DATE: 12/15. REF: 1101

Fresh cross 1:1:10 12:30 - 3:30. dilute in $H_2O$.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| A. 3:27 - | 1. ++ incl 2 v. large (1 pred. zyg) | 23 no pairs no v. large. | 21 do. | 15. + dirt do. | 8+ ? pairs | 3+ dirt | 3 | 1. 0 | 1+2+ | 3 |
| zygs: | 1-2 ✓ | 0 | 0 | 0 | 1? | 0 | 0 | 0 | 0 | 0 |
| 3:55 - | 23 (2 fairly long) | ++ no pairs | ++ one + rather large | ++ one v. large | +.. 1 large (paired?) | +.. 1 v. large | ++ 1? v. l. | ++ 1 pr | + some things but no very large | + do. |
| B. | | | | | | | | 1 large but better. | 1 long 1 not | |
| 4:20 | more zyg: → | | | | | | | ↑ | | |
| | 2 | 0 ✓ | 1 ✓ | 1 | 1 | 1 | ? | 0 | 0 | 0 |
| | 7-10 divid? esp. 10. | | | | | | | | | |
| C. (Just ED.) for capillary | × | × | × | × | × | × | 0 | | × | × |
| D. 4:40 - | 2 | × | × | 0 | 0 | | | | | |

Streak out diluted suspension also →

| P1 | P2 | R1 complexes |
|---|---|---|
| 13 | 131 | 3 |

- = P1 + = P2

Plate 3

12/16: A 1 1R1/P1, 13P1, 22P2
2 14P2 [illegible]
3 12P1 4P2
4 4P1 7P2
5 2P1 5P2
6 2P2 + ? c.g.
7 2- 1+
8 0
9 - ? m gloss →
10 1- 1+

B 1 ++ (>23!)
2 4P2
3 23P2 1R1/P1 + c.g.?
4 61P2 6P1
5 37P2 1P1
6 49P2 2P1
7 6P2 + cg ?
8 53P2 : 2P1 : 1R1/P1 ...?
9 73P2 : 14P1
10 17P2 : 8P1

DATE: XII. 16 REF: 1102

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ~~6, minute~~ | ~~0~~ | ~~1~~ | ~~pair 1~~ | ~~5~~ | | | | | |
| | | fresh cross. | | | V.S.! | | | | | | |
| | | 12^15 – 2:40 | | dil in $H_2O$. | | | | | | | |
| 2^50 | A. | t+1+1+ dirt | ca 12 clumped | 5 | t | 2, · | 0 8 | 0 | 1. | 1 | 0 |
| 3:10 | B. | X | 0 add fluid 1 lost in drop hold to. hold to 4:40 | ~~2~~ X | ~~1+d~~ 2 | 1+d. | 0. | 0 | 1+d X | 2 d | 0 but [illegible] fragments X |
| | | | | | dry? dry? | | | | | | |

XII. 17

| | | cells | Colonies |
|---|---|---|---|
| A. | 1 | 3 | 3 – |
| | 2 | 12 | ~~4 – 1+~~ 12? Obs[illegible] not precise [illegible] |
| | 3 | 5 | 2 – |
| | 4 | 1 | 0 |
| | 5 | 2 | 2 –, 1? (c.g.) |
| | 6 | 2 | 1 – |
| | 7 | 1 | 0 |
| | 8 | 1 | 0 |
| | 7 | 1 | 1+ |
| | 10 | 0 | 1 – |

} order? probably correct but suspicious

| | | | |
|---|---|---|---|
| B | 2 | 0 | 2 |
| | 4 | 0 | 2 |
| | 5 | 0 | 1 |

DATE: XII.17.53 REF:

Fresh cross: 8 45/4 to ca 10 AM 5:25:10

| | 1 | | | | 5 | 6 | | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 8 | 0 | 0 + D? | D? | 0 | 0 | 0 | 0 | 0 | 0 |

A. add moderate fluid and incubate. Cell probably re-formed in 1, but these drops are too large for proper counting. Left at R.T 10^30 – 4^20 PM.

B

moderate large

thin

0 0 0 0 →

Platings

| | | | |
|---|---|---|---|
| A | 1 1... | 4+ ! | (1 fission) |
| | 2 0 | 0 | |
| | 3 0 | 0 | |
| | 4 1 | 0 | |
| B | 1 2 (large) | 0 | |
| | 2 ++ | 2− | V. low RECOVERY! |
| D | 1 6+ (Z) | 4+ 1− | Incomplete recovery unfortunately. |
| | 3 1 | 1+ | |
| | 4 1 | 1+ | |
| | 7 ? | 0 | yields v. low!! |

still connected in replenished drop.

C Fresh cross 3:30 – 4:40 1:1:10.

5^00 – 6 × × 0 0 0 0 0 0 0 0

(cap too small or resp too dilute ?).

D. Includes 0 1 0 0 0 0 1 6 + pair ?

0 0 0 0 + d 0 + 1 0? 0 1? × 0 0

DATE: XII.18.53 REF: 1104

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| A. | Freshcross 1:1:10 12:15-4. | | | | ∞ | | | | | |
| B. | + X | 0 | 0 1. + 0 | 0 | 0 | 5, none, unusual | 0 | 0 | 0 | 0 |
| C | 5, + | 2 + 1? (sup. drops) | 0 | 0 | 2 + ? | 0 | 0 | 0 | 0 | X |

Plating

A 5

B 3 0
6 3+, 1−, 1z. ∴ 1 type cell = z. → R1, P1 only do not same.
7 1−

C 1 2+ 6 −
2 0
5 0

---

3 stages have been seen:

| | | normal size (presumably) |
|---|---|---|
| 0/ | 0 | 0 |
| ↓ | ↓ | ↓ |
| R1 P1 | R1 | R1 |
| P2 | P1 | P1 |

(→ ultim. ↓ R1)

spend next few days setting up de Fontaine

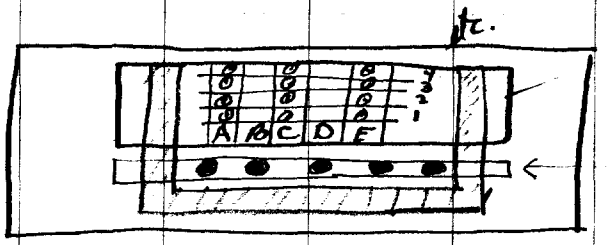
① Microloops (Schouten): finally mastered but not very convenient for microisolation.

② Capillary technique: needs practice c̄ chambers.

Some pul. experiments to isolate yeast (W413)

DATE: 1/6/54. REF:

Developed micromanipulation methods during past few days.
Set up ~~[illegible]~~ oil chambers:




isolation coverglass

after isolation to small droplets, add extra broth and incubate overnight.

<2PM 1/6. I
>8PM II.

A C1 C2 large C3 (P2) C4 E1 E2 G3 attached in some way v. large + some debris

B. A1 large others × strip plating
A2 formerly in pair, broken apart ✓ appearance of pair not recorded
A4 O ✓ strip ?
C2 had dirt? ×
D2 • ? ×
D1 strip
E2 no change to 8PM. ×
E3
E4 tangled rope strip

One other pair not succ. isolated ?

Plate P7.

C ~~1~~ ~~2~~ ~~3~~ ~~4~~ probably wrap
E1 strip?
E2 ×
G3 ✓ strip?

I II

(over)

| | | plating | appearance |
|---|---|---|---|
| A. | E1 | P1 | P1 |
| | G3 | P1 | P1 |
| B | A1 | P1 | P1 |
| | A2 | P2 | P1! ~~(had been ? in pair).~~ Recheck other markers. |
| | A4 | P1 | ?P1 |
| | D1 | P1 | P1 |
| | E3 | — ng. | |
| | E4 | P1 + P2 (+ R1) | (from ⬭⬭) |

BA2: note: Although isol colonies were all P2 re Lac, a few Lac++ papillae noted in brush. Streak, replicate to EMB Lac sm.

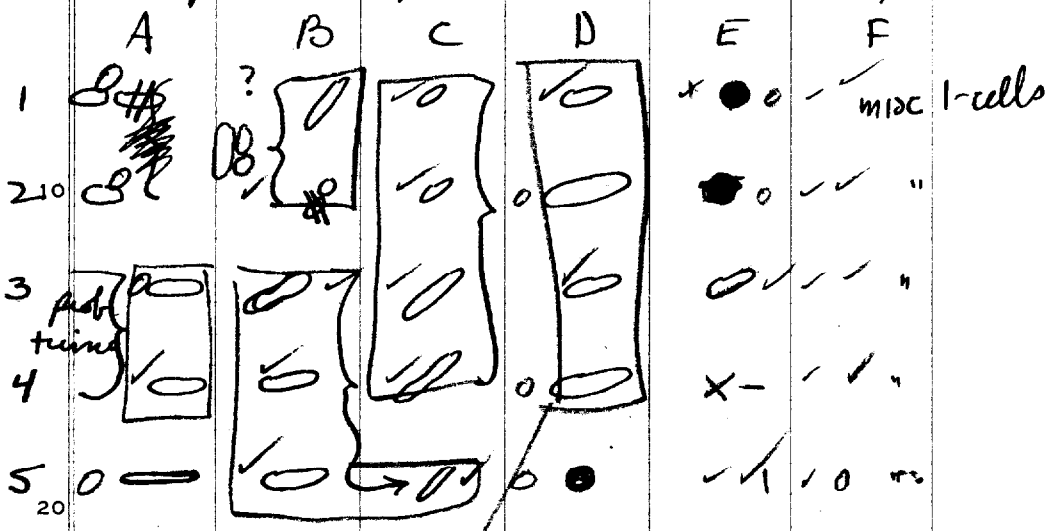
↓

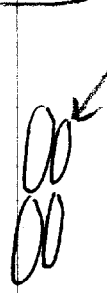
A2 Original plating. One colony was Lac- (previously overlooked). ✓ replica: This is also ~~Lac+~~ Gal+ $S^R$ ∴ P1.

∴ This is a P1+P2 type from single cell. Originally in pair

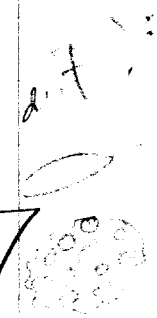
DATE: January 8, 1954. REF:

P1×P2. ~~overnight~~ 48hrs. mouth. 1:1:10 12$^{30}$ – 2$^{30}$ PM. Dilute ca 2$^{30}$ – 4$^{45}$
1:200 pre manipulation in Penassay.



[Note: D1, D3 died (P2 parent?)
But note reversal in appearance (unless both were P1).]




