3/6/53 Friday

Exp. J Examination of protoplasts from cross of 578 x 892, Gal-

Protoplasts	Budded	881/1-5	892/1-2		Lp Rx	
1. } Galt		1st smear	2nd ✓			
2. }						
3.	52	18	S. Smear	4-	S	
4.	2	153	S. Smear	?	Lys	J-4-4 8/8 Stable after (2)
5.	24 *	42 *	Solid Smear	4-	✓	
6.	72	347	S. Smear	?	Lys	J-6-4 8/8 stable after (2)
7.	44	227	S. Smear	?	Lys	J-7-4 8/8 stable after (2)
8.	1	6	S. Smear	4-	Lys	J-8-4 6/6 stable after (1)
9.	40	21	S. Smear	4-	S	
10.	41	36	S. Smear	4-	Lys	
11.	37	11	S. Smear	4-	S	
12.	23	21	29	Lp2R	✓	
13.	1	8	S. Smear	4-	Lys	J-13-4 8/8 stable after (2)
14.	39	10	S. Smear	4-	S	
15.	2	61	S. Smear	?	Lys	
16.	77 *	211	S. Smear	?	Lys	J-16-4 8/8 Stable after (2)
17.	33	60	S. Smear	4-	Lys	J-17-4 8/8 Stable after (2)
18.	23	½=208	S. Smear	?	Lys	J-18-4 8/8 stable after (2)
19.	2	11	S. Smear	4-	Lys	
20.	1	7	S. Smear	4-	Lys	J-20-4 8/8 stable after (2)
21.	4	9	14	Lp2R	✓	
22.	1	17	Si Smear	4-	Lys	J-22-4 7/7 Stable after (2)
23.	30 *	35 *	46 *	Lp2R	✓	
24.	87	12	S. Smear	4-	S	
25.	30 *	18	S. Smear	4-	S	

Carried over from smear

* small in bkgrd.

14	4-	6/14 S
6	?	
3	Lp2R	

Mixed cultures

3/6/53

Transductions

811	EMB gal	No. pop 3 days
	1. no add	43
	2. B8	122
	3. D4t750	42
	4. A3	47
2050		
	1. no add	16 (+ some small)
	2. B8	1/4 = 110
	3. D4t750	1/2 = 210
	4. A3	1/4 = 117
750		
	1. no add	2
	2. B8	78
	3. D4t750	2
	4. A3	18
2175		
	1. No add	24
	2. B8	18
	3. D4t750	12
	4. A3	64

Tuesday 3/10/53

518 Transduction with high activity ~~[illegible]~~ phage.

0.1 ml of saline resuspd 518 cells (overnight culture).
0.9 ml of D1 lysate -1 - Inc at 37 10 min - dil

10^2, 2×10^1 $\xrightarrow{0.1 ml}$ 10 plates.

	unstable (+)	(-)	total
1	72	1708	1780
2.	83	1/4 = 443 (1772)	1855
3.	77	about the same	
4.	83	" " "	
5.	89	" " "	
6.	95	" " "	

remainder about the same

24 of these (+) streaked out - all mixed - many mosaic col.

1708) 72.00 (0.04 ; 6832 ; 5080)

c 4.5 of cells transduced

6 plates of 518 untreated dil to contain c. 156 colony/plate showed no plus colonies

1. plate of undiluted 518 also showed no (+).

Extended Examination of prototrophs from 518 × 892 (mixed culture) - Exp J.

		pop 2 days	
J 4	1. no add	7	
	2. 750λ-2	22	
	3. 902λ-2	1/8 = 66 528	says its probably gal, - ?
	4. 892λ-2	solid smear	
	5. 811λ-5	1/8 = 70 = 560	
J 6	1. no add	c. 50	
	2. 750λ-2	1/8 = 73 = 584	
	3. 902λ-2	1/8 = 87 = 696	says its a new locus
	4. 892λ-2	solid smear	
	5. 811-λ-5	1/8 = 68 534	
J 7	1. no add	21	
	2. 750λ-2	1/8 = 57 456	
	3. 902λ-2	1/4 = 107 428	says its a new locus
	4. 892λ-2	solid smear	
	5. 811λ-5	1/8 = 72 576	

(1775)

3/10/53

1655 (−) gal transduction c̄ 892λ
0.1 ml 1655 saline suspended (aerated cult) + 0.9 ml 892-2λ
- incub at 37C 10 min dil 10^1, 10^2 → 0.1 ml / 10 plates EMB gal

	tot. no. colonies	no. mosaic col.	
1.	155	5	3.2 % mosaic
2.	294	8	2.7 %
3.	rest about the same		

2 plates made to indicate the amt. of phage added to the gal plates indicate about 10^3-10^4 λ / ml

Lysate sterilities

892-2 bottle 1 — sterile 0.5 ml

D1-1 0.2 ml sterile

D4-2 bottle 1 sterile 0.5 ml

D1-2 ~~bottle 1~~ not sterile 0.5 ml. — Re chloroform

1655 about 27 mosaic colonies picked and streaked out — no sign of (−) colonies
evidently (−) duction not easily accomplished

3/17/53 Tuesday.

Transduction. To identify prototrophs from 518X892

750	EMB gal	Prep 2 days
	1. no add	4
	2. J4	6
	3. J7	3
2175		
	1. no add	8
	2. J4	26
	3. J7	30
2050		
	1. no add	1/4 = 56 = 224
	2. J4	1/4 = 58 = 232
	3. J7	1/4 = 41 = 164
	4. 892λ-2 (1-100)	> 2000
	5. D2 (presumed 4⁻ say 518+892)	1/4 = 83 332
518		
	1. no add	33
	2. J4	18
	3. J7	23
	4. D2	15

J4, J7 } appear to transduce gal₂ - only what this means I don't know

J4, J7

probably says D2 is gal₄⁻ altho duction of 2050 is low (hi bkgnd?) also this culture is lysogenic for "normal" λ - not hi-act λ

1485 - Attempt to transduce c̄ hi act λ of 892 - Prep 2

0.2 ml of resuspd aerated cult. c. 10⁹ + 0.5 ml 892λ-2

5 Control plates EMB gal — c. 400 colonies/plate - some intermediate gal+. 2 possible mosaic colonies - streaked out. on streaking showed + and slow + forms.

5 Expt Plates EMB gal — c. 80 colonies/plate - represents about 80% killing? c. 24 mosaic colonies - streaked out

$400 \overline{)25}$ = c. 4% (0.04) of the 24 colonies - 1 segregating (-) on 1st streak

to avoid selection against (-) 5 Expt plates EMB(o) — c. 80 colonies/plate - 31 colonies showing evidence of lysis

3/21/53 Sat.

invalid - 892 a mix

Exp K 811t 892 (-1 segregant analysis)

On EMB gal

Seg #	No add	892 λ-2 (1-100 dil.)	811 λ-5	Probable Locus	Non pap. ... from 811λ
1.	31	c. 2000	33	4	
2.	21	c 1000	54	?	3/8 mixed 2 2/8 mixed 3
3.	71	c 2000	68	4	
4.	~~32~~	c 2000	~~33~~ 63	?	1/8 mixed 2 1/8 mixed 3
5.	26	c. 2000	28	4	
6.	26	c 2000	29	4	
7.	17	c. 1000	59	?	4/8 mixed 2 4/8 mixed 3
8.	37	c. 2000	32	4	
9.	36	c 1000	73	?	
10.	27	c. 1500	31	4	
11.	32	c 1500	48	4	
12.	28	c. 1500	33	4	
13.	24	c 1500	22	4	
14.	24	c. 500	54	?	6/8 mixed 2 7/8 mixed 3
15.	12	c. 1000	45	?	5/8 mixed 2 5/8 mixed 3
16.	33	c. 1500	19	4	
17.	47	c. 2000	43	4	
switched 18.	28	c. 2000	21	4	

892
1 on the Stability of spontaneous pap - after 2 all appear pure +

Exp + D

instability of D1 spontaneous pap. confirmed (again) 3/8
stability of D4 " " " " 8/8

2050 - from EMC - transduced by 892 λ - 2 to high ~~titer~~ frequency

892 - from EMC - ~~[illegible]~~ lac - - colony form) distribution about the same as own 892

- own also lac - ——— small col form + spreading colony form

Sun
Mon: 3/22/53 - 3/23/53

~~518 Percentage Transduction as a function of multiplicity~~
~~λ = 892 λ²~~

~~2050 EMC~~ -

892 - streaked out EMB lac - appears homogeneous lac - minus - 2 colony types - small round, large spreading
well isolated of each pelleted, lysates made 892-isol 1, 892-isolate 2 } don't know which is which! detrim. from culture

2050 EMC
518 is these lysates

cell	lysate →	isolate 1 (892)	isolate 2
2050 E	c. 3	150 lysis?	100 lysis → c. 200 plaques plus gross lysis - transduction difficult to assess - massive? steak and see extent of gal + vers
518	c. 30	c. 20 200 plaques & massive ductions? →	c. 20 ← 200
		like wise ←	1-100 dil. c. 10 pfg 1-5 plaques

plaques not examined

no transduction b/c gal (-) in B different areas

results suggest isol 1+2 are gal 4 -?

