BOOK94R

Notes:
"CACCD II" on front
"II" on spine
"NB-WI-2" on spine

Blank pages: page opposite page 1, 4-6, 17-19, 24-29, 35-39, 43-49, 58, 59, 66-69, 78, 79, 83-89, 98, 99, 103-109, 112-119, 121-129, 131-139, 152-159, 164-179, 181-199, 262-300, inside back cover sheet

-3 graph sheets are between front cover sheets
-page 9 has big graph taped to it and tab with "C1" on it
-page 19 has tab with "C2" on it
-page 29 has tab with "C3" on it
-page 39 has tab with "DC1" on it
-page 49 has tab with "DC2" on it
-page 52 has 1 thin graph taped to it
-page 59 has tab with "DC3" on it
-pages 63 & 73 have 1 graph taped to each page
-page 69 has tab with "R1" on it
-page 71 has red (post-it) tab at top of page
-page 79 has tab with "R2" on it
-page 89 has tab with "PM 1" on it
-page 91 has 1 half sheet taped to it
-page 99 has tab with "GR" on it
-page 109 has tab with "AMP" on it
-page 119 has tab with "PriSc" on it
-page 129 has tab with "Rm RCL 107" on it
-page 139 has tab with "PM country sep" on it
-page 149 has tab with "Log" ? on it (illegible)
-page 159 has tab with "C-4 C-5" on it
-page 163 has 2 (8.5x11) graph sheets taped to it
-page 179 has tab (illegible)
-page 199 has tab with "Inst Dev" on it
-pages 203 & 216 have 1 (8.5x11) graph sheet taped to each page
-page 214 has 2 (8.5x11) graph sheets taped to it
-page 225 has long sheet taped to it
-pages 224/225 has 2 (8.5x11) graph sheets between pages
-page 257 has red tab (post-it) at top of page
-page 259 has tab with "PM-1 etc" on it

Scanned by:
Sheila Finch
RSICC /Oak Ridge National Lab.
September 8, 1999

Instrument Log - West Group - 9213

INST SERV - '50 - '53

DEV '53

SHAW'S

PIONEERS SINCE 1831

Account Book

No. S 149

NO UNITS

Journal . . . . . .

Ledger, Single Entry . .

Ledger, Double Entry .

Record Ruled (27 Lines)

Made in 150, 200 and 300 Pages

MADE IN U. S. A.

TO REORDER, SPECIFY NUMBER, RULING AND THICKNESS INDICATED ON BACKBONE OF THIS BOOK.

Radiation Level μr/h

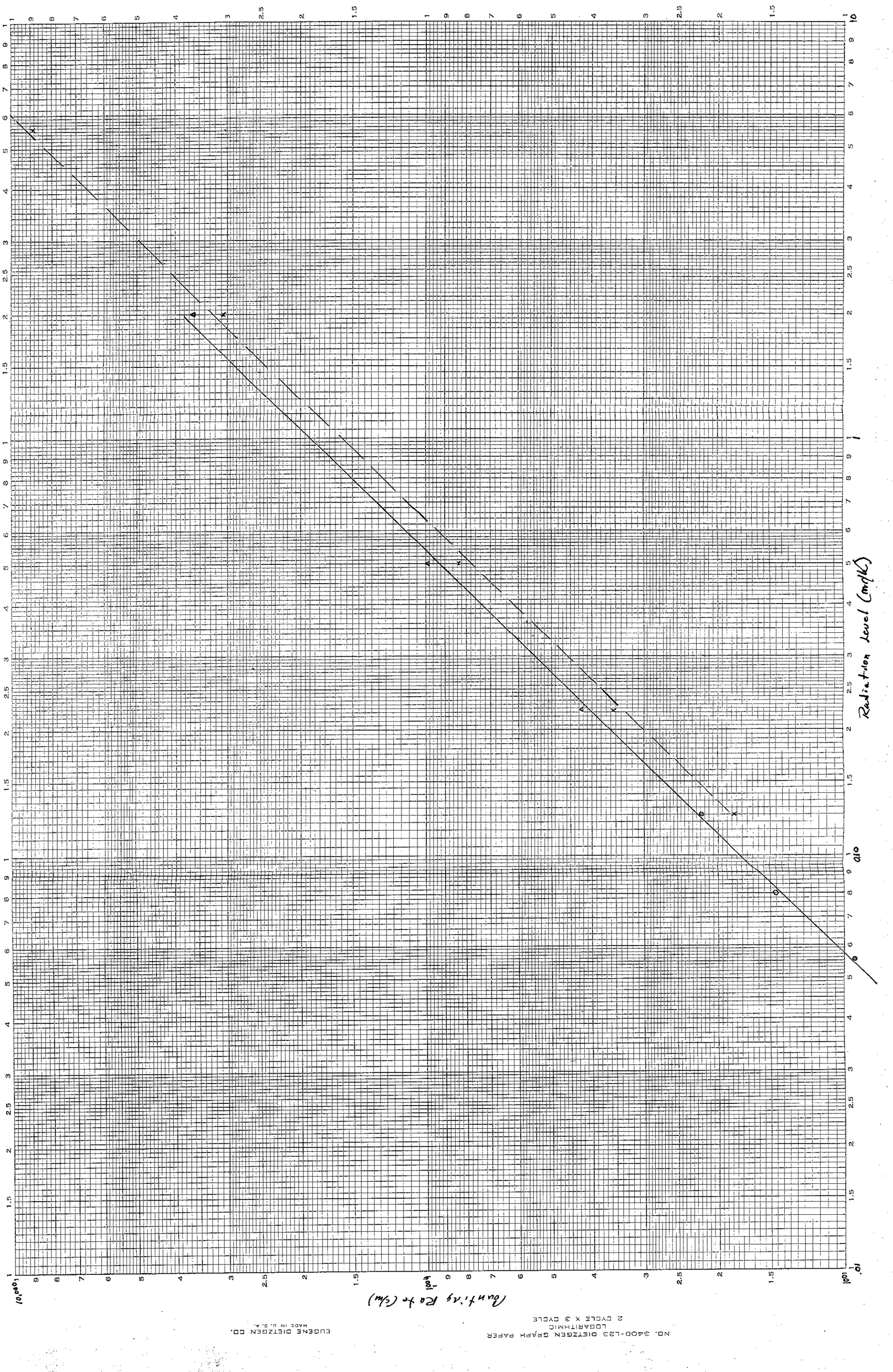
Net Counting Rate (c/m)

Counting Rate (c/m)

Radiation Level (μr/h)

EUGENE DIETZGEN CO.
MADE IN U.S.A.

NO. 340D-L23 DIETZGEN GRAPH PAPER
LOGARITHMIC
2 CYCLE X 3 CYCLE



NO. 340D-L23 DIETZGEN GRAPH PAPER
LOGARITHMIC
2 CYCLE X 3 CYCLE
EUGENE DIETZGEN CO.
MADE IN U.S.A.

Indium Decay Curve
12-14-51
Scintillation Counter
5819 + Anthracene
Rm 210
G.M.R.

Half-life Calculation:

			log
$\Delta t=100$	$t=0$	$c = 8.22 \times 10^3$ c/m	4.9149
	$t=100$	$c = 2.23 \times 10^3$ c/m	4.3674
			.5475

$$t\lambda = \frac{\log c_1 - \log c_2}{.4343} = 1.2606$$

$$\lambda = 1.2606 \times 10^{-2}/m$$

$$T = \frac{.693}{\lambda} = 54.97 \text{ m.}$$

Counting Rate (c/m)

Time (minutes after start of count)

KEUFFEL & ESSER CO., N. Y. NO. 358-71L
Semi-Logarithmic, 3 Cycles × 10 to the inch, 5th lines accented.
MADE IN U.S.A.

NB-WI-2

West Group Instrumentation:

General Description - Equipment in Rm 202

Scaling Systems:

C-1, C-2 — 2 - units of Los Alamos vintage, including linear amplifiers and scale-of-64 counters with three-register panels. These are in rack I, being the northernmost rack in Rm 202.
1 - 4 output (2x2) high voltage supply for counters, providing outputs 1A, 1B, 2A, 2B. This is generally used in conjunction with the two above units. Located in lower part of rack 3.

C-3 — 1 - 1024 scaling system - modification of 10L 162. Power supply 200 - 850 v, amplifier, scaler, and timer. Engineered by E.R.R. 1950. Location: Rack 2.

DC Amplifiers:

DC-1 — V-12 engineered DC amplifier driving Brown recorder. Location: Rack 3, upper portion. Controls under recorder.

DC-2 — DC amplifier with alarm circuit. Drives Brown recorder. Recorder & amplifier in rack #4.

DC-3 — Same as above. Rack #5

Reed Electrometers:

R-1 — Applied Physics serial 18. Operates alarm circuit and Speedmax recorder. Rack #6

General

R-2 Applied Physics serial 160 - to be installed with alarm circuit in panel rack #7 to drive Speedomax

Photomultiplier monitors:

PM-1 Alarm circuit. Mounted in rack #4.

PM-2 Alarm circuit - Relay unit rack #4 - monitor Run 201 -

Gamma Monitor:

GR Process monitor for γ detection in Run 202. Complete in 202. Operates E-A. recorder. Rack #5, lower portion.

Intercom. Rack #3

Alarm, primary. Rack #4.

Master Timer Control - Rack #6 Controls C, C2K, E 9/18/52

General

Equipment Rm 201.

For operation with C-1, C-2, or C-3.

2 - B¹⁰ lined proportional counter tubes.
Used with single stage pre-amplifier.

1 - BF_3 counter tube (ORNL). Used with four-stage preamplifier.

DC-1 ~~Detector~~ Detector: BF_3 ion chamber + electrometer tube

Detectors for DC-2 or DC-3.

2 - BF_3 ion chambers, used with 2-stage preamplifier.

Heads for R-1 & R-2.

Photomultiplier heads:

1 - 931-A & batteries + pre-amp.

PM-2 detector and power supply

7-15-52

A \ 2	0	10	20	30	40	50	60	70	80	90	100
1	165	179	192	206	219	227	240	253	266	279	292
2	330	345	365	375	385	395	412	425	430	450	470
3	500	575	525	535	550	565	575	585	602	617	628
4	665	675	684	702	720	725	730	750	770	788	998
5	828	840	853	870	880	890	902	915	930	942	960
6	990	1007	1015	1030	1047	1055	1070	1080	1095	1110	1125
7	1170	1185	1200	1210	1220	1235	1250	1265	1280	1295	1308
8	1340	1360	1375	1395	1405	1410	1425	1440	1460	1475	1490
9	1520	1540	1560	1575	1585	1595	1605	1615	1630	1650	1670
10											

(Spot) 1-B 1 2 3 4 5 6 7 8 9

15-8 325 485 649 820 990 1160 1325 15-10

8 H.V. power supply for C_1, C_2 & other minor services.

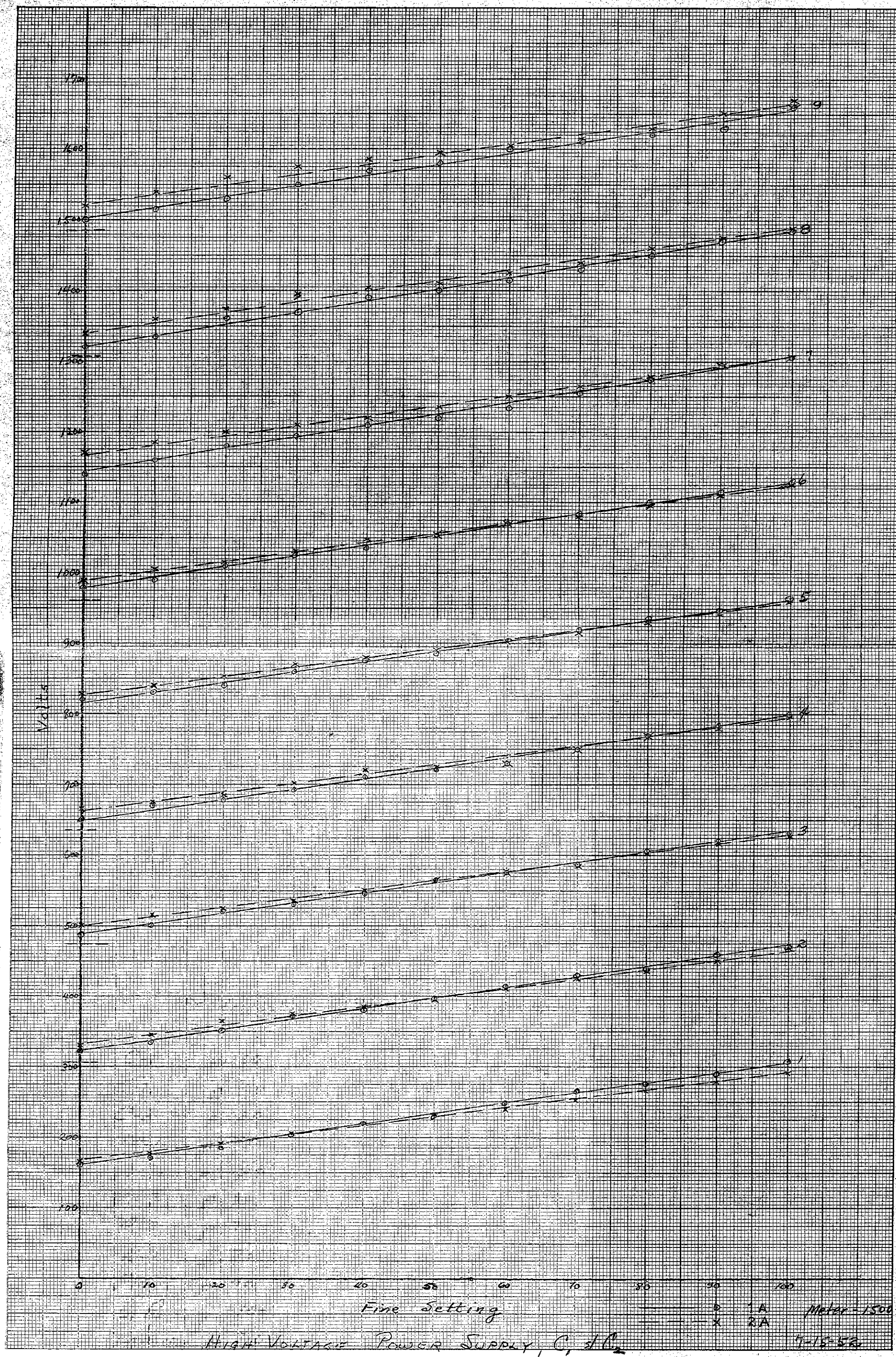
3-14-52 Panel meter reading low @ 1.5 kv. Should be 1.75-2.00.
Checked batteries O.K. Checked tubes bad 807 &
6SJ7. Replaced these. H.V. now 1.75 KV.

