(49) Total Review of pedigree expts. APR 18 1956

Exp.		1954	SW666
1137	✓	2-15	12
2	✓	16	12
3	✓	17	12
4	✓	18	12
8	✓	3-1	967
41	✓	9	12
42	✓	11	960
43		16	60
44		17	60
47		30	60
49		4 2	60
50		12	60
51		14	22 × 578
36		2 23	12
37		26	× 967
40		3	92
46		3 19	9 × 967

Tabular resume of pedigrees.

APR 19 1956

a = minimum interval of branching.

Exp. ☐ Initial

Interval of latest branching | interval of termination

a b c d

how many intermediate branches.

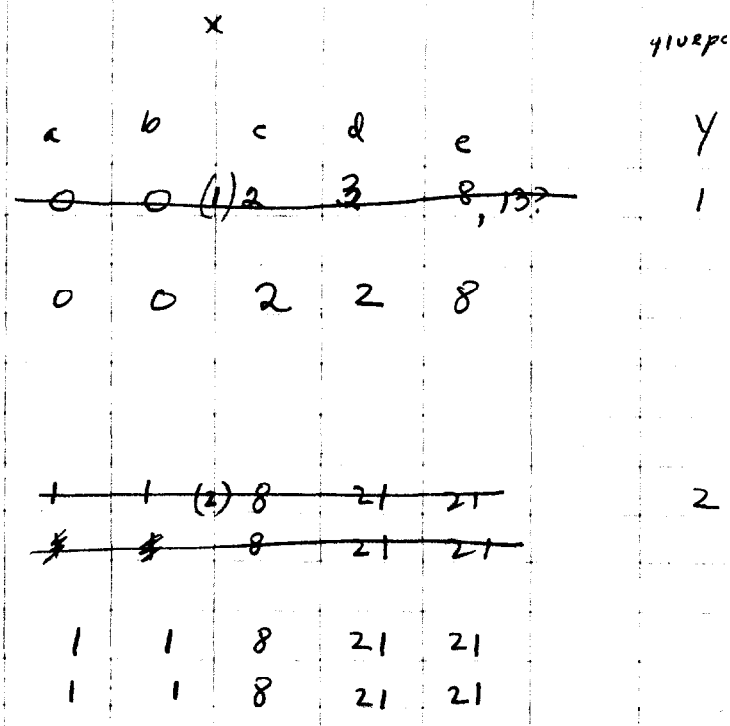
max. yield per branch

APR 19 195

#			a	b	c	d	e followed to	Yield
1131	CD	followed 3 generations. All cells became immotile. Separated at n_3, 1 cell gave a swarm; D3. the others non motile clones. On further isolation, D3 was mixed → 12⁻ : 8⁺, the latter all i, the former x — FA10 → b.	0	—	—	—	1sw/n_4.	1s
	C5	all nm at n_{13}	0	13 (0)	13	13	13	1
	B5	" "	0	13 (0)	13	13	13	1

APR 19 1956

1132 E5 Unicat. 2 divisions.
8: all⁻ at n_3, and at n_8



D5. dicat, branch at n_1.

APR 19 1956

1133 E5 pure swarm / late isol.; 1/4 inv. 3/4 → H_1^i

	a	b	c	d	e	Y.
D5	1	11	11	11	11	
C5	0	10	10	10	10	1
B5	0	10	10	10	10	

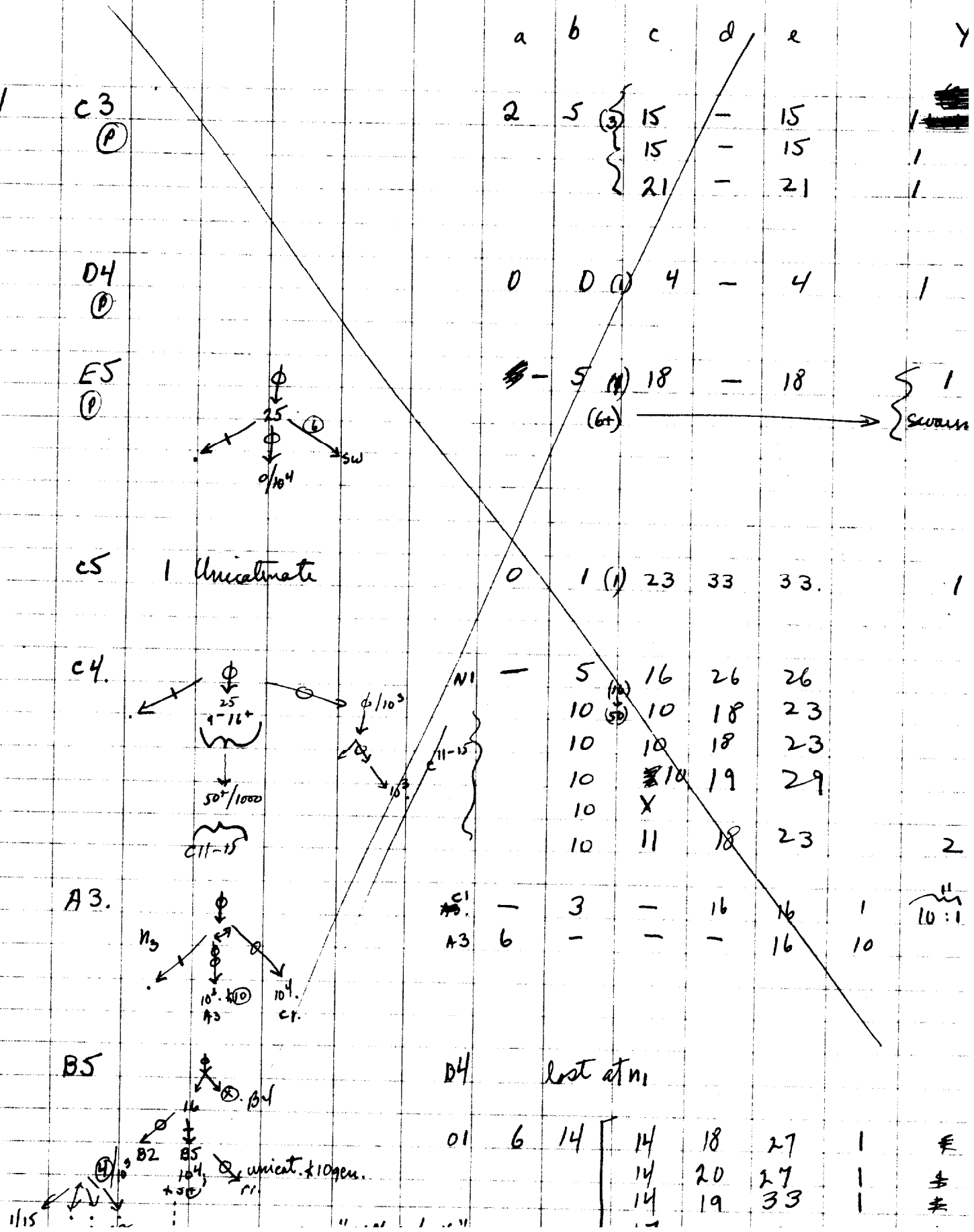
test for swarm essentially

(P) in notes

APR 19 1956

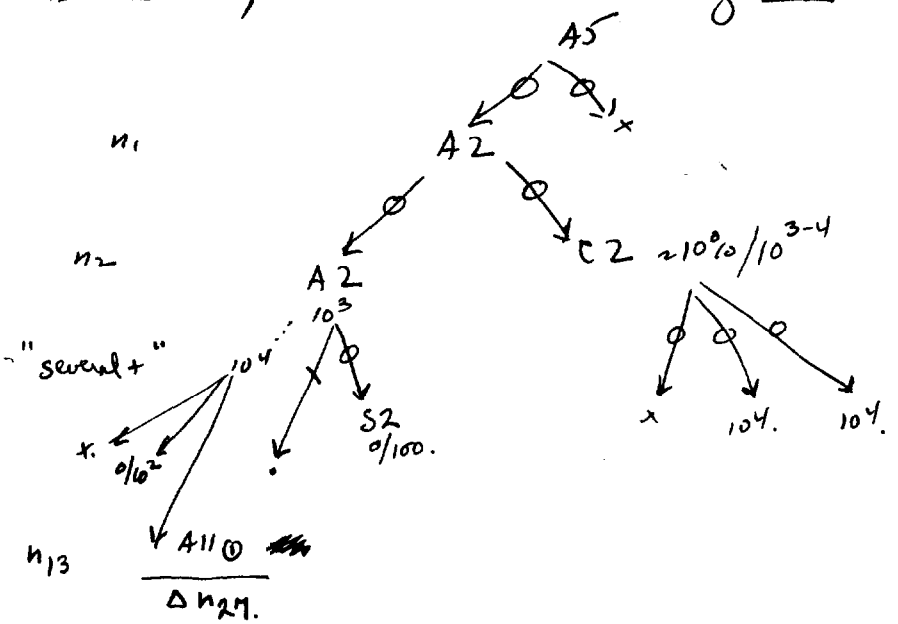
how many + at this time

		a	b	c	d	e	y
1134	c3 (P)	2	5	(3) 15	–	15	1
				15	–	15	1
				21	–	21	1
	D4 (P)	0	0	(1) 4	–	4	1
	E5 (P)	–	5	(11) 18	–	18	1
				(6+) →			scram
	c5 1 Unicellmate	0	1	(1) 23	33	33.	1
	c4.	N1	–	5	16	26	26
				10 (5)	10	18	23
				10	10	18	23
				10	10	19	29
				10	X		
				10	11	18	23	2
	A3.	c1.	–	3	–	16	16	1	11 10:1
		A3	6	–	–	–	16	10	
	B5	D4		lost at n1				
		01	6	14	14	18	27	1	✱
					14	20	27	1	✱
					14	19	33	1	✱



Note: 55 was mycoplasmadiagnosed as a
sarcoma as a positive ex. of a pluricatenate clone.
Exact number not specified. 5 isolated.
Pl was taken as an early sample

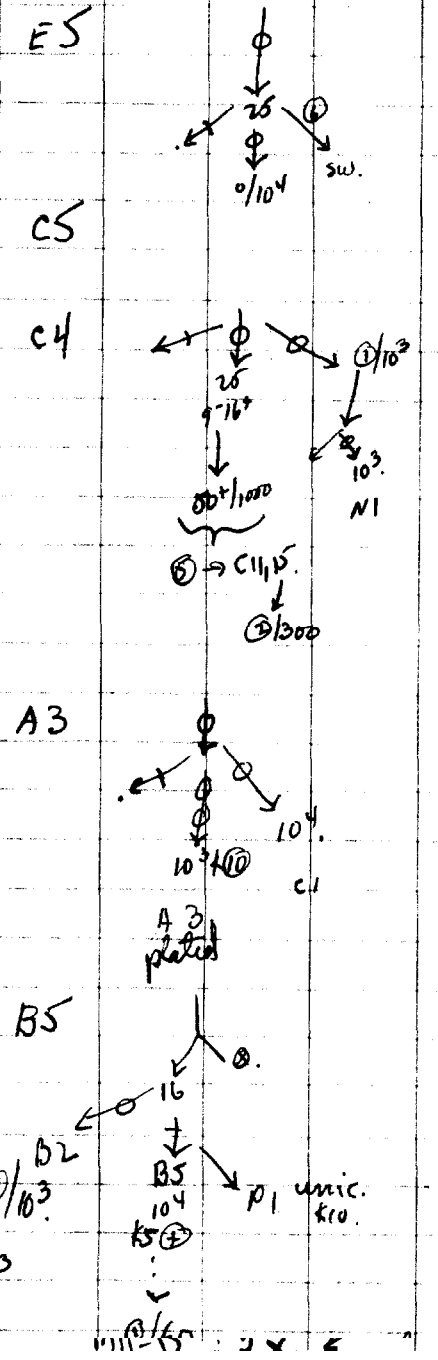
- Hare state Pl. cell isolated at n_{22} was a chain for at least Δn_4 and seen again at $n_{39,442}$ as no motiles. The chain had sibbranches between n_5 and n_2.
a should read, ~~earliest~~ latest time that branching must have ceased for that chain.



