

Introduction - 1

- Roger Bumgardner
- M.P.H., BSRT (R),
(NM),(CT),(CV)
- Instructor Radiography and
Computed Tomography Houston
Community College
- Served in the Peace Corps 1983-
1985 in St. Vincent, West Indies



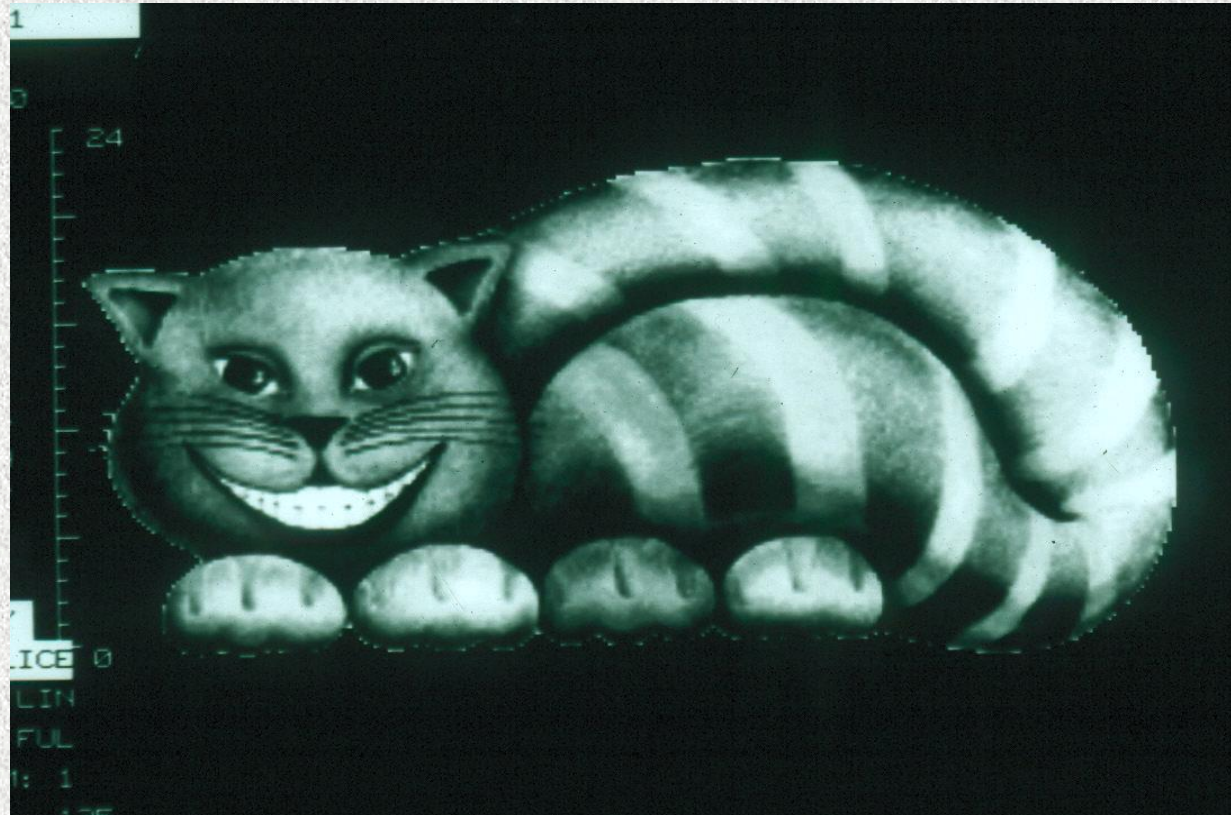
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Historical Development of Computed Tomography

Original CAT Scan



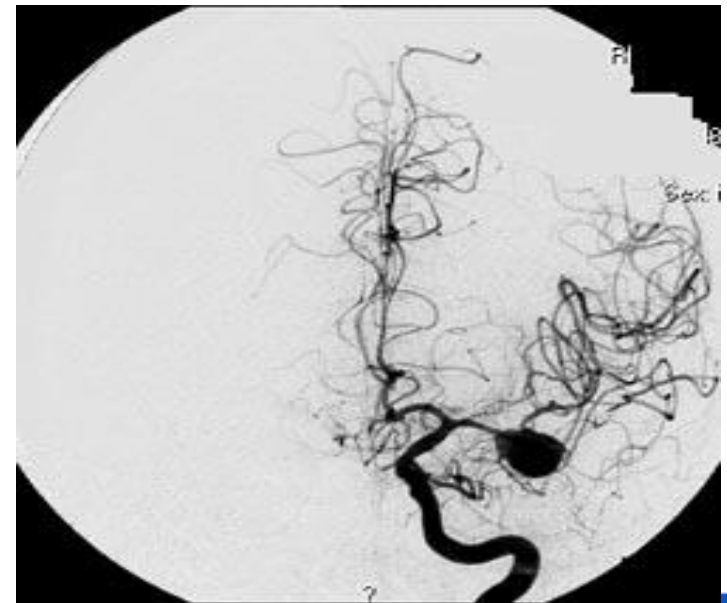
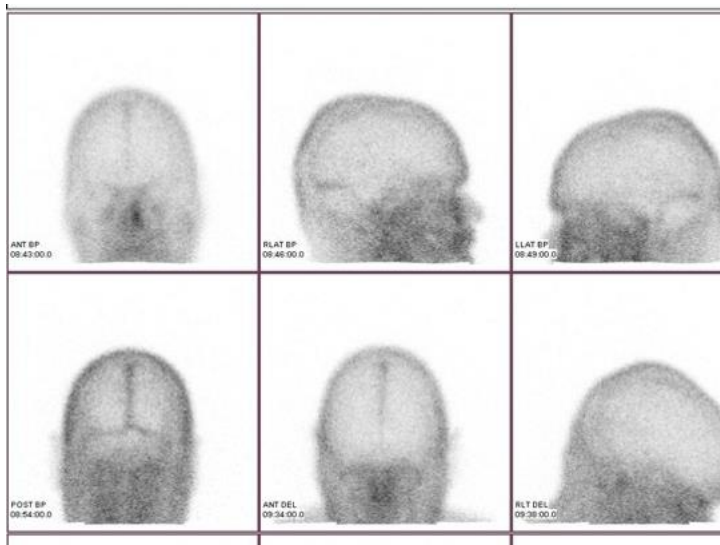
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HISTORY

