

Gamma Array Issues

- Interface Program to Output Efficiency
- Calibrating the Array
- Simulation Examples

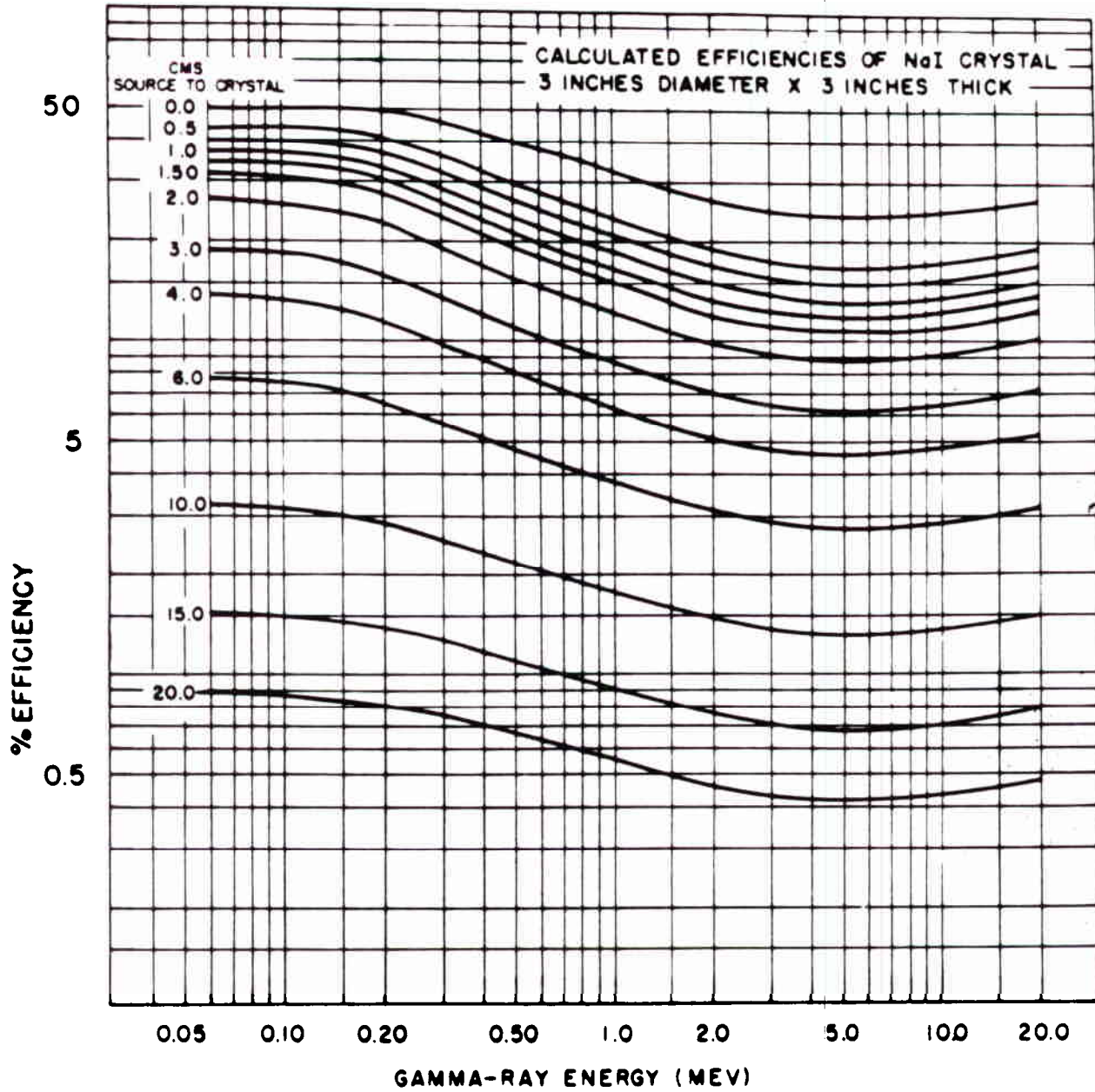
Interface Program

- Interface screen
- User Enters
 - Efficiency of individual detectors
 - Flags (which detectors are in place, position?)
 - Gamma energy
 - Reaction Distribution in the gas along the beam line
 - Thresholds
- Program Outputs
 - Array efficiency
 - Intended reaction cross section

Calibrating the Array

- **NaI Cross Calibration**
 - Use standard 3in x 3in crystal
 - Use known efficiency tables
 - Calibrate sources

