11/16/50

W2252 = 1895 Hfr Lp^s

(-) transduction with HFT λ's to obtain Hfr gal-

2341 { 1. Several (-) colonies with N16 HFT gal_2-
Isolated and purified - HFT λ tests indicate gal_2-
cross with W902

Results indicate HFT cross - almost solid
smear (with dilute cells also)
no (+) in probably 100,000 colonies

(2.) Streaked against λ - not sens.
518 - not lysogenic = Lp_1^R Lp_2^S
λ2 - sensitive

(3) "Lysate" prepared - very viscous

0.1 ml / 2281 = no effect, neither plaques nor pex
" 518 = " " (?) 14/9 = ratio exptl/control areas

11/25/50 Repeat with NA-4 lysates 1+2

W 2345 = From lysate 1 - one gal_1- isolated - { tested against N16, NA-1 = gal_1-
From lysate 2 - 5 gal_1- isolated - { " " " = gal_1-

also nonlysogenic

NA-1 }
NA-2 } lysates
sterility confirmed

11/30/53

Transductions for segregant analysis

A W1765 gal; (made by ~ transduction) W2373

	λ	control ½	phage ½
1.	811	1	30
2.	1210	0	56
3	902 (poor lysate)	1	11
4	K-12	1	33

W 750

1.	K12	1	46

W1210

1.	K-12	4	~~21~~ (23)
2.	750	2	65
3.	811	5	56

12/5/53 See also next page

T18 } λ's against 2070 - to see if both 1⁻, 2⁻ is in these apparent doubles.
T19 }

(-2) lysates not very active

245B

T18-2 5/1
T19-2 7/2

1. Analysis of transductions of 2070 by T19-2 λ

segregants	/N1	/N16	Focus
1.	+	0	2⁻
2.	+	0	2⁻
3.	0	0	--?
4.	+	0	2⁻
5.	+	0	2⁻
6	+	0	2⁻
7	+	0	2⁻
8.	+	0	2⁻
9.	+	0	2⁻
10.	+	0	2⁻
11.	+	0	2⁻
12.	+	0	2⁻
13.	+	0	2⁻
14.	+	0	2⁻
15.	+	0	2⁻
16.	+	0	2⁻

1. Analysis of segregants from 2 transd. c̄ T18/2070

	/N16	/N1	λ Rx	Allele
1.	+	0	R	1⁻
2.	+	0	"	1⁻
3.	0	+	"	2⁻
4.	0	+	"	2⁻
5.	+	0	"	1⁻
6.	+	0	"	1⁻
7.	+	0	"	1⁻
8.	contaminated c̄ (+)		"	

12/2/53

A. Tl8 = 2175 & 750 λ - transduced by mixture N16, ~~N14~~ N1, but not by single λ's

Proposed Constitution: ① 18 pp (gal+) picked and streaked. Many mosaic colonies — all appear to be segregating lac+ $2^- 1^-$, $2^- 1^+$, $2^+ 1^-$ } 3n on lac should be lac slow if gal+ present — which is the case. Can't test gal segregation

② One of +ⁿ on gal streaked out on lac, gal — segregating on gal — also on lac, (+) appears to be segregating lac slow

	On lac	Gal - Segregants	by transd
lac+ $2^- 1^-$	s	no	wt.
lac+ $2^+ 1^-$	s	no	1^-
lac+ $2^- 1^+$	+	no	2^-
lac+ $2^-/2^- 1^-/1^+$	+	seg lac slow	2^-, wt.
lac+ $2^-/2^+ 1^-/1^-$	s	no	1^-, wt.

see next page 246A for details

B. 2345 / 2251 λ to make HFT, Hfr

0.1 mL 2251 λ = 56, control ½ = 0

On second streaking only 4/24 +ⁿ — greater stability of transd. than expected

The 4 restricted and segregants examined

12/9/53 T18 continued.

Transcr. Assay

1. The loc

	Loc	Bond	N1	N116	Loss	
# 1	slow	(−)	o	+	1−	
2	slow	"	o	+	1−	
3	slow	"	o	o	double −	} On standing (12/14) Trace cell pigmentation quite heavily.
4	slow	"	o	o	"	
5	"	"	o	+	1−	
6	"	"	o	o	double −	?
7	"	"	o	o	"	
8	"	"	o	+	1−	
					41−	
					4 (+−)	

Low chloraller not good culture

Ignore

accordance with results [illegible]

Trans. Assay

2. The Cac + ON

	Bloc	Bond	Sqzt	HFT N1	HFT N116	Loss	
# 1	+ (?)	+"	+	o	+	1−	−1 ⊕
2	clay	"	o	o	o (1pp)	−−	−2
3	clay	"	o	o	o streakthrough	−−	−
4	"	"	+	o	+	1−	−1 ⊕
5	"	"	o	o	o	−−	−2
6	"	"	o	+	o	2−	−2 ⊕
7	"	"	+	o	+	1−	−1 ⊕
8	"	"	o	+	o	2−	−2 ⊕
9	"	"	o	o	o	−−	−1 +[1] gave stable + early
10	"	"	o	+	o	2−	−2 ⊕
11	"	"	o	o	o	−−	−11
12	"	"	o	o	o	−−	−2 +[2] gave stable + early
13	"	"	o	o	o	−−	−2
14	"	"	o	+	o	2−	−2 ⊕
15	"	"	+ 1pp	o	+	1−	−1 ⊕ Rev. unstable (det 12 sqzt (−−)
16	"	"	o	o	o	−−	−11
17	"	"	o	o	o	−−	−2
18	"	"	+ 1pp	o	o	? −−	−2
19	"	"	+	o	+	1−	−1 ⊕
20	"	"	o	+	o	2−	−2 ⊕
21	"	"	o	o	o	−−	−2
22	"	"	o	o	o	−−	−2
23	"	"	+	o	+	1−	−2 ⊕
24	"	"	o	o	o	−−	−24

24 loc all picked from here and Sqzt tested

Certain behaviors not likely from loc — need better basis of det. suggest this is [illegible]

Low recession on double ?

[1] gave stable + early

[2] gave stable + early

On 2 examinations the following marked ⊕ were found stable — Why stable?

Omit known — 13 −−
What to — 6 1−
Think about — 5 2−
This.

Correlation of duction above with 1° clap This lysate is not + [illegible] 1pp but I'm not This is a [illegible] 1pp lysate

3/5/54 Lysate made of 246A-15

1 drop		
/200	solid spot	medical HFT gel
/120	0	
/80	solid spot	

6/18/54
246A-15 + streak discarded
246-A-15 on streak

S R
4- +
2+ -

247A

S R
4+ +
2- -

→ S R
4- +
2- +

See pg 245 - Sample size = 22 6/22 [illegible]

12/6/53

W1210 transduced by K12

Transduct	Transd /518	Segregant /N16	N1	Segregant of Rx	Mhlet
1.	lip	0	+	↓	2-
2.	"	0	+		2-
3.	"	0	+		2-
4.	"	0	+		2-
5.	"	0	+		2-
6.	"	0	+		2-
7.	" pure galt				
8.	" pure galt				
9.	"	0	+	↓	2-
10.	"	0	+		2-
11.	"		+		2-
12.	"		+		2-
13.	" weak	0	+		2-
14.	"	0	+		2-
15.	" pure galt				
16.	" pure galt				
17.	"	0	+	↓	2-
18.	" weak pure galt				
19.	" pure galt				
20.	" gal + se				
21.	" pure galt				
22.	"	0	+	↓	2-
23.	"	0	+		2-
	18/33 +"		15/15 galt-		

6/18/54 Stocks discarded See ↙

Cross x 902

247A - 4	6/20/54	out
247A - 13	Those in stocks	5/13/55
247A - 22		"
247A - 33		

Lysates 4/22/54

	Sported /2.75	/811
4	1/<0.1	2/0.5
13	0/<0.1	0.70/0.5
22	0/<0.1	0.20/0.5
23	0/<0.1	0.40/0.5

these two lysates give large numbers of small papillae } possibly not strict? partially HFT?