- Before 1972, information about the brain was obtained through:
- Pneumo-encephalography
- Cerebral Angiography
- Nuclear Medicine

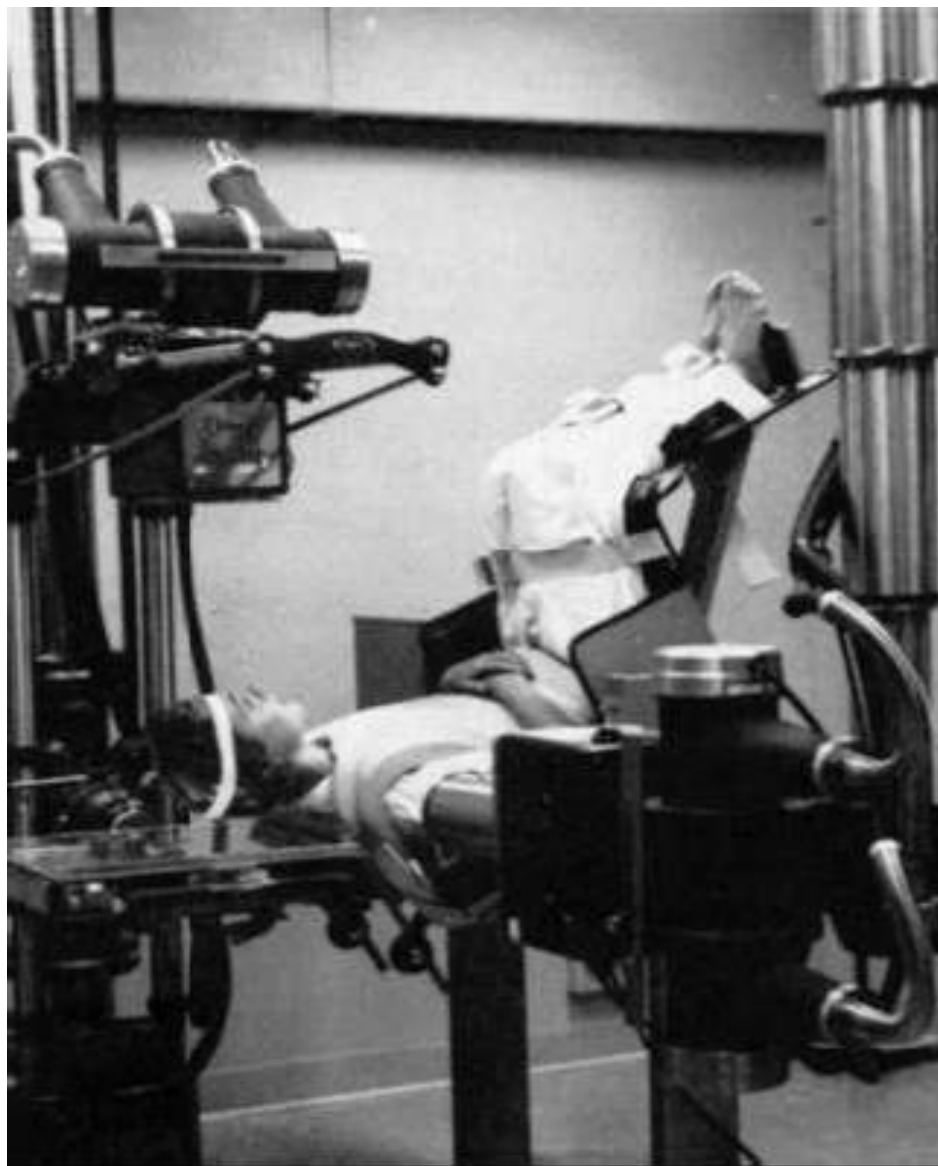


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Pneumo- Encephalography

