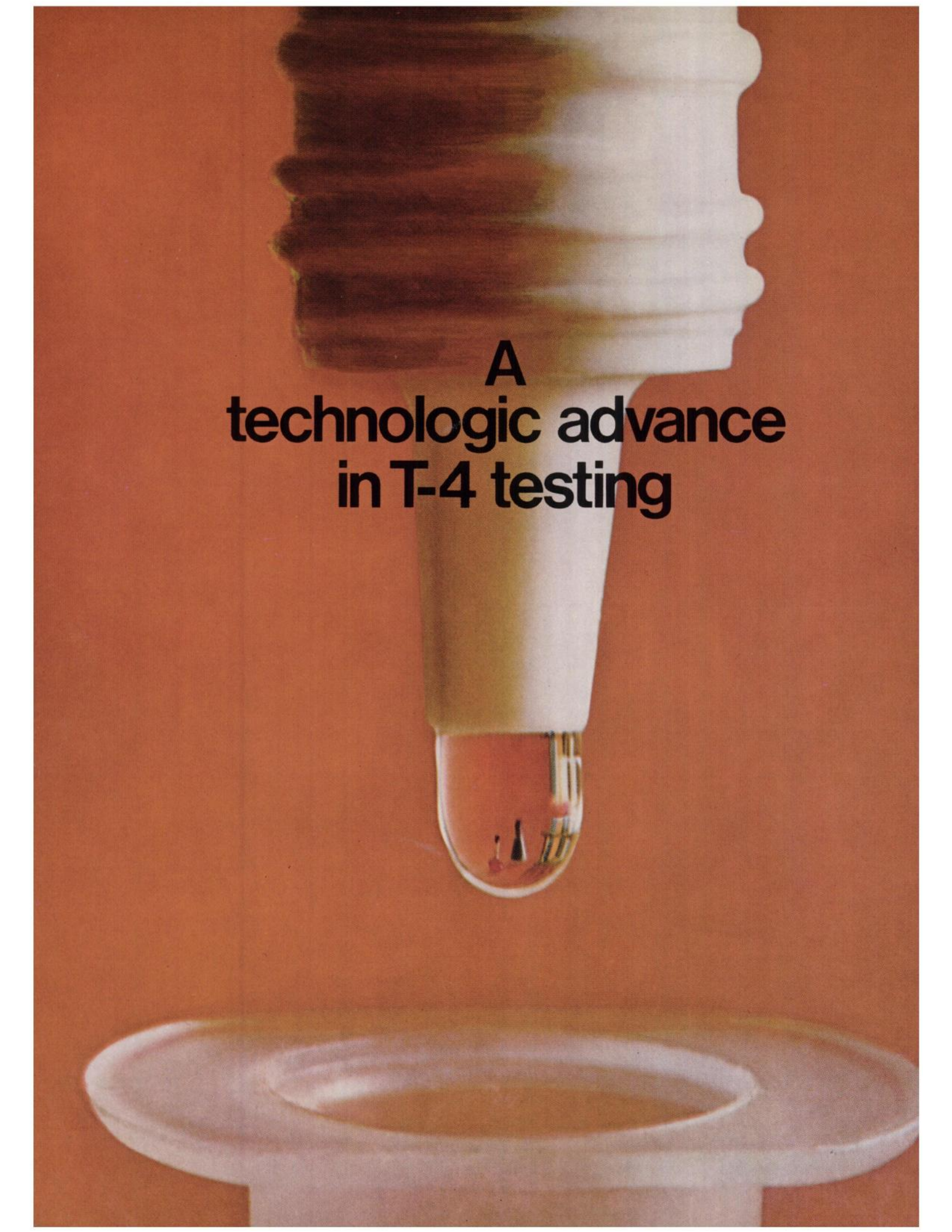
First showing June 28, 1971, Society of Nuclear Medicine, Los Angeles.

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**A
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New Tetralute®

¹²⁵I Column T-4 Test for Thyroid Function

Cuts time and steps compared to tests you may be using now

*Eliminates centrifuging,
incubating and evaporating...
cuts testing time significantly*

TETRALUTE® is a T-4 test that takes fewer steps and less time than older methods. A technologist can do approximately 60 tests in only 2½ hours.

TETRALUTE measures total thyroxine (both free and bound T-4). It provides information comparable in value to PBI testing, but test results are not distorted by inorganic or organic iodine which so often renders PBI measurements invalid.

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.



Tetralute®

¹²⁵I Column T-4 Test for Thyroid Function

Trilute®

¹²⁵I Column T-3 Test for Thyroid Function

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Direct Ratio Reading Gamma Counter

Ames Company

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Elkhart, Indiana 46514



140071

And now, **DIGITAL** meets the gamma camera.

Small computers from DIGITAL can now be linked to the gamma camera to provide dynamic data acquisition and statistical image enhancement.

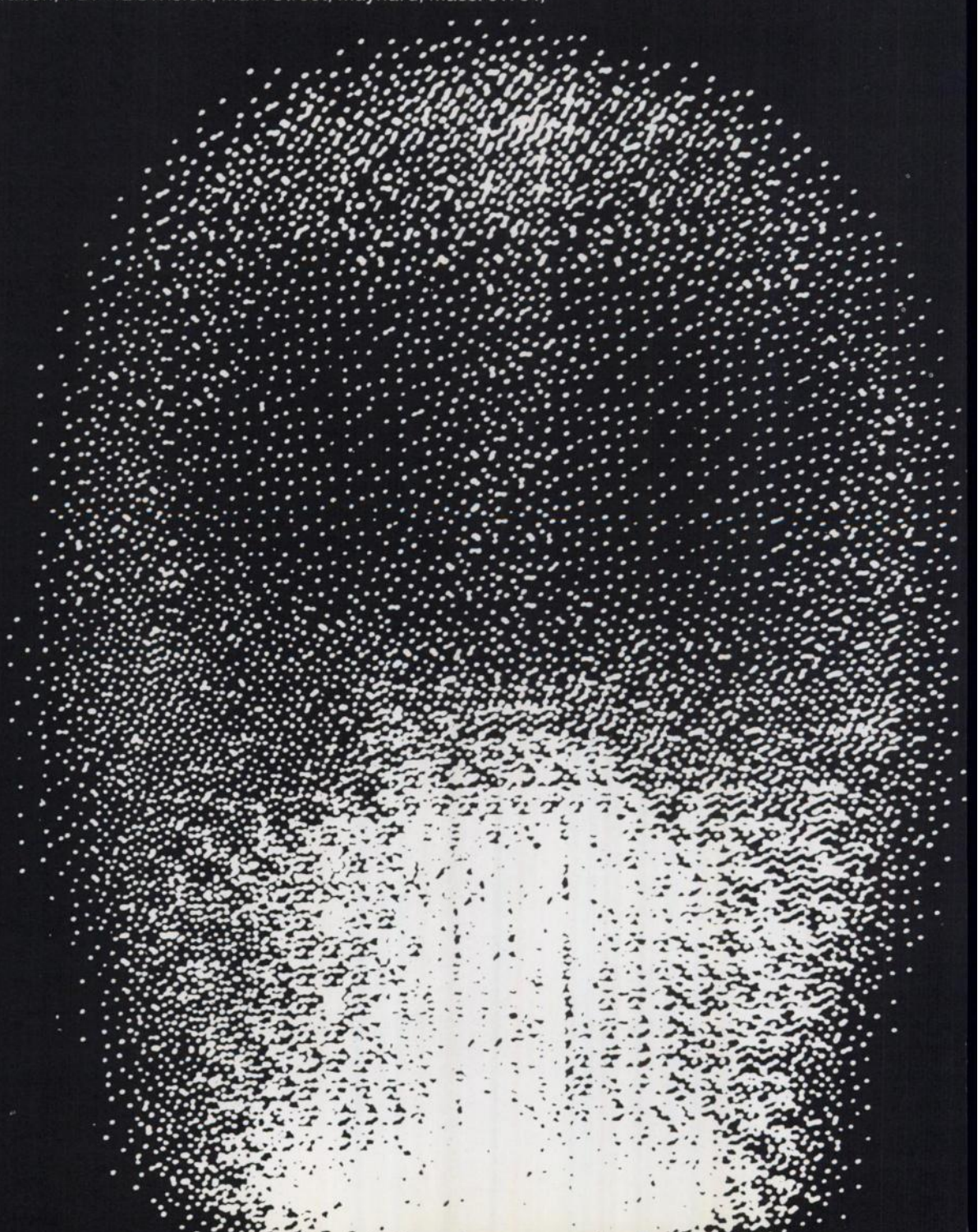
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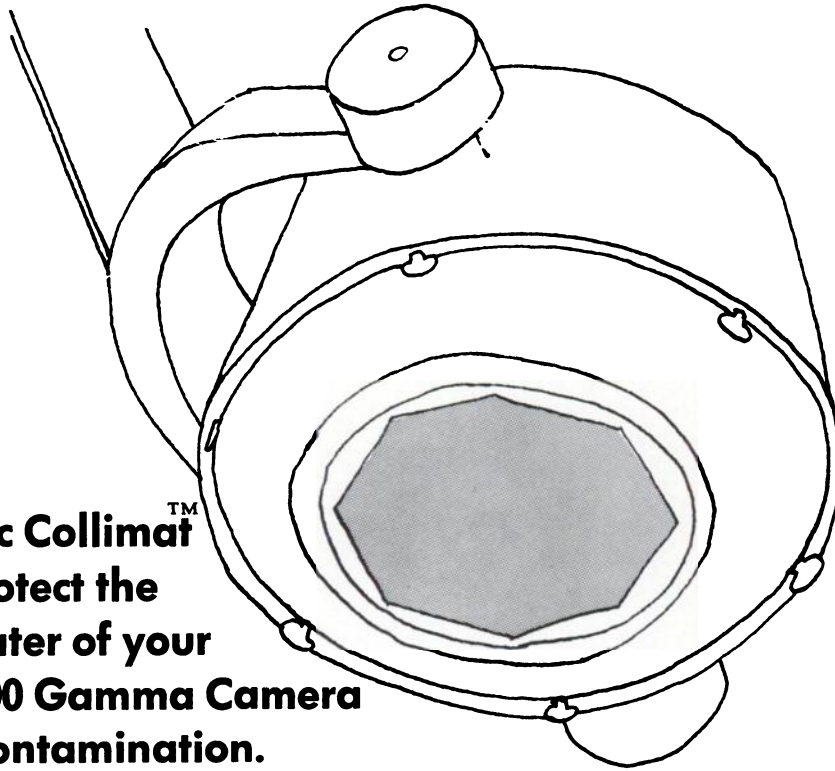
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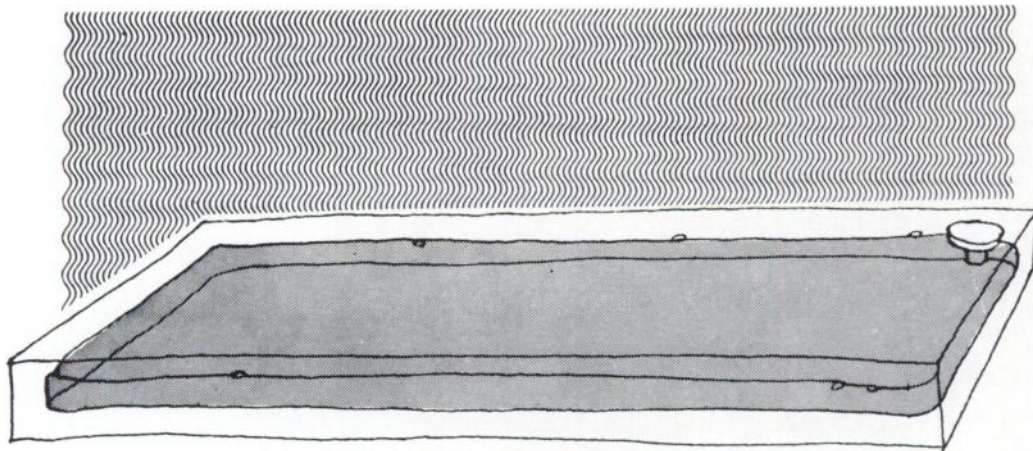


