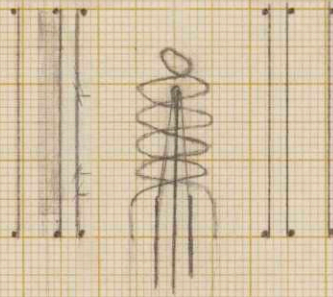
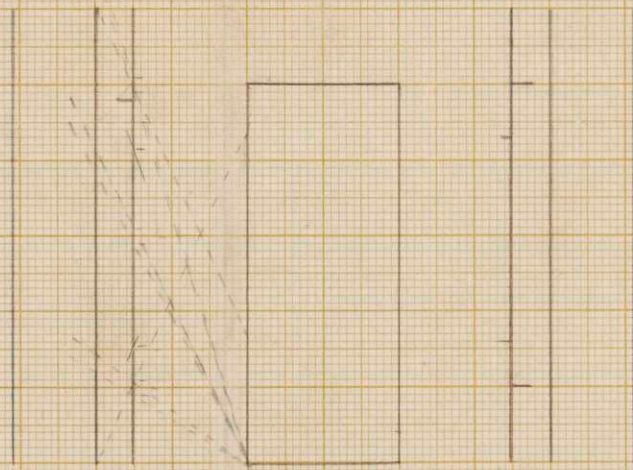
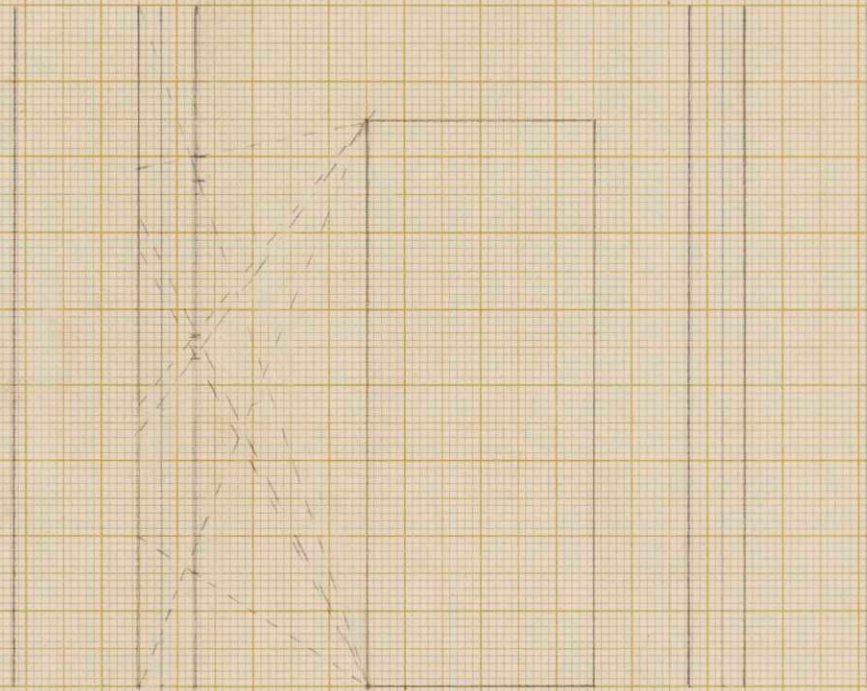
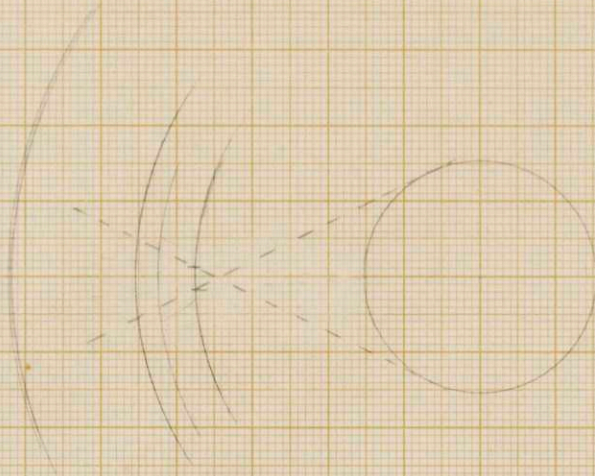


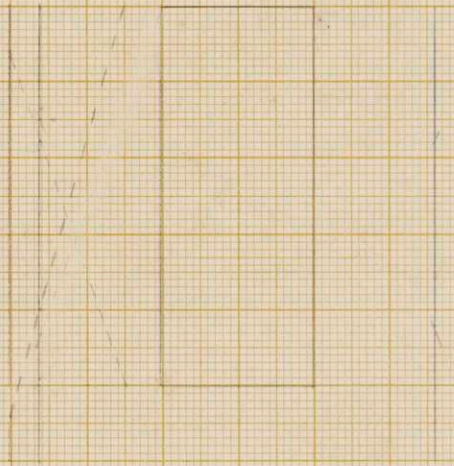
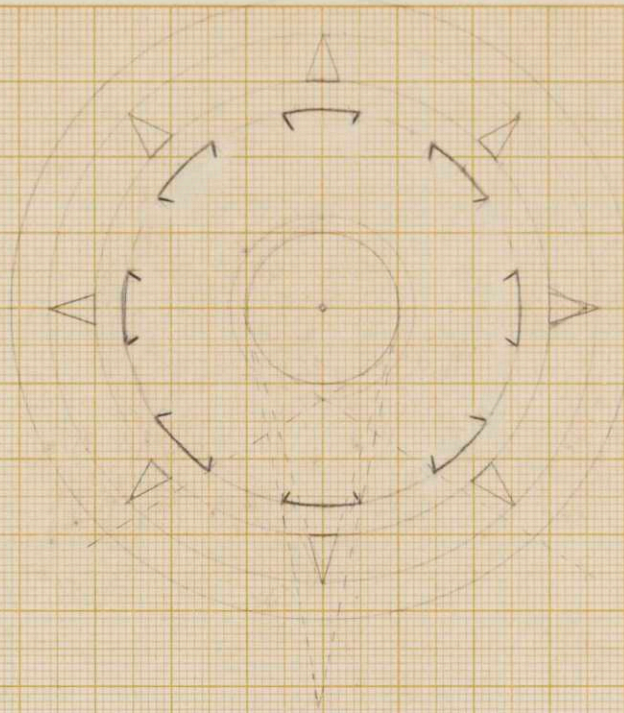
MO 241
BOX 2 FOLIO 30

Ionization Gauge, 1948-49

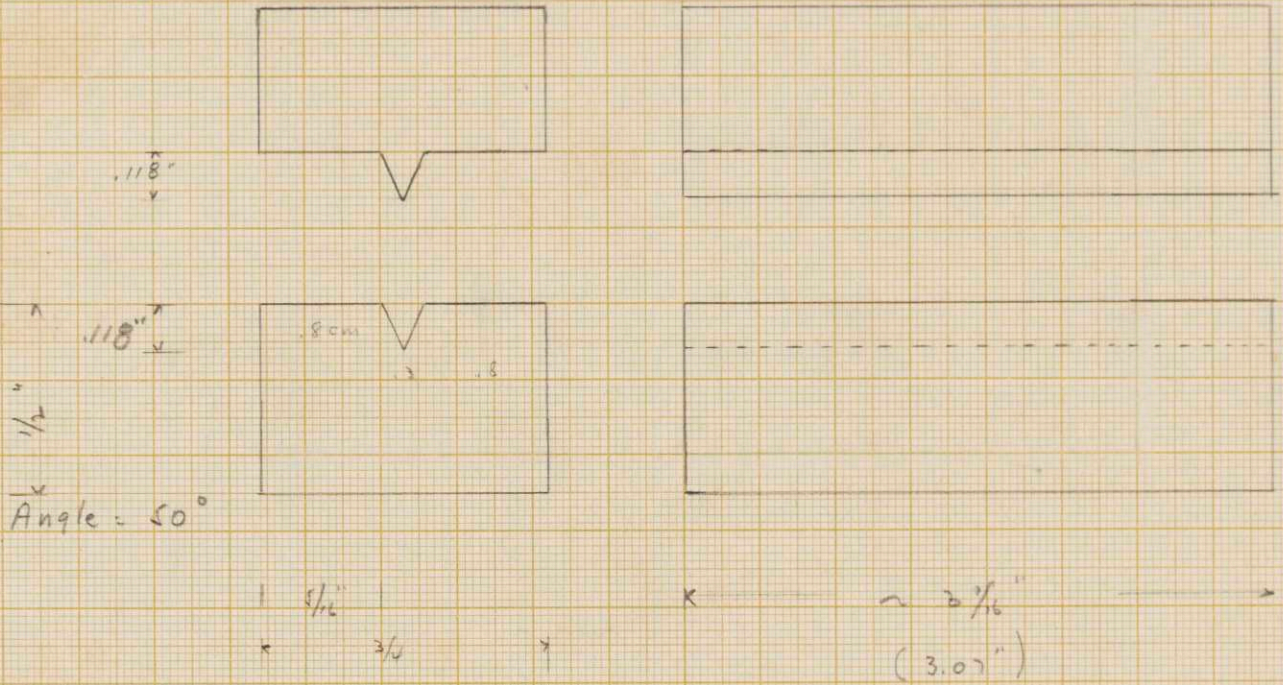




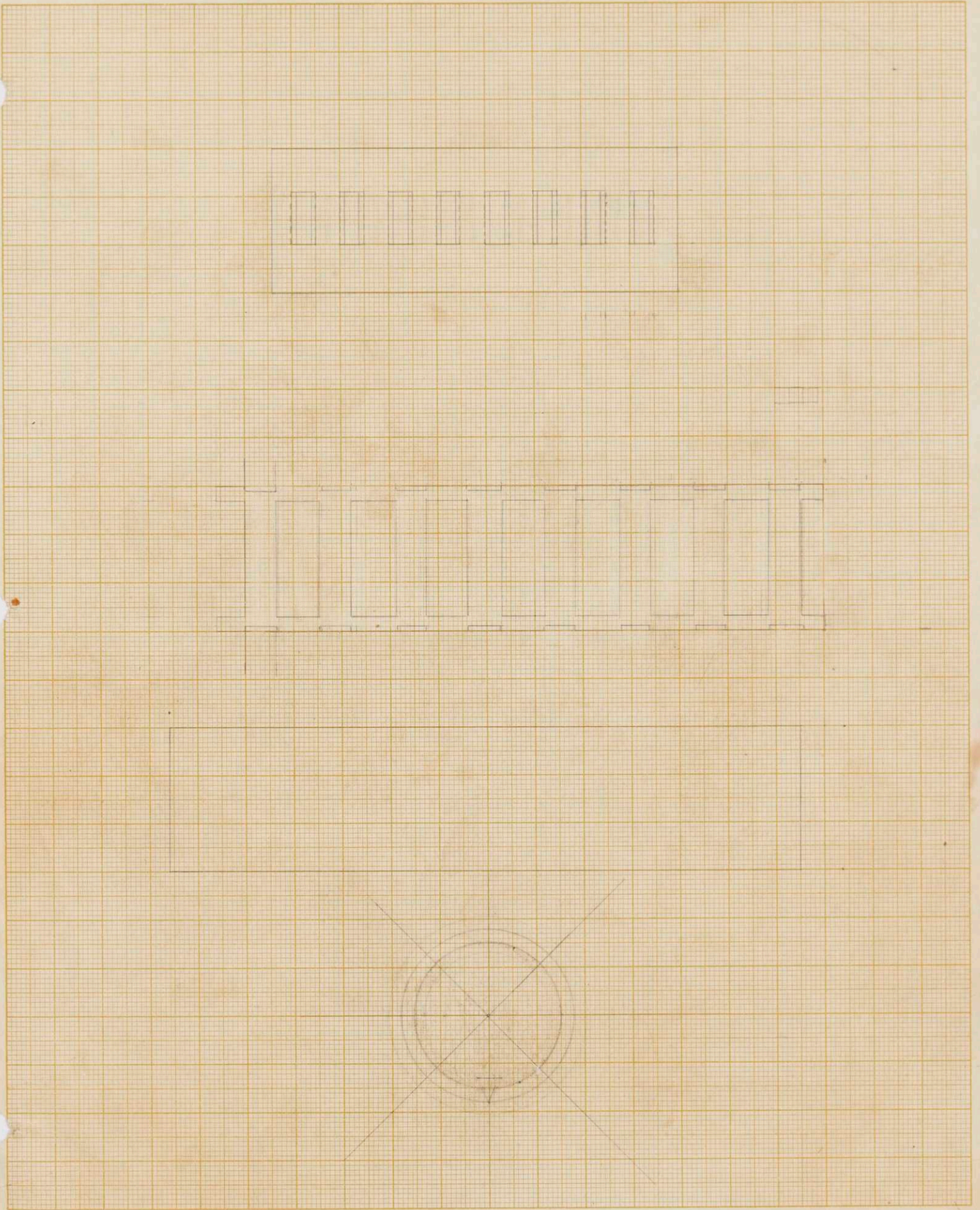
Preliminary sketch to determine
size of opening if open areas were
series of holes instead of slots
3x actual size