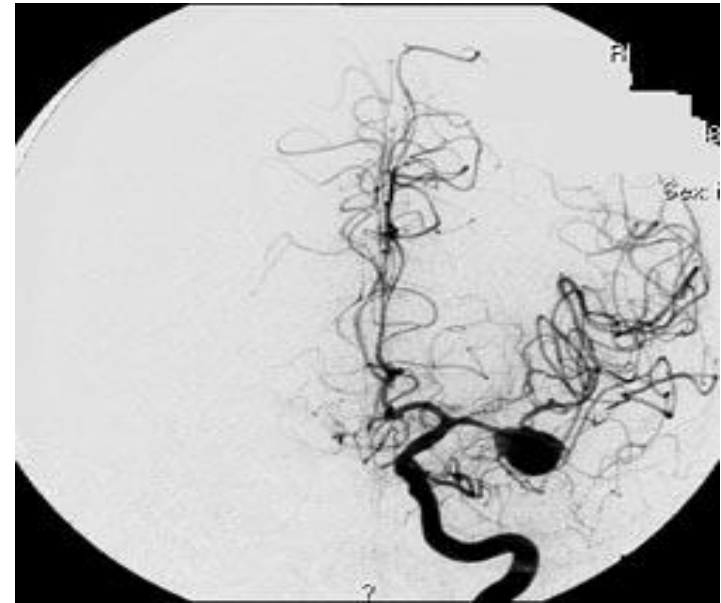


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Angiography

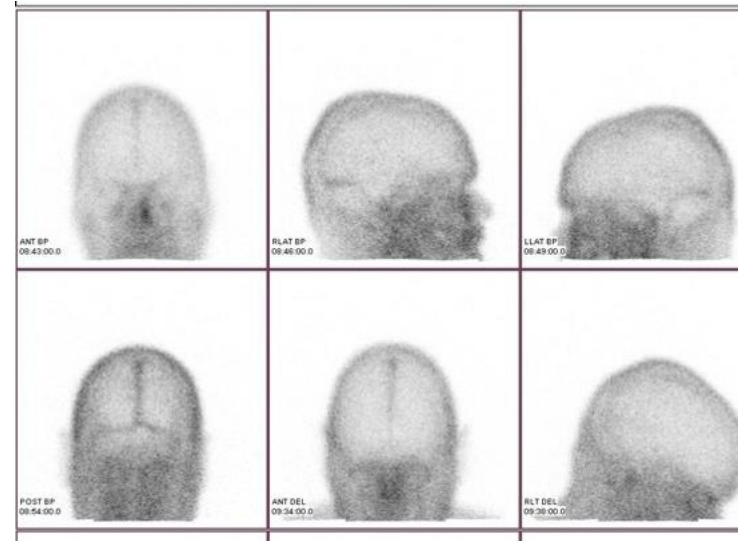
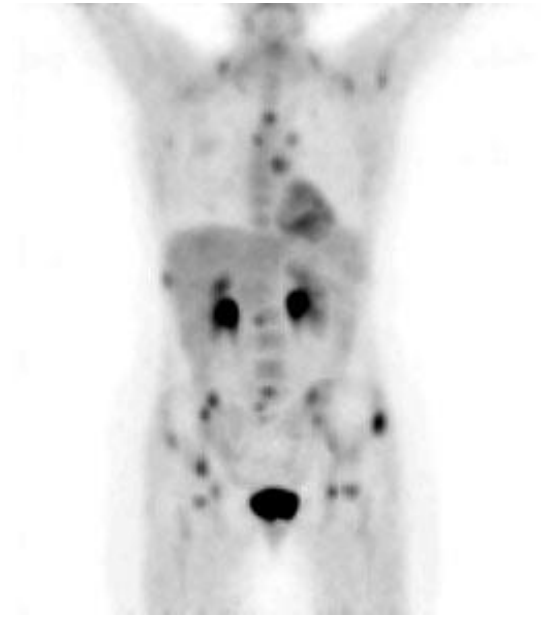