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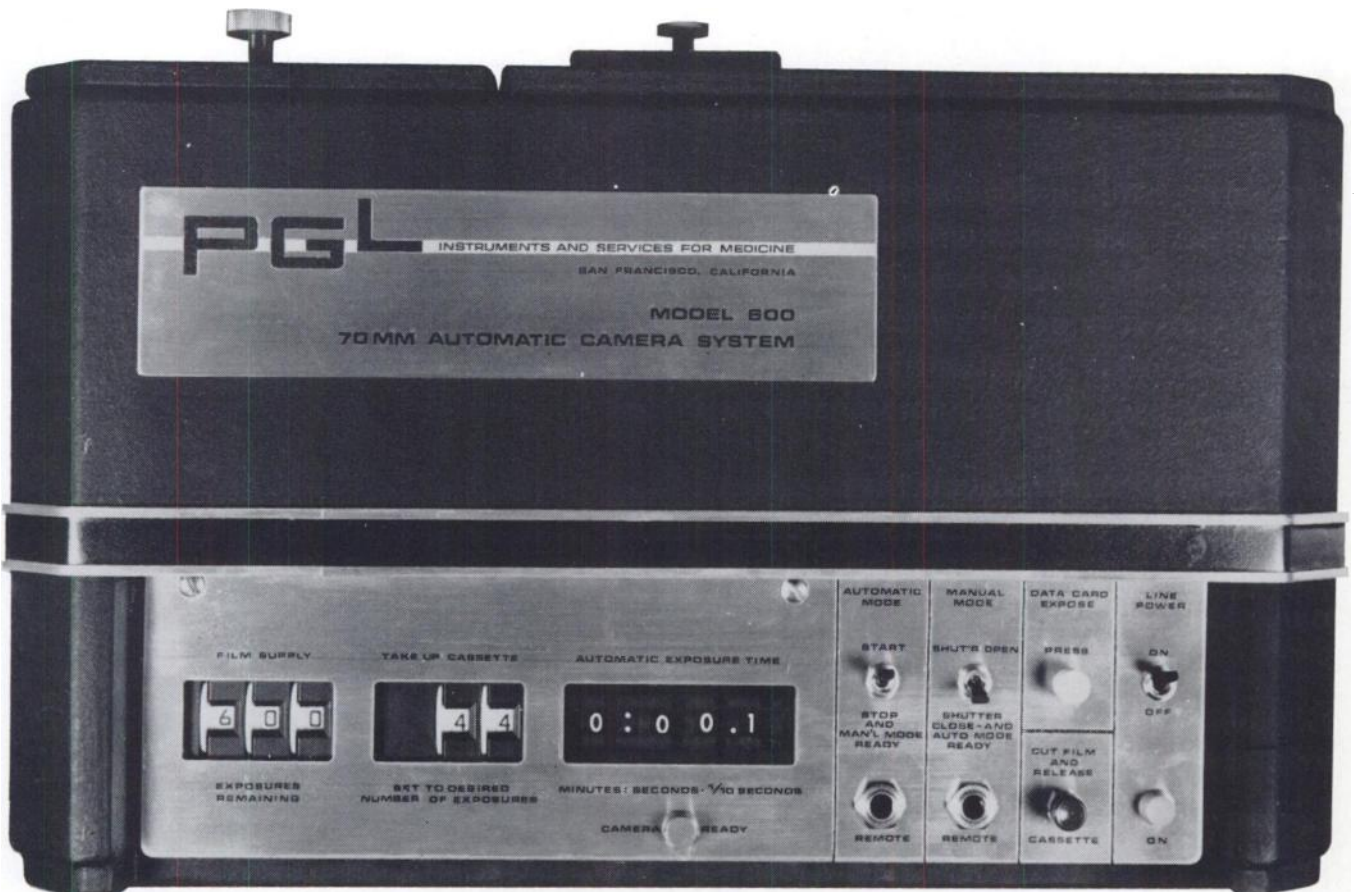
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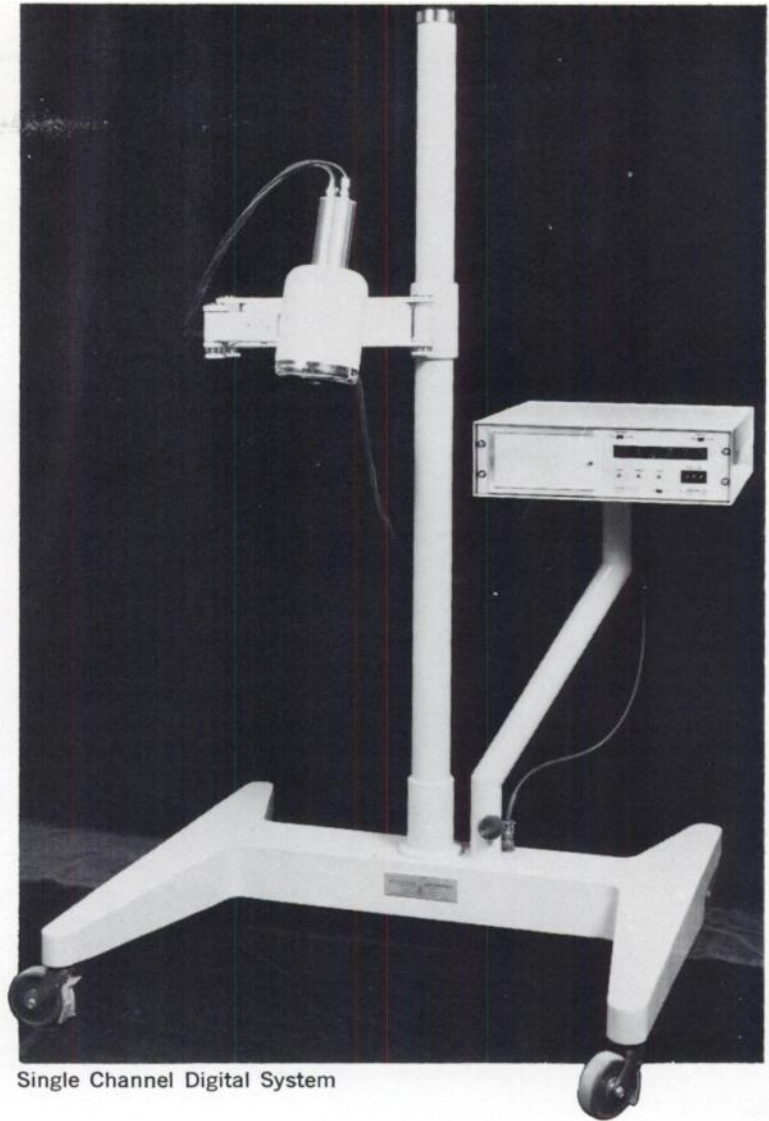
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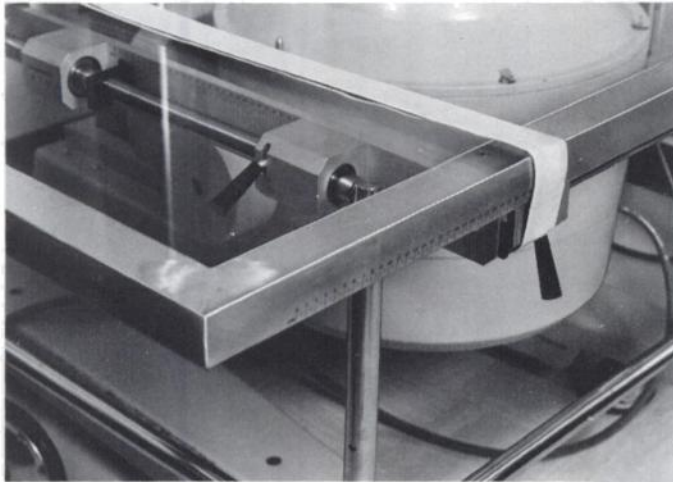
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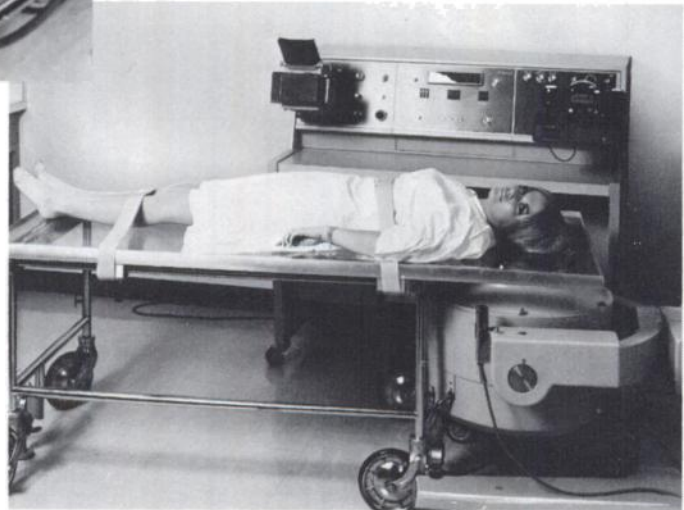