B2' lysed. A1' lost. by nozzle.

E, F misc. 1-cell isol. No pairs seen then.

B3-4-5-C5 from 1 clump of 4 cells.
C1-4 from 1 clump may include an extra small cell not clearly seen in the original clump.

1/9/53. Growth in droplets ✓ or o. Series A probably dried out
Droplets not apparent at time of fluid addition
Fate of D2, D4? Not necessarily accident. Keep in mind poss. segregation of λ? (what is lp? of P2).
B1 – probably oil globules only

Transfer to 1 ml broth A9.

1/10/54

Platings (streak out from 1ml broth transfers, P9) on EMB Lac.
P1 = Lac - P2 = Lac+.

| | 1106. |
|---|---|
| A4. | P1 |
| B1 | 0 |
| B2 | P1 |
| B3 | P1 |
| B4 | P1 |
| B5 | P1 |
| C5 | P2 |
| C1 | P2 |
| C2 | P2 |
| C3 | P1 |
| C4 | P1 |
| E3 | P1 |
| E5 | P2 |
| F1 | P1 + few + papillae / No + colonies |
| F2 | P2 |
| F3 | P2 |
| F4 | P2 |
| D1 | P1 |
| D3 | P1 |

No apparent recombinants in this series

Save B2; B3-4-5-C5; D1, D3; C1-4.

mass stab D2, D4 still empty P10.

Jan. 9, 1953.

W2338 P1 × P2 (old cultures) ca 1:5 at $10^{30}$ Remoi ca 1/50 12 N — 3PM
W2344

3 - $4^{30}$.

6+, 6- tested:

In later test, 2/2/54, B5 → Lac + $V_1^R$ A | 2
These are all ✓ as Gal+, Lac+, -. Lac + $V_1^S$ B | 4
Possibility of recurrent recombination here? Or Lac - $V_1^R$ C | 1
is this an illustration of a "twin" set. Lac - $V_1^S$ D | 5
Re ✓ OK. cf 1117B.

see over

10PM Plate. Most had $10^2$-$10^3$ in clumped. NG in B1-3-4 D4-5
P10: litter

1 clumped

A 1 0 P1
2 0 P2
3 0 P1+R1 ~~[illegible]~~ $V_1^S$ ✓ further (pictured as largest in group)
4 0 P2
5 0 P1 (1 col.). Replate from tube & original drop.).

B 2 0 P2 ~~[illegible]~~
5 0 P1+R1 ~~[illegible]~~ $V_1^R$, $^S$ ✓ further see 1117B.

D 1 P1
2 P1
3 P1

∴ conclude zygotes either result from or tend to form clumps c (P1, P2

Nutritional test: 110785 (mass):

| O | M | H | M+H | |
|---|---|---|---|---|
| − | − | − | ++ | (12h.) |

∴ Set up crossing test for A, B, C, D and mass assuming each is M− H−.

Test 1, 2, 3, 4, mass, and W2338
× Y10 (F−) ; W1918 (F+).

all cultures × Y10 [on D(o)] − sterile
× W1918 → [EMSLac] ++ prototrophs

∴ all F⁻.

$3^{30}$ Start i rather dense sump. Make micro drops + looks for pairs.

① Cluster densely connected? Reversed together is first transfer to drop. Dispersed later

~~hold~~

A1  A2  A3 

A4 A5 B5  B4 ~~B3~~ B2 

∴ Same doubtless lysed. — $4^{00}$ PM.

---

$4^{03}$ in reservoir → D1 →

Remarkably bound! Behaviour of despite the rotation and rotation even after 1 sister pair is separated. Attach & for train over > 1μ.

after repeated reinjection

Y20 was able to separate. Then all were readily separate

D2 0 D3 0 D4 — D5 0

sisters

Y25

D1 8

Add fluid Y:30

---

ABD

Compulsory mating — n.g.

1108

DATE: 1/10/54. REF:

P1, P2 fresh overnight. 12N – 5:45 in Penicillin (sep) 1:100
5:50 – Separate in drops, then coalesce.

Repeat, cells having grown in reservoirs. Cells continued to divide in transfer droplets.

4 Drops coalesced. Manipulate A, B further. In B, P1 → ghost.
In A, cells conjoined 00 $10^{40}$ but will separated $10^{45}$. Could not force conjunction. Expt. abandoned $10^{45}$ PM.

Objectives of single cell study:

① Genotypes issuing from primary hybrids < Total / clonal separation
② Correlation of zygotes with association with P2 parent
③ Cytol. appearance of the early hybrid
④ Early stages of the hybrid.

Should do ① first.

1/11. Started a few droplets, but milk broke. Spent day largely on review for Ephrussia etc.

1/12. Class; Hanson apptment. Almost no work.

1/14/54.

P1×P2 1:1:10 5:15 – 7:45 PM then diluted ca 1:100. Difficulties in capillaries. Isolations began 9:30 PM. Pick larger cells or clumps (v

A1 9:34.

A2-3 separated 9:48

A4 v. motile 9:30. B4

B1-B2 → ,

B3 seems apparently but → only

C. in reservoir, → + in first drop.
9:38 C4 9:43
C2 C3 9:46

D4 v. large 9:58 (later lost.)

E in reservoir → 1 2 3 4 → spont. → + → E3

clumps of ... give pattern ...

E2 10:12 10:13 E1 E4.

Later could not find D4, E1 drops. (evap?

A 1 ✓ 2 0 3 ✓ 4 ✓ all others P1 $S^R$ (Lac-Gal + $V_1^S$) P2: Lac-Gal-$V_1^R S^S$

B 1 ✓ 2 ✓ 3 0 4 ✓

C 2 ✓ 3 ✓ 4 ✓ 0

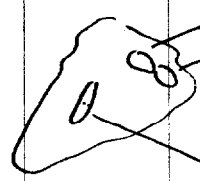
E 1 2 3 4

8 control drops n.g. Growth ✓ n.g. 0 and D1-4 0

DATE: 1/15/54. REF:

C, D n.s. E4. E1-5,5

P1 x P2 1:1:10 $12^{30}$ – $2^{40}$. Then dilute ca 1:50. (Pigs prob to drip).

3:15 80 →  C1 C2 D1 – 3:50 and D2, D3 in same pipette.

D2 D3 → D4.

But all inviable. (dried ?? – tried to add fluid!)

E. → stayed together → → + E3. (seems mismated!) E1 4:08 E2 separated 4:26 - 4:28

E v. large → E4 → E5.

SURVIVORS. Plate 1/16.

| | EMBLac | Gal | SM | T5 |
|---|---|---|---|---|
| E1 | – | + | R | S |
| E2 | – | + | R | S |
| E3 | – | + | R | S |
| E5 | ±, – eq. prop. | + (–) | R (S) | S (R) |

∴ has Lac + Gal – $V_1^R$ ($S^S$) and Lac – Gal + $V_1^S$ $S^R$.

= P1 + P2

R1 if present not numerous. Plate crowded: restrick EMBLac. → very rare, pres. secondary.

rare Lac + $S^R$ also presumably secondary

(Too bad E4 not visible!).

Unless specified, all cultures saved are impurified mainly where more than one type is present, saved mass as well as separated components.

Background for compulsory F-deletion: 1111

DATE: 1/13/54. REF:

Fresh cultures (ca 24h. 1:5) W1655, W2338.
Mix under oil, room temperature, 2 hours in their own broth
+
A —
B = vol. fresh broth
C ca. 3 x vol. fresh broth. and plate out.

A20. Give to EML.
She found ca 1/10 - 1/5 F+ in A; 0/10 in B, C.

DATE: 1/16/54. REF:

P1XP2... $10^{30}-12^{30}$ Refr. to $2^{15}$. Dilute 1:25, flat legs.
2:50 isolate random, empty. larger cells.

| | | | N17 (growth) | EMBlac | Gal | Replica to S | $V_1$ | Diagnosis |
|---|---|---|---|---|---|---|---|---|
| B 5 | 0 | | ✓ | − | + | R | S | P1 |
| B 4 | 0 | | ✓ | −, ++ | + | R, R. | S | P1, R1 |
| 30 | 0 | 3:20 | ✓ | − | + | R | S | P1 |
| C4 | 0 | X lost sight | 0 | | | | | |
| C5 | 0 | | ✓ | − | + | R | S | P1 |
| D5 | 0 | | ✓ | ± | − | R | R | P2 |
| D4 | 0 | X lost sight. | 0 | | | | | |
| | but add broth fairly promptly. | | | | | | | |
| A5 | ~~No~~ | ~~(May have been storage~~ | ✓ | − | + | S | S | P1 |
| A4 | 0 | ~~[illegible]~~ | 0 | | | | | |
| Control + reservoirs (H) | | | 0 | | | | | |

(Note. all self-agglutinated except D5.)

∴ P1R1 may be paired, insignificantly, with P1. These expts. give little information on significance of pairing.

Also some time on yeast asci (WY6) but could not break walls successfully. Suspension is too thick and numerous cells stick to surfaces of rather large capillaries needed. (Use desiccated wore?)

✓B4. No lac±. about 5P1:1R1

DATE: 1/17/54 (Sunday) PM. Picks for large cells.

A4 — N18 o
A3. Record? ✓

Probably mixup. Notes also refer to B4 partner → A4, lost ?

B 1 2 3 4

"A4 lost poss. in A4."

C 5 55 marked X. Probably several cells. C3 ✓ others o

D1 v.l. Pipette too small! Carried at tip. Damaged? (was well shaped but too narrow for same cells! Passed others. Use such pipettes for filtrates??)

5 55

D2 3 } 1 → o

D4 1 → o other damaged?

E2 E3 } o ("sisters – may have switched?")

E4 o

Initiate technique of replacing fluid drops for replenishment and placement. Best arrangement:

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | o | o | o | | | |
| 2 | o | o | o | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |

Grew:

| | Lac | Gal | S | T1 |
|---|---|---|---|---|
| A3 | – | + | R | S |
| B1 | – | + | R | S |
| 2 | – | + | R | S |
| 3 | – | + | R | S |
| 4 | –, ± | + – | R | S R |
| C3 | – | + | R | S |
| D2 | ± | – | S | R |
| 3 | " | – | S | R |
| E2 | – | + | R | S |
| 3 | – | + | R | S |

P1, P2 ?

extra fluid at A-O etc.

imp Lac struck too heavy

As control, check all squares and reservoirs and note extraordinary growth if ever.

OH ✓.

