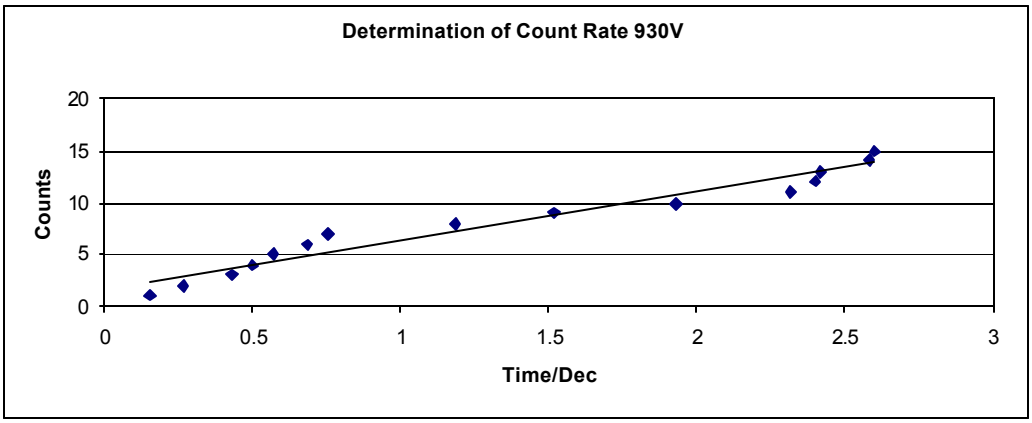
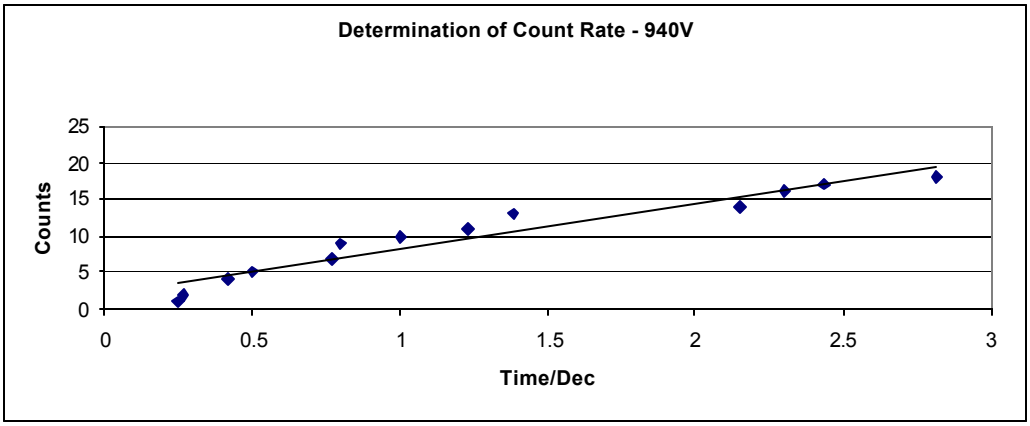
Appendix I

Determination of Optimum PMT voltage

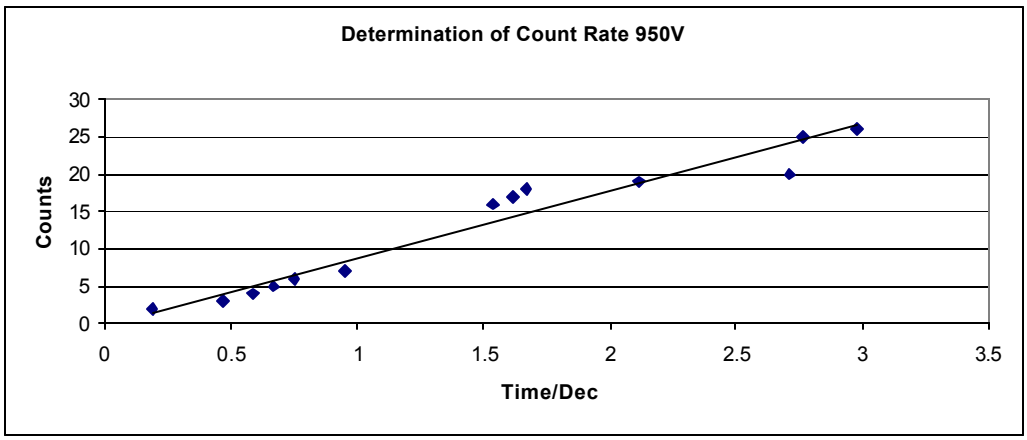
Simon Bevan



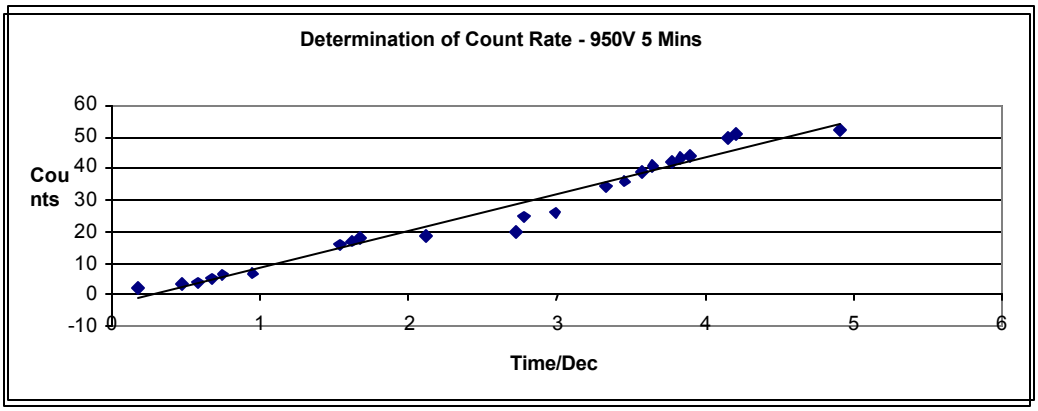
Graph 1 – determination of count rate for 930v



Graph 2 – determination of count rate for 940v



Graph 3 – determination of count rate for 950v



Graph 4 – determination of count rate for 950v

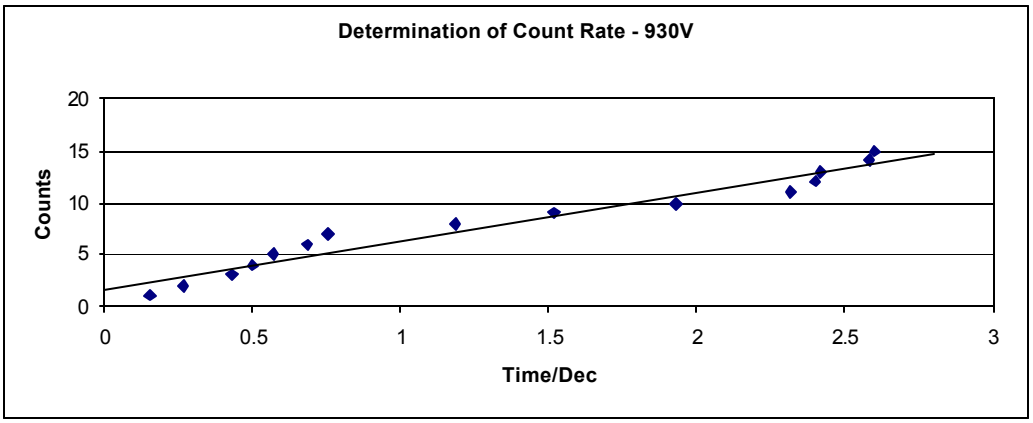
Time/s	Counts	Time Interval/s
0.11	2	
0.28	3	17
0.35	4	7
0.4	5	5
0.45	6	5
0.57	7	12
1.32	16	35
1.37	17	5
1.4	18	3
2.07	19	27
2.43	20	36
2.46	25	3
2.59	26	13
3.2	34	21
3.27	36	7
3.34	39	7
3.39	41	5
3.46	42	7
3.5	43	4
3.54	44	4
4.09	50	15
4.12	51	3
4.55	52	43

Table 1 – Time interval for each count

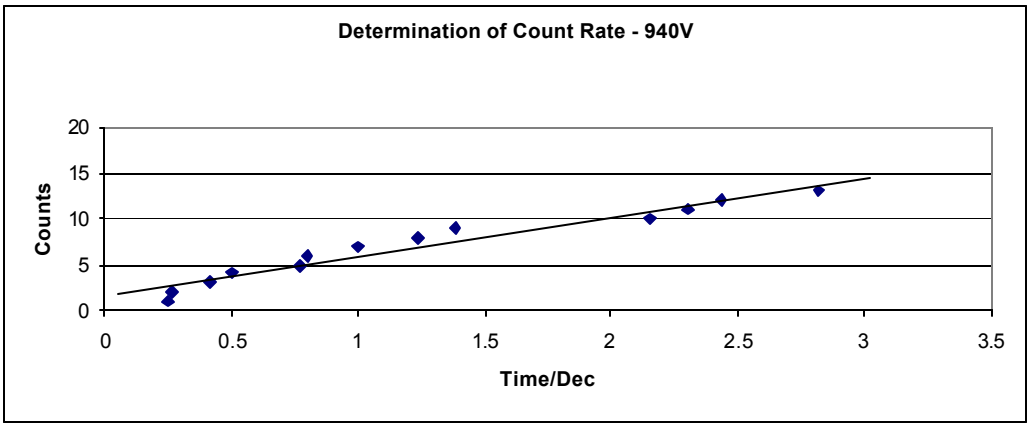
Appendix II

Graphs adjusted for noise

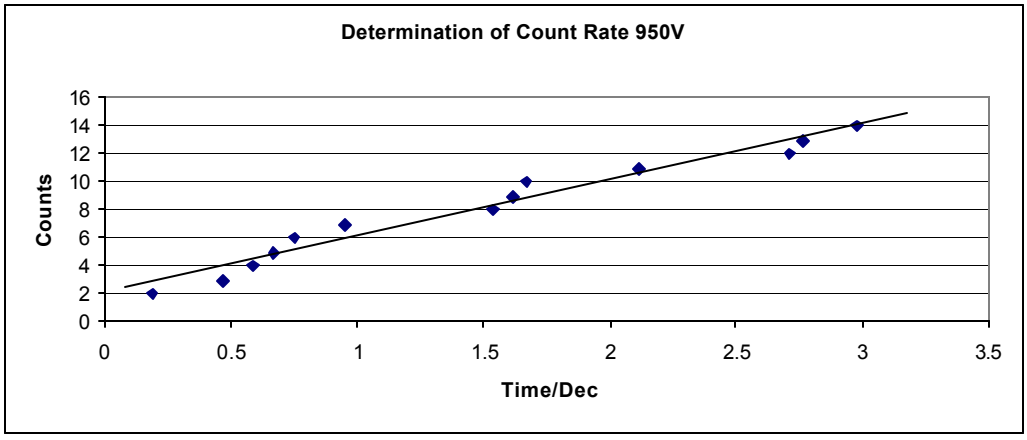
Simon Bevan



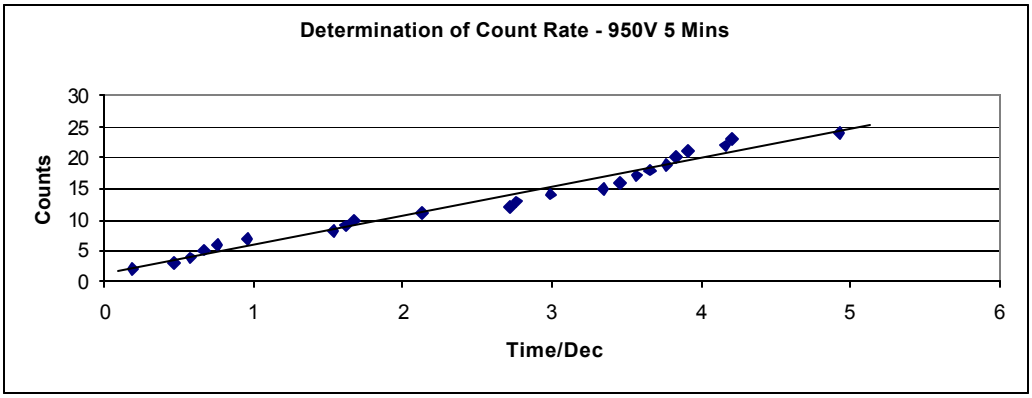
Graph 1 – determination of count rate for 930v