No
evidence.

4/21/5

		a	b	c	d	e	Y
1134	C3 (P)	D1	3	5	15	—	15	3
		D2	3	5	15	—	15	
		D5	3	5	21	—	21	
	D4 (P)		0	0	~~5~~ 4	—	4	1
	E5		1	4	5	17	17	1+x
			2	→			swarm	
	C5		0	0	23	33	33	1.
	C4		4	5	16	26	26	
			6	10	10	~~18~~	24	
			6	10	10	18	24	
			6	10	19	27	27.	
			6	10	~~19~~ x			
		C16	~~11~~	~~18~~	~~18~~ 18	26	26	
	A3		3	3	3	17	17	1
			6	13	—	—	13	10
	B5	B4	1	x				
		P1	5	13	23	33	33	
		01	6	14	18	—	25	
		91	6	14	14	18	27	
		2	6	14	14	20	27	
		3	6	14	14	19	~~33~~	
			5	13	—	21	21	



4/21/56

1134 A5

see for partitions @ '10:10?

terms observed.

	a	b	c	d	e	x	y
A5	1	—	—	—	1		
S2	6	12	12	19	22		
A11	6	15	42	~~42~~	~~47~~		
12	6	15	x.				
13	6	15	—	22	22		
* D11	6	14	x				
12	6	14	—	27	27		
13	6	14	—	27	27		

~~+ 5 12 —~~

A4

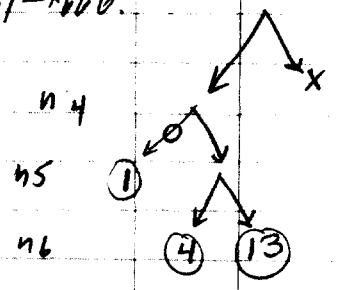
see @ for 4 pt sets and terminal patterns

	1	5	12	—	12
	1	5	20	—	20

4/21/56

1138
B4

967–666.



	a	b	c	d	e
F21	5	5	44	45	51
			19	28	28
D22	8	15	[illegible]	[illegible]	[illegible]
23	8	15	[illegible]19	[illegible]24	[illegible]31
24	[illegible]8	15	32	44	44
E24	8	15	28	28	38
A21	10	16	18	—	18
22	10	16	19	32	32
23	10	16	17	29	29
24	10	16	32	-	32
25	10	16	31	35	42
B22	10	16	32	—	32
23	10	16	17	29	29
24	10	16	19	26	26
25	10	16	33	38	38
C21	10	16	20	20	30
22	10	16	19	32	32
E21	10	16	29	[illegible]34	39
22	10	16	44	50	54

4/21/

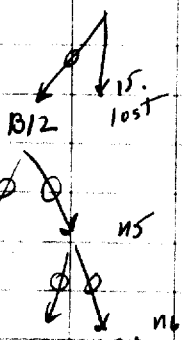
V.S.

1138

	a	b	c	d	
F21	5	5	44	—	44.

967 + 666. most lost.

B4:



-chain
$\Delta n = 39$
=

D22 A 21-25
23 B 22-25
24 C 21-22
E24 E 21-22.

E21 n_{13} → B32 term.
E22 n_{13} → B33 n_2; n_8 → E31 → n_1, n_1, n_1 E32 $n_2 < n_6$ can't to n_{10}.
E23 n_{13} → B34 $< n_5$.
E24 n_{13} → C31 term.; to minimize.

A21. uncat n_2, ⇒ C23
A22 " n_3 C24
A23 " n_1 ; term $< \Delta n_{13}$
A24 " n_3 ⇒ C25.
A25 n_2 → D25
B22 n_3 ; n_{13} → A31 ×
B23 n_1 ; term $< \Delta n_{13}$
B24 n_3 $< \Delta n_{10}$
B25 n_2 n_2 E23
C21 t.f. n_4:
C22 n_3 ; $< n_{13}$
C23 ① — lost
C24 ① $< n_{13}$
C25 ① n_{13} → A32 ×
~~D21 : E24~~
D22 n_4 ; $< n_{13}$
D23 n_1 → A31 term $< n_6$

recover for tabulation.

1141 — 13 init. 1E (33)

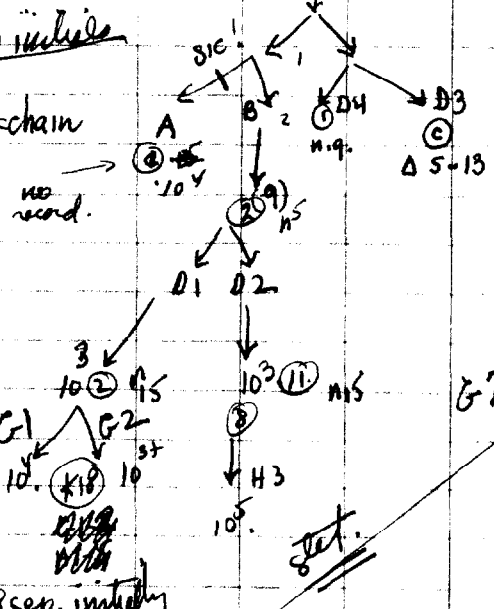
3 died
1 lost
8 E.

4-22-5

1141.

13 include

ⓒ = chain

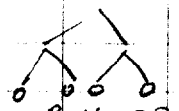


		a	b	c	d	e
A4	A	2	2	15	—	15
	D4	2	—	—	—	2
	D3	2	2	7	13	13
	G1	16	16	16	29	29
G2	1	19	27	28	32	32
	2	19	27	28	37	37
	3	19	27	28	40	40
	4	19	27	28	32	32
	5	19	27	27	32	32
H3	1	19	27	28	32	32
	2	19	27	40	47	50
	3	19	27	29	29	× 3 nuclei
	4	19	27	28	41	41
	5	19	27	28	41	41
A3		8 cells.			29	29

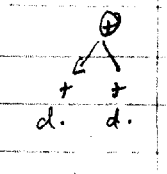
persisted G

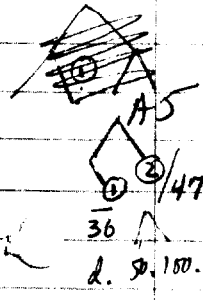
pulsations

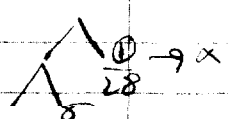
C2



a		2	2	46	6	11
b		2	2	7	7	20
c		2	2	5	5	18
d		2	2	2	2	15
A1	② d. after 1 division	1	—	—	—	1
B5	① n.q. — persisted 48h. comatile.	0	—	—	—	0.
A3	① died overnight	0	—	—	—	0
A5		1	5	—	—	5
		2	5	—	11	12
		2	5	—	12	18
B1		0	0	1	2	18
B2.		no data				
	①	0	0	1	1	15







1141A4.

		a	b	c	d	e	
	A4A	2	2	15	—	15	
	D3	2	2	7	13	13	
	D4	2	—	—	—	2	persisted
H3 -	8 cells D2	8	15	—	29	29	
	G1	6	16	—	29	29	

a	b	c	d	e
19	27	28	32	32
19	27	28	37	37
19	27	28	40	40
19	27	28	32	32
19	27	27	32	32
19	27	28	32	32
19	27	40	47	50
19	27	29	27	x sm.
19	27	28	41	41
19	27	28	41	41

G2 K18 (+) H2

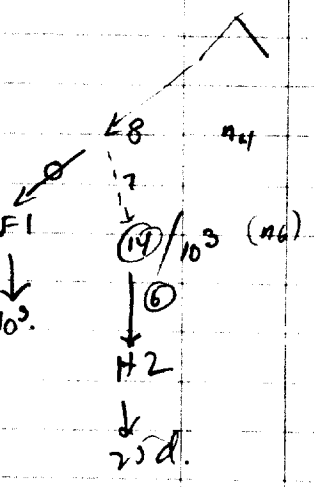
---

			a	b	c	d	e
Or alt. interpretation,	1141A4 for G2 subset →	H2.	6	16	31	—	31
	1141B4 :	G2 series	13	21	etc.		

Subtract [6] from above.

APR 24 1956

11/4/B4.



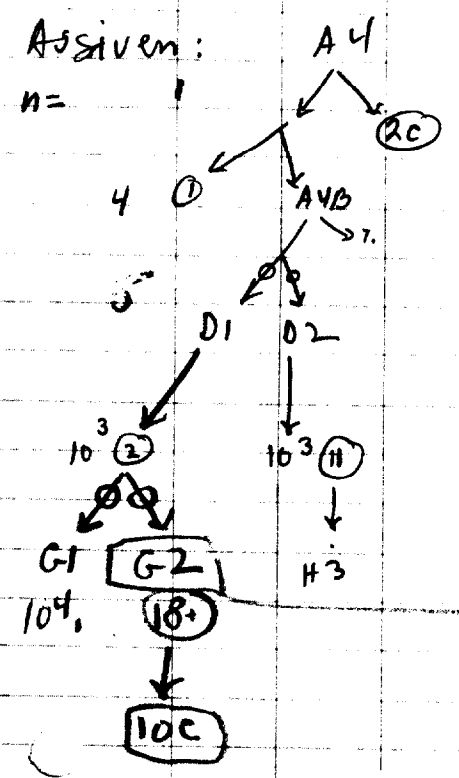
	a	b	c	d	e
F1	4	—	—	14	14

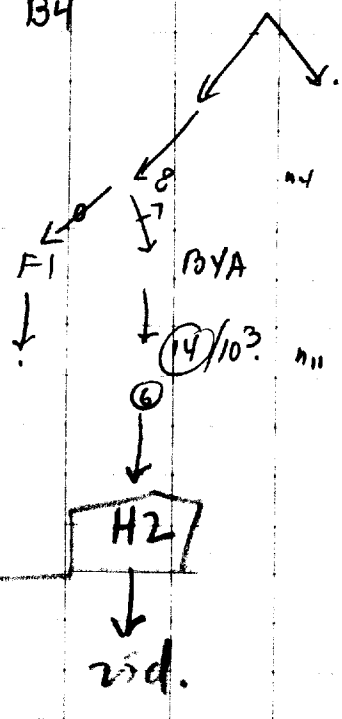
Note: notes are confusing on the C2 - H sequence of A4:

Note 14: partition.