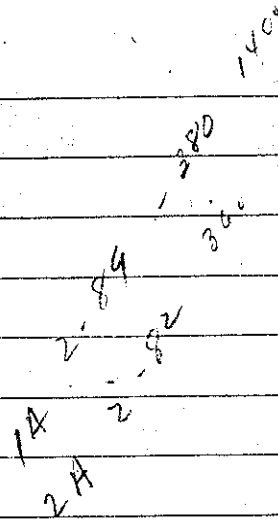
3-17-52 H.V. meter @ 1250 V Needs to be checked.
Cleaned chassis. Disconnected lead from NU4
output panel. Output voltage = 2400 v.
Connected output panel. New reading obtained on Vomax 1
Checked tube stock to see if had replacement for CE
Found GE 3B24W had almost identical characte
Put in 3B24W. No drop in H.V. when tied in output o
2.0 KV output (meter)

Master Timer
3-19-52 Put new coupling link between motor & ~~register~~ timer
on Master control panel. Rubber tubing used.

7-14-52 Output meter of H.V. supply on C_1 & C_2 reading low -
@ 1360 volts. One 45 V battery bad. Replaced.
Modified circuit - removed thyrite unit & tied screen 16
to lo end of 1 Meg Ω resistors. 70 KΩ resistor formerly
in thyrite divider net now inserted as regulator in
output net. Tools data on output settings, meter s
at 1.5 kv.

A / 1	0	10	20	30	40	50	60	70	80	90	1
1	160	170	185	204	220	230	248	265	275	290	30
2	328	335	352	372	380	397	415	430	446	460	47
3	487	502	520	530	545	565	575	587	608	622	63
4	650*	670	678	693	710	720	730	750	770	765	80
5	820	830	840	860	875	885	905	920	935	948	96
6	980	990	1010	1025	1035	1053	1070	1085	1100	1115	11
7	1140	1160	1180	1145	1210	1220	1236	1253	1275	1295	130
8	1330	1335	1360	1370	1390	1400	1415	1430	1450	1470	148
9	1500	1515	1530	1530	1570	1580	1600	1610	1620	1630	16
10											





Service Log

Service log - C-1 For H.V. power supply notes see p 8.1

12-22-50 B" lined x ctr. in west reentrant tube 5-
H.V. setting: 1-A 3-70-80. ~550v.
Scaler: max gain. Input volts ~33.
This setting high to eliminate excess counts upon starting 5-

12-28-50 Volts input set up to 38 to cut out excessive initial counts. Operation
- - - ok. Now mounted under tank, slightly south of center, in hemisphere. Vin
Scaler operating poorly. Cut down for checking. B" ctr
shorted to C-2 & in E. tube.

1-11-51 Linear Amp. (lower) not operating, seemingly. Checked
tubes Replaced 6AC7, 6SJ7, 6SG7, 6AG7, 2 6SH7's, 6SN7 ok

1-11-51 1300 C-1 system operating: G.E. ctr + preamp + Hypu L.A. + C-1. HV ~2s
Discriminator 30.

2-(12)-51 C-1 down. Counts not reproducible. Checked tube
ok. Ins scaler & Linear Amplifier

2-14/15-51 Checked scaler in shop. Replaced voltage input pot
25K, with 50K Helipot. Replaced some resistor
components not at rated values. Instrument
satisfactory with 5 volt input pulse from
pulse generator. C-1 system inoperative.
Linear Amplifier not good. Checked in shop
Signal traced to output stage. Tried feeding
output from cathode. - OK.

2-17-51 Operation ok. Volt input setting 6.00 on helipot.

3-27-51 Accident. Operations shut down.

5-18-57 Connected detector head under tank in 201. Turned on system - no response. Noted scaling pair "8" & "16" non-operative.

5-19-57 Checked scaler with pulse generator. 1 μs, 2.5 v, 60 ∿, pos. pulses. Fans at "8".
Removed pair "8" & put in replacement. Shifted pairs. Pulses:

1 min.	56^{+17}	3601
	56^{+13}	3597
	56^{+28}	3612

Removed pulse gen. Set scaling scales running fast. set at 4.00. & checked for spurious counts.
12 min. no count
at 4.00 16 volt pulse required.
at 2.50 5 volt pulse required check for spurious setting to low.
With source 175 under tank no response. Trouble in L.A. Swapped head in pulse & C2 worked, meaning head OK.
Check of L.A. - Dead.
Tube Check V_1 6SJ7 OK
V_2 6SG7 OK.
V_3 6J47 to gm. replaced
V_4 6SH7 O.K.
V_5 6AG7 to gm. replaced
V_6 6AC7 OK.
V_7 6SN7 OK.

Signal Trans. Input 60 N, neg. 1 μs., 0.5 volt.

V, G. - OK P OK

R OK ∘ no good. {Noted low plate supply voltage to amplifier strip (<100 v.)}

Checked regulator P.S. tubes. One 6Y6 had replaced

½ 6SL7 shorted

Signal gets to 3rd stage, 6SH7. Plate voltage N 20 v. Hz.

Coupling capacitor between 3 & 4 leaky, shorting (N 2000 Ω replaced. E_{P_3} 160 v. - Pulse tracks through.

C-1 now working when L-A installed.

2 m. Hg source on S. wall 201. 0+42, 0+50, 1+10.

Location: Head water west side of tank, running N-S. Met. lab. ctr.

5-21-57 60 min. count: 23 + 59

2 m. bkg N½ S. wall 201: 0+56, 0+52, 0+45, 0+57

6-15-57 Operation normal.

6-22-57 No obvious faults. Have noted that multiplication increases up to point of decrease for some non-critical systems. Investigation of cause needed.

7-16-57 H.V. Power Supply for C-1 & C-2 needs checking. Meter indication low. ~135 v battery in regulator ckt. low. Replaced. Meter indication 2.1 kv. arc. range a little high. Voltage 620 v. (HV 2010)

9-11-57 Routine operation OK. Some modification in wiring of Hewlett panel to accommodate monitor scaler. Thin down 9-10.

9-28-57 Pulse Height Adjustment used on scaler. Have been counting exceedingly high.

10-1-57 Input voltage (P.H.) adjustment had to be again set. It appears that the unit is still sick.

10-30-57 Unit still showing poor reproducibility & extremely high counts. Checked to determine unit at fault.

(a) Cs used: C_1 high, C_2 normal

(b) Probes swapped: C_1 High, C_2 normal ∴ not probe

(c) L.A. output swapped: C_1 norm, C_2 high ∴ LA, should be unit in trouble.

moved to 210 for servicing.

Signal Trace showed unwanted transients after 1st stage. A check of 1st supply & screen voltage point showed mud signal. Filter capacitor bad.

Replaced capacitor - test improved.

@ 2.5 V. in. 11-12 x 64 in 2 min.

10-31-57 C_1 still not all well. Probe suspected in LA-1. Took LA-2 to 210 to get typical traces & voltages - (see p 29 F05 notes)

On basis of above ran test again on LA-1

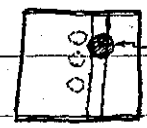
note fuzz on upper grid - fuzz on reduced B+ pt.

Much hash on B+. Replaced capacitor (2 x 8 μf) at 300 V point in amp. stage. Replaced capacitor (2 x 8 μf) in power supply output capacitor of C-L-C filter.

11-1-57 Checked counting - Results of ten 2 minute counts showed 5% deviation from avg. 605 ± 31 c/m

11-11 & 16-57 Showing poor counting characteristics. C-2 head used under N side tank E-W orientation.

Location. Under tank on unistrut supports. Running NS - E of center near NS center. GE 6h (2 band). Bare

11-20-51 → Relocated C1 (GE 26 and). Placed in howitzer on onistrut below tank as per sketch:  C. Top of howitzer ½" below 6" NS beam.

2-7-52 Operation To be checked: occasional count thrown in on register by pushing master start switch.

3-14-52 Input 5.00 2m.

	×64	+	C_{E2}
~~40~~		11	2571
41		10	2634
38		60	2492
38		28	2460
39		57	2553
40		12	2572
38		06	2436
41		46	2670
41		57	2681
40		43	2603
Avg			2567.2

+113.8 −121.2 ±5.11 %

3-17-52 Output 2A 2-80 570 volts (Umax)
Sens 5.09 (1m at)

200 ± 45	51	12845
200		12851
198	14	12686
204	8	13064
204	±4	13080

12905.2 + 174.8 − 219.2 ±1.7%

3-19-52 Operational check. see C_2 notes.

4-16-52 Reset input volt setting. 8.00. ✓

5-7-52 O.K

5-16-52 Check ref. p 32-33 - not reproducible.

5-19-52 Servicing - noted at base. "Hot" side of neon light strip at 220V instead of 300.
5Y3 rectifier base - replaced.

S

* req

7-16

10

1

1

1

5-19-52 6Y6-G low - replaced.
6SN7 & 6SL7 bad, replaced.
At now 2600. - something better
2m. bkg. dials 5^00. 3^03 195
3^06 198
3^25 217
2^60 188
2^51 179
Operation check. with C1 . C2 . C3 input to C1 7^00

* register thrown in	C1	C2	C3
5-16 (83-245)	* 204^5	105^43	160^15
	* 195^11	105^14	159^44
	153^29	107^21	159^43
	*		

7-16-52 #16 lite out - replaced 6SL7 — OK.
10-16-52 OK.
1-2-53 Background Check (5^00 beam) (460): 1^21, 1^06, 1^04, 1^01, 1^36.
±1.7%
1-4-53 ADC Register inoperative - Scaler OK. 2050's replaced still not register.
Interchanged thyra from output with that of C-2 OK.
1-16-53 SKH As stands no register - reader not needed debug - OK.
2-21-53 VOS.
4-6/10 Routine tube check VGH
4-13-53 Checked - on start throws in 1 register occasionally.

7-14-53 Head Location: Outside Nell - On North Wall - Between tank and Control Panel - Marked "A."

7-20/21 VGH High Bkg. ct. Fast counting.

Changing 3-6527's produced normal ct. up to #16 Dr. which was off. Found shorted 6/16 to #16 pair.

Replaced 3-6527's & 7-6146.

Fast counting still evident. Interchange of input leads to channels 1 & 2 indicated source of trouble in 201.

Noted that washing was being done in tank at time of trouble. Possible that preamps got wet.

8-4-53 Noted pulse input setting very low (< 1 div). Checked gain setting on back. It was not at maximum. With HV off, set gain at max & adj PHS for 60v sig. with input selector at 2.5V. Set selector @ X100 for counting operation.

20 C-2

12-22-50 BF_3 ORNL ctr. in howitzer s.s. side tank.
H.V. setting: ~~600~~ 2-A 4-30 (800-900v)
Scaler: reduced gain - Input volts 25
Reduced gain to compensate for high gain pre-amp.

-50 BF_3 hum counter was shorted to case. This fixed. Scaler not operating satisfactorily. Needs checking. May be in pre-amp. Loca

-51 Check BF_3 tube & pre-amp. - 5-2

B^{10} ctr from C-1 put in S. Tube for counting - System seems to be O.K.

As of 1-11-51. New G.E. ctr & pre-amp. + upper linear amplifier (usually C-1) + Scaler C-2 + HV 1-A. Tube @ 650v.

1-11-51 L.A. 2 (lower). Traced signal up to 6AG7 stage then a loss of x100. Feed back capacitor shorted. Replaced output & 75Ω cathode resistor. L.A. 2 signal traces through O.K.

1330 C-2 System: Met lab counter + pre-amp + L.A. 2 + C-2. HV ~~+~~ 1A.
Discriminator 27.

2-15-51 Discriminator 28 - L.A. output - cathode - 4-15

2-17-51 O.K. Discriminator 30. 8-21

3-27-51 Accident - Operation shut-down.

5-18-57 Installed detector head under tank via Kin 20 1-00. Turned
No analog background. System to be checked 7-16-

5-19-57 Checked with pulse generator. 1μc, 0.5v, 60~, + pulses.
H.V.: 25. 1 min - 57 ± 46 3694
57 ± 58 3706 7-17-
57 ± 14 3662

Removed pulse gen. Scaler running at 25 H.V. Set at 27. and

checked for spurious counts. 2+32 in 12 min. Set at 29 V.
In 5 min. no count. In 10 min no count.
at 29 V. in., 5 volt pulse is required.
With source 175 under tank - inst. responds.
2 min thy source S wall 201 3+31, 3+43, 2+52
Set V. in @ 35: 2+44, 2+46

Location: Head under north side of tank, running W-E. G-E ctr.