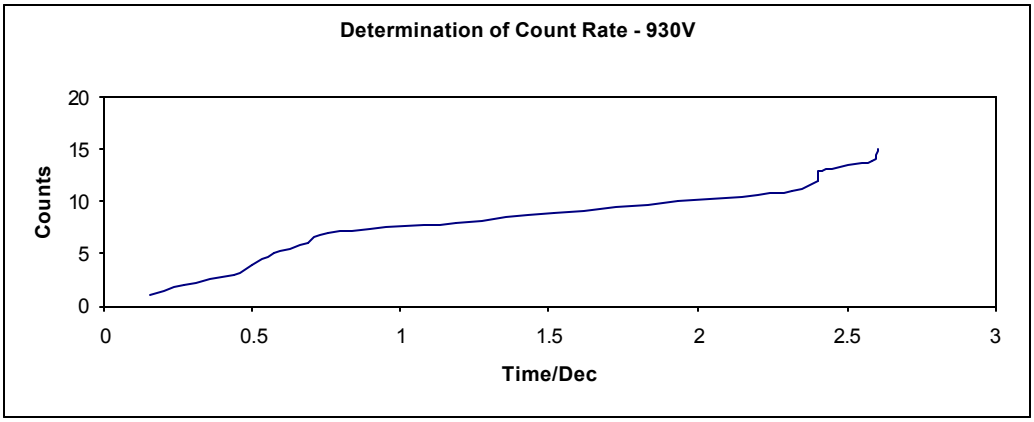
Graph 2 – determination of count rate for 940v



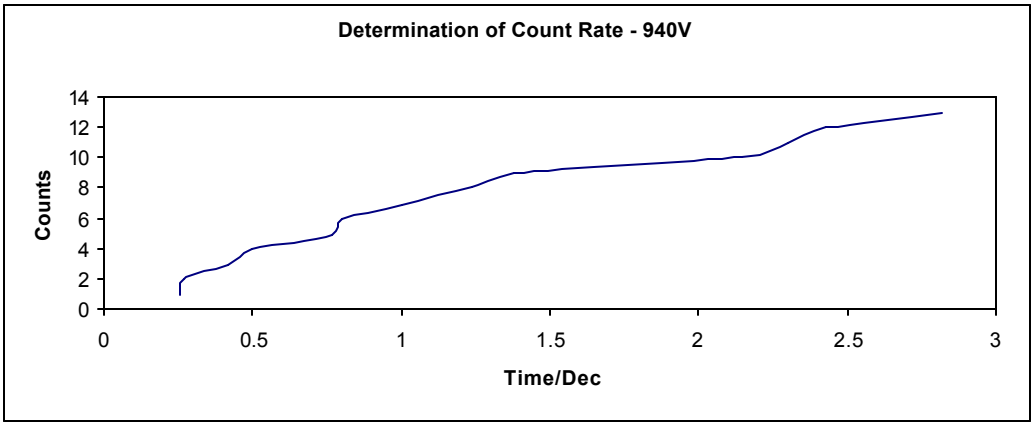
Graph 3 – determination of count rate for 950v



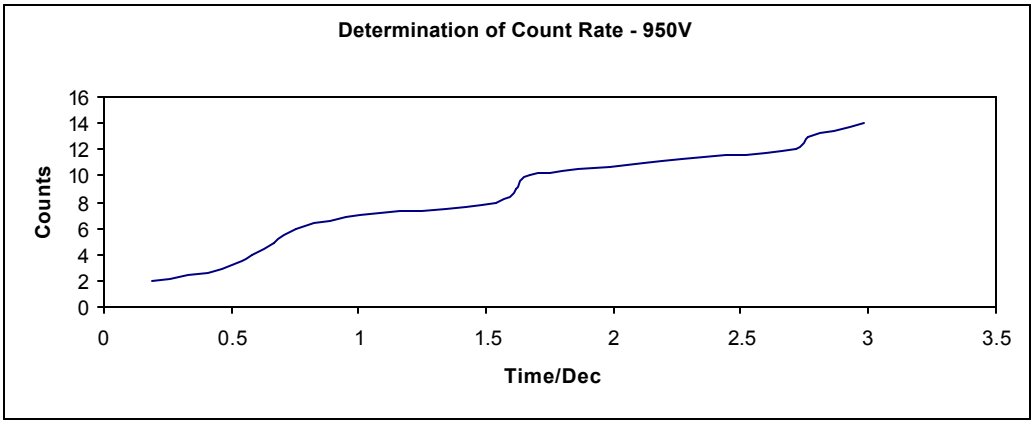
Graph 4 – determination of count rate for 950v 5 mines