12/6/53

W1210 & 811

See 245 for origin

(247B)

Transd.	Transd. /518	seg NFT +	/518 0	seg rp Rx r ← 9/10 (54?) NFT segregant found gal4⁻ +ⁿ of NFT segregant found atbl.
1	lys.			
2	"	0	+	
3	"	0	+	
4	"	0	+	
5	"	0	+	
6	"	contaminated with galt →		r
7	"	0	+	
8	"	0	+	
9	"	0	+	
10	"	0	+	
11	"	0	+	
12	"	0	+	
13	"	contaminated with galt →		
14	" rx	0	+	
15	" bad	0	+	
16	"	0	+	
17	lys	0	+	
18	"	0	+	
19	"	0	+	
20	"	0	+	
21	"	0	+	
22	"	0	+	
23	"	0	+	
24	"	0	+	
	all +ⁿ	22 gal2⁻		
		1 gal4⁻		

Crosses x 1436, 902

1
8
14
18

6/18/54 Stocks discarded

2/9/54

Lysates	/811	/2175
-1	0/0	solid smear = HFT gal4⁻ (ALSO as the result F+ → x F×)

See 245

(247C)

12/6/53
W1210 t 750

Transd. #	Transd. Lp Rx/38	Seg N16 / [illegible]	Seg N1 / [illegible]	Seg Lp Rx	Locus
1	hyv	0	+	✓	2-
2	"	0	+	↓	2-
3	"	contaminated with gal +		→	[illegible]
4	"	0	+	✓	2-
5	"	0	+		2-
6	"	0	+		2-
7	"	0	+		2-
8	"	0	+		2-
9	"	0	+		2-
10	"	0	+		2-
11	"	0	+		2-
12	"	0	+		2-
13	"	0	+		2-
14	"	omitted		→	(but segregating)
15	"	0	+	✓	2-
16	"	contaminated with gal +		→	[illegible]
17	"	0	+		2-
18	"	0	+		2-
19	"	0	+		2-
20	"	0	+		2-
21	"	0	+		2-
22	"	+	0		1-
23	"	contaminated with gal +			—
24	"	+	0		1-
	all +"	19 gal 2-			
		2 gal 1-			

6/20/54
These on stock stands

	out
1	5/13/55
3	"
[illegible]	
24	"

12/5/53

W750 transduced by K12λ

Transd #	Transd Rx/578	/N1	/N16	Arbitrate
1	lys.	0	+	1⁻
2	"	pure galt →		
3	"	" " →		
4	"	" " →		
5	"	contaminated with galt →		
6	"	0	+	1⁻
7	"	0	+	1⁻
8	"	0	+	1⁻
9	"	0	+	1⁻
10	"	0	+	1⁻
11	"	0	+	1⁻
12	"	0	+	1⁻
13	"	0	+	1⁻
14	"	0	+	1⁻
15	"	pure galt →		
16	"	0	+	1⁻
17	"	0	+	1⁻
18	"	0	+	1⁻
19	"	0	+	1⁻
20	"	contaminated with galt →		
21	"	pure galt →		
22	"	0	+	1⁻
23	"	0	+	1⁻
24	"	0	+	1⁻
	19/24 +"			16 1⁻

Lysates	Spotted /2175	/750
1	1/0.5	0/0
7	2/0.5	0/0
9	2/0.5	0/0
11	5/0.5	0/0

6/20/54

← only culture surviving in stock of the fosi

12/8/53 — W2373

(249) A

W1765 gal$_1^-$ (by c-s transd. with NA4 lysate) transduced by 84λ - See pg 245

Transd.	Transd. by R	Stab. after 3	Sex	
1	S	non lys	stable	N1 / S18
2	R	lys	"	
3	R	lys	"	
4	R	lys	"	
5	R	lys	"	
6	R	lys	unstable	+ (?) λ^R = gal$_1^-$
7	S	non lys	stable	
8	R	lys	"	
9	R	"	"	
10	S	non lys	"	
11	R	lys	"	
12	R	"	"	
13	R	"	"	
14	R	"	"	
15	R	"	"	
16	R	"	"	
17	R	"	"	
18	R	"	"	
19	~~skipped~~		"	
20	R	lys	"	
21	R	"	"	
22	S	non lys	"	
23	S	"	stable	

extra? → ~~stable~~

~~Lp$^+$ = 17~~ 1/23+^{u}

~~Lp^{str} = 5~~ 1 Lp$^+$

5 s
17 +
0 r

6/14/54 stocks discarded

23	22
24	16
12	12
23	13
82	63
23	23
	40
	82

0.50
59 | 41.0
35.4
560

41
59

249 B

12/8/53 W2373

W1765 gal⁻ (by (-) transd c̄ NA4) transd. by 1210 λ

Transd #	Transd Lp Rx		Transd. stability		Seg. Anal. N1	N16	allele	
1	lys	R	s					
2	H	R	u		−	+	λ^R	1⁻
3	H	R	s					
4	H	R	s					
5	non lys	S	s					
6	lys	R	s					
7	non lys	S	s					
8	lys	R	u		−	+	λ^R	1⁻
9	H	R	u		contaminated c̄		(+)	
10	non lys	R	s	x	+	−	λ^R	2⁻ ✓
11	H	R	s					
12	lys	R	u					
13	lys	R	u		−	+	λ^R	1⁻ ✓
14	non lys	S	s					
15	lys	R	s					
16	H	R	s					
17	H	R	s					
18	H	R	s					
19	non lys	R	s	x				
20	lys	R	u		−	+	λ^R	1⁻ ✓
21	H	R	u		−	+	λ^R	1⁻ ✓
22	H	R	s					
23	H	R	s					
24	H	R	u		−	+	λ^R	1⁻
			8/24 +ᵘ				6	1⁻
	$Lp^+ = 18$						1	2⁻
	$Lp^{s+r} = 6 = 3Lp^s$		8 Lp^+					

what give ?

an Lp^R transduction segregating the allotypic allele and Lp^R simultaneously.

10/26/56 Probably an error in recording

S may refer to segregating and not stable.

See next page as well.

