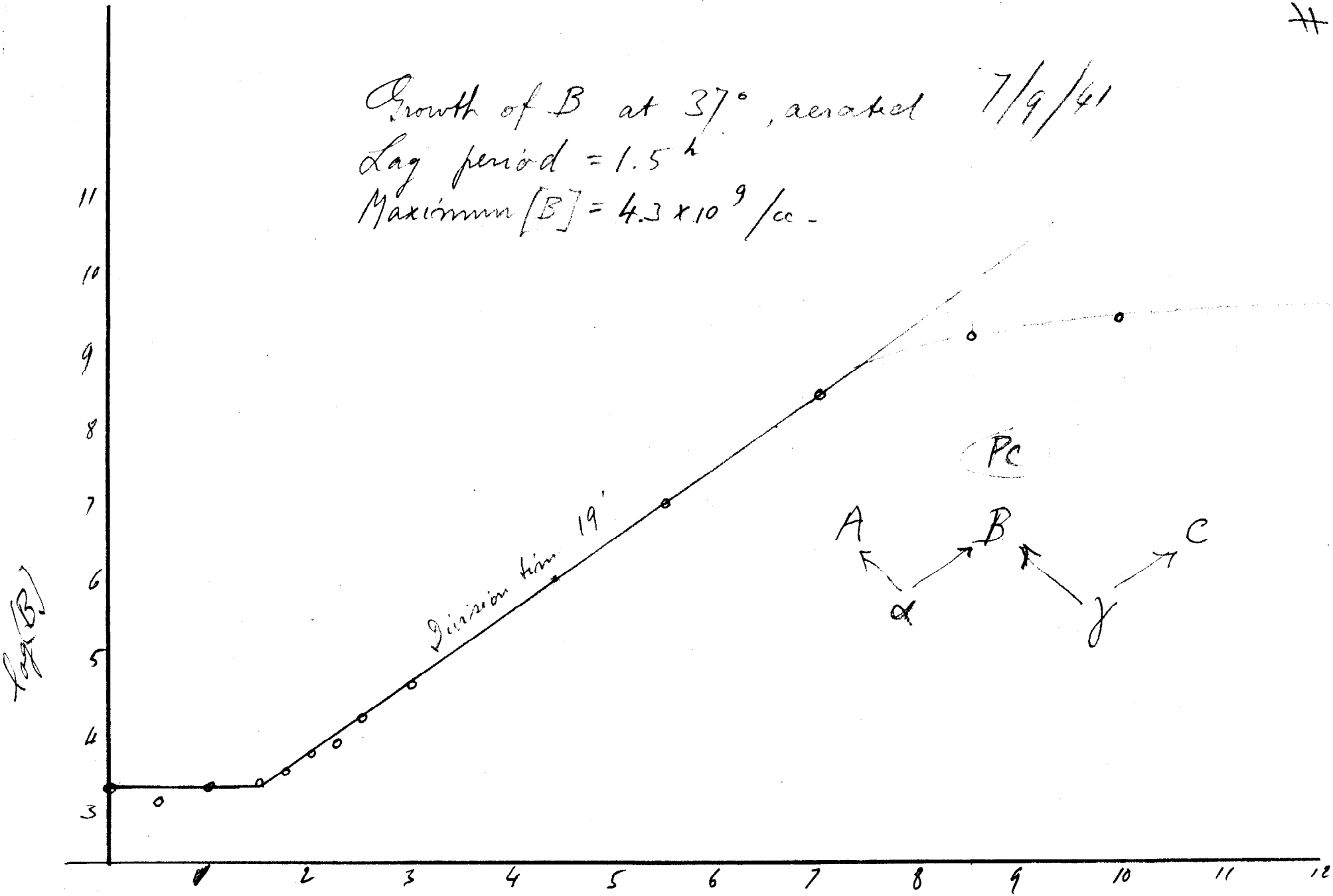
$$\begin{tikzcd}
A & B & C \\
\alpha \arrow[u] \arrow[ur] & & \gamma \arrow[ul] \arrow[ur]
\end{tikzcd}$$