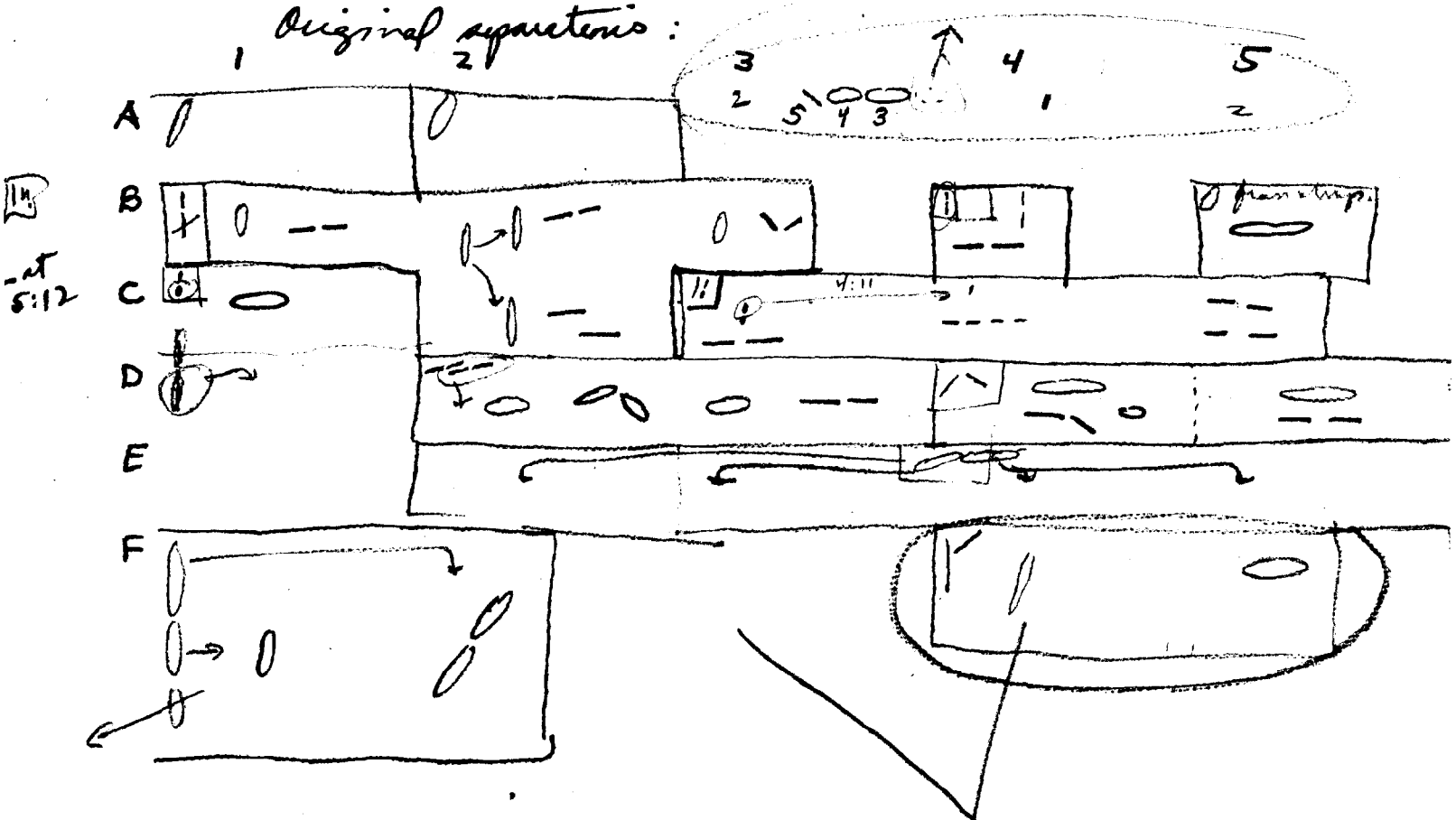
1/18/54.

10:1
P2:P1

$10^{20}$ – $1^{20}$ 1:.1:5 in Pennassay. Dilute 1:25 1:20 PM.

30 clones separated from about 2:50 – 5:30 PM (pervious time setting up drops, chamber, etc.) Noted that many cells had given 2–4 cells. Refrigerate at 5:30 – 8:30 PM to permit further separations of selected cells.

Original separations:




Do all clones. wait for F4-5 if necessary

7 clones were transplanted, 9:15 – 11:30 PM to separate cover-glass squares, leaving one cell behind in situ. These were plated directly on EMB lactose.

$10^{43}$ empty.

Growth Type

Singles:

A1

A2

B4

B5 (from clump)

C1

D1

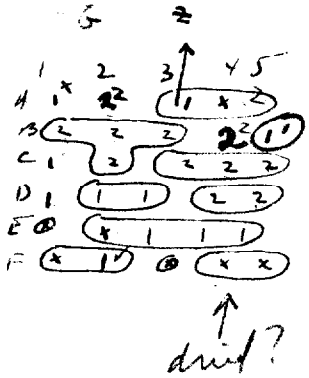
G = plate on glass also

G2 : P2

G1 : —

G5 P2

G4 P1




Groups

A 3-4-5

Z 1-5 later.

died (drying?)

B 1-2-3-C2

B1
B3
B2
C2 ?

C 3-4-5

5/13
14

D2-D3

E 3-4-5 large pair

4 5
2 3

D4-5 not stuck

E1 blank
F3 "

F 1-2

F 3-4

Deaths may have resulted from dry.... Were anticipated by 10 PM in failure of division of A4, F1, F4, F5. E1, E3 were blank. E2 should have grown.

---

W1113 stock susp. was also plated on EMB Lac ± sm.
Counts difficult, possibly ≯4 R1 : 32 P1 : ca 200-300 P2. on EMB Lac
An Lac sm, P1 : P1+R1 = 330 : 34 (very few R1 & P1)

P19. cf. P2, W1655, W2206 × P1. 10:1 ratio, Incubate 4 hours + Plate EMB Lac sm.
W1655, W2206 No SR+ (> 300 −) each. P2 × give 42 SR+ / 271 total (P1 + P1R1)
(over) = 15.5%

∴ Therefore the incidence of R1/P1 isolations is now no better than chance!

DATE: 1/19/54. REF:

A) Direct platings of clones to EMB Lac agar.

| | | #cells recorded. | Lac: Found. 1/19 2:35PM. |
|---|---|---|---|
| possible leakage from glass! 1 | (A2) | 3 | 3 ± |
| 2 | (A1) | 3 | 0 |
| 3 | A5 | 3 | 6 ± (1 under glass) |
| 4 | B5 | 2 ( — — ) | 2 − Both Gal+ |
| 5 | B4 | 11 (some doubled?) | 13 ± (1 under glass) |
| 6 | B3 | 3 doubles | 5 ± |
| 10 | F2 | 3 (fuzz | 3 − ( |

to 11:10PM 1/18. Excellent recovery.

B) on cover glass. E1, E2, F1, 3, 4, 5 and A4 n.g. (as reported at 10^43 also! as empty single cell [illegible]) all other grow, including Z (extra from A3) 1-5.

| | Lac | Gal | T1 | SM. | Diagnosis | ✓G↑: |
|---|---|---|---|---|---|---|
| Z 1 | − | + | S | R | P1 | |
| 2 | − | + | S | R | P1 | |
| 3 | − | + | S | R | P1 | |
| 4 | − | + | S | R | P1 | |
| 5 | − | + | S | R | P1 | |
| A 3 | − | + | S | R | P1 | |
| A 5 | ± | − | R | S | P2 | ✓ |
| A1 | ± | − | R | S | P2 | — |
| A2 | ± | − | R | S | P2 | ✓ |
| B1 | ± | − | R | S | P2 | |
| 2 | ± | − | R | S | P2 | |
| 3 | ± | − | R | S | P2 | ✓ |
| C2 | ± | − | R | S | P2 | |
| C1 | − | + | S | R | P1 | |
| C3 | ± | − | R | S | P2 | |
| 4 | ± | − | R | S | P2 | |
| 40 5 | ± | − | R | S | P2 | |
| D1 | − | + | S | R | P1 | |
| D2 | − | + | S | R | P1 | |
| 3 | − | + | S | R | P1 | |
| D4 | ± | − | R | S | P2 | |
| 5 | ± | − | R | S | P2 | |
| E 5 | − | + | S | R | P1 | |
| 4 | − | + | S | R | P1 | |
| 5 | − | + | S | R | P1 | |
| F2 | − | + | S | R | P1 | |

some pool

some G+ colonies [illegible]

| | Lac | Gal | T1 | S |
|---|---|---|---|---|
| B4 | ± | − | R | S |
| B5 | −,+ | + | S | R |

Lac − ✓

inc. Lac+ pop.

B5 ✓ :

∴ all parentals except B5!

High ratio of P2:P1 not necessarily efficient.

Perfect concordance with drop platings.

∴ of original cells, There were 7 groups of P1, 5 groups of P2, 1 cell → P1 → P1+R1 and 1 group P1+P2 → 2 [illegible]

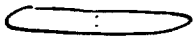
Cells: 11 P1 13 P2 1 P1+R1

✓ 2 blanks and 5 dead

B5.

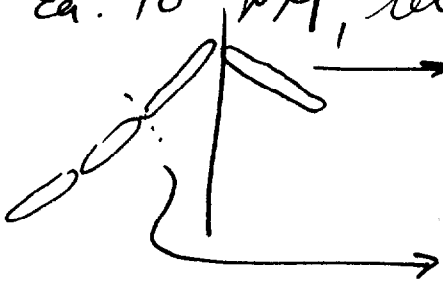
"Isolated as a single O cell from a clump."

at 5:12PM recorded only as



"Long"

At ca. 10^30 PM, recorded as



→ P1+R1 (left in drop).

→ P1, P1. (plated on glass)

see remarks over next page.

DATE: 1/21/54. REF:

11 – 1$^{30}$ P1×P2 1:1:8 Penassay.

Ail. (Intern. visitors ...) at 5$^{10-30}$ 8$^{30}$

X 1. large cells 4$^{10}$ same at 5$^{10}$ 8+ snake

2. 4$^{14}$ *** ** 12+2 in one chain

A 3 } 4 } stayed together to 4:16 → → 5$^{10}$ * same

5 } 6 } → 5 as unit 6 +2

4+4

separated

2 [not absolutely certain but no other similar cells in neighborhood].

X 6PM – 8$^{20}$

A5 9PM → A4

* ** ***

Retransfer to B:

A1 → B1.