Lyne 249B
10
13
20
21

6/18/54 stocks discard

249C

12/10/53 W2373

1765 gal - transduced by 902

Transd #	Transd. Lp/S18	Transd. stability	Segregant analysis			
1	- lys	R	S			
2	- "	R	"			
3	- non lys	R	"			
4	- non lys	S	"			
5	- lys	r	"			
6	- lys	r	"			
7	- non lys	S	"			
8	- non lys	S	"			
9	- lys	r	"			
10	- lys	r	"			
11	- non lys	r	"			
12	- lys	r	u	−	+	+

This is the only segregant obtained

λR r

7 Lp^r
2 Lp^r
3 Lp^s

6/18/54

(Stocks discarded)

249D

12/10/53 W2373

1765

W1~~675~~ gal - transduced by K12

Sample = 23

Transd. #	/1485 Lp14	/λ	Transd. stab		/N16	/N1	Allele	
1	lys	r	s					
2	lys	r	s					
3	lys	r	s					
4	non lys	s	u	−	+	−	λR	1− ✓Lp
5	lys	r	s					
6	non lys	s	u	−	curtain. c̄	(+)		
7	lys	r	s					
8	"	"	u	−	+	−	λR	1−
9	"	"	s					
10	"	"	s					
11	"	"	s					
12	"	"	u	−	+	−	λR	1−
13	"	"	s					
14	"	"	u	−	+	−	λR	1−
15	"	"	u	−	+	−	λR	1−
16	non lys	s	s					
17	lys	r	u	−	+	−	λR	1−
18	"	"	s					
19	"	"	s					
20	"	"	u	−	+	−	λR	1−
21	"	"	u	−	+	−	λR	1−
22	"	"	u	−	+	−	λR	1−
23	"	"	s					
			10/23 +u					
	20 Lp+ 3 Lp s		8 Lp+ 2 Lp s				9 Lp+	

Lysates 4, 8, 12, 14 } none have any action on 1st prep

6/18/54 Stocks discarded

Expt. 642

250

A

12/12/53 EMCs cross 1210 × 2234 Gal_2^- × Gal_4^- (F^+ F^- Lp^+ Lp^v)

1. The small colony "prototrophs" (probably require B_1)

#	N16	S18	Lp Rx	Locus
1.	+ (few)	0	s weak	4
2.	+	0	s	4
3.	+	0	s	4
4.	+	0	s weak	4
5	+	0	s weak ?	4
6.	0	+	R	2
7.	+	0	s	4
8	+	0	s weak	4
9.	+	0	s	4
10	0	+	s	2
11.	+	0	s weak	4
12	+	0	s	4
13	+	0	s	4
14.	+	0	s	4
15.	+	0	s	4
16	+	0	s weak	4
17	0	+	s	2
18	+	0	s weak	4
19	+	0	s	4
20	+	0	s	4
21	+	0	s	4
22.	+	0 (?)	s	4
23	+	0	s	4
24	+	0	s	4
25	+	0	s	4
26.	0 ✓	0 (4 pap)	s	?
27.	0	+	s	2
28.	0 ✓	0 ✓	s	?
29.	+	0	s	4

23 = 4⁻ all Lp^v

4 = 2⁻ 3 Lp^+, 1 Lp^v

2 = 2⁻4⁻ Lp^v

F^+ Gal_2^- Gal_4^+ Lp^+ × F^- Gal_2^+ Gal_4^- Lp^s

250 B

Cont. of 250A.

2. The Large colony prototrophs.

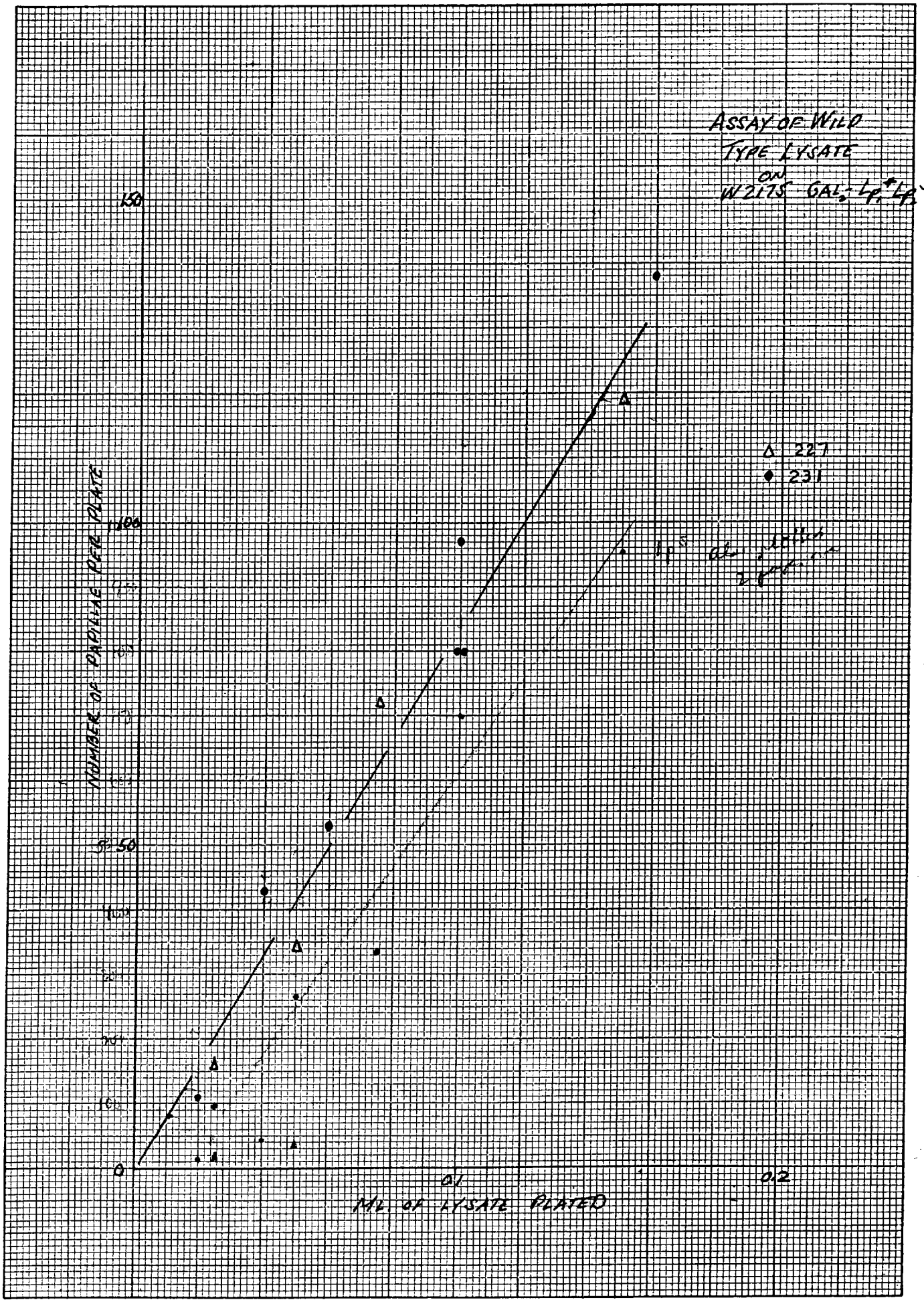
	N16	S18	Lp	Locus
1.	0 ✓	0 ✓	s	— — ?
2.	0	+	r	2 —
3.	+	0	s	4
4.	0	+	r	2 —
5.	+	0	s	4
6.	+	0	s	4
7.	+	0	s	4
8.	0	+	r	2 —
9.	0	+	r	2 —
10.	+	0	s	4
11.	+	0	s	4
12.	0	+	r	2 —
13.	+	0	s	4
14.	+	0	s	4
15.	+	0	s	4
16.	0	+	s	4 —
17.	0	+	r	2 —
18.	+	0	s	4
19.	+	0	s	4
20.	+	0	s	4 ✓
21.	0	+	r	2 —
22.	0	+	r	2 —
23.	+	0	s	4
24.	+	0	s	4
25.	0	+	r	2 —
26.	+	0	s	4
27.	+	0	s	4
28.	+	0	s	4
29.	0	+	r	2 —
30.	+	0	s	4
31.	+	0	s	4