518 + 2050 - 3 (purified) stocks made of separate transduction
not a high incidence of transduction 2050 → × 518

3/24/53
Expt K stored on EMB gal plate

518 - one plate - transduced c̄ 892 hi powered to see if transduced are M+
replica (slightly) to D(0) - no growth D(0) - no prototrophs

3/26/53
Thursday

892 - all confused - probably complicated by a switch in media.
apparently 892 mixed with gal+, gal-, possibly (-) of
a couple of types.

518 Examination of D4 to see hi activity of λ present.

		pgs
1. no add	=	12
2. D4 λ	=	$>10^4$

Summary 518tK-12 See pages 170a

page 1. Examination of a single gal- segregant from separate transductions of W518 gal4- by lysates of K-12

		Receptor test No. of seg.	No. transd. by gal4- lysates	No. transd. by gal2- lysates	Probable locus by receptor test
170a	A.	22	0	22	22 gal4-

1. (A3)

2 = A1

3 = A2

4 = A3

2. Examination of a number of gal- segregants from a single transduction

		Receptor test No. of seg.	No. transd. by gal4- lysates	No. transd. by gal2- lysates	Probable locus by receptor test
145	A.	15	0	15	15 gal4-

163 B. Crossing test (X1436)

	Seg no.	No. prototrophs	No (+)	Probable locus
1.	A3	975	0	gal4-
	A11	1048	0	gal4-
	A13	c. 1250	0	gal4-

C. Donor Test

	Lysate of Seg	Transducer gal1-	gal2-	gal3-	gal4-	Probable locus
165, [illegible]	A1	+	+	+	no	gal4-
1766 1.	A3	+	+	+	no	gal4-

Summary of 518t902

page

1. Examination of ~~a series of~~ single gal-segregants from different transduction.

2. Examination of a series of gal-segregants from a single transduction

A. Receptor test

	No of Seg.	No transd. by gal_4^- lysates but not by gal_2^-	No transd. by gal_2^- lysates but not gal_4^-	Probable locus
146	19	2	17	2 gal_2^-, 17 gal_4^-

B. Crossing test

1. Seg. gal_2^- by receptor test (x902)

	Seg. no.	No prototrophs	No. (+)	Probable locus
175	B7	c. 2200	0	gal_2^-
	B8	c. 1600	0	gal_2^-

2.

C. Donor Test

	Lysate of Seg	Transduces gal_1^-	gal_2^-	gal_3^-	gal_4^-	Probable locus
	B7					
176B	B8	+	no	+	+	gal_2^-

76
16
446
76
1216

Sunday 3/29/53

811 Analysis of 892 mixture

892-1 } = 2 (-) gal colonies from stock of 892 - lysate made
892-2 } of these - both are lac - TLB -

811 Pgs 2 days
1. no add 28
2. 892-1 39
3. 892-2 33

} these lysates appear to have at least 2 phages in them - 1 resembling λ, other giving plaques on λ+ cultures!

2175 for the purpose of ~~[illegible]~~ reciprocal of 518 & 902
1. no add - 6
2. K-12λ 30-1 176 ← pick 24 for analysis

750 For the purpose of picking transductions for analysis - 18 segregants.

Monday 3/30/51
1. no add 2
2. K-12λ 30-1 1/8 = 18 342
3. 902λ-3 1/4 = 29 116

518 For the same purpose as 750 above
1. no add 28
2. 750λ-2 79
3. 902λ-3 1/16 = 76 = 1216
4. K-12λ-30-1 1/8 = 65 = 280
5. filtrate of culture of 1485ED1 } 57 ← indicates that if λ from "natural" lysis is not very active - assuming high titers. a few plaques resembling λ-2

518
a second culture to test a lysate of gal+ from mixture 892
7 day incub
1. no add c. 20
2. lysate of 892 gal+ colony & a broth culture of this appeared mixed > 10^4 high activity

Monday March 30, 1953

1673X D1 to see if (λ+) got from this cross have hi-act lambda-
purity of the cross cultures
D1 - pure -
1673 - +, with slow gal present - a plus picked for purif.
and a new

4/2/53 Thursday

— 1485tD1 - the negative (-) transduction - Examination of (-) segregants to determine their nature.

Exp. L.

		no pop 2 days	Locus suggested
L1	no add	4	
	902λ-3	19	2-
	811λ-6	37	
L2	no add	6	
	902λ-3	5	2-
	811λ-6	21	
L3	no add	10	
	902λ-3	9	2-
	811λ-6	22	
L4	no add	5	
	902λ-3	5	2-
	811λ-6	21	
L5	no add	5	
	902λ-3	8	
	811λ-6	13	2-
L6	no add	3	
	902λ-3	7	2-
	811λ-6	21	
L7	no add	3	
	902λ-3	8	2-
	811λ-6	14	
L8	no add	2	
	902λ-3	3	2-
	811λ-6	22	

all these found 5 Lp and prototrophic

Reason for low transduction not known. Data appear ok - but better recheck.

892 hi powered λ - Is hi power DNAase susceptible?

578	no add	16	
5	892λ untreated (-100)	>10⁴	no
	892λ DNAase treated at 37c 10 min 1-100 x 6/5	>10⁴	

4/2/53

518 gal+ - is there a diff. between 518 gal+ R and 811 gal+ R because 811 was made Lp+ 1st ? Data on 811 reversions as gal+ donors not cleared because strains not transducing gal+ do not give (-) in crosses with Y-10. Examine 518 gal+ to find strains giving (-) with Y-10, then make lysogenic and examine transducing power.

Check in the crossing cultures. Y-10 are (+)
518 gt-1 " "
518 gt-2 " "

518 gt-1 X Y-10 - are + prot. found
nos/1/4 plate = 65, 48, 75, 114, 67, =

518 gt-2 X Y-10 - are + prototrophic found
nos / 1/4 plate = 75, 128, 95, 87, 108

892 mixed stock - plated against λ^2 - large proportion of cells Lp_2^R
Selection for Lp_2^R portion of stock.

2175 tK-12
24 (-) sey obtained - carried thru (2) purifications

518t750-1 } made from (2) purification
518t750-2 }
750t902-1 } made from (2) purification
750t902-2 }
750t12-12-2 } made from (2) purif.
750t11-12-1 }

April 5, 1953

892(mix) preliminary examination of occurrence of transducing phage in bursts from single cells of irradiated 892
1. Growing culture of 892 diluted to contain c. 500 cells/0.1 ml
2. irradiated 15 seconds.
3. plated before and after with 750, 1485, and by itself.

1. 892 cells/0.1 ml before irrad. = 585 (galt = 101) 5
2. 892 cells - plaques/0.1 ml on 1485 before = 1.
3. 892 cells - transd/0.1 ml before on 750 = 78 (galt from 892, 78)

4. 892 cells/0.1 ml after irrad 16.8 } (galt = 26)
5. 892 cells/0.1 ml plaques on 1485 after irrad. ~~169~~ 247 } (total = 415)
6. in 892 cells 9" on 750 cells 35 (galt from 892 = 31) / no effective particles yielded

750 in add = 2

518 galt R #3 X Y-10
controls o.k.

	(+)		
1.	1/4 = 60	240	no (-)
2.	1/4 = 33	192	"
3.	1/4 = 46	184	"
4.	1/4 = 40	160	"
5.	1/4 = 51	204	"
		930	

0(-)/930 (+)

518 galt R #4 X Y-10 controls o.k.