5-21-57 60-min. count: (After 23 minutes, no counts) - 0+00.
Examination: interchanged inputs to LA's. C-1 works, C-2 still dead.
Trouble in 202 equipment, LA. or scaler.
output from LA-1 with S-2. no counts - S-2 bad.
" " LA-2 with S-1 counting, so LA-2 ok.
Tube check 6SN7 in power supply reg. 10-gm replaced.
6V6 output replaced - short.
Pulse gen. input produces reading.
2 min counts 175" S. wall 207
2+16, 2+16, 2+29, 2+17

4-15-57 Operation normal

8-21-57 No obvious faults. Investigation into reason for mis-fall of count. Application curves for over and critical runs deemed necessary.

7-16-57 H.V. Power supply for C2 & C1 needs checking. Meter indication low. - Refer top 12 for summary of work O.K. Voltage 620V (HV 2.07 KV)

7-17-57 Not registering from scaler. Normally extinguished 2050 firing transient cycle. Replaced other 2050 - OK. Had been dead.

9-11-57 9/10 Made connection on trim panel for leads to counter timer system ok.

10-29-57 Probe never mounted in neutron howitzer under tank, vertical. Can on table top or platform.

11-1-57 Checked count. Results from five 2 minute counts showed ~4% deviation from average 2218 ± 95 c/m

11-11&15-57 Poor counting characteristics - inverted in howitzer NS center W of center of tank. -

11-16 Location: Base - NS orientation - W of center on flange of small NS beam - Metlab etc (1 bond)

2-7-52 Operation: To be checked: occasional count shown in by meter start switch

		x6 c	+	cts
3-16-52	Input 35: 5 min	16	12	1036
		10881 7	18	1106
		1216 19	58	1274
		9601 5	18	978
		1021 16	28	1052
		9601 5	58	1018
		9601 5	57	1019
		1088 17	03	1091
		1084 17	36	1124
		1021 16	57	1081
			Avg	1077.9

+196.1
- 99.9
18.19%

3-17-52 Output 2-80 (1A) 575 volt.

Sc. in 35 (1 min ct)	103 25	6617
	102 50	6578
	103 43	6635
	102 50	6578
	107 28	6876

6656.8 +219.2 -78.8 ±3.29%

3-19-52 Operational check - (See (3 notes)

4-16-52 OK.

5-5-52 Throwing in counter. Readjusted input voltage selector. ok

5-16-52 (check ref p 32-33) o.k.

7-16-52 OK,

10-16-52 OK.

1-2-53 Background Check (80) : (x64) 5^{16}, 4^{43}, 4^{50}, 4^{46}, 6^{20}

1-4-53 Thyratron output swapped with that of C. Sealing too fast.

1-15-53 As stands not registering — re-mounted cable & checked thyratron panel —

2-20-53 Feeder - not stepping not registering —

2-21-53 Checked thyratron panel. Replaced one 2050. Still bad. Trouble mechanical - ratchet & register gear train — OK.

4-6-53 Reactivation Tube check VG4

4-13-53 Reported VG. 4/12. Seemed OK., save for occasional register start-ups throw in.

7-14-53 Head Location: Outside Well - On North Wall, tank - Between tank & control panel - marked "C"

30 C-3

12-22-50 B^{10} lined ∝ ctr. in cast reentrant tube
H.V. setting 600v.
Scaler - high gain. input adjusted above 60v pickup point.

12-28-50 ok Tube & pre-amp. mounted under tank on wet of small beam, axis north-south, in air.

1-11-51 Has been std. vertically in paraffin under tank when C-1 was.

1-12-51 Register inoperative. Checked tubes in register ckt. Replaced one 2050 & 6SJ7. Still. Removed unit & took to shop. Found 2 pfd capacitor between plates of 2050's shorted. Replaced. ok. register. Reinstalled in panel rack

1-21-51 Output intermittent or weak - Readjusted bias on comm. circuit. ok.

2-5-51 H.V. power supply drawing excessive current - to shop. Checked tubes - Replaced 2X2A, 6SF5 in HV ckt. OC3, OD3 in LV reg. ckt.
~~ok~~ Blew fuses when again mounted in rack -
Found CV outlets in racks to have 110vac hot on one pole & zero on other two, contrary to floating poles in lab. After much checking found leaky H.V. transformer - Replaced & reinstalled - C-3 in operation 0900 2-6-51

2-17-51 ok

3-27-51 Accident. Operation shut down

5-18-51 Installed head under tank in 201. Turned on power as background count. -

5-19-51 Checked with pulse generator 5V, 1μs, 60∼ + pulse. in scaler. 6SN7 in "2" showed open filament. Replaced ok.

x64
1 min - 56 + 12
56 + 9
57 + 8

Brought 175' coax into room in plastic cone. Under tank. Instrument responds.
2 min bkg, count s. wall 201 - 0+40, 0+55, 0+41.

Location: Head in paraffin container under south-center tank, mounted vertically, Met. lab. ctr.

5-21-57 60 min. count: 18+24,
2 min. count. #75 s. wall 201
0+35, 0+38, 0+31, 0+32

6-10-57 Operation normal.

6-22-57 ~~No trouble found. However, it is felt necessary to check ... of rod displacement fall in multiplication during ... subcritical runs.~~

Operation normal.

7-16-57 Seems OK.

9-11-57 On 9-10, wired in nearby power panel.
Re-wired neon lamp (HV indicator), ~~[illegible]~~ runs directly across HV switch (one side previously grded)

— Speaker output dead needs to be fixed.

11-1-57 Checked counting. Results of four two minute counts showed 5% deviation from avg. 1040 ± 35 c/m

2-7-58 Operation OK. Had noted slight drift in H.V. power supply. Stable now.

OK.

3-17-52 Work done over weekend by R.F. Cronin - 3.14-15-
Replaced 2X2 & 1 VR150 in HV supply panel.
Replaced VR75 & 2 2050's in Trans panel.

3-19-52 Operational check of C_1 C_2 C_3 Source counts

* change

C_1 (input 500)	C_2 *(input 37 *)	C_3
51 30	28 49	8 50
49 61	32 27	8 8
51 30	33 45	9 53
64 9	36 55	8 62
50 0	31 57	9 21

3-20-52 H.V. output dropped to Zero.
Checked H.V. tubes. 6SF5 low - replaced
Checked HV tubes: Both VR tubes had replaced.
OK.

4-16-52 OK.

5-7-52 Speaker & register out in Step. Adj. bias & Thyratron in rate meter ckt. OK

5-16-52 Operational Check of C_1, C_2, C_3 Source 222 under tank in air.
C_1 not reset before *C_1 & R_1 register on start.
C_2 to count

C_1 (900)	C_2 (45)	C_3
245	53 34	193 32
* 221 9	* 52 37	194 10
212 35	50 34	195 57
197 25	53	194 43
225 39	52 32	190 04

8-16-52	C_1 (90°)	C_2 (45°)	C_3
	214^{41}	54^{38}	192^{43}
	199^{49}	53^{8}	190^{2}
	183^{59}	54^{38}	187^{9}
	205^{57}	51^{5}	190^{30}
	192^{25}	53^{4}	192^{2}
		✓	✓

9-14-52 O.K.

9-15-52 Had been inoperable for several weeks. Fault arose upon shifting head under reacta tanks. Found HV lead open in connector to pre-amp. Resoldered connection — O.K.

10-16-52 OK.

11-1-52 H.V. Supply - output not adjustable over full range.

11-3-52 Checked tubes 2x2A bad & replaced

6AG5 OK
6SF5 to- needs replacement (out of stock)

now adjustable-

1-2-53 Background check (#64) 1^{+15}, 0^{+58}, 0^{+49}, 1^{+44}, 1^{+21}

1-4-53 ADC Register recording ½ integers most of time.

1-15-53 Checked thyratron ckt. Replaced w 2050 & 6SJ7. Still not registering always. Checked rectifier - 5V4 - was bad. Replaced with 5R4.

4-6/10 Routine tube check V6H

4-13-53 Checked out: Power Supply voltage low - set up 150 v to fire 003. put in 8 μfd across 105 v out. Removed 1st trigger 6SN7 & pumped 400 μfd to 400 μμ coupler to input 2nd trigger. Shaking seems okay, probably due, seemingly, to loose contact tube.

7-14-53 Head Location: Outside Well - On North Wall, tank - N 2/3 - way up - Taped & supported by Log N cm channel Marked "B"

10-15-53 Instrument had shown signs of trouble by counting at high rate suddenly - continued count with no H.V. on counter tube -

Checked pre-amp - replaced 6AK5 cathode follower -

Checked power supply:

VR150 & VR105 shorted
5U4 low
6AG5, -6SF5 low -

} Replaced -

Ran a series of 2 minute counts for 10 minutes - Seemed to be OK

40 D-C-1

12-22-50 South side tank

12-28-50 Head mounted under tank, cable connection down, in paraffin, slightly north of center.
Replaced Brown 1½v. battery. Remaining batteries o.k.
Seems to drift without cause.

2-17-51 O.K.

3-27-51 Accident. Operation shut down.

5-18-51 Installed chamber in paraffin case under tank 201. Turned on. Seems to adjust properly.

5-14-51 Responded to source 175 when placed under tank.
Location: Under tank in paraffin. Vertical head near N-east section of tank.

5-21-51 Inst. on for routine check.
After ~ 15 min. run, seemed to be stuck mid-scale. Adjustment of zero set control freed pen. Ten minutes later stuck again: pen does not move when zero set or scale selector switch moved. Off-fil-on switch flipped to fil & back on corrects momentarily.
Checked relative responses to n & γ source.
scale x100: deflection n = 12 div/100
γ = 99 div/100

Battery check: OK.

5-22-57 Response check X 100 Y 85

6-15-57 Have been noting fluctuations on recorder - drifting. Batteries may need to be checked soon.

6-18-57 Battery check - O.K.

6-28-57 Drifting noted: - Replaced 1.5V battery in Brown.

7-11-57 No check made

8-14-57 Drifting: Replaced 1.5V battery in Brown.

9-11-57 Routine check: Stability O.K.; Response O.K.

2-7-58 During 1-58 load began to wander some up of scale. Took down, Noted wiring & schematic got the same, Rewired as per schematic after checking with Ohm. Improved. Performed satisfactorily 2/6/58

4-16-58 O.K.

5-7-58 Checked batteries after overnight "on". O.K.

6-1-58 Replaced 1.5 battery in recorder.

7-14-58 O.K.

10-16-58 OK.

1-2-59 Relocated under Nell after exploratory run under Sid for slurry work. Has found to be too insensitive for Sid when under bank in S.E. sector. Now under N. central segment of Nell in paraffin shield. Responds to Source.

Location

4-6-59 Unable to cause needle to go up scale off zero even with gain adjust full clockwise.

Battery check: Replaced 7½ v [3V] bias battery

6V battery

1.5V fil. battery

& 1.5V batt in Brown

After 15-min-warm-up seemed steady -

5-19-53 Recorder Tube Check. Replaced 2 7F7's
2 7N7's

7-9-53 Recorder unstability -
Battery check. Replaced both 1.5v batteries -

7-17-53 Subject to shock on front panel - causes unstability,

7-20/31 VGH Servicing to check above trouble:
Loose terminal of common lead on scale selector switch rotor. Replaced suited.
7F7 & 7N7 had not mutated. Replaced.
Operated ok.

50 DC-2

12-22-50 West side tank
Output meter .100

Instrument unstable. This instability apparently in head, since when heads swapped trouble swaps instruments. Pre-amplifier needs checking. Can operate on least sensitive scale during opening press of business.

12-28-50 Instability not so much in evidence. Position of chamber unchanged.

1-17-51 Instability rather marked. 1-18-51 Instrument not responding sent Hp for repair.

1-20/21 Voltage check showed excess current thru R24 20kn cf. output resistance. Attempts to find source of trouble failed. Voltage at 12J5 (V4) cathode was positive rather than the expected -21 volts.
Ran preliminary test on spare unit (K-25 used for tests) Pre-amp seemed unstable. Put on other pre-amp Left on for drift check. At 3:30 1/21 meter set at 2 at setting of 50-5 on scale selectors.

1-23-51 DC amp of K-25 design checked OK. on overnite test for drift. Mounted pre-amp in ion chamber, replacing pre-amp suspected of introducing spurious readings. Checked OK with Ra source. In 201 & 202.

2-14 Replaced K-25 DC-2 with remodeled LA model. Remodeling included helipots in zero adjust controls, new knob & reset buttons, by-pass switch for safety circuit, & installation of filter

capacitor to reduce effect of transients.

2-17-57 OK. Note sensitivity to heavy vibrations in room -

2-18-57 Rec. Scan skipped. Tapping on panel of floor.
Adjusted opening of relay contacts in DC-2 - OK.

3-27-57 Accident - Operations shut down

5-18-57 Installed chamber in 201. Turned on. Responds to adj. OK. (Brown amp. on during interim)

5-19-57 Responded to source 175 when placed under tank
Location: This is chamber running N-S under middle tank - no paraffin.