20 = 4 — all Lp^s
10 = 2 — all Lp^+
1 = 2 — 4 — Lp^s

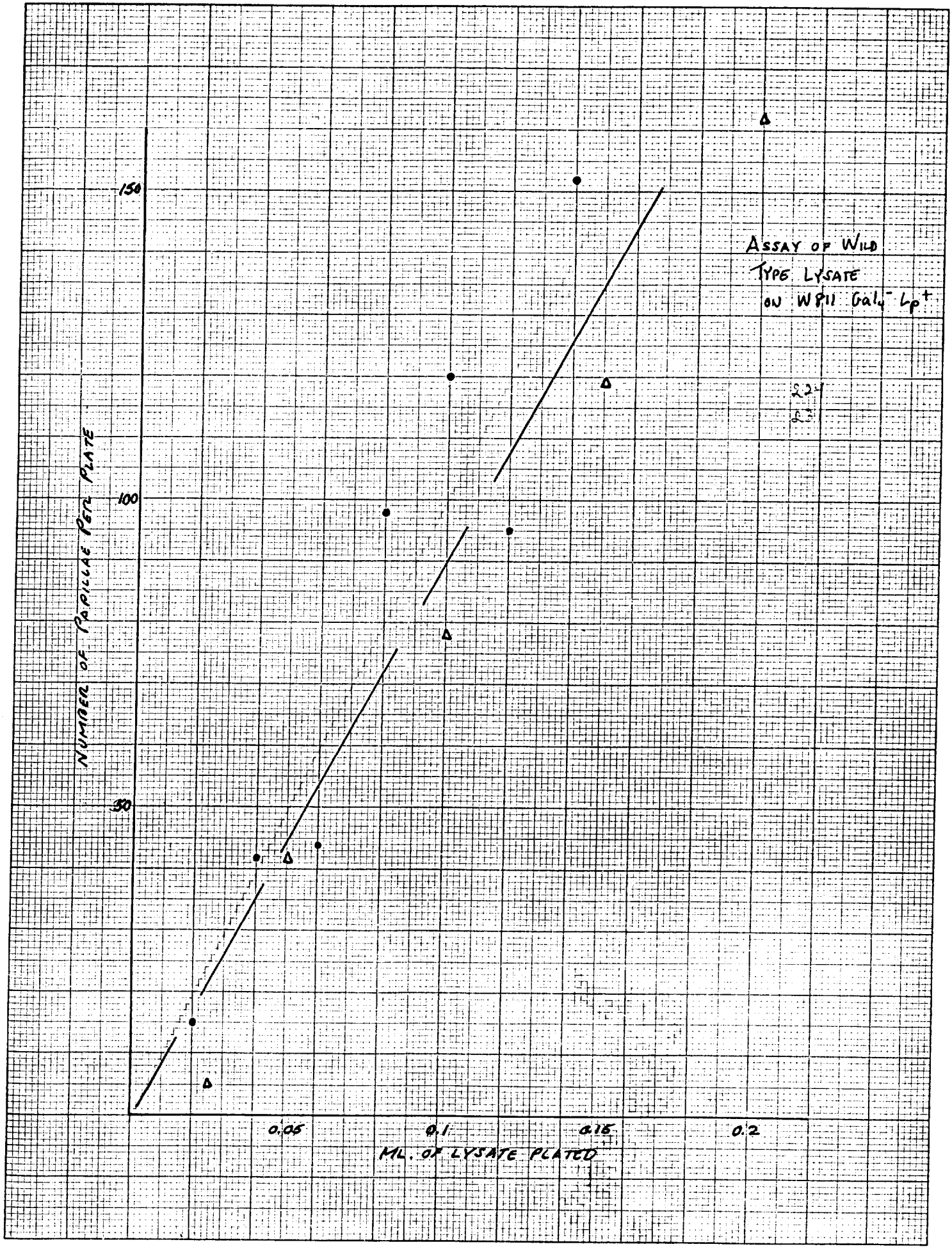
$4^- Lp^s \times 2^- Lp^+$

Total of 250A + 250B

43	4 —	Lp^s
13	2 —	Lp^+
1	2 —	Lp^s
3	2 — 4 —	Lp^s



Form No. 999 — 20 Squares to Inch
AMERICAN PAD & PAPER CO., HOLYOKE, MASS.



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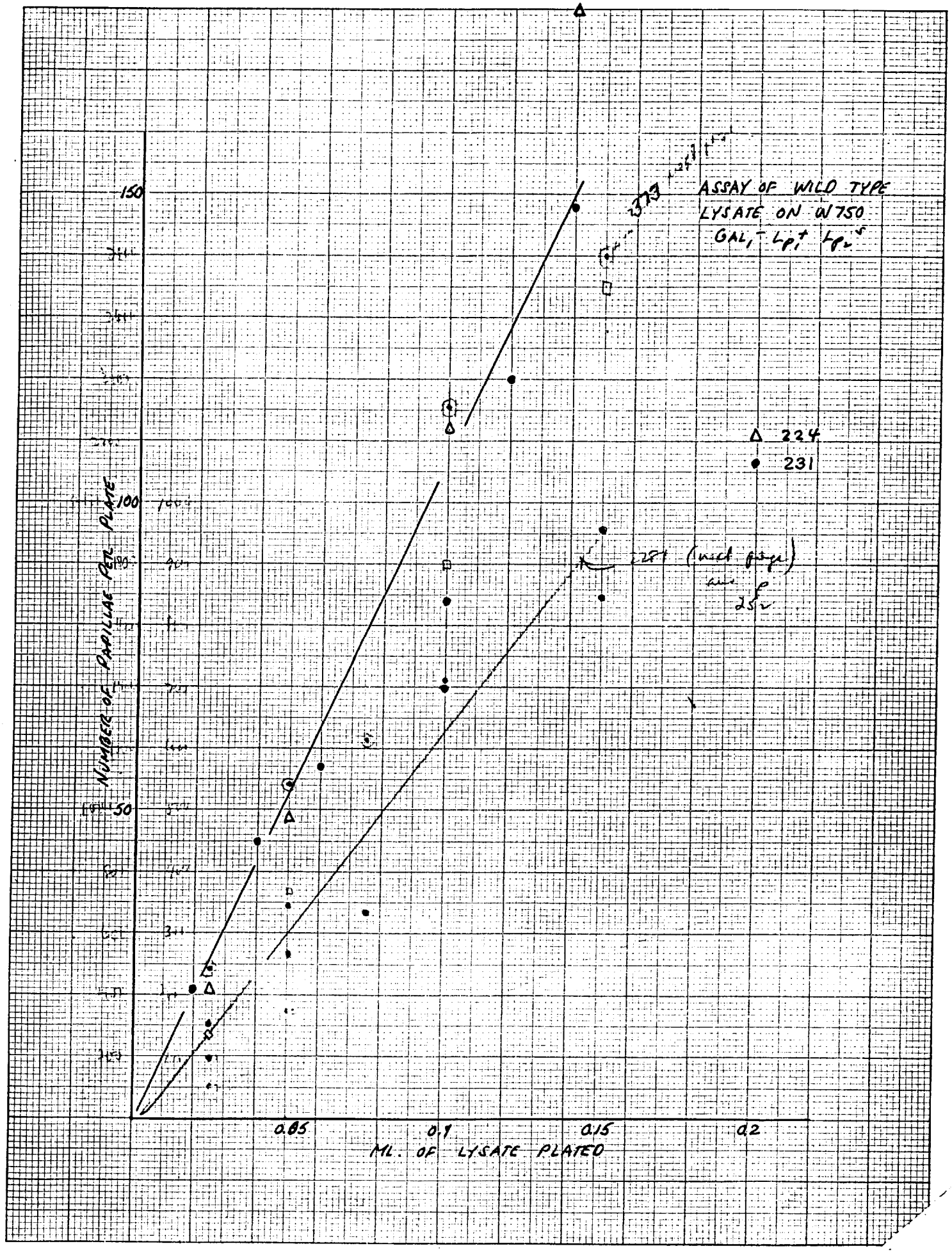