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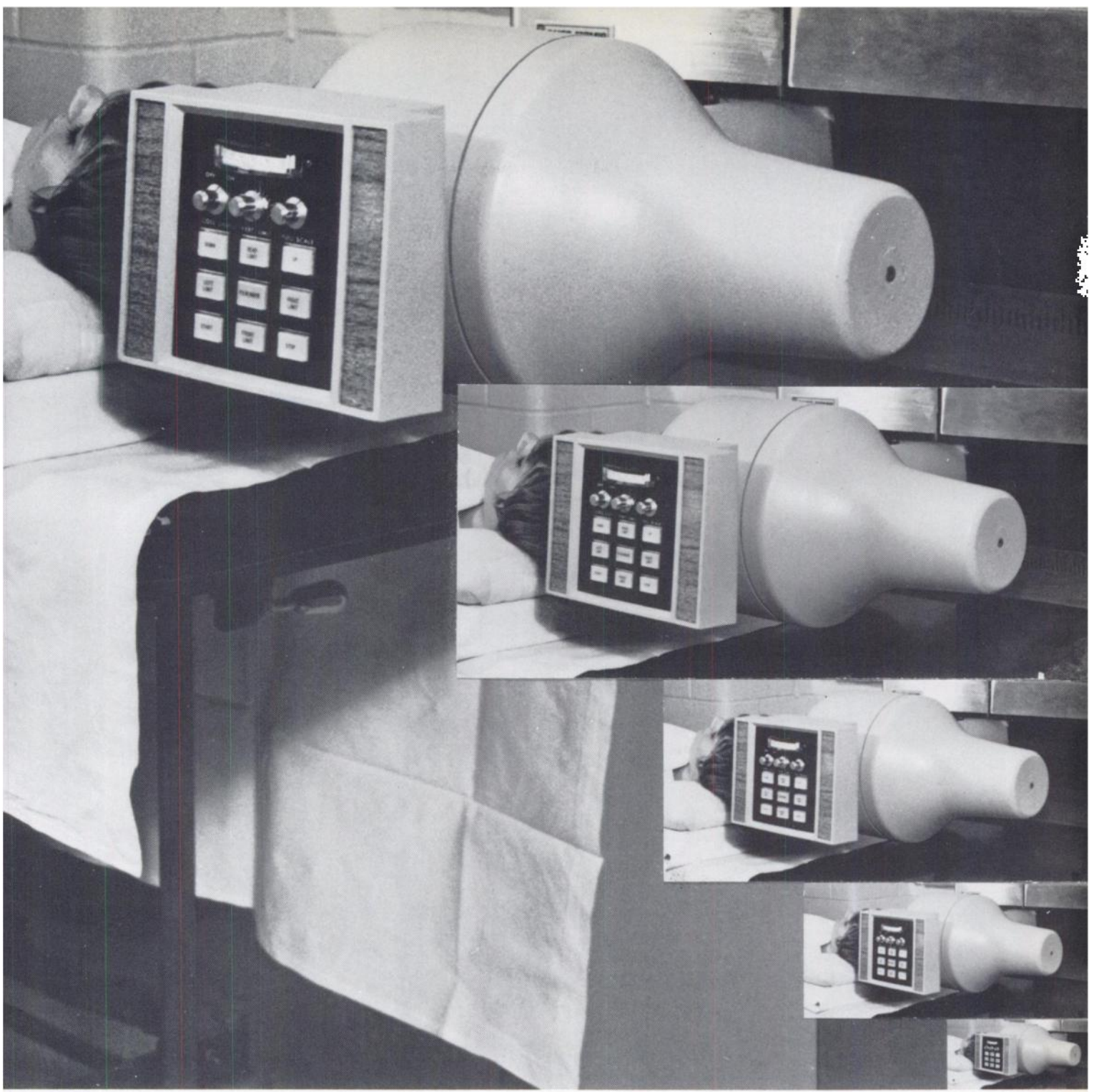
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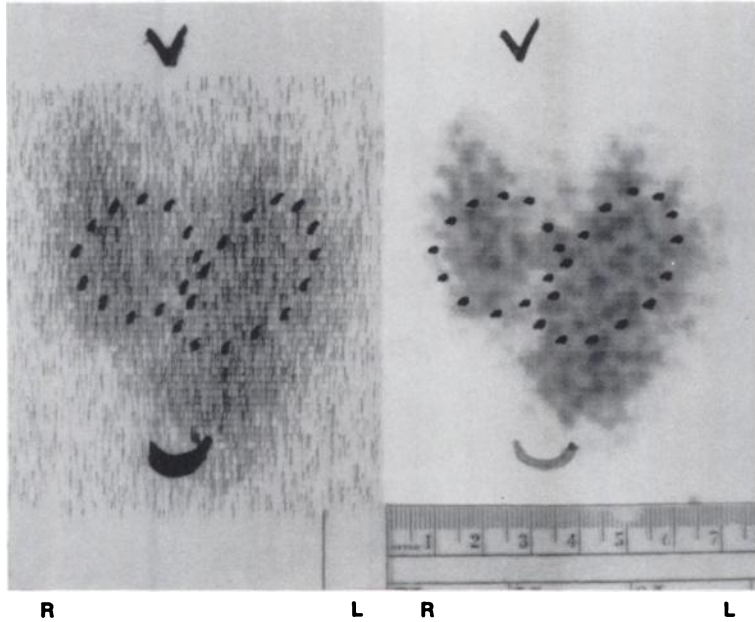
The B/A Scanner gives you greater patient comfort and greater patient through-put.

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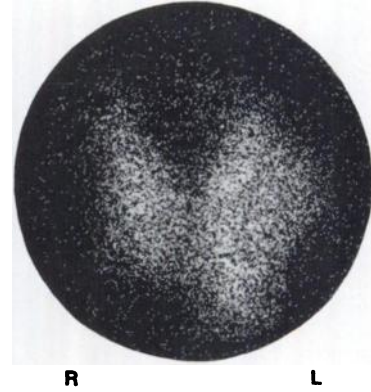
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TOXIC NODULAR GOITER. RHEUMATIC HEART DISEASE.



RECTILINEAR SCANS.
Isotope: ^{131}I iodide. Dot scan (left). Photo scan with 61-hole collimator.
0% suppression. Scan time 10 minutes. Broken lines define palpable nodules
not evident in scan recordings.



PHO/GAMMA SCINTIPHOTO.
Isotope: ^{131}I iodide. Pho/Gamma
equipped with single-pinhole collimator.
Total counts 10,000. Total exposure
time 3 minutes, 32 seconds. Cold
nodule evident in left lobe (see text).

**THE PHO/GAMMA
SCINTILLATION CAMERA**



The Thyroid Study

A Basic Technique for Evaluation of Regional Thyroid Function with the Nuclear-Chicago Pho/Gamma® Scintillation Camera

Scintiphography, using ^{131}I iodide and the Pho/Gamma Scintillation Camera, serves as both a primary diagnostic method and as a supplement to rectilinear scanning in the evaluation of thyroid function.

SETTING-UP. The patient is positioned with his thyroid at the appropriate distance (usually about 3 inches) from the aperture of the Pho/Gamma single-pinhole collimator which is directed at the thyroid isthmus. The patient must be positioned to remain stationary during the exposure.

ISOTOPE AND DOSE. Normally, 50 μCi of ^{131}I iodide is given orally 6 to 24 hours prior to the study. Smaller doses may be used, depending upon radioiodide uptake. The 24-hour uptake is generally twice the 6-hour uptake and therefore permits data accumulation at double the rate. (Note: Thyroid scintiphography may also follow oral or intravenous administration of $^{99\text{m}}\text{Tc}$ pertechnetate to yield higher data densities and good images of small nodules.)

DATA ACCUMULATION. With ^{131}I iodide, small cold nodules located within thyroid lobes may be defined by data densities as low as 5000 counts in the entire scintiphoto. Better resolution is produced in the image by longer counting times to accumulate an increased number of counts. Extended exposure times may also be necessary to obtain thyroid images in children who are given reduced isotope doses.

CASE HISTORY. The clinical illustrations on the facing page are for a patient with the following case history: Female, 53 years old. Scheduled for mitral-valve

surgery. Referred for thyroid evaluation because of atrial fibrillation and recent weight loss. Pertinent physical findings limited to a fine tremor and a 60-gram multinodular thyroid gland. Neck radioiodide uptake was 43% at 24 hours and TT_4 was 9.4 $\mu\text{gm}\%$ (normal maximum 8.2 $\mu\text{gm}\%$). Initially, a rectilinear scan was ordered.