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Nuclear Medicine



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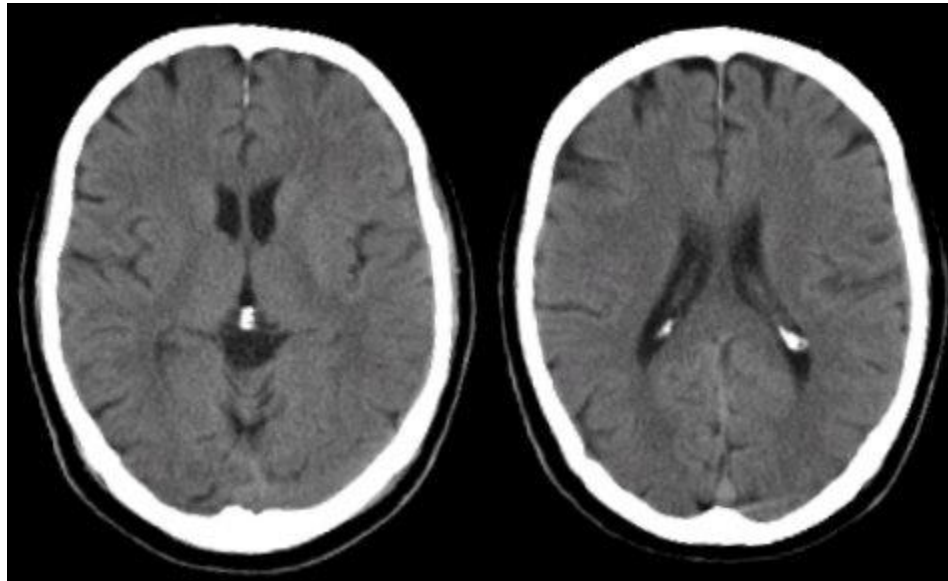
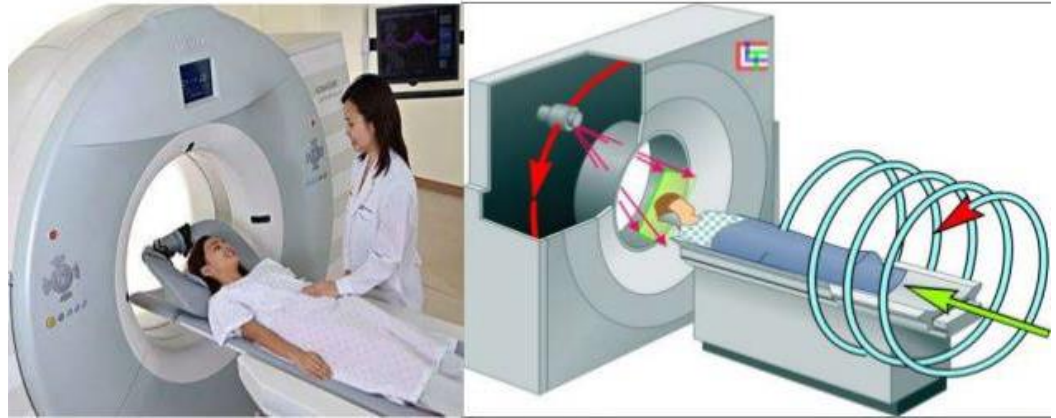
The Reconstruction Of Trans-axial Images By Computer

- Tomo--from Greek means section, cut or layer
- Graphy -- a picture or drawing



Computed Tomography Scan

Then Came Computed Tomography



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Evolution of Terms

- **1973 British Journal of Radiology**
 - **CTAS Computed Transverse Axial Scanning**
- **Other Terms**
 - **CTAT –Computed Transverse Axial Tomography**
 - **CAT – Computer Assisted Tomography or
- Computerized Axial Tomography**
 - **CT –Computerized Tomography**
- **CT - Computed Tomography is currently used**
 - **Established by RSNA in journal Radiology and American Journal of Roentgenology**



- **Geoffery Hounsfield (1919-2004)**

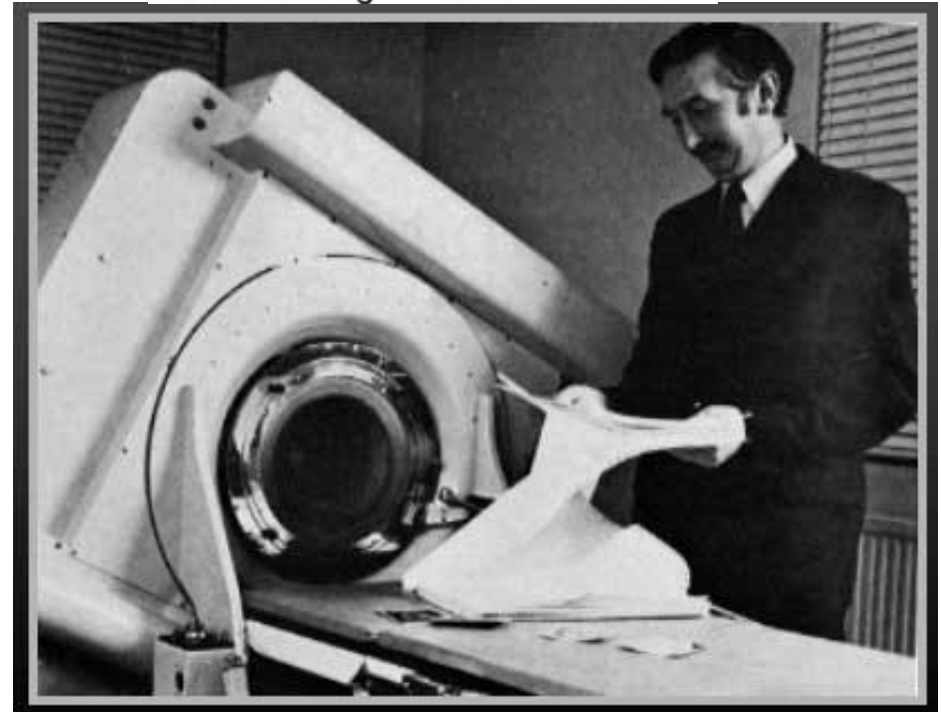


Geoffrey Hounsfield

- **Father of CT**

- **He worked at EMI-
Electric and Musical
Industries**

- **EMI Better Known
for ?**



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Research Contributors in CT

Johann Radon - Theory
was actually developed
in 1917

- Showed that an image can be reconstructed of a 2 or 3 dimensional object from a large number of projections stemming from different directions



Allan MacLeod Cormack (1924 - 1998)