5-21-57 Inst. on for routine check.
Set gain up on Brown amplifier.
Checked relative response to near sources
x100 : deflection n = < 1 div/100
γ = 99 div/100

Battery check:

5-23-57 Swapped head & unit with DC-3.
DC-2 now chamber on top level vertically mounted, in paraffin can. S-W corner tank.
Response check x100 : γ f.s.

6-15-57 Operation Normal -

6-25-57 O.K.

7-16-57 Meter reading negative when Power off & switch on x1000, meter reads only 5 div. This indicates low battery voltage on 24 volt bank. Checked batteries, were low. Replaced

9-11-51 Routine check: Slight drifting on sensitive scales (K-5)
Response to δ radiation OK.

9-17-51 Alarm ckt tripped & strike reading light. Reset & let set.

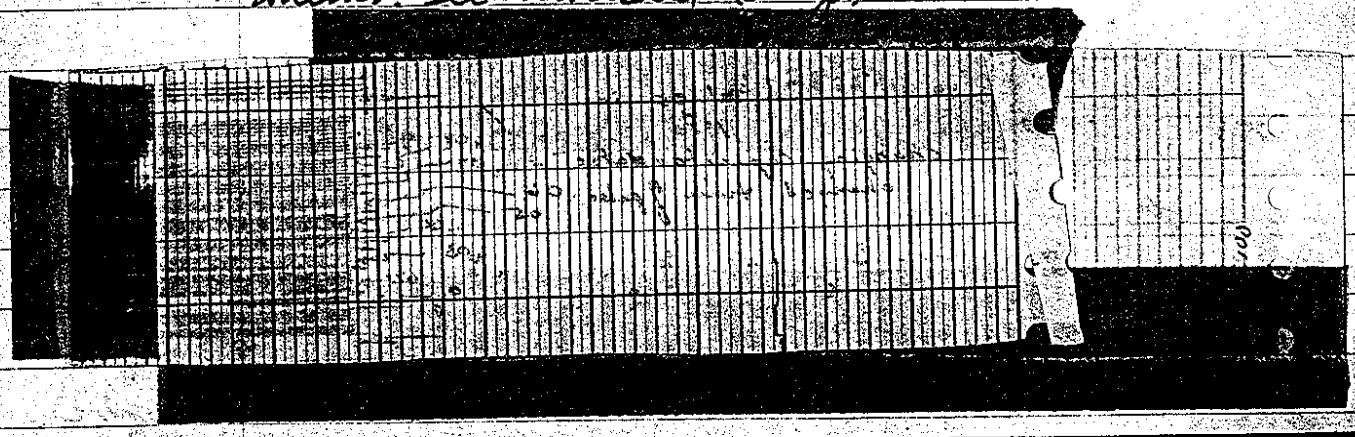
9-18-51 Overnight test tripped. Removed for servicing. Put in spare (K-25) unit.
Servicing notes: Two 45 v batteries bad; Instr. type batteries were extremely hard to replace, one in 135 v bank low & replaced. Seems to balance satisfactorily in use with head in shop. Shelved as spare.

11-14-51 Put in spare, replacing K-units. This to improve speed & response to scale changes. System had been sluggish. Seemed to be in amplifier & not recorder

2-7-52 OK. Still noting sluggishness on scale change. To be investigated. Instrument is useable.

2-27-52 Instrument had been sluggish, not responding readily to scale changes. Replaced capacitor which had previously been removed from Brown. This improved response, permitting lower zero set of DC-amplifier.
45 v battery in Brown

2-28-52 Checked response of DC-2 recorder to varying pulse widths. see attached strip.



was used in shop. Marked as spare.

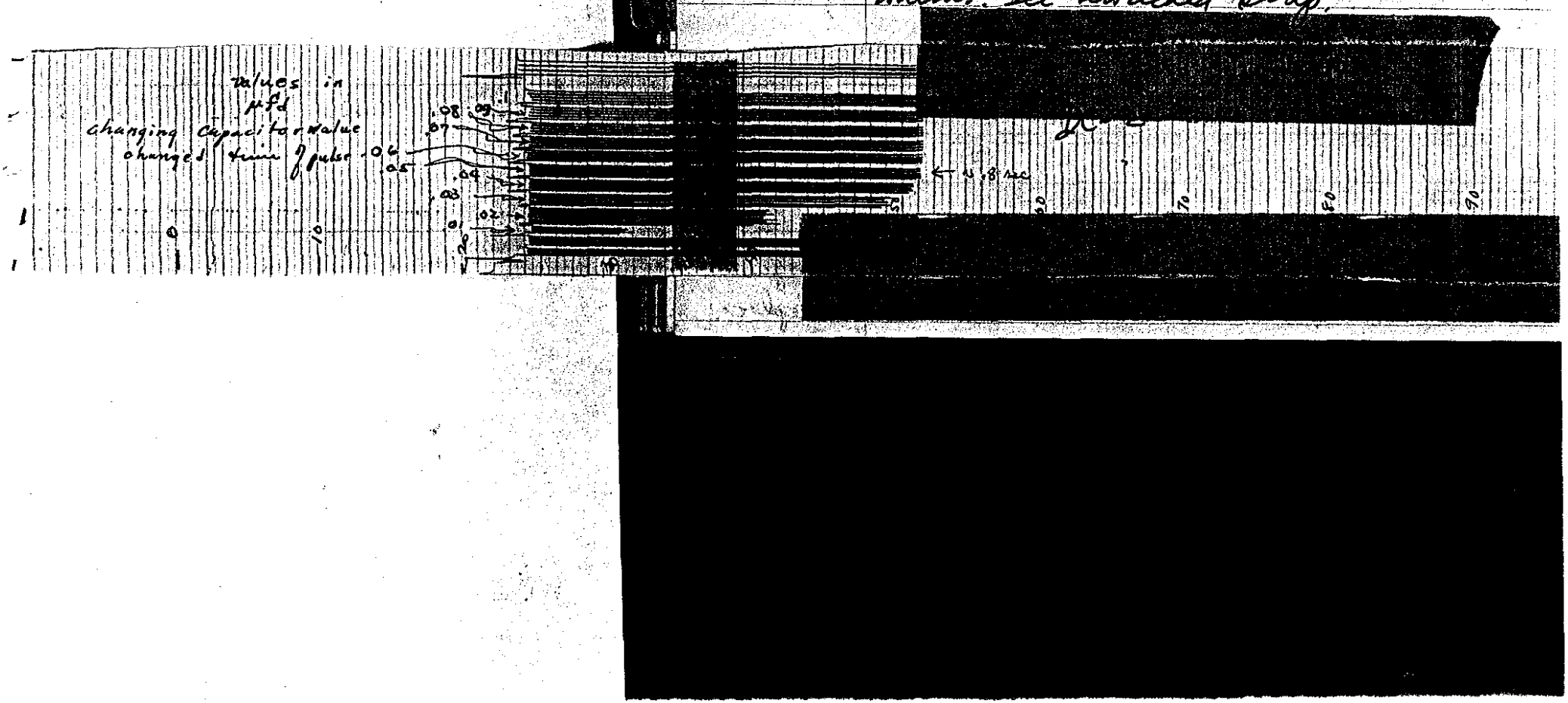
11-14-51 Put in spare, replacing E-units. This to be speed & response to scale changes. Seemed been sluggish. Seemed to be in amplifier

2-7-52 OK. Still noting sluggishness on sc. To be investigated. Instrument is u.

2-27-52 Instrument had been sluggish, not responding re scale changes. Replaced capacitor which previously been removed from Brown. This r

1.5v battery in Brown } response, permitting lower zero set & DC-

2-28-52 Checked response of DC-2 recorder to vary widths. See attached strip.



3-17-52 Request for observation by working crew.

3-18-52 Checked recorder response:

Disconnected leads from each of the DC-amps.

Used 2-conductor jumper cable to tie in either recorder to either DC-amp output.

(A) Output from DC-3. Normal on DC-3 recorder & small deflection on DC-2 recorder very small indication of poorly operation recorder unit.

(B) Output DC-2 Normal on DC-3 recorder (same as before A) little & no deflection on DC-2 recorder.

Put tubes from 2 in 3. Pattern of 3 unchanged. Tubes ok

Replaced converter of 3 by 2 no change -

Std. cell no change -

Check of wiring - Put back together for exp. (components except std. cell stripped)

3-19-52 Checked gain on DC-2. Seemed to work fine when in creation. Noted that instrument response was somewhat improved after work of 3-18 -

4-16-52 OK,

5-5-52 Erratic recording - Checked DC-2 Batteries 2- 45V units replaced. OK.

5-6-52 Placed Lead in Al tube inside water tank - Wells. used cable stretcher for,

5-7-52 O.K.

7-14-52 O.K.

7-29-52 Recorder jumper negative pumps. -

1.5V battery replaced

2- 45V batteries replaced -

7-29-52 Still kicks negative at times. It was noted that when intercom switch was flipped pulses appeared on recorder & output meter of DC amplifier.

8-12-52 In trying out new Brown recorder, noted that output not satisfactory. On some ranges recorder driven negative. On x100 scale recorder above zero only when panel meter ≧ ½ dry level (≧ 30% f.s.)

9-22-52 Off-scale positive meter deflection — Checked batteries all ok. Checked tubes. Both 807's bad — replaced. Replaced one bad 12SJ7.

10-16-52 ok.

11-2-53 Still has negative recorder readings on higher scales when set properly on ±5. Sensitive to shock. Is operable, however. Needs to be replaced as soon as spare is checked out.

Location

D&C

1-14-53 Replaced 4-45 v. batteries. 2 12J5s; 1 6J5; 1 0Z3

1-15-53 Back in use. Still sensitive to transients & neg. readings.

2-21-53 Meds work — not reproducible — too sensitive to shock

4-7-53 Took down for check — Replaced one bad 12SJ7.
In shop, found ground connection open — had been burned open —
In 202-201 — Cable connection at pre-amp ungrounded. No go with ion chamber-preamp — Put on new pre-amp chamber operate ok. — No response to intercom switching. Thus good.
In shop: hi-neg resistor open to chamber — Replaced repaired

pre-amp & Chamber. Output scale selector switching trouble—

5-19-53 Recorder Tube Check: 12AT7 OK.
12BH7 not tested

5-25-53 Routine Response Check - OK to PB source.
Same inst. troubles as before.

6-10-53 DC-2 removed to shop for observation of servicing—
put circular Brown on output as recorder
With this recorder did not note negative readings
on scale setting changes.—
Noted excessive fluctuation for background signal—
output meter unsteady—settled when instrument
struck. Overnight run with circular Brown
indicated great fluctuations—
Checked Batteries: All O.K.
Tubes: Replaced 2-12SJ7's, 5Z3, 6J5—
Loose connection in 110v, 60c, input (at indicator
lamp). Soldering this connection seems to have
eliminated fluctuations.
Brown recorder brought in from 202.
Output of DC-2 to Brown - Still neg. deflection of Brown.
Used in circular Brown. Output of DC amps to both.

Circular Brown		D.C. Amp Scale Fd.	Zero	Brown Rec	Cir. B.
9	mist off	100	{5-45 coarse 5-22 fine} -	-8.2	1.5
10	"	50	-	-0.5	6
21	"	20	-	20	18.5
38	"	10	-	51	38
49	"	5	-	92	70

Turned recorder over Examined. Took readings & right above

6-11-53 Output Meter ~~[illegible]~~ - 6 pos
Cir. Brown x100 6 leads not attached to Strips Brown.
x5 67

7-9-53 Had ~~made~~ noted fluctuations & drift previous week. Seems to be in reasonably good shape now after routine testing.

7-14-53 Recorder shifting, some type of fluctuations as before + response to interim switching -
Battery check O.K. - Still needs further checking

9-30-53 Large fluctuations on panel meter.
Battery check: 135 v bank reading only 50 v.
45 v interstage reading only 10 v
22½ v. interstage OK. (22)
24 v bank OK.
Replaced 2-45 v batteries in 135 v bank.
1-45 v battery, interstage -

11-16-53 Instrument & head to shop (210) for servicing.
Had been in stable & was at last reading negative on normal adjustments for zero.
Voltage check by USH.

11-11 / 11-24 Wiring closely checked. Some loose connections were found & fixed. Output Meter selector switch replaced. Resistor components replaced. .02 μfd condenser in input of V3 was shorted - replaced. After a general wiring & component check (as above), still operation was questionable. Zero adjustments required high setting of dekapots. Resistor on V5 (12SJ7) exceeded rating.

FOUND FILTER CAPACITORS IN POWER SUPPLY bad. Replaced both 16μfd & 8μfd with 2@16μfd.

11-25-53 Installed in 202 for further check —

⇒ Instability in space unit - 2050 & 573 replaced - Filter condensers replaced — —

Tube socket for one 807's had loose connection on grid pin. This was cause of much instability.

60 DC-3

12-22-52 East side tank
Output meter .100

Operating fairly well. Chart drive seems to stick on occasions.

12-28-52 Chamber out under tank in air with east-west axis, operation OK.

1-22-53 Just swam from Y-12 fixed chart drive tightened clutch.

2-17-53 OK. - Note sensitivity to heavy vibration air borne 20~

3-7-53 Rather sudden drift to zero & return to normal.
Reset zero adjustment

3-8-53 Operation check of K-25 model DL amp. + spares
Power OFF: meter 148 μa OK. 22.5 V battery full voltage.
Power ON: meter drops after warm up to read negative
Safety ckt not reset.

Pre-amps Voltage Check.