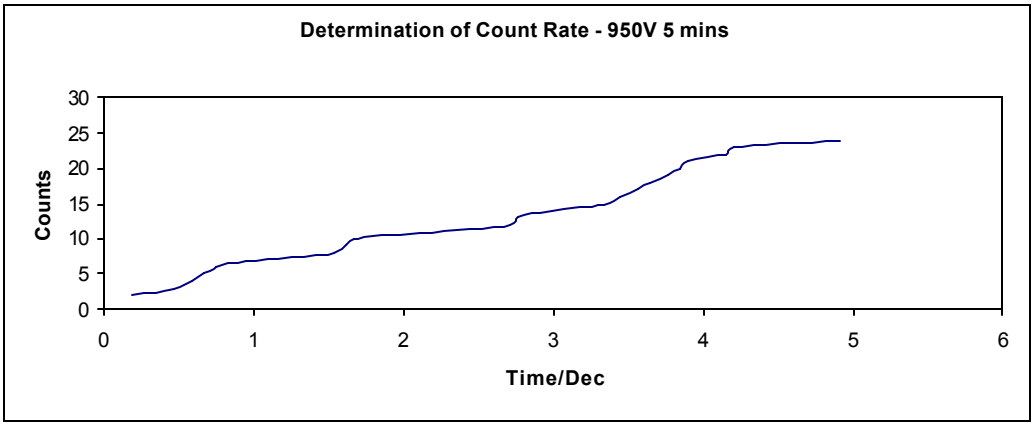
Graph 5 – line graph of 930v



Graph 6 – line graph of 940v



Graph 7 – line graph of 9500v

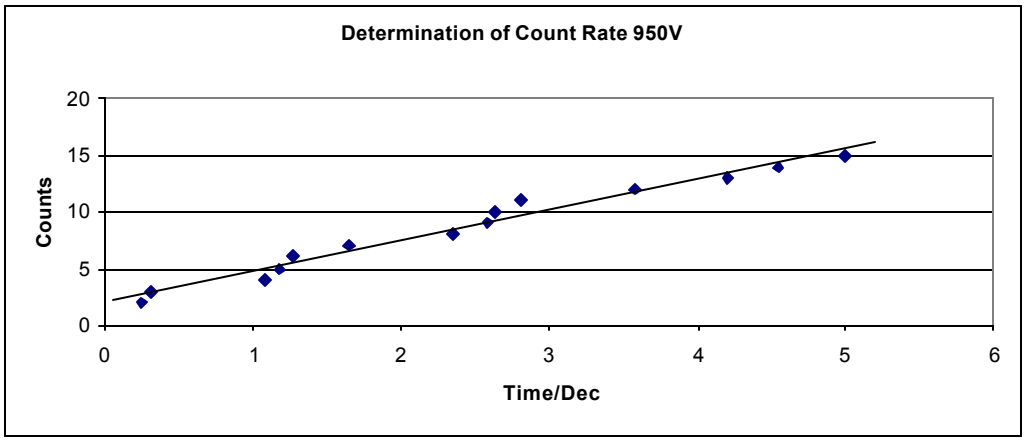


Graph 8 – line graph of 950v 5 mins

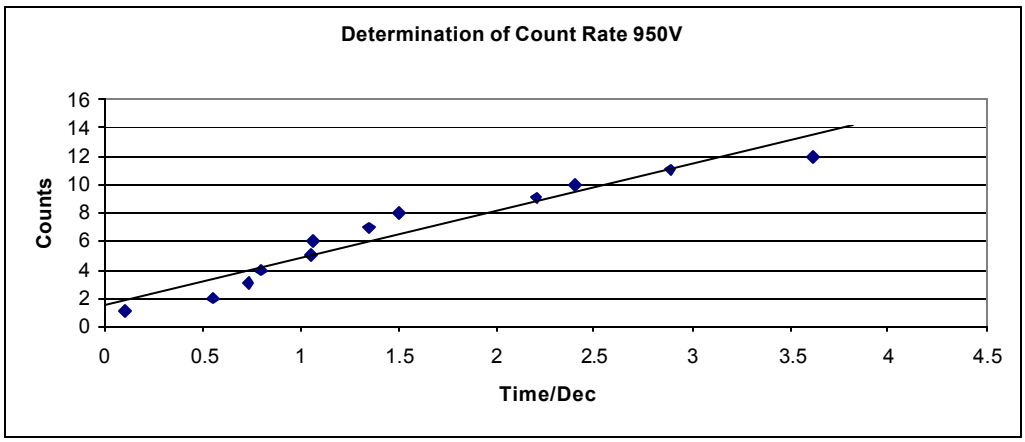
Appendix III

Results taken after noise problem was reduced

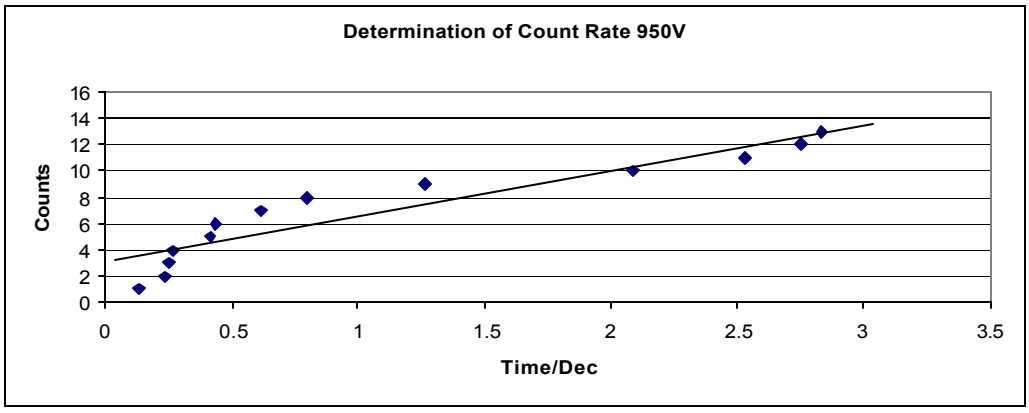
Simon Bevan



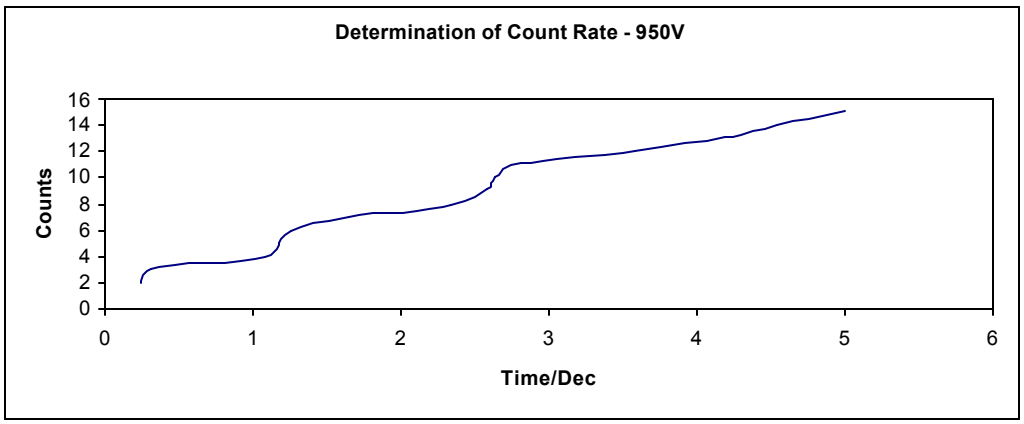
Graph 1 – determination of count rate for 950v(1)



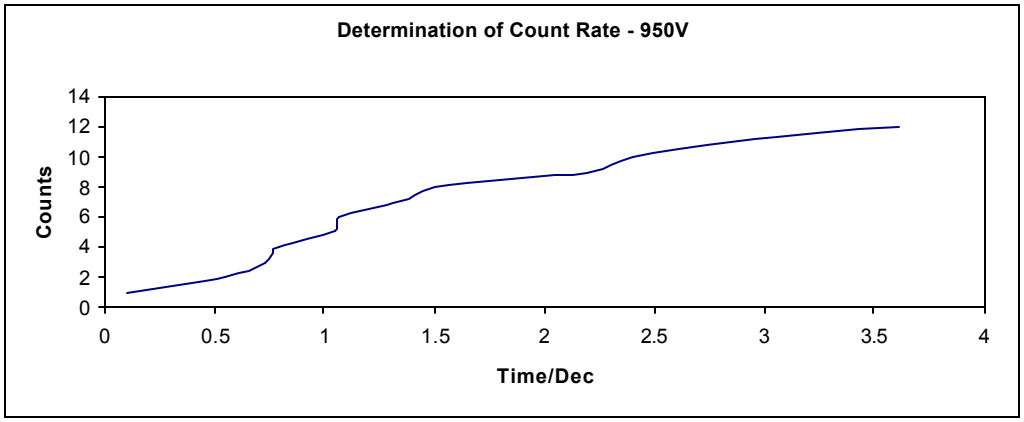
Graph 2 – determination of count rate for 950v(2)



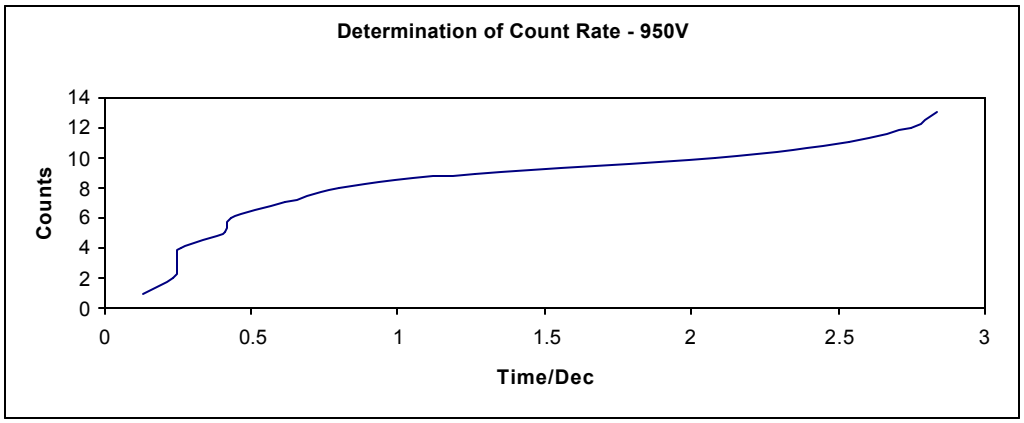
Graph 3 – determination of count rate for 950v(3)



Graph 4 – line graph of 950v (1)



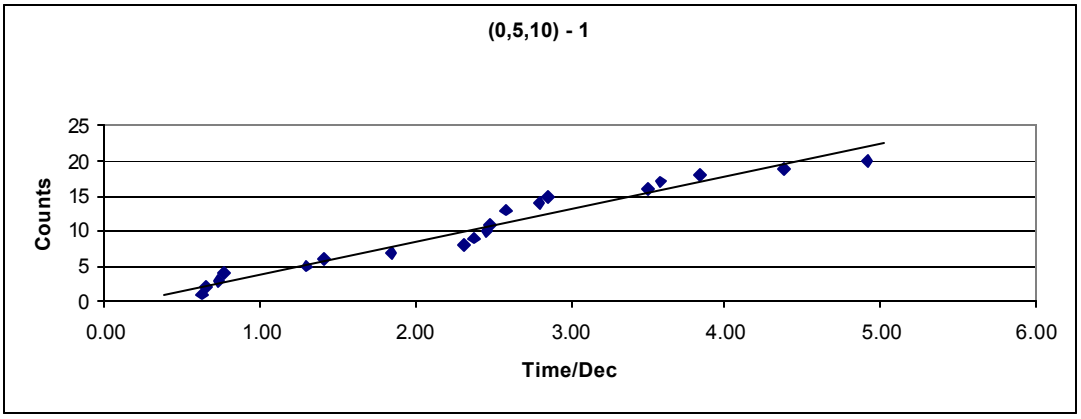
Graph 5 – line graph of 950v (2)



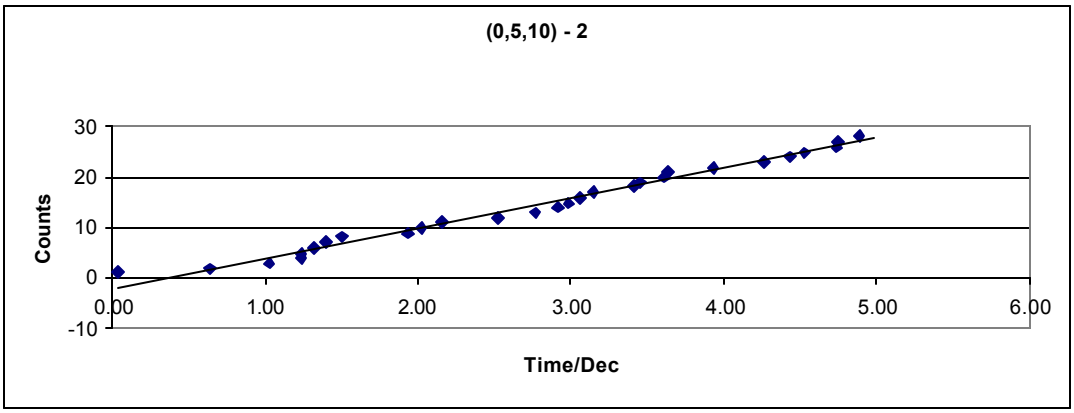
Graph 6 – line graph of 950v (3)