- **South African/American Physicist**
- **1979 Nobel Prize in Physiology or Medicine for his work on X-ray Computed Tomography.**
- **Lesser known than Hounsfield, Cormack's pioneering work on axial tomography was a major contribution to the development of CT scanning.**

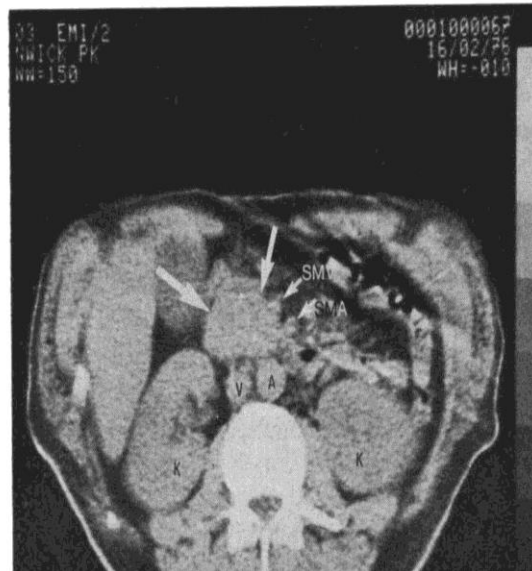
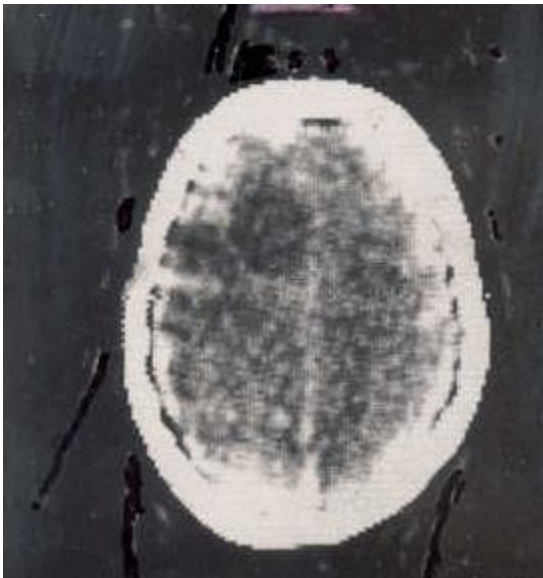


James Ambrose (1923-2006)

- Radiologist at Atkinson Morley Hospital
- 1st Clinical CT scan Oct. 1, 1971
 - Brain Tumor
- Modest Ambassador for CT

Louis Kreeel

- English Physician
- 1977 wrote influential article on the use of the EMI Scanner in Body CT
- Changed how investigative medicine use used.



Historic Events

- **1917 Johann Randon**
 - **Mathematical foundation for x-sectional reconstruction**
- **1963 Cormack**
 - **Technique for absorption distribution in human body**
- **1971 Hounsfield & Ambrose**
 - **1st clinical exams**
- **1972 Hounsfield and Ambrose**
 - **Presented to RSNA**
- **1974**
 - **First whole body scanner**
- **1979 Hounsfield & Cormack**
 - **Awarded Nobel Prize**
- **1989**
 - **1st clinical exam with Spiral**
- **1998**
 - **Introduction of multi-slice scanner (4)**
- **2000**
 - **Introduction of PET/CT**
- **2001**
 - **Introduction of 16 slice scanner**
- **2004**
 - **Introduction of 64 slice scanner**
- **2005**
 - **RSNA Introduces Dual Source**
- **2006**
 - **256 and 320 slice per revolution**

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**Atkinson Morley Hospital
Wilmington, England**

- **EMI and CT scanners were synonymous**
- **Seimens - 1st radiologic company to produce CT scanners**
- **Late 70's 18 companies produced CT Scanners**
- **Now most are gone including EMI**