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Assay - K12λ 5/30/53 3.6×10^10 λ/ml

2175

ML	227	231
0.025	16	0.02 11
0.05	34	0.04 43
0.075	72	0.06 53
0.100	—	0.1 97
0.15	119	0.16 138
0.20	—	
0.3	255	

Lpk

750

224	231
0.025 - 21	0.02 - 21
0.05 - 49	0.04 - 45
0.1 - 112	0.06 - 57
0.15 - 183	0.08 - —
	0.10 - 84
	0.12 - 120
	0.14 - 148

84

250c

P 253 K12λ 12/28

224	231
0.025 5	0.02 - 15
0.05 42	0.04 - 42
0.1 78	0.06 - 44
0.15 119	0.08 - 91
0.2 162	0.1 - 120
	0.12 - 95
	0.14 - 152

0 —
0.025 = 5
.05 = 9
0.1 = 2
0.15 = 2

Gelg -

2281 Lp S K12λ 12/28/53 1.7×10^10 λ/ml

	0	0
0.025	96	151
0.05	266	345
0.075	334	—
0.1	700	706
0.15	955	842

2373 Lp S 252 K12λ 12/28/53 1.7×10^10 λ/ml

0.025	483
0.05	1079
0.075	1223
0.1	2314
0.15	2799

578 K12λ 12/28/53 P. 253 1.7×10^10/ml

0	0
.025	276
.05	738
0.1	1778
0.15	2689

1924 P. 253 K12λ 12/28/53 1.7×10^10/ml

0	0
.025	53
.05	72
0.1	143
0.15	249

1.7
1.5
8.5

12/17/53

2345 - Hfr gal$_1$ - Use as a allele tester by
growth with prototrophic gal$_x$ - for several hours and then plating out on B gal

1. Preliminary encouragement.

Tube	From test cultures	No. of (+) pgs Plated on B gal after 6 hours
1. 2175 (= gal$_1$ -)	0.1 ml	12
2. 2345 (= gal$_1$ -) Hfr	0.1 ml	1
3. 2175 + 2345	0.1 ml each	166

} suggest method may work

12/20/53 2. Cultures apparently need purification in some places
Expt as above.

purify	Parent 2		Gal$_2$ - HFR 2341	Parent 1 Gal$_1$ - 2345
✓	2341	47	—	—
	2345	3	—	—
	2343	3	(+) >500 ✓	(0) 3 ✓
✓	750	26	(+) >1000 ✓	(0) 14 ✓
Lp$^+$	1210	9	51 107 ?	(+) >500
	2175	14	(0) 17 ✓	(+) >1120 ✓
Lp^s	2281	1	(0) 41	(17) 21
	578	11	(+) >10^4 ✓	(+) >250 ✓

12/29/53

Are lysates "decaying" at room temperature? Inability to repeat massive direction 578 and the inability to obtain expected ~~amount~~ 210.5 of transduction of Lp^s as compared to Lp$^+$ says perhaps. This would also argue that transduction of Lp$^+$ is affected by particles different from those affecting Lp^s directions.

No transd. of 578, 2281, 1765 gal$_1$ - by K12 5/30 λ

NEW lysates of N16, K12 made - designated 12/28 approximate titers

1. K12 - $167 \times 10 \times 10^7 = 1.67 \times 10^{10}$ against 2281
2. N16 - $>50 \times 10 \times 10^7 = >5 \times 10^9$ " "

N1765 gal$_1$ - made by (-) transd. entered into stock book as

W2373

12/31/53

Assay against λ^s - use of K12 λ 12/28/53

1. 2373 = gal$_1$ - Lp^s hist Leuc - - no. cells in suspension

λ added	pop/plate	Δ
0.	3	0
0.025	486	483
0.05	1082	1079
0.075	1226	1223
0.1	2314	2311
0.15	2799	2796

$= \frac{1378 \quad 1108}{12} = 1243 \times 10^7 = 1.2 \times 10^{10}$.

added / plate = 1.2×10^9

2. 2281 = gal$_2$ - Lp^s - no cells in suspension = $2145 \times 10^7 = 2.1 \times 10^{10}$

2.1×10^9 added

λ added	pop./plate
0	0
0.025	96
0.05	266
? ~~0.075~~	~~[illegible]~~
0.1	700
0.15	955

← 18 of these picked and added - tests against 518 - all seg. λ^+

suspension appears mixed - large and small colonies

1/9/53

Purified 2281 - small colony from cell assay 221, 200 } $211 \times 10 \times 10^7 = = 2.1 \times 10^{10}$

2.1×10^9 added

0	0
0.025	151
0.05	345
0.15	842
0.1	706

1/4/54

Cells from aerated 10× conc. cultures.

Assays – K12 λ 12/24/53

		Δ	
1. 581			
no add.	40	0	
0.025′	94	54	✓
0.05′	138	98	
0.1	247	207	
0.15′	319	279	
2. 1974		Δ	
no add	27	0	
0.025′	80	53	
0.05′	105′	72	
0.1	170	143	
0.15′	276	249	
3. 2341		Δ	
no add.	34	0	
0.025	217	183	
0.05′	423	389	
0.1	945	911	
0.15′	1398	1364	
4. 518		Δ	
no add.	55′	0	
0.025	331	276 ′	
0.05′	793	738	✓
0.1	1833	1778	
0.15′	2744	2689	

1/11/54

518 Transduction of —, with HFT gal- lysate of 1/9/54

① One ml lysate added to one ml of cell suspension – 1/12/54 incubated at 37C for 10 min centrifuged and resuspended in 1.0 ml broth. diluted and plated.