#

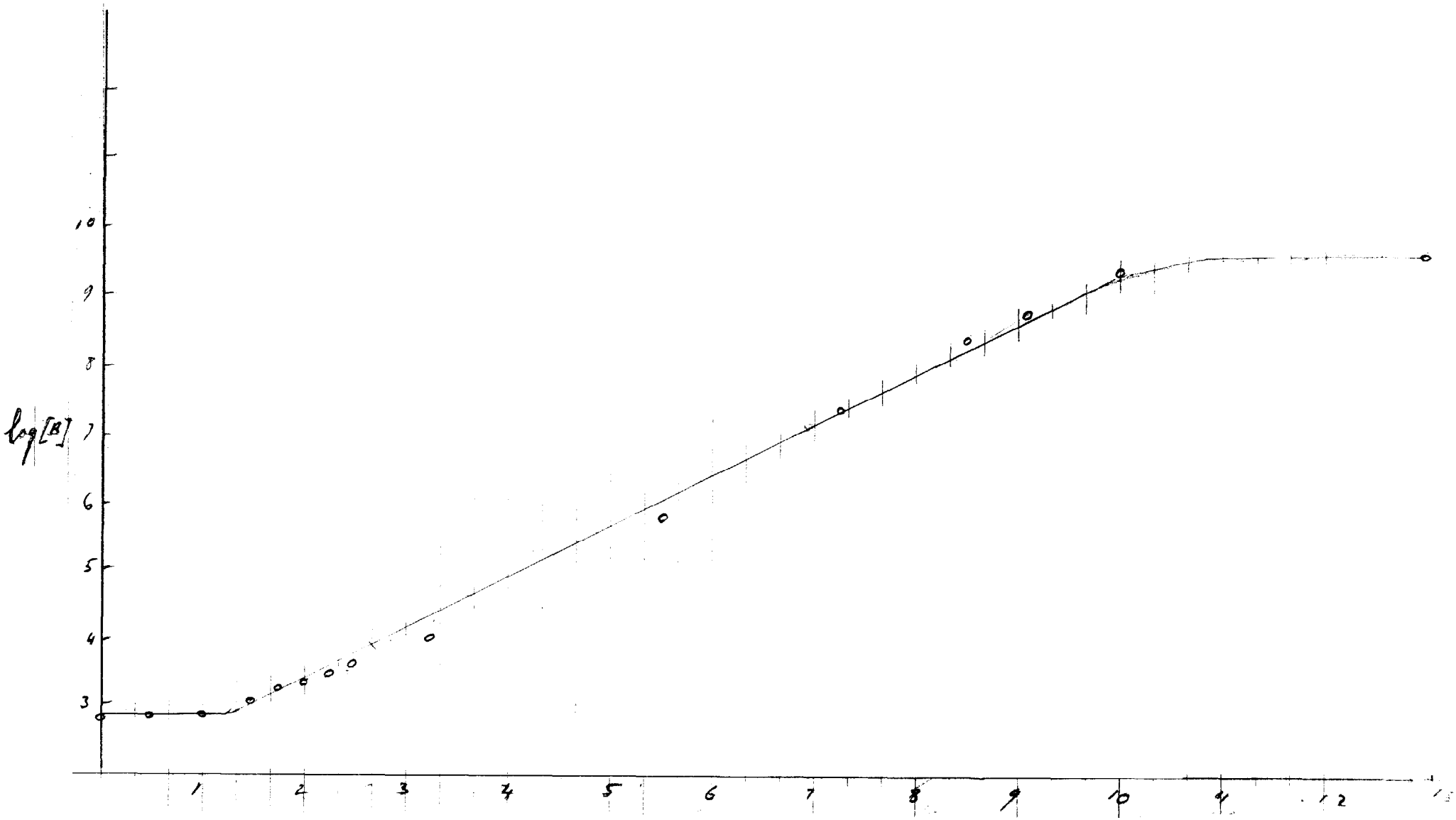
Growth of B at 37°, aerated 7/9/41
Lag period = 1.5 h
Maximum [B] = 4.3×10^9 /cc.