A2 snake → B2

~~A3~~

A4 → B3

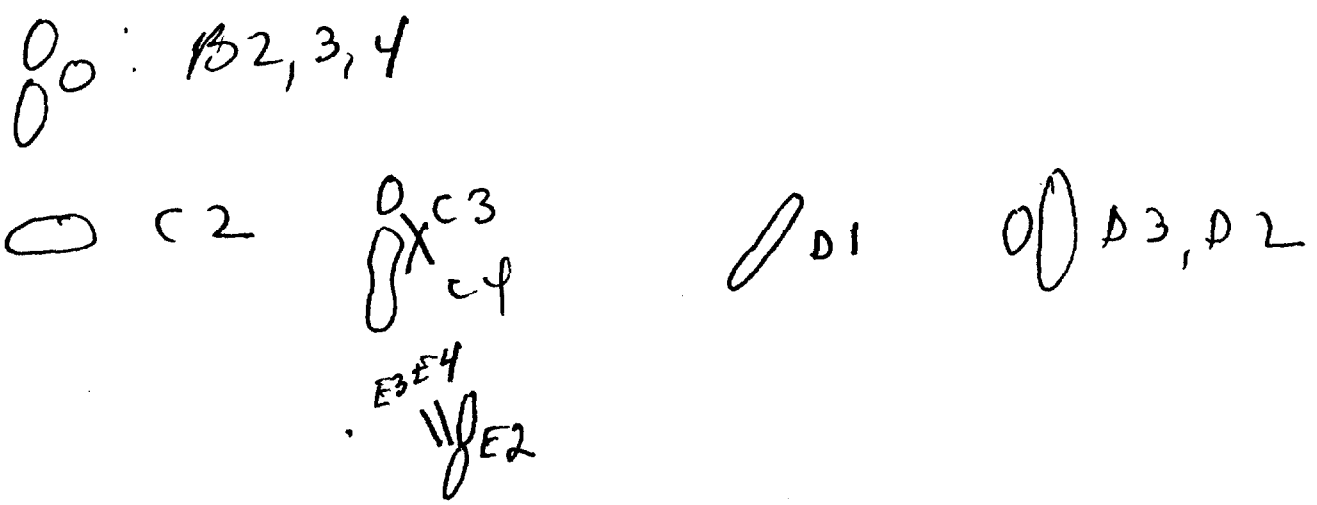
A5 → A4

9:00PM A3 has:

none [illegible] removal

(over)

1114C.




(all but E3, 4) = P1
= P2

1114
Series

| | | EMBlac | | | |
|---|---|---|---|---|---|
| A. | 1 → B1 | NG | | | |
| | 2 → B2 → 1 | P1 | ← R1. | all $S^R$ $V_1^S$ | → P1+R1 |
| | 3 4 | P1 | | | P1 |
| | 4 → B3 NG; | 0 | | | |
| | 5 | 10 P1 | | | P1 |
| | 6 | 6 P1 | | | P1. |
| B. | 2 | Lac+ $S^R$ | Gal + $V_1^S$ | Pure Lac+ ! | cf. A 2 |
| C. | B 2 | Lac− $S^R$ | Gal+ $V_1^S$ | | P1. |
| | 3 | " | " | | P1 |
| c4NG: | 4 | " | " | | P1 |
| | C 2 | " | " | | P1 |
| | 3 | " ✓ | " | | P1 |
| | 4 | " | " | | P1 |
| | D 1 | " ✓ | " | | P1 |
| | 2 | " ✓ | " | | P1 |
| | 3 | " ✓ | " | | P1 |
| | 4 | " ✓ | " | | P1 |
| | E 2 | " | " | | P1 |
| | 3 | ± $S^S$ | Gal − $V_1^R$ ✓ | | P2 |
| | 4 | ± $S^S$ ✓ | Gal − $V_1^R$ | | P2 |

2 P2: 14 P1 :

A1 B1. → A1 B1.

A3 B2 B3 B4 — B2 B4 (B3, A3)

C1 C2 — C3

D1-2-3

D4-D5

E. E1 ? lost, E3, E4 E2

F. 1 (3 4 5) 2

(7 P1 2 P2

| | Growth | all pure Lac (A25). | S | Gal | V1 | | | |
|---|---|---|---|---|---|---|---|---|
| A1 | ✓ | − | R | + | S | | P1 | |
| B1 | ✓ | − | R | + | S | | P1 | |
| A3 | ✓ | − | R | + | S | | P1 | |
| B2 | ✓ | + | S | − | R | | P2 | |
| B3 | SN → grew out A25 (P1 morph) | − | R | + | S | $\lambda^s$ ✓ | P1 | sent hold for recheck |
| B4 | ✓ | + | S | − | R | | P2 | |
| C1 | ✓ | − | R | + | S | | P1 | |
| C2 | ✓ | − | R | + | S | | P1 | |
| C3 | ✓ | − | R | + | S | | P1 | |
| D1 | ✗ ✗ | | | | | | | |
| 2 | ✓ | − | R | + | S | (* destruct appearance on EMB lac and weak? Gal possibly a minor mutant) | P1 | |
| 3 | ✓ | − | R | + | S | | P1 | |
| D4 | ✗ | | | | | | | |
| 5 | ✗ | | | | | | | |
| E1 | ✗ | | | | | | | |
| 2 | ✓ | − | R | + | S | lost P2's | P1 | No Zyg! |
| 3 | ✓ | − | R | + | S | | P1 | |
| 4 | ✗ | | | | | | | |
| F1 | ✓ | − | R | + | S | | P1 | |
| 2 | ✓ | − | R | + | S | | | |
| 3 | ✓ | − | R | + | S | | | |
| 4 | ✓ | − | R | + | S | | | |
| 5 | ✓ | − | R | + | S | | | |
| G1, G2 | | − − | RR | ++ | SS | | | |

A25 controls OK.

1/23/54

1:1:3

4:25 - 3:05 at 37

3:05 - 3:25 at RT to dil. pyrex. - 5:05. Plating at 4:05 PM:

EMBlac sm. 3 P1·R1 per 167 (2%).

EMBlac : probable zygotes = 5/130P2/113P1.

Among 3 of 3 plates, colony appearance suggests following distribution: R1 P1 (P1P2 R1P1P2). Simple sectored colonies P1+P2 not counted here.

||| ≠ ~~||||~~ |||

This may of course be inaccurate.

---

G1,2 = pur. D1, D2. " controls OK.

---

Crew P23 - P24 at R.T.

A1,3, B1,2 C1,2,3 D— E2,3 (6?) F1,2,4,5,6.

∴ growth failed in (B3) ; D1, 4, 5; E1, E4;

controls OK. Same may have dried out.

Morphology ~ wg 28A except: B2 (motile, bacillary)

B3 has self limited smalse development. Hold!

large, wide elements

....

B4 grew in a smaller droplet. bacillary but not motile; - - , - -

D2 small drops. D3 sm drops D4 - D5 dry (some cells?)

D6 dry

E1 - E4 - F3 sm drop.

Education.

1116

1/25/54

W1655, W2338.

exp. cultures in Rivassay, 1:1:2 $3^{20}$ at 37°.

$3^{40}$ dilute 1:50. Try to find F+/F- pairs. But drops were too dilute. However.

D4-5
E4-5 from poss. pairs, but both are morph. W2338 next day.

D1-2-3 from poss. { 10-2. 10-1. D3 n.g. D1,2- to EML.

controls OK. A-E 1-5.

D3.

| | EML F test (659) |
|---|---|
| D1 | - |
| D2 | - |
| D3 | - |
| D4 | + |
| D5 | - |
| E4 | + |
| E5 | - |

T.O.

1/26/54.

P1xP2 (old) 1:1:8 12:15 – 2:45.

① Plate on EMB Lac ± sun to rev $V_1$ segregation (cf. $V_1^s$ character of all SR + so far!).
(B) ca 3PM. (B) see over

② Dilute 1:50 for single cell...
High ratio of inviable. This experiment involved rather fresh (gram cells) still possibly in stationary phase.
Drops empty overnight still stuck at N28. Cols –

Grew:

| | | | EMB Lac | Gal | T1 | Lac | S | |
|---|---|---|---|---|---|---|---|---|
| 1 | B | 3 | – | + | S | – | R | – diff shade Lac, Gal |
| 2 | | 4 | – | | | | | |
| 3 | | 6 | – | | | | | |
| 4 | C | 4 | – | | | | | |
| 5 | | 5 | – | | | | | |
| 6 | D | 3 | – | | | | | |
| 7 | | 4 | – | | | | | |
| 8 | | 6 | – | | | | | |
| 9 | E | 1 | – | | | | | |
| 10 | | 2 | – | | | | | |
| 11 | | 3 | – | | | | | |
| 12 | | 4 | – Rev, ++ | | | | | |
| 13 | | 6 | – | | | | | |
| | F | 1 | NG (drop growth also peculiar) | | | | | |
| 14 | | 2 | – | + | S | | | |
| 15 | | 3 | – | + | S | | | |
| 16 | | 4 | – | + | S | | | |
| 17 | | 5 | – | + | S | | | |
| 18 | G | 1 | – | + | S | | | |
| 19 | | 3 | – | + | S | | | |
| 20 | | 5 | ± | – | R | ± | S | P2 |
| 21 | | 6 | – | + | S | | | |
| 22 | H | 1 | – | + | S | | | |
| 23 | | 5 | ± | – | R | ± | S | P2 |
| 24 | I | 1 | – | + | S | – | R | P1 |
| 25 | | 2 | – | + | S | – | R | P1 |
| 26 | | 3 | ± | – | R | ± | S | P2 |
| 27 | | 6 | – | + | S | – | R | P1 |

P1

[no Lac I seen; T1: S, R.]

almost all P1

23 P1
1 P1, R1
3 P2
compare with high incidence in plating!

P1, R1 < Lac + Gal + S $V_1$ ; Lac – Gal + SR $V_1$

11 cols. + stuck → any Lac + $V_1^s$?

E 4 was merely $\frac{\rho_5}{4}$ of ordinary size! #5 n.g. But this was 150 minute cross.

1117B. Pick Lac ✓ from EMB Lac
to classify proportions of types and
to characterize Lac - $V_1$ segregations.

Columns 1, 2 6, 7 Brush 65 isolates
on EMB Gal/T1 (no pur.) and indicate
T1/Gal types Gal+ $V_1^S$/Gal+ $V_1^R$ usually typeable
but some doubtful

Columns 3, 4, 8, 9 Lac types on streakout
✓ [illegible] to be repeated

---

1117B: Plated (T.C.N.) $2 \times 10^{-7}$ ml per plate.

| | | | | |
|---|---|---|---|---|
| EMB Lac | Lac+ | 40.6 | Lac sm | |
| $\bar{X}$: | Lac- | 55.2 | | Lac - 48.8 |
| | +/- | 3.5 | (SR+) | +/- 3.7 |
| | | 99.3 | | |

∴ SR+ = Lac+/-. Plates all showed Poisson variation of each type.

$$\% \text{ zygotes} = \frac{3.5}{99.3} = 3.5\%$$

$$= \frac{3.5}{58.7} \text{ of P1 type} = 5.96\%$$

∴ expected ca ~~[illegible]~~ 1.43 zygotes from 24 P1- isolations.