	(+)		(-)
1.	1/4 = 53	212	none
2.	1/4 = 57	228	"
3.	1/4 = 50	200	"
4.	1/4 = 58	232	"
5.	1/4 = 55	220	"
		1114	

0(-)/1114 (+)

1485 tD1 — unstable galt ⟶ hi act. lysates λ

gave rise to stable + ⟶ low act λ

902 St X 2175 (gal₂- x gal₂-) on low sm - about 300 recombinants per plate.

2251

Tuesday 4/7/53

- 1821 - vs. hi powered 892 λ

On EMBgal.
1. no add - c10 } appears that hi act λ has
2. 892λ 1-100 - c. 1000? } less act. on 1821. - situation similar to "normal" λ.

On EMB xgl
1. no add - many small, 3-4 large }
2. 892λ - 1-100 - " " c10 " }

Repeat xgl using undiluted λ 892.

1485tD1 - Re-examination of the possibility of (-) duction.

1. Lysate D1λ - 2 prep.
2. Cross pushed on 1485 on EMB(0).
3. After 1 day lysed area picked to HoH - streaked out several times on EMBgal.
4. a single (-) colony observed
several intermediate gal+ col.
a few segregating (what?) colonies.
many gal+ colonies.
5. some of above colonies picked and streaked.

6. Results.
a. 2 streaks c̄ pure (-) col.
b. several mixed?
c. mostly gal+ col.

Summary Stock cultures on Plates in Refrigerator

- 1924 t K-12 Unstable + 11 in all
- 811 gal + R. 10 in all
- 518 gal + R 8 in all

Expt A 518 t K-12 all seg single transduction
" B 518 t K-12 all seg from single transduction
" C 518 t 892 (mix)
" D 518 t 892 mix
" E 2050 t 811
—
—
—
Exp J
" K
" L
" M 750 pr t K-12 (-) seg ~~18~~ 17 in all
" N 750 pr t 902 (-) seg 23 ~~16~~ in all } replaced using treated gal, - prototrophic to make nurses c 750 s v 902 s v = 2257
" O 2175 t K-12 (-) seg 21 in all
" P 518 t 750 (-) seg 3 in all
" Q 518 t K-12 (-) seg 13 in all
" R 518 t 902 (-) seg 23 in all
" S 811 t 902 (-) seg 19 in all
T 2175 t 750 (-) seg ~~23~~
U 2175 t 811 (-) seg 16 in all
V 811 t K-12 (-) seg 20 in all
W 1924 t 902 (-) seg 18 " "
X 1924 t K-12 (-) seg 29 " "

4/9/53

1485tD1 - Occurrence of hi-act λ in bursts of single mod. cells

	1. 1485tD1 cell count pre mod. =	493 /0.1 ml
Pre mod.	2. Sport pop. 750	1
	3. No. pop in mix of 1 + 2. EMBgal Expected	494
	4. Plaque by 1485tD1 / 1485 Found	494
		0
Post mod.	5. No. 1485tD1 cells surv.	123
	6. No. " cells giving plaque/1485	140
	7. No. " cells giving pop. 750	123
	" Sp. pop 750	1
	Total	124
	8. No. pop mod. 1485t1 on 750	222
	No of lysing 1485tD1 cells giving pop 750	222-124 = 98
	Fraction of lysing 1485tD cells giving rise to at least 1 hi act. λ particle	98/140 = 70%

4/10/53 Friday

750 and D1 Occurrence of hi-act-λ in single bursts of D1

C. 10^3-10^4 cells of D1 - sampled before irrad., then irrad ≡ U.V. sampled immediately and after 2 hours inc in broth

aerated cult. D1

↓ dil to 10^3-10^4 → dil 10 sample → for cells → for plaques/1485 → for pap / 750

↓ irrad 5 sec, 10 sec. → dil 10 into broth → sample immed. → cells survival → plaques induced → pap 750

↓ inc. 2 hours → sample as ↑

Pre Irrad

		0.1 ml
1. Total no. cells =		310
2. plaques/1485 =		1
3. Pap./750	(3)	6

750 spp pap = 1.

Post Irrad.

5 Second exposure.

4. Surviving cells		159
5. plaques induced/1485		40
6. immed. pap/750	(3)	6
7. plaques after 2 hrs/1485		3344
8. pap/750 after 2 hrs.	— (2)	>47 (many small) upper limit = c. ~~180~~ 600.

40 plaques / 151 disappearing cells

10 sec. exposure.

9. Surviving cells		84
10. plaques induced/1485		40
11. immed. pap/750	(8) —	15
12. plaques after 2 hrs/1485		2720
13. pap/750 after 2 hrs	(2)	>53 (many small) upper limit = c. 200

Plaque assays against 1485 when streaked out - center of plaque show evidence of (-) duction

892 mix gal+ (also unstable)

lysate has hi act / 518

1485 t D1 — (-) seq

lysate probably has hi act / 518 but appears quite lytic also.

518 gal+ R. #5 and #6 tested in crosses X Y-10 for mimic reversion

518 gt #5 gal+ proto = 420, 680, 522, 416, 266 (all obtained by counting either 1/4 or 1/8 of plate) no gal(-)

< 0/2304

3 mimic col. → 518 gt #6 gal+ proto = 440, 440, 432, 440, 340, 672 (also obtained by counting 1/4, 1/8 of plate) no (-) proto

< 0/2764

3/10/53
Sat.

Various transductions to secure (-) seg for classification.

		pop 2 days	
2175	1. no add	13	
	2. 811λ-4	39	(-) seg isolations made from both - discarded
	3. 811λ-7	50	

750

1. no add.	2	discard - transduce gal, - prots instead and use 750 s^r as crossing tool
2. 811λ-4	10	
3. 811λ-5	14	
4. 811λ-6	33	
5. 811λ-7	25	

518

1. no add.	29
2. 750λ-2	72

1821 On EMB xyl -

1821 xyl No ductions?

1. no add	3	
2. 892λ-2 (hi powered)	c. 150	on ✓ these are galt xyl - Apparently EMB xyl can select for gal - duction -

3/16/53 Thursday.

750 s^r = 2319 - test for validity

1. no add		21
2. 750λ-1		25
3. 902λ-3	1/4 = 107	428

4/16/53

750 pr = gal, prototroph - Isolation of (-) segregants

1.	no add	1.	
2.	750λ-1	0	(check on authenticity)
3.	K-12λ 30-1	143	
4.	902λ-3	84	
5.	811-6	14	after 2 single coloring isolations 2/14 are mixed - probably indicates that stable transductions result 811 → 750

Gal$_3$ - 1655 X 2238 (= loc, - gal$_3$) to isolate Lp_2^s form (Lp^s also if possible)

Control plating	1.	1655	pure +
	2.	2238	pure -
		(+)	total prototr
cross itself	3.	30	220
	4.	33	211
	5.	44	433
		107	864

$$\begin{array}{r} 0.124 \\ 864\overline{)107.0} \\ 864 \\ \hline 2060 \\ 1728 \\ \hline 3320 \end{array}$$

+ = 12.4%

Pickings for Lp^s, Lp_2^s or both
1. 5/34 Lp_2^r all Lp^r
2. 30/30 Lp^+ or Lp^r / λ

750 pr (gal$_1$ - prototroph) - Irradiation to obtain Lp^s form.
5 pink colonies on EMB lac noted. Pick and examine

none Lp^s

1821 purified - try transduction of single coloring isolate - Stock made of this

1.	no add	10
2.	K-12λ (30-1)	84

1485tD1 - 2 additional segregants tested

(-) seg #9	1.	no add	10	
	2.	750λ-1	1/4=15=60	apparently gal$_2$ -
	3.	902λ-3	10	
	4.	811λ-7	29	
(-) seg #10	1.	no add	8	
	2.	750λ-1	1/16=54=864	possibly gal$_2$ -
	3.	902λ-3	24	← check
	4.	811λ-7	1/32=55 1750	

Saturday 4/18/53

2175 - (attempt to observe "satellite" phenomenon in 2175 failed - check to see if other transduction give 1 — are the gals secretory something?)

1. no add 17
2. K-14 30-1 248

Examination of some lysates.