1/9/41

Growth curve of B in broth, aerated at 37°

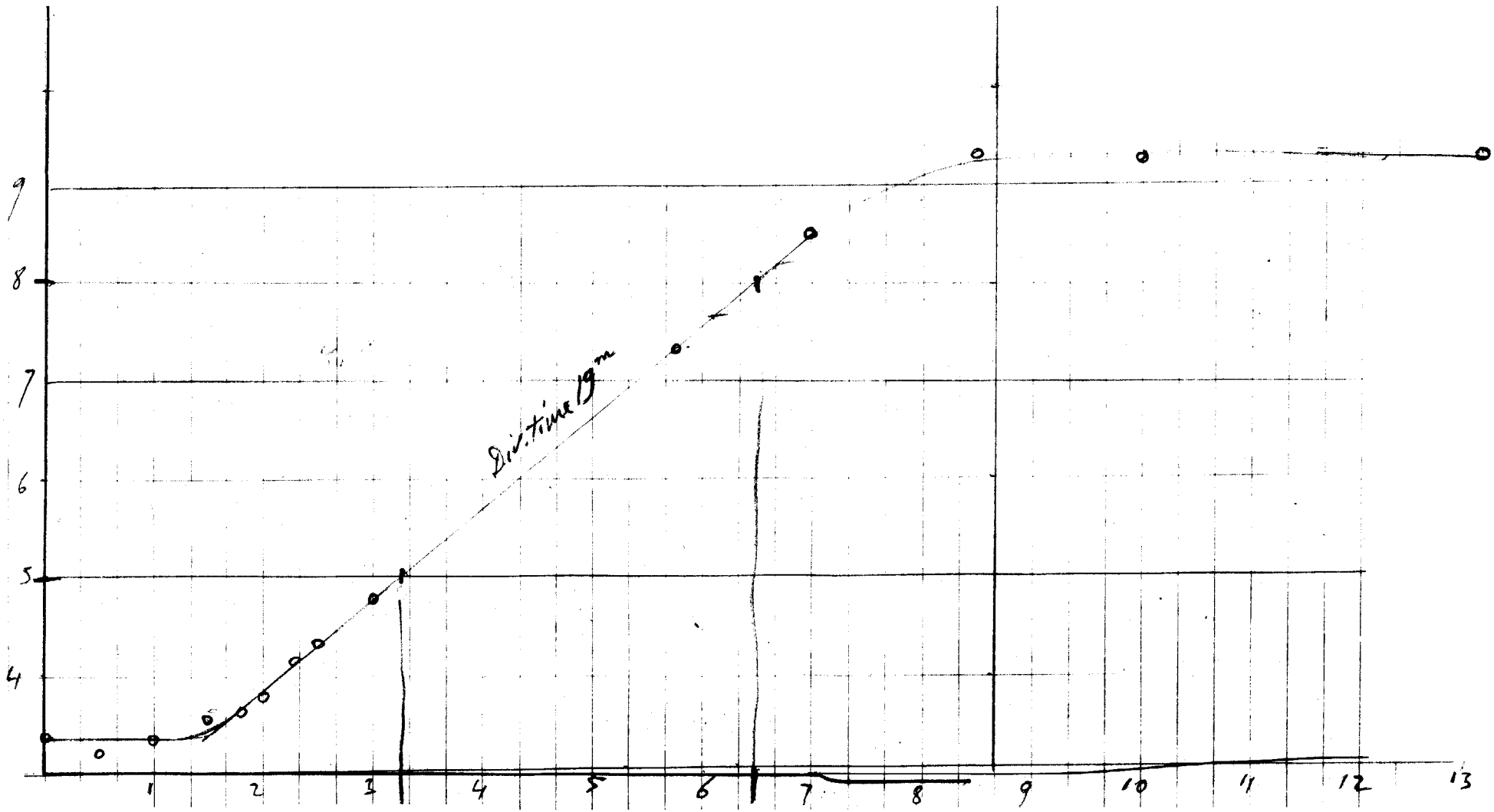
PST	24h aerated B : 2 x 10^6 (in 20cc broth, prewarmed) - aerate at 37°							
0	:1	:10	:2500	:2x10^5	:10^6	:2x10^6	assay	log ass.
0h	1-191 2-185						1.9 x 10^3	3.28
.5h	3-129 4-123						1.25 x 10^3	3.1
1.0	5-174 6-187						1.8 x 10^3	3.26
1.5	7-180 8-198						1.9 x 10^3	3.28
1.75	9-305 10-325						3.15 x 10^3	3.5
2.0	11-543 12-510						5.25 x 10^3	3.72
2.25	13-593 14-943						7.7 x 10^3	3.89
2.5	15-1500 2 16-	15a-164 16a-147					1.55 x 10^4	4.19
3.0		17-415 18-387					4.0 x 10^4	4.60
5.5			19-374 20-381				9.5 x 10^6	6.98
7.0				21-147 22-133			2.8 x 10^8	8.45
8.5					23-151 24-160		1.55 x 10^9	9.19
9.5					25-250 26-259		2.55 x 10^9	9.41
13.0						27-206 28-224	4.3 x 10^9	9.63