Found 1 (see over): not different from chance!

Total $\chi^2$ testing Poisson variance: $\chi^2 = 56.0$ d.f. = 50

$\chi = 10.583 - 9.950 = .633$ $p = .6-.5$

Plate 1 analyzed by Newton Hunter 2 - 9, 3 - 8

1117

DATE: EMBlac REF: EMBlac sum

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| | Lac + | Lac − | Het | | | | Total | Hit | − hit |
| 1 | 48 | 51 | 4 | | | | 55 | 4 | 51 |
| 2 | 44 | 48 | 4 | | | | 56 | 1 | 55 |
| 3 | 31 | 67 | 3 | | | | 53 | 7 | 46 |
| 4 | 52 | 61 | 3 | | | | 62 | 9 | 53 |
| 5 | 28 | 49 | 4 | | | | 42 | 3 | 39 |
| | | | 3 | | | | | 0 | |
| $\Sigma x$ | 203 | 276 | 4 | | | | | 3 | $\Sigma x = 244$ |
| $\Sigma x^2$ | 8089 | 15516 | 4 | | | | | 7 | |
| | | | 2 | | | | | 4 | $\Sigma x^2 = 12072$ |
| | | | 1 | | | | | 3 | |
| $\bar{x}$ | 40.6 | $\bar{x} = 55.2$ | 8 | | | | | 3 | $\bar{x} = 48.8$ |
| $\Sigma d^2$ | 447 | 281 | 3 | | | | | 2 | |
| | | | 3 | | | | | 4 | $\Sigma d^2 = 165$ |
| $\chi^2_4$ | 11.0 | 5.1 | 2 | | | | | 2 | |
| | | | 2 | | | | | 5 | $\chi^2 = 3.4$ |
| $p$ | .05-.02 | .3-.2 | 3 | | | | | 2 | |
| | | | 2 | | | | | 4 | |
| | | | 4 | | | | | 4 | |
| | | | 5 | | | | | | |
| | | | 3 | | | | | | |
| | | | 5 | | | | | | |
| | | | 6 | | | | | | |

not corrected

not corrected

20

Lac vs. Lac

$\chi^2 = \frac{73^2}{479} = 11.1$

$p < .01$

Lac vs. Lac

$\chi^2 = \frac{32^2}{520} = 1.97$

$p = .2-.1$

$\Sigma x = 78$

$\Sigma x^2 = 326$

$n = 22$

30

$\bar{x} = 3.545$

$\Sigma d^2 = 326 - 276.545 = 49.455$

$\chi^2 = \frac{49.455}{3.545} = 14$ $p = .4$

$\Sigma x = 67$

$\Sigma x^2 = 333$

$n = 18$

$\bar{x} = 3.722$

$\Sigma d^2 = 333 - 249.389 = 83.611$

$\chi^2 = 22.5$ $p = .2$

$F_{17,21} = \frac{4.918}{2.355} = 2.09$ $p > .05$

$\sigma^2 = \frac{133.066}{38} = 3.502$

40

$\chi^2_{[1]} = \frac{9.9[.177]^2}{3.625} = .0856$ $p = .75$

$\sigma^2 = \frac{145}{40} = 3.625$

∴ Het variance Poisson, means homogeneous.

| | col. 2,3 | Col. 8, 7-8 | |
|---|---|---|---|
| + | 276 | 244 | 520 |
| − | 18 | + 24 | 42 |
| | 294 | 268 | 562 |

$\chi^2_{[1]} = \frac{(2232)^2 n}{\pi} = \frac{2.8 \times 10^9}{1.72 \times 10^9} = 1.6$ $p > .2$

50

∴ Frequency of het. homogeneous in the two tests. Het : Lac.

1117B
(1)

EMB Gal $V_1$ 1/27/54

DATE: Streak EMB Lac REF:

| | S | R | ++ | − | ± | EMB Lac/T1 1/21/54 | S | R | ++ | − | ± | Lac $V_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | + | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | | ✓ | ✓ | ✓ | + | + | + | ✓ | ✓ | | + |
| | | + | ✓ | ✓ | | | + | + | ✓ | ✓ | ✓ | + |
| Gal * | + | − (+ rec) | ✓ | ✓ | ✓ ? | + | + | + | ✓ | ✓ | | + |
| | + | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| 10 | | + | ✓ | ✓ | ✓ | + | + | + | ✓ | ✓ | | + |
| 11 | | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| * | + | − | ✓ | ✓ | pure Gal + | + | + | + | ✓ | ✓ | | + |
| | + | + | ✓ | ✓ | × | + | + | + | ✓ | ✓ | | + |
| | + | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| ? 20 | | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| 21 | + S | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + R (+S) | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| * | + S | − R | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| * | + S | − R | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | (+R) | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | (+R) | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| 30 | (+R) | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| * 31 | + S | − R | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | (+R) | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + R | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| * | + S | − R | ✓ | ✓ | ✓ | + | + | + | ✓ | ✓ | | + |
| | + R | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | + R | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + S | (+R) | ✓ | ✓ | pure Gal + | + | + | + | ✓ | ✓ | | + |
| 40 | + S | | ✓ | ✓ | ? pure Gal + | + | + | + | ✓ | ✓ | | + |
| 41 | (+S) | + R | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| * | + S | − R | ✓ | ✓ | ✓ | + | + | + | ✓ | ✓ | | + |
| | + | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| | + | + | ✓ | ✓ | | + | + | + | ✓ | ✓ | | + |
| * | + | − | ✓ | ✓ | ✓ | + | + | + | ✓ | ✓ | | + |
| * | + | − | ✓ | ✓ | ✓ | + | + | + | ✓ | ✓ | | + |
| 50 | + | + | ✓ | ✓ | ? sic ✓ | + | + | + | ✓ | ✓ | | + |

not verified all from + Lac

? Rev again on EMB Gal (for Gal−)

P1+P2

purified test on EMB Gal/T1.

× = unscoreable.

1st streak not too clear. Repeat N28 (DCG)

2338 Gal−

scores have Gal+$V_1^R$ do not.

Summably this is segregation of $V_1$ among recombinants (Lac+$S^R$), as can be verified

EMB Lac.

10/65 contain P1·P2·(R1) being rechecked. Some recorded as Gal+$V_1^R$ probably also have $V_1^S$ not certainly detected.

of 64 zygote colonies (1117B) scored,

31 lacked Gal + $V_1^R$ (± Gal − $V_1^S$), but had Gal + $V_1^S$ and recombinants

32 had Gal + $V_1^R$, at least 21 also Gal + $V_1^S$ (pres. parental)

This would argue for 1:1 rate S/R if the latter are pure. Test for homogeneity of recombinants

---

① For this purpose, ignore pure + S scores

② Check ① Lac − fur Lac + from others for homogeneity

~~Exp. tests for Lac − $V_1^S$ among app. pure + R~~ (more efficient in 1119).

---

Scores on Lac / S agree generally with Gal

Though not always to definite

Re ✓ 27, 57 as

having Lac − $V_1^R$ recomb.

These should have been detected, if present,

in virtually all cases where Lac + comp.

was $V_1^S$.

Revised scores

1117B

Zygote character
1 R1
2 P1+R1+P2
3 P1+P2

V1 character (excl. 3)
A pure $V_1^S$ Gal(+)
B $V_1^R$ Gal+ present
• ~ $V_1^S$ + notable

(1)

| | | | | |
|---|---|---|---|---|
| 1 | 1 | A | | |
| | 1 | A | | |
| | 2 | B | | |
| | 1 | B | | |
| | 2 | A | | |
| | 1 | A | 3 | |
| | 1 | A | 4 | |
| | 1 | B | 2 | |
| | 1 | B | 5 | |
| | 1 | A | | |
| | 2 | B | | |
| 11 | 1 | B | 3 | |
| | 1 | B | 4 | |
| | 1 | A | 6 | |
| | 1 | A | 7 | |
| | 1 | A | 8 | |
| 17 | 1 | B | 9 | X |
| | 1 | B | | |
| | 1 | B | | |
| 21 | 1 | A | B | |
| | 1 | A | | |
| | 1 | A | | |
| | 1 | B | | |
| | 1 | A | | |
| | 3 | A | | |
| | 3 | A | | |
| | 1 | B | 10 | X |
| | 2 | B | | |
| | 1 | B | 11 | |
| 31 | 2 | A | | |
| | 1 | A | 14 | |
| | 1 | B | 12 | X |
| | 1 | B | 13 | |
| | 3 | A | | |
| | 1 | B | | |
| | 1 | A | | |
| | 1 | B | | |
| 39 | 1 | - | A | A |
| 40 | 1 | - | A | |
| 41 | 1 | | B | |
| | 3 | | A | |
| | 1 | | B | |
| | 1 | | B | |
| | 1 | | B | |
| | 1 | | B | X maybe 1A+ -R |
| | 2 | A | A | |
| 49 | 3 | X | A | |
| | 1 | | B | |

45 has +S -R

| | | |
|---|---|---|
| 51 | 1 | B |
| | 1 | B |
| | 2 | A |
| | 1 | B |
| | 1 | A |
| | 1 | B |
| | 1 | B |
| | 1 | B |
| | 1 | A |
| | 1 | A |
| 61 | 1 | B |
| | 1 | B |
| | 1 | A |
| | 1 | B |
| 65 | 1 | A |

also has - $V_1^R$ A+ -

-111

Final

~~2A~~ 29A
53 - 1 < ~~3B~~ 26B
7 - 2 < 4A 3B
5 - 3 <

+350 type 1
B type 2
+14 type 3

at 2½ hours

4 to be verified

Variety of $V_1^R$ might be useful in separating type 2 and 3

2B might be overcast step (usual, confused c 3).

$R1^S + P2$

~~Totals 1,2 A 29~~
~~1,2 B 31~~

Notable discrepancies in Gal/Lac for # 17, 28, 33, 45, 46, 57. were classed as 1B. If these are included, we have 22 1A : 25 1B.

In Class 2, which were detectable as Gal+$V_1^S$ Gal−$V_1^R$ ?