518

1. no add 11
2. 892 Lp2 (enrich) 18
3. 892 M+ (enrich) 11
4. 811 λ-8 11
5. 902 λ-4 1/4 = 118 472
unknown (cross Expt.) → 6. D15 1/16 = 56 896
7. 844 1/16 = 44 704

W2346.3

(192) A

4/25/53 Saturday. (tested by spotting 0.05ml of 1 prep on 1/2 plate - 1/2 plate serves as control) (1/2 control) Supernat. of segregants

Expt. M 750 prototrophic gal,- transduced by K-12 λ 30-1 - Examination of Segregants (-)

Segregant	No. of Segregant progs. (+/Gal)	No. prog. 750λ-2 pfu	No. prog. 902-4 pfu	Probable locus	To be taken by X	Satellite of Gal, λ
1.	7	0	6	gal,-		0
2.	1	0	10	"	✓	0
3.	4	0	9	"		0
4.	0	0	11	"		0
5.	0	0	11	"		0
6	7	0	7	"		0
7.	0	0	9	"		0
8.	0	0	6	"		0
9.	0	0	8	"		0
10.	0	1	10	"		0
11.	0	0	13	"		0
12.	2	7	9	"		0
13.	0	0	13	"		0
14.	1	0	8	"	✓	0
15.	0	0	10	"	✓	0
16.	0	0	15	"		+
17.	0	0	13	"	✓	+
						2/17

2/24/54

Stocks of this experiment discarded as not worthy of carrying

Examination of lysates M2, M14, M15, M17

	750	518	2175
1. no add	1	40	14
2. M2	3 ok ✓	29	50
3. M14	5 ok ✓	62	70
4. M15	4 ok ✓	15	33
5. M17	5 ok ✓	28	74

Test crosses of M2, M14, M15, M17 × 750 sr - Controls EMBgal 750, M14, M15, M17 ok., M2 no gen R

	(+)	(-)	total	2nd cross	total	3rd cross - Controls ok	total
M2	0(?) ok	125, 89, 115	0+/332	2, 2, 2, 3 = 11	0+/343	21, 16, 14, 13, 19 (83) (4/5)	4/26
						×2196 gal+ : 37, 57, 51, 66, (16/45)	
M14	0(?) ok	121, 126, 136	0+/383	0, 3, 2, 4 = 9	0+/392	24, 38, 37, 36, 27 = 162	0+/554
M15	0(?) ok	210, 130, 171	0+/511	9, 6, 2, 1, = 18	0+/529	×2196 gal+ : 7, 9, 13, 12, 15 contaminated	
M17	0(?) ok	87, 181	0+/268	0, 4, 5, 9 = 21	0+/289	13, 21, 29, 33, 27 = 123	0+/391
				controls ok on 2nd X		×2196 gal+ : 62, 63, 63, 57, 58	

ok = check

SUMMARY 17 segregants.

by transd. test 17/17 gal,-

by donor test 4/4 gal,-

by cross gal, 4/4 gal,- with following mix. prototrophs (332, 383, 511, 268)

source and number

(1913)

4/25/53 Sat. 750 prototroph t 902

Experiment N 750t902 → (-) agr Examination - Plated as 750tK12(-)Xg p. 1924

Segregant	No. spont. /g (½ plate)	No. prot 750t-2 spot	No. prot 902t-4 spot	Probable Nacc.	Scalate	Test cross ± 25% or control
1.	0	0	20	gal1-	0	ok ✓
2.	1.	0	24	1-	0	
3.	4	c. 50	0	2-	0	
4.	3	0	32	1-	0	ok ✓
5.	3	48	0	2-	0	
6.	0	0	14	1-	++	
7.	0	0	19	1-	0	ok ✓
8.	0	0	25	1-	±	
9.	5	45	1	2-	0	OK SEE BELOW
✓ 10.	0 (2)	1 (2) many small	14 17	1-	±	unst. ? ok unstab. + ? + confirmed on ½ duct
✓ 11.	1	0	26	1-	0	ok ✓
12	4	0	26	1-	0	
13.	0 ✗	0 ✗	13 ✗	✗	0	
14.	7 ✗	0 ✗	16 ✗	2< 1-	0	
15.	9	60	0	2-	0	
✓ 16.	4 (12)	53 (98)	4 (27)	2-	±	unst ? ok unstability ? + confirmed each duct SEE BELOW
17.	0	7	22	1-	0	
18.	3	1	13	1-	+	
19.	0	0	33	1-	±	
20.	3	0	25	1-	0	
21.	0	0	12	1-	0	
22.	0	1	14	1-	0	
23.	0	0	23	1-	0	
						750t ↑ = ok
				5 gal2-	21	
				18 gal1-	4±	
					170	

( ) = 4/26/53

5/4/53 → Spgt tests of Segregants (spgt 5/2e about)

Activity of Lysates of These Segregants

Crosses			/750	/518	/2175
See well mixed	gal2- agr X 902S on EMB gal SM				
controls	1. N3 (no + prot. observed)	(-) = 679, 582, 531, 443 = 2135	ok/2135	78	52	0
on EMBgal SM - no growth	2. N5 (")	(-) = 369, 280, 274, 359 = 1283	ok/1283	79	60	1
on EMBgal - all (-)	3. N9 (")	(-) = 363, 477, 419, 540 = 1799	ok/1799	41	46	1
	4. N15 (")	(-) = 454, 529, 479, 466 = 1928	ok/1928	44	43	0
	5. N16 (")	(-) = 638, 530, 535, 655 = 2358	ok/2358	raised vs appear. (well. T)	raised vs appear. (well c. 37 gaps	2
N16 → λ_2^S (5/9/53)		Recovered no (-) = (c.1500) 6 = c.9000		control area 1/67 plate = 18	control area c. 16	control area = 1

5/4 N10 streaked out (i.e. picked) → spgt tested → regal duced → /750l = 0 /811 = 4 /902 = 16 - control area 1

transductions confirmed here by brk. resm.

5/19/53 N16 purified (not transduce 811) 5/8

N16 " " " " /750l = 0 /811 = 3 /902 = 0 ^ control area = 0 Reactels! double(-)?

N16 " " " " /750l = 0 /811 = 0 /902 = 0 double (-)? or tp_2^r?

5/8 Crosses: ? gal- agr (-) X 750S (no prot observed)

				state of cross tst
1.	N1	31, 26, 34, 23 = ot/114	8, 3, 6, 1, = 18	ot/132
2.	N4	21, 28, 11, 28 = ot/88	7, 4, 1, 3 = 15	ot/103
3.	N7	39, 46, 38 35 = ot/178	5, 3, 7, 8 = 23	ot/201
4.	~~N10~~	~~50, 33, 41, 52 = ot/176~~		
5	N11	32, 20, 13, 40 = ot/105	5, 3, 1, 1; 10	
6.	N16	37, 33, 25, 44 = ot/139	3, 2, 2, 2 = 11	ot/150 ot/160

skip

control ok.

Activity of gal- lysates 5/9/53

	/750 spotted	/2175 spotted / solid smear	/811 spotted / solid smear	Does this indicate gal- ? ? or not?	811 1-100/750 spot ÷ bkgrd.	811 1-100/2175 spot / ½ = 92 = 736	811 1-100/811 spot c. 500	811 1-100/gal- spot c. 300
N1	0				—	—	—	—
N4	0	15	15		= bkgrd	½ = 78 : 580	c. 500	c. 300
N7	0	solid smear	solid smear		—	—	—	—
N11	0	11	11		control a little high	control 19	control 27	control 19
	control = 0	control = 1	control = 2					

Expt. N continued.

N16 plate = original plate stock

5/26/53 N16 - single colony isolation - Hershfield referred to as N-16 original or pure stock as

lysates (pure / original)

"original"	restreaked original	ancestor
/150	0 (?)	0
/2175	0	2
/2238	c. 10	c. 10 ← not likely to be same as 2238 lysate
/891	c. 7	c. 7

N16 original	transd	ancestor	← this lysate also fails to transd 1405 → (-)
/750 λ	0	0	1/14/53
/902 λ	0	1	residuum
/2238	0	4	N16 titer now is 1-2.7
/891	0	4	
/K-12 λ	0	4	
/842 gal+	solid smear	4	

N16 "plate" - because s.c. of N16 plate suspension as lysate gave no transd. and was not transd by anything but 842 gal+ (This repeated) - Lysate of plate inoculation was made.

N16 "plate" ½ stock

/891	solid smear ← stock of this showed +, gave tonic growth 0(0)	control: c. 5	hi ael. reconfirmed.
/2175	0	1	

Additional crosses gal$_1^-$ × 2257

N7	1 plate = 1432 × 4 = c. 4200	(-) no (+)	
N4	1 plate = 844 × 4 = c. 3376	(-) no (+)	
N1	1 plate = 2676 × 4 = c. 10,500	(-) no (+)	
N11	1 plate = 1640 × 4 = c. 6560	(-) no (+)	

7/6

Additional crosses gal$_2^-$ × 2251

N3	1 plate = 2660 × 4 = >10640	total > 12,775
N5	1 plate = 994 × 4 = >3976	total 5359
N7	1 plate = 1484 × 4 = >5936	total = >7735
N15	1 plate = 968 4 = >3872	total > 5900

Gal+ reversants obtained of

N1 - 1 on HFT (811)
- 2

N7 - 1 on HFT
- 2
- 3

5/16/53 N16 lysates of 30', 40', 60' exposure dont show a great deal of diff. All HFT

Monday 4/27/53 — became SM

750 prototroph × 1436 on EMB gal SM — F station wrong?