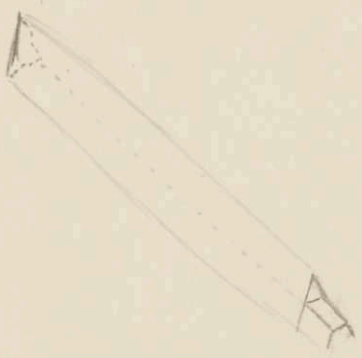


Arrangement of slots and
length of openings to hide
middle collector from grid
2x actual size

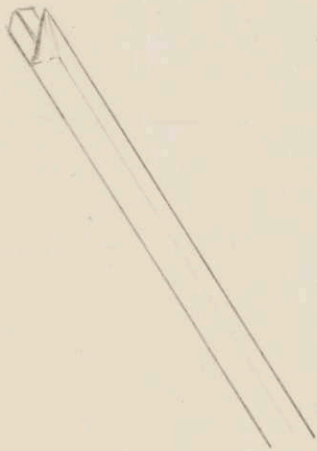
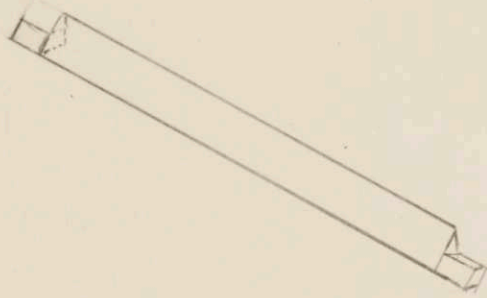


Die for bending
collector
2x Actual size





A



$3\frac{1}{2}$

$1\frac{1}{2}$

$1\frac{9}{16}$



$$d = \sqrt{8}$$



if perpendicular is 3 mm

$$x^2 = 3^2 + 1.5^2$$

$$x^2 = 9 + 2.25$$

$$x^2 = 11.25$$

$$x = 3.36$$

$$c = 2r \sin \frac{1}{2} \theta$$

$$3 = 6.6 \sin \frac{1}{2} \theta$$

hypotenuse = 3.5

side = 2.6

$$3.5^2 = x^2 + 2.6^2$$

$$12.25 = x^2 + 6.76$$

$$\frac{5.49}{5.7} = x^2$$

$$\begin{array}{r} 26 \\ 26 \\ \hline 52 \\ 776 \end{array}$$

$$+ 3 \text{ cm} = .118 \text{ in}$$

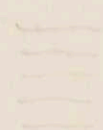
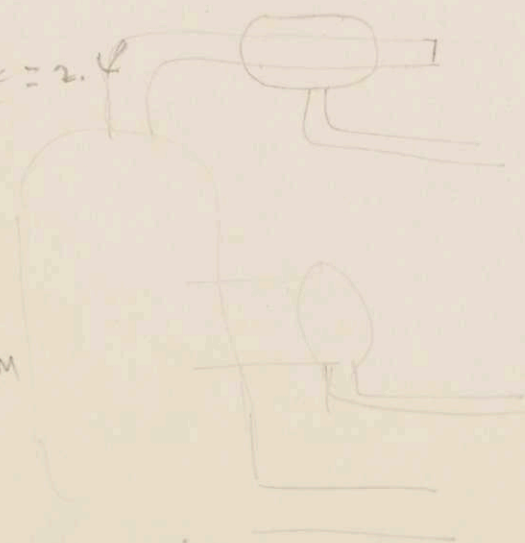
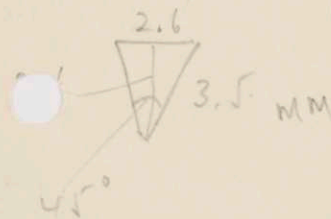
$$.24 \text{ cm} = .094$$

$$.35 = .137$$

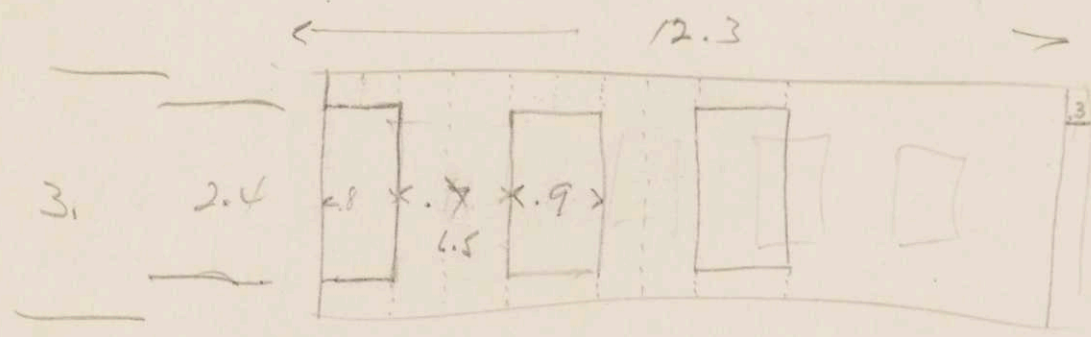
$$.26 = .102$$

2.6

$$x = 2.4$$



$$\begin{array}{r} 4.1 \\ 3.0 \\ \hline 2 \overline{) 1.1} \\ 2 \overline{) 0.55} \\ \hline .27 \end{array}$$



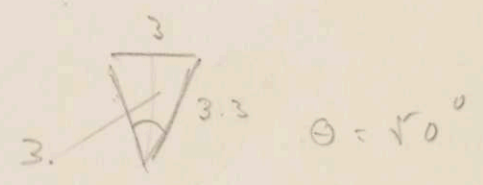
$$\begin{array}{r} 1.5 \\ 8 \\ \hline 12.0 \\ 3 \end{array}$$

.66

Spacing

$$\begin{array}{r} .26 \\ 2 \\ \hline .52 \text{ cm} \end{array}$$

$$\begin{array}{r} 1.2 \\ .3 \\ \hline .9 \end{array}$$



$$\begin{array}{r} .08 \\ 8 \\ \hline .64 \end{array}$$

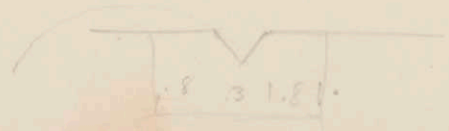
$$\begin{array}{r} 1.50 \\ 1 \\ \hline 1.6 \end{array}$$

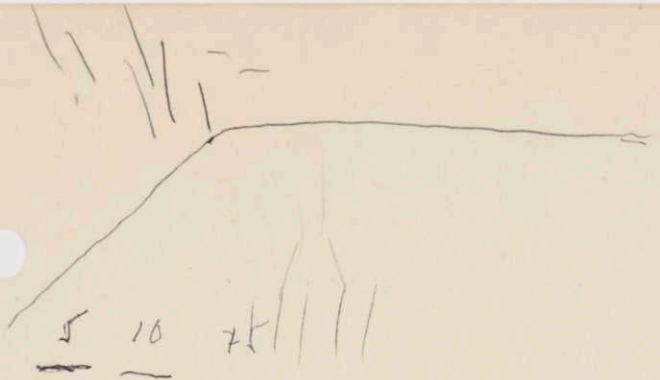
Cent. inch

$$\begin{array}{l} .3 = .118 \\ .33 = .130 \\ 3.0 = 1.18 \end{array}$$



1.9



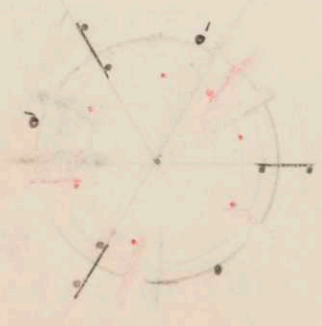
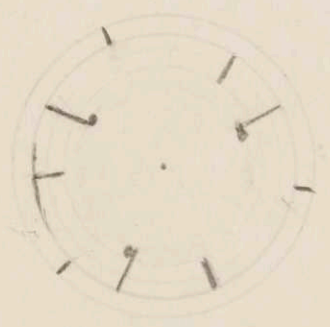
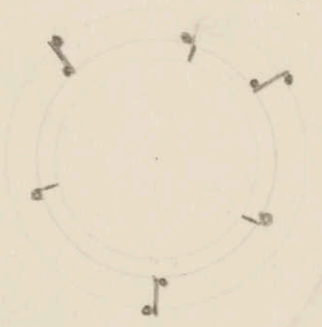
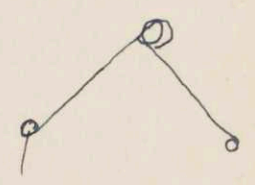
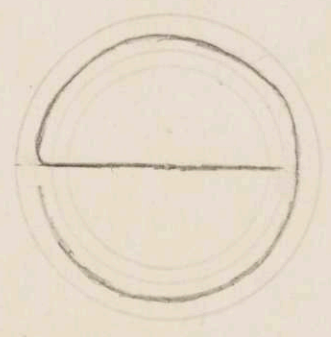


5 10 25
 L |
 J
 4

a o r t
 s n -
 ~, ~ -



9



Experimental Fabrication Gauge

- ✓ 1 Plan view arrangement of slots + collectors
- ✓ 2 Side view to determine length of openings in collectors
- 3 Layout for Ta sheet for cutting.
- 4 Plan view arrangement of beaded supports
- 5 Plan view arrangement of press + supports for grid + filament.

$$\theta = 31.5^\circ$$

$$\begin{array}{r} 45 \\ 16 \\ \hline 270 \\ 45 \\ \hline 720 \end{array}$$

$$\begin{array}{r} 9.4 \\ .72 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \overline{) 9.4} \\ 1.17 \\ \hline .97 \end{array}$$