NaI Calculated Efficiencies



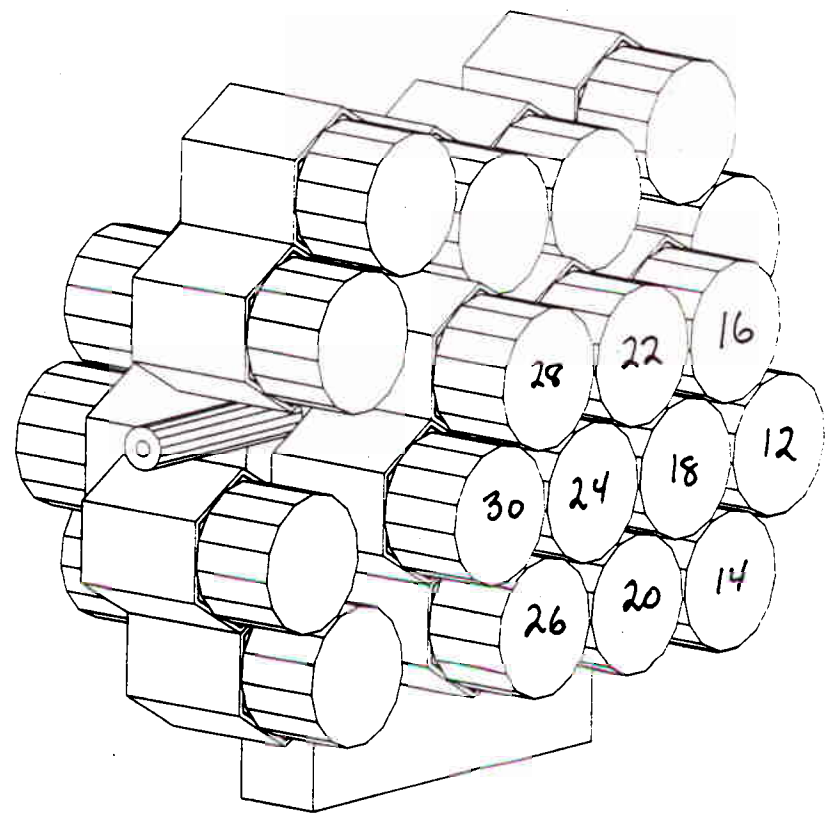
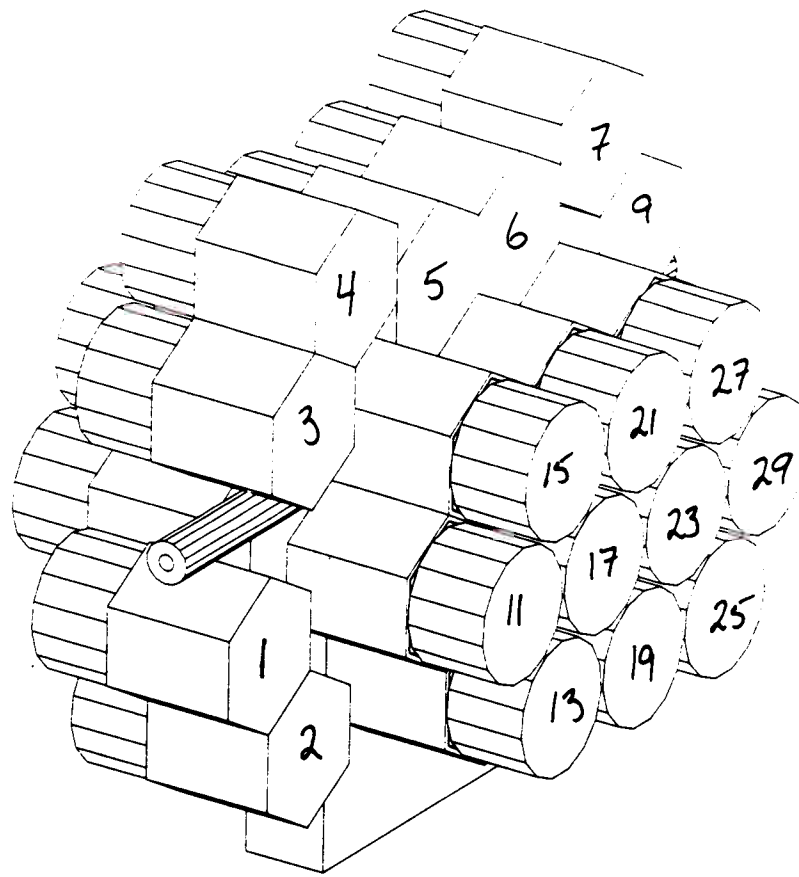
Calibrating the Array

- Use calibrated sources
 - Determine BGO detector efficiencies
- Compare Single BGO calibration to a GEANT simulation