V_1:	Gnd ref.	B⁻ ref	"Rated"
4	-36	0	-45
3	-36	-.2	-46
2	-34	+1.6	-44
1	-32.5	+2.3	-43
5	-36	0	-46
C_t	~~-50.5~~ ~~-36.5~~	+6.5	-40
C_b	-34 ~~-33~~	+1.55	-44

V_2	Gnd ref	B⁻ ref	"Rated"
1	-34	+1.5	-43
2	-17.5	+1.8	-22
3	-36	5.3	-38
4	-30	5.3	-38
5	-30	5.3	-38
C_t	~~-38~~ ~~-41.5~~	4.4	-3
C_b	-30	5.2	-40

Consistantly off by ~10 V. marked diff on plate reading too negative

Cable Connection

	Gnd	
A	0	-
B	-37	-45
C	-31.5	-38
D	-37	-46
E	+86	+90
F	-38	-3 — marked difference
G	N.C.	-
H	+42	-45 — marked diff.
V_3: Pin 8:	-80	-48
35:	-40	-45
6	-19	-24
8	+88	-5
V_4: 3:	92	+80
5:	+80	-28
8	+40	-21

marked diff.

marked diff.

Disconnected 45V battery on input V_3 $G_1 V_3$ -32

P_{V_1} -27V

— Resetting O.K.

3-8-57 Beam not responding to scale change.
Replaced 7N7's & 7F7's - O.K.

3-13-57 Cleaned Pre-amps; put in new tubes. Warm-up all day -

		3/8	Retied	3/13			3/4	Retied	3/13
V_1	P_1	-33.5	-43	-38	V_2	1	-34	-43	-38
	2	-34	-44	-34		2	-42.5	-22	-20.5
	3	-36	-46	-40.5		3	-30	-38	-33.5
	4	-36	-45	-41		4	-30	-38	-33.5
	5	-36	-46	-41		5	-30	-38	-33.5
	C_4	-30.5	-40	-35		C_4	-38	-3	-16.8 * plate too for neg.
	C_p	-34	-44	-39		C_p	-30	-40	-35
	H	13	-45	+10.2 * too pos.					
V_3	3.5	-40	-45	-41	V_4	3	+92	+90	+88
	4	-80	-48	-61 * too much bias		5	+40	-28	+31 too high
	6	-19	-24	-20		8	+80	-21	+32 too high.
	8	+88	-5	+78 * too high					

3-27-57 Accident. Operations shut down.

5-15-57 Installed chamber in 201. Turned on. Initial instability. Settled down after brief warm up & adjustment. (Brown amp. on during interim)

5-19-57 responded to 175 ft Ra source when brought along side.

location: This head is at S.W. corner of truck 201.

5-21-57 Test. on for routine check.

Checked relative response to ntr sources

X100 *deflection n - 23 div/100

*above bkg γ = 58 div/100

5-23-57 Swapped head with DE-2, DC-3 chamber now under truck center n-s orientation. No paraffin.

Response check X100: Y = 55.1

1-15-57 Operation normal —

6-22-57 O.K.

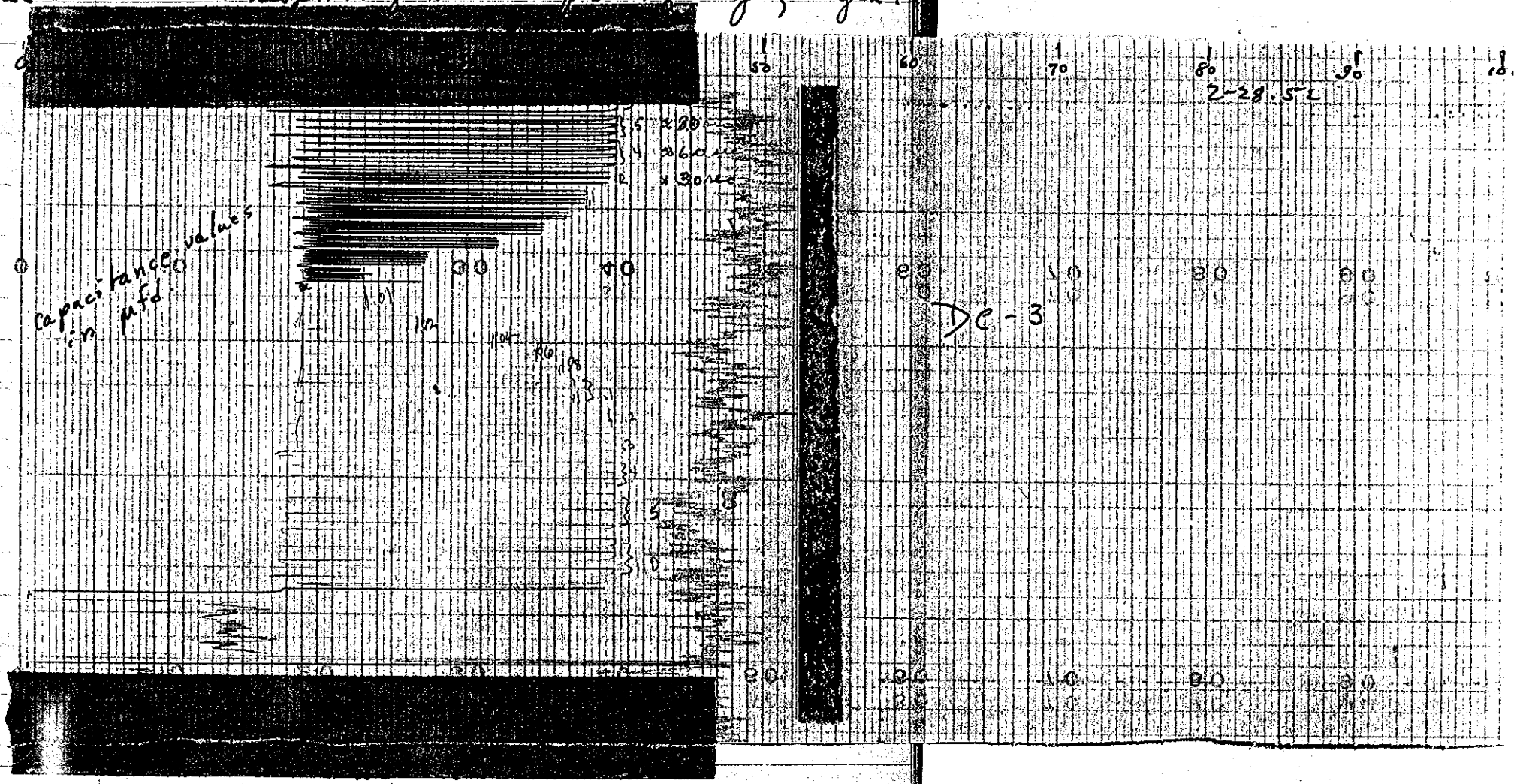
7-16-57 Seems OK.

9-11-57 Routine check: Stability OK
Response OK.

1-7-52 O.K.

2-25-52 Recorder visual. Replaced 1.5v battery. (was 4½v)

2-28-52 Checked response of Bivine to pulses of varying length.



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6-22-57 O.K.

7-16-57 Seems O.K.

9-11-57 Routine check: Stability OK
Response OK.

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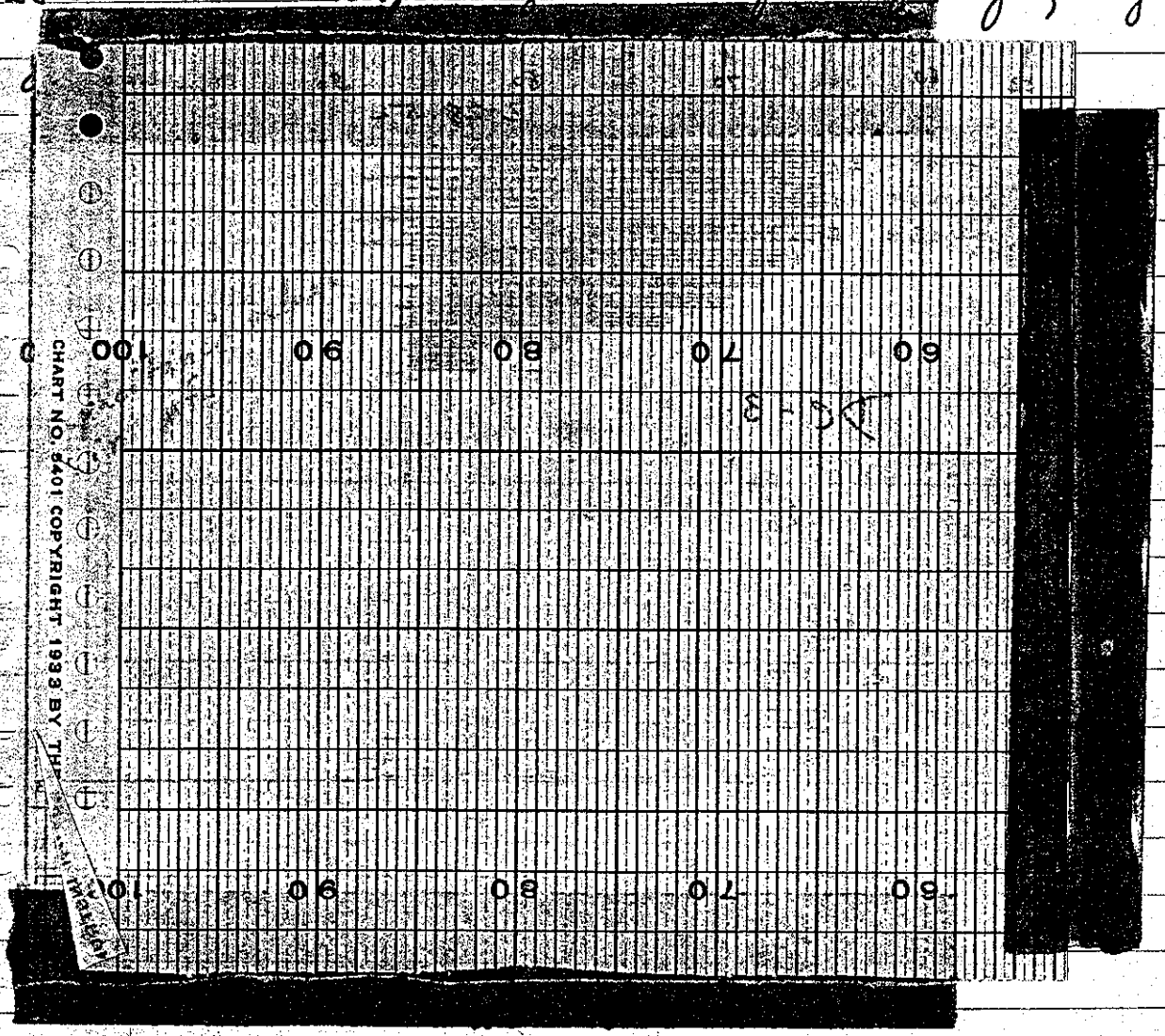


4-16-52 OK,

5-7-52 OK.

7-2-52 Dfc. Power failure occurred. Inst. not recovering. 45v batteries were low. Replaced -

7-14-52 OK.

10-16-52 OK.

1-2-53 Now used for both Nell & Sid. When for Nell (at present) the chamber is mounted in paraffin shield just outside South wall of Nell in center. When for Sid, chamber is mounted in re-entrant tube in Sid - from the left, number 2. Cable extension is left extended in tube when chamber is used with Nell. Reports to source after switchover to Nell.

Location

1-15-53 OK.

1-26-53 Brought pre-amp and chamber from 210 to 202 and attached to DC-3 This to check on operability of pre-amp when DC-3 turned on, all seemed normal. Output meter deflection was normal on scale changes. Returned test pre-amp to shop.

Span DC-amp & output meter OK. up to 50-20 scale change - then meter reverses direction -

Changing scales of recorder sens. selector affects meter reading, driving negative -

4-3-53 XC-3 in panel: - Sudden recorder & meter movement off-scale to right.
VR tubes out; Series 12V. tubes not heating;
Voltage very low on plate of 807's -
5Z3 rectifier gone bad - Replaced.
Replaced one 12J5 & one 12SJ7 -

4-6-53 Trip lite unable to reset - meter & recorde off-scale.
Cut off & them removed from rack for check.
Replaced: 2 - 45v. batteries -
1 bad 6J5 tube in trip ckt.
1 4,000 Ω potentiometer in trip ckt.

5-19-53 Recorder Ckt Check: 12AX7 OK.
12BH7 not checked

5-25-53 Response Check: ok. to PIS source

7-9-53 Operating satisfactorily

7-14-53 O.K.

10-10-53 O.K.

70 R-1

12-22-56 To be install · east of tank.
Attempt to check on warm-up revealed aborted freon ion chamber. No further tests possible until new ion chamber repaired.

12-28-56 Status unchanged.

2-8 Received ion chamber from X-10.

2-16-57 Set up preamp. head and ion chamber in 201. Found polarizing battery to be reversed. Changed, Current battery for negative voltage on shield re outer can value 135 volts.
Made initial operational checks as prescribed in instruction book. Checked for response o.k.

2-17-57 Operation under experimental conditions OK.

3-5-57 Checked tubes in search for cause of instability - Replaced 6Y6G regulator.
Ran through adjustment procedure, Set in operation.

3-22-57 Accident - Operations shut down.

5-19-57 Battery for head lo. Fixed new 135 supply.
Location: Mounted head on floor 6 ft N corner of Bank 201.
Put extra case around chamber turned on test. Responds weakly to Ra & well to 175.