H2	6	—	—	—	6 (lost by dying).

A4 and B4 pedigrees may have been mixed at C2 ↔ H2 so following interpretations are ~~possible~~ indicated. This seems





An account of H1, the given interpn. seems most likely, but it should be recorded with reserve.

APR 28 1956

1142
60 → 666
1/2 for plating

No early separations: survey of yields of ①.
A1-5 B1-5 ⑩ were ess. inoculable.
C-D followed ERG-plated.

Yields at first examination	+	Tot	$\log_{10}$
c2	2	2⁻	
c3	>50	3	
c4	10	3	
c5	1	4	
D1	>100	4	
D2	3	3	
D3	0	3	
D4	0	3	
D5	1	3	

		a	b	c	d	e	
C3	c3 c4 c1	6	10	10	23	23	…
	c2	6	10	23	29	33	
	c5	6	10	31	37	41	
D1	(3)	7	13	—	26	26	
	(1)	7	13	14	—	14	
		7	13	26	—	26	
		7	13	26	28	36	
		7	13	26	31	36	
		7	13	26	29	36	
		7	13	26	31	36	
		7	13	26	31	36	

C3 → ⑩/10^3

⑤ → 105: C1-2-3-4-5

10⁴. ①/10^4 10⁴. 10⁴. ①/10^4

106
C1 → 50.

C2 → ①/100 → ①/2 → 50., 10^3.

D1 → >100/10^4 ⑩

105 D,E (1-5): 3: 10⁴ / 1: 0 (5²⁴) / L. 10^4/①

D2 C5 0.
D5 B5 4.
F1 → B1 28.
C2 → B2 8.
F3 B3 50.
C3 nil →

108

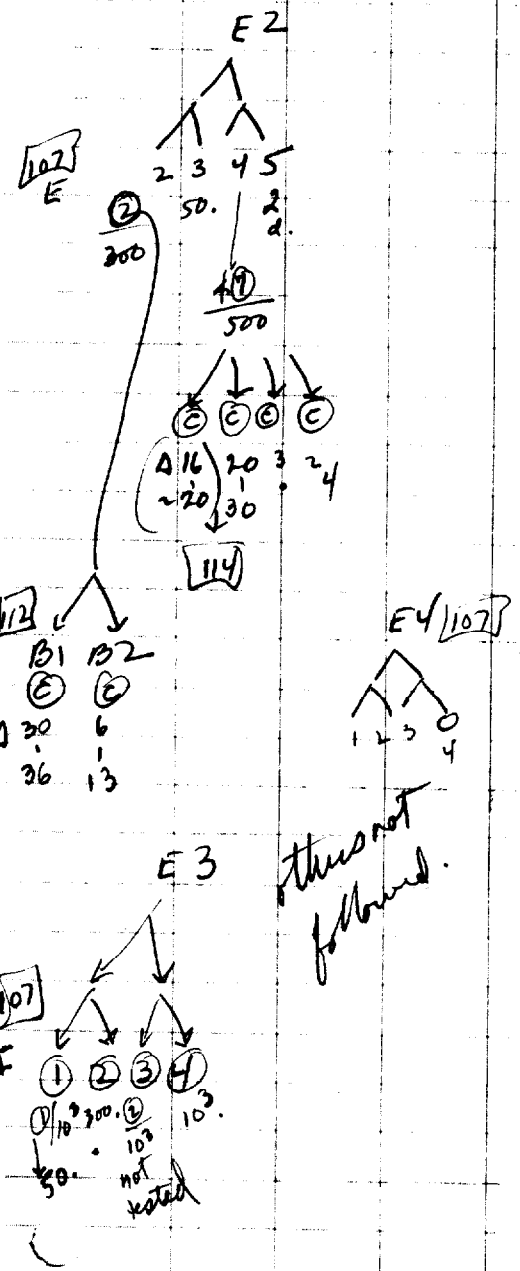
Platings: 16 "calls" plated → 9 grew (1 was 3 mixed, 5 reduced)

↓ residues

1143

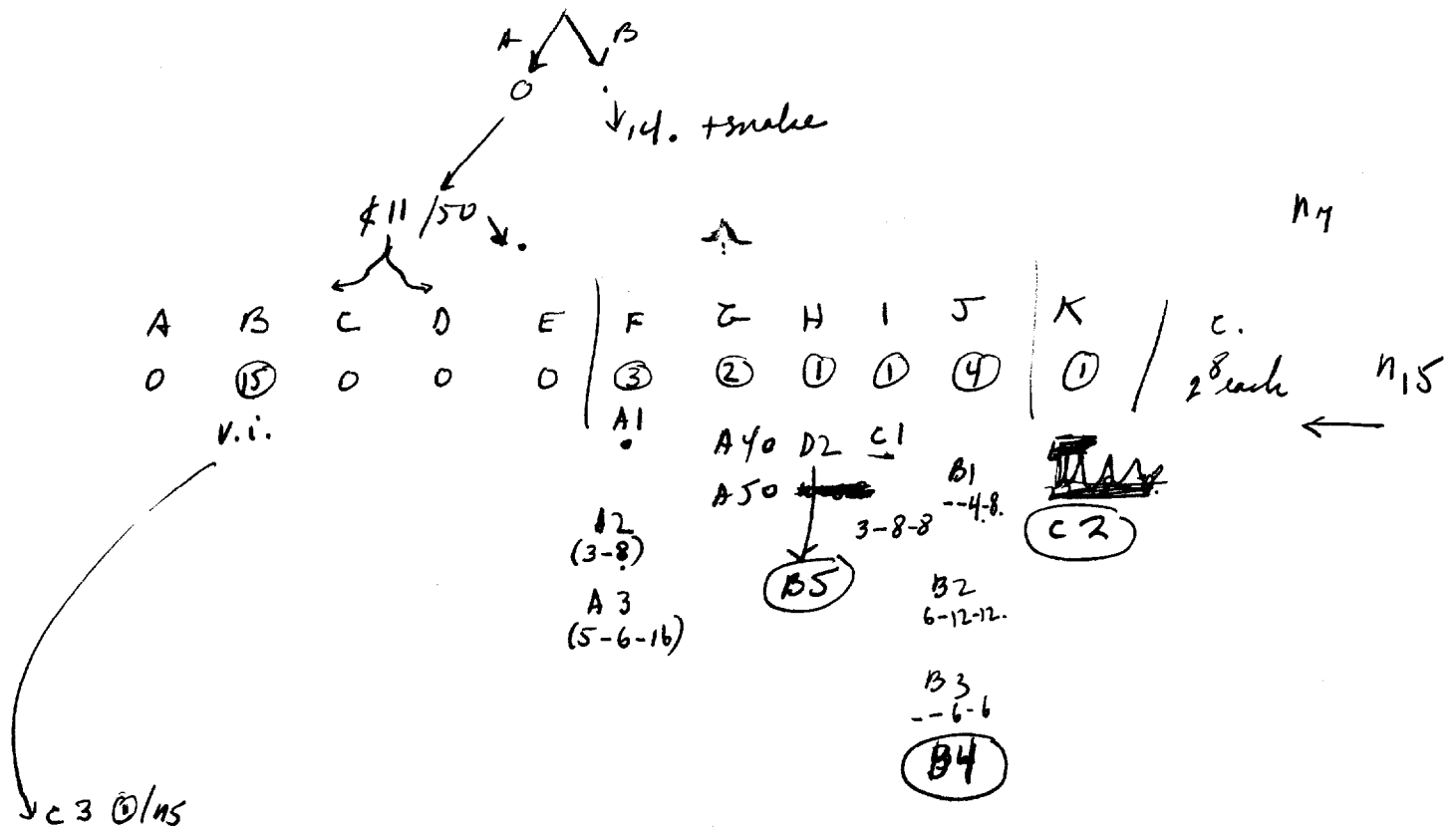
Plating: ~~4~~ 14/16 hd dup colonies; no Tox S.

110 E1-5 → 107



	a	b	c	d	e
	~~10~~	~~40~~	~~46~~		
	~~40~~	~~16~~			
{	3	10	40	46	46
{	3	10	16	23	23
E3	2	—	—	8	8
E4					
E5	2	—	—	3	3
BB	~~3~~ 3	11	27	31	31
4	~~3~~ 3	11	34	41	41
5	~~3~~ 3	11	14	17	~~19~~ 19
C5	~~3~~ 3	11	—	15	15
F	4	2	—	—	12	12
	~~2~~	2	—	—	10	10
	3					
	1	2	2	12	18	18

1144 B4



C3 ①/n5
C4 n6.
C5 ①/n5
D1 71.
D2 n5 n8.
D3 — n6 n10
D4 - n5 n10
D5 — n4 n10
E1 - 22-28-28
E2 · n5 n5
E3 · n4 n7
E4 · n4 n7
E5 · n5 n9
F2 · n5 n9
F3 n5 · n11 n11

$[\bar{x} = ①/2^x]$

Σ 34-38-39 C2 $\bar{n}_6$ $\bar{n}_1$ $\bar{n}_6$ $\bar{n}_1$ H3 (n32) # $\bar{2}$ $\bar{7}$ $\bar{5}$ H1 $\bar{7}$ $\bar{7}$ $\bar{4}$ G2 $\bar{2}$ $\bar{2}$ F2 $\bar{7}$ $\bar{7}$ 4 5.

Σ 21-23-31 B4 $\bar{10}$ $\bar{7}$ H2 (n32) $\bar{5}$ I2 $\bar{7}$ $\bar{4}$ H2 n2. n_{10}.

Σ 37-37-37 B5 $\bar{5}$ $\bar{4}$ $\bar{3}$ H1 (n36) $\bar{9}$ I1 $\bar{3}$ $\bar{3}$ H3 $\bar{7}$ $\bar{10}$ G3 0

But see notebook for missing items: now K → C2

But acc to notes, {C2 is n_{27}} {H3 = n_{32}}

Then does OK; there must have been an n_3 virtual between K → C2, H3 ; H → B5 (n5)

114434 any other summaries?

5/2/56

			a	b	c	d	e	
(11) isolat n_7			7 – 4 cells O.					
	H	B5	5	7	44	44	44	duel at n_{44}
	I	C1	5	7	10	15	15	
	K	C2	5	7	41	45	46	
(27)					both d.			
(2) isolat n_{15}	G	A4 A5	9	15	–	–	15	
(3) isolat n_{15}	F	A1	9	15	–	–	15	✓
		A2	9	15	18	23	23	
		A3	9	15	20	21	31	
(4) " " n_{15}	J	B1	9	15	–	19	23	✓
		B2	9	15	21	27	27	✓
		B3	9	15	–	21	21	✓
		B4	9	15	36	38	46	✓
(15) " " n_{15}	B	C3	11	15	27	32	32	
		C4	11	15	–	21	26	
		C5	11	15	20	25	25	
		D1	11	15	–	21	25	
		D2	11	15	–	20	23	
		D3	11	15	–	21	25	
		D4	11	15	–	19	25	
		D5	11	15	–	19	25	
		E2	11	15	–	20	20	
		E4	11	15	37	43	43	
		E3	11	15	19	19	22	
		E4	11	15	–	19	22	
		E5	11	15	–	19	24	
		F2	11	15	–	20	24	
		F3	11	15	20	26	26	
Isolated at n_8, n_{15}	H	B5	6	7	59	59	59	
	I	C1	5	7	10	15	15	
	K	C2	5	7	52	56	57	

3/30/56.