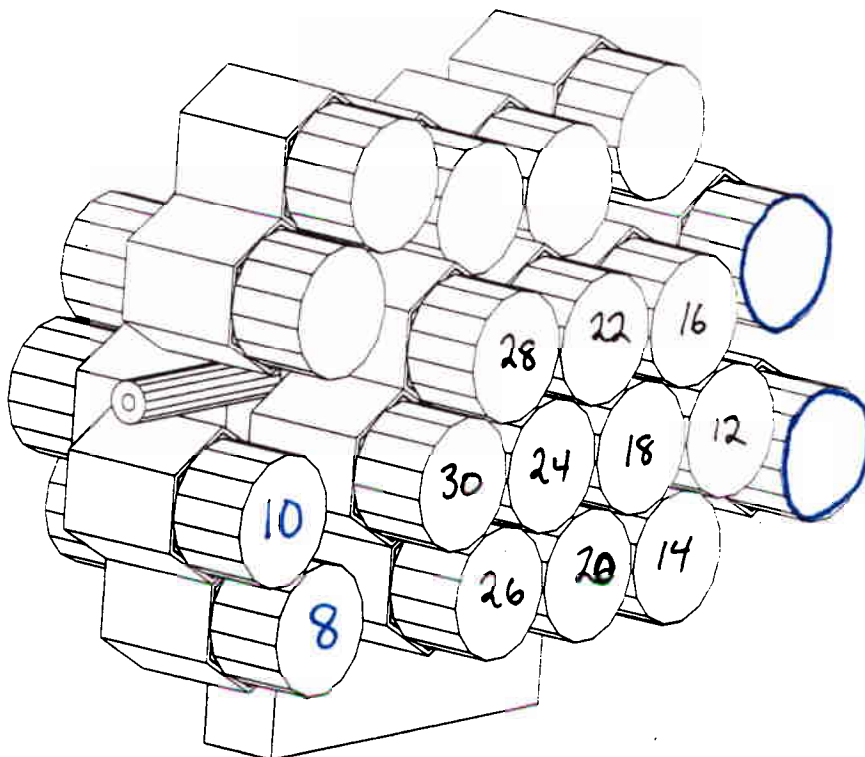
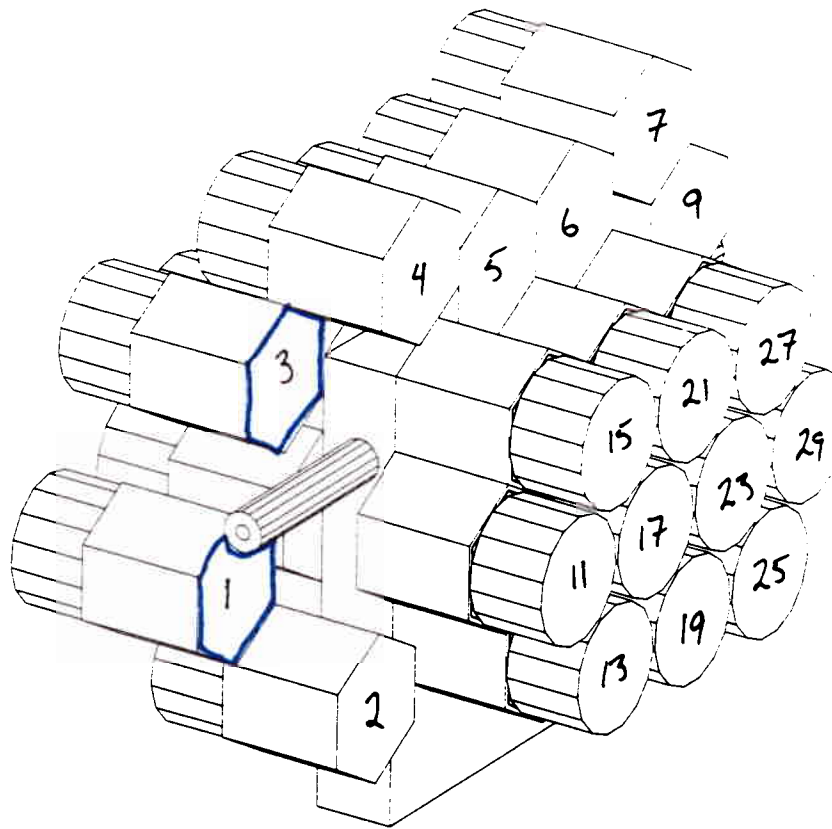
Calibrating the Array

- Compare Full Array data to simulation
 - Will include attenuation of gammas in target box
 - Use low energy source because attenuation is greater
 - Efficiency will be affected greater.
 - Possibility of very limited effect
 - Should be moved through target box will all components in final position

Original Full Array



Modified Full Array



Simulation Examples

- Modified Array Simulation Efficiency
 - Point source, $z=0$, 4.467 MeV, 2MeV threshold
 - 55.61%, no neighbours
 - 55.95, one neighbour
 - 56.20, two neighbours
- Original Full Array
 - Point Source, $z=0$, 4.467 MeV, 2MeV threshold
 - 57.44%, no neighbours

Simulation Examples

- **Modified Array Simulation Efficiency**
 - Line Source, 10cm length, 4.467 MeV, 2MeV threshold
 - 54.86%, no neighbours
 - 55.14%, one neighbour
 - 55.34%, two neighbours
- **Original Full Array**
 - Line Source, 10cm length, 4.467 MeV, 2MeV threshold
 - 56.44%, no neighbours