3 Bwo
5 Ayes
10 Bwo
29 B
31 Ayes
33 Ayes

47 A

∴ Totals:

1 < 25A, 26B  $\frac{Lac+V_1^S}{Lac-V_1^R}$  −2

2 < 4A, 3B.

$$\therefore \frac{Lac+V_1^S}{Lac+V_1^R} = \frac{25+2+4}{26+3} = \frac{31}{29}.$$

see 1117C

∴ no discrep. here

If ratios in 1-cell isolation:

| Re-examining Lac/T1 | | Repeat Lac/T1 |
|---|---|---|
| 17 Clear plaques | + | probably ✓ |
| 28 " " | + | mixed: ✓ $\frac{Lac+V_1^S}{Lac+V_1^R}$ and score as 1 each. |
| 33 " " | + | $Lac+V_1^S/Lac-V_1^R$ |
| 45 " " | ++ | $Lac+V_1^S/Lac+V_1^R$ (P2?) or remove from score. |
| 46 " " | +++ | ~~$Lac+V_1^S/Lac-V_1^R$~~ |
| 57 " " residing Lac− only. | ++ | clearly $Lac+V_1^S$, $Lac-V_1^R$ |

+ prob
++ certain
$V_1^R$

17 28 33 may have −S, +R
45, 57 have −R+S
46? may have Gal−$V_1^R$

1 A
28
33
45
46

57?

# Homogeneity tests.

1117 B

1/29/54 (1117 E4) 11 ~~[illegible]~~ Lac+ Gal+ all $V_1^R$

Pick Lac+ (pref. not ± or −) colonies and test on Gal/T1.

1/29 types 2, 3.

1B: Gal+ 5R (1 S) (✓ Lac) ~~[illegible]~~ Restrick R, S

2B 3: 6 + R

2B 29 6 + R

Lac+ components (Lac − presumed $V_1^S$)

otherwise [illegible] homogeneous $V_1^R$.

1B 50 6 + R

1B 51 + R

1B 34 + R

1B 3[illegible] 6 + S ! ∴ 1A if Lac −

43 6 + R

44 6 + R

[illegible] should better [illegible] these on Lac [illegible]

(Lac+ unspiked.)

Could this be a Lac − Gal+ by mistake? (= P1)

when streaked, S and R comps are both pure Lac+ (R some but weaker!)

Save for re − of course, in 2B types there is likelihood of recurrent recombination where there was a primary or not! This is probable explanation. Restrick on EMB Lac ± soon for further analysis.

Conclusions:

① Most zygotes are homogeneous in recomb unless P2 still present. $V_1$ heterogeneity might be useful to discriminate primary + secondary recombination.

② $V_1$ s zygotes 1:1 for R/S

2/3 46: 10 Lac − are $V_1^S$ 57: 9 Lac − : 2 $V_1^S$, 7 $V_1^R$

1117B 57: 4 Lac+ $V_1$ S 4: 4 Lac- S

sucov. 4 Lac- S 11: 4 Lac- S

27: 4 Lac- S

30: 4 Lac- S

58: 2- R

2- S assoc. with Gal+ (Lac+?) $V_1^R$ ~~and~~ any Lac+ $V_1^S$?

36 4- S

note, e.g. 58 Lac- also mixed R/S so that this is presumably Lac+R, Lac-R, Lac-S

Streak out $V_1^R$ from 45: Gal+, mostly Lac- (some fur + papillae)

∴ 45 contains Gal+ { Lac+ $V_1^S$, ~~Lac+ $V_1^R$~~, ~~Lac- $V_1^S$ (P1)~~, Lac- $V_1^R$ }

Lac+ $V_1^R$? (new recomb? cf. 1107B5?)

46: Gal+, mostly Lac+. ~~(Some-?)~~

∴ Lac- $V_1^S$ presumed. (P1)

Lac+ $V_1^R$

Re ✓ exceptions

1117B

2/2/54 etseq

(1) Restreak on EMB Lac, Gal:

| | | | |
|---|---|---|---|
| 17 | pure Gal+ ; | lac+ seems weak., | lac+/− |
| 33 | " | | " |
| 45 | " | lac++ | " |
| | | " | |
| 46 | " | | |
| 57 | " | " | |
| | | " | |

# Types definitely seen.

1117 B.

Gal+ unless qualified

• = tested for.
□ = ~~[illegible]~~ present by gross test
⊙ = " absent by gross test.

| | (Gal−) | Gal+ Pl. Lac−$V_1^S$ | − R | + S | + R | tested |
|---|---|---|---|---|---|---|
| 2B | 3 ✓ | □ | | | ✓ | 6 |
| | 4 | □ ✓ | • | | □ | 4 |
| 3B | 10 ✓ | □ | | ✓ | ✓ | 6 |
| | 11 | □ ✓ | • | | □ | 4 |
| | 27 | □ ✓ | • | | | 4 |
| 2B | 29 ✓ | □ | | | □ ✓ | 6 |
| | 30 | □ ✓ | • | | | 4 |
| | 34 | □ | | • | □ ✓ | |
| | 36 | □ ✓ | • | | □ | |
| | 39 | □ | | ✓ | ~~[illegible]~~ □ | |
| | 43 | □ | | • | ✓ | |
| | 44 | □ | | • | ✓ | |
| | 50 | □ | | • | ✓ | |
| | 51 | □ • | | • | ✓ | |
| | 58 | □ ✓ | ✓ | | □ | 4 |
| | 17 | ☑ ✓ | ✓R | ✓ | ☑ ✓ | |
| | 28 | □ | ✓ | □ | □ | |
| | 33 | ☑ ✓ | ✓ | ✓ | ☑ ✓ | |
| | 45 | ✓ | □R | ☑ | ☑ | |
| | 46 | ☑ ✓ | • w(R) | ✓ | □ | from ~~[illegible]~~ R |
| | 57 | ☑ ✓ | □ ✓ | ✓ | ⊙ | |

from original tab. as 1A!

∴ many (~~[illegible]~~) 1B types are pure $V_1^R$ in Lac+. Lac− not tested [defer full analysis to multimarker test] (and Lac−$V_1^S$ in "most"). but cf. 58

∴ a fair proportion of colonies may have, ~~[illegible]~~ in addition to −S (= Pl) 1, 2, or 3 addl. components. How many is not clear, as not many examples.

R: weak + only.

of patent Lac+$V_1^R$ were examined further. But note 39 above. $V_1^R$ is therefore perhaps slightly overestimated.

cf. 1107B5

– Further colony analysis 2/3-4/54

Lac-/U1

| | | |
|---|---|---|
| 17C1 | 4R | 4S |
| 2 | ~~[illegible]~~ | 4R |
| 3 | 3R | |
| 4 | 8S | 0R. |

φ probably infects 1 ?
in earlier test

Corrected totals 2/4/54.

type 1A (presumed simple!) 25 (pure $V_1^S < \pm$) − 25 + 5C

1B (given as simple but possibly containing + S also) 24 + 5C + 1.

C. Containing $^+V_1^R$ and $^+V_1^S$: (17, 28, 33, 45?, 46) 5.

D. (57) Containing +R, −S, −R. (1)

---

∴ Detected + R (parental) = 30

Scored as + S (+R not also present) = 30.

= 1:1

? Possibility of undetected recombinants hitherto ?

(1) Lac ± $S^S$ [illegible] Lac + $S^R$ (Gal+).

2. Gal + $V_1^S$ [illegible] Gal + $V_1^R$ (Lac−)

i.e. pure $V_1^S$ [illegible] cancel $V_1^R$

$S^S$ " " $S^R$.

Left me: Lac − $S^S$ among Lac − $S^R$ (probably best handling with additional fermi. [illegible])

and ~~Gal− $V_1^S$ $S^S$ among Gal−~~

1117C

SR+ colonies picked & purification to EMBLac.
40 + 17. 1/31 Replica to EMBLac ± T1.

C1: Each strokes on EMBLac was Lac+/Lac−. With T1:

| | | | |
|---|---|---|---|
| Unaltered resistants (i.e. Lac+ $V_1^R$ (Lac− not verified) ~~(Lac+R/−R)~~ not verified. | : 19 | 6 | 25 |
| pure sensitive Lac+ $V_1^S$/Lac− $V_1^S$ | : 17 | 9 | 26 |
| ✓ Lac+ $V_1^S$/Lac− $V_1^R$ | : 3 (17C 1-3) | 2 | 5 |
| Recombinant not ~~Obvious Lac+ $V_1^S$/Lac− $V_1^R$~~ not really | ~~1~~ (17C4) | | 1 |
| | plate 1 | plate 2 | |

Or in sum: Lac+ are 31 S: 26 R / 57 total.

Include at least 6 Lac− $V_1^R$ recombinants, possibly more.

1117 B: 31 S: 29 R.

| Totals: | recomb. (S) | par (R) |
|---|---|---|
| B | 31 | 26 |
| C | 31 | 29 |
| Thior. | 1 | 1 |
| 1082 | 26 | 25 |
| 1119 | 15 | 18 |

agreement is obvious
See also 1082. (25R: 26S)

Still queries on incidence of Lac− $V_1^R$ recombinants and association with Lac+ $V_1^R$ ($\underline{S}^R$). Are the Lac− components of these pure?

Misc cells. 1118

DATE: 1/29/54 REF:

12 35 Overnight P1, P2 1:5 3 10 1:1:5 X. Also at
(1235 cross W2377 + W2341.) – 3:55

Growth P ♀. EMB lac strokes Gal, $V_1$, S(Lac)

A 1 ✓ —
2 ✓ —
3 ... tiny dots 0
4 ✓ —
5 ✓ —

all are Gal + $V_1^S$ $S^R$ Lac$^-$ $_S$ = P
except C2 = Gal – $V_1^R$ $S^R$ Lac ± = P2
and E5 = P1, P2 (SR+ m
$V_1^S$ $V_1^R$ papillae

B 1 ✓ —
2 0
3 0
4 ✓ —
5 ✓ —

C 1 ✓ —
2 ± ~~and 2 – ? colonies~~ (= contaminant (also Gal – $V_1^R$) (spatter, not in our tube)
3 ✓ —
4 ✓ —
5 ✓ —

D 3 ✓ —
4 ✓ —
5 ✓ —

E 3 ✓ —
4 ✓ —
5 ✓ —

± and – in equal proportions P1, P2

F 4 ✓ —
5 ✓ —

(Same colonies from 1st plating's restrike.)

No SR+ (exc. at intersection).
Lac – = SR on replica = Gal +
Lac + = $S^S$ = Gal –

controls OK
A3 OK
B2, 3 n.g.

18 P1
1 P2
1 P1 + P2

1119
(813)

DATE: Jan 27, 1954 REF:

W2377 x W2341 12 30 – 5PM.

A EMBlac

B EMBlac sm

C EMB lac T1. (for S-ratio)

D = C ca 10X

late action of phage and secondary crossing ?