log[B]
10
9
8
7
6
5
4
3
1
2
3
4
5
6
7
8
9
10
11
12
13

3 7/15/41.

PST Growth curve of A in broth + NaCl, aerated at 37°.

hours								
0	24 h aerated		:4x10^6		.01 → 1	.01 → 1	.05 → 20 cc broth prewarm.	
	:1	:10	:2500	:10^4	:5x10^5	:10^6	assay	log ass.
0	1 - 69 2 - 66						6.8 x 10^2	2.83
.5	3 - 81 4 - 83						8.2 x 10^2	2.92
1.0	5 - 88 6 - 74						8.1 x 10^2	2.91
1.5	7 - 159 8 - 123						14.1 x 10^2	3.15
1.75	9 - 174 10 - 181						17.8 x 10^2	3.25
2.0	11 - 261 12 - 270						26.6 x 10^2	3.43
2.25	13 - 431 14 - 395						41.3 x 10^2	3.62
2.5		15 - 48 16 - 74					6.1 x 10^3	3.79
3.25		17 - 141 18 - 154					1.48 x 10^4	4.17
5.5			19 - 29 20 - 30				7.5 x 10^5	5.88
7.25				21 - 157 22 - 161			1.59 x 10^7	7.20
8.5						23 - 16 24 - 14	1.5 x 10^8	8.18
9.2					29 - cont. 30 - 00		3 x 10^8	8.48
10.0						25 - 154 26 - 162	1.6 x 10^9	9.20
13.0						27 (:2x10^6) -191	3.8 x 10^9	9.58


9
8
7
6
5
4
1
2
3
4
5
6
7
8
9
10
11
12
13
Div. time 19m

7/24/41

PST	γ on B, multiple infection			
-150	.05 cc 24h cur. B → 20 cc broth = B_I			
-10	γ assay : 2.5×10^6	1 - 221 2 - 245	$[\gamma] = 5.8 \times 10^9$	
-3	B assay : 5×10^4	3 - 99 4 - 105	$[B] = 5 \times 10^7$	
0	.05 cc γ → 1 cc B_I = B_γ, at 37°		$[\gamma]$ in $B_\gamma = 2.9 \times 10^8$	
5'	.02 cc B_γ → 1 cc broth cf. tube, prewarmed			
	cf. 4', sud. : 10^3	7 - 229 8 - 188	$[\gamma]_{free} = 10.2 \times 10^7 = 35\%$ $[\gamma]_{ads} = 65\%$ $\gamma/B = 3.8$	
	.1 cc → 20 cc broth (:10)	1 cc → 19 cc (:10)	assay	rel. assay
8	5 - 169 6 - 146		1.55×10^4	1
15.5	9 - 145 10 - 167		1.55×10^4	1
18	11 - 177 472 :6 = 162 12 - 168		1.72×10^4	1.1
21	13 - 342 14 - 339		3.4×10^4	2.2
24	15 - 648 (:50) 16 - 456		2.75×10^5	17.5
27		17 - 228 18 - 230	4.6×10^5	30
30		19 - 391 20 - 350	7.4×10^5	47
33		21 - 581 22 - 507	1.09×10^6	70
40	Step size = ~100 burst size = $\frac{1.5 \times 10^6}{5 \times 10^3} = 300$	23 - 738 24 - 668	1.41×10^6	91
60		25 - 825 26 - 850 ~	1.65×10^6	106
120		27 - 720 28 - 702	1.42×10^6	93
300		29 - 1190 30 - 1159	2.35×10^6	147