EVALUATION. The rectilinear scan was performed with the focal distance of the collimator carefully adjusted to the level of the thyroid gland. The images thus produced failed to show any clear definition of two discrete palpable nodules, which are shown, as palpated, in outlines superimposed on the images.

The Pho/Gamma scintiphoto study was therefore ordered, following the procedure described above. In the scintiphoto obtained from this study, a definite cold nodule is apparent. It is seen as a large area of decreased labelling laterally in the mid-portion of the more actively functioning tissue in the left lobe. Other areas of decreased labelling are seen in both lobes.

CONCLUSIONS. The Pho/Gamma thyroid-imaging technique illustrated here is most often used as a primary diagnostic method for the determination of regional thyroid function. It may be used as a secondary or supplementary method when rectilinear scanning fails to demonstrate the nature of a clearly palpable nodule. In the latter case, the scintiphoto made with the Pho/Gamma single-pinhole collimator often demonstrates cold nodules, even though they are not apparent on the scan. Pho/Gamma imaging generally requires one-third the time of a rectilinear scan of the same area.

O-233

Nuclear Reviews

PHO/GAMMA AT WORK: A DISTILLATION. For convenient reference, we offer a new brochure containing both clinical and phantom studies, plus results of the latest advances in scintillation-camera technology. Profusely illustrated. Properly detailed. Write for it.

SCINTILLATION SYSTEM PAR EXCELLENCE. Pho/Gamma with its Data-Store/Playback unit equips you to achieve such things as unambiguous area-of-interest pulmonary dilution curves. And, in addition to comparative quantification of data, studies can be replayed at will—for teaching,

for reviewing and comparing dynamic pre-and post-operative studies—and for re-doing scintiphotos that didn't make it (without having to repeat the original study). Interested? A new issue of "The Nucleus," our publication for the nuclear-medicine community, is now available. It contains an informative discussion of the many capabilities of Pho/Gamma with Data-Store/Playback. It includes studies which demonstrate these capabilities in clinical practice, and discusses (in detail) the techniques involved in producing taped dynamic studies with the Data-Store/Playback unit. Your copy (or copies) are ready on request.



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CM-189

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1. Does the control panel follow the set-up sequence in a logical left to right pattern?

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2. Does it offer a choice of digital mode scanning or selectable fixed levels of film density, contrast enhancement and background erase?

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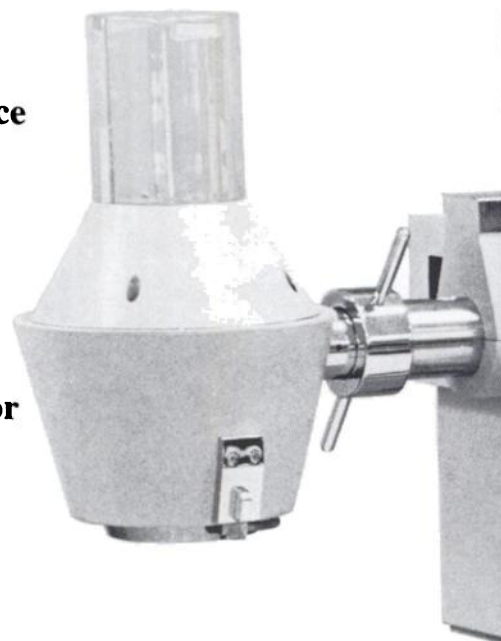
3. Is there a collimator locking system to make changing or removing collimators easier and guard against dropping?

GRAPHIC™ has one. It was designed with patient and operator safety in mind. A remote handset with a deadman switch positions the detector head while protecting against accidental movement.

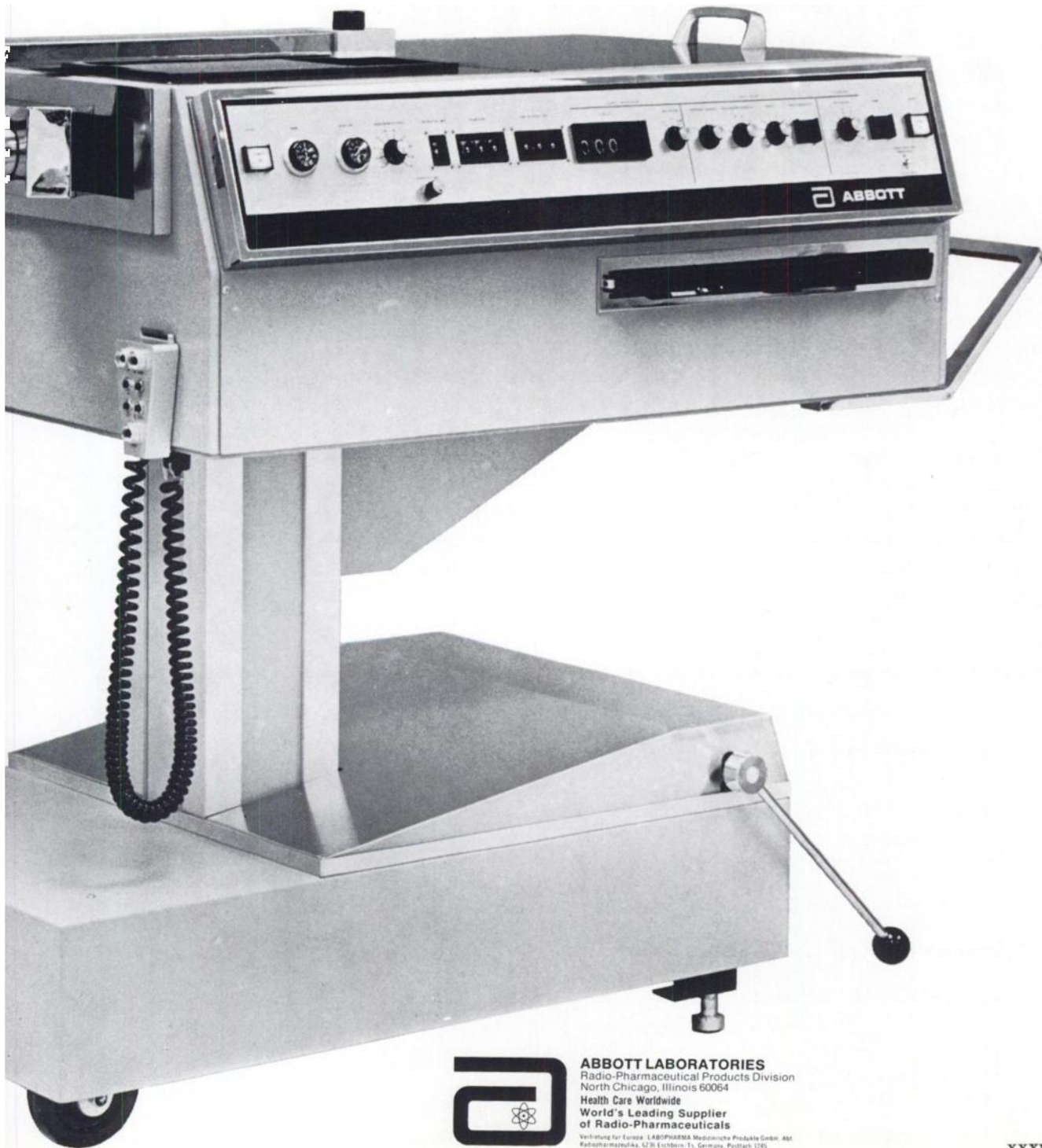
4. Is the manufacturer a full line supplier? *Abbott Laboratories* is the first and only full-line supplier of nuclear instruments and radio-pharmaceuticals. Our continuing interest in your business assures you of prompt, reliable servicing of all your needs.

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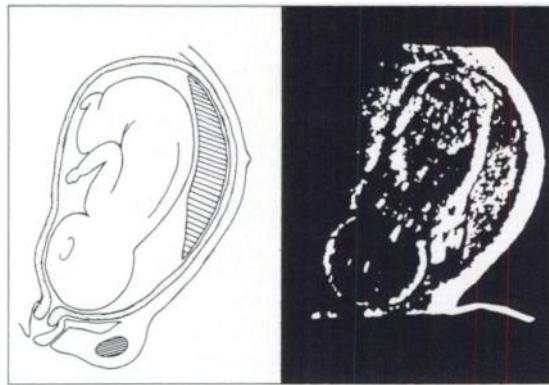
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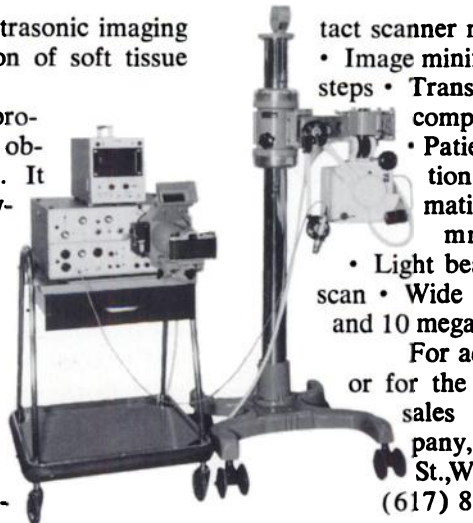


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August 15-21, 1971

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ALEXANDER GOTTSCHALK, M.D., Argonne Cancer Research Hospital, operated by the University of Chicago for the U.S. Atomic Energy Commission.

CRAIG HARRIS, Division of Nuclear Medicine, Duke University Medical Center.

JAMES L. QUINN, III, M.D., Director of Nuclear Medicine, Chicago Wesley Memorial Hospital.