$$\begin{array}{r} 1.2 \\ \hline 1.2 \end{array}$$

$$\begin{array}{r} 1.17 \\ .27 \\ \hline .97 \end{array}$$

3
9

9.6

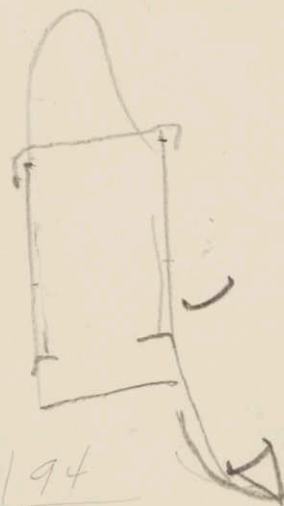
9.42 circum.
1.6 cm Total

$$\begin{array}{r} 8 \overline{) 7.82} \\ .97 \end{array}$$

70
9

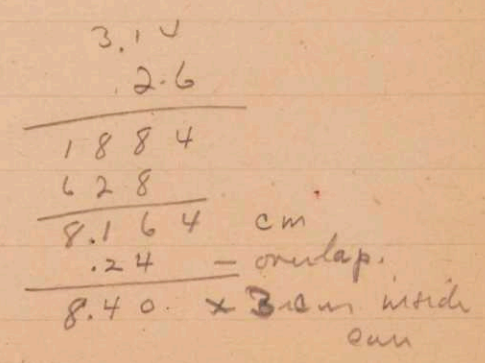
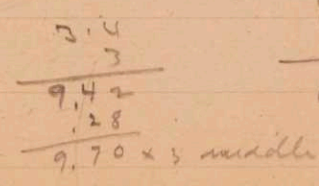
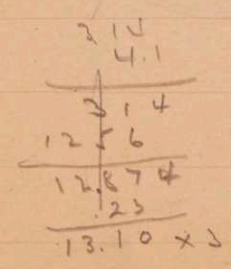
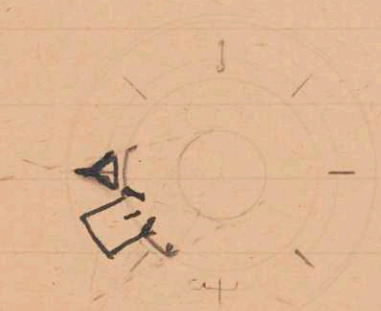
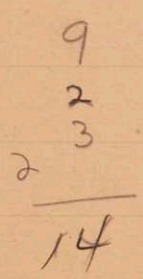
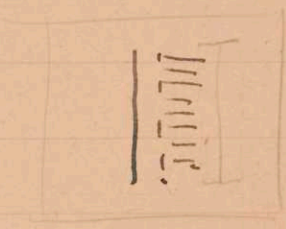
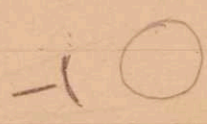
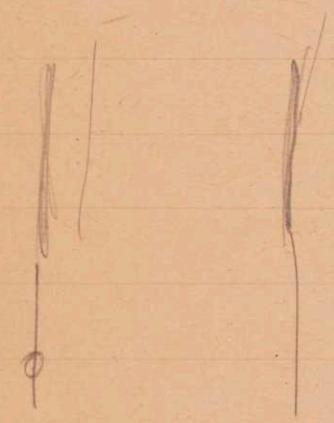
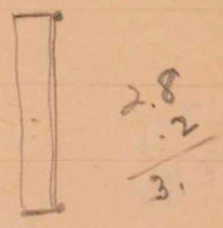
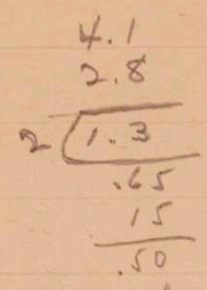
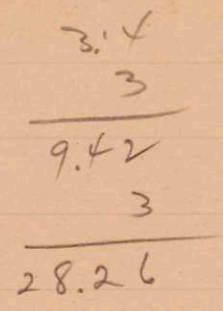
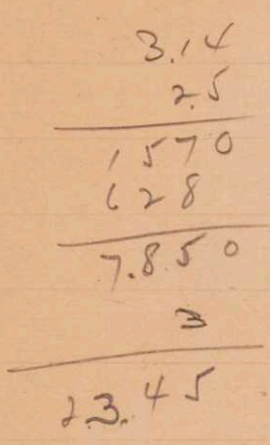
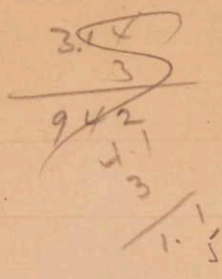
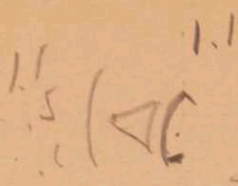
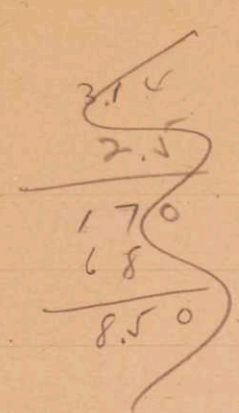
$$\begin{array}{r} \theta = 31.5^\circ \\ 1.8 \\ \hline 2520 \\ 315 \\ \hline 56.78 \end{array}$$

$$\begin{array}{r} 8 \overline{) 94} \\ 117 \end{array}$$



4.8
4.1
.7

- 3/8" 1. Size of glass envelope
i.e. how much clearance
2. can inside & outside
be connected internally
this would eliminate
3 supports



area of inside can

mandrel diameter 2.6 cm

$$2.6 \times 3.14 = 8.164 \times 3 = 24.49$$

size of openings $1.1 \times .5 \text{ cm} = .55$

$$.55 \times 8 = 4.40 \text{ cm}^2$$

Effective area 24.49

4.4

$$\rightarrow \frac{24.49}{4.4} = 20.09 \text{ cm}^2$$

area of outside can

mandrel diam. 4.1

$$4.1 \times 3.14 = 12.874 \times 3 = 38.622 \text{ cm}^2$$

5/12/48

Blank for Redesigned gauge

Blank with top press on which is mounted the filament and grid sealed on system for purpose of annealing glass, testing for tightness of glass and for outgassing and annealing grid and filament also check on distortion under heat.

9:00

Ovens open for high temperature bake to 500°C. Tube was sealed on system 5/11/48 and pumped overnight.

$P_2 = +3.5$ cm stick.

11:00

$T = 500^\circ\text{C}$

11:30

500°C

12:00

500°C

12:05

Liquid air on trap

12:30

Heat off ovens down.

12:45

Filaments heated. Current increased slowly to:—

i_f	T_{P_f}
3.8 a	1975

i_g	T_{P_g}
9. a	1775

When heated separated —

3.8	2000
-----	------

9. a	1750
------	------

1:25

$P_2 = +4.0$ cm.

Pumps off.

5/12/48

5/18/48

Outgassing Collector & Inside Can for Ionization Gauge

2:30 Blank containing bucket (To) with parts inside
(Bucket has top & bottom covered) sealed on system.

3:00

~~2:45~~

3:30

3:45

Pressure ok. with pumps on
Ovens on for bake

Discovered thermometer had broken inside oven
Shut off heat and cleaned oven platform
to get rid of loose Hg.
Too late for bake before closing time. Left
pump going over night.

5/18/48

8:15

Back pressure high. Pressure in system
higher than 6×10^{-2} as a result.

Started for pump. Note: check stopcocks before final take

8:25

8:30

9:00

9:10

9:17

9:25

11:25

11:30

11:40

11:50

$P = +3.5$ cm stick

Ovens on for bake

$T = 420^\circ\text{C}$

$T = 480^\circ\text{C}$

$T = 500^\circ\text{C}$

$T = 480^\circ\text{C}$

$T = 490^\circ\text{C}$

(Changed from 270V to 115V D.C.)

$P = 2 \times 10^{-6}$

Trap oven off & down.

L.G. on trap.

orans off

Outgassing with R.F.

11:40

11:55

$P = +3.5$ cm stick

After intermittent bombing upto Pyrometer temp
readings of 1400°C $P = +1.5$ cm hot.

Inside 1450°C

" 1500°C

5/20/48

Redisigned Tetrode Ionization Gauge #52048

11:00 Stopcocks regreased
 4:00 Tube sealed on system & checked for leaks
 4:30 Hg pumps on.
 Pumped over night

5/21/48

8:30 Back pressure high but not seriously so.
 $P = +1.5$ cm stick.
 Fan pump started
 8:45 Aux fil at press heated to test it's operation. -OK.
 9:00 Oven on for bake
 9:45 $T = 510^\circ K$
 11:45 L.C. on trap.
 12:00 Heat off
 12:10 Oven down
 14:15 $P = +4.5$ cm stick

First operation of gauge.

I_a	Gen
8.7	4.7
8.5	4.7
Plots	offscale

MV	Δ
3	7.4
4	43.
	254

12 min

5/24/48

Outgassing metal cans.

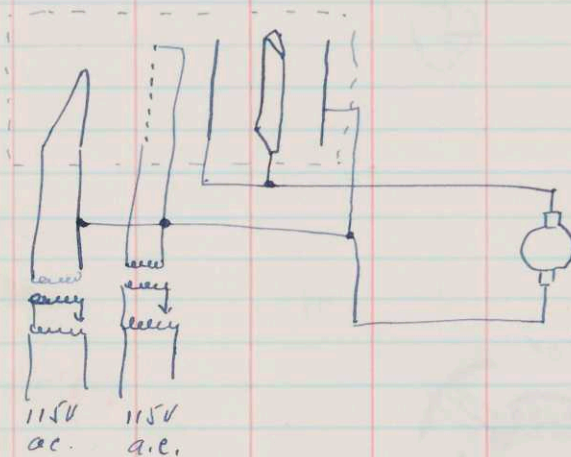
The middle and inside collectors were connected together and to the positive of 900 v D.C. Negative of D.C. connect to grid and to filament both of which were operated as filaments, and the source of electrons R.F. was applied to outside can. This hookup was not sufficient to get the inside can hot enough and less than 50 ma. of electron current was drawn.

✓ 1/24/48

(2)

52048

The outside can was then also connected to the negative of the D.C. source and an electron current of 90 ma. was obtained. The inside can reached an estimated temp of 1000°C.

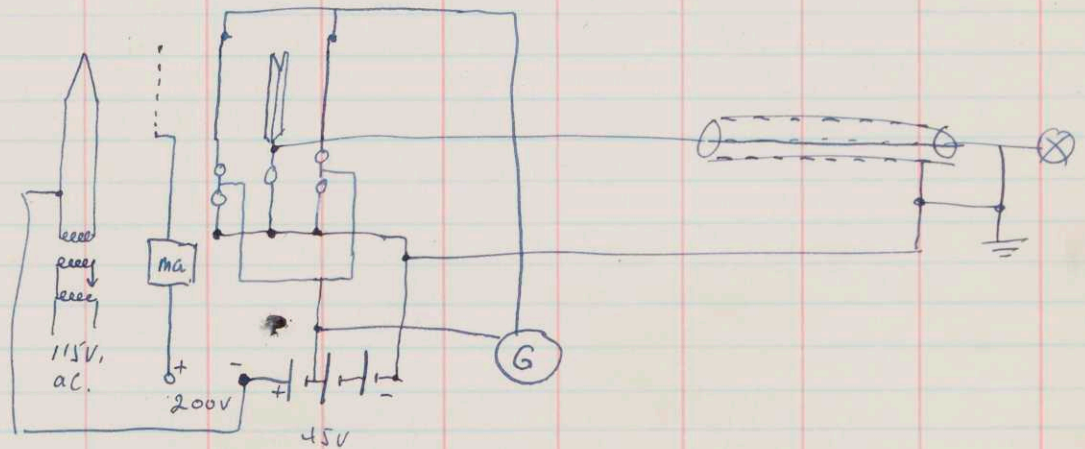


Gauge operation

2:30

I_e	G_{em}
10 ma	1.4
"	11.25

Tube oscillated when emission increased to ~ 13 ma.



2:55

10 ma. " 8.85

Adjusted zero on galvanometer

2:58

10 ma " 13.5

3:25

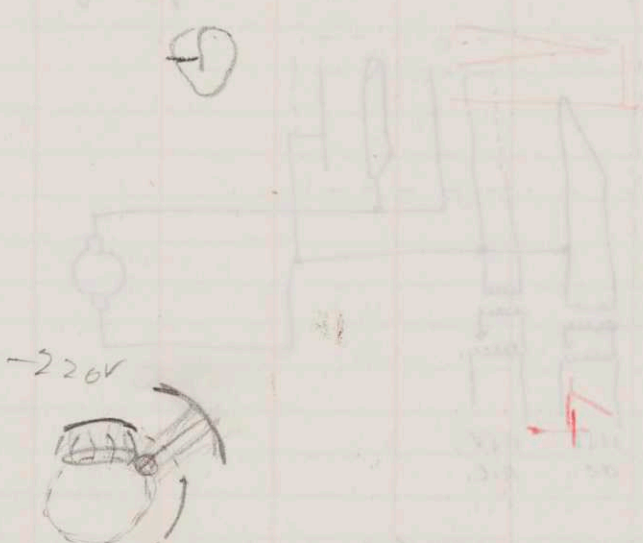
" " 12.4

1/10/52

(2)

2004

The circuit can be used for the purpose of the D.C. source and an electric current of 40 ma. can be obtained. The main can be used in a similar way of 1000°C.



General operation

1000°C
 1000°C
 1000°C

The circuit is a simple one and can be used for the purpose of the D.C. source and an electric current of 40 ma. can be obtained.



1000°C

General operation

1000°C
 1000°C
 1000°C

5/20/48

③

52048

	I_c	Gen	Δ	
5:00				Tube into oven for all night bake
8:15				After all night bake $T = 500^\circ\text{C}$ $I_c = +2.0$ cm stick Trap oven turned off + covered.
8:40				L.C. on trap
9:15				Heat off. oven covered.
9:30				Filament turned on for gauge reading
10:20	10 ma	"	1.95	(Still oscillates at 13 m.a.)
10:55	"	"	1.5	
12:00	"	"	1.2	
1:10	"	"	1.4	McLeod = +5 cm

8:40	10 ma	"	1.6	
8:45				Lower any fil. heated to clean it off
8:50	10 ma	"	2.5	
52	"	"	2.2	
	"	"	.2	
9:02	Flash 6a.	"	23. 21.	Take flash at 5amps. (30
9:05	off			
9:07		"	.15	Flash both fil. connected in series.
		"	.0	

~~Flash~~ The upper fil. failed to heat with 5amps. with both filaments connected in series. The upper filament is .012" diameter but the lower filament it is recalled has been subjected to conditions which have undoubtedly reduced the wire diameter to less than its original .012" diameter. It will be necessary to operate these on separate transformers. It takes about 9 amp to heat upper fil.