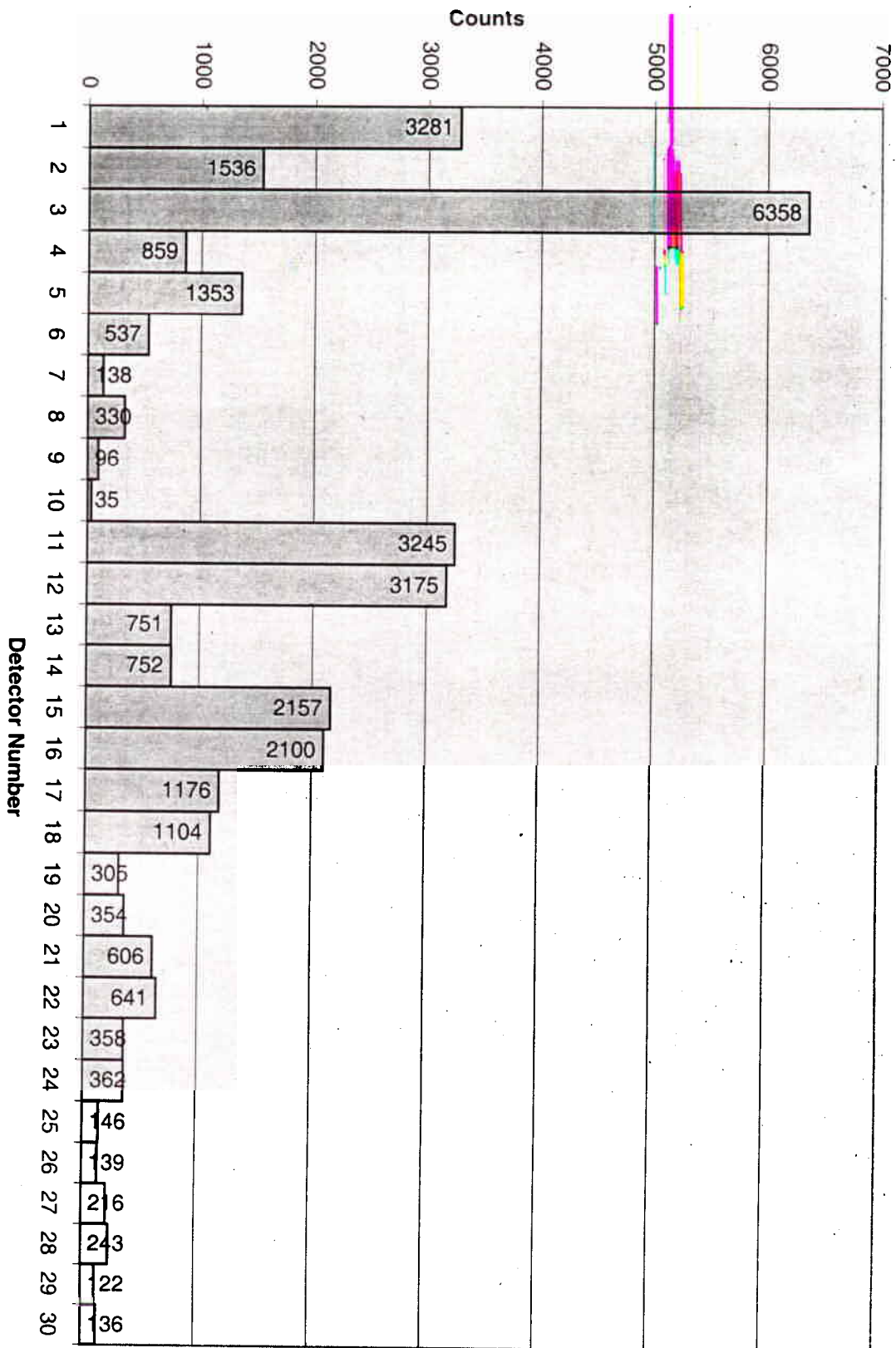
Simulation Examples

- **Modified Array Simulation Efficiency**
 - Line Source, 20cm length, 4.467 MeV, 2MeV threshold
 - 49.93%, no neighbours
 - 50.19%, one neighbour
 - 50.39%, two neighbours
- **Original Full Array**
 - Line Source, 20cm length, 4.467 MeV, 2MeV threshold
 - 51.83%, no neighbours