1.
2.
3.
4.
} all plates barren — Control streaks on EMB gal show pure (−)

1924 transduced C̄ 01 λ — Observation to see if any plaques present — an indication of the new phage in lysates of 892 gal + a mix

1. no add 18
2. 01λ-1 (1-10⁴ dil.) 1/4=64. ~~256~~ 238 -18 ×10×10⁴. 2.38 ×10⁷ transductions/ml lysate

2238 × 1655 - gal₃ - λp₂ s prototroph.

1. no add 64
2. 750λ-2 199
3. 702λ-4 123
4. 811λ-8 156

2343
750 prototrophic gal₁

1. no add 5
2. 811λ-8 8

750 s^r = 2319

1. no add 29 a suspicious? - high for gal₁ - why the change?
2. 811λ-8 128

750

1. no add 3
2. 811λ-8 10

4/28/53 Tuesday -

Lysate checks: On single plates - 0.05 ml lysate added (spots)

518	1. no add sector	2	
	2. 2238 λ - 1 spot	4	— poor lysate - aeration stopped intermediate - may contain new phage active on Lp^+
	3. 2175 λ - 4 spot	109	
	4. 750 pr "	3	
	5. 750 sr "	3	
750.	1. no add sector	0	
	2. 750 pr spot	1	
	3. 750 sr "	0	
	4. 2175-4 "	148	
	5. 2238 "	2	
2175	1. no add sector	4	
	2. 2238 spot	7	
	3. 2175 "	0	
	4. 750 pr	10	
	5. 750 sr	16	

Gal 4 - gal4-proto X 750 sr = W2319 on EMS gal SM both F^+ in cross?

1. Control susp. - no growth EMS SM gal
   - pure (-) on EMB gal

X plates	(-)	(+)	total
1.	5	0	5
2	12	0	12
3.	21	0	21
4.	16	0	16
			54

0(+)/54

750 pr. X 750 sr = W2319 (both probably F^+ in cross
EMS gal SM

1. Controls - no growth of both EMS gal SM
   - both (-) on EMB gal

2. X plates

(+)	(-)	total
0	42	42
0	35	35
0	30	30
1?	32	33
		140

0/140?

↑ Hm ✓

5/2/53 Saturday

750t 811 - (-) seg 1 Examination

1. no add - 7
2. 750λ-2 4
3. 811λ-8 10

} no decision possible -

750pr - For the purpose of making transduction of 750 by gal4- ~~811~~ to observe segregant (-)

1. no add 3
2. 811λ-8 12 ← pick and look for unstable

811 - For the purpose of making transduction gal4- by gal1- to obs. segregant (-)

1. no add 51
2. 750λ-2 96 ← pick and look for unstable no unstables obtained

5/4/53 Monday -

750pr - For the purpose of making transduction of 750 by gal4-
Spread plates

1. no add 3
2. 811λ-8 3
3. 811λ-8 2
4. 811λ-8 1

} again! no success

5/2 → 5/7 confusion about gal EMB - due to new mix?

2175 ductions test partly nullified by part of medium

17/22 gal seg came out + on und. restreaking of these showed all to be gal -

5/7/53 gal₂-

Expt. 0 2175 tk-12 gal₂ (-) segregants.

Segregant	No. spread 902A spot	No. prop. 902A spot	No. prop. 8114-8 spot	Probable locus
01	1	0	11	2-
02	0	0	4	2-
03	contaminated			—
" 4	10 0	1 1	13 12	2-
" 5	6 0	1 0	17 4	gal₂-
" 6	1 0	0 0	12 18	2-
" 7	11 0	0 0	13 14	2-
" 8	8 0	1 1	13 6	2-
" 9	← not spread →			—
" 10	2	1	12	2-
" 11	1	0	13	2-
" 12	0	0	6	2-
" 13	0	0	15	2-
" 14	0	0	4	2-
" 15	0	0	9	2-
" 16	0	0	10	2-
" 17	1	0	9	2-
" 18	0	0	10	2-
" 19	0	0	11	2-
" 20	0	1	7	2-
" 21	0	0	13	2-
" 22	0	1	10	2-
				20/20 2-

Tet Crosses - (-) Seg X (2251) 902A sp on EMS gal SM - control streaks on these EMB gal-OK

	total ptds	tracks (+)	2nd cross: tetr ptds	(+)	Grand ptds	Grand (+)	
03	162, 154, 89, 95, 130 = 630	0/630	604, 608, 567, 796, 814	0	4070	0	
05	139, 167, 162, 161, 128 = 757	0/757	1248, 1064, 914, 1092, 1016	0	5384	0	
011	64, 78, 67, 47, 77 = 336	0/335	237, 228, 400, 416, 456, 8	0	2072	0	now 0/4235
014	278, 201, 242, 318, 284, 73 = 1323	0/1323	1089, 1328, 1382, 644, 1116	0	6988	0	
					22 677		

011 X 2251 - 2nd cross
569, 861, 733 = 0/1563

Segregants	1811	2175
03	c. 15	0
05	c. 50	0
011	c. 50	0
014	c. 30	0
no add	2	0

2/24/54

Strains of this experiment discarded as not worth saving

5/9/53 Sat.

Various 'ductions for the purpose of obtaining seq. for classification

2175

1. 2nd add 16, 15
2. 811λ-8 32 — 3/24 unstable after 2 streakings
3. 750λ-2 50 — 4/21 unstable after 2 "

Hi act. λ - Anti serum test.

Hi act λ = 01 - dil 1-100 of 01-1 c. 10^{10} λ/ml

1-100 = 10^8 ml → phage assay - dil $10^1, 10^2, 10^2$ $\xrightarrow{0.1\,ml}$ (10^6 dil) = 35,24 = 2.95×10^7

Pre-treat

'duction assay - 0.1 ml → 1/8 = 272 2176

+ 0.5 ml
0.5 ml 1-100 Anti P1
incubate 37C for
10 minutes

$2176 \cdot 10 \cdot 10 \cdot 10^2$

2.2×10^7

post-treat → phage assay - dil 1/10, 1/5, 10^2 $\xrightarrow{0.1\,ml}$ (10^5 dil) = 206,254 = 2.30×10^7

'duction assay 0.1 ml → 1/4 = 213 852

to equate to pre conc mult. X2 = 1704

Fraction plaques surviving = $\frac{2.30 \times 10^7}{2.95 \times 10^7}$ = 0.78

Fraction plaques surviving = $\frac{1704}{2176}$ = 0.78

$\frac{2.2 \times 10^7}{2.95 \times 10^9 \lambda} = \frac{1}{1.3 \times 10^3}$

Stocks of 2/24/54 this experiment (198) discard.

5/14/53 Source: duction: Pl 191 (w. para thiop at...)

Expt. R- 5/8 t 902 (-) seq. tested by spotting ~ 703λ-4, 841-P.

Seq	Control spot area	902 spot	811 spot	Platable factors	
R 1.	0	0	13	2-	✓
2.	1	7	1	4-	—
3.	0	10	0	4-	—
4.	0	1	9	2-	✓
5.	0	14	0	4-	—
6.	0	4	2	4-? 1pt.	not gal⁻ see below
7.	contaminated c (+)				
8.	1	10	1	4-	—
9.	1	11	1	4-	—
10.	contaminated with (+)				
11.	0	13	0	4-	—
12.	0	17	1	4-	—
13.	2	11	0	4-	—
14.	0	14	0	4-	—
15.	1	20	1	4-	—
16.	2	15	2	4-	—
17.	1	0	14	2-	✓
18.	1	8	2	4-	—
19.	0	8	1	4-	—
20.	2	15	7	4-	
21.	11	12	1	4-	
22.	0	6	0	4-	
23.	0	18	0	4-	

3. 2-
19 4-

Lysates of Gal₂⁻ R1, R4, R17

	Spotted on 811	/2175
R1	c. 70/2	1/0
R4	c. 60/2	0/0
R17	c. 80/2	0/0

Lysate test. (looking for lic ant. & gal⁻ variety) Crosses. Gal₂⁻ X 2257

R2	18/1	0/4
R3	33/8	26/42
R5	83/8	34/42
R8	67/8	34/42
R9	16/1	0/4
R11	8/1	0/4
R12	17/1	2/4
R13	6/1	1/4
R14	14/1	2/4
R16	11/1	0/4
R18	5/1	2/4
R19	2/1	1/4
R 20	3/0	3/4
R21	7/0	1/4
R22	7/0	2/4
R23	5/0	0/4

In these cases no equal → + lysate pop/control pop

others spot test, no pop. sort / control pt.