2000

1/20/42

1/20/42

1/20/42

1:00
 1:12
 1:30
 1:45
 1:55
 2:00
 2:10
 2:20
 2:30
 2:40
 2:50
 3:00
 3:10
 3:20
 3:30
 3:40
 3:50
 4:00

Take into spring for one night lab
 after all night lab - 200°
 Tap over tank off - 200°
 1/2 on tap
 Heat of room turned
 1/2 on tap
 (200° covered at 10:00)

8.5
 7.5
 7.1

Mt. Hood + 7cm

4:10
 4:20
 4:30
 4:40
 4:50
 5:00
 5:10
 5:20
 5:30
 5:40
 5:50
 6:00

down out for heat to clean up
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap
 1/2 on tap

8.5
 7.5
 7.1

1:38
 1:11

It will be necessary to separate them in separate
 to be done at regular intervals
 which have undoubtedly about the same character
 it is possible that they are subjected to conditions
 found in 200° tap but the same filament
 the well filament should be used in various
 that the upper part of the tap is not with tap

5/26/48

(2)

52048

i. Gen Δ

Each filament runs connected separately with individual transformers. Flash valve - Lower 5 amp. Upper 9 amp.

Both Filament: .3

2 min. 11:38 flash 10wa "1.55" 1.25
11:40 off

18 min. 11:58 flash 10ma. "1.15" 1.2 "1.05"
12:00 off

ifl ifu ie Gen A

12:00 flash trayed back snapping on various switches, cause galv. to kick in wrong direction. Subsequent flashes will be made by turning up deals.

12:04 off off

5 min. 12:09 5a. 9a. 10ma "1.7" "7.4" "4.7"
12:11 off off

2 min. 12:13 6a 9a "1.8" 11.5 9.7
12:15 - off -

2 min. 12:16 5a 9a "1.8" 6.7 4.9
12:19 - off -

5 min. 12:23 5a 9a "1.7" 5.8 4.1
12:24
12:26 off

~~10 min.~~ 12:35
12:36 5a 9a
12:38 ← Start turning off period

12 min. 12:49 5a 9a "1.6" 4.1 2.5
12:50
5v off

1/2/10
②

1000

$$\begin{array}{r}
 1.5 \\
 4.8 \\
 \hline
 1.5 \\
 \hline
 3.25
 \end{array}$$

$$\begin{array}{r}
 1.6 \\
 2.2 \\
 \hline
 \end{array}$$

15 min.
 flash upper with lower cold
 leave on for 2 min
 turn off for 1 min.
 flash lower
 leave on for 2 min + flash upper with lower still hot
 2.7

5/26/48

(3)

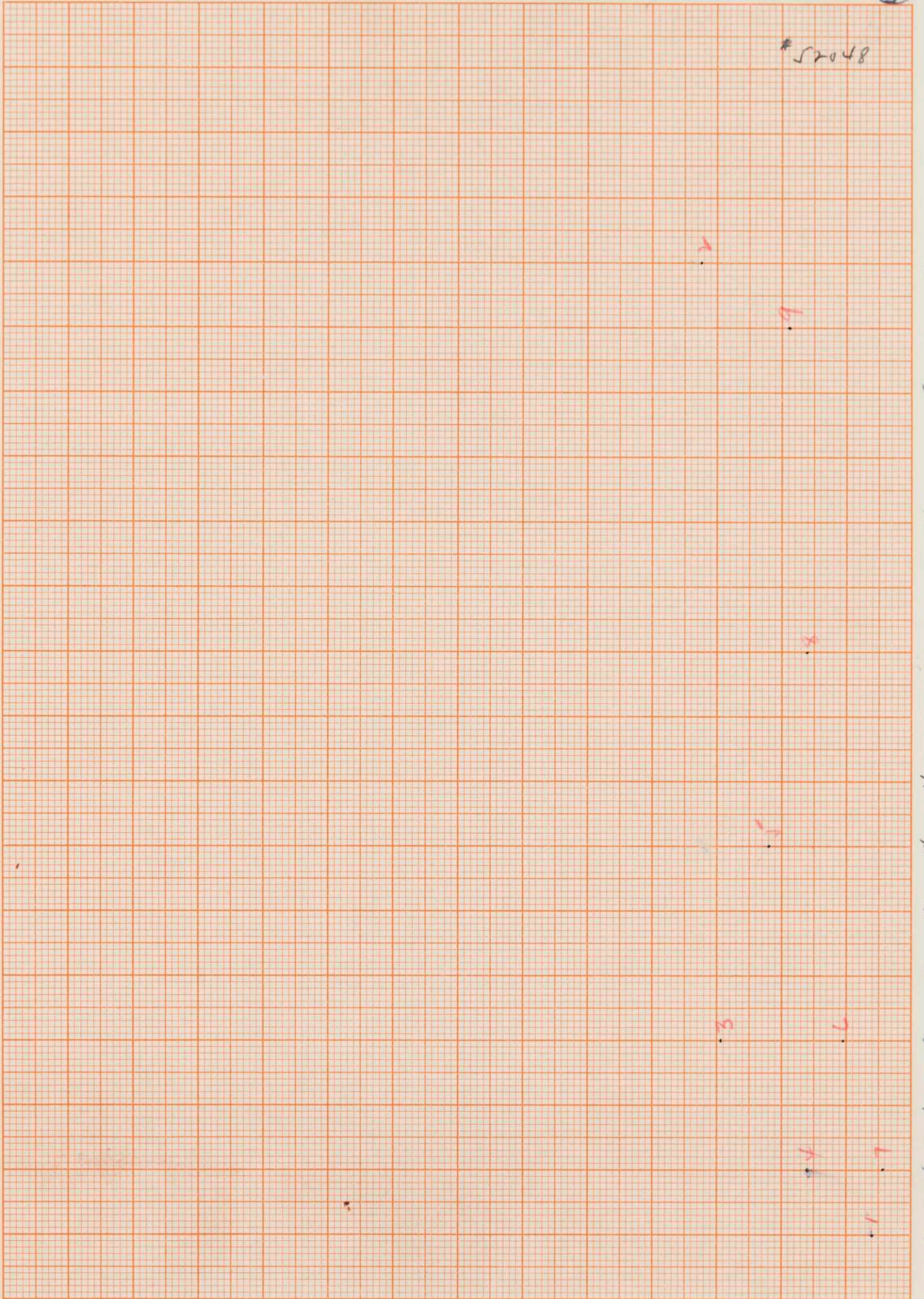
52048

+10

		i_{fl}	i_{fu}	i_e	i_{oc}	Δ
2 min.	12:54	8a	9a		1.6	
				→	2.2	.6
	12:56	off				
32 min.					1.55	
	1:28	5a	9a	10ma	4.8	3.25
	1:32	off				
	1:39				1.5	
8 min.	1:40	5	9		4.45	2.95
	1:42	off				
					1.6	
4 min.	1:46	5	9		3.2	1.6
	1:48	off				
					1.6	
14 min.	2:02	5	9		3.8	2.2
	2:04	off				
					1.65	
8 min.	2:12	5	9		2.7	1.05
	2:14	off				
					1.65	
4 min.	2:18	off			2.1	.45
	2:20	off				
					1.55	
20 min.	2:40	5	9		3.15	1.6
	2:42	off				
					1.6	
30 min.	3:12	5	9		3.5	1.9
	3:14	off				

5/26/48 (3)

#52048



8 7 6 5 4 3 2 1

2 4 6 8 10 12 14 16 20 24 28 32

upper fil. is #1
 lower fil is #2

5/26/48

(4)

#52048

		i_{f1}	i_{f2}	i_e	G_{cm}	Δ
15 min.	3:29	9	0	10ma	2.1	.5
	3:31	off			1.6	
18 min.	3:32	0	5		2.9	1.3
	3:34				1.2	
	3:34	9	5		4.7	3.5
	3:36	- off -				

The above run beginning with the off period at 3:14 pm. consisted in allowing both filaments to remain cold for 15 min. Then —

- 1 - upper filament was flashed
- 2 - Left hot for 2 min. and turned off.
- 3 - Lower fil. flashed 1 minute later
- 4 - Upper fil. flashed 2 minutes later with Lower fil. still hot.

Repeat of above

					1.7	
15 min.	3:51	9	0		2.1	.4
	3:53	off				
	3:53:30				1.6	
	3:54	0	5a		2.8	1.2
	3:56				1.2	
	3:55	9	5a		4.0	2.8
	3:57	off				

} 1 min instead of 2 min.

20 min.	4:17	9	0		2.1	.5
	4:19	off				
	4:20		5		1.6	
	21		5		2.7	1.1
	4:22	9	5		1.4	
	24	- off -			4.2	2.8

5/27/48

(1)

* 52048

I_f I_{fr} I_e Gen Δ

Gauge not running one night

	8:25			10ma	1.4	
					1.4	
	:27	5a	10ma	2.95	1.55	
	:20	5a		.75	(hot)	
	28:30	5a		.95	(hot)	
	29	8.5	5a	14.8	13.8	
	:15	8.5	✓	1.7		
	:30	8.5	✓	1.4		
	:31	off	✓	1.4		
	15	"	✓	1.35		
	32	"	"	1.15		
	05	3		#		
	15	3		1.		
	33	3		1.1		
	41	3.	10ma	1.15		
	30	3.	5ma	.5		
			11ma	oscillations		
	9:00		3	10	1.3	
30 min.	9:01	9	3	4.	2.7	
	9:03	off	3			
				1.2		
15 min.	9:18	9	3	2.5	1.3	
	9:20	off	3			
			3	1.3		
72 min.	10:32	9	3	5.9	4.6	
	:34	off	3			
			3	1.2		
5 min.	10:39	9	3	1.55	.35	
	:41	off	3			
153 min.			"	8	1.0	
	1:14	9	"	10	9.0 (11.2)	
	:16	off	"			
			"	1.0		
62 min	2:18	9	3	8.	4.4 3.4 (4.3)	