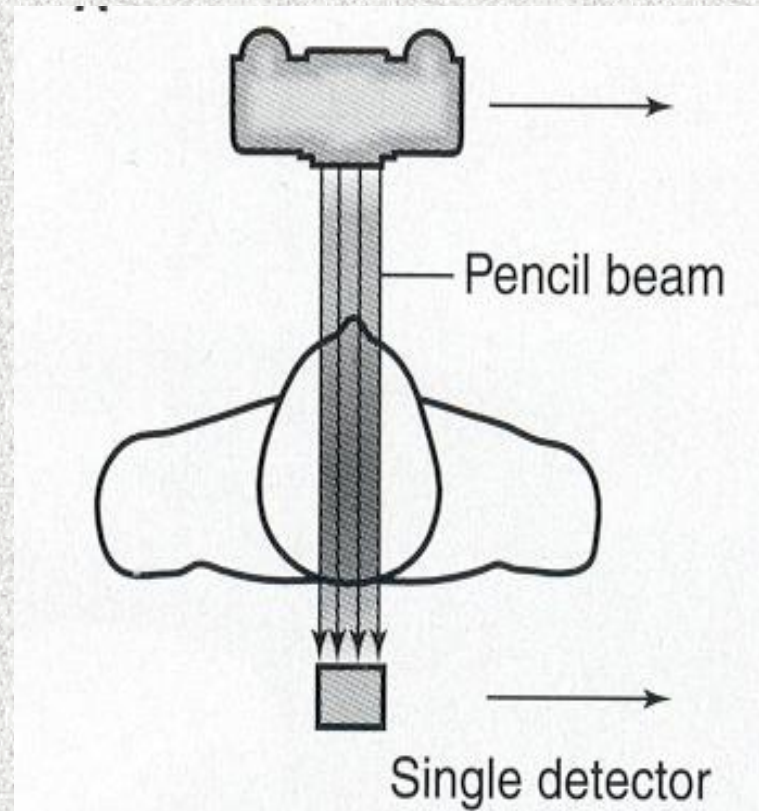


EMI Scanner



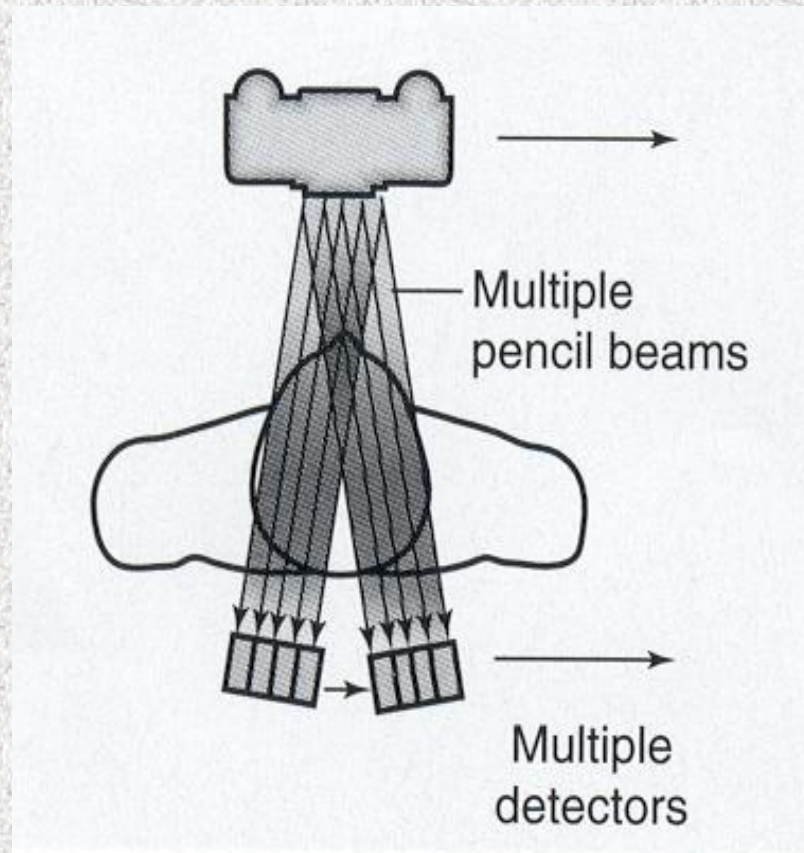
First Generation Scanner

- Translate/Rotate
- Pencil Beam
- 1 or 2 detectors
- Head only Scans
- Scan time of 5 minutes



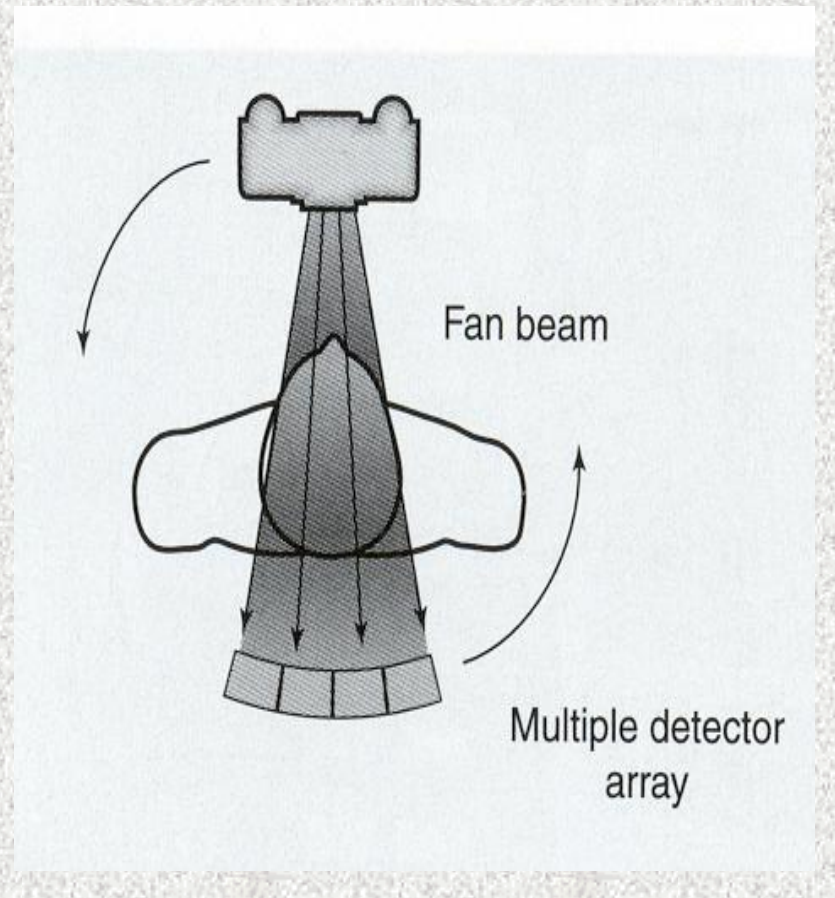
Second Generation Scanner

- Still Translate/Rotate
- Fan shaped Beam
- 30 detectors
- Scan times of 20 seconds
- Body scanning possible