Appendix IV
Three-way Coincidences

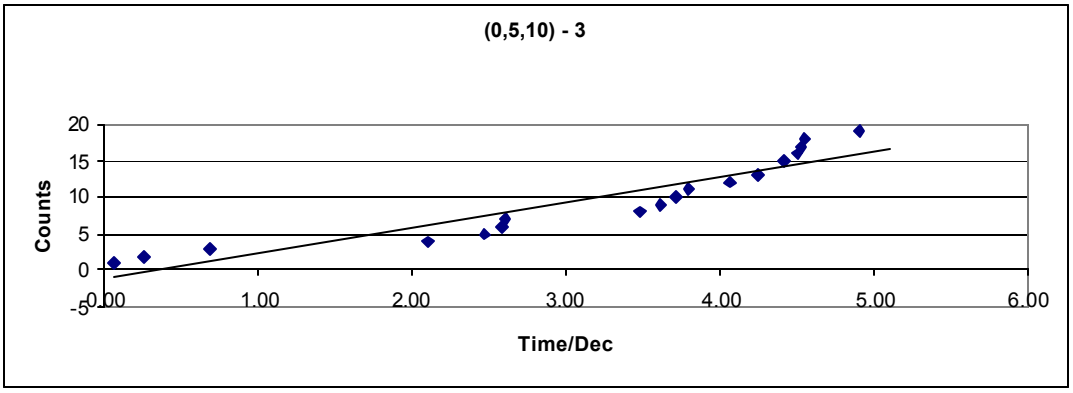
Simon Bevan



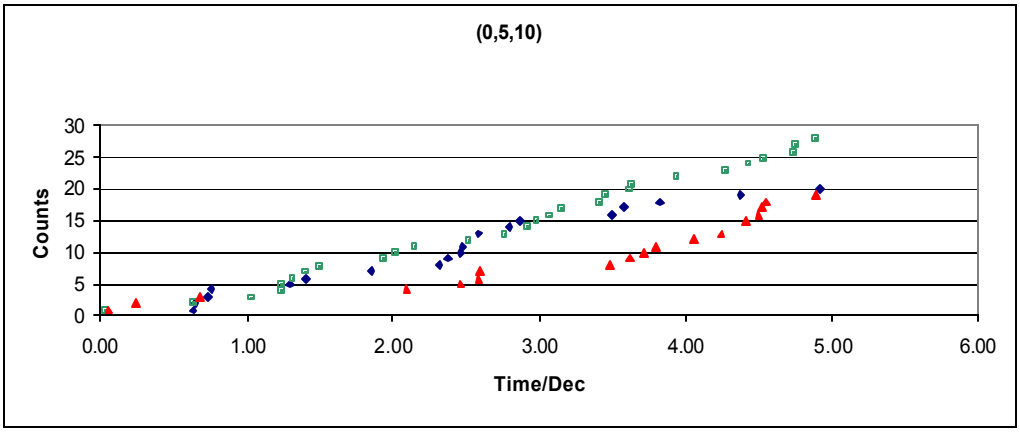
Graph 1 – (0,5,10) test 1



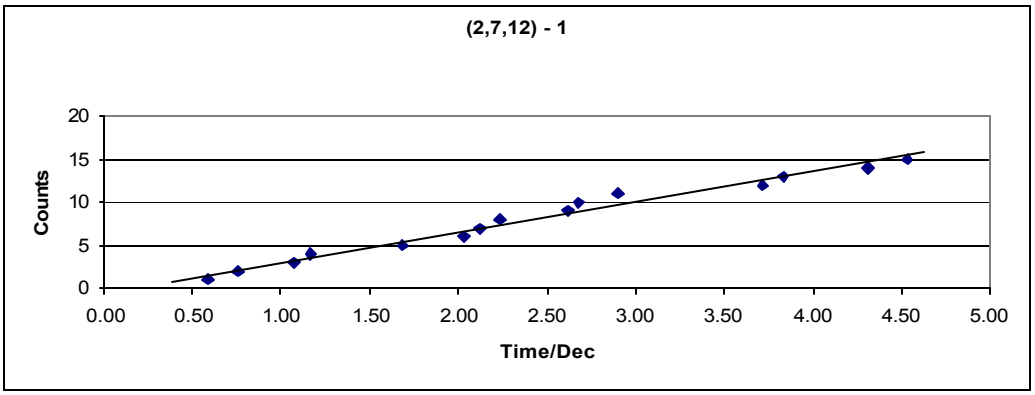
Graph 2 – (0,5,10) test 2



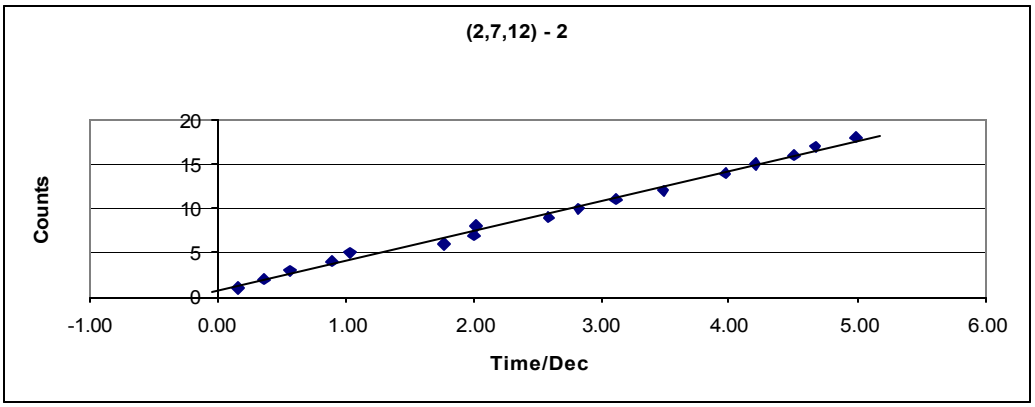
Graph 3 – (0,5,10) test 3



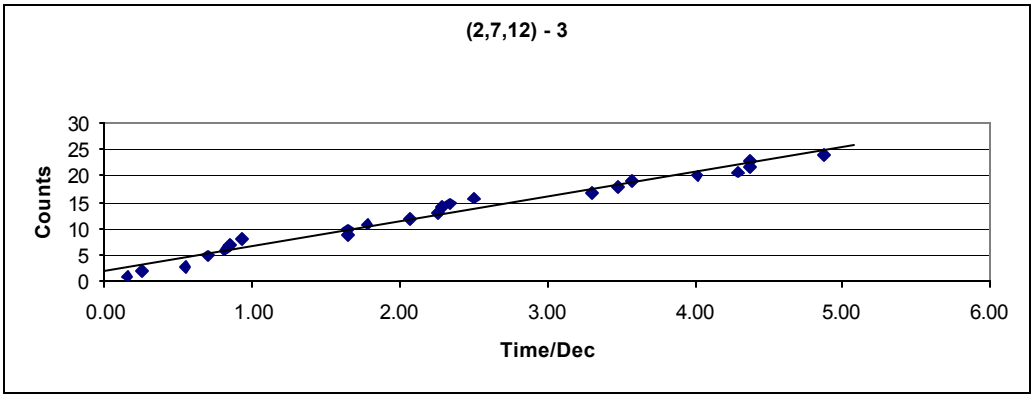
Graph 4 – (0,5,10) all results



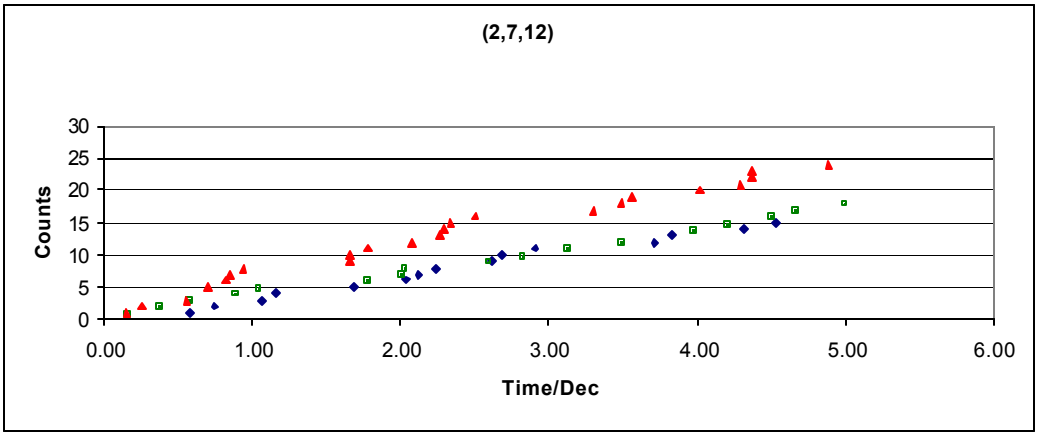
Graph 5 – (2,7,12) test 1



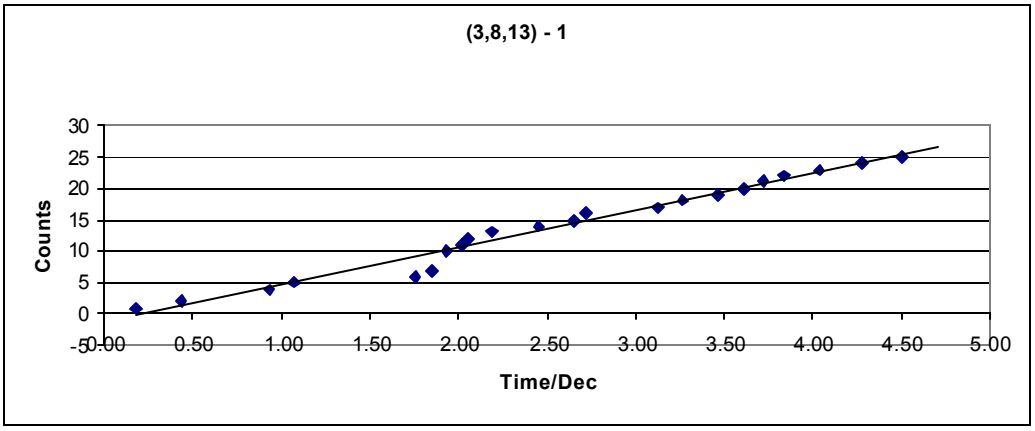
Graph 6 – (2,7,12) test 2



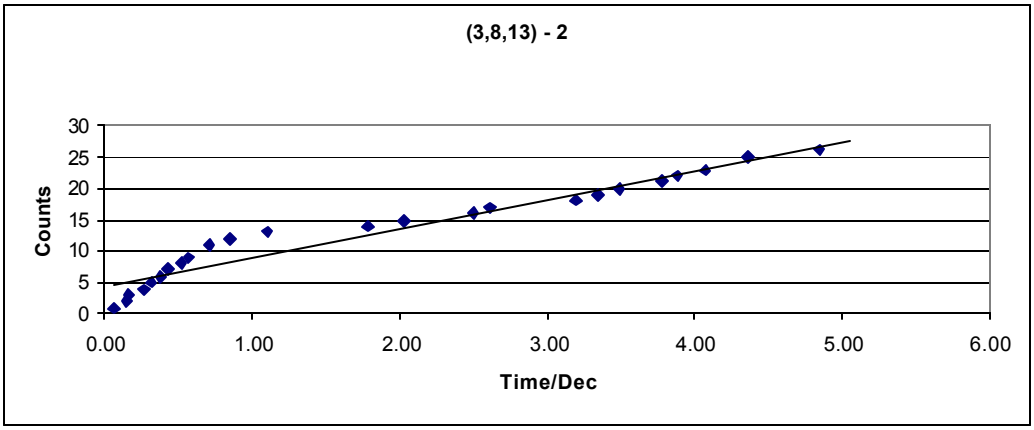
Graph 7 – (2,7,12) test 3



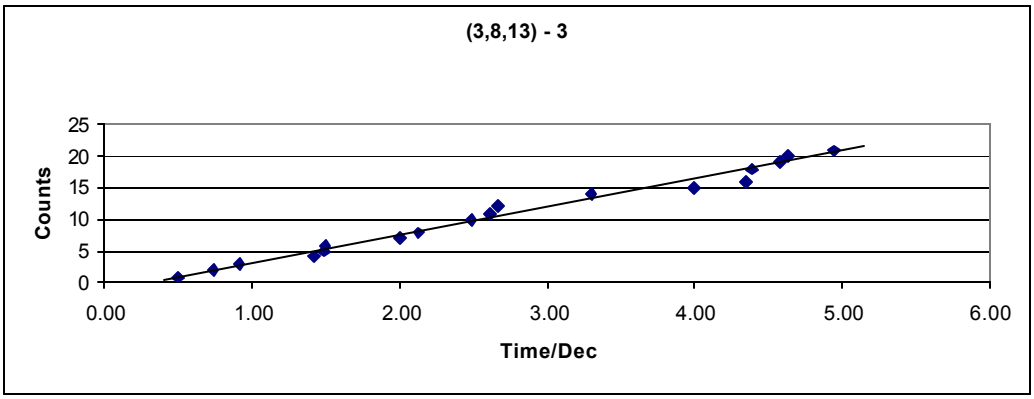
Graph 8 – (2,7,12) all results



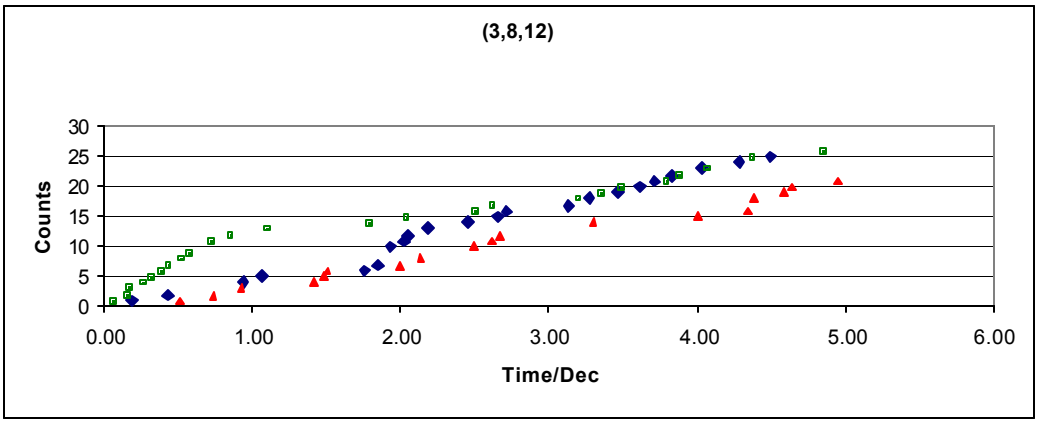
Graph 9 – (3,8,13) test 1



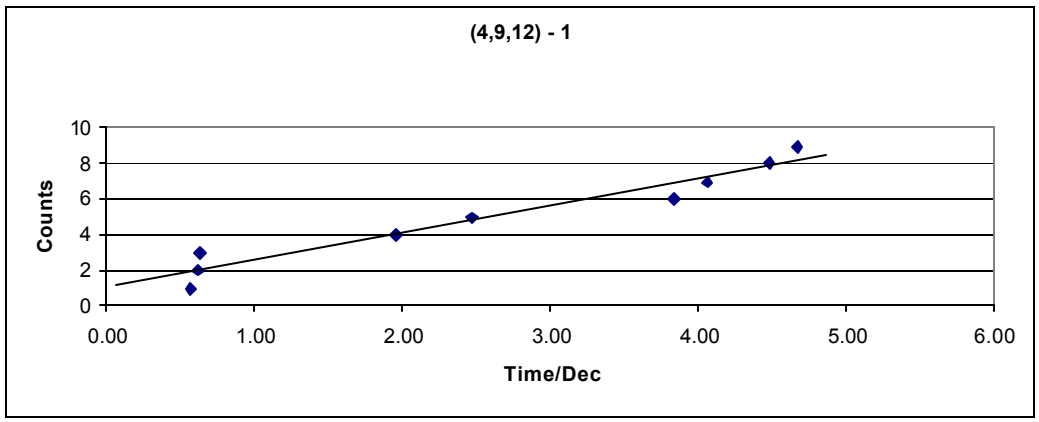