$$\begin{array}{r} 12 \\ 6 \\ \hline 720 \end{array}$$

15 in. 10 min

$$\begin{array}{r} 60 \\ 900 \end{array}$$

$$\begin{array}{r} 30 \\ 375 \end{array}$$

$$\begin{array}{r} 29 \\ 361 \end{array}$$

$$\begin{array}{r} 40 \\ 900 \end{array}$$

~~740~~
~~360~~
 300

$$\begin{array}{r} 30 \\ 60 \end{array}$$

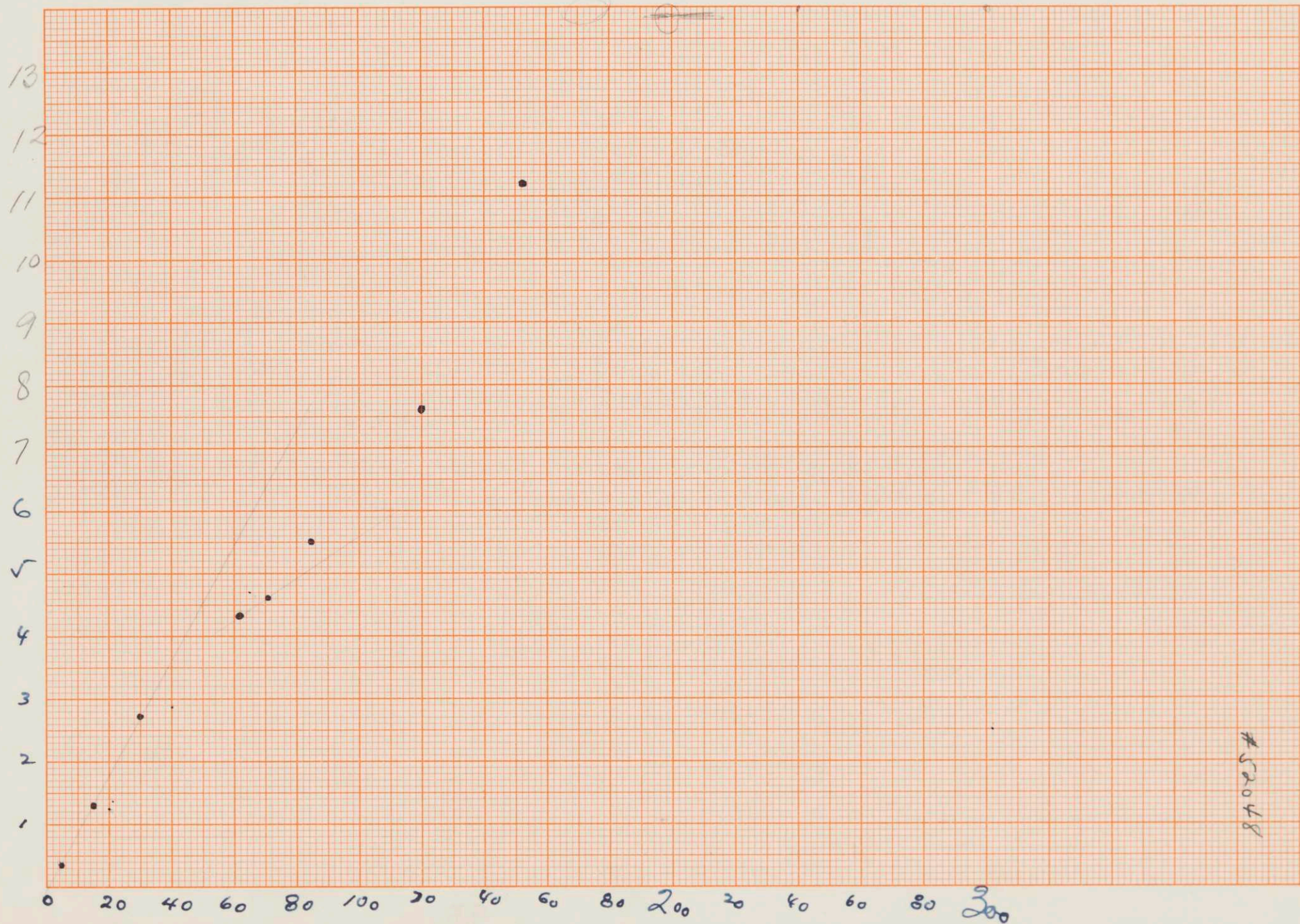
$$\begin{array}{r} 11 \\ 20 \end{array}$$

$$\begin{array}{r} 60 \\ 30 \end{array}$$

$$\begin{array}{r} 30 \\ 30 \end{array}$$

1.1	2.1	3.1	4.1	5.1	6.1	7.1	8.1	9.1	10.1	11.1	12.1	13.1	14.1	15.1	16.1	17.1	18.1	19.1	20.1
1.2	2.2	3.2	4.2	5.2	6.2	7.2	8.2	9.2	10.2	11.2	12.2	13.2	14.2	15.2	16.2	17.2	18.2	19.2	20.2
1.3	2.3	3.3	4.3	5.3	6.3	7.3	8.3	9.3	10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3	18.3	19.3	20.3
1.4	2.4	3.4	4.4	5.4	6.4	7.4	8.4	9.4	10.4	11.4	12.4	13.4	14.4	15.4	16.4	17.4	18.4	19.4	20.4
1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5
1.6	2.6	3.6	4.6	5.6	6.6	7.6	8.6	9.6	10.6	11.6	12.6	13.6	14.6	15.6	16.6	17.6	18.6	19.6	20.6
1.7	2.7	3.7	4.7	5.7	6.7	7.7	8.7	9.7	10.7	11.7	12.7	13.7	14.7	15.7	16.7	17.7	18.7	19.7	20.7
1.8	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.8	13.8	14.8	15.8	16.8	17.8	18.8	19.8	20.8
1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	15.9	16.9	17.9	18.9	19.9	20.9
1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0

24/1/14
 10



#52048

5/12/48

5/27/48

(2)

#52048

		I_{f1}	I_{f2}	I_e	G		
	2:20	off	3a	8ma	1.0		
85 min.	3:45	9	3		.9	5.3	4.4 (5.5)
	3:47	off					
120 min.	5:47	9	3	8ma	.9	7.0	6.1 (7.6)

5/28/48

Tube operated over night fil. + HV on.
 Fil # 2 running at 3 amp.

(15 to 10 min.)
 9:10 min.

8:57 9

3 8ma 1.

off scale probably to 30 cm

~29. (36.0)

Main filament (but not aux. fil. #2) was off momentarily during morning several times while changing over valves.

8ma 1.

302 min.

1:59

8

3

3.

2.

(2.5)

2:01

off

20 min

2:21

3

1.

2.

1.

(1.25)

2:24

off

21 min

2:45

9

3

3

1

2.1

1.1

(1.37)

65 min

3:50

9

3

8

1.

4.85

3.85

(4.7)

52

off

4:32

9

3

.9

3.2

2.3

(2.88)

:34

off

1/20/42

4.4

10000

$$\begin{array}{r}
 20 \\
 20 \\
 \hline
 40 \\
 20 \\
 \hline
 60 \\
 20 \\
 \hline
 80 \\
 20 \\
 \hline
 100
 \end{array}$$

$$\begin{array}{r}
 5 \\
 5 \\
 \hline
 10 \\
 5 \\
 \hline
 15 \\
 5 \\
 \hline
 20 \\
 5 \\
 \hline
 25
 \end{array}$$

1/20/42

The amount of work done in the first 10000 hours is 20000 man-hours. This is a measure of the amount of work done.

Time (hours)	Work Done (man-hours)	Rate (man-hours/hour)
0	0	0
10000	20000	2.0
20000	40000	2.0
30000	60000	2.0
40000	80000	2.0
50000	100000	2.0
60000	120000	2.0
70000	140000	2.0
80000	160000	2.0
90000	180000	2.0
100000	200000	2.0

6/1/48

6/2/48

#52048

10:00

Hg pumps off. System will be let down to air and a U tube liquid air trap will be set in between flow pumps ~~and~~. A flask of argon and a flask of nitrogen will be sealed in at U tube cut off

4:00

Completed above

Flow pump on & check for leaks - ok.

4:30

Hg pumps on

5:15

$P_2 = +3.$

Left pumping over night

6/2/48

8:30

Discharge tube indicate high back pressure

McClved $P_2 = +1.5$

8:45

Ovens on for bake.

9:15

$T = 520^\circ C$ Change to 100 v DC.

Touched out Hg bottles on McClved & cut off.

9:55

$T = 480^\circ C$

11:15

$T = 520^\circ C$

$P_2 = +2.5$ cm

11:15

Trap oven off.

11:22

Trap oven down.

11:30

L.C. on trap

11:55

all heat off. Oven down.

12:03

$P_2 = +4$ cm

1:30

I_e Gen
8ma " 3.2

1:40

" " 2.8

1:48

" " 1.7

2:02

Both aux fil. were flashed.
1.7

6/2/48

(2)

6/3/48

#52048

3:00

Outgassing metal parts

I_f	I_g	I_e	RF
4a.	10a.	100ma	3.6

Two inside cans connected together and to positive of DC generator ~ 900 V D.C. Negative to fil. & grid, each heated by a.c.

Outside can heated with R.F.

Both aux fil. hot during entire outgassing.

Hot P_{fil} = 4×10^{-6}
 Cold = +1.

4:10

Fil. H.V. on for gauge measurement

4:13

I_e	I_{aux}
8ma	1.0

This is same as steady value on 5/27 before system was let down to air.

9ma oscillation

4:50

Tube in cover for all night bake

6/3/48

8:40

Back pressure high. Fore pump started

Trap cover off.

8:50

L.C. on trap

Heat off on all covers but main cover left up.

1/21/68
②
1/21/68
1/21/68

$\frac{6}{9} \frac{6}{6} \circ$

Outcrop on hillside

at 100' from top of hill

Two small cones, possibly together and points
of DC quartzite, 100' or more from top of hill.

Outcrop on hillside at 100'

Both small, but some with quartzite

at 100' from top of hill

at 100' from top of hill

This is some on top of hill
on the left side of the hill
the outcrop is at 100'

Top of cone for red quartzite

These are the top of quartzite

Top of cone

at 100' from top of hill

6/3/48

(2)

52048

10:00 Filaments slightly discolored from baking at high pressure
 10:15 all filament heated for ~ 5-10 min.
 10:30 gauge on and allowed to run to clean up.
 11:30 P

11:30 in Gen
 sma " 1.6

11:45 all filament heated + RF on.
 11:50 off.

11:52 gauge on
 12:00 sma " 1.2
 1:20 sma " .7

3:15 sma .9

4:17 0 5a .1
 .5 .4
 .3

4:18 9 5 .9 .6

4:22 off 3

10 min 4:32 9 3 " " 1.45 " 1.35

4:35 off
 sudden change in stand by is suspicious
 #2 fil. turned off. and normal stand by of .9 cm returns.

#2 fil. connected to ground. Deflection of .9 cm with filament at 3 amp.

7 min 4:42 .8
 44 off 9 3 1.65
 :44 off

Gauge off overnight.

1/4/48

(1)

52048

	I_f	I_{fr}	I_e	G_{aw}	Δ	$\times 1.25$
8:30			8ma	1.		
Test made for stopcock leakage. Required 2 stop cocks.						
10:45			8ma	.9		
				1.0		
10:46		Flash	5a.	14.8	13.8	(17.3)
48			3	.9		
48		9a.	3	24.3	23.4	(29.2)
10:50		off	3			
			3	.7		
10 min	11:00	9	3	1.5	.8	(1.25)
	11:02	off	3			
			3	.9		
5 min	11:07	9	3	1.4	.5	.6
	11:09	off				
	11:18		3	.8		
10 min	11:19	9	3	1.5		
	11:19:10	off	On this test #1 filament had been connected to ground as with #2. On the flash the galvanometer swung up to 1.5 and then violently swung in opposite direction. Filament turned off, and ground connection removed.			
10 min	11:29		3	8ma	.8	
		9		1.4	.6	.75
	11:31	off				
The galvanometer swung up to flash value and reverses direction very abruptly almost as though an oscillation was taking place. Will try a longer off period and watch for this effect.						
32 min	12:02			.85		
	12:03	9	3	3.25	2.4	3.
	12:05	off	Deflection	normal		

14/10

1002

Two more for adjacent category
Required a stop order.

60
40
100

1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020

60
60
40
100

44) 11-60

60
10
70

On the left + 1. The ground on the left is
ground on the right. On the left the ground
is of a different nature than the ground
on the right.

12
37
3
40
25
65

The ground on the right is of a different nature
than the ground on the left. The ground on the
right is of a different nature than the ground
on the left.

1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020

1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020

5/19/49

(2)

20.6 ^{21.4}
5:12

i_f	V_c	V_e	i_-	MW	i_+
2.3	22	40	.076	⁵ 57.3	.87 ⁻¹⁰
"	"	60	.078	⁵ 262.0	3.97
			.077	³ 11.9	3.77 ⁻¹⁰
2.35	"	60	.106	17.	5.4 ⁻¹⁰
		40	.106	4.2	1.33
		60	.108	17.6	5.6
2.4		60	.145	23.9	7.6
		40	.143	5.5	1.75
2.45		40	.225	7.7	2.44
		60	.73	36.5	11.6
2.5		60	.32	50	15.9
		40	.305	10.5	3.33
2.55		40	.43	13.9	4.4
		60	.46	67.7	21.5
2.65		60	.77	105.7	33.5
		40	.74	19.7	6.25
2.75		40	1.25	28.9	9.15
		60	1.30	174	55.2
2.85		60	2.6	276.5	87.5
		40	2.2	40	12.7
3.0		40	3.12	48.5	15.4
		60	3.9	³ 341.5	108

5:24

[Faint handwritten notes and scribbles at the bottom of the page]

$830 \times 10^{-7} + 2 \times 10^{-6} = P$
 1.63×10^{-6}
 $\frac{7500}{366} = 20.6$

83×10^{-9}
 $\frac{83 \times 10^{-9}}{10^{-4}} = 8300 \times 10^{-5}$
 36×10^{-9}
 $\frac{36 \times 10^{-9}}{10^{-7}} = 3600 \times 10^{-2}$

$\frac{1440}{3}$
 $\frac{4320}{4080}$
 $\frac{4080}{4080}$

Normal increase is 10 per 1000 min
 Expected increase 40 is in fair agreement with $405 - 340 = 65$ } depending on which value is used for 5/20/49
 or $405 - 360 = 45$

$\frac{2880}{160}$
 $\frac{2720}{2720}$

at 5/25 expected mean 27
 observed 18

Should study "clean up" at 40, 50, 60, 2080, 100

#307

5/20/49

R₂ 11.7

2:40
2:46

	i_f	V_e	V_e	\bar{i}_r	M_G	\bar{i}_x	$\frac{i_x}{i_r} \times 10^7$
	2.02	22	200	.0093	³ 9.3	⁻¹⁰ 2.95	317
	2.17			.03	32.7	10.4	317
	2.3			.082	³ 86.2		335
	2.45			.23	² 102		
				.73	8.7		378
	2.58			.55	19.5		355
	2.69			1.06	36		340
	2.8			2.0	65		325
	2.45			.738	² 100		360 ^x
	2.3			.086	³ 86		316 ^x

x shows effect of clean up.