Detector by Detector Distribution

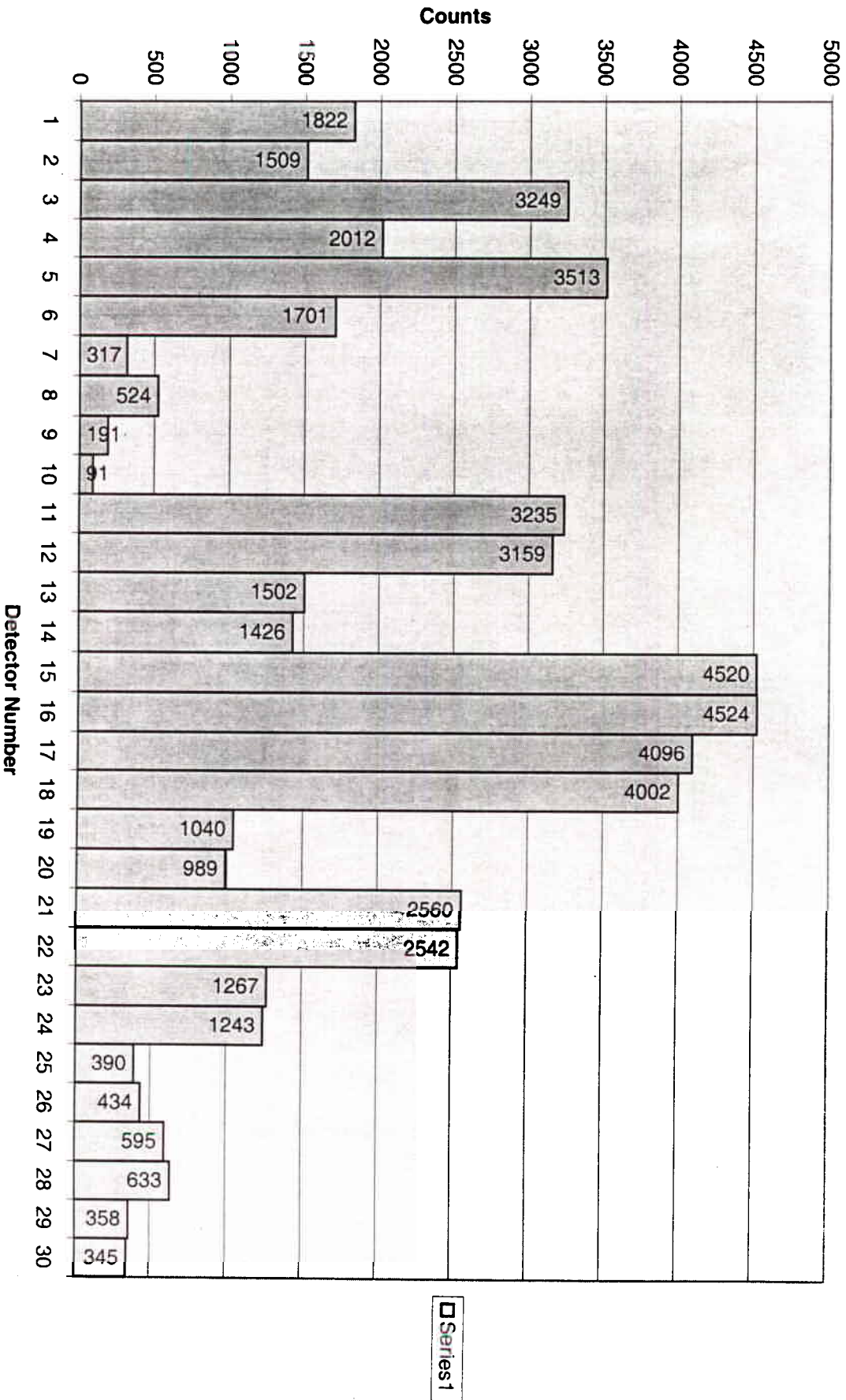
- Point Source, 4.467 MeV, $z = -10, -5, 0, 5, 10$ cm, 2MeV Threshold

Number of Counts in each Detector of the Gamma Array for a Point Source at z=-10cm