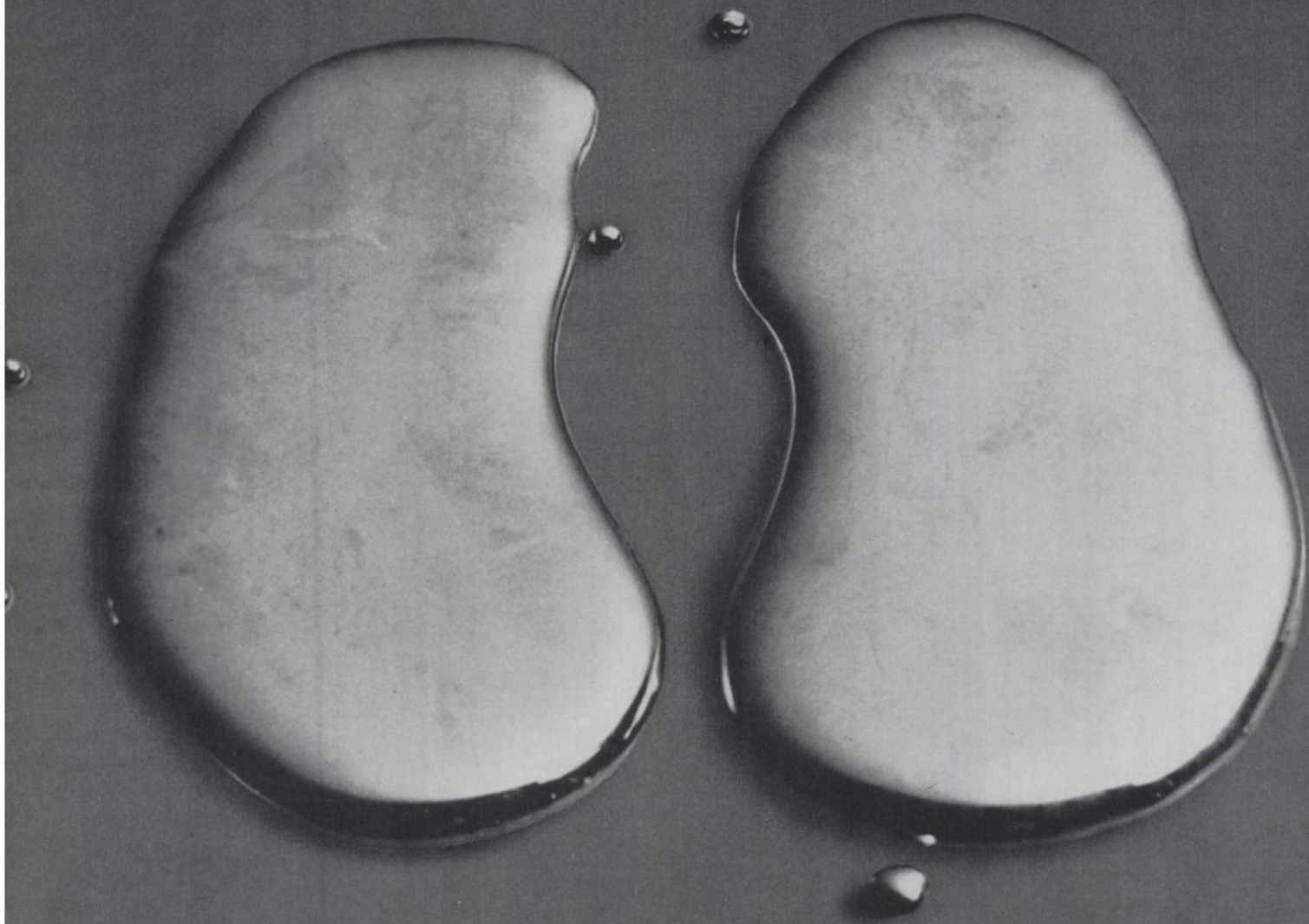
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See next page for brief summary.

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.

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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 ^{99m}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.

^{99m}Tc-DTPA, ^{99m}Tc-S colloid, and sodium pertechnetate ^{99m}Tc 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 ^{99m}Tc-DTPA or ^{99m}Tc-S colloid are occasionally necessary in such patients. The low internal radiation dosage of ^{99m}Tc-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 ^{99m}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 ⁹⁹Mo 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 ^{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. 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 ^{99m}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 ^{99m}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.

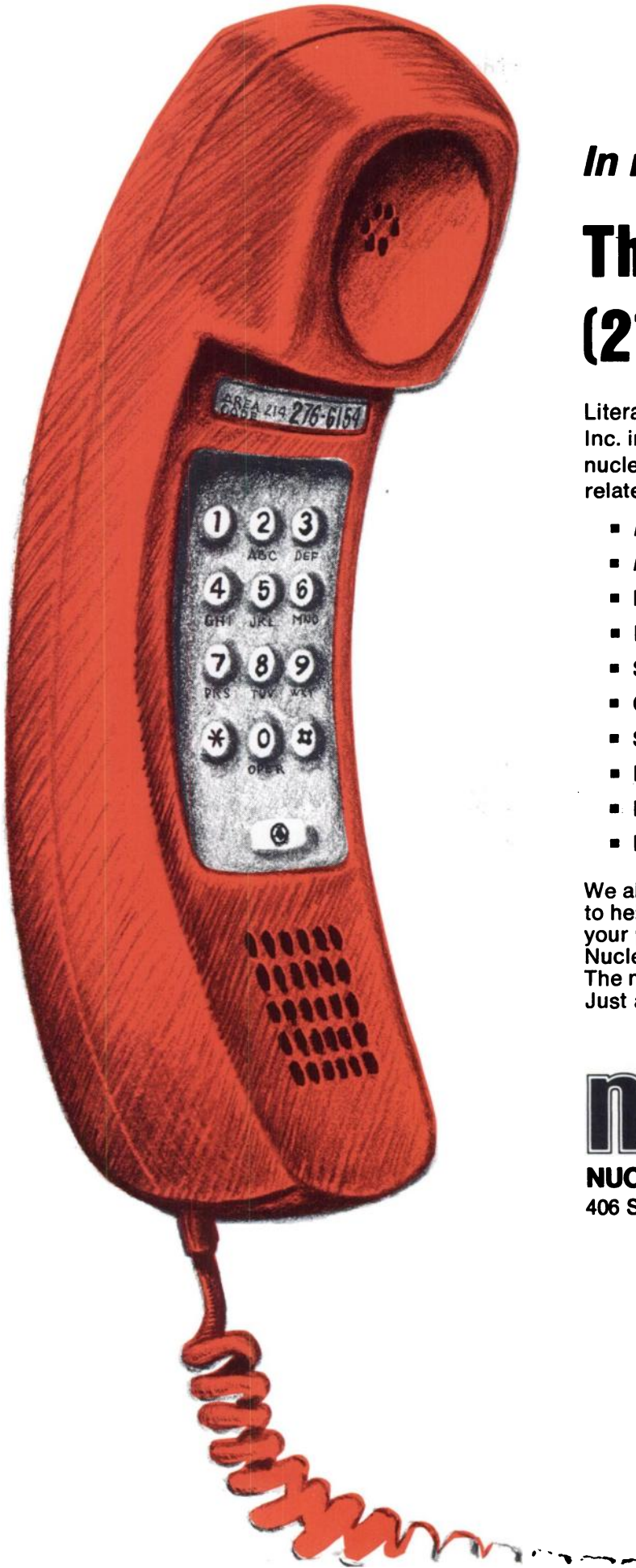
Each elution from Technetope II (Technetium 99m) Sterile Generator should be

assayed before use for ^{99m}Tc activity and for the possible presence of ⁹⁹Mo. Material containing more than 5 microcuries of ⁹⁹Mo per dose of ^{99m}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 ^{99m}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 ^{99m}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 ^{99m}Tc pertechnetate scan than on a radiochloromerodrin scan, and because the choroid plexus may be visible, it is particularly important to recognize the appearance of a normal brain scan when ^{99m}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 ^{99m}Tc are consistently compatible and meet the standards of Technetope II.

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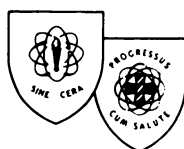
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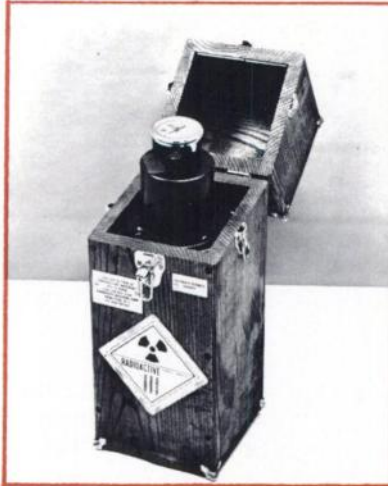
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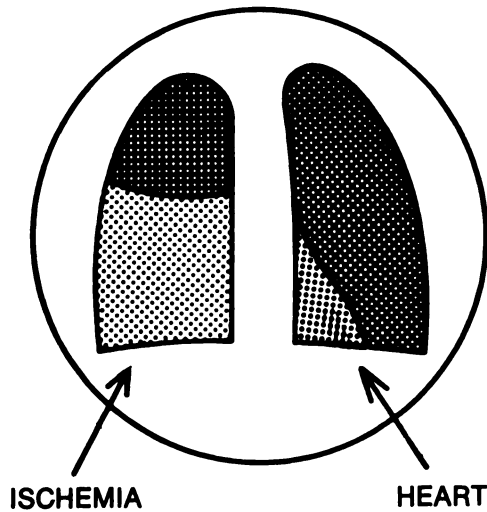
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Pulmonary Embolism?

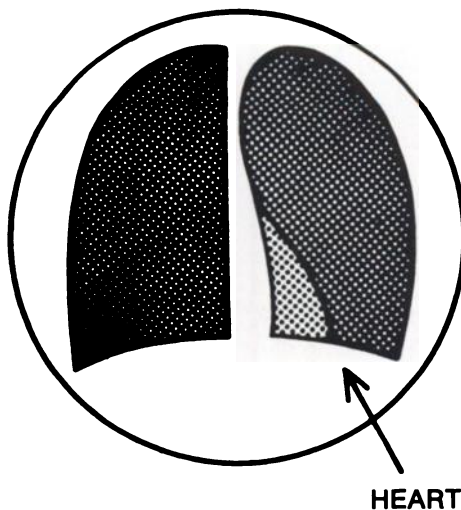


ANTERIOR PERFUSION

“Although perfusion lung scanning has proved clinically useful in the diagnosis of pulmonary embolism, many other disorders that affect ventilation can produce abnormalities of regional pulmonary blood flow. Therefore, some additional test is required for a specific diagnosis of pulmonary embolism.”