Analysis of γ on B, multiple infection - 7/24

All figures for tube B_γ, unless otherwise specified -

$[B] = 5 \times 10^7$

$\gamma = 2.9 \times 10^8$

$\gamma_{free} = 1.05 \times 10^8$

$\gamma_{ads} = 1.85 \times 10^8$ Ads. = 64 %

$\frac{\gamma_{ads}}{B} = 3.7$ $[B_{no\,\gamma}] = 2.5$ %

total $\gamma_{(inf.\,cent.)} = 1.55 \times 10^8 = \gamma_{free} + [B]$ -

Step size: $\gamma_{40'} / \gamma_{8'} = 95$ -

$\gamma_{increase} = 1.45 \times 10^{10}$ -

Corrected for free phage and multiple infection:

$\frac{1.45 \times 10^{10}}{5 \times 10^7} = 290$ -

Analysis of γ on B, multiple infection - 7/24

All figures for tube B_γ, unless otherwise specified -

$[B] = 5 \times 10^7$

$\gamma = 2.9 \times 10^8$

$\gamma_{free} = 1.05 \times 10^8$

$\gamma_{ads} = 1.85 \times 10^8$ Ads. = 64 %

$\frac{\gamma_{ads}}{B} = 3.7$ $[B_{no\,\gamma}] = 2.5$ %

total $\gamma_{(inf.\,cent.)} = 1.55 \times 10^8 = \gamma_{free} + [B]$.

Step size: $\gamma_{40'} / \gamma_{8'} = 95$ -

$\gamma_{increase} = 1.45 \times 10^{10}$ -

Corrected for free phage and multiple infection:

$\frac{1.45 \times 10^{10}}{5 \times 10^7} = 290$ -

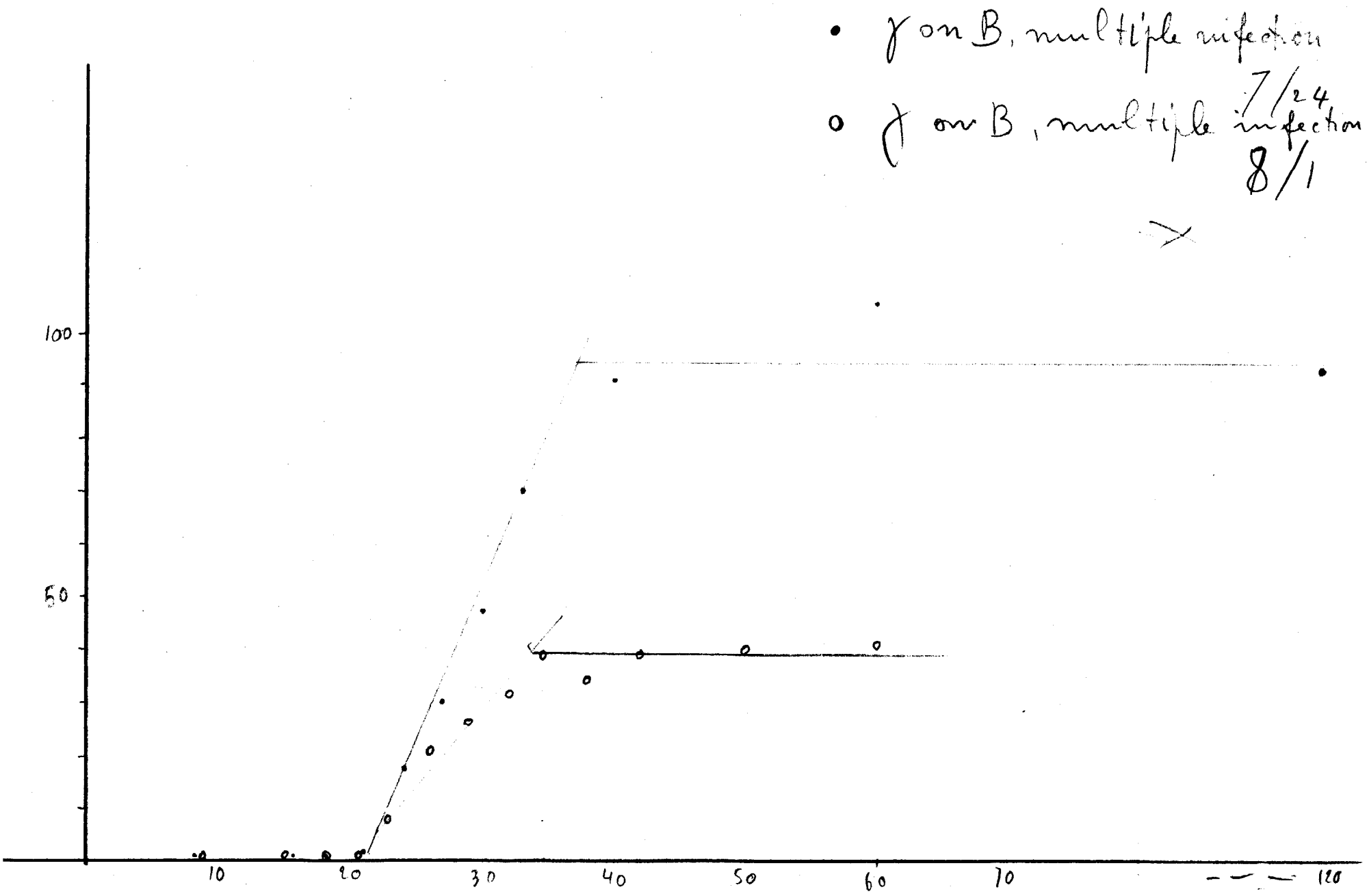
PST	γ on B, multiple infection
-150	.05 cc 24^h aer. B → 20 cc broth, aerate at 37° = B_I^+
-10	new γ assay : 5×10^6 1 - 447, 2 - 482
-2.5	B_I assay : 5×10^4 3 - 228, 4 - 211
0	.1 cc γ → .9 cc B_I = B_γ, at 37°
5'	.1 cc B_γ → .9 cc broth } prewarmed.
	.02 cc → 1 cc broth of tube }
	I of 4', sn : 10^3 5 - 150, 6 - 171; plated again after 48' 51 - 247, 52 - 232.