3.8 ← 0

3:07
5/23/49

11:00 AM

5/25/49 8:20 AM

5/26/49 5:00 PM

2.68				1.06	'43		405
3.17			0				
2.6	22	200		.685	79		423
3.17							
2.65	22	200		.91	40.1		441
3.17							

June 9/49 5:05 PM

June 13/49 5:00 P.M.

6/15/49 9:00 AM

2.65	22			1.0	'75		750
3.17							
2.65	22	200		1.03	82		795
3.17							
2.66	22	200		1.0	'83		830

6/14/50

3:09 PM

3:10:30 "

3:12

3:36

3:41

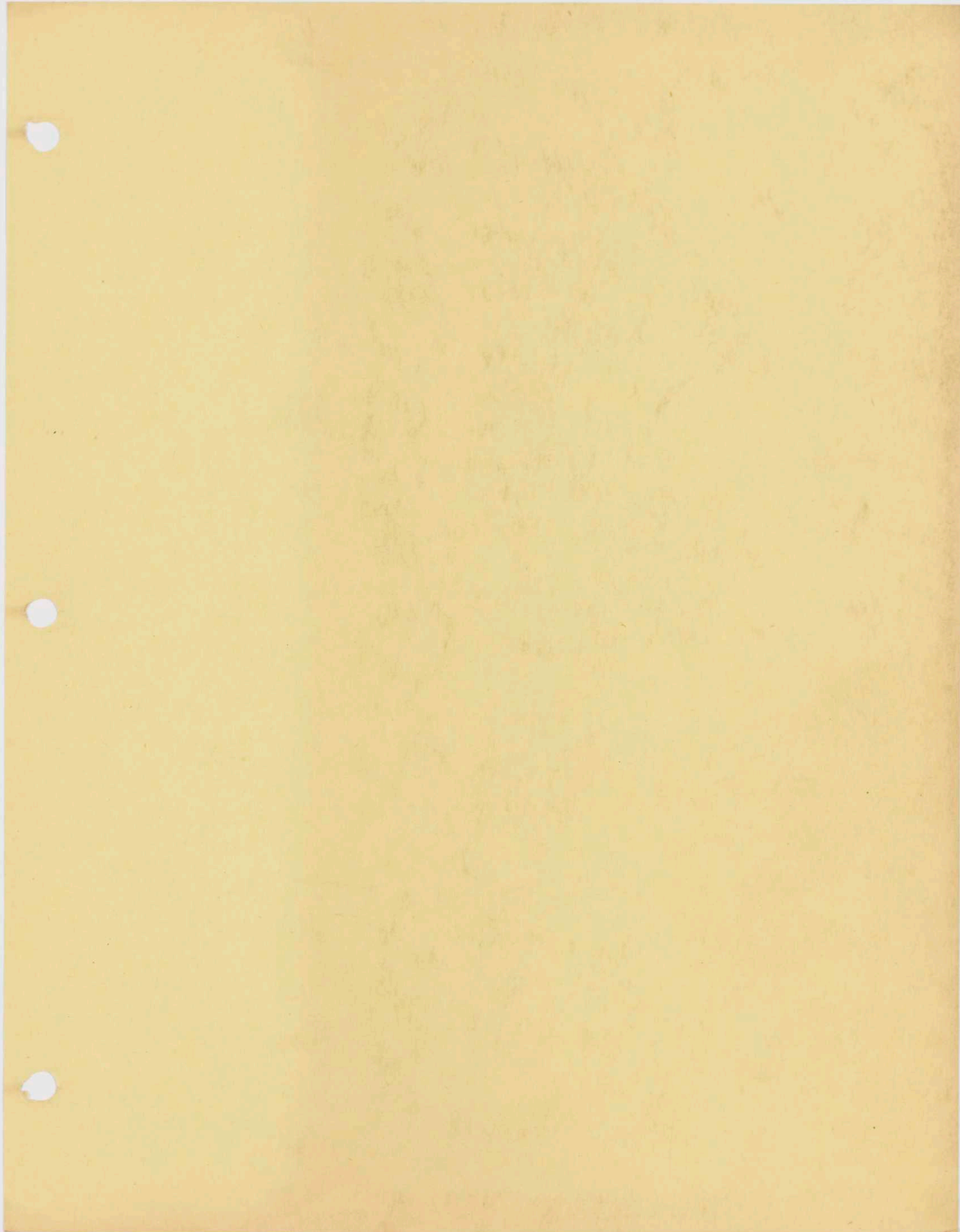
0	22	200		^{T6} 0 ^x	'83.5		8350
				100	81.8		
	"	"		100	81.8		

off at this time " to be

examined again in October 1950

← clean up

Pressure about 2×10^{-6}



4/25/49

Ionization Gauge # 42549

Standard triode with one test filament
 main filament or cathode .007" hairpin
 Grid .015" double helix
 Collector .003" Tantalum
 Test filament 7 turns of .007" tungsten wound on
 .062" mandrel.

8:45

Sealed in system

9:00

Fore pump on; test for leaks ok.

9:10

Hg pump on.

9:35

+2.0

9:45

Ovens on for short bake.

12:00

T = 400°C.

12:05

Heat off tube oven. Heat still on trap and
 way ovens.

4:30

P = +2.

Heat off all ovens. Starts the intention to outgas
 the parts during afternoon but opportunity did not
 present itself.
 System fixed for overnight pumping.

8:30

P = +2.

Trap and way ovens turned on
 Conclusion made for outgassing all the filament
 with R.F. on can.

4/26/49

9:15

Test filament	at	3.4 amp.
main "	"	3.5 amp.
grid	"	9.0 amp.

all filament and collector hot for ~ 5 min.

10:00

Tube in oven for bake

10:30

T = 490°C oven current cut to 20 amps.

P = +1.8 sat.

10:55

Liquid air on trap.

4/26/49
②

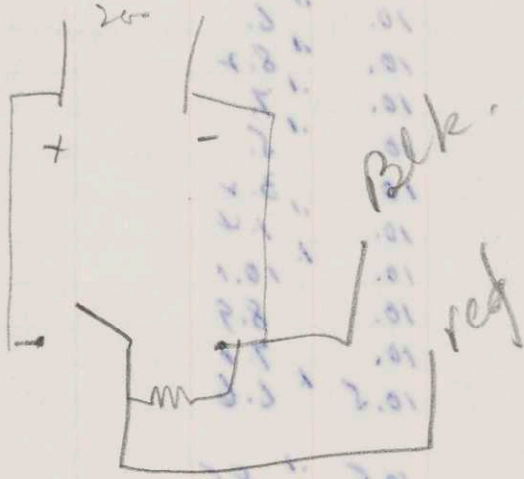
T	Least Al.	L	Gen
11:32	Fd. on	200	1. on grid +
:15		.5ma	5.0
45		.97	6.2
33:05		2.1	11.5
:30		2.1	6.
45		4.1	12.
34:18		4.2	13.1
45		4.2	13.
35:15		4.1	9.
35		10.	6.
45		10.	8.2
36:30		10.	7.
:45		10.	5.
37:15		10	3.2
38:15		10.	1.4
39:15		10.	10.1
40:15		10.	8.9
41:15		10.	7.2
43		10.5	6.6
	flask	10.5	8.5
45	3 amp flask		8.9
10			7.5
30		10.5	6.
46	3.5		6.5
45			6.8
10			6.2
15			5.5
30			5.0
47	0	10.2	3.35
10"		10.2	3.2
30"			3.2
48:20	3 flask		3.2
30			4.2
40			3.2
49			3.3
	0		4.1
25	0		3.8
30			

note the change on cooling of filament

Big flask because various turned in wrong direction

9/22/22
 (5)

Time	Temp. of filament	Temp. of bulb	Temp. of air	Temp. of water
11:54	11.5	11.5	11.5	11.5
12:00	11.5	11.5	11.5	11.5
12:05	11.5	11.5	11.5	11.5
12:10	11.5	11.5	11.5	11.5
12:15	11.5	11.5	11.5	11.5
12:20	11.5	11.5	11.5	11.5
12:25	11.5	11.5	11.5	11.5
12:30	11.5	11.5	11.5	11.5
12:35	11.5	11.5	11.5	11.5
12:40	11.5	11.5	11.5	11.5
12:45	11.5	11.5	11.5	11.5
12:50	11.5	11.5	11.5	11.5
12:55	11.5	11.5	11.5	11.5
1:00	11.5	11.5	11.5	11.5
1:05	11.5	11.5	11.5	11.5
1:10	11.5	11.5	11.5	11.5
1:15	11.5	11.5	11.5	11.5
1:20	11.5	11.5	11.5	11.5
1:25	11.5	11.5	11.5	11.5
1:30	11.5	11.5	11.5	11.5
1:35	11.5	11.5	11.5	11.5
1:40	11.5	11.5	11.5	11.5
1:45	11.5	11.5	11.5	11.5
1:50	11.5	11.5	11.5	11.5
1:55	11.5	11.5	11.5	11.5
2:00	11.5	11.5	11.5	11.5
2:05	11.5	11.5	11.5	11.5
2:10	11.5	11.5	11.5	11.5
2:15	11.5	11.5	11.5	11.5
2:20	11.5	11.5	11.5	11.5
2:25	11.5	11.5	11.5	11.5
2:30	11.5	11.5	11.5	11.5
2:35	11.5	11.5	11.5	11.5
2:40	11.5	11.5	11.5	11.5
2:45	11.5	11.5	11.5	11.5
2:50	11.5	11.5	11.5	11.5
2:55	11.5	11.5	11.5	11.5
3:00	11.5	11.5	11.5	11.5
3:05	11.5	11.5	11.5	11.5
3:10	11.5	11.5	11.5	11.5
3:15	11.5	11.5	11.5	11.5
3:20	11.5	11.5	11.5	11.5
3:25	11.5	11.5	11.5	11.5
3:30	11.5	11.5	11.5	11.5
3:35	11.5	11.5	11.5	11.5
3:40	11.5	11.5	11.5	11.5
3:45	11.5	11.5	11.5	11.5
3:50	11.5	11.5	11.5	11.5
3:55	11.5	11.5	11.5	11.5
4:00	11.5	11.5	11.5	11.5
4:05	11.5	11.5	11.5	11.5
4:10	11.5	11.5	11.5	11.5
4:15	11.5	11.5	11.5	11.5
4:20	11.5	11.5	11.5	11.5
4:25	11.5	11.5	11.5	11.5
4:30	11.5	11.5	11.5	11.5
4:35	11.5	11.5	11.5	11.5
4:40	11.5	11.5	11.5	11.5
4:45	11.5	11.5	11.5	11.5
4:50	11.5	11.5	11.5	11.5
4:55	11.5	11.5	11.5	11.5
5:00	11.5	11.5	11.5	11.5



Not too cheap on cooling of filament

And film become more than a lamp

4/26/49

(3)

	LP	L_{ma}	Gov
11:51		10.4	3.8
	flash		
	10	10.4	3.8

12	0	off	3.9	Note no decrease in turning off filament.
			3.9	

With milliammeter on 1000 position, tube oscillates at 10 m.a. Eliminated with meter in 10 ma full scale also none on 100 mc. full scale

Oscillations at 12 m.a. on 100 scale

at 20 m.a. ^{.001}-6. (100 scale on meter)

30 -25.