7/21 R7 was HFT acquired 2275, 7580

lost in 2nd plate

1. controls R1, R6, R17, 2257 on EMB gal⁻ plates. only 2257 & R6 on EMB lactose
R1 = 104, 99, 117, 39, 110, 126 = 0+/595 } 0+/1188
7/6/53 2nd 368, 458, 348, 247
Ignore not included R6 = 147, 175 (225) 127, 108, 109 = 1+/8 91 } NOT gal₂⁻
2nd 152, 138, 318, 444 abs. normal 1436 c 5000
R17 = 83, 41, 76, 78, 113, 85 } 0+/
7/6/53 2nd 221, 107, 231, 152 1187

2. Gal₂⁻ X 1436 4/7 λ^S 8/8 stable on strk
7/6/53 R1 1+/1116, 2+/873, 2+/837, 2+/276 = 7+/3102 = 0.22

6/8 λ^S 8/8 stable on strk
R17 - 6+/1063, 892, 554, 3+/511, 1+/344 = 10+/4364 = 0.228%

3. Gal₂⁻ X 1436 - controls o.k.
R2 - 4 plates one crumbled - 696 total c. 0+/2786
R3-5 " " " = 538 " " 0+/2675
R5- " " " 697 " " 0+/3485
R8- " " " 368 " " 0+/1840 } 0+/5952
7/6/53 " " " 1028 0+/4112

4. Gal₂⁻ X 902 - controls
3+/3 stable on strk R2 885, 583, 1+/740, 1+/410, 1+/345 = 3+/3183 = 0.094%
3+/2 " " R3 800, 679, 1+/563, 1+/625, 804 = 2+/3471 = 0.057%
1+/1 + stable on strk R5 6/849, 2/1513, 4/776, 4/1441, 7/905 = 19+/5432 = 0.35%
1+/1 stable on strk R8, 188, 269, 369, 585, 1+/254 = 1+/1668 = 0.06%
20+/121-611 = 0.21%

(+) recombinants
12/15 λ^S

5/16/53 Saturday.

Effect of anti λ serum on hi-act λ -

antiserum = anti P1
hi-act λ = D1 dil 1-100

plaque assays against 1485
ductive assays against 750

Experimental

antiserum dil 1-10

1-100 dil D1-1

0.2 ml + 0.2 ml → incubate 10 min at 37°

PRE-ASSAYS

1-100 → ductive assay: 123, 139 → ave 131

1-10, 1-5, 1-100 → 0.1 ml → 313, 285 plaque → ave 299 plaque.

surviving plaque titer = 2.99×10^7

surviving ductive titer = $131 \times 10^5 \times 2 = 2.62 \times 10^5$

plaque assay dil 1-100, 1-100, 1-10, → 0.1 ml → 75, 63 plaque → ave 69

titer 1-10 dil = 6.9×10^7 /ml

ductive titer → 0.1 ml : 709, 608 ductive → ave 6.58×10^5 ductive/ml

6.58 duct/ml / 6.9 plaque/ml = 1 ductive / 100 plaque

Plaque survival = $\frac{2.99}{6.90} = 0.433$

ductive survival = $\frac{2.62}{6.58} = 0.398$

---

750 × 902 to assay unit of recombination between parental suspensions of ca on ca 13 gal

Cross plate.

1.	296 (-) : c. 300	1 (+)
2.	c. 300	0
3.	c. 300	2 (+)
4.	"	0
5.	"	0
	c. 1500	2

↖ a minimum no. since there were many small (+) appearing colonies not counted

2/1500 = c. 0.13 %

Recombination between the various gal -

Ref. above		% Recomb	no. particles
	1. gal$_1^-$ × gal$_2^-$	0.13	c 1500
	gal$_1^+$ × gal$_2^+$	0.13	c. 1600
p. 171, 174, 175	2. gal$_4^-$ × gal$_2^-$		
	578 × "	0.38	1289
	811 × "	0.07	1365
	3. gal$_4^-$ × gal$_1^-$	< 1.9	54
	1486 × 750	0.83	4588
	4. gal$_3^-$ × gal$_1^+$		

0.3 - 0.6

5/18/53 Monday.

811 vs lysates of 2277, 2278 - cultures of 1485 lysogenic for 892 λ

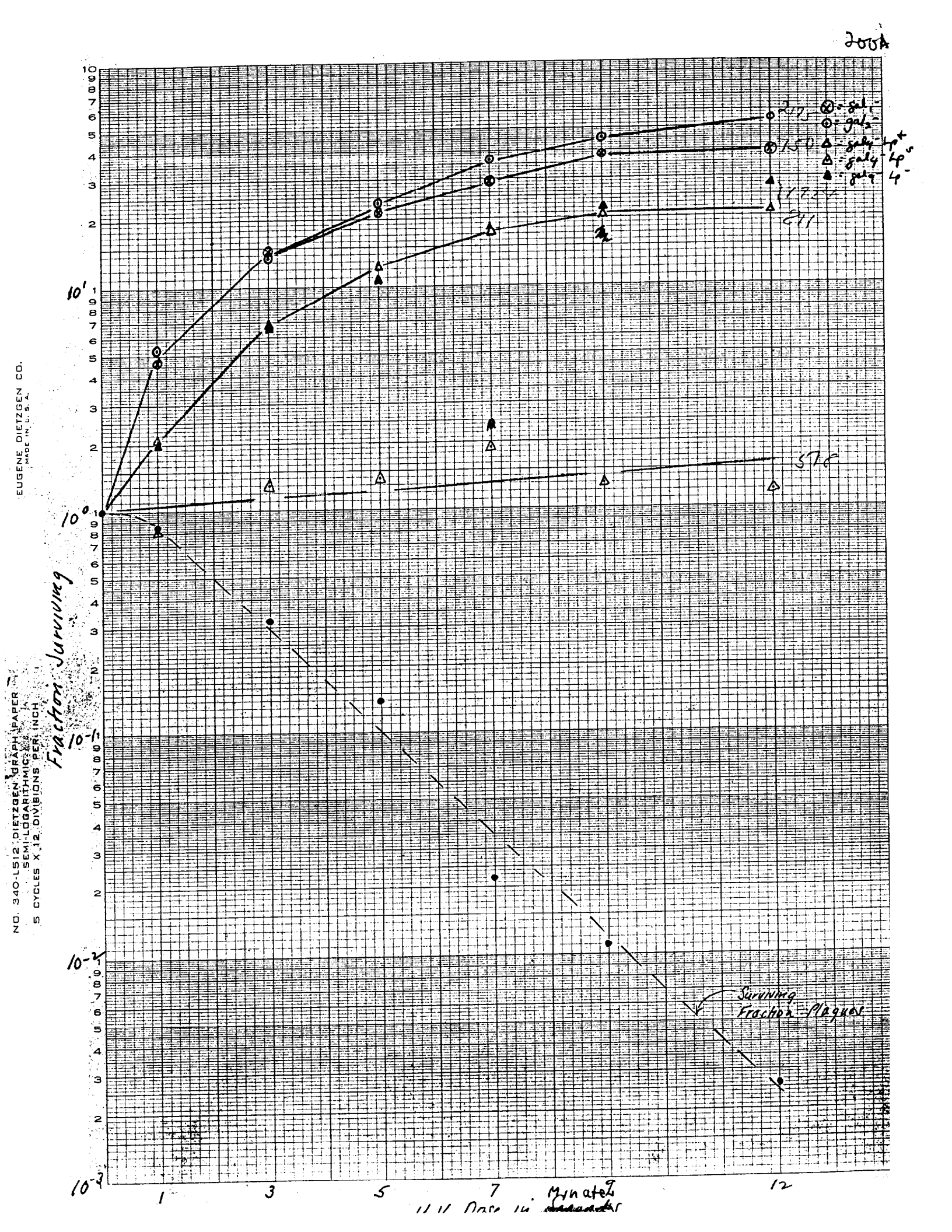
1.	no add	42	
2.	2277	52	plaques c 10^3
3.	2278	6	many plaques c 10^4

5/25/53 Monday.