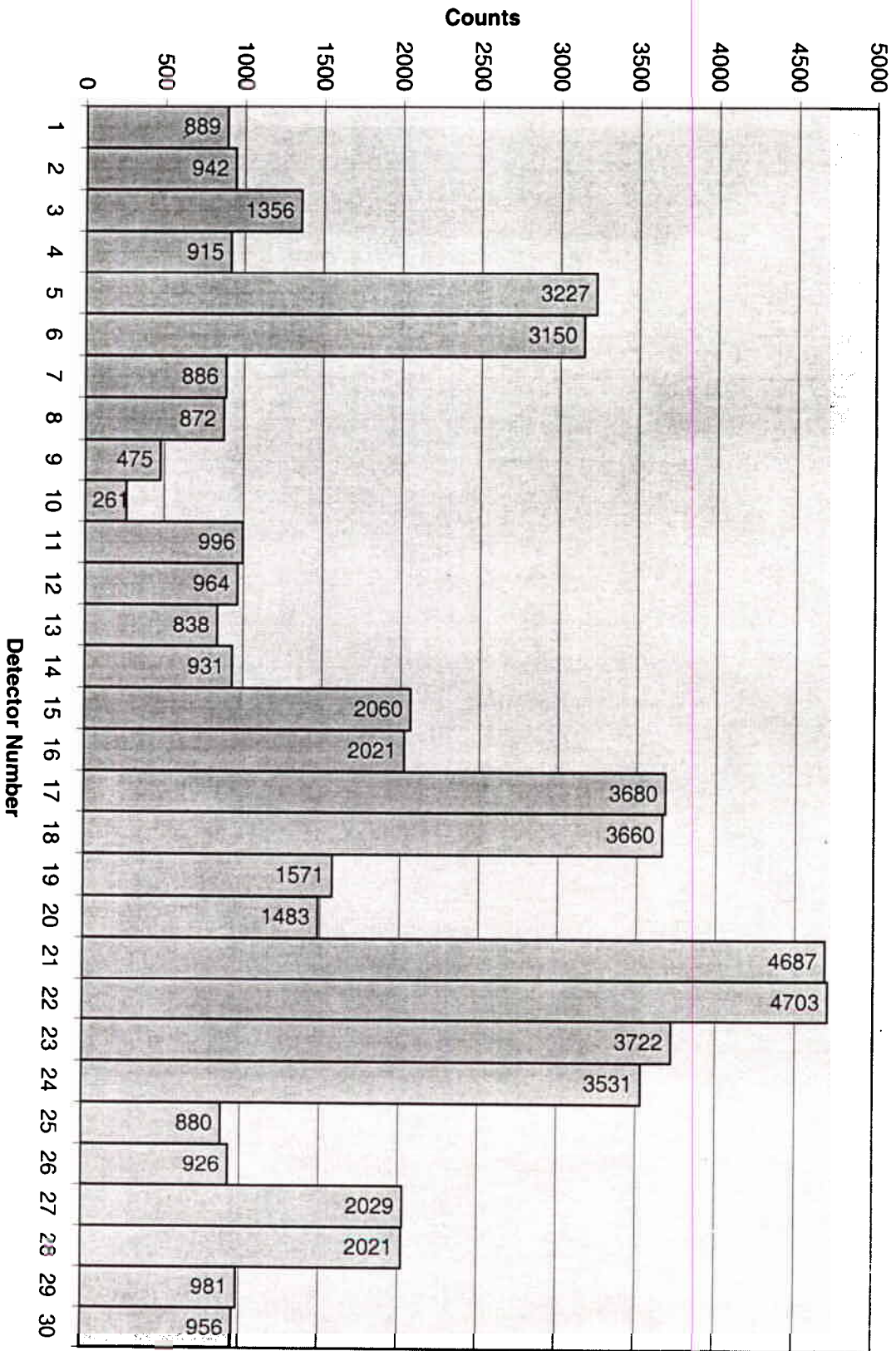


Series1

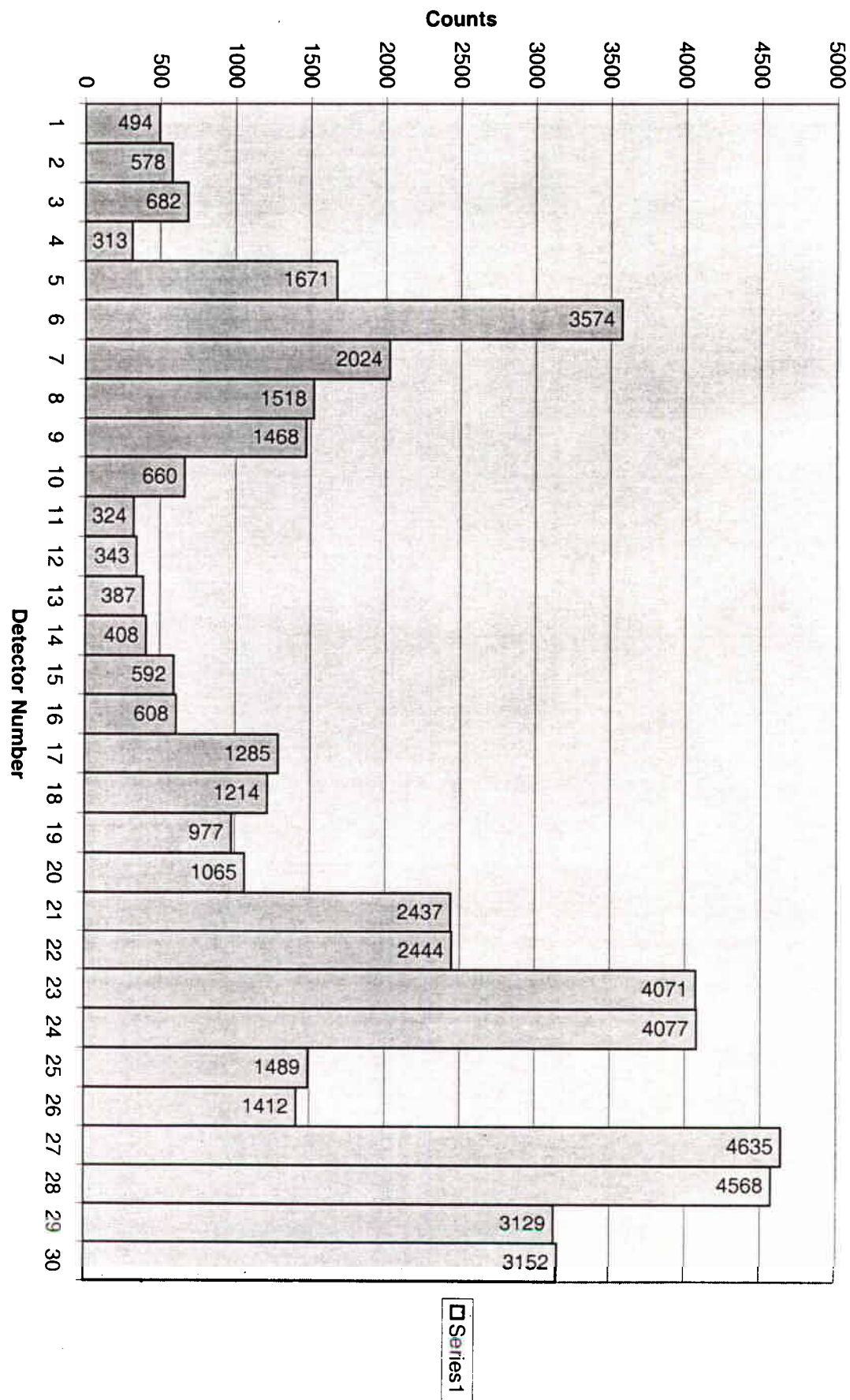
Number of Counts in each Detector of the Gamma Array for a Point Source at z=-5cm