11/4/4

8 clones started

109

A2

① 52

a.

A5

① 26

10².
10⁴.

B1

⑩ 50

⑯ /100.

not pursued!

B2

⑩/25 ns

↓10

0/10³

*8 10³

*6 10³

*1

not pursued.

A3

⑧/64

Note partition

① 300

② 200

D1 D2

114

G1 G2

150. 60.

10⁴. 10³.

B5

③/5.

lost.

B4

see next page.

	a	b	c	d	e	
A2	0	0	6	—	6	
A5	0	0	5	12	17	
B1	3	—	—	—	—	
B2	5	15	—	—	10	① → 0
	6	15	-	-	15	① → ①
	8	*	not isolated			① → *6
	8	—				① → *8
B3	Pure swarm		Pure gm		saved.	
A3	1	6	14	21	27	
	1	6	14	20	24	
B5	2	6	—	—	—	3 cells lost.

5/2/56.

1149

This expt. designed for swarms; did not search deliberately for oligocalenates.
• = 0 or 1 or 2 Fla+.

35 Fla+ [118] 3 n.g. 4 swarms; 1 $\frac{\text{KB}}{200}$ G3; 19 few ⊕
8 few or no ⊕.

SWARMS: (2 hours)

B4: pure motile
G1: pure motile variable expression. Question of phenotypic variability.
H2:
H3: ± ± both pure S. low manipet

H2 × B → F1 — 2 cells { a 2, b 14, c –, d 24, e 24
slb { about 1–10% Fla+ swarm.
Conf 1/5 – key progeny test
∴ ± 20% + in H2B3
at least 2 genetics segregation. c/ B4, G1, H31
not segregating,
esp H3.

F1 → ① 2/10⁴ → [119F1] 10³.
F1 → ② 100/10⁴ → 20 → sw. not yet
F2 → 10³.
some +, some – definite

Note: some late isolates had 60%+ but were lost. These probably showed incomplete expression but late segregation not excluded.

F2 → ① → 10² → [119E3, E4]
F2 → ② → .10³

Expt. monogr? (esp. H3)

118 G3 48/200 → ③ 750/10⁴ → 119F4 → 20 → K2/10⁴ → 121F3

typical incomplete

1148

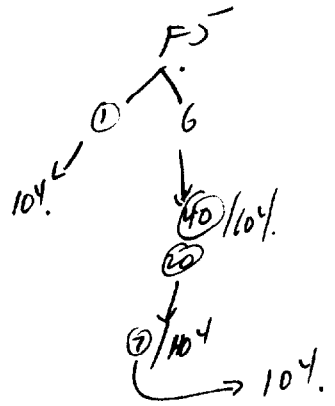
10 cells: 2 ng
2 ⓪
4 ~~2~~ ①
2 plus cat

B1. ⑩/300

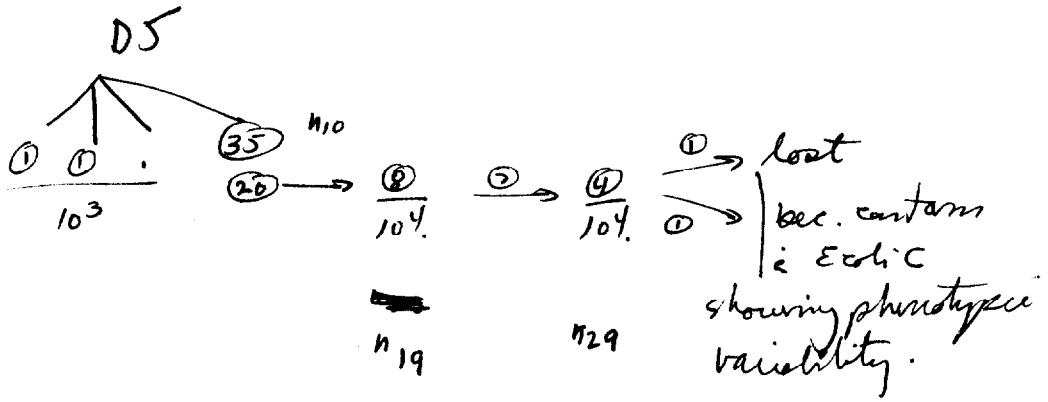
B4. ~~39~~/10^3. no pattern data.

Cat
120

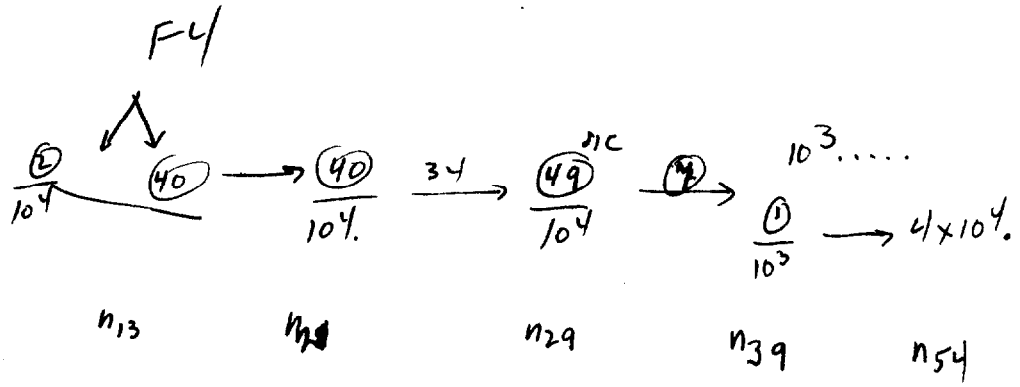
1149



Not certain when single chains



Remarkable problem of variability in Flat clones



1149

122 → 123

37 ① → 2 swarms B5 F5 pure pure

⑪ → swarms 71. (too few?)

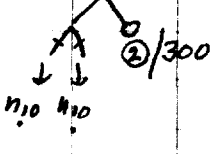
intended to separate early characters to make it easier to handle. primarily for segregating clones.

gave no ⊕ at n_{10}: A2, A3, A4, A5 B1 B2 B3 B4 C1 C3 C4 C5 D2 D4 E1 E2 E3 E5 F1 G1-G2 G3 G4 H2 H3 H4 (mislabeled = "uninteresting") = 26 clones.

These pedagogies generally are not useful except for partitions as no intermediate isolations were made. Note 2 pure swarms. Some late isolates were lost.

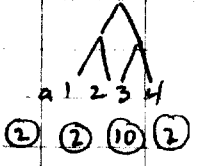
No indication of late replications.

A1



B5 ⊕

C2

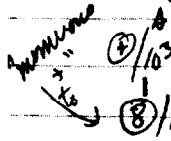


Partitions: at 1st div.

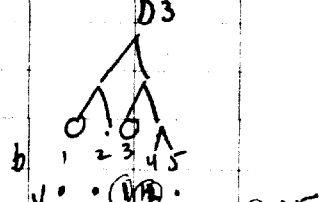
2 : 0
2 : 2 : 2 : 10
0 : 0 : 1 : 12
1 : 1 : 0 : 35
1 : 40
2 : 20
2 : 40

sw: pure
sw: pure.

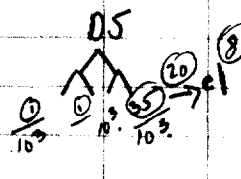
D1



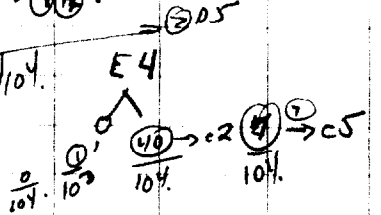
D3



D5

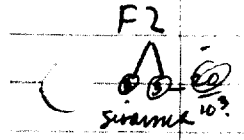


E4

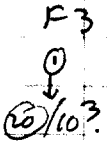


(natural F4 a 6 c d e / 6 39 — 54 54)

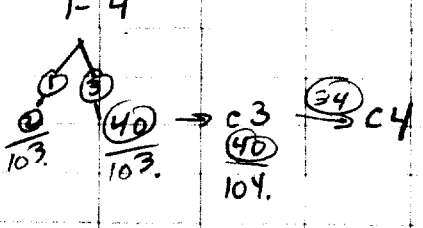
F2



F3

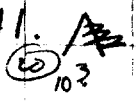


F4



F5 sw. ⊕ pure

H1.



11/9/13 Crossovers among tail ends.

35 from 11/9 x-FA60., x-FA90 → only b

F1 H5 D3 F2 all ++.
but 60C dubonic lysate as it transformed 967!

Found that SW967 is lysogenic on SW661 for a → x phage

1150

60—×666

1 solutes at 2½-3+ hours. 40 insolutes

(134) ↓ 126 A2 < pneumaum. Divide at n_1, n_2 when possible. Patterns or guides.

	at n_{10+}		
A3	1:1		
A4	1:0	obj not	
A5	0 ①		
B1	0 2		
~~B2~~	~~④~~		
B3	① ①		
B4	① ①		
B5	①		
C1	③ ①		
C2	① 0	obj nm	
C3	③ ①		
C4	③ ①		
C5	① ①		
D1	① 0 0 0		
D2	①		
D3	0 0		
D4	0 ①		
D5	① ①		
E1	① ①		
2	① 0		
~~3~~	~~④ ⑤~~		
~~4~~	~~4 ①~~		
5	① ①		
~~F1~~	~~① ④~~		
~~F2 3 0 a~~			
~~3~~	~~① ①~~		
4	① ⑤		
5	⑤		
~~G1 .... ① ++++~~			
2	① 0		
3	① ②		
4	①		
5	①		

H1 ① ①
0 ö obj ①
① ①
① → H3 126
①

Intermediate patterns

E3
④ ⑧

E4
⑦ ⑪ 1266 ⑬

A1
① · ㊸

F3
㉚ · ⑥

E5
① · ⑳

H4
㊿

C1
㉖

~~㉗~~ F1
④ · ㉗

B2
⑫

No further pedigree.

Are plus cotyledons delayed?

5/16/56.

→ × paralytics

TM 2 → × SW578. Most ⊕ proved unstable, and motility sluggish..

~~4 ± 5~~ 16 INV.
10 → 140 ⊕/10^3.

3: 2 clones

B1 ~~3~~ 5 /10^3.

C1 ~~3~~ 7 /10^3. These ⊕ proved very sluggish + could not readily be followed.

E2 ~~8~~ /10^3.

F1 2/10^3.

also remarks on stability of $F1a^+$ in E coli C.

at this point these expts. were interrupted for pair isolation.

5/22/56.

1212
Resumé

Representations and splits, early.