Graph 10 – (3,8,13) test 2



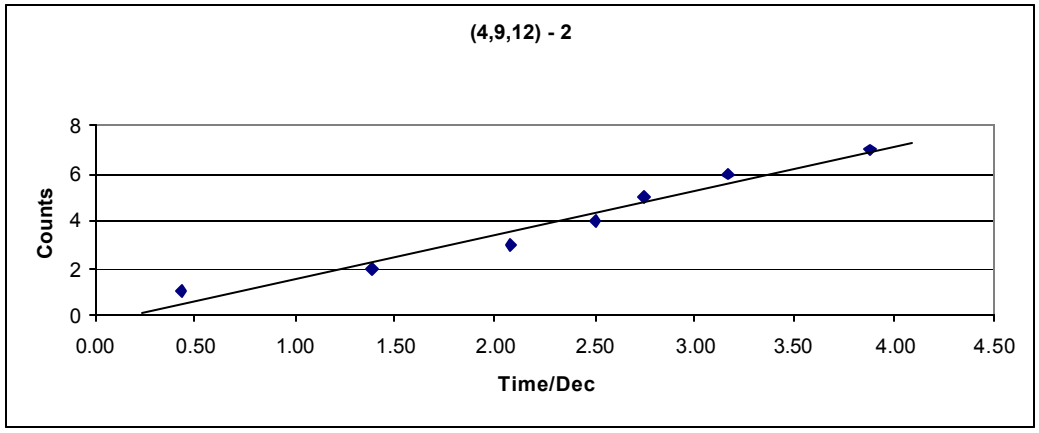
Graph 11 – (3,8,13) test 3



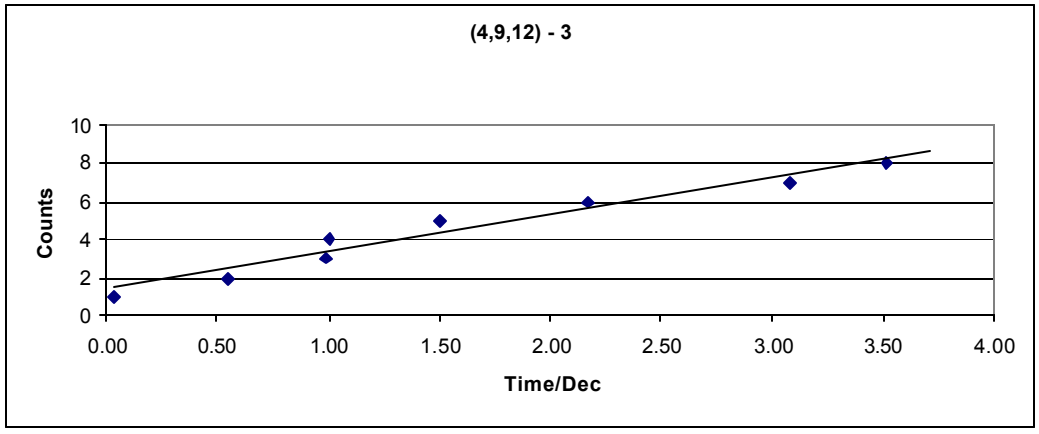
Graph 12 – (3,8,13) all results



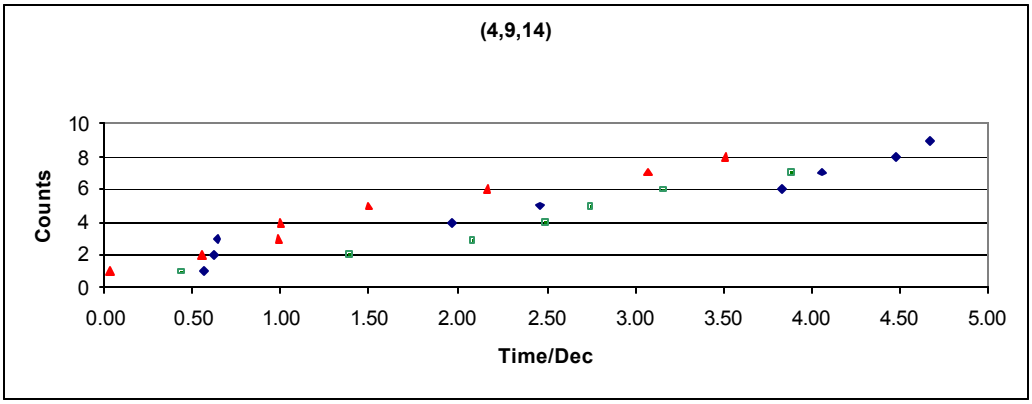
Graph 13 – (4,9,12) test 1



Graph 14 – (4,9,12) test 2



Graph 15 – (4,9,12) test 3

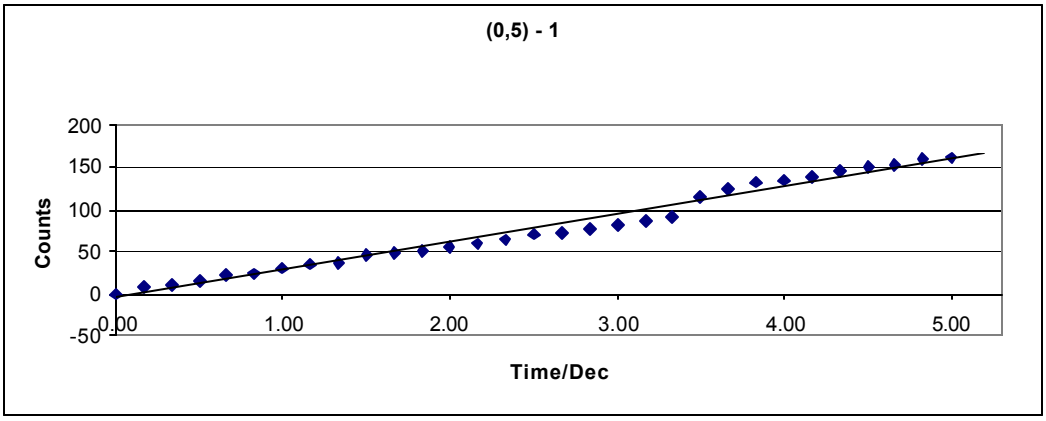


Graph 16 – (4,9,12) all results

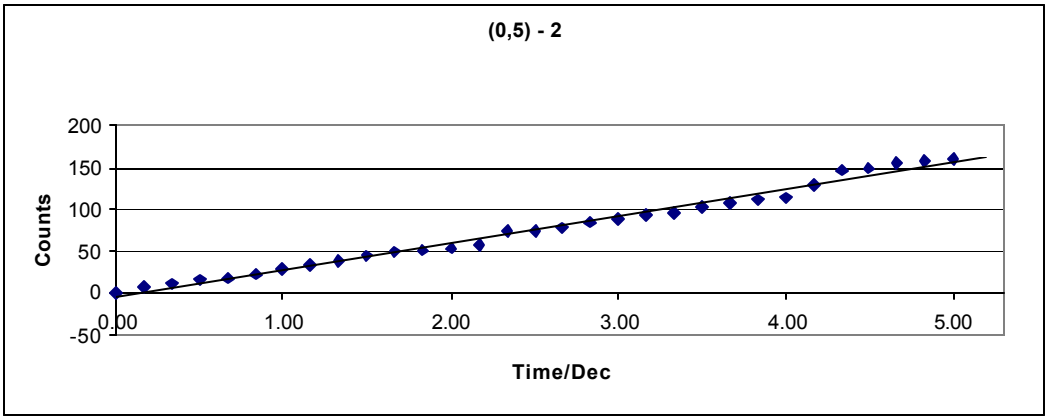
Appendix V

Two-way coincidences

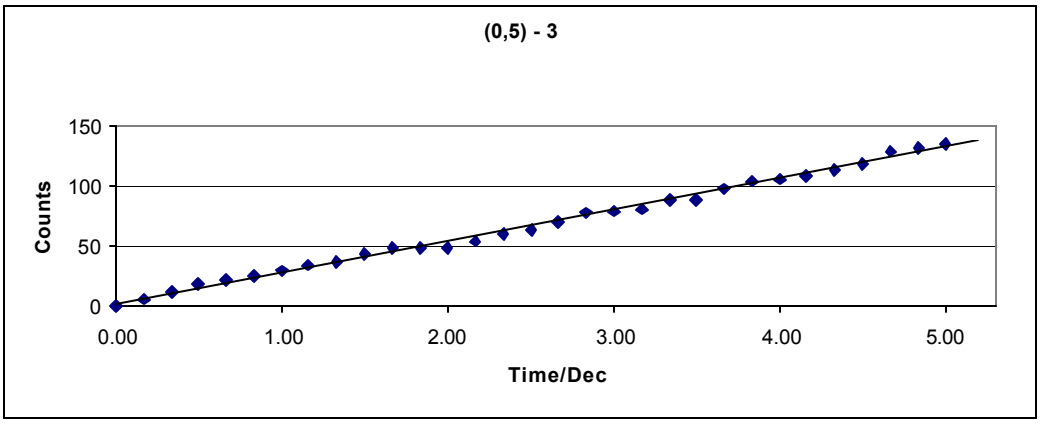
Simon Bevan



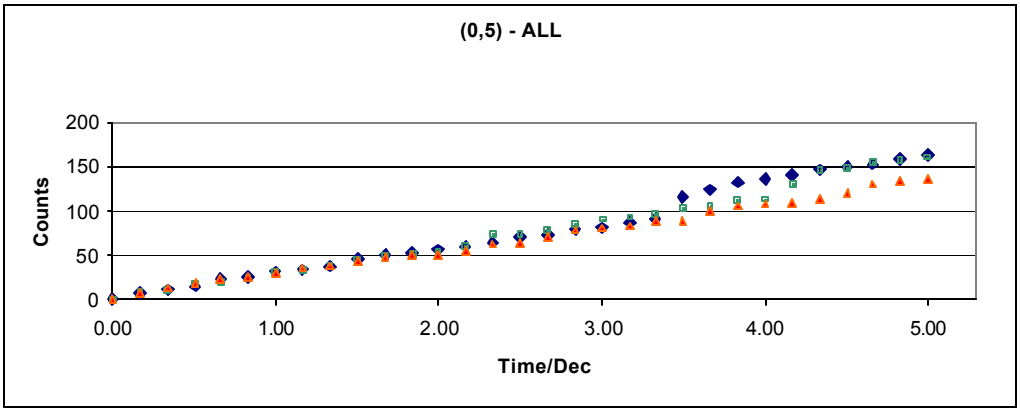
Graph 1 – (0,5) test 1



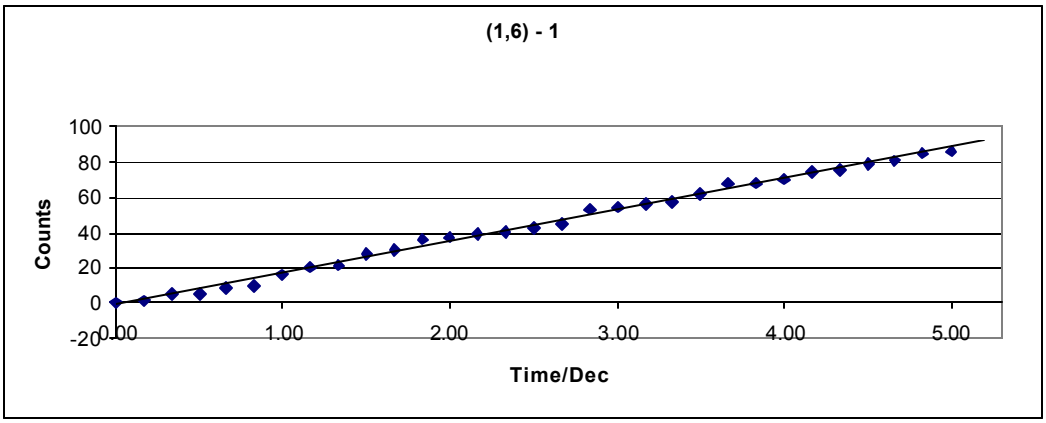
Graph 2 – (0,5) test 2



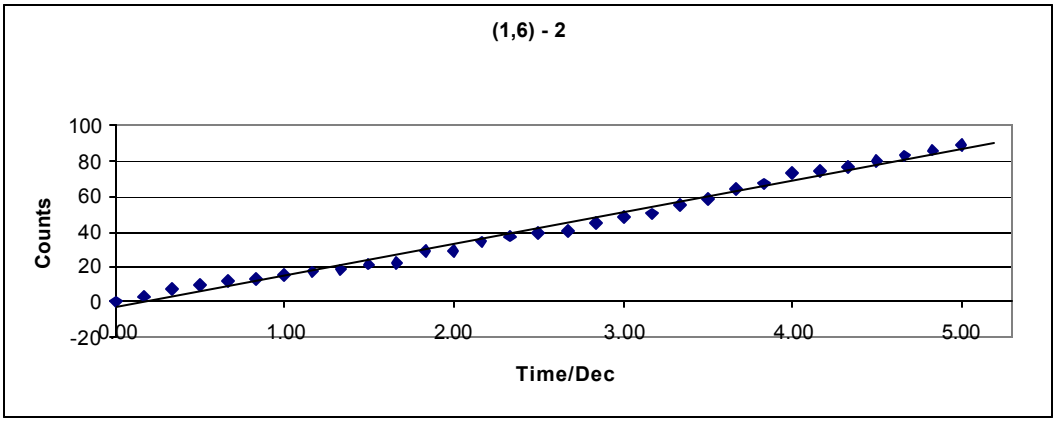
Graph 3 – (0,5) test 3



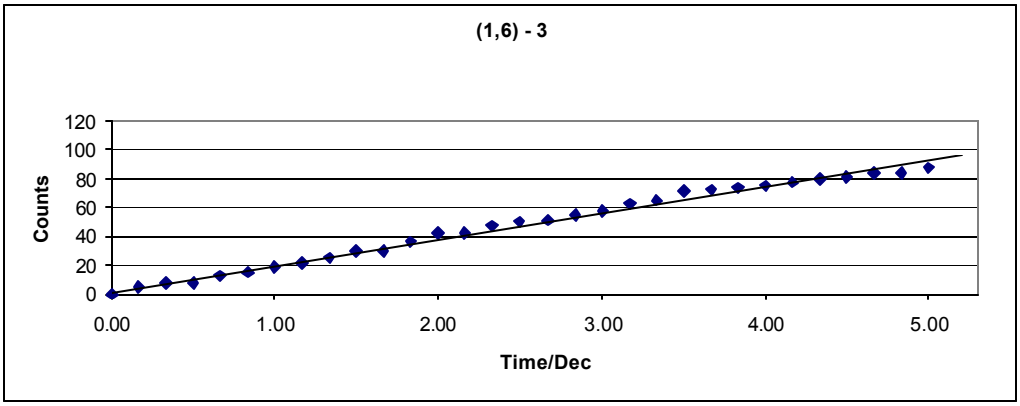