λ exposed cell titer = 708, 889, 794, 889

3280/4 = 820 × 10 × 100 × 100 × 50 = 410 × 10⁷ = 4.1 × 10⁹/ml

λ exposed cell titer 761, 651, 670, 719

2801/4 = 700 × 10 × 100 × 100 × 50 = 3.5 × 10⁹/ml

② Distribution of cell types - column

	gal (–)	gal (+)	gal – λ culture	Total
1. Control (both exposed)	3280	0	0	3280
2. λ exposed	2801	31	~~58~~ 54	2886

31 (–) picked and streaked /518 - all um lys.
/λ - all sensitive

30(+) picked

#	/518	/λ	Segregating?	/518	/λ	Segregating?	/518	/λ	Segregating?	Summary
Lp+ 1.	lys	R	yes	11. um lys	S	no	21. lys Lp+	R	"	~~R~~ S
Lp+ 2.	"	"	"	12 Lp+ lys	R	yes	22. —	— S	a (–) (no)	23 Lp+
Lp+ 3.	"	"	"	13 Lp+ "	"	"	23. clys Lp+	mix	[illegible] yes	3 Lp^R
Lp+ 4.	"	"	"	14 Lp+ "	"	"	24. lys Lp+	"	"	
Lp+ 5.	"	"	"	15 Lp+ "	"	"	25. " Lp+	"	"	
Lp^R 6.	um. lys.	"	"	Lp^R um lys	R	"	26. " Lp+	"	"	
Lp+ 7.	lys	"	"	17 Lp+ lys	"	"	27 um lys Lp+	small pairs	"	
— 8.	um lys.	S	" ?	18 Lp+ "	"	"	28. lys Lp+	R	"	
— 9.	" "	"	no (wk. R)	19 Lp+ "	"	"	29. lys Lp+	"	"	
— 10.	—	— S	a (–)	20 Lp+ "	"	"	30. lys Lp+	"	"	
							31. lys Lp+	"	"	

2543 Lytic λ – Plaqué (#3) of lytic d lysogen previously reported inadvertently

	um lys	no control spread done
1. 750	3	
2. 2281	9 ← all discarded as slow and slow growing	
3. 2373	4	
4. 518	6 4/4 tested stable	2 appear slow (+)
5. 811	89 ← are stable (+)	

Stocks made

2/24/54 Stocks of these discarded except #s 6, 16, 27

Stocks made of these

254-5 = W2866

254-16 = W2867

1/13/54

Crosses - check on Lp Gal segregation

A 1. 1765 X 750 on S gal
39 prototrophs - all (-)

B 2. 2281 X 2035
25 (-)
329 (+)

C 3. 902 X 1655
not counted - many small - appears about 50-50

1/22/53

246A-15 Reversions continued

Reversion	Segregating?	Segregant Character	Proposed Genotype
1	yes	(– –)	1 2 / – – → / + +
2	"	(– –)	
3	"	(– –)	
4	"	(– –)	
5	"	(– –)	
6	"	(– –)	
7	? no	stable +	–
8	? yes	mixed ±	
9	? no	stable +	
10	yes	(– –)	1 2 / + – → / – +
11	"	2–	
12	? no	stable +	
13	yes no	"	
14	"	(– –)	a 1-6, 10
15	"	(– –)	
16	"	(– –)	
17	"	(– –)	

2/4/54

S11 t902 (New location of 902 - 3 bottles)

for the purpose of isolating HFT gal$_4^-$

1. mould ½ - 19
2. 0.1 902 λ - 89

2/8/54

750t902 gal$_2^-$ (segregants coming around about a month) suspected of HFT gal$_3^-$ Origins now cloudy - Originally 3 but one lost Both in need of purification

257-1 → #1 Test for HFT

	Col. 1.
1.	750 NFT
2.	NFT
3.	HFT
4.	"
5.	" (?)
6.	"
7.	"
8.	-
9.	NFT
10.	HFT

257-2 →

257-3 →

257-4 →

#2 Tests for HFT

1.	750 HFT
2.	"
3.	"
4.	NFT
5.	HFT
6.	"
7.	"
8.	NFT
9.	HFT
10.	NFT

9/10/54

NFT cultures examined

257t-1 = gal$_2^-$, +^{17} stbc
257-3 = gal$_3^-$, +^{17} stbc

W2869

S18 transduced with N16 λ 1-9-54 for the purpose of establishing that the transduced colonies contain both 4p$^-$, 4p$^+$ cells and gal$^-$ cells (segregate for both?)

Fresh inoculated with S18, 0.2 ml cells + 0.4 ml λ incubated at room temp. 10'
Then diluted 10^6 and plated B gal

Plate	(+)	(−)	(−) nibbled	total
1.	1*	28	2	31
2.	1**	32	0	33
3.	0	39	2	41
4.	0	43	1	44
	2	142	5	149

37 X 10^1 X 10^6 X 3/1 (10) X (10) ? = 1.0 X 10^{10} ?

1 * a colony such ●
2. ** " " " ◎

both streaked - 10 (+) and 10 (−) colonies picked + λ S18

Opt. 10 16"

	1. (+)	S18 Lysog.	(−)	S18 Lysog.
1.	R	"	R	"
2.	"	"	"	"
3.	"	"	"	"
4.	"	"	"	"
5.	"	"	"	"
6.	"	"	"	"
7.	"	"	"	"
8.	"	"	"	"
9.	"	"	"	"
10.	"	"	"	"

257t-5 +^{17} 4p$^+$

	2. (+)	S18 nonlyg.	(−)	S18 sens. nonlyg.
1.	R	"	"	"
2.	"	"	"	"
3.	"	"	"	"
4.	"	"	"	"
5.	"	"	"	"
6.	"	"	"	"
7.	"	"	"	"
8.	"	"	"	"
9.	"	"	"	"
10.	"	"	"	"

257t-6 +^{17} 4p$^-$

W2868

see p. 262

2/13/54

W2350 - double diechan

parent culture streaked out and 10 colonies examined to eliminate possibility of including reversions as one cocci in the inoculum $- + \rightarrow - +$ and therefore transductible Sg. one of the 2 (-) lysates.

1. All 10 colonies NOT transductible by HFT 2⁻, 4⁻

2. Drop fuls of overnite broth placed on B gal.

2350 = 4⁻ 8⁻

Cells — (c.60 pap) HFT 2 λ | (0 pap.) HFT 4 λ | (c. 20 pap.) HFT₂ HFT 4 λ

4⁻	−	+	
8⁻	+	+	
2⁺	+	−	

Are the pap on HFT 2 due to reversions of the 8⁻ donor being transduced? If so they should segregate 4⁻ segregants predominantly and few (−−). Pick up 12 and see —

258-A. Of the 12 - 6 found unstable Segregants.

	HFT 2⁻	HFT 4⁻			
1.	0	+			
2.	0	+			
3.	contaminated with + (0)		0	+	(2⁻) Now 4⁻ 3 (2⁻)
4.	0	+	−	−	(⁻⁻) explain 2 (−−)
5.	0	+	0	+	(2⁻) 1 (4⁻)
6.	0	0	−	−	(−−)
	+	0	+	0	(4⁻)

3/8/54 Double-decarbt

3. Examine HFT 2 + HFT 4 for double ductn.

258-B pap

19 examined — Segregants streaked

	HFT 2⁻	HFT 4⁻	Loci			
1.	0	0	(−−)			
2.	0	0	(−)			
3.	0	+	2⁻			
4.	0	0	(−−)			
5.	0	+	2⁻			
6.	0	+	2⁻			
7.	0	+	2⁻			
8.	0	0	(−−)			
9.	0	+	2⁻	9	0 (+) pap	
10.	+	0	4⁻	10.	46 (+)	1/6 stable
11.	+	0	4⁻	11	48	1/6 stable
12.	0	0	(−−)			
13.	0	+	2⁻	13.	22	1/6 stable
14.	0	+	2⁻	14.	9 (+) pap	1/6 stable
15.	0	0	(−−)			
16.	+	0	4⁻	16	11 (+) pap	5/6 mixed
17.	0	0	(−)			
18.	0	+	2⁻	18	contam's	
19.	0	+	2⁻	19	event (+)	

Reversions statistically + pap. deleted.