750 X 2238 to obtain double mimics
purity. contrib ok.

	(+)	total
1.	2	c. 400
2.	0	c. 400
3.	0	c. 400
4.	0	c. 400
	2	1600

800) 1. 0.00125 = $\boxed{0.13\%}$



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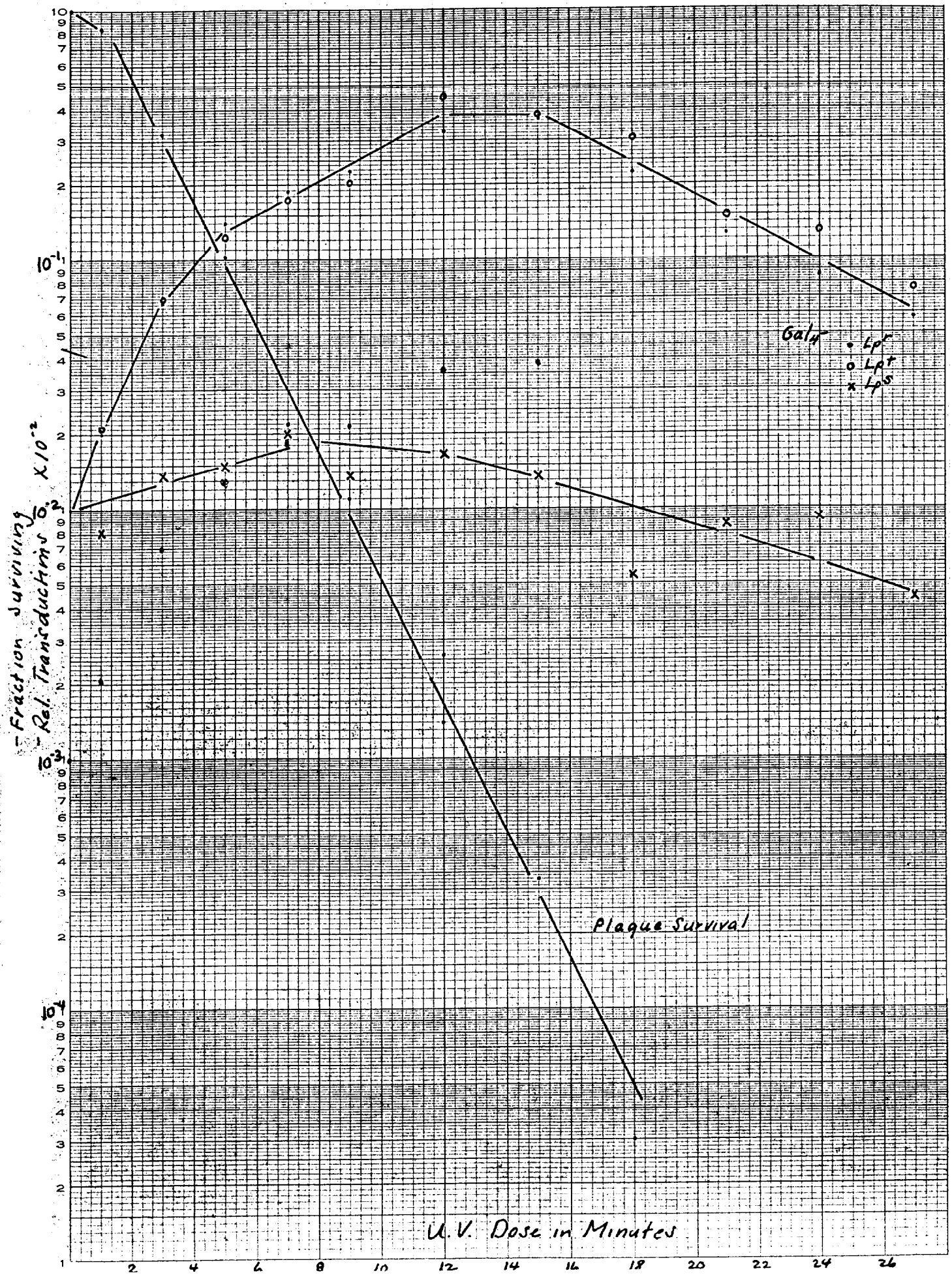

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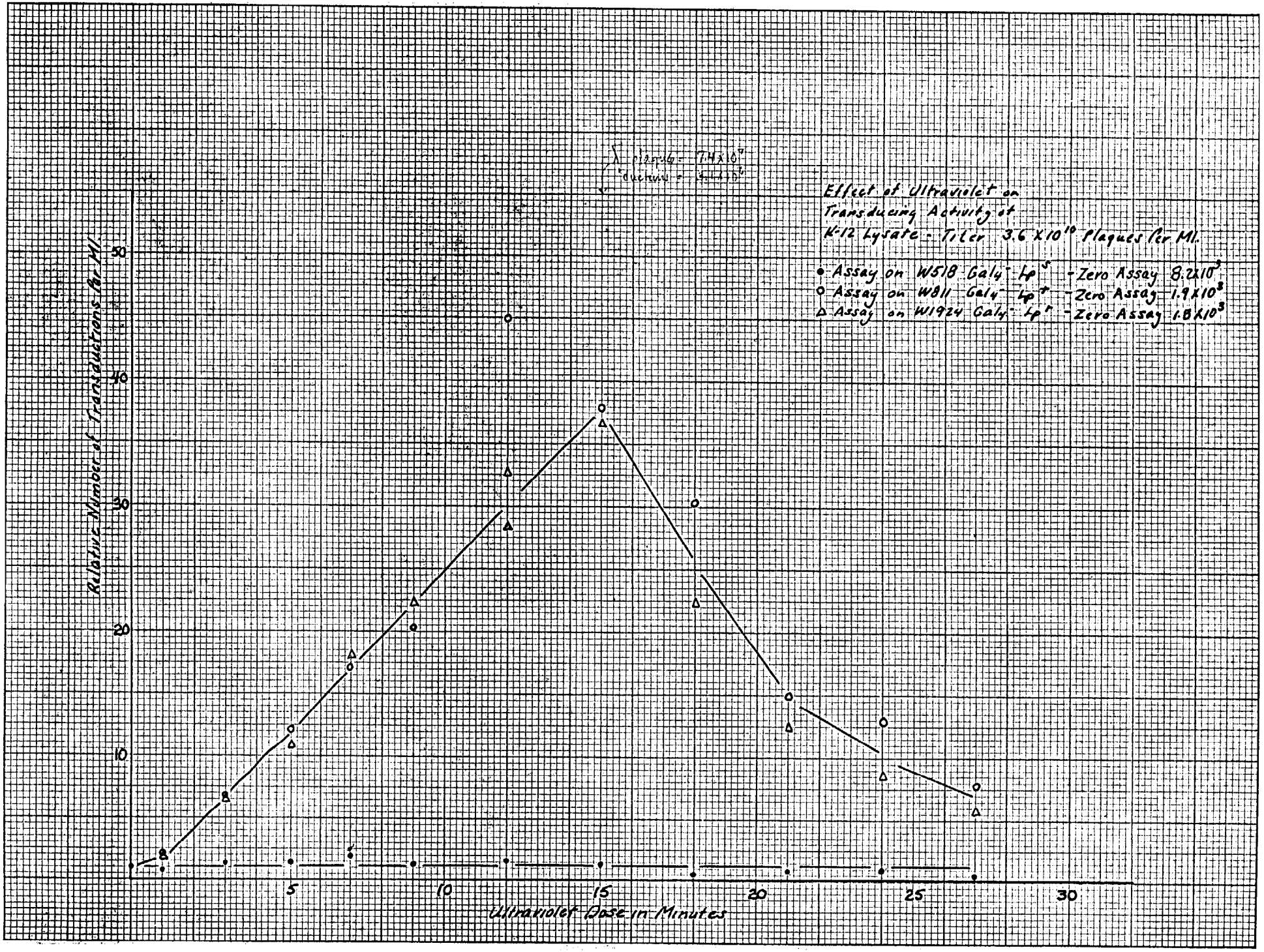