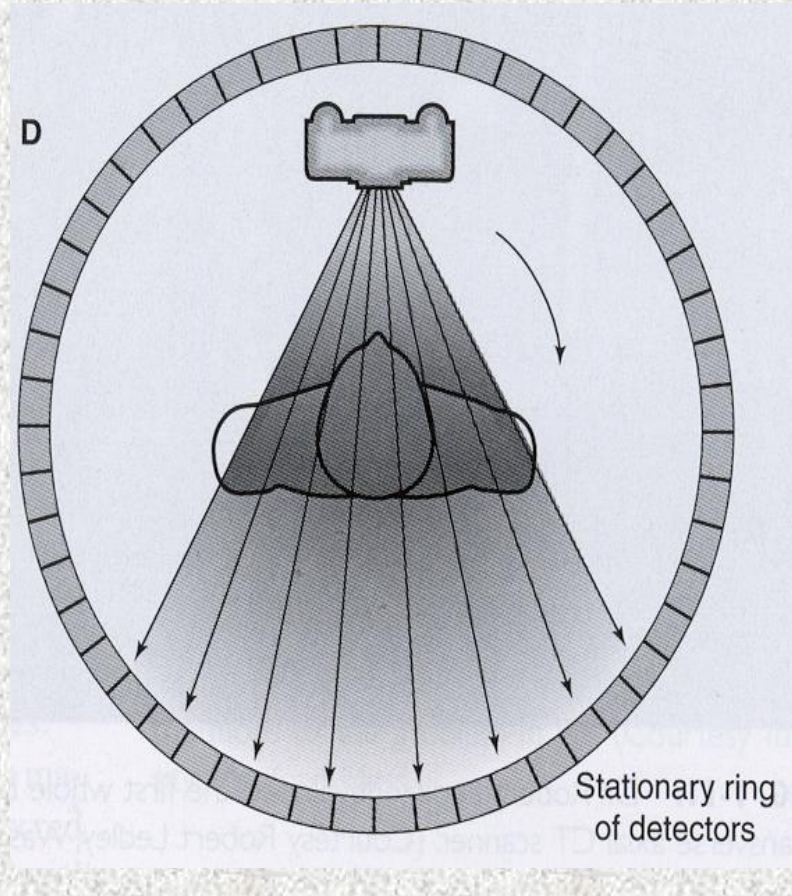
Third Generation Scanner

- Rotate-Rotate System
- Fan shaped Beam
- Hundreds of Detectors
- Full 360 Degrees of Rotation
- 1 to 8 Seconds/Scan
- Disadvantage of Ring Artifact



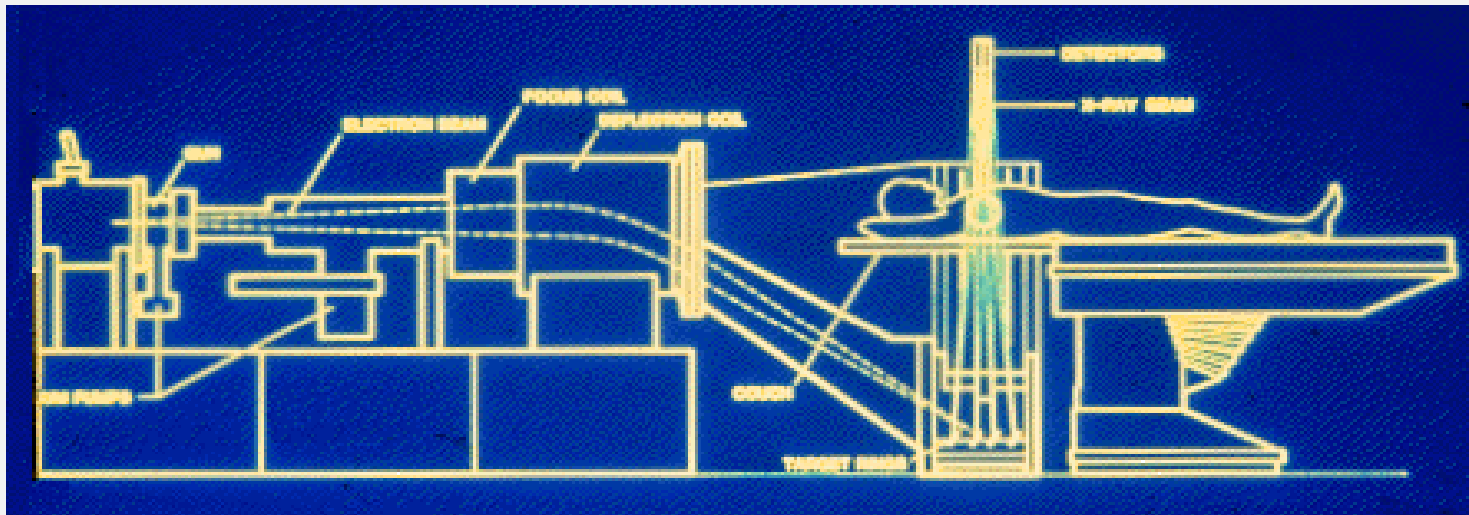
Fourth Generation Scanner

- Rotate-Fixed Scanner
- Thousands of detectors in a complete circle
- Advantage-- No ring artifact
- Disadvantage-- Higher cost, Radiation dose, and Magnification