Graph 4 – (0,5) all results



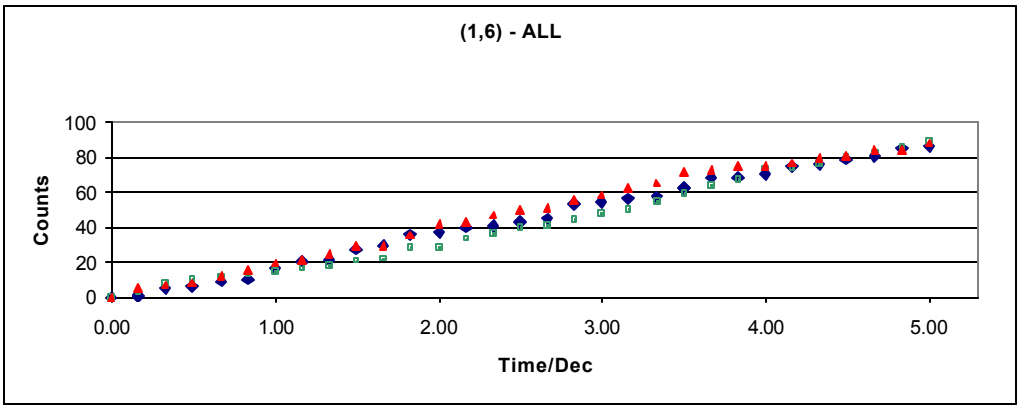
Graph 5 – (1,6) test 1



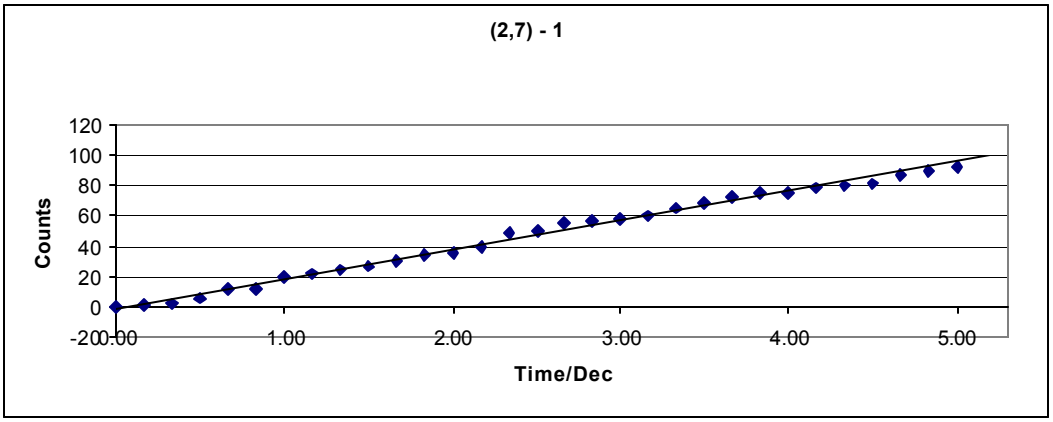
Graph 6 – (1,6) test 2



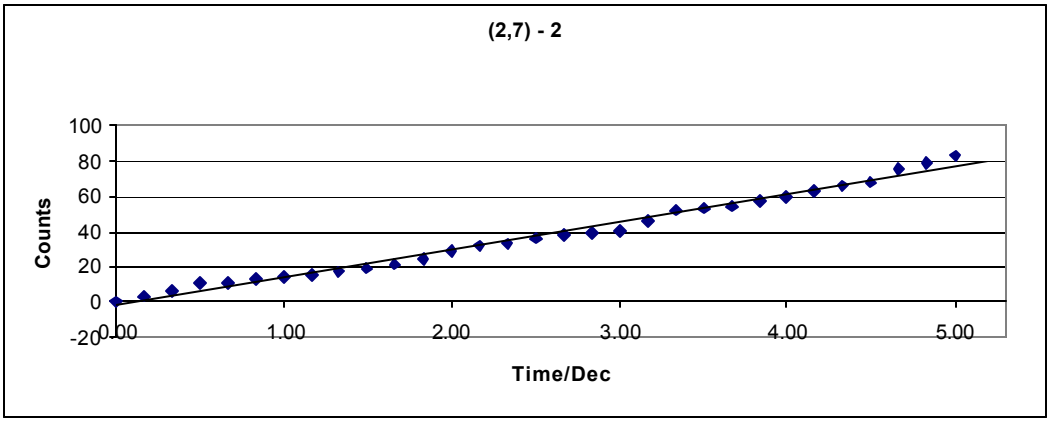
Graph 7 – (1,6) test 3



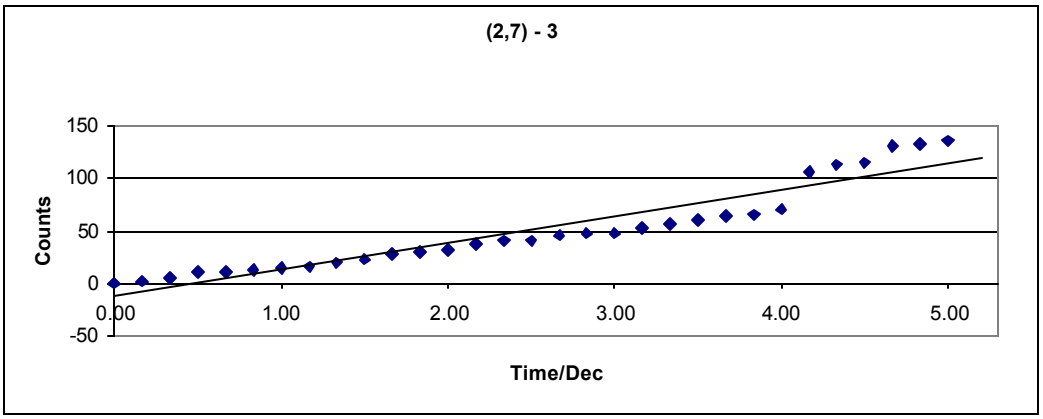
Graph 8 – (1,6) all results



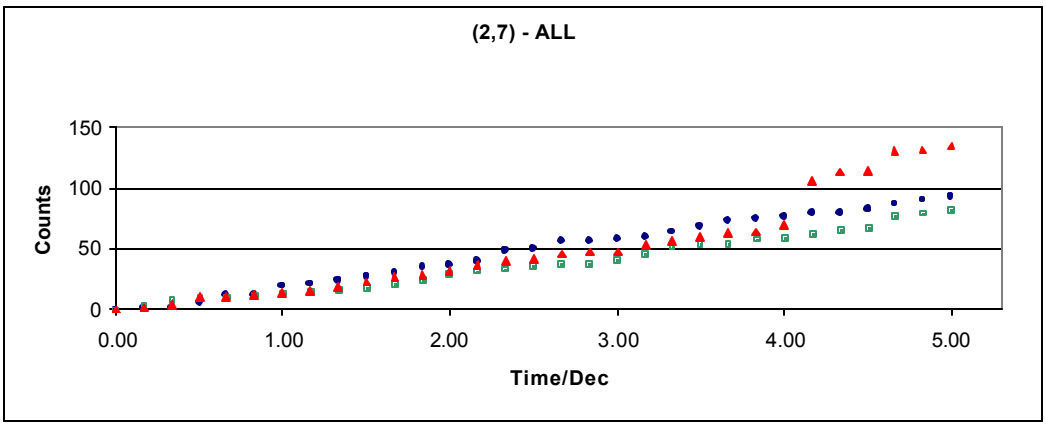
Graph 9 – (2,7) test 1



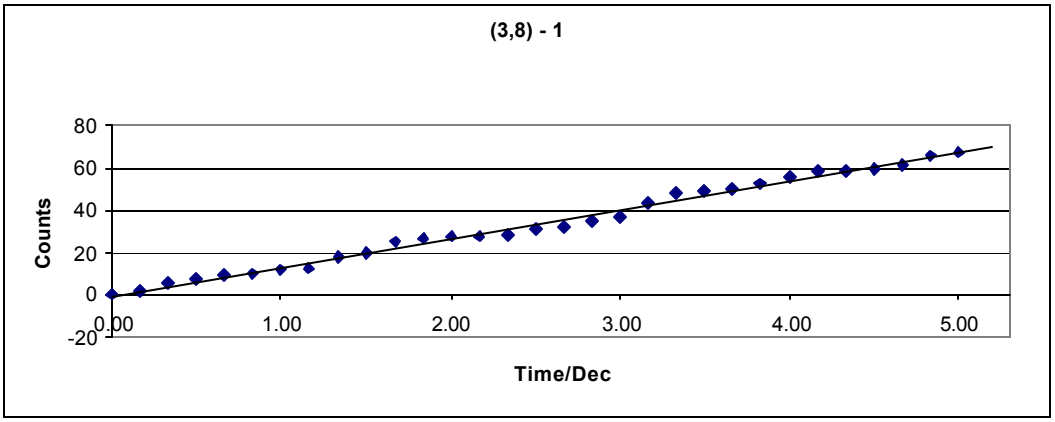
Graph 10 – (2,7) test 2



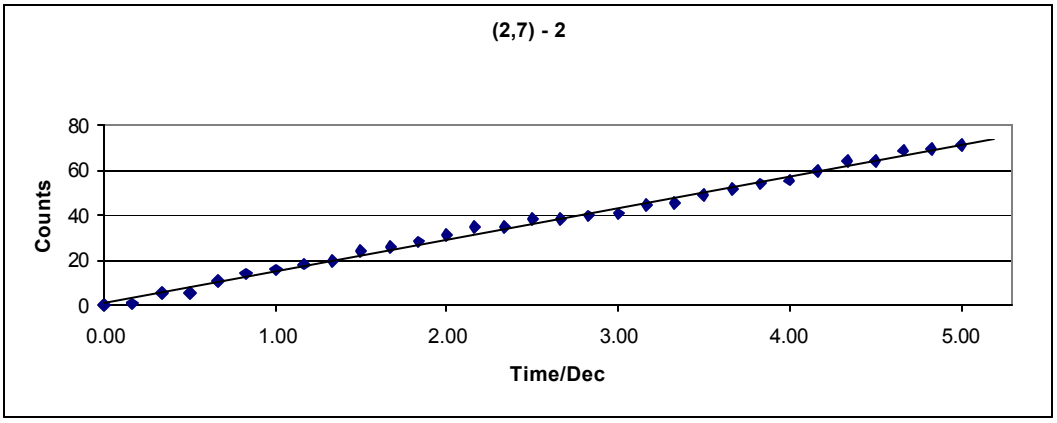
Graph 11 – (2,7) test 1



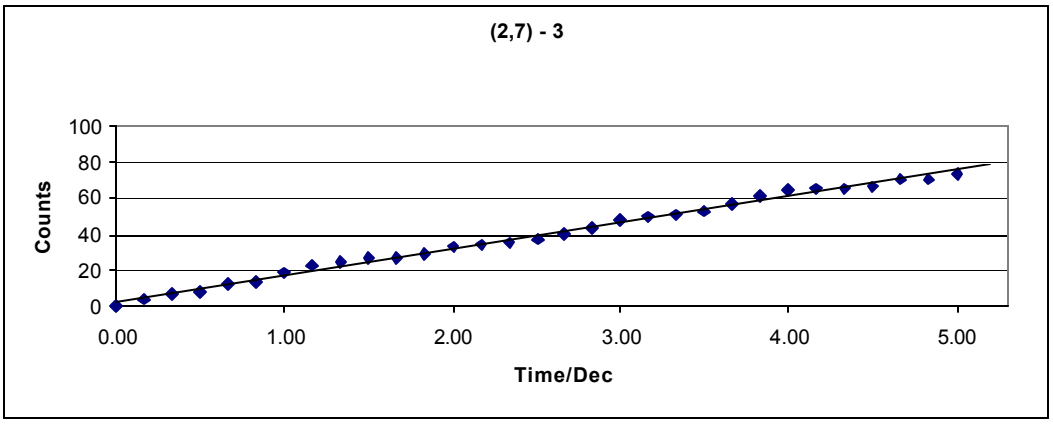
Graph 12 – (2,7) all results



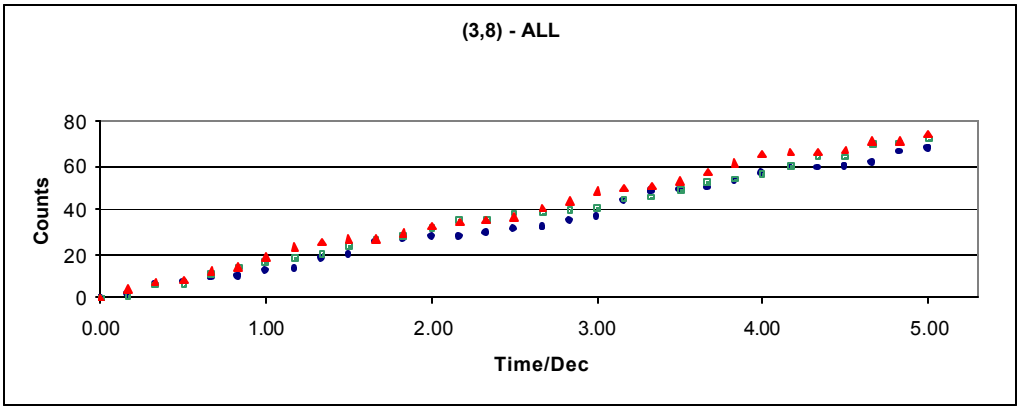
Graph 13 – (3,8) test 1



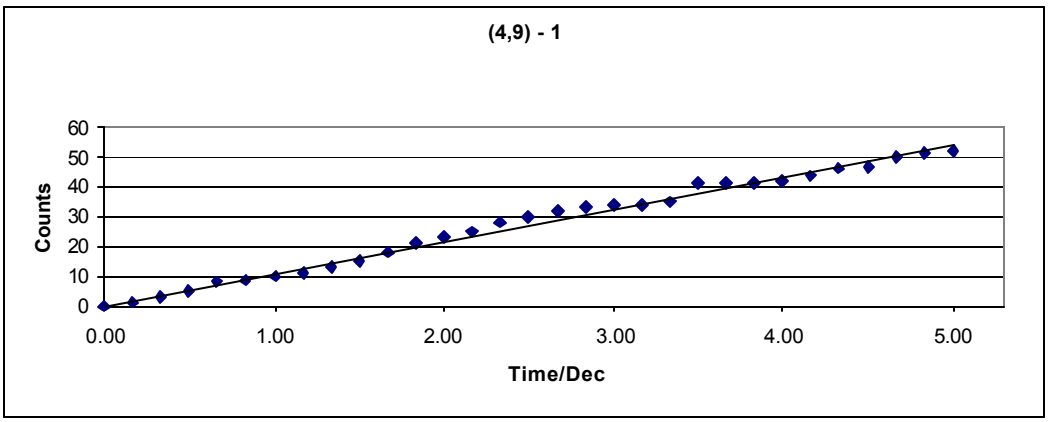
Graph 14 – (3,8) test 2



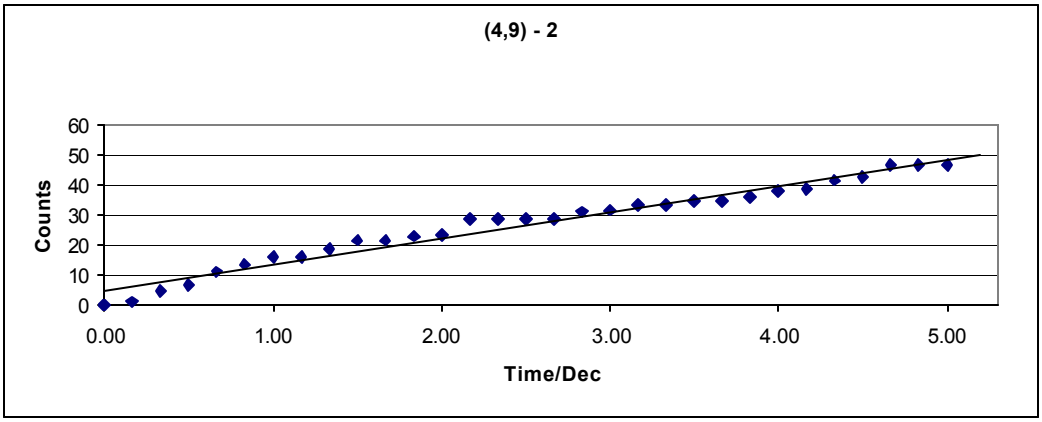