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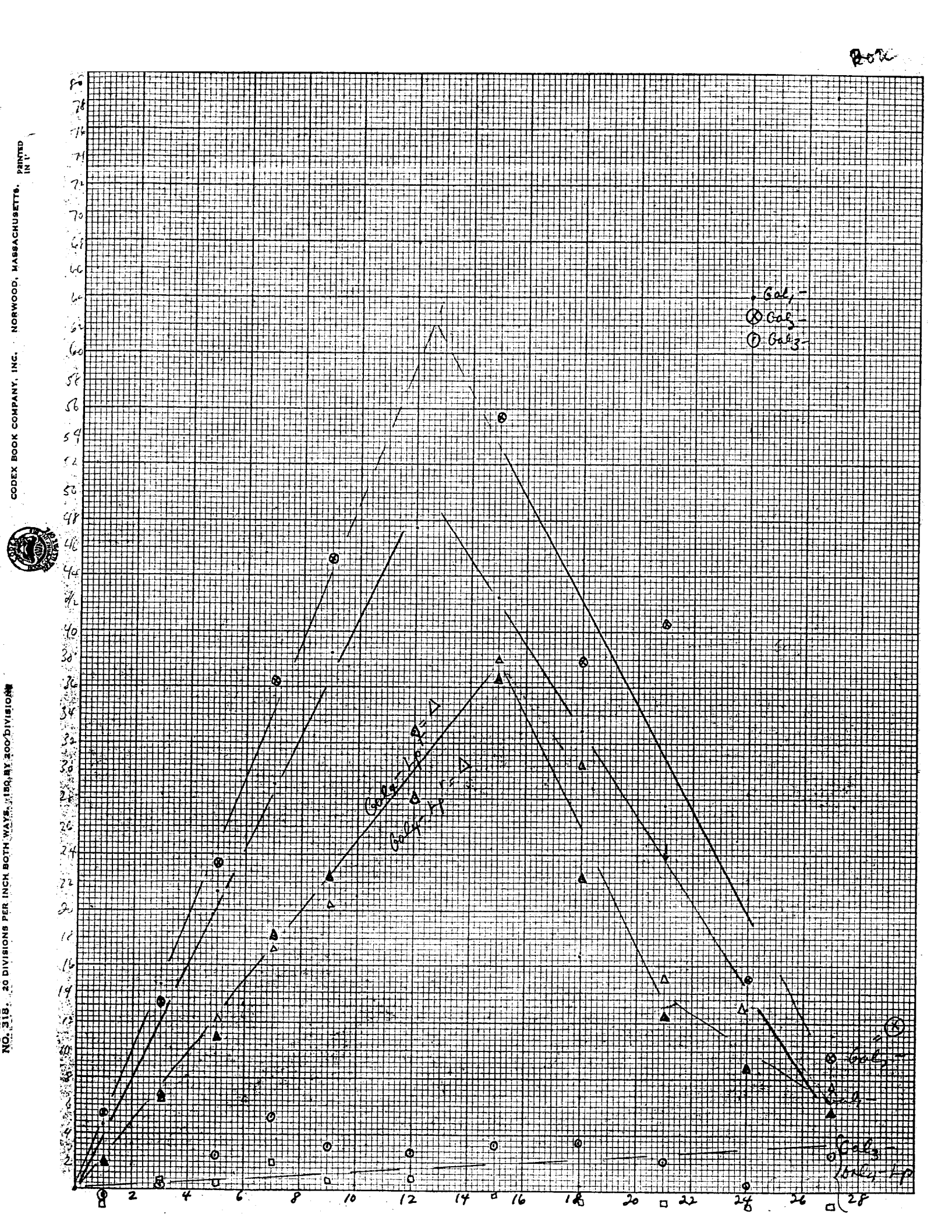

Lysate K12 5/30

Inhibition of pupillar/rel lysate

Irradiation of K-12 λ - Effect on Inhibition

Irradiation	W750 +λ	W750 -bkgrd	W750 ratio	W2175 +λ	W2175 -bkgrd	W2175 ratio	(1-10 die) W2297 +λ	W2297 -bkgrd	W2297 ratio
control-blk	3 (4)	—	—	9 (14)	—	—	6 (12)	—	—
control + 0 dose	89	86	1.0	83	74	1.0	43	370	1.0
1 min	410	407	4.7	401	392	5.3	39	330	0.89
3 "	1257	1254	14.5	1006	997	13.4	49	480	1.3
5 "	2034	2031	21.2	1641	1632	23.4	82	760	2.3
7 "	2512	2509	29.1	2706	2697	36.4	185	1790	5.4
9 "	3306	3303	38.4	3356	3347	45.2	109	1080	3.1
12 "	3420 (1/10 dil = 413)	4100	47.6	4058 (1/10 = 604)	6011	81.4	97	910	2.7
15 "	368	3640	42.3	424	4100	55.5	119	1070	3.3
18 " 1/10	277	2730	32.9	294	2800	37.9	131	1190	3.6
21 " dil.	243	2390	27.8 1/10	313	2990	40.5	82	700	2.1
24 "	116	1120	13.0 dil	115	1100	14.9	58	460	1.4
27 "	55	510	6.0	84	700	9.7	102	900	2.7

(cf W518 Lpt)

Irradiation	+λ	-bkgrd	ratio
control blk	19 (41)	—	—
control + 0 dose	835	816	1.0
1 min	686	667	0.82
3 min	1118	1099	1.35
5 " 1/2	1182	1163	1.4
7 " 1/4	1680	1661	2.04
9 " 1/8	1108	1108	1.36
12 " 1/16 dil = 1060	1370	1150-41=1109 / 750-41=709	1.6 / 1.36
15 " 1/32	115	450-41=409 / 740-41=699	0.84 / 0.86
18 " 1/64	48 (105 plaque)	740-41=699	0.86
21 " 1/128	74 (2.3×10⁴ plaque)	790-41=749	0.92
24 " dil	79 "	400-41=359	0.44
27 " 1/256	40 —		

W811 Lpt

Irradiation	+λ	-bkgrd	ratio
	32 (36)	—	—
	226	194	1.0
	443	411	2.1
	1369	1337	6.9
	2409	2377	12.2
	3384	3352	17.2
	3977 (1/10 = 878)	3945	20.3
	7036	8784	45.0
	776	7400	38.0
	626	5900	30.4
	328	2920	15.0
	290	2540	13.0
	186	1500	7.7

W1924 Lpt

Irradiation	+λ	-bkgrd	ratio
	44 (49)	—	—
	223	179	1.0
	392	358	2.0
	1264	1220	6.7
	1996	1952	10.9
	3296	3252	18.1
1/20 dil = 4056	4056	4012	22.4
1/40 dil = 5144 (49)	5144 (49)	5700	32.4
1/80	330 6600	6551	36.6
	201 4020	3971	22.2
	114 2280	2231	12.5
	79 1580	1531	8.6
	54 1080	1031	5.8

$\frac{1300 \cdot 10 \text{ d/ml}}{1.8 \times 10^3 \lambda/\mu\text{l}} = \frac{1.3 \times 10^4}{1.8 \times 10^3} = \frac{13}{1.8}$

at 12

$\frac{8784 \times 10 \text{ d/ml}}{1.8 \times 10^3 \lambda/\mu\text{l}} = \frac{8.7 \times 10^4}{1.8} = \frac{87}{1.8}$

8784
4036
12760 = 6380
2

226 | 6380 (25) — 502 — 1360

226 | 4036 (17) — 226 — 1770 — 1582

200E

K-12λ 5'30

Irradiation of K-12λ - plaque survival

Dose	dilutions	plaque counts	titer	survival
0	$10^7 \xrightarrow{0.1}$	357, 370	364×10^{10}	1.0
1	$10^7 \rightarrow$	337, 282	3.10×10^{10}	8.5×10^{-1}
3	$10^7 \rightarrow$	122, 114	1.18×10^{10}	3.2×10^{-1}
5	$10^6 \rightarrow$	548, 506	5.27×10^9	1.4×10^{-1}
7	$10^5 \rightarrow$	853, 749	8.00×10^8	2.2×10^{-2}
9	$10^5 \rightarrow$	202, 612	4.07×10^8	1.1×10^{-2}
diluted 1-10	$10^4 \rightarrow$	1033, 897	9.65×10^7	2.6×10^{-3}
	$10^5 \rightarrow$	69, 36	5.3×10^7	1.4×10^{-3}
15	$10^3 \rightarrow$	103, 140	1.22×10^7	3.3×10^{-4}
18	$10^3 \rightarrow$	18, 3	1.1×10^6	3.0×10^{-5}
21	10^2	6, 6	6.0×10^4	1.4×10^{-6}
24	10^2	0		
27	10^2	0		