	.1 → 10 cc br. :10	1 cc → 9 cc br. :10	assay $\times 10^4$	rel. ass.
8	7 - 225, 8 - 222		2.2	1
15	9 - 187, 10 - 225		2.1	1
21	11 - 197, 12 - 193		2.0	1
22.5	13 - 266, 14 - 379		3.2	1.5
29.5		15 - (543), 16 - 344	44	21
33		17 - 283, 18 - (535)	40	19
36		19 - 168, 20 - (448) :20	62	30
39		21 - 171, 22 - 224	42	20
42		:20 23 - 336, 24 - 334	67	32
45		25 - 244, 26 - 279	53	25
60		27 - 238, 28 - 371	61	29
80		29 - 427, 30 - 462 (:1.2)	75	36
100		31 - 330, 32 - 410	74	35
143		33 - 430, 34 - 441	87	41
180		35 - 378, 36 - 379	76	36
230		37 - 416, 38 - 407	82	39
300		39 - 382, 40 - 365	75	36

$[\gamma] = 2.3 \times 10^{10}$ $[B_I] = 1.1 \times 10^8$

in B_γ: $[B] = 1.0 \times 10^8$
γ input = 2.3×10^9
free = $.8 \times 10^9$
ads = 1.5×10^9 = 65%
γ ads/B = 15
B + γ free = 9.0×10^8
i.c. = 10.3×10^8

in tube I : $[B] = 2 \times 10^3$
γ final = 750×10^3
burst size = 375


• γ on B, multiple infection 7/24
o γ on B, multiple infection 8/1
100
50
10
20
30
40
50
60
70
120

New γ on B, multiple infection.