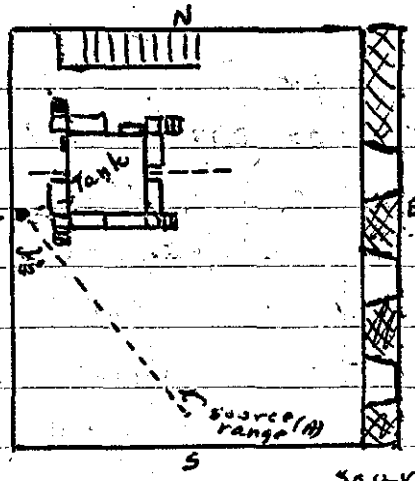
5-21-57 Inst. on for routine check.
Checked relative response to n&γ sources
X6 deflection n = > f.s.
γ = 4 div/70

5-23-57 Response check X6 : γ 8

(Data which follows applies to γ-monitor R-2) 71

2-4-57 Calibration -

Sketch of room :



Dist. chamber - tank edge = 6'4" to pt. 2' from SW corner of tank on W wall.

Bkg. readings with:
(a) Source 172 in shielding S.E. corner lower level.
(b) Ra source in Pb. safe S. wall upper level.

Inst. was given routine adjustment with bkg. conditions prior to calibration

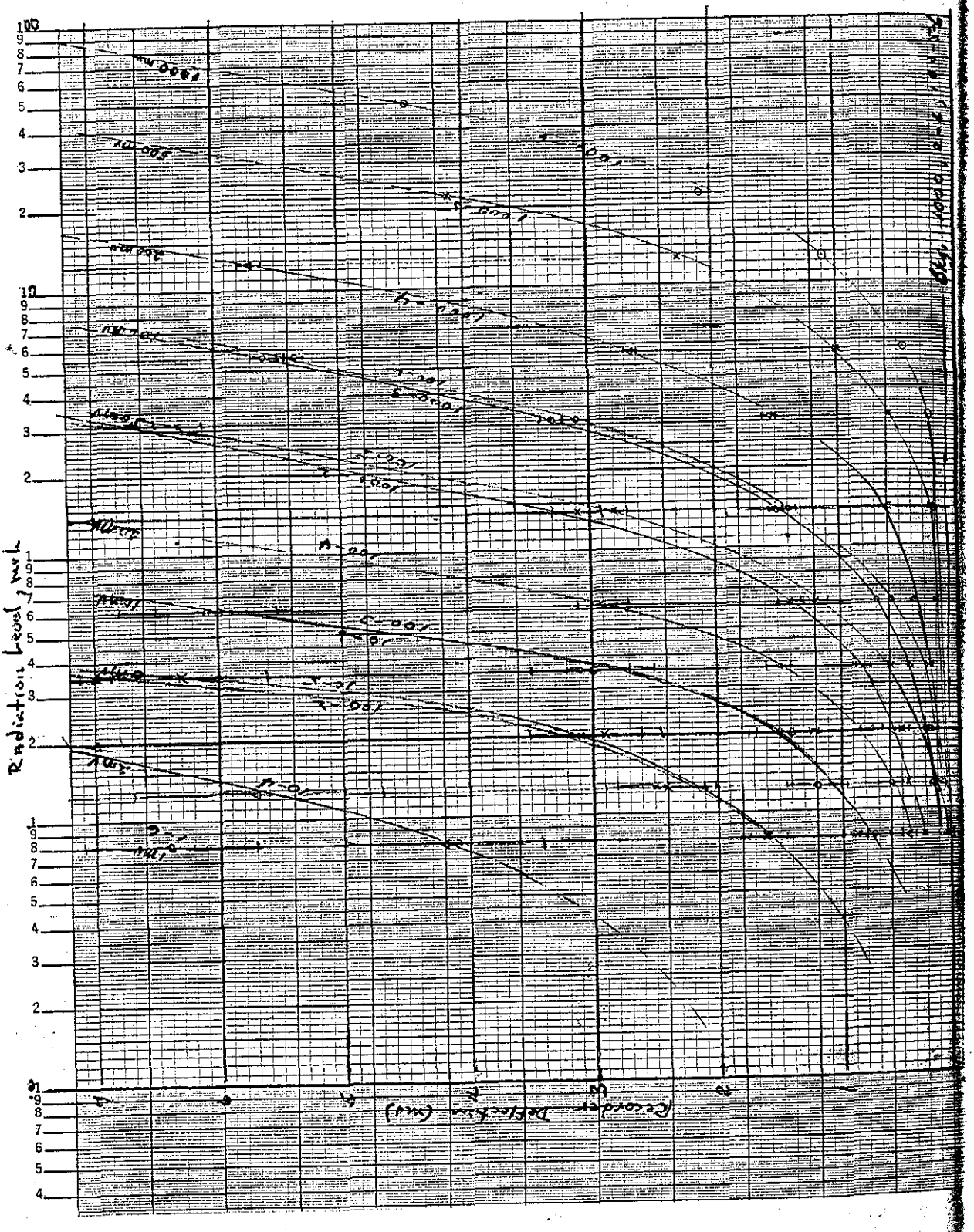
source: 5mg. Ra. { 12.5 mr/h @ 2' check with NICC 2610

(0-7 mv)

Recorder mv	Setting C	Setting F	Source Dist	Radiation mr/h	Recorder mv	Setting C	Setting F	Source Dist.	Radiation mr/h
2.5±.5	1	6	Bkg	-	6.4±.7	1	6	25'	.080
.45±.15	1	5	Bkg		.9±.1	10	6	"	"
.25±.05	10	6	"		1.6±.4	"	5	"	"
.4±.1	"	5	"		.2±.8	"	4	"	"
1.3±.4	"	4	"		.12±.02	100	6	"	"
2.6±.7	"	3	"		.12±.02	"	5	"	"
.45±.15	"	2	"		.05±.05	"	4	"	"
Note - this is "zero" .09±.0	100	6	"		.75±.15	"	3	"	"
.1±.01	"	5	"		.6±.4	"	2	"	"
.13±.03	"	4	"		3.4±.7	"	1	"	"
.18±.05	"	3	"		.1±.0	1000	6	"	"
.4±.1	"	2	"		.1±0	-	5	"	"
.7±.3	"	1	"		.1±0	"	4	"	"
.09±0	1000	6	"		.18±.01	"	3	"	"
.09±0	"	5	"		.32±.01	"	2	"	"
.09±0	"	4	"		.68±.05	"	1	"	"
.09±0	"	3	"						
.11±.01	"	2	"		1.2±.2	10	6	20'	0.125
.45±.05	"	1	"		2.4±.4	"	5	"	"

R-2 Calibration

Recorder mv	Settings C	Settings F	Source Dist.	Radiation mr/h					
5.7 ± 1.0	10	4	20'	0.125	.59 ± .03	100	5	12"	"
.17 ± .02	100	6	"	"	1.5 ± .1	"	4	"	"
.22 ± .03	"	6	"	"	3.1 ± .4	"	3	"	"
.6 ± .1	"	4	"	"	7.0 ± 1	"	2	"	"
1.2 ± .3	"	3	"	"	1.52 ± .1	1000	1	"	"
2.5 ± .4	"	2	"	"	.81 ± .05	"	2	"	"
4.4 ± .9	"	1	"	"	.42 ± .02	"	3	"	"
.8 ± .1	1000	1	"	"	.24 ± .01	"	4	"	"
.44 ± .02	"	2	"	"	6.0 ± .5	10	6	9"	0.617
.24 ± .01	"	3	"	"	.59 ± .01	100	6	"	"
.15 ± .01	"	4	"	"	1.2 ± .1	"	5	"	"
1.4 ± .3	10	6	16'	0.196	2.9 ± .2	"	4	"	"
2.9 ± .5	"	5	"	"	6.1 ± .7	"	3	"	"
f.s. 2.0+	"	4	"	"	2.8 ± .3	1000	1	"	"
.2 ± 0	100	6	"	"	1.4 ± .1	"	2	"	"
.28 ± .03	"	5	"	"	.7 ± .02	"	3	"	"
.25 ± .1	"	4	"	"	.4 ± .01	"	4	"	"
1.5 ± .3	"	3	"	"	.2 ± .01	"	5	"	"
3.1 ± .5	"	2	"	"	1.4 ± .05	100	6	6"	1.388
6.0 ± 1.0	"	1	"	"	2.8 ± .1	"	5	"	"
.9 ± .1	1000	1	"	"	13.0+ f.s.	"	4	"	"
.5 ± .05	"	2	"	"	.21 ± .01	1000	6	"	"
.25 ± .01	"	3	"	"	.21 ± .01	"	5	"	"
3.0 ± .5	10	6	12"	0.347	.59 ± .02	"	4	"	"
6.3 ± .7	"	5	"	"	1.5 ± .05	"	3	"	"
.24 ± .01	100	6	"	"	3.1 ± .2	"	2	"	"


Radiation Level, mrem
Reactor Deflection (mils)

R-2 Calibration -- 73

mv	C	F	dist	m/h
6.0±.3	1000	1	6'	1389
3.1±.1	100	6	4'	3.125
6.3±.2	"	5	"	"
.245±.01	1000	6	"	"
.58±.02	"	5	"	"
1.55±.05	"	4	"	"
3.3±.1	"	3	"	"
6.7±.2	"	2	"	"
5.35±.1	100	6	3'	5.56
.45±.02	1000	6	"	"
1.0±.02	"	5	"	"
2.65±.05	"	4	"	"
5.6±.1	"	3	"	"
1.1±.02	1000	6	2'	12.5
2.27±.03	"	5	"	"
5.7±.1	"	4	"	"
2.07±.02	1000	6	1.5'	22.2
4.1±.03	"	5	"	"
0.5	"	4	"	"
.443±.02	1000	6	1'	50.0
0.5	"	5	"	50.0

6-25-57 Does not 'heat'. Needs checking

6-25-51 Battery check T_{13} 1½ v. ok., T_8 45V ok., T_{12} 135V ok.

Tube check. 5Y3-GT ok; 6Y6 - 6220 gm/1000; 6SJ7 reg bgm replaced

6SJ7(T_2) ok; 6SJ7(T_3) OK; 6SJ7(T_8) OK; 6J5(T_9) ok, 6J5(T_{10}) bgm replaced

6J5(T_4) ok; 6A6(T_5) ok; 6A6(T_6) replaced — T_6 AKT ok / T_6 AKT ok

Trouble still present - symptoms

6-26-57 Summary of ~~location~~ & servicing 6/26-27

Overall gain check - meter does not swing to rated 200±10 MA

short wire & returns to zero.

Osc. output ok.

Driving voltage ok.

Hand gain low.

Voltage check: reading on plate of T_2 was 150 c.f. 8-

Visual check with scope - sine wave o/c to T_4, 6J5 -

plate of 6J5: ∫∫∫∫∫.

Component changes: R_9 470Ω to 330Ω

R_{11} 10k to 33k

R_{21} 2.2K to 620Ω (to peak at 9-

volt. adj.)

C_{86} 10μ to 20μ (to eliminate

waveform on cathode 9-

Instrument under observation

7-16-57 No change. Still needs servicing

12

1-

7-21-51 Summary of servicing on R-1

Unable to get unit operating after frequent adjustments over a period of days. Checked resistive & capacitive components. Checked tubes. Continued adjustments got no where.

7-27 By-passing T7&8 (osc) fed 250 V 6 v signal from HP osc. to rect control pot. When shorting switch closed, adjusts OK. Upon opening switch meter always negative; meter will not zero. Replaced BF_3 head with argon head, Works OK. Put BF_3 head back in. Same trouble.

Scope in jack indicates large rise in signal upon opening switch for BF_3. None in argon case.

8-15-51 Installed BF_3 head after serviced at X-10 replacing polystyrene insulators with Teflon. Chamber voltage low. Replaced batteries. Checked response with Ra source - off scale at chamber. - Source PB 172 full scale at outer edge of paraffin shield & chamber. OK.

8-14-51 Routine check. Responds satisfactorily to PB 172. Background level is much too high. Needs servicing.

9-25-51 High background. Meter not responding properly on changing of scales. Adjusted oscillator - OK.

12-14-51 O.S. repeated osc.-

2-7-52 For week has been drifting - down fuller scale. Needs adjustment.

2-26-52 Checked electrometer circuits.
Test equipment: Tektronix scope
HP audio signal generator
Ballentine AC. voltmeter
overall gain check: 840mv (after reducing gain)
Electrometer Head gain: 3.4v A.C. vm.
" Balance: .025v AC. vm.
Osc. Tuning: O.K. Scope & sig. gen.
Osc. Output: 6v rms Scope & AC vm. initial reading about 4.5v. Adjusted osc. volt & osc. adj. to get 260v at 6v.
Reed Driving Voltage: 20 v rms was high.
Checked tubes in screen circuit - O.K.

2-27-52 Re-installed motor in Spardomax recorder (Had been in use by P.E. Wilkinson in Rm 210) Instrument did not operate properly. Found, after much checking, that one of the motor connections was not secure. Adjusted recorder.

4-16-52 O.K.

5-7-52 Reed seems O.K. Recorder non-operative. To be checked.

5-14-52 Tests indicated bad amplifier output transformer. Open primary. Obtained inter-stage transformer for trial - not known to be equivalent.

5-15-52 Wired in transformer. Recorder responds, but at times both thyratrons are triggered & will not extinguish until bias control is varied sharply

5-15-52 motor hot after hour-

5-15/6-15-52 (ST) Instrument Shop working on recorder - replaced thyratron in amplifier. Instrument fixed after thyratron unit was replaced by spare.