Graph 15 – (3,8) test 3



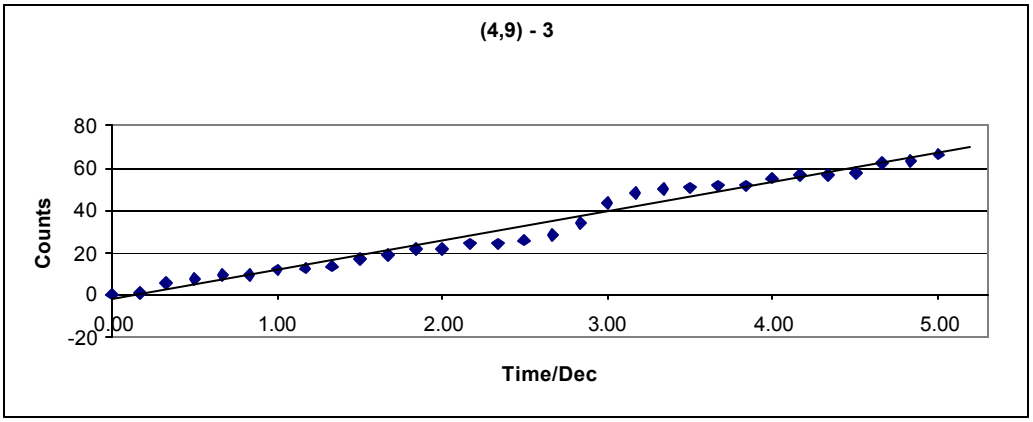
Graph 16 – (3,8) all results



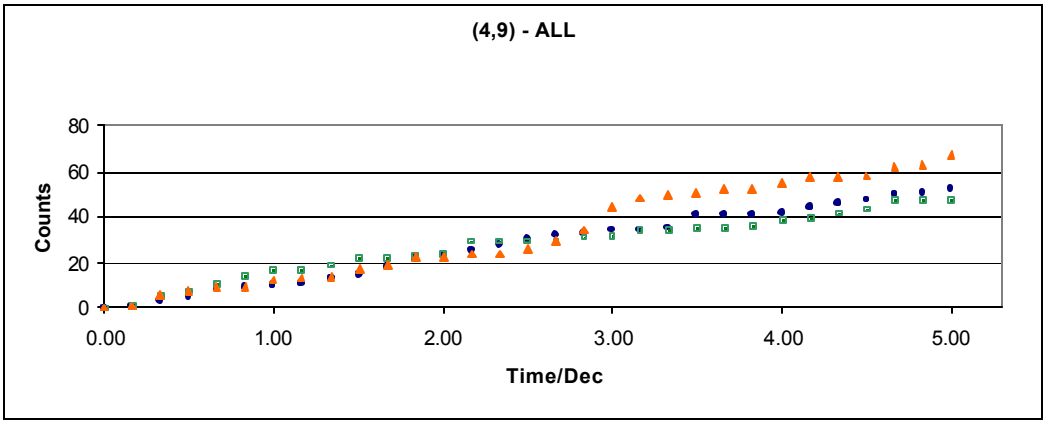
Graph 17 – (4,9) test 1



Graph 18 – (4,9) test 2



Graph 19 – (4,9) test 3



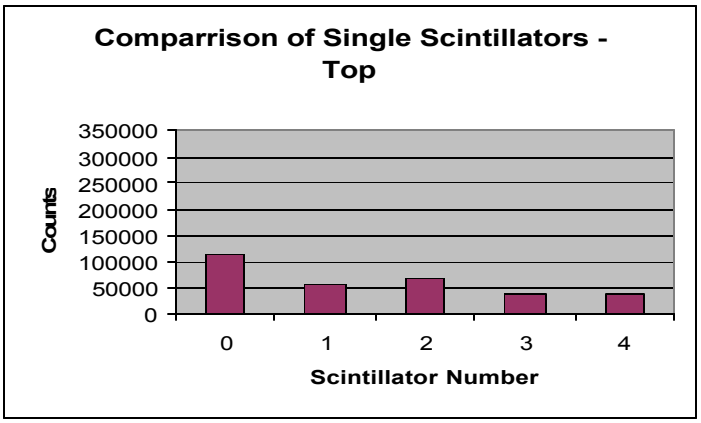
Graph 20 – (4,9) all results

Appendix VI

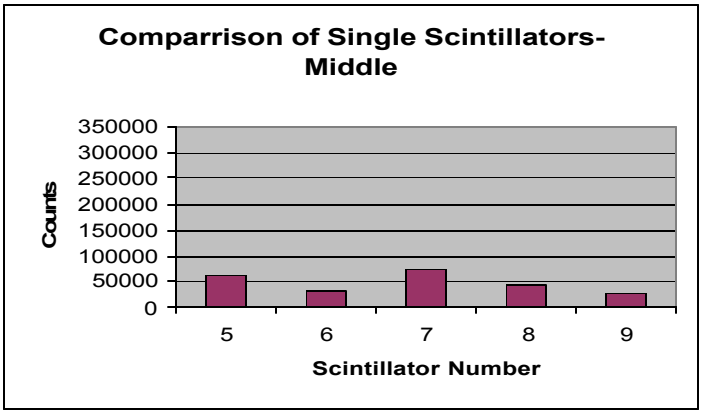
Comparison of Single Scintillators and the New Scintillator with the Old

Simon Bevan

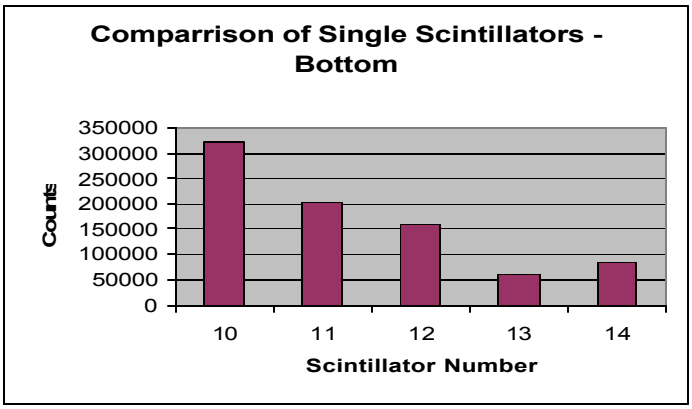
These graphs represent the comparison of the top, middle, and bottom layers



Graph 1 – Scintillators of the top layer



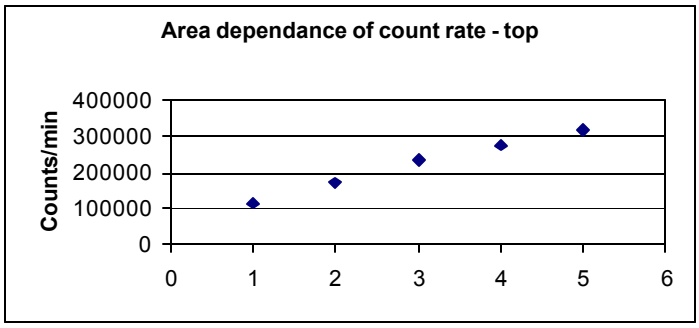
Graph 2 – Scintillators of the middle layer



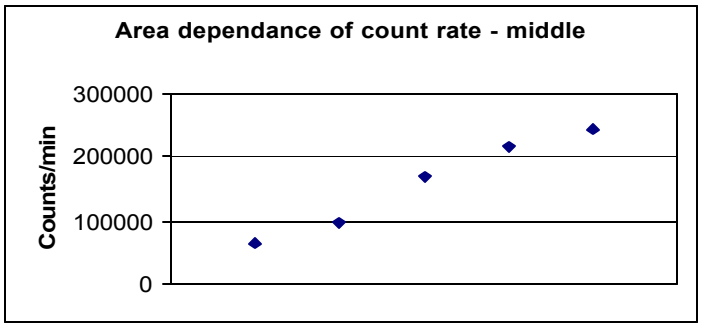
Graph 3 – Scintillators of the bottom layer