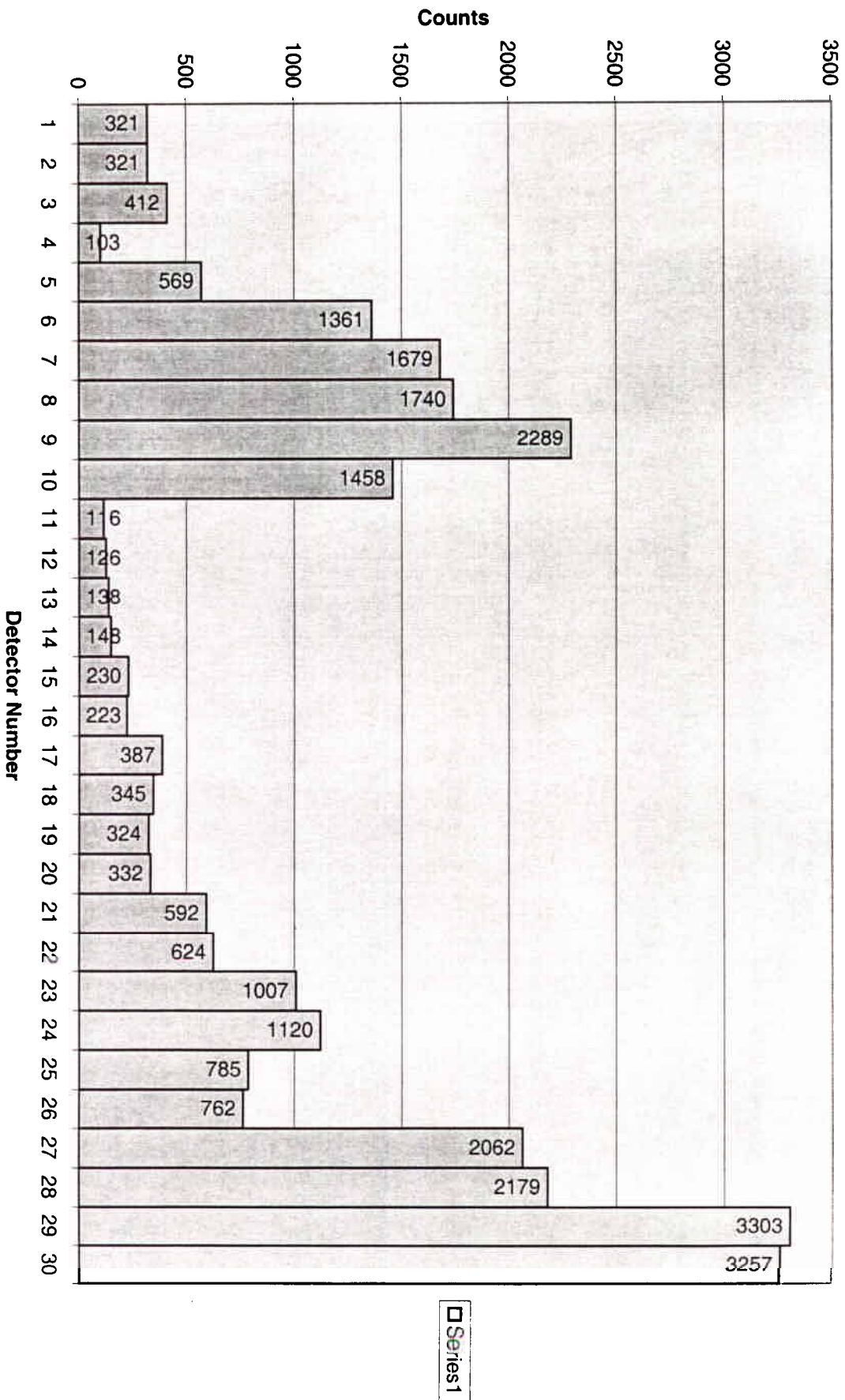
Number of Counts in each Detector of the Gamma Array for a Point Source at z=0cm