7-14-52 OK

8-12-52 Checked recorder which had been tagged for off-scale response. Left-hand thyratron replaced. Instrument would check out on initial tests. Still sluggish. Left on to see if motor heats excessively. After 2 hours OK.

10-16-52 OK. (Speedomax recorder is sluggish but can be lived with.)

11-15-53 Recorder poor - stall -

1-2-53 Installed stretcher station on panel 6 to select either 1 or 2 or rotary read instrument - unit on panel 8, 6 with lead near Well, 9 unit in panel 9 (near Well) with lead in Sid.

5-25-53 Response Check; OK PB source - (Both Well & Sid)

7-14-53 OK.

9-8-53 Checked batteries in R-1 unit for Well. Both low -

9-9-53 Replaced batteries & put R-1, Well in operation - Checked out OK

10-10-53 R-1-Well had been disconnected and out of use, the lead moved away to prevent damage by experimenters at Well. R-1 Sid seemingly recording high fluctuations; On 100 m.r.s. sky centered at 1 f.s. Output meter fluctuating. When input to head from chamber is shorted, all adjustments are normal.

9-11-51 Routine check - OK.

~~9-25-51 High background - meter not adjusted properly to make charges. Adjusted recorder.~~

2-7-52 OK.

2-27-52 Adjusted recorder. Recorder needs adjustment ~~on test~~.

4-16-52 Recorder jamming on full scale position - Turned off pending servicing.

5-6-52 Recorder out of unity. Replaced tube & ½ amp fuse, OK. Need many need adjustments.

5-9-52 Short lead. To shop.

5-13-52 Checked R-2 with new head. First several tests OK. Brought in R-2 head from Bu 201. On 10 MV scale got wide fluctuations on output meter test. Trouble seems to be in head. Cannot get use of 1 MV scale. GAK6 OK replaced 12AT7

R2 head & new amplifier:

This combination does not show fluctuations.

R-2 head & amp - fluctuations.

~~Battery~~ door replaced

checked voltages - all low - 6X4 tested bad V10 replaced. New OB2 V9, V7 - 12AT7, V5 V24T7, T3 12AT7.

1-14-52 OK

10-16-52 OK.

11-3-52 Pen sluggish - checked galvanometer not balance - Replaced 1.5V battery -

1-2-53 Chamber head under steps between Sed & Well. In this position can monitor both assembly areas.

R-2

12-22-56 Instruments needs to be mounted on 19" panel for rack mounting. At present has no chamber.

12-28-56 Status unchanged.

2-16-57 Used mist. to check ion chamber repaired at X-10. Checked with Knoob from X-10 as to voltage applied. Made up supply of 2 67½ volt Eveready #467 batteries in series, giving a total of 135 volts. Sheath +, center case negative.

Instrument responds to source

~~2-17-57 but responding as to dist in satisfactorily during experimentation~~

2-15/3-6-57 Remounted Reed Mod #30 Ser 160 on relay rack front panel so that instrument may be put in service when new ion chamber is received from X-10.

5-22-57 Mounted selector switch Rpf on panel. Attached cable connector in 201.

5-23-57 Finished cable connector job. Mounted inst. in rack, finding selector & speedomax. Head & chamber (3 atm argon) at west wall 201. On line with S edge of Fault.

Response check X(: Y = O.S.

6-4-57 Calibration - see p 71-73

6-15-57 Operation normal ✓

6-27-57 OK

7-16-57 Mechl. recvr OK

1-4-53 Balance Motor Smells - QSL - by Dr. O.
1-10-53 Speedomax sent to shop by Dr. O.
1-15-53 Speedomax still in Shop.
3-2-53 Sans - no panel lite - recorder dead - front panel meter dead.
Checked fuses - one out - replaced -
5-25-53 Response Check: O.K. PB Jones
June 53 - Instrument dead. Fuse blown. Replaced fuse blew. - To shop for servicing -
Tube check — Replaced 6X4
4-12AT7's
Re-mounted in 202.
8-24-53 Seemed sour. Unit not in use for many hours during set of experiments, Recorder in use as temperature recorder.
9-8-53 Does not zero adjust easily. Checked 1.5v battery. Was very low. Replaced. Instr. OK. Responds to source -
11-10-53 O.K.

90 PM-1

12-22-50 S. side tank

Mistake - to point of scanning. By-passed until checks can be made.

12-22-50 Gnd (+) end of HV. supply found floating - fixed. Replaced bad battery. Rewired several leads. Reassembled not working. Replaced CK512AX's - had grids shorted to filaments. Operated OK in 210. Placed in operation for checking.

-28-50 Operation OK. Trip switch thrown.

1-2-50 NOT TRIPPING

1-3-50 O.K. no apparent servicing needed.

12-17-57 Needs batteries in 10 volt amplifier. Switch had been on while PM had been out of service for several weeks.

unit replaced by PM-2

8-31-57 PM-1 considered for incorporation with new Scintillation counting system. Ran tests on alarm circuit to determine trip level.

Impressed Signal volts	Meter Indication	6SJ7 Plate volts	7050 Grid volts	
0	.70	48	-92	
.1	.67		-80	
.2	.64		-68	
.3	.61	not read	-55.5	
.4	.58		-43	
.5	.55		-30	
.6	.52		-17.8	
.67	.50		-7.9	
.70	.49			
.74	.49		~ -3.0	

8-11-52 Has been installed in B.S. rack 2. with variable high voltage supply. Head in 701 is 5819 + 6AK5 C.F. 100' of cable. Tested > 1wk with no false scans at sensitivity for tolerance tripping. (Reference: service book I pp 56-59)

(7-27-53) Trip distances 5mg Ra	0"	3"	6"	9"	12"	18"	24"
H.V.	700	850	1000	1080	1150	1250	1330

9/22/52 H.V. unable to read ≥ 1300 v. Checked 2X2A - bad. Replaced - OK.

10-16-52 OK.

11-11-52 HV adj. poor - Replaced 2X2A.

1-2-53 Satisfactory > Head used with both Sid & Nell.

1-15-53 Head in Sid

2-10-53 Varian vs Voltage

Varian	Voltage
42.5	700
48	800
53	900
57	1000
59	1100
64	1200
70	1300
75.5	1400
81	1500
87	

Voltage.
Check: HP-VTVM on plate 6SJ7 @ 1300 v panel .12, 6J5 - 11.7 v.

700 82 11.7

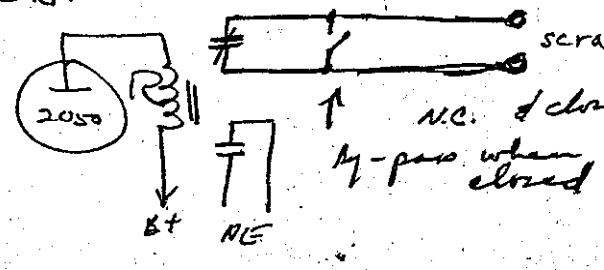
Adj.

4-10-53 PM - service data p 260 f.

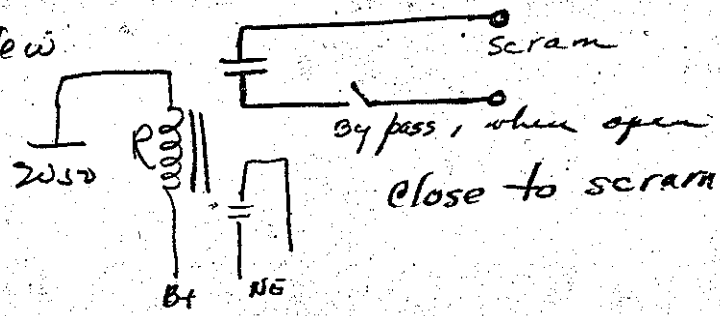
8-6-52

Photomultiplier Modification

Old.



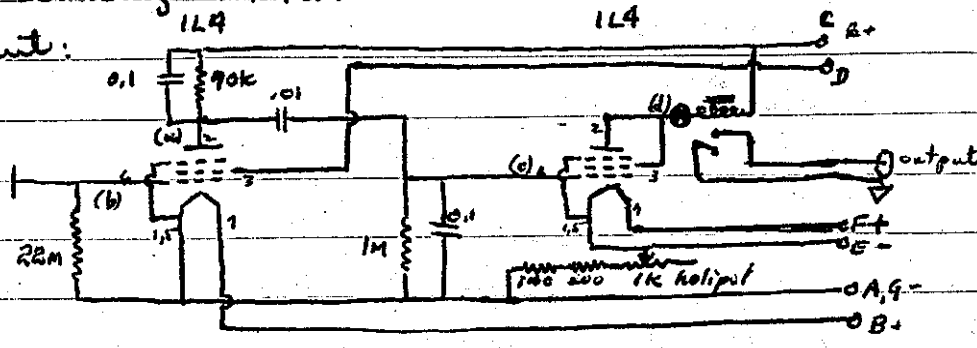
New



PM-2: Notes on development of instrument found on pages 201 - 209

Prior servicing 218 & 219.

8-27-57 Circuit:



(Power supply circuit p 208)

Characteristics — Voltages

helipot all out (0°):

	a	9.4	9.5
	b	0	0
	c	0	0
	d	95	98
	B	1.08	1.08
	C	104	104
	D	66.5	73
	E	1.24	3.00
	F	2.20	3A5
(current)	M	0.59	0.325

helipot in 10°

		Dial							
Sens @ .61 on M; V_E =	1.90		1.70	1.74	1.67	1.67	1.65	1.51
	1.71		1.67	1.61	1.64	1.52		
	1.93	1.86	1.71	1.75	1.69	1.58		

8-28-57 Checked ok. trip 7"-8". Set at .48 on meter & 1.3 dial

8-29-57 0825 tripped - reset - .48; 1.66

1415 ok.

8-30-57 0817 ok. trip 6-7" $\frac{6}{64}$ tol dial 16x8x5 = 8x25 = 200 mil

8-31-57 0820 ok.

9-11-57 Sensitivity low trip @ < 2" N.V. supply low. Replaced blown Sens. @ 46 V 8." Set @ 1600, 9-11-57

9-12-57 0800 - .47 reading. Trip dist ~8"

9-14-57 1600 - .485 Trip dist ~9"

9-17-57 1205 - .45 - set at 46 Trip dist -

Installed in Rm 201. Tripping at ~7½".

9-27-57 Servicing. Voltage Checks - 10°

a 8.7
b 0
c 0
d 8.8
B .98 - .985 - lo. fil
C 10.4
D 67.5
G .97 > .99 - lo. fil
F 1.26
M .25

Raised fil voltage, removing #7 resistance unit in control. & taking off 2000Ω jumper across 5000Ω resistor in 2nd stage cathode. Still not jumping in meter on trip meter = 48 below set = 3.38 a c/o Noted #1 jumping current meter sens. Checked OK 2 OK. Replaced 991 -

Trip ~.52 set .38 on meter -

Set at .50 meter - 16 - V off over-night lo-V on

9-28-57 No trip over night meter still on .50 Turned on H.V @ 9:45 Tripping at ~2.1' H.V. off 4:15 - lo V. on -

10-1-57 9:45 meter held to .50 over weekend with lo. voltage on. Relay had tripped. Opened relay & left instrument remain in "stand-by"

12:00 Turned on H.V, first cutting off lo.V to prevent tripping. Meter .495 Relay V tripping ~1½". H.V. off 4:15

10-2-57 10:00 Not tripped over night meter .495 -

10:45 Checked trip point - same as before 10-1 in - H.V off 4:00 No false trips -

10-3-57 Meter .50 10:07 A after continuous Lo. voltage operation. HV on with Lo momentary cut off. Meter .49 - no false trips H.V. off 4:15

10-4-57 H.V. on 10:00 with no false trips over night. meter .49. Hpot 29 Trip distance 12"-15" ok. Put on top covers -

10-5-57 12:00 Meter reading .6 and tripped. Reset to .49 @ 8.00 on helipot. - 8.00 Hpot 1.48 after trip 12' cut off HV 3 1/2 charge meter .005 Left Low voltage on over weekend to see if have false trip. 8.00 .47. (Trip point .50)

10-6-57 Meter @ .47 with Hpot @ 8.00 no false trips over weekend Trip level = .50 Trip distance 12"-15"

10-9-57 Meter @ .47 with Hpot @ 8.00 no false trips over night Trip level .50 Trip dist 12"-15"

10-10-57 meter @ .47 no false trip Trip 12"-15" . after unplugged momentarily, level at .41 @ 8.00

10-11-57 Set to ~~.48~~ .46 from .41 - @ 8.00 - Trip dist level @ .48 Trip dist 10"

10-12-57 Hpot @ .46 no false trip. Turned on - Trip dist 12"-15" ok Trip level .50 - ok.

10-15-57 Hpot @ .48 no false trips trips - with foot. OK.

10-16-57 Hpot @ .48 no false trips - " " ok.
Hpot trips as source drops by, min dist being 7"

10-17-57 Hpot @ .48 no false trips HV on

10-18-57 Hpot @ .48 had tripped over night - Pulse lite off.

10-17-52 Checked Response Time PM-2

Fall Time (s)	Fall + Rest Time	Fall	Source min dist
.31	.318	.306	5½"
.32	.318	.304	11/2 : 48/2
.313	.318	.308	11/48 Hor. dist
.314	.322	.305	
.305	.313	.305	1/4
.305	1.583	1.528	
.307	3.166	.305-6	
.313	.3052		
.308	.0114		
.309			
3.097			

11.4 msec.
.0114 sec.