①

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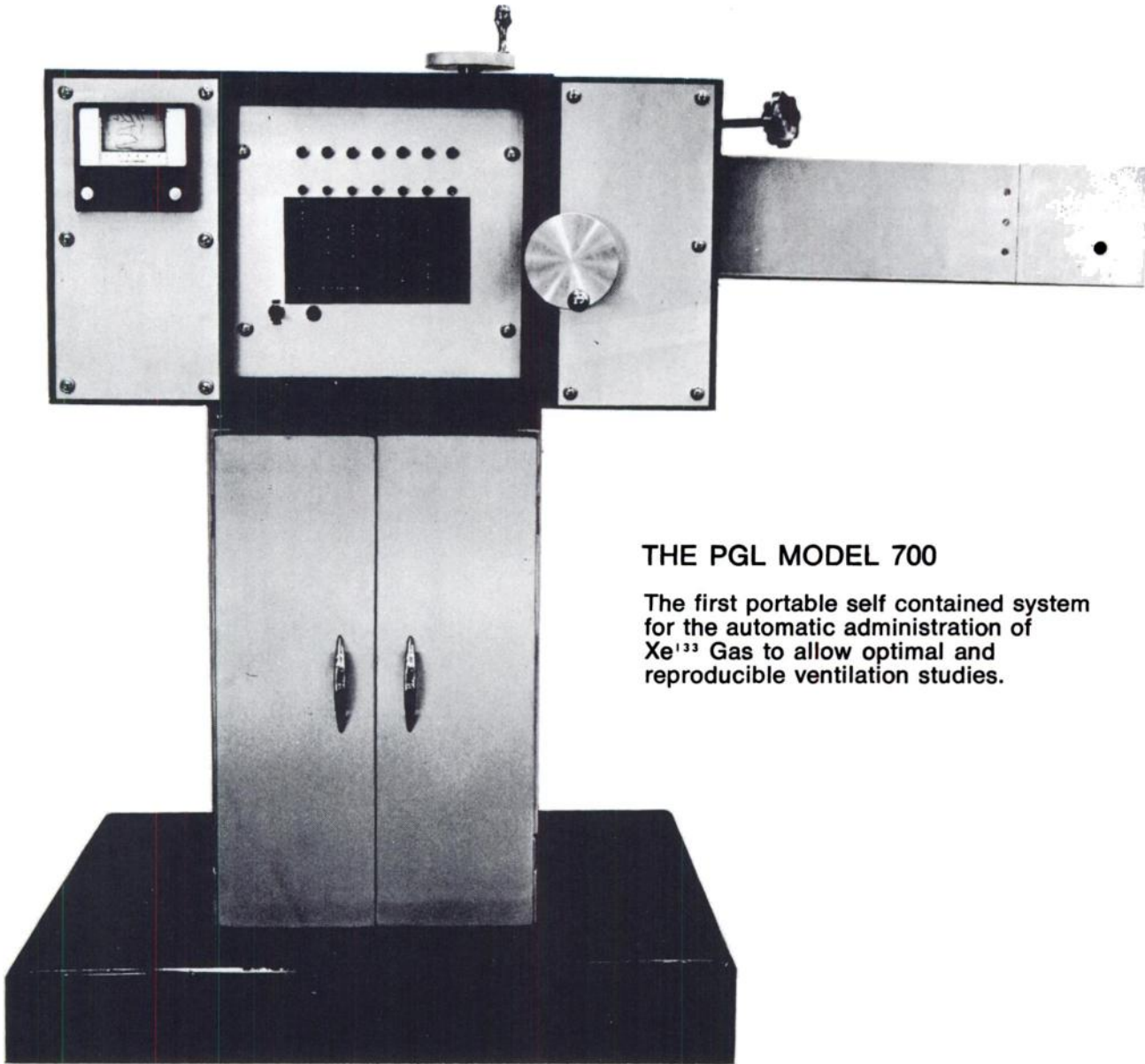


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②

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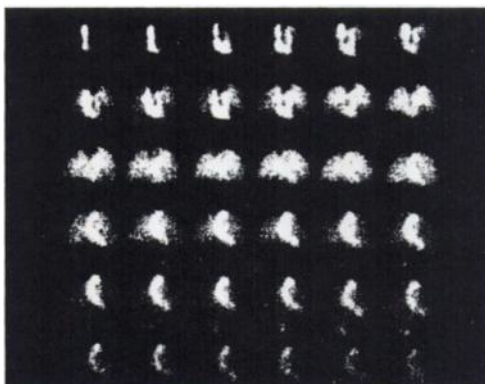
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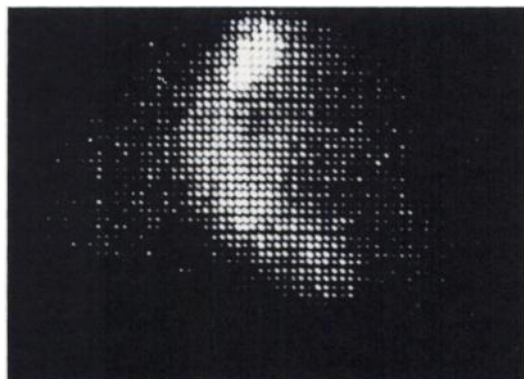
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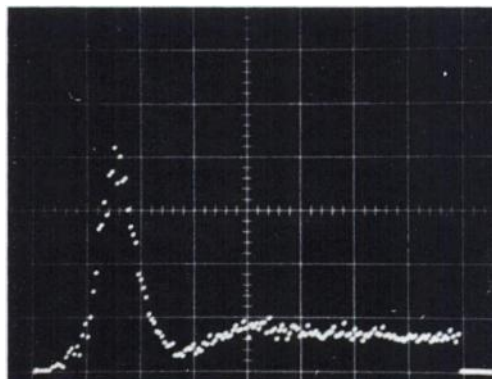
50/50 MED: DIGITAL DYNAMIC CARDIAC FUNCTION STUDY.



*36 frame sequence showing
cardiac circulation.*



*Intensified area of interest
corresponding to aortic arch.*



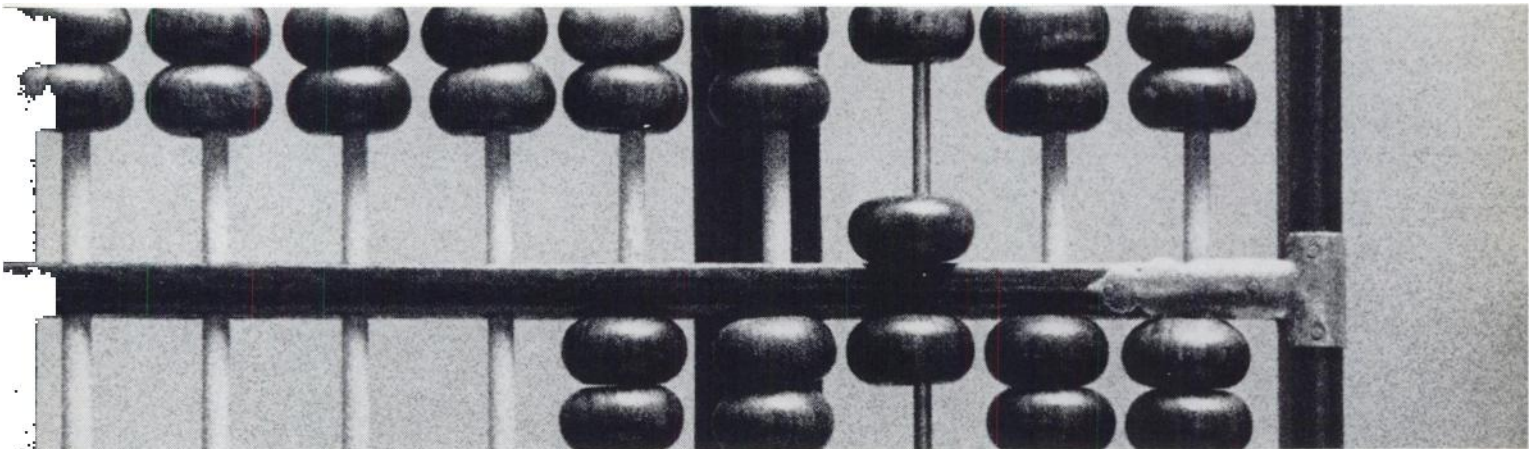
*Dynamics of circulation plotted
automatically by computer.
Curve shows time/activity over
160 frames.*

This dynamic study was recorded in 64 x 64 channel resolution, 160 frames at 0.5 seconds each. The patient was injected with 10mC 99m Tc-m Pertechnetate. Nuclear Data's 50/50 MED recorded each frame on magnetic tape, selected the area of interest, and integrated this area over every frame in the study. Four areas of interest can be selected and plotted automatically. Each curve can include over 1000 time/activity points. Identical studies can be performed on kidneys, lungs, brain, or any other varying phenomena.

The 50/50 MED Digital Image and Processing System provides more diagnostic information from data provided by organ imaging devices. In addition, the system can often provide data without an additional dedicated recording system. Case in point: the above cardiac function study.