Scintillator	Number of counts in 2 min	Number of counts per min	Percantage increase
0	225554	112777	
(0,1)	338633	169316.5	0.50
(0,1,2)	472596	236298	0.40
(0,1,2,3)	552255	276127.5	0.17
(0,1,2,3,4)	633187	316593.5	0.15
5	125905	62952.5	
(5,6)	191869	95934.5	0.52
(5,6,7)	336964	168482	0.76
(5,6,7,8)	431880	215940	0.28
(5,6,7,8,9)	488756	244378	0.13
10	644346	322173	
(10,11)	1059129	529564.5	0.64
(10,11,12)	1392698	696349	0.31
(10,11,12,13)	1544971	772485.5	0.11
(10,11,12,13,14)	1752378	876189	0.13

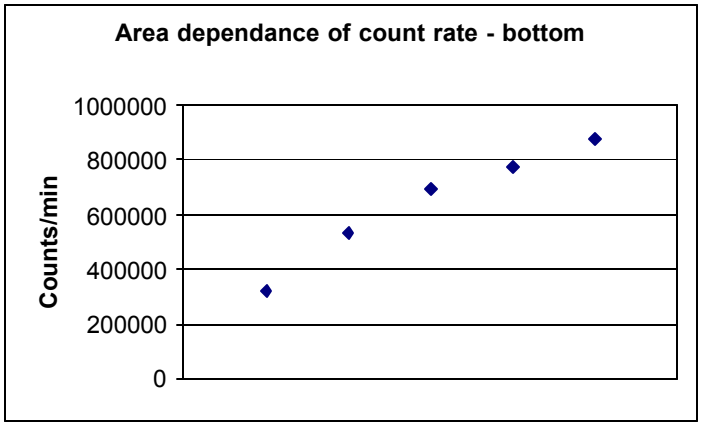
Table 1 – All results for the area of various layers



Graph 4 – count rate of various area of top layer



Graph 5 – count rate of various area of middle layer



Graph 6 – count rate of various area of bottom layer