FIFTH GENERATION

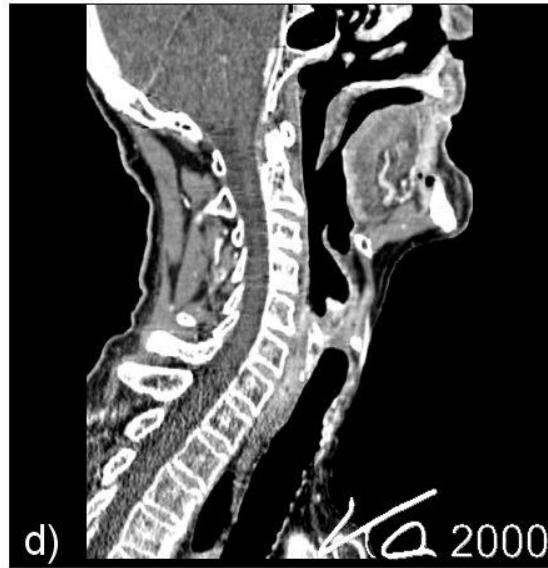
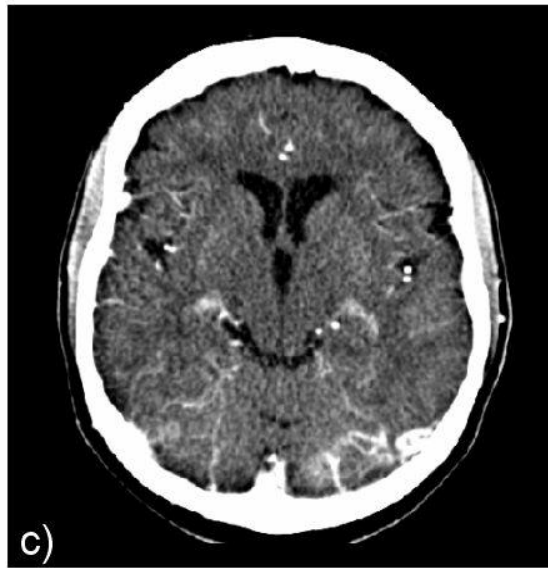
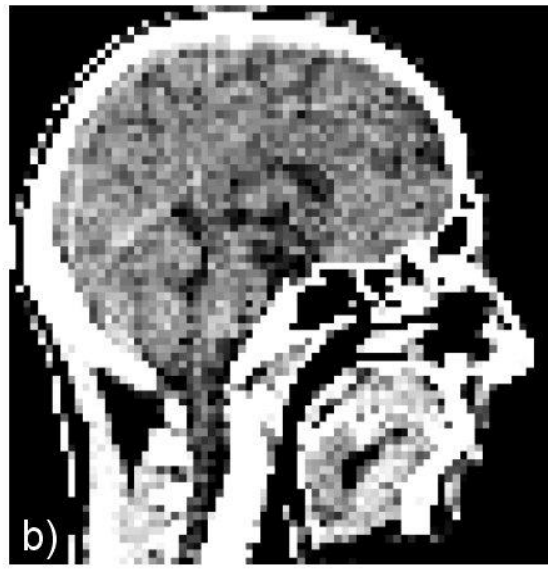
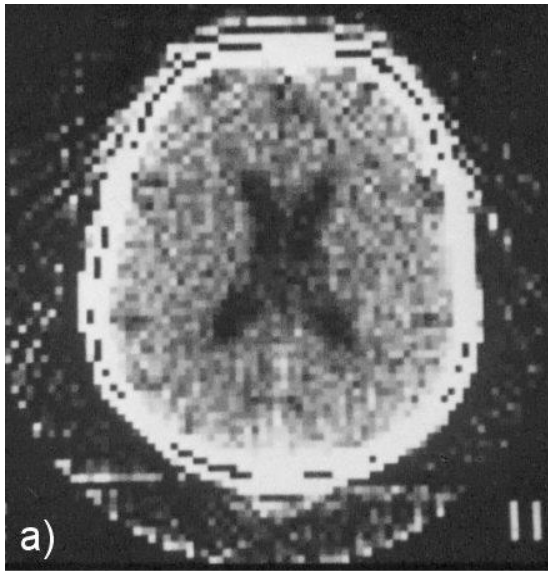
- High speed scanners
- Acquire data in milliseconds
- EBCT- electron beam scanner, and Dynamic spatial reconstructor scanner



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The End or The Tail or Tale of the CAT



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