(⁝) or (·)

C: colonies Lac–, Lac+ comp. (6 have only small papillae? unlike anything noted with streptomycin.)

19/165 tot.

11/122 } (pait squared)
5/70 }

35/357 +-/-. A: + ca =. Not acc. scoreable for + vs ±, –.

B. +-/tot = 12/171
6/149
15/236
14/231
47/787

Intact (apparently) in B: 2+1?
C: 0

Since virtually all of these colonies in B or in C are Lac+/Lac– sectored, no recombinants are here missed that are not otherwise picked up if only as +/–.

Why discrepancy in rel. count? 10% in C
ca 6% in B

a) counting some "papillate" $V_1^R$ Lac+
b) as other hand, some $S^R$ Lac+ are $V_1^S$!

1/28. Pick B, C, D to EMB lac + store for later study.

This cross does give rec. yields also.

1119
B – C – D

DATE: 1/31/54. REF:

(B) Plates stored from 1/28 in fig.
Replica B to Lac, T1 to score the $V_1$ segr. ratio (cf. 1117 B).
All colonies have Lac – $V_1^R$ (P1 residue); score strokes for presence of Lac+ s/c T1.

2/1/54

| Lac char: | – T1 | + T1 | Score type |
|---|---|---|---|
| 1 + | | (–) + | 1 |
| + | | + | 1 |
| + | | + | 1 |
| + | | + | 1 |
| + – | | – + | 1 |
| + | | – | 2 |
| + | | – | 2 |
| + | | + | 1 |
| + | | + | 1 |
| 10 + | | – | 2 |
| + | | – | 2 |
| + | | – | 2 |
| + | | + – | 1 |
| + | | – | 2 |
| + | | – | 2 |
| + | | – | 2 |
| + | | + | 1 |
| + | | + | 1 |
| + | | – + | 2 |
| 20 + | | + – | 1 |
| + | | – | 2 |
| + | | + | 1 |
| + | | + | 1 |
| + – | | – (+) | 2 |
| + | | + | 1 |
| + | | + | 1 |
| + – | | – + | 2 |
| + | | – | 2 |
| + – | | + – | 1 |
| 30 + – | | + – | 1 |
| + | | – + | 2 |
| + | | + | 1 |
| + | | + | 1 |

∴ 18 type 1 15 type 2.

Lac+ $V_1^R$ (par) $V_1^S$ (recomb.)

Totals now are ~~98~~ parental ~~103~~ recomb. | ~~99~~ $10^2$ !

Lac / $V_1$ : among Lac+ $S^R$ recombinants, including $V_1$ reversal.

$\chi_1^2 = \frac{12.5}{101.5} = .1$

$p = 0.8$

<10 + all $V_1^R$ – ; <10 Lac+ Lac– all $V_1^R$. ∴ type 1.

Restrain 1119 B ~~[illegible]~~ B20 for components:

actual numbers therefore type 1 : 19
2 : 14.

$\chi_1^2 = 0.7$

Scores: 1 : T1 no effect = + R / –.
2 Lac+ $V_1^S$ / – R
[3 Lac+ $V_1^S$ (+ $V_1^R$ ?) / – R] probably ≐ 1, phage inadequate mixture possible but ignore here. They would not influence ratios in some marked 3. in any event.

But $p_{total}$ almost too high!

1119C

DATE: REF:

Replace Lac+$V_1^R$/$-^R$ to EMBLac ± Sm.

2/1/34.

C1. 30. Lac+ equally prominent in EMBLac sm.

C2. ← C 10 ~~30~~ 20. " " " " " "

D1. 23.

D2. 29.

Conclusion

112 all orthotype $S^R$ among Lac+$V_1^R$ recombinants. Still possible that some $S^S$ are present but obscured in mixture but no evidence for it. ∴ S behaves very differently from Lac, $V_1$. Other data show extreme rarity of Gal/S recombinants but this should be reviewed in multipoint tests.

Recheck in 1119 only to verify 13, 20.

2/5 See also 1026, just noted!!

Note also, in 928-945, W1895 × W1177 among Lac+$S^R$'s, reported 41S:74R (par. recom.). (poss. of selection through linkage to TL?). Needs to be reprated.

Casual 1-cell cool. 1120

DATE: Jan 28, 1954. REF:

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cross: old mouse P1xP2 1:1:8, 2:10PM – 3:30 | | | | | | | | | | |
| Setup 3:45. Morphol: (not ...) | | | | | | | | | | |
| Grow N29: N30 Gal Tilac SA30. | | | | | | | | | | |
| A 1 | | ✓ | not not. (macro-some) | | + | S | – | R | P1 | |
| 2 | | | | | | | | | | 15 P1 |
| 3 | | ✓ | | | | | | | | 5 P2 |
| 4 | | 0 | rec bacteria? | | + | S | – | R | P1 | |
| 5 | 0 | ✓ | 1 | | + | S | – | R | P1 | 1 P1, R1 |
| B 1 | | ✓ | 1 | | + | S | – | R | P1 | [redacted] |
| B2 | 0 | 0 | 0 | | | | | | | |
| 4 | 0 | ✓ | 1 | | + | S | – | R | P1 | |
| 3 | | ✓ | 1 | | (+S) | (+R) | –, + | R | P1 | R1 (V, R) |
| 5 | 0 | 0 | 0 rec bact? | | | | | | | |
| C 4 20 | | ✓ | | | [redacted] | | – | [redacted] | [redacted] | NG (in both also) unspecified |
| C1 | | ✓ | 1 | | + | S | – | R | P1 | |
| 2 | | ✓ | 1 | | + | S | – | R | P1 | |
| 3 | | 0 | 0 | | | | | | | |
| 4 | v. sup. | | 2 (+1?) | | | | | | | |
| 5 | 0 | ✓ | 2 | | (+S) | (–R) | | | P1 | |
| D 3p | | ✓ | 1 | | + | S | – | R | P1 | |
| 2 | | ✓ | 1 | | + | S | – | R | P1 | |
| D3 | D3 | ✓ | 1 | | + | S | – | R | P1 | |
| E2 | 2 3 | ✓ | 1 | | + | S | – | R | P1 | |
| E3 | | ✓ | 1 | | + | S | – | R | P1 | |
| D4 | | 0 | 0 | | | | | | | |
| D5 40 | 0 | ✓ | ✓ | | – | R | ± | S | P2 | |
| E1 | | 0 | 0 | | | | | | | |
| E4 | | ✓ | 1 | | + | S | – | R | P1 | |
| F1 | not gdump. (had one) | ✓ | 1 | | + | S | – | R | P1 | |
| F3 | | ✓ | 2 | | – | R | ± | S | P2 | |
| 4 | | ✓ | 2 | | – | R | ± | S | P2 | |
| 5 | | ✓ | 2 | | – | R | ± | S | P2 | |
| dump G3 | | ✓ | 2 | | – | R | ± | S | P2 | |

Previous testing waste stock out completely as well as cross back. Now omit the stock except alive & specimens.

(F3) controls OK. Selection for size ... P for vodinking

G4 G5 G6 cells!

Review V, segregation in 1-cell recomb.

Cross brush against T1, T1 sm / Lac

| # | T1 | (T1 sm.) | |
|---|---|---|---|
| ~~1105 A2~~ | ~~S~~ | ~~(the same) P1 P2 (or)~~ | ~~(This is the [illegible] strain)~~ |
| 1105 E4 | S, occ. R | P1 P2 | |
| 1107 - A3 | S | P1 R1 | |
| - B5 | S, R | P1 R1 | |
| 1110 E5 | R, S | P1 P2 ✓ | now heavily mixed with R1 also. |
| 1112 B4 | R, S | P1 P2 ✓ | |
| 1113 B5 | S | P1 R1 ✓ | |
| 1118 E5 | S, R | P1 P2 ✓ | |
| 1120 B3 | R, S (+ −) | P1 R1 ✓ | |

New information:

1107 A3 R1 is S

1107 B5 ~~R1 is probably R~~ (+R, +S, −R, −S)

1105 E4 } stated as P1, P2 mid check.

11~~[illegible]~~

unsaved label ("BB2").

DATE: 2/1/54. REF:

P1, P2 Mix fresh cells ~~1+2~~ 2:2:2 3$^{00}$ (−9:30 PM.)
Look for clumps, pairs. Most isolations ca 4$^{30}$.
— Note on motility. W2344 seemed much less motile in dilute growing cultures c̄ 2338 than otherwise. Compare effect of growth phase, mixture.
See protocols A1, E1 ng. Controls OK except (1 very large drop = Lac ± Gal −1) (flushing of possible accident).

From clumps.

D
C inhibited on Lac sm.

| Lac | S |
|---|---|
| Gal | V1 |

| | A | B | C | D | E | F | D | |
|---|---|---|---|---|---|---|---|---|
| 1 | × large | − 1 R | ± 2 S | − R 2 cells! | × | ± 2 S | ± S | 2 |
| | | + S | − 2 R | − 2 R | | − R | − R | |
| 2 | − 1 R | − 1 R | ± S | + S | − 1 R | ± 2 S | ± S | 2 |
| | + S | + S | − 2 R | − 2 R | + S | − R | − R | |
| 3 | − 1 R | ± 2 S | ± S | − 1 R | ± 2 S | ± 2 S | − R | 1 |
| | + S | − R | − 2 R | + S | − R | − R | + S | |
| 4 | ± 2 S | − 1 R | ± S | ± 2 S | − 1 R | ± 2 S | ± S | 2 |
| | − R | + S | − 2 R | − R | + S | − R | − R | |
| 5 | ± 2 S | − 1 R | ± 2 S | ± 1 R | − 1 R | ± 2 S | − R | 1 |
| | − R | + S | − 2 R | + S | + S | − R | + S | |

∴ No zygotes from these clumps.

P1 : 11

P2 : 17.

Note: clumps AB 1,2
C all 2
D none 1,2
E 1,2
FD all 2.

Good agreement c̄ morphol. prediction except for A4 which is drawn as smallish.

P3 [illegible]
C D 2
[illegible]

Use W2384 as P1 from here on. To date P1 has referred specifically to W2338

Misc. segr. 1122

See over for continuous

DATE: 2/1/54. REF:

A. W2381-6 × W2344

2:45 – 9:30 PM Plate $10^{-6}$, $10^{-7}$ on EMB Lac ± sm, EMB Mal sm.

[Usefulness of new Mal⁻ markers, esp. in assessing residual P2 comps.].