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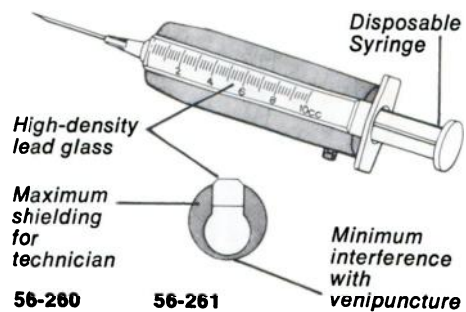
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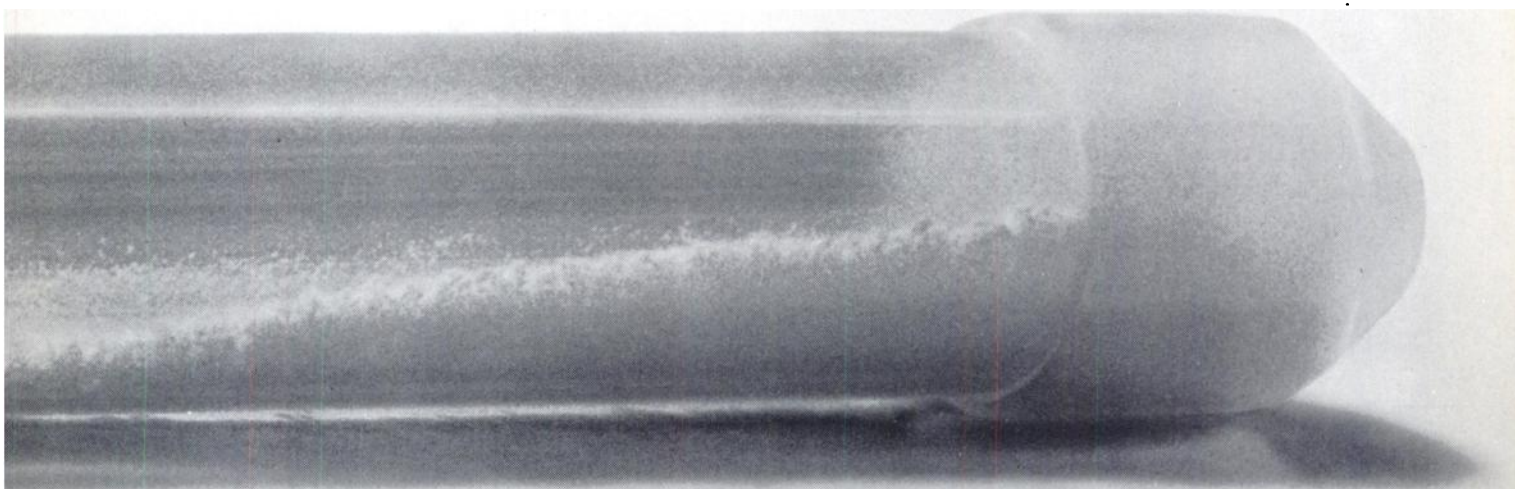
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results than
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tion, it should not be used as the sole basis for such an evaluation. In any patient, the clinical state is probably the best indication of thyroid status, and any laboratory test must be interpreted with caution when test results do not agree with clinical evidence.

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rofoam platform holds the vials. One end of the platform is modified to facilitate suction washings of the resin powder.

The Tresitope Diagnostic Kit is also available as a 105-test kit and a bulk vial kit. The 105-test kit contains 100 light-resistant (amber) vials of solution for serum testing, plus 5 vials for use with reference samples. The vials of radioactive test solution are packaged separately with these two kits and are the only parts requiring refrigeration. Included is a sufficient supply of tubes of resin powder and individual droppers for each test.

The bulk vial kit contains a 60 ml. bottle of test so-

lution with a sufficient number of plastic tubes of resin powder to perform at least 105 tests.

IMPORTANT

Use appropriate radiation precautions in handling, identifying and discarding all radioactive material. Remember that minute amounts of radioactivity remain on components used in the test, including the styrofoam platform when it is used in performing the test, and particularly when the Tresitope Suction Method is used for a number of tests.

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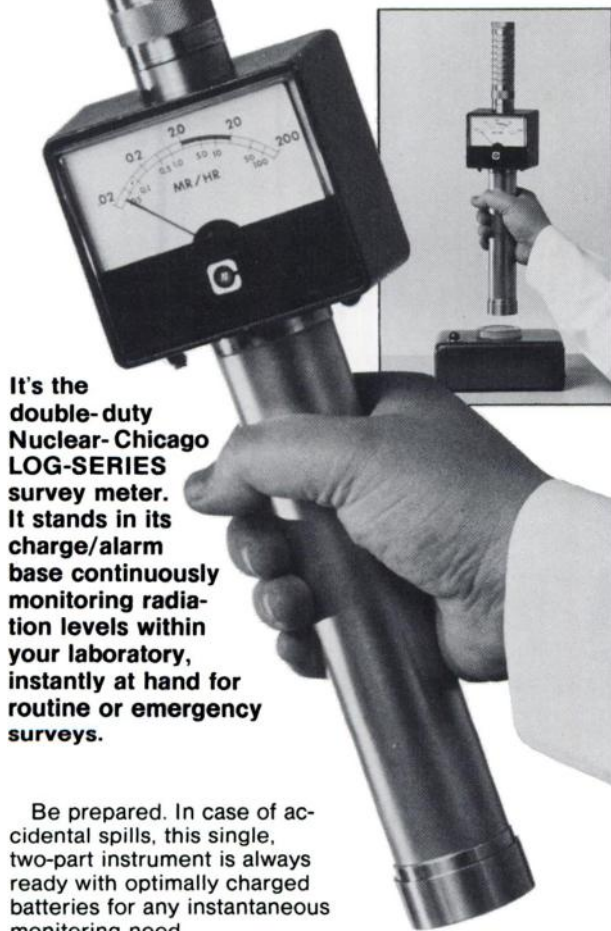
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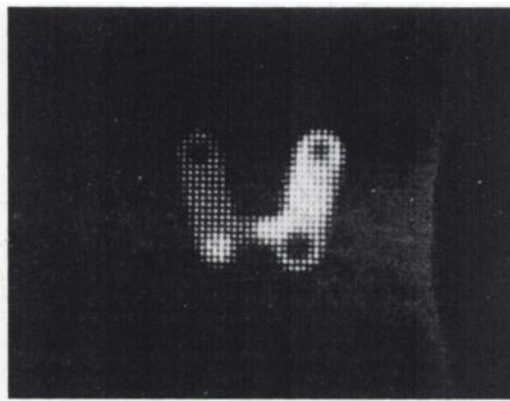
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The Baird-Atomic Scintillation Camera: a new kind of image.

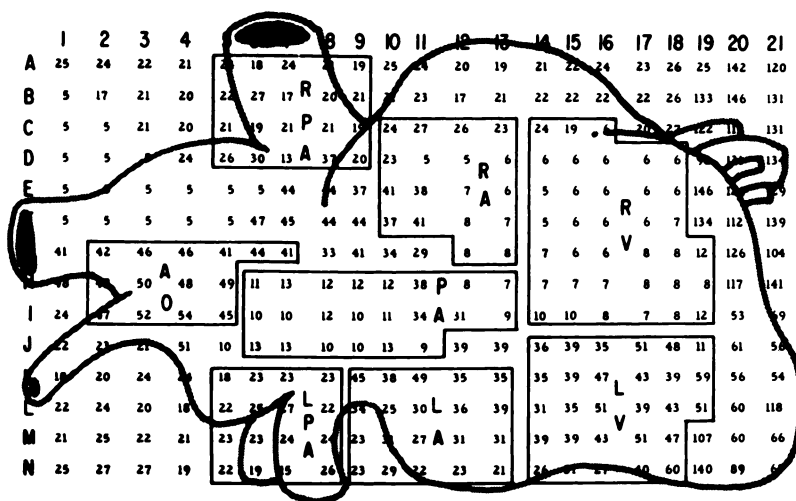
By Johan Govaert and Frank Troiani

The thyroid phantom shown here was made by B/A's new 2.78MM Imager System. This significant increase in resolution, an order of magnitude better, is effected by eliminating the intrinsic resolution of the sodium iodide crystal as a limiting factor on overall system resolution. This makes Baird-Atomic's Autofluoroscope the most valuable Scintillation Camera obtainable.

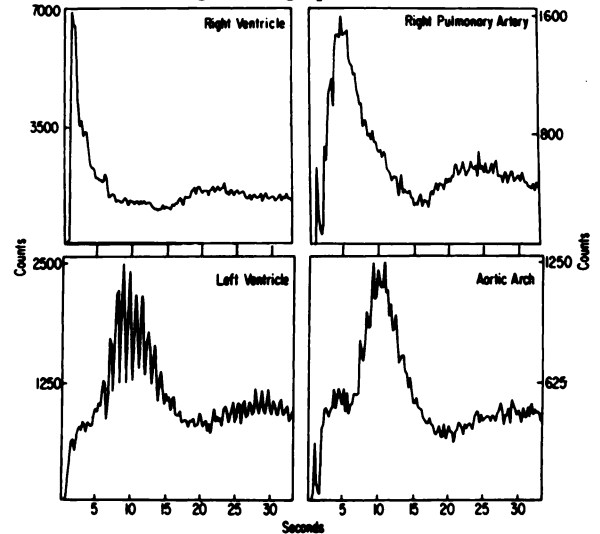


Thyroid Phantom
500 μ C
57 Co

RADIONUCLIDE ANGIOCARDIOGRAM TIME OF MAXIMUM COUNT



Radionuclide Angiocardiographs for areas selected.



Notice the thyroid phantom to the left. It says a lot about the Autofluoroscope's new image. Quite frankly, we don't think there's another camera that can get this resolution at all energies. Even large organs can be imaged in this way.

It means that patient data, even large organs, are imaged with resolution of 2-3 millimeters. Even at 16 centimeters from the detector the Autofluoroscope's resolution is less than one centimeter.

It represents, of course, a significant step forward.

Another example: the quantitative angiocardio-gram. It utilizes the computer and Baird-Atomic's extensive portfolio of computer programs. (All data has been corrected for detector uniformity and instrument dead-time.)