10.5 2.7 (10 scale)

5.3 1.1

9.8 2.4

2.5

12:00:	3.0	flash	2.5
:30	0.		

12:05			10.1	2.3
:05	200 volts turned off.			

HA:

12:59	200 v. on			
			10.8	4.
:05			10.8	5.2
:40			10.	2.5
1:00			10.3	1.3

1:01 200 v. off.

1:01	200 v. on			
:10			10.1	2.3
:30				2.4
:40	3.	flash		2.8
:55				2.4

4/26/49

	6f.	10.	Gen	
1:02	0.	off	2.4	zero of galv. off.
			2.0	
1:03	3.	flush	2.5	
			2.5	
20	200	Volts off.		
1:04	0.	off		

2:40 Outgassing
 Current through all filaments and grid
 R.F. on collector case.

3:35 Heat off collector and grid
 Two filament left on until gauge readings
 on taber.

8:45	3	H.V. on	5.7	1.6
	30		10.	
	40		10.	2.2
	50			2.1

0 HV. off
 off.
 no effect in turning off flush fil.

3:47	H.V. on	10.1	2.1
10			2.1
15	3.	flush	2.
10			2.
15	0	off	2.
40	H.V. off.		

no effect

2:55 Constriction located and reduced in size
 Ideal on for second outgassing.

4/16/49

(2)

	LEF	L	Geom	
3:27	All power off. Tubes sealed off without being allowed to cool off.			
5:06	200 volts on Leakage current 42 μ a @ 200 volts filament to grid.			
5:08			1ma	3.5
:30			10ma	3.7
:40				3.2
09				2.8
:30				2.2
10				2.1
			10ma	2.5
5:11:30	3			4.3
:45				2.5
12:30	off			2.1
:35				2.0
				2.
13:30	3a			2.8
45				2.1
14:30	3.5			2.8
:30				2.0
5:15:30	3.			3.2
45				2.3
16:30	off			2.0
5:17:30	3			4.9
18:30	off			2.7
:37				1.9
19:30				1.8
19:30	3			2.2
20:30	off			2.1
:37				1.95

7 second to get up to this value.

(cut)

First time flash value is not big.

4/26/49
 (5)

Time	C ₁ f	V _{10 ma}	C _{em}
5:21:30	3		1.95
			2.35
			2.0
22:30	off		2.
24:30			1.8
			1.85
			2.1
25:30	3.		2.8
			2.1

Probably zero shift of galv.

Oscillation about same as when on system
 i.e. ~ 12 ma.

main filament current 3.35 amp.

6:10

10 ' 1.7

Tube to be allowed to run all night
 Test filament on @ 2.9 amp.
 H.V on grid. 200 v.

4/27/49

8:12 AM	off		1.95
+	3.0		1.95
8:15	off		1.95
+	3.0		1.95
8:16	off.		1.95
9:47			1.90
9:48			1.90
+	3.0		1.90
9:49	off.		1.90

Shows no condensation
 in 3 min.

No flash effect after
 92 min.

10:51		200V	10	1.80
	+ i _f = 3.32	0	0	0.1

(Photo current)

12:59	178 mm.	200V	10	2.4
-------	---------	------	----	-----

on for 25 sec.

2:11	200 mm.	200V	10	2.9
------	---------	------	----	-----

on for 10 sec.

Tube 425

4/27/49

	i_{ef}	i_{-}	Gen
2:16	aver.		
2:16	3	10	
10"			2.9
30			2.8
60			2.65
2:17+	3.0 Flash		2.65

after 268 min off.
shows no flash effect.

Tube put into big box for measurement.

5:45 $i_p = 3.29$

✓ i_{el} MW
0 0 5 62

Photo current

:49

200 10 3 87

Tube has been operated at 200 v for trial and present situation is fairly well cleaned up.

:53

" " 3 85.5

:54

(220 min)
5 sec. 3a flash.
40 "

" " 85.5
" " 90.0
" " 88.0

only 2 is real flash effect rest photo effect

:55

0 0 3 3.0

due to photo eff. from elect. fil.

3a.

0 0 3 5.0

Increase because of photo current from light of filament.

6:07 3.5

200 10 3 135

Shows real gas coming out when flash fil is on.

:08

200 10 119

6:10 3.5

200 10 117

6:11 3.0

200 10 94

Change comes at once

:12 3.0

93

:13 3.0

89

$$\begin{array}{r}
 3 \times 1440 \\
 4320 \\
 \underline{480} \\
 4820 \\
 \underline{12740} \\
 17160
 \end{array}$$

$$\begin{array}{r}
 1577 \\
 \underline{757} \\
 820
 \end{array}$$

$$\begin{array}{r}
 1440 \\
 220 \\
 \underline{305} \\
 2465 \\
 \underline{17160} \\
 19625
 \end{array}$$

$$\begin{array}{r}
 720 \\
 \underline{142} \\
 862
 \end{array}$$

$$\begin{array}{r}
 1440 \\
 5760 \\
 \underline{150} \\
 860 \\
 6770
 \end{array}$$

$$\begin{array}{r}
 8.36 \\
 \underline{6.14} \\
 2.22
 \end{array}$$

$$\begin{array}{r}
 1440 \\
 \underline{160} \\
 1280
 \end{array}$$

$$\frac{66 \times 10^{-9}}{9.7 \times 10^{-3}} = \underline{\underline{6.8 \times 10^{-6}}}$$

6.8 ions per million el.

x ray level.

$$\frac{2.7 \times 10^{-9}}{10^{-2}} = 0.27 \times 10^{-6}$$

.27 ion per million el.

Assume for N_2 0.16×10^{-6} for 10^{-8} press.

$$\text{x ray equi.} = \frac{.27}{.16} = \underline{\underline{1.7 \times 10^{-8}}} \text{ mm.}$$

$$\frac{6.8}{.16} = \underline{\underline{42.5 \times 10^{-8}}} \text{ at } \underline{\underline{5.6 \text{ days}}}$$

Probably 0.2×10^{-6} is better value for 10^{-8}

425

4/27/49
6:14 PM 0
I_{aux} 0 I_f 3.29 V 0 i 0 mV 3

4/28/49
8:37 AM 862 min.
200 9.9 323 on about 10 sec.
Tube 307 would have been 350 at this time.

5/2/49
11:07 6770 min.
200 9.6 '54 (56) (Equiv 3,730)

5/3/49
8:27 8050 Min.
200 9.7 '66 (68) (Eq. 2,120)

5/4/49 8:27 9490
200 9.7 '76 (78)

5/5/49 8:37 10940
200 9.5 '86 (90)

5/6/49 7:57 AM 12,340
3.29 200 10.4 '105 (101)

5/9/49 4:17 PM 17,160
200 9.9 134 (135)

5/11/49 9:22 AM 19,625
200 10.0 156

5/12/49 9:22 AM 21,065
200 10.4 170 (164)

5/13/49 8:42 22,465
200 10.1 176.5 (175)

8:47
200 1.04 '21 (200)

8:49
200 3.7 76 (205)

8:52
200 7.4 133 (180)

Under these conditions about 18 ma needed for oscillation.

5/16/49 3:07 200 10.6 210 (198)
4:30 1.65 40.5 (245)
4:32 .635 14 (220)
.22 3.5 (160)
.215 3 100 (145)
4:42 3.27 10.2 '198 (194)

482

Time	Temp	Pressure	Flow	Notes
8:25	82.0	10.0	0.0	Start of run
8:30	82.0	10.0	0.0	
8:35	82.0	10.0	0.0	
8:40	82.0	10.0	0.0	
8:45	82.0	10.0	0.0	
8:50	82.0	10.0	0.0	
8:55	82.0	10.0	0.0	
9:00	82.0	10.0	0.0	
9:05	82.0	10.0	0.0	
9:10	82.0	10.0	0.0	
9:15	82.0	10.0	0.0	
9:20	82.0	10.0	0.0	
9:25	82.0	10.0	0.0	
9:30	82.0	10.0	0.0	
9:35	82.0	10.0	0.0	
9:40	82.0	10.0	0.0	
9:45	82.0	10.0	0.0	
9:50	82.0	10.0	0.0	
9:55	82.0	10.0	0.0	
10:00	82.0	10.0	0.0	
10:05	82.0	10.0	0.0	
10:10	82.0	10.0	0.0	
10:15	82.0	10.0	0.0	
10:20	82.0	10.0	0.0	
10:25	82.0	10.0	0.0	
10:30	82.0	10.0	0.0	
10:35	82.0	10.0	0.0	
10:40	82.0	10.0	0.0	
10:45	82.0	10.0	0.0	
10:50	82.0	10.0	0.0	
10:55	82.0	10.0	0.0	
11:00	82.0	10.0	0.0	

on basis of experience
 with the other tubes (#307)
 40 would have been expected

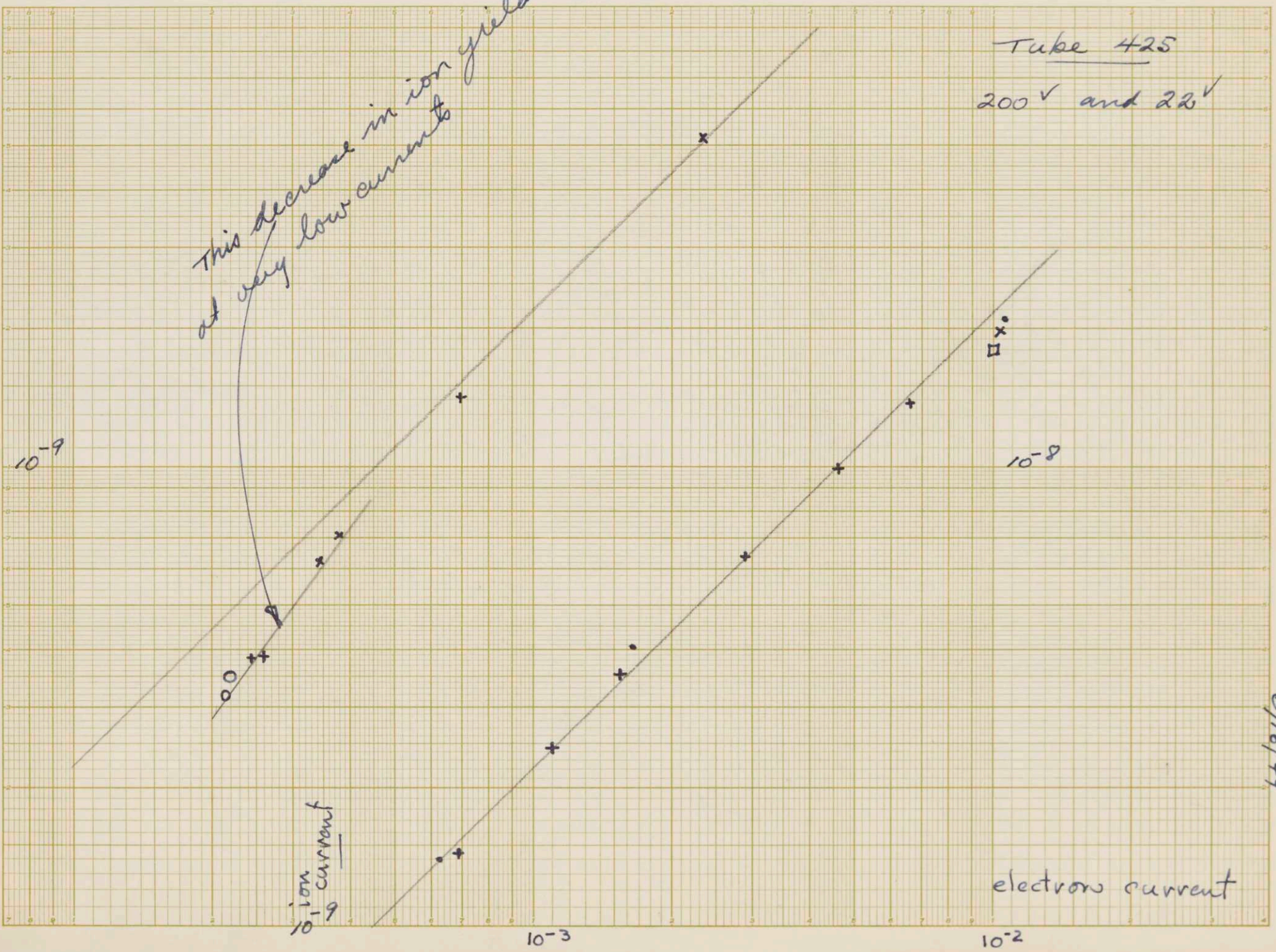
312
 264
 48

(148)
 (147)
 (146)
 (145)
 (144)
 (143)
 (142)
 (141)



Tube 425
200V and 22V

This decrease in ion yield
at very low currents



5/16/49

425

5/16/49
cont

4:49
:51

31.1

Take 31.5

4:58

5:22

5:27

5:40

ifd	✓	i	Mu.	
3.2	200	6.6	'138	(209)
3.1		4.6	99	(215)
3.0		2.9	64	(221)
2.9		1.55	35.5	(229)
2.8		1.1	24.5	(273)
		.69	'14.2	(205)
2.7		.695	3444	14.1 (203)
2.5		.26	119	3.78 (145)
2.5		.242	120	3.81 (157)
2.58		.342	197	6.25 (183)
2.6		.38	224	7.1 (187)
		2.35	'52	(221)
3.27		10	'180	180

The above readings show that clean up is going on but that in addition there is a real non-linearity.