9 2⁻
7 (−−)
3 4⁻

Probe labelled 1L

* reclassify

9 (2⁻ or 4⁻) 2⁻8⁻
7 (2⁻4⁻ or 8⁻4⁻)
3 (4⁻)

3/5/54 Lysate made of #16 Loop spotted

	750	1210	811
a.a.a. =	0	0	0

2/13/54

W2350 lysate on 2070 - After about 4 days c. 50 small pap on lysate half - 1-5 larger pap (reversions?) and on control 1/2 about 5 larger pap - no smaller -

24 picked to gal for purification - all (-)

EML analysis EML 867

2/22/54 Rpt HFT direction with N16

N16 lysate 1/9/54 - 0.5 ml

N16 titer - 2x10^9 $\frac{200}{8.9}$ = c. 20x multiplicity 0.5 ml N16 + 0.5 ml cells

Cell titer = 892 x 10^5 = 8.9 x 10^7

control plates c. 900/plate - all (-)

exposed plates 1/4 of (1) = 213 = 852 per plate - indicates little killing

no of (+) 21, 23, 35, 24 = 103/4 = 26 870) 26.00 = 3.0% (+)

0.03
2610

518 HFT direction with N16 1/9/54

See above

Aerated culture 1/10 - 1 ml sedimented - resuspd in 0.5 ml N16 added, adsorb. c 3 min centrifuged - Rpt 3 times except no centrifugation after in 3rd - dil 10^2, 10^2, 0.5/10 → plate

Control plates

37C 371, 341, 319 = 1031/3 = 344 x 10^6 x 2 = 688 x 10^6 = 6.8 x 10^8 36/344 = 10.4%

30C 350, 398, 361 = 1109/3 = 369 x 10^6 x 2 = 738 x 10^6 = 7.3 x 10^8 39/369 = 10.5%

N16 Phage Plates

37°C 63/763, 22/309, 23/207 = 108/1279 = 8.4% (+) /3 = 426 (/3 = 36)

30°C 31/175, 45/197, 41/194 = 117/566 (= 39) /3 = 189

Esters Page 667

N16 Assay -

λ 10^7 dil = 106
130
236 = 120 x 10^7 = 1.2 x 10^9

Testing of (-) on plate - tp^x and (+) present in any (-) colony?

30 gal - on vv

7/28 found mixed tp^+ + tp^s - in 518 - self plaquing

transd.

10^7 dil = plaques = 240
papillae = 104

why 2-fold diff.? 0.2 ml pipette?

no control plate for spot. done on assumpt = 44 ratio pap/plaques = 60/240 = 1/4

2/14/54

Looking for Recombination between Lp^R by selecting for (+) recombinant when two diff. gal- are Lp^R

1. This is second attempt - previously no Lp^+ found in (+) recombinants between 2341 gal_1 - Lp^R x 1924 gal_4 - Lp^R

2. In this case 2341 gal_2 - Lp^R x W1 (= 1924 t 902 Lp^R → seg gal_2 - Lp^R) out of 33 gal(+) on a Bgal mixed culture of these (probably includes sp. reversions) none found Lp^+.
Not expected? since in 1st test Lp^R_x x Lp^R_{1924} failed to give Lp^+.

What goes here? $2741 = \frac{Gal_2 - Lp^R}{Gal_2 - Lp^J}$

Where did Gal+ come from?

518 t N16 - again for higher fraction (+)

0.4 ml N16 1/9/54 + 0.1 ml of 518 culture c. 10^7 cells/ml

cell assay of above $10^2, 10^4 \xrightarrow{0.1}$ 3 plates 1 = 600 no (+)

Failure? why

duction plate " " $\frac{x1}{5}$ 3 plates 1 = 163 x5 815 no (+)

2/19/53

246A-15 gal+ R -1 } ~~[illegible]~~
-11 } ~~probably +R-1 rw~~

246A 15 - labelled 11 reversions examined

~~Reversion colonies~~	single seg (1-)	~~HFT (2-)~~	Structure	Label
1	o	o		246A-15+R-1A
2	+	o	— a crossover	" " -1B
3	o	o	as 1	
4	o	o	as 1	
5	o	o	as 1	
6	o	o	as 1	

Because of above check seg regards from culture labelled 246A-15+R-1 to see if conforms to original definition of 246A-15+R-11

261 C 3/5/54
Lysate of 261C →

reversion col.	Minus characteristics		
1	6/7	(- -)	1 (gal2-)
2	stable		
3	7/7	(- -)	
4	7/7	(- -)	

according to this it is not 246A

750 solid spot } indicates HFT
1210 " "
811 " "

Lysates of 261A + 261B made

Ratio of (+) to minus colonies in	(+)	(-)	Examination of the (-)	
261A	82	44	11 (2-)	4 (- -)
261B	103	63	10 (2-)	6 (- -)

Action of lysate	261A drop	261B drop
750	HFT	HFT
2175	HFT	HFT
578	HFT	HFT

N16 [illegible] Acc [illegible] 270 [illegible] NFT
seg of N16 [illegible] $1^- 2^-$. Since N16 [illegible]
[illegible] from $1^- 2^+$ → $1^+ 2^-$

(262)

2/26/54

257C-2 518 t N16 → $+^a$ Lp^R. Examination of the segregants

Segregant	from this 518	N16 HFT 2^-	518 HFT 4^-	Lp^{Rx}		
1	non lys	0	0	S	1	+
2	"	0	+(?)	S	mt	
3	"	0	+	R	✓	—
4	"	+	0	S	2	—
5	"	0	0	S	2	—
6	"	0	+	poor	S	mt
7	"	0	+	reset	S	mt
8	"	+	0	S	2	—
9	"	0	+	R	✓	—
10	"	0	+	R	✓	—
11	"	0	0	S	3	
12	"	0	0	S	4	
13	"	0	(0)	(S)	5	
14	"	(0)	(+)	R	✓	
15	"	+	0	S	2	
16	"	0	+	R	✓	
17	"	0	+	R	✓	

2	4		
−	−	S	(5) (8')
−	+	R	(6) ✓
+	−	S	✓

Not certain that these segregations came from separate (+).

In ideal reactions on p 292 and in any case trans $1^- 4^-$ interact are not (+).

The NFT results suggest that [illegible] is [illegible]

$1^- 2^-$ → $1^+ 2^-$

On this [illegible] #s 2, 6, 7 in the table could be

$1^- 2^-$ →

In which case [illegible] transit [illegible]

$1^+ 2^+ 4^-$ → $1^- 2^- 4^+$

↓

$1^- 2^- 1^+$ →

[illegible] been observed before

2/20/54 — this is the original (−) that is deploid for some portion of this gal region

246A-15 — Streaked out and (−) colonies picked and tested against Both HFT gal_1 - and gal_2 - . (−) and gal_2 - found - no gal_1 - (4) disagrees with earlier classification

The gal - by the present test were plated and reversions obtained and streaked out on B gal

gal_1 -	stability of Reversions	
1	unst.	+
2	"	+
3	stab.	
4	unstab.	+
5	"	+
6	stab.	
7	unstab.	+
8	"	+
9	stab.	
10	"	
11	unstab.	+
12	stab	

6/18/53 These stocks discarded -

(5 stable
7 unstable)

246A-15 — prototroph stripped! cross with 1503 gal_1 - EMS gal

246A-15 — 2 1 / − − / = + → aerated = F −

1503 gal − — + − — F +

control plates ok

	(+)	(−)
plate 1.	27	0
2.	13	3
3.	25	3

10/26/56

~~[illegible]~~

where did these counts come from if we is prototroph?

2/22/54

1503 - (-) ductions to obtain gal- in Het stocks?