Time progression of a 10 mCi ^{99m}Tc bolus passing through the heart: time units in 0.2 seconds when maximum counts occurred for each element in the matrix over the duration of the study.

To the right of the initial computer print-out are radionuclide angiocardio-graphs for areas selected. Notice that all pertinent cardiac time parameters are evident from these curves. (Data was accumulated at a rate of 0.2 seconds per frame.)

Now let's look for a moment at another dramatic demonstration of the Autofluoroscope's capabilities: a blood flow study, performed by Dr. Bernard Mongeau, Hotel Dieu de Sherbrooke, Sherbrooke, Canada, and James McCoo, South Chicago Community Hospital.

The study was performed using 10 mc ^{99m}Tc Pertechnetate I-V injected as a bolus. The Autofluoroscope accumulated the information at the rate of 1 frame per second. Based on the curve data, the diagnosis was reported as positive with "incomplete obstruction of the left internal carotid (left carotid insufficiency)."

We have used this space to show you the kind of advances that we are building into the Autofluoroscope. To tell you that if you're looking into scintillation cameras, you should have the Autofluoroscope in mind. (Incidentally, the improvements discussed here can be readily installed in existing Autofluoroscopes.)

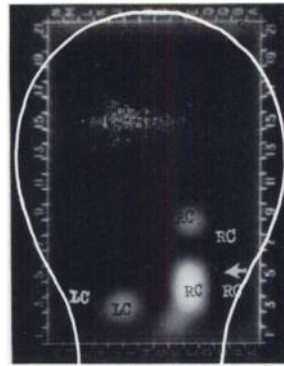
Naturally, you'll have questions. And also naturally, we have the answers. Abundantly. Write or call.

Baird-Atomic

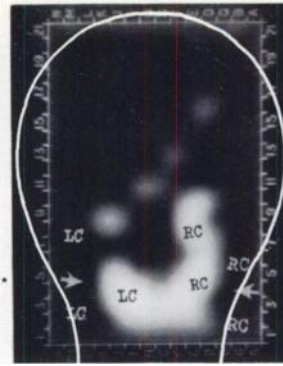
125 Middlesex Turnpike
Bedford, Mass. 01730. (617) 276-6208

Baird-Atomic Limited, Braintree, Essex,
England. Baird-Atomic (Europe) N.V.,
The Hague, The Netherlands.

Assessing cerebral "Blood Flow" — using the clinical screening method.

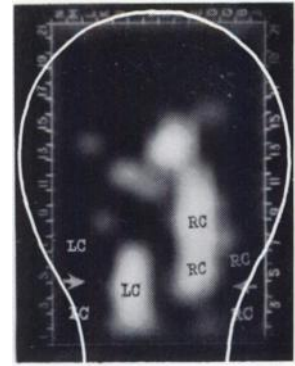


Frame 1

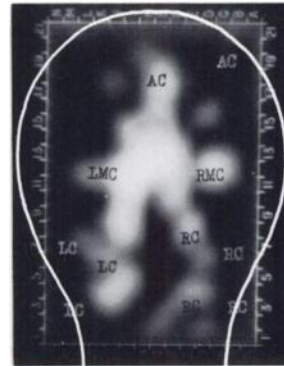


Frame 2

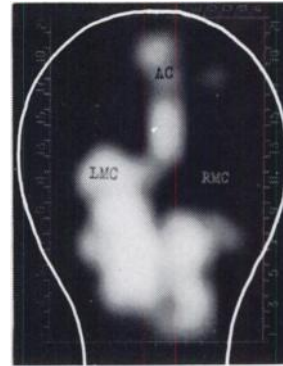
*NOTE: point of obstruction confirmed by angiogram.



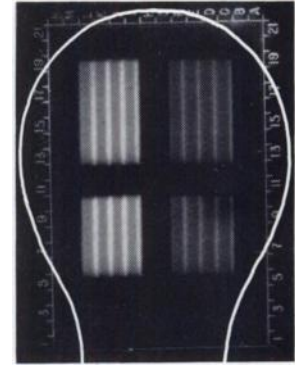
Frame 3



Frame 4



Frame 10



Area Flagging

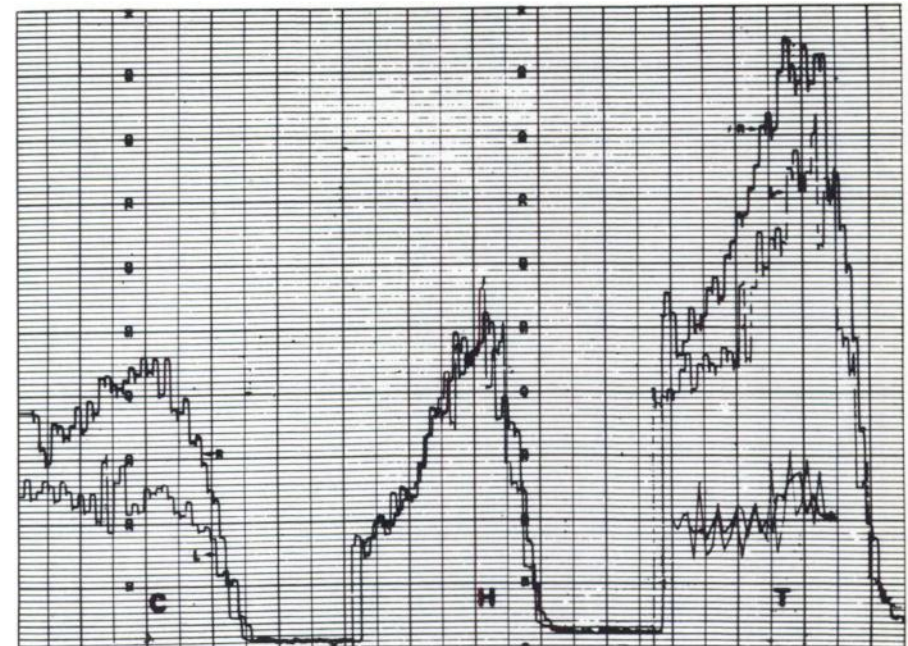
Legend

AC — Anterior Cerebral
LC — Left Carotid

RC — Right Carotid
LMC — Left Middle Cerebral

RMC — Right Middle Cerebral
W — Circle of Willis

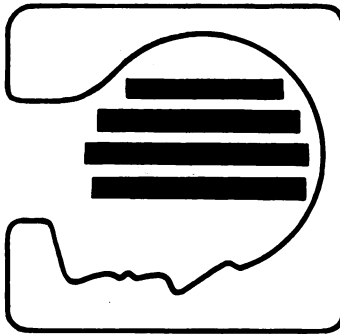
Cerebral Blood Flow Plots — 1000 counts full scale.



Cerebral Blood Flow

Analysis of the curves: parameters used.

1. Peak Activity A. Time from cervical to maximal cerebral perfusion (N: 7-10 sec.; symmetrical within 3 sec.) B. Amplitude height (± 2 S.D.)
2. Transit Time is determined by the first derivative method of Oldendorf.
3. Breakdown of Curve showing total blood flow into 2 curves showing: A. Hemispheric Blood Flow — Equal. B. Cervical Blood Flow — Reduced on left side.



Isotope tomography is here.

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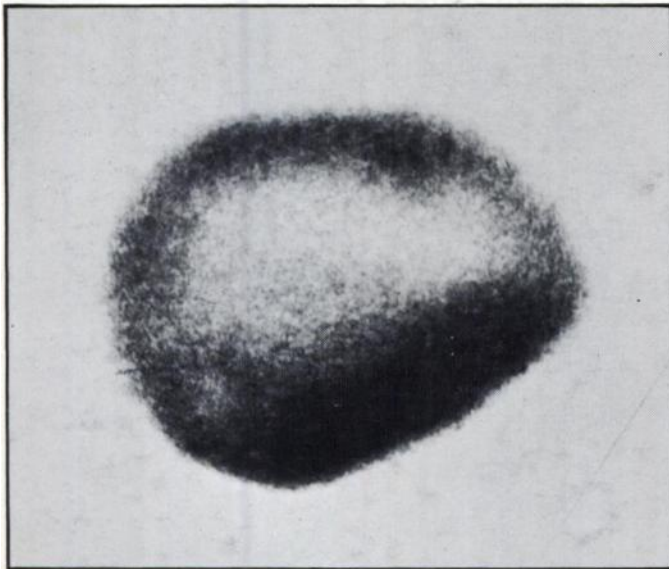
Distance from collimator to farthest focal plane is variable to 7-3/4 inches.

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

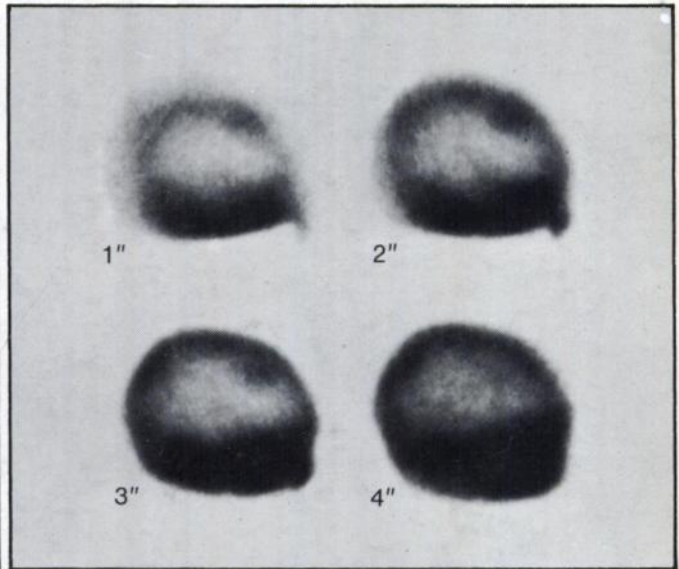
Obscuring events above and below each plane of focus are effectively "tuned out."

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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.



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