Number of Counts in each Detector of the Gamma Array for a Point Source at z=5cm



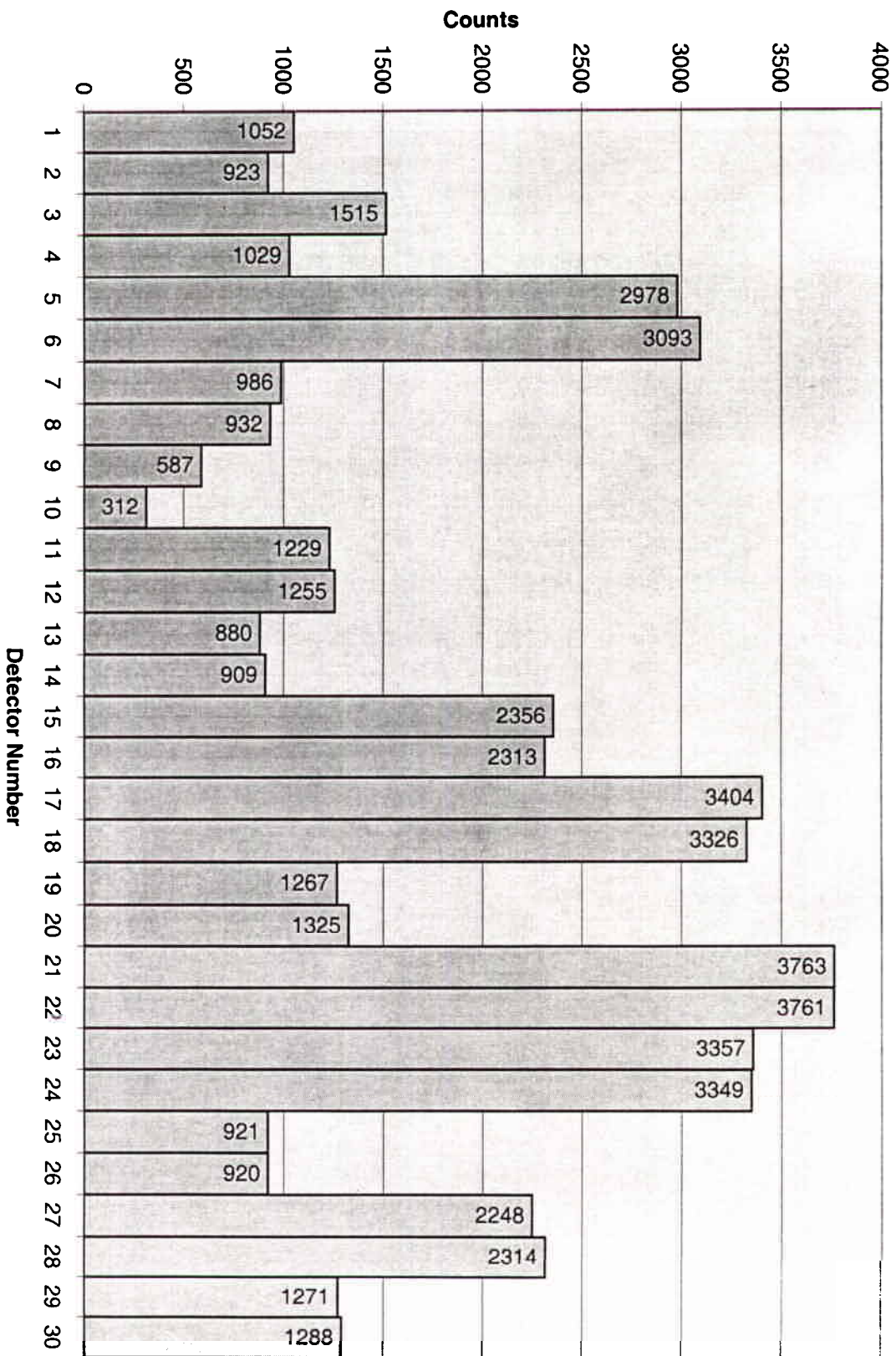
Number of Counts in each Detector of the Gamma Array for a Point Source at z=10cm



Detector by Detector Distribution

- Line Source, 4.467 MeV, Length 10 cm, 2MeV Threshold

Number of Counts in each Detector of the Gamma Array for a Line Source of Length 10cm



Detector by Detector Distribution

- Line Source, 4.467 MeV, Length 20 cm, 2MeV Threshold

Number of Counts in each Detector of the Gamma Array for a Line Source of Length 20cm