PST	
−135	.05 24^h aerated B → 20 cc broth, aerate at 37° = B_I
−10	New γ assay : 10^7 − 1 − 127, 2 − 109
−3	B_I assay : 5×10^4 : 3 − 119, 4 − 120
0	.05 cc new γ → .95 cc B_I = B_γ, at 37°
5'	.02 cc B_γ → 1 cc broth cf. tube, prewarmed.
	cf 4', m. : 4×10^3 5 − 117, 6 − 111

.04 → 20 cc :10   1 cc → 19 cc :10

			assay	rel. ass.
8.5	7 − 179 8 − 167		1.7×10^4	1
15	9 − [108] (bad dish, wet) 10 − 161		1.6×10^4	.95
18	11 − 145 12 − 189		1.6×10^4	.95
20.6	13 − 145 14 − 207		1.75×10^4	1.03
22.7	15 − 212 16 − 268 (:50)		1.2×10^5	7
26		17 − — 18 − 181	3.6×10^5	21
29		19 − 224 20 − 219	4.4×10^5	26
32		21 − — 22 − 277	5.5×10^5	32
34.5		23 − 317 24 − 341	6.6×10^5	39
38		25 − 301 26 − 277	5.8×10^5	34
42		27 − 336 28 − 318	6.5×10^5	39
50		29 − 338 30 − 355	6.9×10^5	40
60		31 − 357 32 − 340	7×10^9	41

(over)

Analysis of γ on B, mult. inf. 8/1 -

All data referred to tube $B\gamma$, unless otherwise specified.

$[B] = 5.7 \times 10^7$

$\gamma_{ass} = 5.9 \times 10^8$

$\gamma_{per} = 2.3 \times 10^8$

$\gamma_{ads} = 3.6 \times 10^8$

Ads. = 61 % -

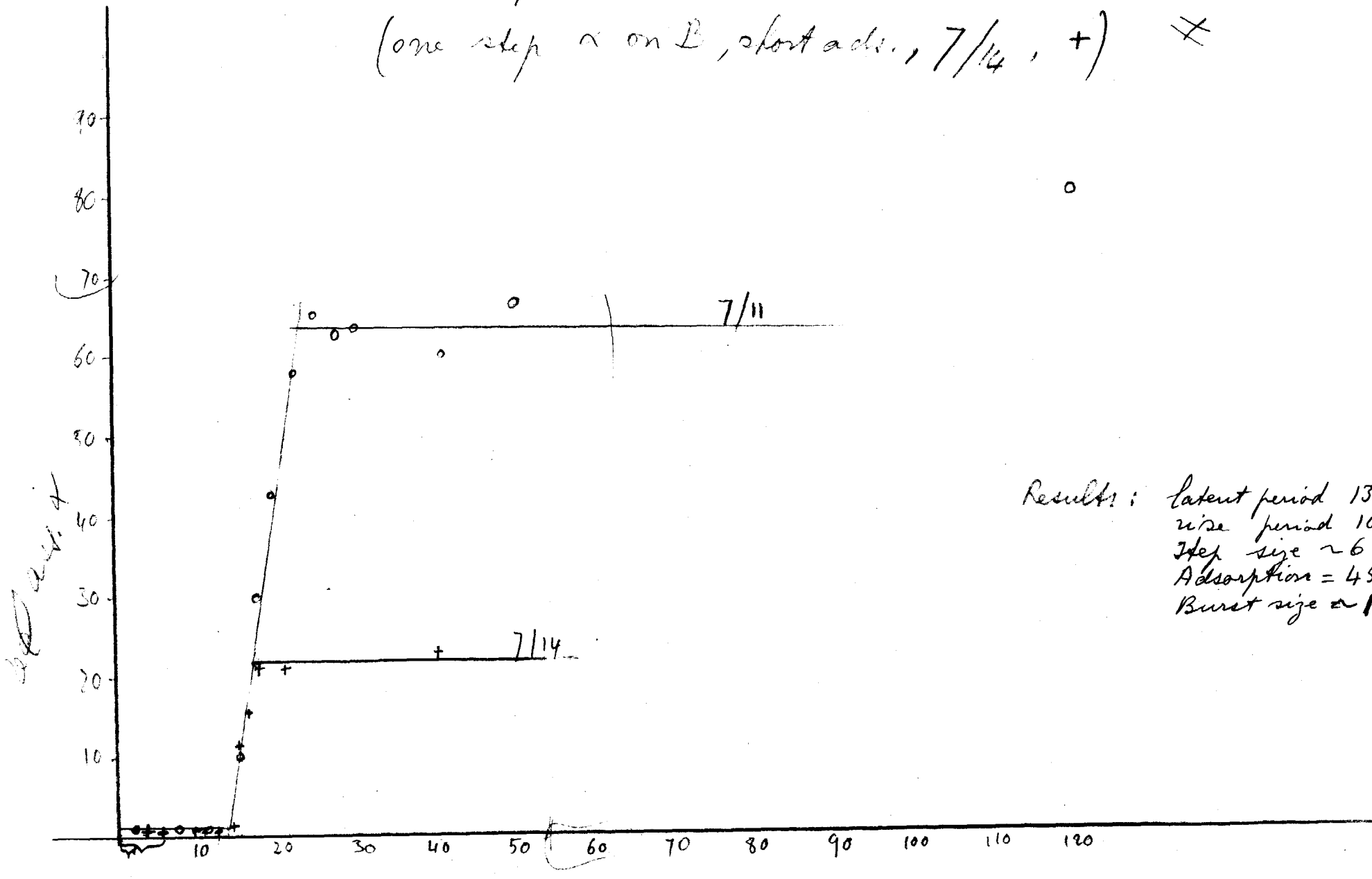
$\frac{\gamma_{ads}}{[B]} = \underline{\underline{6.3}}$