	Splits	at n		n		n	Σ n
A1.	3, 3	1					6
B1	1, 1	1					2
C1	7, 6	1	7, 0	2			13, 7, 6
			4, 2	2	3, 1	3	
B3	6, 3	1	6, 0	2			9, 6, 3
			3, 0	2			
D1	7, 4	1					11
E1	1, 1	1					2
F1	1, 7	1					8
G1	1, 1	1					2
H1	4, 2	1	3, 1	2			6, 4
C3	lost						—
D3	nf						—
E3	2, 0	1					2
F3	swarm	save. (prob prime)					sw. no seq?
G3	1, 1	1					2
H3	4, 1	1	2, 2	2			5, 4
B5	1, x	1					—
C5	24, 2	1	21, 3	2	20, 1	3	26, 24, 21, 3
					2, 1	3	

17 12 deletes.
A - x.

5/16/56.
5/17/56.

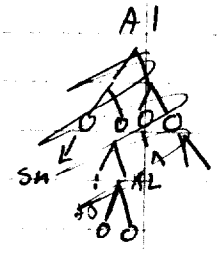
notes

Recapitulation

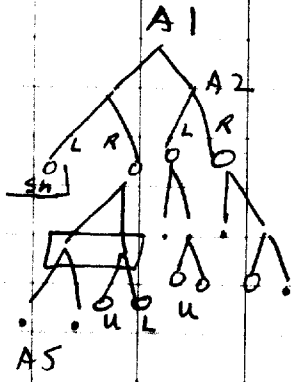
(18 real from 22 → 666 (3 hours)

37 → 666

count subclones at n_{10}.

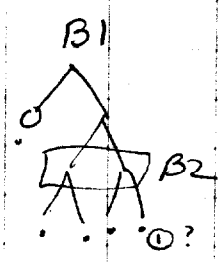


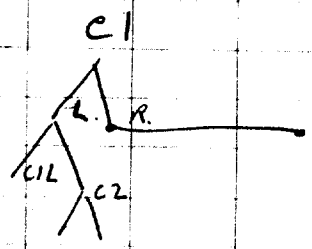
no + at n_{10}.



F3 swamp.

prob pure.





ch.

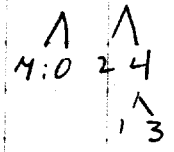
See protocol sheets.

Significant patterns.

A1: (3) (3)

B1: (1) 1:1

C1: 4:6

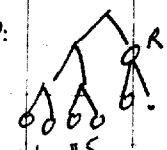


at n_1 unless indicated.

B3: 6:3

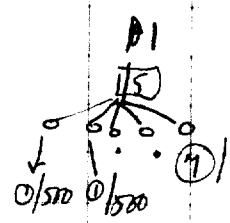
H1: 4:2

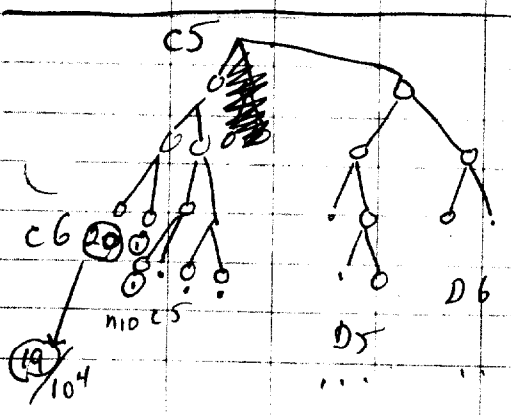
H3:



4:1

C 3 1:1 C





24:2 n_1

(21:3) n_2

(20:1) n_3

5/27/56.

1212 → early partitions

1214 calibrate loop volume. +trails in motag. no trails, only clusters.
ratio of trails to swarms F#37 × sw666

Σ spots (diluted)		Exp's	C
	0	27	11
	S	2	10
	~~T+S~~ T	2	6
	T+S	1	3
		32	30.

total				
	T	3	~~9~~	12
	S	3	~~13~~	16

In these conditions, S > T. (question of trail data). See 1216

1215 – First platings of sw666 in diluted motag

1216 sw967 × ; platings of dil. agar. noted satellites.
BBDS* 16 hour trails with 30–54 clones per trail
vary motag. Not reliable. Looked for evidence of non-random distr trails per spot.

2/5/58 1217 → ~~calculation of trails, plates~~ ; clones from undiluted initials ; plate
1218 Scoring
1219

5/27/56.

1212 → early partitions

1214 calibrate loop volume. +trails in motag. no trails, only clusters.
ratio of trails to swarms F#37 × sw666

Σ spots (diluted)		5×5	6	
	0	27	11	
	S	2	10	
	~~T~~	2	6	
	T+S	1	3	
		32	30.	
total	T	3	~~9~~	12
	S	3	~~13~~	16

In these conditions, S > T. (question of scatter data). See 1216

1215 - First plating of sw666 in motag (diluted)

1216 sw967× ; plating & dil. agar. noted satellites.
16 hours trails with 30–50 clones per trail
many motag. Not reliable. Too hard for evidence in non-random
distr trails per spot

BBDS*

2/5/57 1217 → ~~calculate titers, plate~~ clones from undiluted initials; plate
1218 Dec 19 sq
1219

5/27/56.

1219 – 1221 – 1222

1219 SW967 x – 50D. ① effect of extra cells ② trails per initial.

added	initials	Crew	trails	
–	17	13	1	5T/50 initials
SW666	17		1	
SW967	16		3	

No decisive difference.

~~58~~ isolates

1221. A) ~~[illegible]~~ initials planted out. A C E b

58 Absolute positive drops. 34/viable → 4 trails motag.

~~Gracilis explosive drops.~~

+	–
–	+
+	+
–	–

Also, 48 initials formed clones,

following had ⊖ at n_{10} 0^{39}....; 1^{4}; 2^{3}; 3^{1}; 20^{1} ∴ 1E/48.

Sign. of initial ratio of E so low! None of these gave trails. cf 1/48, 4/34 above.

No survivors.

44 initials → 1 trail rather old Motag.

17 " → 1 trail

1224 50 – x SW967. Plate spread. on motag. Initials pooled.

M & A 5T/12 colonies MA 0T/14 cols. Hegh!

effect of spreading considered (spots before now).

1225 ditto. and contrasting residues.

a) 96 initials → 14 clones (low viability!) 2 duplicate strains

b) 14 " standard cigarette → 1 trail

c) 2 complete clones (#?) squadron → small clusters underneath.

1225

d. pool inoculated various ways, media

967x	2x .01 ml spread	→ 90c, 8T		
	" not "	35c 4T		
	.02 " "	— c 5T		∴ not effect of spreading
	Spots from pipet	25c 4T.	16 3T.	" "
	" pre-spread plate	16c 6T	20c 1T	

∴ No effect of spreading; rather variable ratios

Totals: 202c 31T.

1226. Pool 895 initials & plate samples. Media diffs in stages.

967x

altogether 38T, 138 colonies = 1/4.

& poor plates, 10/171 No diffs.

also misc effects. possible φOH → 17/40.

1 trail: 125 colonies in 17 hours

later known: (Bit 967 has spont. "minors")

1227 40 initials to broth for plating in tubes + plates.

12/17 good clones No major trails; all slow "minor".

+8 500–1000 some photographed

→ 1 trail

pooled: 19 → 14/four trails 1/20/25 = 1 trail/20 viable clones/25 initials

---

1228–9– plated clones as 1237 summary. 1229: described that SW967 produced spontaneous minors. Other Fla did not.

–30. – spontaneous motiles.

5/28/56.

1230: some clones from sp motile SW967. noted fluidity effects.

1231 all major trails occurred singly.

1232 dropped SW967 x—.

SW666 x— Plate pooled initials:

1233 plated clones.

1236 plated selected single clones
"Flares" also noted. Genotypic Fla+ are also immobilized in motag.

Cloneplatings

1227 } SW967 x— Clones: In motag 100%.
1228 } 12 had trails (uniquely major)
1229 } 60 were viable (clone size ~ 150)
74 were plated. definite nonlinearity noted for first time. (tactic orientation is diffuse)

(problem of quiescence of large cell size)

SW666 x—

1232	4/16/25	Majors single, but other clones	2^6
1233	1/34/47		2^6
1234	6/15/48	Concentrate of trails!	2^{3-4}

"selected" clones (most active on micro major following).

1236 3/57 plated: Flacy MGA. ~~2=27~~ not countable.
1237

48 clones followed: ~~31=4~~ 3 swarms + single (all 4)
3 sibs tested, all Fla- note ratios.
end/flare effect.

In selected group 2/7/7 (grown before packing)
control 0/10 incl 1 swarm } expt to test "quiescent vs active" clones
2/17/17

Would S/T concentrate obvious?

5/28/56.

1227 – 1237

pooled-initials: platings in motog.

SL0967X — practically no guanine

1228	~~11/0~~	11/81/100	
1229		24/198/200	
		35/279/300	

SL0666X —

	SW	TRAILS	COLS.	POOL (plated)	
1232	1	27	159	202	
B) 1233	5	13	79	100	
B) 1234	3	30	149	200	
1236	7	5 Rd	172	190	
1237	15	11	173	185	old prym.
	31	86	732	877	

Character of swarms – any comment given – often too large to be readily studied aborjin.

1237 of 15 swarms, 8 were clear, 5 had single at center, 1 had c^2, 1 had ○°: ; ° at near-center. No recorded attempt to isolate (see A)

5/28/56. 1238

FA37-xsw166

a) ~200 plated, but not incubated. Exclude 9sw/157 cols/197 mor. redisc fluidity efforts.

155 {100 T 21 Cl 9sw 25 l's / 175 mor. "many surfaces were entered & CorT" Most trails in one plate.

Effect of agar on T.S... 250 samples:

VB/25 ml motag. Bryant 250

	Clear Cols	T.	SW.	Σ
0	2	53	2	59
1	2	55	1	58
2	—	59	2	64
5	5	46	6	57
7.5	18	39	11	71
10	11	19	19	52
0	1	159	3	11	174.

Reexplated some clones see 1238 C1 plates for major + minor trails.
C 13 Heads 4 contam. } all but C1 singles only. { 9, 9, 2, 31 = (4)
D 8 Heads 5 clones } { 6 to 52 (18)
see printed notes for clone size ↑

22 viable clones

1239
5/28/86.

plate clones in 60% MOA.

a) MOA contains 12 blanks 16 all singles 2 swarms, no def. colonies; 2 large plaques.

b) MOA 8 blanks 1 swarm + 41 - cols.
6 all singles
1 11 tails (100; 30 elements). See photo 1239-6

mutations not limited for these

see notes protocol for clone sizes: ~~from 6~~ - from 11 to 225.

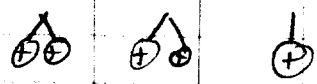
1240 used Wilson gelatin n.g. but have photos.
plated clones. 9 blanks 19 visible.

also many platings
3 swarms 1 e T
3 swarms 5 T
2 1 e,

a) 1 swarm + cols + tails. See for pictures + cluster sizes.

40 ⊙ to 10 4. "No E" - to many cells.

1241 part prequis: saved 3 Fla+ clones.
49.