5/20/49

3:10 PM.

2.78	²² ✓	200	.945	'25.2	267
			9.2	217	236
			3.6	98	272
			.93	24.5	264

5/23/49

~~11:00 AM~~
11:10
:15

3.27	0				
2.68	²² ✓	200	.90	78	312

5/24/49

3:25 PM

3.27	0				
2.68	²² ✓	200	.57	'19.6	344
			1.02	34.9	341

5/25/49

8:15 AM

Lift on at →

2.80	0				
2.80	²² ✓	200	1.02	35.3	346
3.27	0				

425

5/26/49

5/26/49
4:00 PM

i_g	i_e	W_e	net	i_x/i_e
2.8 327	$22/100$ 0	1.05	37.2	354

5:21

2.59	$10/20$ 20 0	.005 .2	21 30.8 21.0	9.8
------	--------------------	------------	--------------------	-----

5:28

	10 25 0	.205	21.0 107.5 19.0	87.5
--	-----------------	------	-----------------------	------

17.3
Take $R_5 = 660$
 $R_7 = 11,400 \text{ meg}$

	30	.208 .210	19.0 480 28	460
	35	.189	86.3	85.3
	0		1.	

5:52

3.42

	40	.191	201	200
	45	.192	344.5	
		.197	103	
		.192	343.5	

6.18

	50	.194	154	
		.196	25.1	
		.195	155	

	50	.196	25	
--	----	------	----	--

	60	.200	44.5	
	70	.208	66.0	
2.55	80	.204	83.5	
2.54	100	.200	116.	
	125	.210	162	
2.50	150	.179	143	

6:12 PM

	35	.204	96	
3.27	0			

2/2/2

254

428

428

$$\frac{93.2 \times 10^{-3}}{660 \times 10^{-6}} = 1.41 \times 10^{-10}$$

$$\frac{1.41 \times 10^{-10}}{1.96 \times 10^{-3}} = 7.2 \times 10^{-8}$$

$$\frac{2.2 \times 10^{-3}}{11.4 \times 10^{-12}} = 1.93 \times 10^{-12}$$

$$\frac{1.93 \times 10^{-12}}{2.3 \times 10^{-6}} = 8.37 \times 10^{-7}$$

428

428

428

Table 2-2
p. 11, 100 mm

3.43

8.18

428

425

5/27/49

5/27/49
8:52 AM

i_s	V_c	V_e	i_e	Mur	Net	i_t	i_t/i_s
2.59	10	35 (.192) 0	.196	⁵ 95.2 ⁵ 2	93.2	141 ⁻¹²	7.4 ⁻⁷

2.49		35 (.105) 0	.109	⁵ 55.8 ⁷ 14	55	83.5	7.9
------	--	-------------------	------	--------------------------------------	----	------	-----

		(.056)	.059	⁵ 30 ⁶ .6	29.4	44.6	8.0
--	--	--------	------	------------------------------------	------	------	-----

change meters for i_e

		(.06)	.0625	⁵ 31	30.4	46.2	7.7
--	--	-------	-------	-----------------	------	------	-----

2.34		(.04)	.043	21.8	21.2	32.2	8.0
------	--	-------	------	------	------	------	-----

		35 (.026) 0	.029	⁵ 14.8 ⁷ 9	⁵ 14.3	22	8.4
--	--	-------------------	------	-------------------------------------	-------------------	----	-----

2.1		(.0056)	.0096	⁷ 53 ⁷ 7.7	⁷ 46	4.04	7.2
-----	--	---------	-------	-------------------------------------	-----------------	------	-----

		35 0	.0043	8.5 8.0			
--	--	---------	-------	------------	--	--	--

		35 (.0066) 0	.0101	⁷ 64 ⁵ 5.5	58.5	5.15	7.95 ⁻⁷
--	--	--------------------	-------	-------------------------------------	------	------	--------------------

9:23
24

0		35	.003	⁷ 2 0029			
---	--	----	------	------------------------	--	--	--

		.0023	.0052	23.2	22	1.93	8.37 ⁻⁷
			.0029				

		35 (.0066) 0	.0099	61.2 ⁷	54.2	4.75	7.2
--	--	--------------------	-------	----------------------	------	------	-----

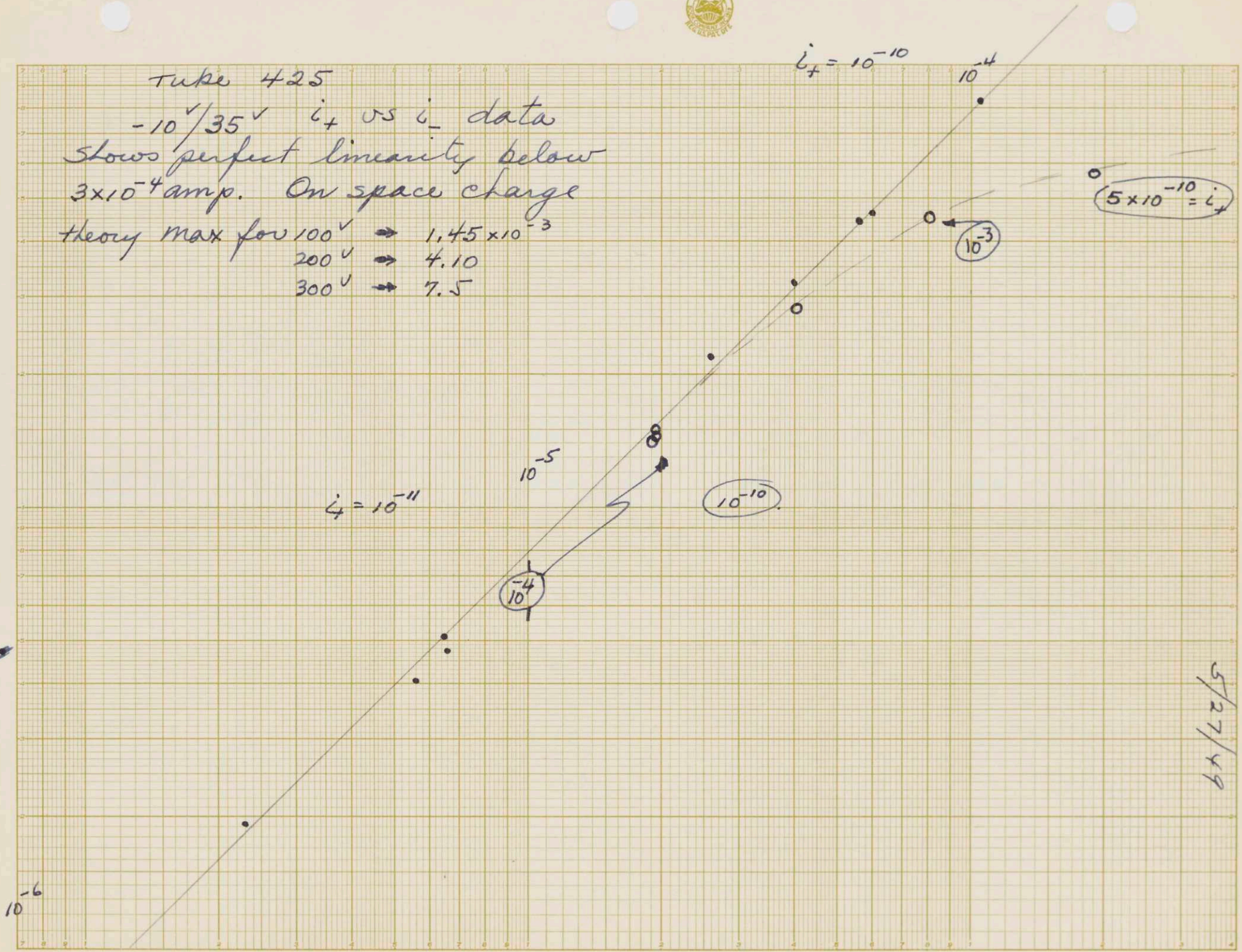
		35 .0033	.0033				
--	--	------------------------	-------	--	--	--	--

10:57

2.59		(.194)	.195 .198 ^x	⁵ 97	⁵ 95.5	145	7.48
0		35		⁴			



Tube 425
 $-10^4/35^2$ i_+ vs i_- data
 Shows perfect linearity below
 3×10^{-4} amp. On space charge
 theory max for $100^2 \Rightarrow 1.45 \times 10^{-3}$
 $200^2 \Rightarrow 4.10$
 $300^2 \Rightarrow 7.5$



5/27/49

5/27/49

1:42 PM

i_f	V_c	V_e	i_-	Acti ₋	mo	net	i_+	i_+ / i_-
2.57	10	35	.193	.189	100	599	150 ⁻¹²	7.94
0		35	.004					
		0			1			

1:48

2.7		35	.405	.40	188	186	282	7.03
2.8		35	.81	.805	302	298	451	56.0
0		35	.004		4			
3.0		35	1.90		385	376	570	30.0
		0			9			

2:23

3.0	10	100	2.4 ⁻³	2.375	42.3		
0			.024				
2.9			1.48	1.46	28.0		
2.8			1.0		19.1		
			1.0		242		

12.6

3:41

		4.00	1.02	1.00	19.7		
		.79	.81	.79	200		
		.502	.525	.503	130		
0			.022				
.263			.275	.255	70		
			.020				
			.110	.090	24.9		
			.115		65		
			.116		47		
			.116	.096	25.5		
			.02				
			.120	.100	70.7		
			.068		34		
			.035	.016	12		
			.019				

4:03 PM
5/27/49
on at 3:27 = 0 f

Increase
in pressure in
1 year 11.4 times
 $\frac{\dot{c}_t}{\dot{c}_i} = 740 \times 10^{-6}$

Pres = $\frac{3.7 \times 10^{-5}}{364}$ mm

Pressure rise in
364 days 3.4×10^{-5}
or 90×10^{-8}

per day
 $24 \times 60 = 1440$

Average rise
 $\frac{0.6 \times 10^{-8}}{1440}$ per 100 min

$\frac{\dot{c}_t}{\dot{c}_i} = 65 \times 10^{-6}$

$1.5 \times 1440 = 2160$
 $\frac{246}{2406}$

$\frac{\Delta \dot{c}}{\dot{c}_i} = \frac{3.5 \times 10^{-9}}{10^{-3}}$

$\frac{3.5 \times 10^{-6}}{2400} = 1.46 \times 10^{-9}$

1.46×10^{-9} per min.
 2×10^{-7} per 100 min
 $10^{-8} \approx 20 \times 10^{-8}$ per 100 min

$10^{-8} \times \frac{65 \times 10^{-6}}{0.2 \times 10^{-6}} = 3.25 \times 10^{-6}$ pres.

425

June 9 '49

Date	Time	if	V	200	i, MW
June 9 '49	5:10 PM	2.8	22	200	1.02 ⁻³ '57
		3.27			
June 13 '49	4:55 PM	2.8	22	200	1.0 '62
	4:57	3.27		0	
6/15/49	9:02 AM	2.8	22	200	1.01 65.5

Date	Time	if	V	200	net current	leakage over press.
6/14/50	3:00 PM	0	22	200	79x10 ⁻⁶ 0	
	3:03	2.5	22	200	4200 ⁻⁶ 90.4	
	:05				200 88.2	121x10 ⁻³
	:07				83.5	
	:08			0		
	3:					745