$[B \text{ no } \gamma] = 1.14 \times 10^5$

γ total (inf. cent.) $= 4.1 \times 10^8$ -

one step α on B o 7/11

(one step α on B, short ads., 7/14, +) ✗



Results: latent period 13',
rise period 10'
Step size ~65
Adsorption = 45 %
Burst size ~140.

7/11/41

PST	One step growth curve α on B.
-150'	.05 cc 24h aerated B → 20 cc broth, aerate at 37° = B_α
-2	B_α assay : 5×10^4 1 – 94, 2 – 104 [B] = 5×10^7/cc.
0	.2 cc α → B_α
2'	α assay : 10^4 3 – 337, 4 – 316 (α in tube I : 1.6×10^4)
5'	.02 cc B_α → 2 cc broth in cf. tube, prewarmed.

cf. 4', su : 100 5 – 166, 6 – 174 9.5×10^4 20×100 19×10^7

I: 1cc → 19 cc broth; II: 1cc → 9 cc broth; III: 1 cc → 9 cc br.

	:10	:10	:10	assay α	rel. ass.
8'	7 – 143, 8 – 151			1.5×10^4	1
11'	9 – 129, 10 – 136			1.3×10^4	.87
15'	13 – ~1500, 14 –			1.5×10^5	10
17'		15 – ~900, 16 – 447		4.5×10^5	30
19'		17 – 659, 18 – 625		6.4×10^5	42
22'			19 – 89, 20 – 83	8.5×10^5	57
25'			21 – 106, 22 – 91	9.8×10^5	65
27	$\frac{19 \times 10^8}{1.61 \times 10^7}$		23 – 89, 24 – 94	9.2×10^5	62
30			25 – 109, 26 – 85	9.5×10^5	63
41			27 – 95, 28 – 86	9.0×10^4	60
50'			29 – 90, 30 – 114	10.1×10^4	66
120'			31 – 122, 32 – 121	12×10^4	80

8/[illegible]/41

Growth Curve of C, aerated at 37°.

9h 24h aerated : 2×10^6 .01 → 1 cc .01 → 1 cc .1 → 20 cc broth, prewarmed.

		:1	:10	:2500	$:2\times10^5$	$:10^6$	2×10^6	assay	logass.
AM	9.00	1-194 2-216 :2						2.05×10^3	3.31
	9.30	3-92 4-62						1.54×10^3	3.19
	10	5-102 6-108						2.1×10^3	3.32
	10.30	7-182 8-187						3.7×10^3	3.57
	10.45	9-292 10-180						4.7×10^3	3.67
	11.00	11-361 12-407						7.7×10^3	3.89
	11.18		13-170 14-149					1.6×10^4	4.2
	11.30		15-289 16-234					2.6×10^4	4.42
	12.00		17— 18-734					7.3×10^4	4.86
PM	2.45			19-892 20-—				2.2×10^7	7.34
	4.00				21-177 22-189			3.7×10^8	8.57
	5.30					23-202 24-194		2×10^9	9.30
	7.00					25-169 26-178		1.75×10^9	9.25
	10.00						27-110 28-103	2.1×10^9	9.32