1242

(A:) Single cell clones plated in MBA+40%NSB

18 empty

7 swarms, all had additionally: 50 1's; 41's; 10 cols incl 5-6 trails; 20 trails, few 1's; 3 3's 2'; 100s singles + short clusters

1 was contaminant ∴ all 6 segregated!

clones on MBA:

8 clones most had 1's + 2's

#21: 61's 8 clusters 3-6 1T^{35} 1T^{10} ←

#37: 18-1 3-C 1T

#27: 6-1 9-C 1T

MBA+40 #11: 37-1 5-C 2 1T (>10/t; 2 had 100, 100 sm photo) phot ←

10#: >100-1

4#: 50-1 20-30 profuse trails

16: 9-T 38-1

18: 12-T 3-C 38-1. phot

20: 1-T$_{16}$ 60-1

22: partly stopped; 1/3 T 2/3 1

30: 16-T [80, 80, ...] 5-C 55-1 ← phot

32 7-T profuse; 1-C; 56-1

34 75-1

38 17-T 3-C 45-1

40 too crowded

42 14-T 33-1

Incubated 15 hours.

6/7/56.

1242B
-C

-1244

B: plant cells in agent broth.
growth limited to 100 - 1000. 18 x examined

3 - 0
3 - 100 Fla⁻
5 - ① /100
3 - ② /100 each isol.

4 isol. { 30-1, 0, 40-1 }

C1-2-3 < 160-1; 1 frag T8; 120-1; 2-T; all -1's

C14 1 ㉙ /1000
C13 1 ㉓ /1000
C6 1 ⑱ /1000
C5: 1 ⑩ /100
} plated ⊕ 95 15. Plant individually

gave some lawns but also globular tails
see photos. ⇐
no professional. note doubling of tails!

C. Plate pooled initials

Readings ? see photos 1244.
messy plates.

1243

Plate pooled initials various media.

	T	C	1	SW	Σ
MŌ-A	88	12	9	5	114
MŌA + 40% penassay	129	0	8	12	149.

but MŌA itself seemed soft.

Single clones
12 blank; See protocols

1244

6/7/56.

1244

Plate 4b clones.

- 15 pairs: 24's

Trial distributions: (clusters as subs a.) x = no clone

3 - 11 - 1 - O_2

1 - O_1 - O_* - 2

0 - O_3

2 - 4

1 - 2

11 - x

0 - 0

0 - 1

x - 0

1 - 1

6 - 5

x - 1

x - 8

need more data of this kind. omit x-x (5)

[some photos] Note that agar too stiff.

6/8/56.

1245

37 – x 666 serum effects.

A) also noted that H_2O ok for trap medium as dilute bacteriost.

B) 36 ⊕ picked one completely inhibited by anti b or anti i.
overnight, clones in ¼ b serum: 1 weighing cell sol but n.g.

C) ~~35~~ 43 clones plated. 35 viable mid log swarm (pure)
MbA60.
readings: ? see plots

6/8/56

1246

Serums inh of trails [b, i.]

SW666x — FA11; x — FA32 initials viol to 1:100 i, b serums.

b serum inhibited both very quickly; i after 30-90 secs. Therefore serum n.g. in this combination.

similar plating trials: no trails here either.

1247

Check serums for inhibiting of trails 37 — x 666

a	+
b	−
c	+
d	+
i	−
k	+
n	+
1,2	+
B-0	±

i. used a for further tests on this point.

TRAILS ∴ i almost only serum which inhibits. i did not give inhibited swarms.

(FA76a) a — x SW666

1248

a { no inhibit b trails
part. " a/b

b { inh all trails at 1:1000 even as 1:100

E coli Fla⁻

note problem of no absolute Fla⁻; better to use serologically well defined Fla⁻.

6/18/56.

1250
1252
1256
1258E

a → × S666; serum effect: platings of ⊕

Confirmed b inhibit all
a partially inhibit all — see photos

conclude all are initially inhibited, some terminals may develop b, non a phenotype. May be able to conclude that no fragments are Fla+ in b effect.

b (Minnesota) serum to check specificity; plating. 1252

10 → × 666 results as above.

see phot.

no further test of specificity available.

~~No expts c a on nucleosides?~~ 1256

from 1252.

Tested residual ? tails in b serum. This would be one way of picking up Fla+ rec // Fla$_1^-$ H_1^a. There was probably some of nondiffusion of b serum. proved H_1^b.

Many + + + = seen.
1258E a serum as a → ×666 initials: inhibition slow and incomplete.
Some aggl. pairs continue to swim.

1259D 3 or ⊕ each tested in a, b serum. a inhibited more slowly than b but initials all inhibited except c. 2% which persisted at all.
4 allo persisted in b, 3 viable were swarmers.
2 a viable.

Later mixes isolates, e.g. B615 ⊕/a serum → 2 unusual motile. most others immobilized. Conclude some terminals not affected by a. while all initials are.

Correlation of initial motility & progeny, segregation in swarms

56 ① inoc for microcolonies examined for ⊕; underestimates

NG 13 swarms 4/+1 0/2^{13} 6 ⊕/2^{13} 22 >10/2^{13} 11

high incidence! of ε

5 clones harvested for replating of intermediates ⊕.

B3
B12
c9
c1
} 1's and v.s. tails only

D1 swarms. Replate residue: 8 sec/92 colonies ∴ only ≈ 10% of sec. not tails from init inoc.

Note: this clone scored as ⑩/10^4; must have had (10^3)/10^4!

∴ Take segregation ratios as:

	$F/a^+/F/a^+ + F/a^-$	
D1	8%	8/100
c2		4/47
c11		4/33
D7	100%	10% not repl.
D8		3/28

Note swarms were flared but not entire.

Note distribution of clones by ⊕ was

	inv	0 & 1	2-5	6-9	10	>10	sw	Σ
Overall all	13	6 9	10	3	3	8	5	
scored as mot active	2	1 2	6	0	2	1	1	

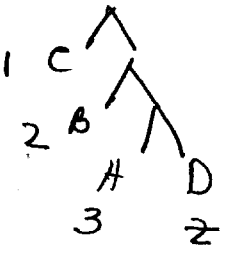
No obvious correlation between progeny + initial motility of method.

inv	0				sw	
13	6	22		11	5	57
2	1	8		3	1	15
—	0	1-9		10-40	sw	

broader clones.

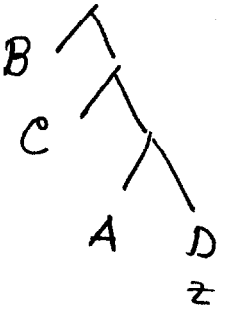
1254. a

According to my reconstruction of 1254, the indicated pedigree is



But, e.g., in #1, E chorus is listed as 2.

as if



Can this be right?
I think I must be correct now!

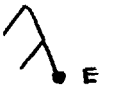
---

partition of E

for n4 minimal

E	#	E+P.
1	~~1~~ +1	4
2	~~2~~ 3 +1	2
3	~~3~~	1
4=Z	~~0~~ +1	1

# corr.	
3+1	= (4)
(2+1)	3
1	1
0	0

+ 

= (3-4)

and one clone c/ Z disappeared.

contemporary summary is either wrong or my interpretation of the ~~results~~ argument!

See summary

1253-4

Tetrahymena

Z and Flagellar characters.

IGNORE

6/8/56

prel. on W 1177, W 2802
sequenced by later tests in method.

1254.

1 Released Tz describes in oil
2 Tz taken up only by stationary cultures.

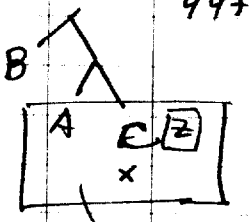
(a) 93 → x 666 A) protargol-stained cells B) post-stained cells.

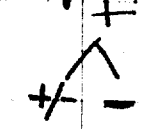
Almost no motile A were stained; 20% (only) of motile B were stained.
Not random sample; 50% of parent population was! 2 clones followed 4-6 fissions

28 isolates B, 2 from A.

1 swarm = 3 | B. What is pedigree? Need to reconstruct the tabulations.

44+ : 77- mating + Fla

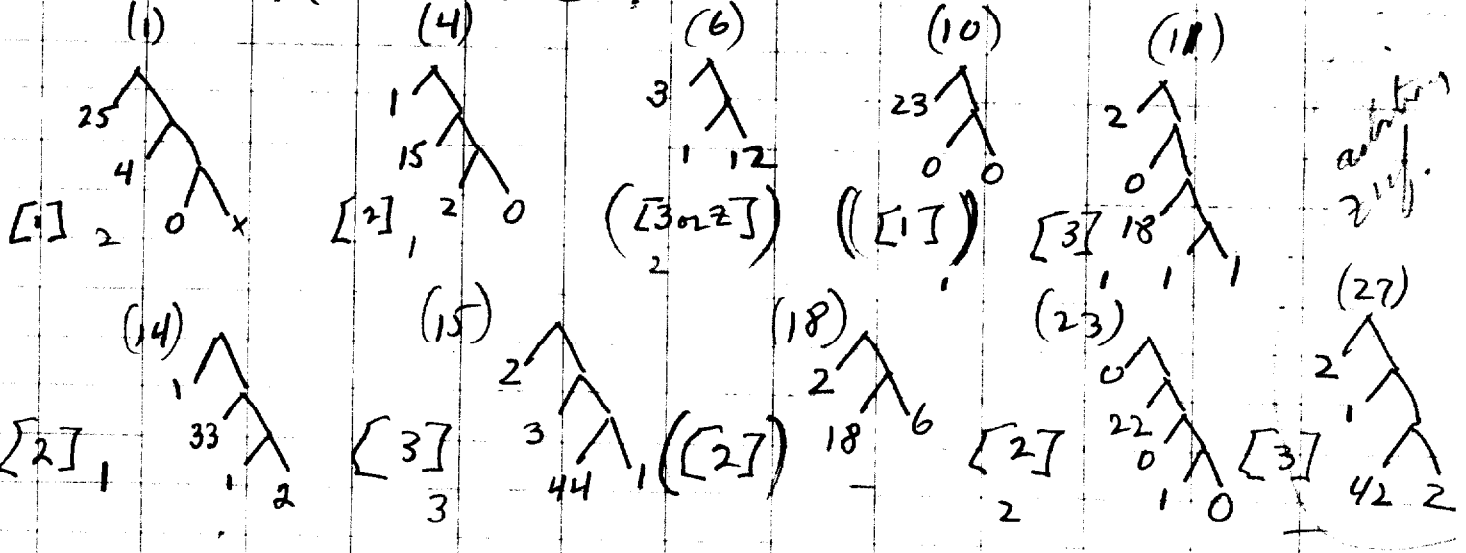




11 calls. 3 were motile at isol; none later.

8 clones had > 10 motiles:

See correction next page

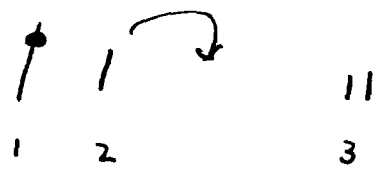


No preexistent polarity of motion. Though ⟲ is less stable and probably less frequent.

6/9/06.

The problem is how to read protocols.

E.G.