✓ = SR+

| | EMB Lac sm | Mal sm | Mal sm | EMB Lac |
|---|---|---|---|---|
| 1 | ✓✓ ✓ | 0 | 1 papilla, 3/1000 | ✓✓ |
| 2 | ✓ | 0 | 1 +/– | |
| 3 | ✓✓ | 0 | 0 | |
| 4 | ✓ | 0 | 0 | |
| 5 | | | | |
| 6 | ✓ | 0 | 1 | |

2/2

See over for MtL

where A5?

But these Mal – evidently all follow (nearly totally) the $S^R$ segregation; and maybe equivalent. Use 2384 for future studies.

B. W2057 × P1
2:45 – 9:30 PM

Plate $10^{-6}$ EMB Lac sm. Struck Lac+ $S^R$ to confirm orthotypy for MtL, Mal among these recombinants in lines 1×28A.

EMB Lac sm:

2/2 ✓✓ (Some pure Lac+). Pool and restrict → pure Mal+/several hundred ca 2% MtL – But analysis from EMB Lac. 16: all Lac+.

Mal sm: pure Mal+. (Some colonies mottled very likely Lac+/–.)

EMB Lac: some Lac+/–, often too crowded. ~~Pick as likely to~~

~~EMB Lac to hold~~ ~~[illegible]~~

From EMB Lac sm 10 Lac V: 9 pure $V_1^S$ 1 $V_1^R$ (all MtL+) (different from line 1×28A in $V_1$ segregation!)
($V_1$ orthotypy).

C. P1-P2 (W2338 × W2344) plate EMB Gal T1 } to test for Lac +/– ratio among $V_1^R S^R$ recombinants (cf 1082.)
(plate as from 1121. 9:30 PM) EMB Lac sm T1

dil. not exact (over)

Forebuck, pick EMB Lac Lac++ (A) and Lac+/– (B) for Mal test.

10 · Mal – SR+ 3 Mal+/– spotty SR+

(over)

Control:

P1 alone: heavy colonial background and partial survivors. Phage titer evidently inadequate.

In crosses:

EMB Lac sm T1: Lac+ probably >> Lac− but many of former also nibbled! In more dilute platings of cross (same T1) Lac−> Lac+!

EMB Gal T1 Fewer T1R and: not reliable! Repeat c better phage stock!

## Conclusions:

A. Mal− have all effectively linked to S, show orthotypy

B. W2057 has same elimination patterns for Mal, S, MR as W1895, but note that the $V_1$ ratio is quite different!! (look for $V_1^S$ in × W2377?) Have these $V_1^R$ been tested with T5? This is same $V_1^R$ as W1177 (= W−1 $V_1^R$); may be different loci.
Also earlier data with W1895 × W1177 where $V_1$ ratio was strongly orthotypic!

C. No information: need fresh T1 for selections.

2/7/54 Sec 1125

Contr. of W2393 (2390 - 2393) = MtL - W2384.
Test for sr Totality in marker line. All showed very few MtL + $S^R$ compared to $S^R$ lac+, but W2393 chosen as having highest (in x P2) (about 10%).

2/7: W2393 x W2344 on EMBMtL sm, lac sm. [Cross all day!]

2/9. (1) Ratio of ~~lac~~ MtL+ to lac+: Pick SR+ from lac sm to EMBMtL.
Found: 2 MtL+ : 67 MtL-.

(2). $V_1^R/^S$ ratio in lac+ $S^R$ of W1895 x W1177. Test colonies directly on lac T1.
classify as $+S^{A.}-R$; $+S^{(C)}$ ....; and $+R^{(B)}$ ....

| | | | | |
|---|---|---|---|---|
| 1 | A | | 31 | A |
| 2 | | A·B (lac+ ev. $<^S_R$; $-<^?_R$ | 32 | B |
| 3 | B | | | C |
| 4 | A | | | A |
| 5 | B | | | C |
| 6 | A | | | B |
| 7 | B | | | C |
| 8 | A | | | C |
| 9 | A | | | A |
| 10 | C | | 40 | C |
| 11 | B | | | B |
| 12 | C | | | B |
| 13 | C | | | A |
| 14 | B | | | B |
| 15 | B | | | B |
| 16 | B | | | A |
| 17 | B | | | C |
| 18 | A | | | B |
| 19 | A | | | ? |
| 20 | C | | 50 | C |
| 21 | A | | 51 | A |
| 22 | B | | 52 | A |
| 23 | A | | 53 | C. |
| 24 | C | | | |
| 25 | A | 17A + 1 A·B | | |
| 26 | C | 14C | | 32 $V_1^S$ |
| 27 | B | | | |
| 28 | B | | | |
| 29 | — | | | |
| 30 | B | 19B + 1A·B | | 20 $V_1^R$. |

But note: incidence of B suggests that most zygotes had already segregated, thus allowing bias.

2/4/54.

(A) 8:45 ✓

2384 × P2 1:1:2 3PM— Dilute ca 4PM,

~~[illegible]~~ Also stain (G.D.) Also Plate 4:20:
i.e., ca 80 minute cross (dense inc.)

EMB Lac + Sm.

Gummy contaminant present (probably from W2384. ✓ but ignore. broth and slant!)

SR+ ca. 1%.

Pick Lac V (A: simple sector B: others ± Lac++) to EMB Mal.
(Most had overt Gal+ Lac+ type components) → of ~~7A, 2B~~ 7B, 2A,
all but 1 had Mal+ (as suspected from colony appearance).

(B) W1177 × W2344. ca 5 hours in broth. Plate EMB Lac Sm.
Pick SR+ directly vs/T1 on EMB Lac. Each of 29 Lac+ : $V_1^R$.
Inview of $V_1^R$ = orthotypy, cross should perhaps be reversed in re the $V_1^R$ used. (Cf. 1107B5 .... carrying $V_{1(2344)}^R$ $F^-$.

(C). Note W2384 stock culture contaminated with gummy ~~[illegible]~~ Lac+, possibly also phage. Recheck single colonies for repurif..

(D). Of W2384 MH−, 1–7, all but #1 appear $\lambda^S$. #2 = $\lambda^R$?
Variable intensity of response to λ.

1-cells: W23937 × W2344.



2/7/54.

see 1125A for cross. Dilute at 1 hour.
Test isolates for MH, Mal, Lac, T1, S, Gal. Streptomycin Gal.

| | Mal | MH | Gal | T1 n.g. | Lac | S | Gal streptomycin |
|---|---|---|---|---|---|---|---|
| B 1 | + | + | − | + | | S | − |
| 2 | + | + | − | + | | S | − |
| 3 | + | + | − | + | | S | − |
| D 1 | − | − | + | − | | R | + |
| 2 | − | − | + | − | | R | + |
| 3 | + | + | − | + | | S | − |
| 4 | + | + | − | + | | S | − |
| E 1 | − | − | + | − | | R | + |
| 2 | + | + | − | + | | S | − |
| F 1? | + | + | − | + | | S | − |
| 2 | + | + | · | (+) | | ? | − |

all parentals!

8P2
3P1

# $V_1$ segregation in Hfr crosses.

2/6/54.

Recap. 1. In Hfr $lac^+ S^S V_1^R$ (W2344) × line 28 $lac^- S^R$..., almost precisely 50% of the $lac^+ S^R$ recombinants are $V_1^R$. (1117B).

2. In line 1, W1895 × W1177, data are rather heterogeneous, but sum is 41 S : 74 R. Should be recapitulated!

3. In W2057 × W2338, in one experiment only, found 1 S : 9 R.
(line 1 Hfr for $lac^+ V_1^R S^S$...)

4. 1123B ~~W2057 × W~~ W1177 × W2344 : No $V_1^S$ recombinants. [see 1122]

2/7. A. W2393 × W2344 11:35 AM — PM. Plate on EMB lac sm and EMB Mtl sm. Test SR+ for lac (Mtl) and $V_1$ segregation.
1:1:5

[B. W1895 × W1177 ". see 1122. ]

A). Mtl+ $S^R$ picked at 24 hours. Cf. isolated Mtl+ and original mass

| | lac (isol) | $V_1$ (isol) | lac (mass) | $V_1$ (mass) | |
|---|---|---|---|---|---|
| 1 | − | S | ✓ | | includes lac+ papillae |
| 2 | − | S | ✓ | | " " " |
| 3 | + | S | ✓ | | " lac− $V_1^R$ |
| 4 | − | S | ✓ | | " lac+ $V_1^S$ papillae |
| 5 | − | S | ✓ | | pure − S |
| 6 | + | R | ✓ | | includes lac? S |
| 7 | − | R | ✓ | | pure: same background of S. |

lac+ (4 colonies each) is:

| | |
|---|---|
| 1 | ~~lac~~ Mtl − $V_1^S$ |
| 2 | Mtl − $V_1^R$ |
| 4 | Mtl − $V_1^S$ |
| 10 | Mtl − $V_1^R$ |

(over)

∴

| lac | $V_1$ | |
|---|---|---|
| − | S | 8 |
| − | R | 3 |
| + | S | 1 |
| + | R | 3 |
| | | 15 |

[poss. that some of these are Mtl+ revertants should be studied?

Also isolate the lac+ components: are they ~~also~~ Mtl+?

see 1129

| | | | | |
|---|---|---|---|---|
| 8 | − | S | ✓ | |
| 9 | − | S | ✓ | |
| 10 | − | R | no − S sum; lac+ pap. | |
| 11 | − | S | ✓ | |
| 12 | + | R | ✓ | |
| 13 | + | R | ✓ | |
| 14 | − | S | ✓ | |
| 15 | − | R | ✓ | 1 ? |

(over)

∴ $V_1^R = 6/15$

$lac^+ = 4/15$

Exp. $+R = \frac{24}{225} \doteq 1.5/15$

~~but~~ but actually +R > +S!

Gross. [BM- lac+]

AA:

-S: 3

+R 1

(+S-R) 1

-R 1

+S-S 1

1? S 1

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Withhold conclusions re ratios

MH + lac$^-$ S$^R$ and MH$^+$ lac$^-$ S$^R$

may occur in same colony!

Xyl – Lac segregations 1125CD

See 1129.

C. W2394 x P2 D. W2397 x P2 on SR+.

D showed many more Xyl+ SR / Lac+ SR than did C.

a: Test Lac+ SR by direct streak on Xyl.

b. Do. Xyl/Lac.

have Lac+

b) C : 1/1 Lac+ D 4/8 Lac+

a) C: 3/28 Xyl+ D 1/25 Xyl+.

Not conclusive as to difference.

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25E 2/12/54. Cross 2394, [redacted] x P2 on EMB Lac, Xyl sm.

No SR+ found on Xyl. See 1129 for repeat.

Numerous on Lac. (= 1126 cross)