1. 2 gal_2 - obtained one Lp^s W2428 (To stock)
one Lp^t W2429

2. 1 gal_1 - obtained one Lp^s W2430

Also this day
2431 = 747B-1
2432 = 1673 gal_2^-
2433 = T18
2434 = T19

Crosses of gal - Control streaks on B gal = pure

1. (X) 750 - c. 30 (small)/plate x 11 = 0+/330
aerated

2. (X) 1210 - 9, 8, 13, 12, 12, 14, 12, 6, 6, 8 = 0+/100
aerated

3. (X) 811 - 3/17, 3/14, 0/15, 1/28, 1/17, 4/15, 0/16, 5/23, 0/29, 2/16 = 19+/190 - (+) questionable of 18 checked 7 found (+)
to see if diploids.

5 of which may be diploid
4 were

Analysis of these diploids by examination of segregants

#2 9 (-) segregants tested against HFT 1-, HFT 4- - all $Lp^{+ or R}$ and gal_4^-
#3 10 (-) segregants " " " " - all $Lp^{+ or R}$ and gal_4^-
#4 8 (-) segregants " " " " - all $Lp^{+ or R}$ and gal_4^-
#5 12 (-) segregants " " " " - all $Lp^{+ or R}$ " gal_4^-

W2360 - a Lp^s form of W2350 gal_2^- gal_4^-
6 colonies tested from old broth streaking out from EMC
all Lp^s and not transduced by HFT 2 or HFT 4 in
two days

Stock made

3/4/54

Examination of Transduction Complex (+ 4) for HFT nature if at all

Stocks have been maintained on slants for considerable time (6 mo ?)

	Designation Stock Slant	Loop spotted 750	1210	811	Characteristic of pop. used to make lysates (−)	(+)	mosaic
	518tK12	solid spot	almost solid spot	solid spot	19	53	5
	750tK12-1	solid spot	solid spot	solid spot	13	79	8
not sterile?	750t902-1	solid spot	solid spot	solid spot	26	110	8
not sterile	750t902-2	0	0	0	14	c.50	4
not sterile?	2175t750-1				4	c.50	poor plate 1-2
not sterile?	2175t811-1				+	2 kinds +++	?
both labelled 2175t811-1	518t750-1	+++	+++	+++	18	83	?
	750tK12-2	+++	+	+++	14	32	5
	750t902-2	+++	+ ok	+++	27	63	6
	2						

HFT Stocks

Designation	Page	Genotype	Comment	Autotrophic Markers
2342 (N16)	192B	gal_2 -		none
2346 (N14)	230	gal_1 -		M -
(D1)	153	gal_2 -	from 592d — x 57F	M -
(S18)	202	gal_4 -	probably NFT now	M -
(#14)	242	gal_2 -		Arg
(#19)	242	gal_2 -		none
246A-15	246A	gal_2 -		none
202-16H	202	gal_2	S16 has an NFT E, it	M -
257-2	257	gal_2 -	has an NFT E it	M -
257-4	257	gal_1 -	" " " "	M -
247B-1	247	gal_4 -		M -
261A	261	+ u		none
261B	261	+ u		none
261C	261	+ u		none
217S2750 + u		+ u	750d — x 217S	none
57BE1412	263	+ u		M -
750t1412-1	263	+ u		M -
750CR02-1	263	+ u		M -

3/21/53

Tests of some lysates for HFT and allele - See also page 265

Lysate	750	1210	811	Comment	Cell Characteristics Making up lys	Stability of +	Yellow crayon #
2342 (3/4/53)	+++	0	+++	Known gal⁻ HFT	—		1
2342 (3/17/53)	+++	0	+++	Known gal⁻ HFT	—	64 12/12 +⁹ ①	2
2175 t811-1	++	0 small	+++		mixed		3
750 t612-2	+++	++	+++	behaves as + HFT	mixed		4
750 t902-2	+++	+	+++	" " " "	mixed		5
2478-1 pop 2	1 pg	2 pg	0	gal⁻ HFT lost?			6
2175 t811-1	0	0	2	NFT?	mixed		7
5Ft 750-1	+++	+++	+++	behaves as + HFT	mixed		8
750 t902-2	1 pg	0	2	NFT?	mixed		9
258-16	5 pg	1 pg small	0	gal⁻ unstable [illegible]			10
2464-15	+++	0	+++	gal⁻ giving +ᵘ revertants			11
2616	+++	++	+++	aggregates (--) principally			12
5Ft K12	+++	c. 100 pg	+++	behaves as + HFT	mixed (+)(-)		13
750 t K12-1	+++	++	+++	" " " "	" " "		14
750 t902-1	18 pg	2 pg	c. 30	NFT?	mixed		15
2346					—	5 4/5 +⁴ ②	

+++ = solid drop
++ = some discret. pop

two dif. cultures mislabelled here

Rev. found?

4/10/54 all typical strain in Pen. 0.5 ml single

The gal⁻ revs is 2175 t811
other 2175 t751

* Gal+ Reversion Stability - no obs., no found +⁴/no. of comments

4/19/54	750 t902-1	0	0	0	16 abs
4/1	750 t912-2	+++	+	—	17 typical strain

3/22/54

Transduction with 2342 (=W16) in NSB

(1.) W518	No (+)	No. (-)	No(-) contam.	No(-) col. pap	dilution	
Lysate	8	140*	9	1	resupd. in 10 ml, 10^2, 1-50 → 0.1 ml	8/140 = 140) 8.00 (0.057, 700, 1400) = 5.7% (+) transd.
Broth	0	679*	0	2	"	on Lp^s

* difference in numbers probably due in part to loss in centrifuge tube decantation

2. W811

Lysate	1	426 *	0	5	above	426) 1.000 (0.0023, 852, 1480) = 0.23% (+) transd.
Broth	0	448 *	0	1	"	

* two colony types - large and small.

3/25/54 Experiment with TCN - Transmission of "injectate" in crosses.

(Hfr $Lp^+ Lp_2^s$ $S^{treated}$) exposed to 2342λ ⊗ $F^- Lp_1^+ Lp_2^R$ TLB ≡ Gal_2 -

Experiment Couldn't succeed in first place — gal_2

Absorption of 2342λ on (2341 streptomycin treated) 1 ml phage + 1 ml cell suspension

[Before 10^7 = 273, 214 = 2.44×10^9 ½ 1.22×10^9 ‖ No adsorption
After 5×10^7 = 20, 26 = 1.15×10^9 (assay by surface plating on B(c)) $\frac{1.2}{1.2} = 0.0$

on 2252
Before - above
After 5×10^7 = 15, 13 = 7.0×10^8] $\frac{7}{12}$ 12) 7.0 (0.58, 60, 100) = 42% adsorpt.

3/30/54 Repeat examination of adsorption of S^t cells.

W 2341 and W2342 HFT λ (Assays by pore tube)

1. Pre adsorpt. titer = 247, 167 × 10^7 = 2.07×10^9 = 2.1×10^9 (compare with above)

2. S^t cells (0.3 ml) + 0.3 ml 2342λ (NSB prep 1/9/54) - incub. 37 C 10' - 9.4 ml broth added centrifuge. 5 min.
dil 10^2, 10^4 → 0.1 = 444, 482
titer = 463 × 10 × 33 × 10^4 = 3.3×10^6 = 1.53×10^9 % Not adsorbed. $\frac{15}{21}$ = 71% 29% adsorpt.