Does $\overset{1}{\underset{2}{!}}\rightarrow$ mean this cell is interpolated between 1 and 3 or put to right of 3. As practical matter, almost certainly the latter. Then sequence becomes:

A	B	C	D	E
4	1	2	3	2

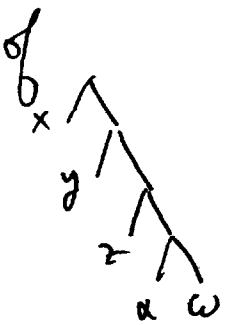
rather than

A	B	C	D	E
4	3	2	1	2

To translate prolysis as given, invert the central items.

A and E still have to be the the terminal sites.

i.e., instead of



read

This now agrees w/ previous summary.

~~REACHABLE~~ — SEE SUMMARY above for ~~FUNKE~~ partition of chains counted.

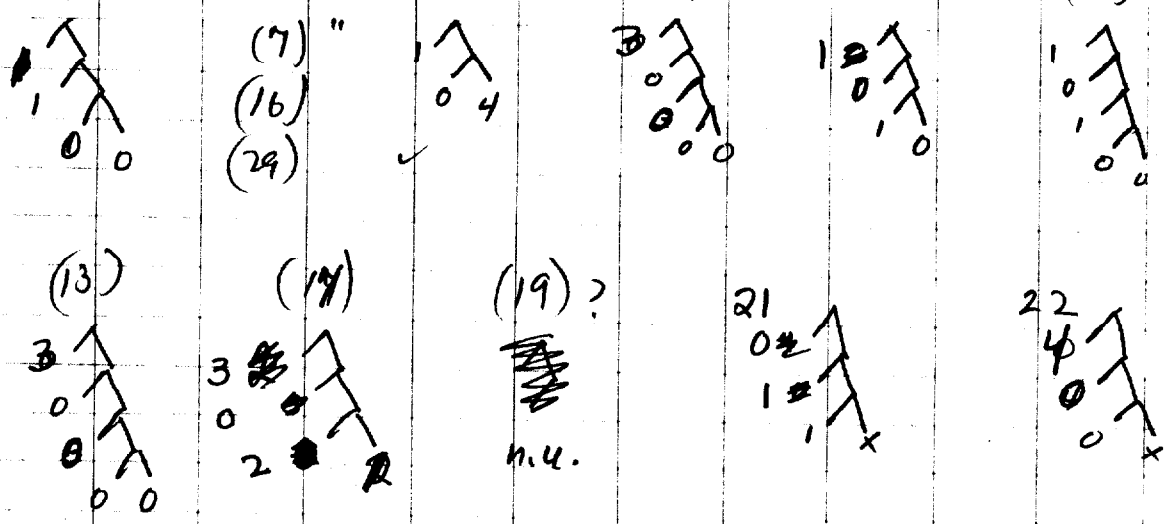
Remaining classes are non-E.

(2) (3) inv (5) (8) (9) (12)

(7) "

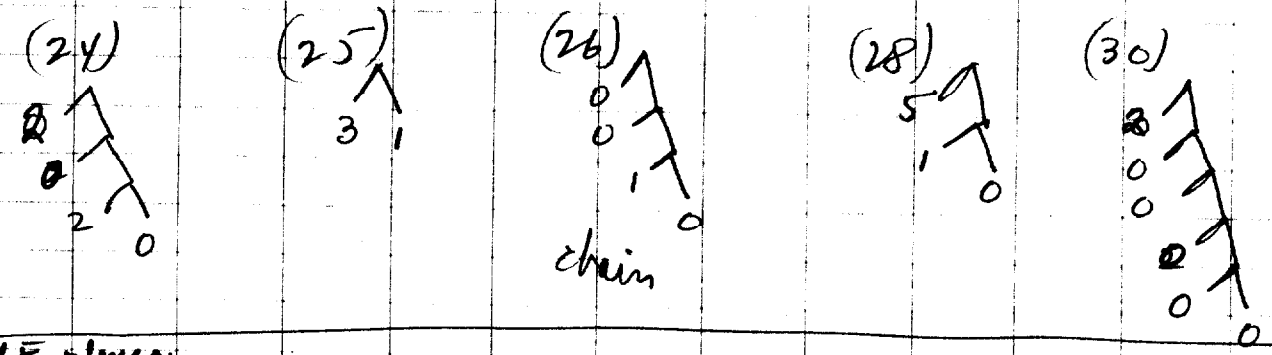
(16)

(29) ✓



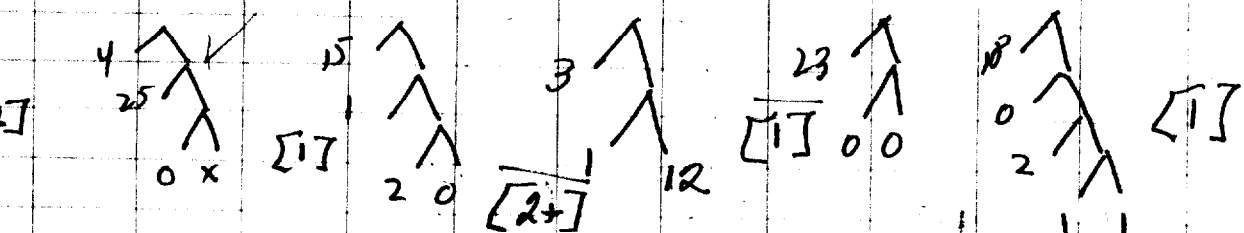
(13) (14) (19) ? (21) (22)

(24) (25) (26) (28) (30)

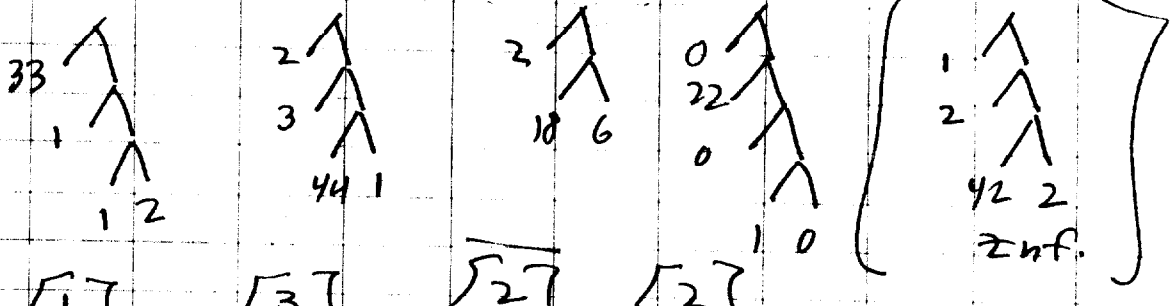


Counted E classes:

[2] [1] [1] [1]

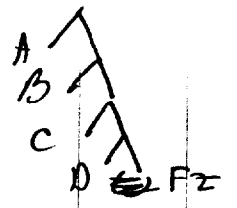


[2+]



inf.

[1] [3] [2] [2]



SUMMARY

1254
tabulate.

E clones.

	A	B	C	D	W	Σ	
✓	4	25	0		x	29	
✓	15	1	2		0	18	
= (	3	1	.....		12	16	} ≡
✓	23	0			0	23	}
✓	18	0	2	1	1	22	
✓	13	1	1		2	17	
	2	3	(44)		1	50	
(	2	18			6	26	)
	0	22	0	1	0	23	
2 inf. → (	1	2	42		2	47	)
Distributions #	4	3	1+1	[1]		Found 4:3:1:0	
						Random Exp: 4:2:1:1	
						Poker Exp 4:0:0:4	
swarm	0	⊞	+		x		
			-				
nonE	1	1	0		0	Neg. correlation of Z and E not excluded. But 1259	
	1	0			4		
	3	0	0	0	0	3	
1259 B2	1	0	1		0	2	
for mod	1	0	1	0	0	2	
	3	0	0	0	0	3	
	3	0	2		1	6	
	0	1	1		x	2	
	4	0	0		x	4	
	2	0	2		0	4	
	3				1	4	
	0	0	1		0	1	
	5	1			0	6	
	2	0	0	0/0	0	2	

Initials with Fz granule. Follow the Z chain to W.

10 E clones
1 swarm
14 E
4 inviable

T2; Methocel.

1255
7
8

DATE: REF:

6/7/56.

1	2	3	4	5	6	7	8	9	10

W1177 Used 2% methocel 4000 to form necklaces i usually terminal 2. See sketches. This particular series is too sticky.

W1177 much same. 1257

10 ditto tried glow beads as positional markers but this n.g. 1258
Note interstitial lysis of necklaces after infection.
some 2 chains i terminal 2 still intact.

Suggest drops methocel to show up Fla+
Noted that swarm cells were much more active than initials. Residual motiles were 6xw 7E 4 ♯ 4 ♂ sug. suggesting selection in favor of ♯. These were ↓ at 10^{3}-10^{4} dests of ⊕
9, 3, 12, 1, 12, 4, 18, 24, 2, 15, 16.
Also attempted to resolate E from interim clones in methocel, unsuccessful.
2% MeC 400 stops 80-90% of Fla+. No selections were E
1% stops none; move more slowly

~~A Sleeves~~

40

50

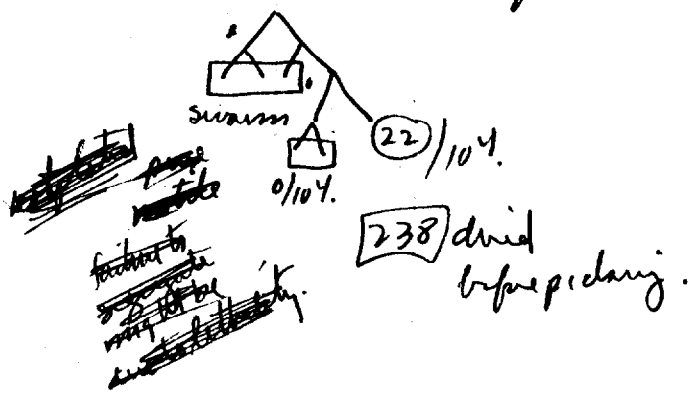
A. No 2. 1% methocel 400 (probably too thin) (15% diluted)
13 clones 2?E in microcytotoxicity. most active 10, 11, 12, 14.

B. 2. Partial separation of early fractions.

(-C) 38 initials 3 ng. 4 E 5 sw.

some partition data E: ⊕ 15, 10, 11, 6 See for partition info.

SW: B2 interesting



C8 IIII 0/104. ! sw

3 others uninformative on segregation.

D see 1250 serum effect.

E. Like B but no separation. 34 isolates

4E	9	11	15	16
25 #	0^3	1^5	2^1	3^4 4^2 5^2 6^1 7^1

sw 5 not plated.

inv 5

conclude no selectivity for E cells in 1% methocel

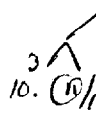
(12593-C)

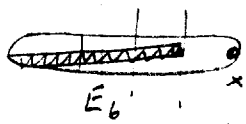
4E 4sw /34/ isolates.

b 1 ⋮ 111 { ↓ 37/ i 10⁴. (15)/10⁴. 10³.

b 2 swarm sensor

b 10 no resp. ↓ → (10)/10⁴.

c 1  10⁴. 

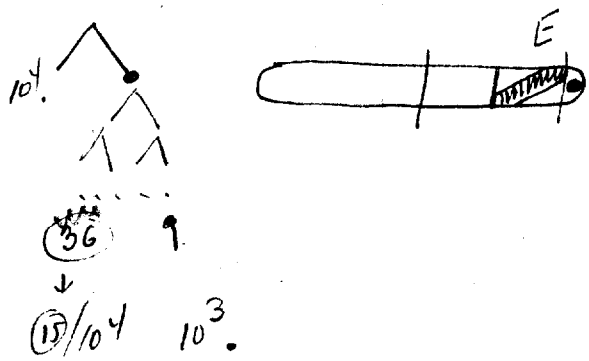
c 2 111 (6) ↓ 9 10⁴. → x 

c 4 ↓ not sep. → sw? > (10)/10⁴. before picking not plated

c 5 x sw x. ∴ ↓ → swarm interpolated pine.

c 8 111.1 / ↓ < sw sw

Fla⁻ 0/10⁴. swarm.

presume b 1 

MeC 400 1½%

1260

6/10/18

tpaelitanis.

DATE: REF:

1	2	3	4	5	6	7	8	9	10

Unrand stub — 10% selected by MeC — No initial as active as SPD Fla+

3rd ~~Bldg~~ 1 2 ~~blds~~ — splits — Some partitions at n,

A. (4) : 2 inv — 14:1 — 6:5

10

B. (1)/x — (1) — (2)/4/1/x — (14) — (1)(1) — (3) — 0/0/0

4 inv — (1)/(1) — 2/1 — 0/(1)/0 — 0/4/1 — 1/3 — 3 — 0 — 0

1 sw.

20 ~~E~~ — 0 0 — 2/1 — 1/0 — (5) — sw +++ — 0/0

1 ~~E~~

20

and — 21 — 27 — 4 — 16 — 5 — 33

~~6/15~~ — 1/20 — 8/20 — 21/2 — 4/12 — 3/2 — 7/26.

4E

2~~E~~

30

E ~~4~~ 7

~~E~~ 23

sw 1

x 6

∴ Totals. — ~~24~~ 37.

no marked selection for E

distinct hits

0 6
1 4
2 2
3 4
4 2
5 3
~~4~~ 1
~~11~~ 1
~~14~~ 1

~~15~~ 16 — ~~+~~ 12

50

1 inv ~~4~~ 6

reads: 7, 11, 14, 15, 16, 21, 28, 33

DATE: REF:

2% MeC 400. discrimination factor about 1% 6/150.

A. (Takes too long to establish differential) + wetting problem

Clones 5 pattern:

⊕ /10^3-10^4:

25, 20, 3, 16, 1, 6, 2, 50; 3, 20, 18, 3, 20, 7, 11, 13, 10, scr

10E 7 ⊄

and 2 inviable.

44+ / 265 −

Remarks - better to wait until linkage organization is better understood or for similar studies crossing systems.

F/a+ also greatly slowed but must not mate.

MeCl 400 2%

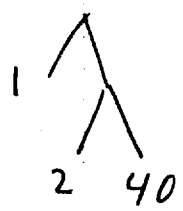
prodigiosatuples.

No cont. motile cells (like Pla+) seen.

34 initials; only 3 E's and 1 swarmer (pure at n_2 n_3)

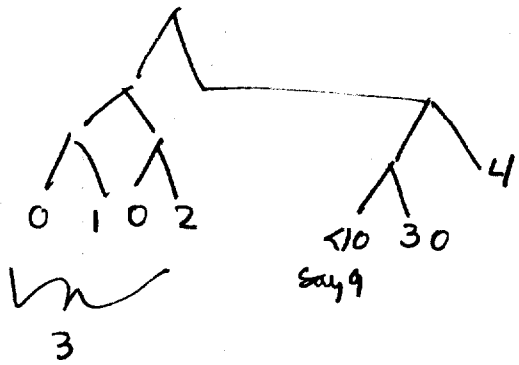
deatr.	n.g	10	
22 F	0	11	
	1	5	
	2	2	
	3	1	
	4	1	28
	6	1	37
	7	1	43.

Partitions.



42:1

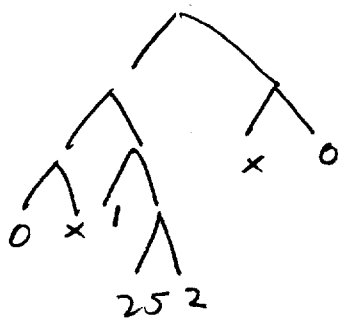
40:2



40: 3

39: 4

30: 9



28:0

28:0

27:1

25:2

no selection by MeC.

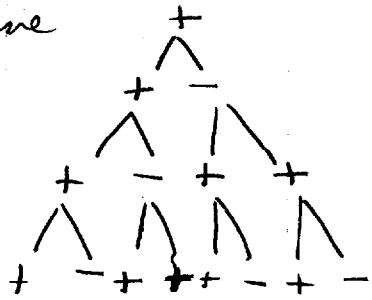
Leifson cultures. 1272

6/10/56.

H1. Ps. aeruginosa typically —oo probably closest.

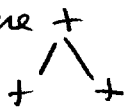
H32 vibrio =o and

did have



see 242 before writing.

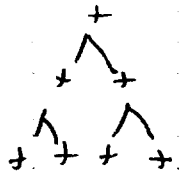
but same



also.

— later → +.

Salmonella typically is from many observations



Summary of splits

Exclude vague splits

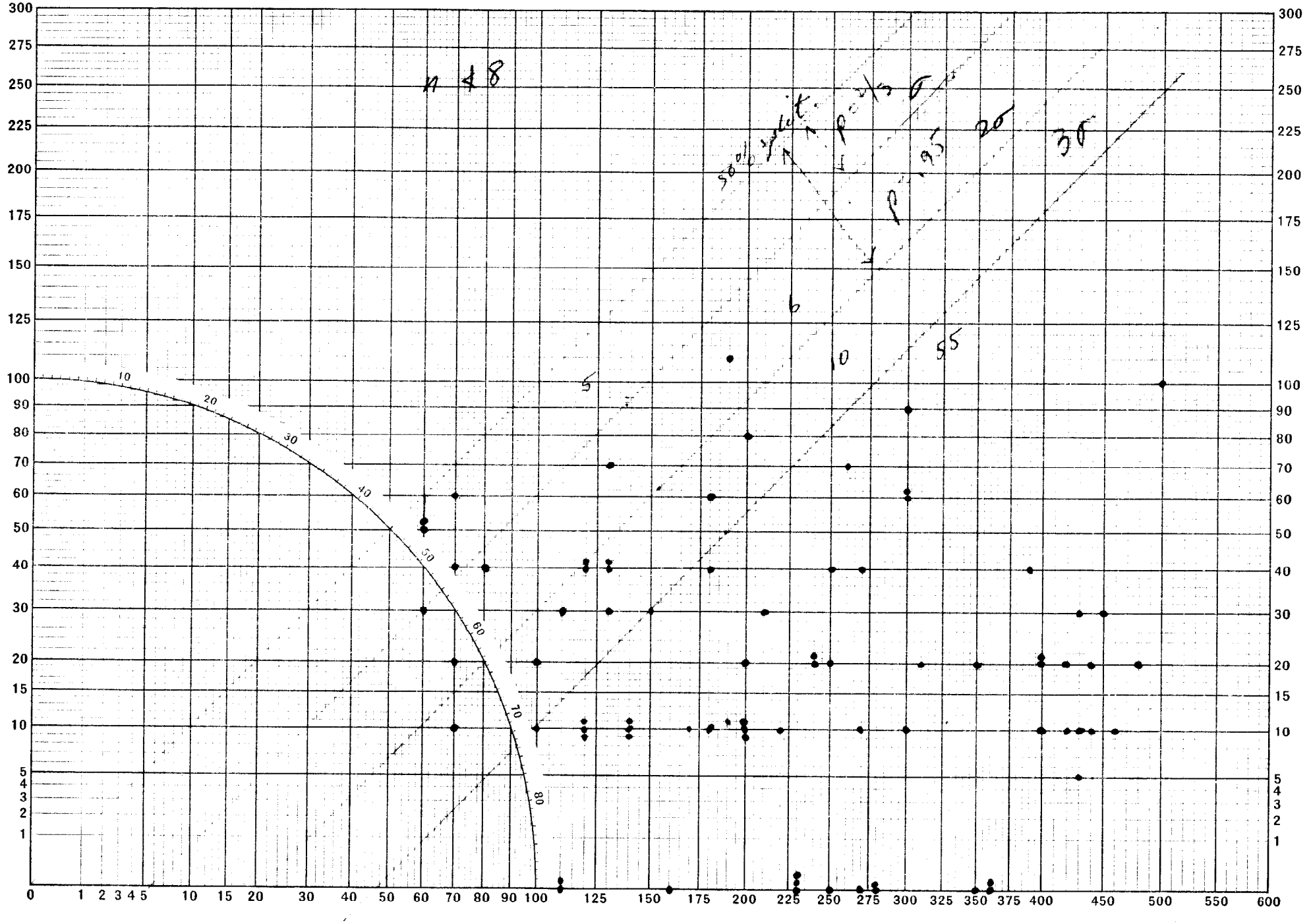
DATE: REF:

	1	2	3	4	5	6	7	8	9	10
1134 A1	1 10			1212 C1	6 7		1259:	0 36		
A5	10 50			B3	6 3			0 36		
				D1	4 7					
				F1	1 7			0 11		
1138 B4	1 17			C5	2 24			0 11		
	4 13				3 21					
					1 20					
1141 A4	2 31						1260	1 14		
	1 30							5 6		
10	11 19	- possible ambiguity but 1 Hemitrio IS.						1 20		
	1 18									
[B4	1 14	but sep 1 call from 7]						8 20		
1143 E2	2 7							4 12		
								7 26		
1144 B4	0 27	Incl (15) from intermediate isol.					1262	1 42		
20								2 40		
A1	0 16									
				1244	1 14			3 43		
					2 3 11			4 39		
								9 30		
1147 F2	1 12				6 5					
								0 28		
1149 B5	4 12			1254	4 25			0 28		
	2 10				0 25			1 27		
30								2 25		
					3 15					
D3	1 12									
					3 13					
D5	2 35				1 12					
	0 30									
E4	1 40				23 0					
					4 18					
F4	2 40									
					4 13					
F2	2 20									
					2 48					
1150 F2	6 30				3 45					
E3	4 8				1 44					
E4	7 13									
A1	1 43				2 24					
C3	6 30				6 18					
E5	1 20									
F1	4 27				0 23					
					1 22					
50										
					1 46					
					2 44					
					2 42					
				1259	0 22					

Full Scale 0 2 3 4 plty+1

Individual Standard Errors

Tenth Scale



Review summaries.

DATE: REF:

1. Lines. tabulate only long (10 or more gens?) and late ones.
   Give statistics on these.
2. Partitions. Use scatter diagrams? (Relate succ. fissions on one clone?)
   on prob. paper! for $\Sigma = 48$ ✓
3. Swarm-containing clones: segregation. ✓
4. distribution of lines per clone. ✓
5. Serum effects.

How many isolations; pedigrees?