Source min 11" from tube at most (max trig distance

Total T
.373
no trig. .111
.430
.350
.360
.328
24'1
.348 sec
.305
.043 sec any trig time at min ordinate level (28 mm/hr)

1-1-52 Same -

2-7-52 Still inoperative needs Servicing

2-27-52 In shop. checked 4V batteries. All low. replaced. Removed pilot light from 6 V winding of transformer.

2-27-52 Checked stability of lo voltage supply.

Time Remarks

0940 turned on

to 255. meter start rise. Stopped at .41 at 355.

0941 meter .415 pot at 10° 991 notified.

range .44 - .61 991 not fired

0943 off & on fired 991. @ 10° 425

991 out @ .55 relay on @ .505 off

tested & replaced 124's.

0951 on -

1000 trip reading 4.76 pot .50+ meter

relay reset @ 10° .425 left on @ 1081 to see if drift

1121 @ 10° .435 trip .50

1539 @ 10° .43 trip .50

2-28-52 0820 on lo voltage -

0831 H.V. on

0915 Trip distance 8-10 in test made at meter setting &

.47 left at 7.75

Left on during day no false trips

3-3-52 0826 Lo & Hi voltage on - meter .43 with 7.75 dial setting.

checked trip point @ meter setting .50 (same)

set meter at .47 ; setting of dial 5.82

1415 @ 495 reset 47@7.75 8-10" trip distance Ra-

off at 1600

3-4-52 On 0806 both lo & hi voltage supplies.
0820 meter .45 dial 7.75
trip distance 8-10".

1236 #62
3-5-52 0815 Power on
0830 .45 trip dist 8-10" 1130 off

3-6-52 0826 Power on; 0828 .415; trip pt .497; trip dist 8-9" 0835.
.45 @ 0843 off 12 44;

3-10-52 0838 Power On 0842 trip dist 7-9".

3-14-52 0830 Power on; 1000 trip dist 8-10"; trip load .50
setting @ 7.25 .462. OK. Procedure both switches
on & both off at start & end of operation.

3-18-52 0814 Power On. Trip dist 7-9" 0830 reading .455 @ 7.25. OK.
Installed in reactor room & checked.

5-7-52 OK.

8-1-52 Disconnected from service for present.

1-2-53 Still shelved

out of service 4-10-53

PM equipment service data p 160 f.

100 GR.

12-22-50 OK. not hard wired to alarm circuit as yet.

2-17-51 OK.

6-22-51 Needs servicing. Meter reads only <2 f.s. & discriminator sometimes drops to zero.
In 210 checked with Ra source. Meter response normal. Needs to break point on relay indefinite.
Check Amp. tubes. Replaced 6SG7.

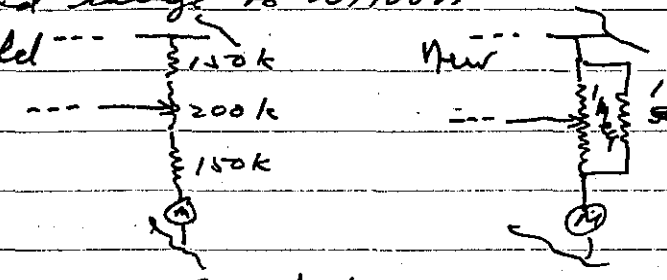
7-16-57 Count meter off scale without H.V.

7-17-57 Checked instrument in Rm 210.
Voltage check indicated that V1 (6SG7) was cutoff, the difference between grid & cathode being -1.20 v.
Checked 6SG7 - OK; 6SG7 - OK. Put in another 6SG7 after noting that insertion of tube caused rise in meter reading & removal of tube brought about reduction.
New 6SG7 in & unit worked satisfactorily.
Calibrated meter @ 920 v to read in work.
Trip point 1.75; release point 1.2 -

9-11-57 H.V. maximum is slightly low.
Responds to γ radiation.

9-27-51 Recap of servicing -
Instrument response to γ low. Meter indicated that tube "jammed" with increasing radiation meter went then a peak. Hi-voltage max only 900 v.
Servicing: Checked in 210 for response. With scope on input to first of C.R.M. stages, saw no signal. Removed GM tube & fed signal from pulse generator. Instrument operated satisfactorily. Trouble: bad GM

Changed resistance values in divider of H.V. supply to allow wider variation of bias on G.M.'s. This increased range to 0/1000 v.



Installed near G.M. tube CK 1024 - op. voltage 900 v.
Calibrated with Ra source.

2-7-52 O.K. To be removed & installed in 102 -

2-27-52 Still in 202. Checked with Ra source. O.K.

4-1-52 In shop for modifications

10-16-52 Unit for monitoring Rooms 201 & 202 has been installed & in operation for several months. O.K.

1-2-53 201-202 Monitor working. Unit for 102 has not been installed yet.

1-13-53 OK

5-26-53 For some time (w 1½ mos) since installation of unit in 102, there has been trouble when both units - in 102 & 202 are tied to a common pre amp. 102 unit goes off-scale suddenly - ~~input~~

Input grid in 102 operates at w 10 volts; that in 202 near ground. Needed D.C. blocking.

Inserted .01 μfd capacitor in input to 102 unit.

Removed input leads formerly used - O.K.

11-10-83 RK.

110 Intercom

12-22-50 OK.

1-5-51 Dead. Checked speakers in reactor room. Rewired, eliminating unnecessary wires. This cleared up trouble. Apparently an open in speaker line in 201.

2-16-51 Removed speaker in 202 & 102. Put single speaker on console. Mounted speech switch on speaker box. Unit OK.

6-22-51 O.K.

9-11-51 OK.

2-1-52 O.K. Jerry I-52 installed new speaker, paralleling one in 202, in box and another reactor rm. speaker by truck doors in 101.

3-7-52 Speakers in Rm 201 rearranged. The bank of four was split. Now: one 6" @ Little Mell, one 6" @ Big Sid, and one 5" in east wall over central water window.

5-7-52 O.K.

10-16-52 OK.

1-2-53 Satisfactory. Recent changes & additions.

To improve pickup under Sid - in particular at pump station - speaker at truck door extended to point of suspension near pump. Other speakers same.

Swapped input & output cables on junction box on N. wall 202. This was done to accommodate new foot switch. Switch was inserted in existing switch line (operating switching relay) so that when pushed

one talks from 202 to 101-201

2-1-53 Noise disturbance has been present for several weeks. This intermittent. Occurs on both Intercom. & Bozen unit and even on one when other is off. Some external source of noise.
V.G.H. Checked intercom amplifier units, resoldering some "cold" joints.

9-9-53 Needs potentiometer in speaker box, Lm. 202 —

11-10-53 OK.

120 Pri. Alarm.

12-22-52 OK.

2-17-53 OK.

6-22-53 OK.

9-11-53 OK.

10-16-53 OK.

1-2-53 Satisfactory - Instruments tied in.

Hall Side

DC-2

← DC-3 →

R-1a R-1b

← PM-2 → (also secondary a bldg. alarm)

11-10-53 OK.

10-2-57 RCL Rate Meter MK15 Mod 10 Ser 107

Check of calibration with HP sig gen & NICC pulse gen.

Input accis (at factory setting) 5 for 1 per sec pulses .35 volts

- { 10 per sec - .175 volts
  100 per sec " .165 volts

+ 100 per sec .18 volts
10 per sec .165 volts
1 per sec .230 volts -

Input pulse .5V neg: (Readings below after initial calibration)

f	RM	
20	120 x 10	40 x 30
25	150 x 10	50 x 30
30	180 x 10	60 x 30
40	-	80 x 30
50	-	100 x 30
60	-	120 x 30
80	-	160 x 30
100	-	200 x 30 60 x 100
200	-	- 120 x 100
300	-	- 160 x 100

10-9-57 Converted power supply to 3-output.

PM. Monitor-Counter —

Unit 1: Tube & Preamps (4 stage)

Cable connections. 1 Coax H.V. Amph 82-805

1 9 pin Bk, wh, Red. 3102-165-15 Coax green 10-8 4 cond

A B C D E F G H A

Gnd B+ Sig Gnd

Test leads Blk, Wh, Red, Grn, Blue, Y, Brown

Check I: PM+preamp feeding Rate-meter.

PM @ 800 v

Preamp B+ 150, 18 ma.

@ Bkg 60 x 3 = 180 c/m (3 c/s)

Bkg. 50-60 (x3) : 150-180 c/m S/N > 100/1

Ra 96': 190-200 (x100), 19,000-20,000 c/m

PM changed to 600 v. Bkg much lower. Sensitivity to enough to work 5 mg Ra to 6" of RM on x100 range.

Checked response & sensitivity of R.M. HV = 800 v. B+ = 150 v

Source in 211 - Detector in 210 Dist # 22½' (from BNL prints)

RM

source shielded E.A .22 50 x 3 150 c/m @ .1 mr/h

source up E.A .41 90 x 3 270 c/m

Source in 201, Background 40 x 3 = 120 c/m, E.A .18

5 mg Ra in 211: Reading 55 x 3 = 165 c/m, E-A .23, .24 @ 33', 20'

201: Background min 15 min.

10-8-37 Bkg over night E.A. .17 avg - 4:11 P. 10:11 A

Brought 5 mg Ra source in 211 & placed at N 30' from detector.

after 15 min. Avg is .24 on E-A.

Changed Scale to x1

Noted rise when contact in operation $\frac{8}{32}$ N 4x Bkg

Made various checks of response. Set need of zero on range &

calibration – Kidwell scaler.

10-4-51 ~~10:29~~ 10:29 – After warmup of system, marked time of East end red light on E-A & started scaler –

	Time	sec. elapsed	E-A	RM	Scaler
	2m	160 sec	.25	50 (130 c/m)	6.60 (148 c/m)
	5m	300 sec.	.24	52 (110 c/m)	11.05 (142 c/m)
	10	600 sec.	.27*	55 (165 c/m)	22.12 (142 c/m)
	15	900	.27	53 (159 c/m)	33.49 (144 c/m)
	16:05	965	.30	67	
	16:40	1000	.37	77	
	16:59	1019	.46	85	
	17:10	1030	.46	100	
	17:24	1044	.60	120	
	17:44	1064	.70	190	
	18:20	1100	.74	198	
	18:40	1120	.78	148	
	20:00	1200	.77	150	
	21:00	1260	.73	155	
	22:06	1320	.75	160	
	23:00	1380	.73	145	
	23:30	1410	.74	1644	
	24:00	1440	.70	135	
	24:30	1470	.80	155	
	25:00	1500	.74	145	
	25:30	1530	.80	155	
	26:00	1560	.76	.152	
	26:30	1590	.74	.150	
	27:00	1620	.72	.140	

* 10 min avg .25

27½	1650	.72	145	37:50	2270	.34	65
28	1680	.72	145	38:00	2280	.31	60
28½	1710	.75	145	38:10	2290	.29	55
29	1740	.69	133	38:20	2300	.29	60
29½	1770	.76	141	38:30	2310	.29	60
30	1800	.78	139	38:40	2320	.28	60
30½	1830	.71	146	38:50	2330	.29	60
31	1860	.76	155	39:00	2340	.29	60
31½	1890	.82	160	:10	2350	.29	55
32	1920	.78	150	:20	2360	.29	57
32½	1950	.76	155	:30	2370	29	60
33	1980	.75	145	:40	2380	.29	60
33½	2010	.76	155	:50	2390	.29	58
34	2040	.78	157	40:00	2400	.29	55
34½	2070	.78	155	41	2460	.24	50
35	2100	.74	150	42	2520	.22	50
35½	2130	.78	150				
36	2160	.75	150				
36½	2190	.75	145				
36:40	2200	.64	120				
36:50	2210	55	105				
37:00	2220	50	95				
37:10	2230	.44	85				
37:20	2240	.40	75				
37:30	2250	.37	70				
37:40	2260	.36	70				

10-9-57 Check of correlation between RM & Scaler:

Circuit: PM-pre-amp → Linear Amp → Scaler

RM input taken from output jack to 1st scaling strip of scaler (x16).

Time of count: 5 minutes. Source 9.5 mc P_2,

LA. setting Gain 2,5, 0,2 μs min lin, - input, Disc @ 50.

HV = 800 V; LOV 150 V @ 19 ma.

Scaler (x256)	RM c/m
$517 + {}^{180} = 26,506$ c/m	$115 \times 100 = 11500$ c/m

Found sensitivity on RM to be too high, setting zero at 8, obtained 16/1 ratio in count.

10-10-57 Mounted units in relay rack, top-bottom:

(a) Trigger circuit

(b) Hi-voltage supply for PM

(c) Rate meter

(d) Linear Amplifier

(e) Scaler

HV = 900 V

10-11-57 More preliminary checks on system.

Connection: PM → RM → Linear Amp → Scaler → Recorder

Source in "Vault" 23' dist. LA Gain x2 (5) .2 mL. (-)

5 min count. RM ~5083 = 150 c/m SA. .25

(1) → Scaler; $2 \times 256 + 236 = {}^{512}\ 236 = 748$ ct = 149.6 c/m.

(2) + input → $VX256 + 81 = {}^{1024}\ 81$ 1103 - dc = 321 c/m (?)

RM - 130-140 c/m

(3) Direct to scaler bypass LA: $11 \times 64 + 33 = {}^{764}\ 33 = 737$ ct = 147.4 c/m

RM: ~270 c/m

(4) PM-RM-SC: source exposed @ 23': $20 \times 64 + 52 = {}^{1280}\ 52 = 1332 = 266.4$ c/m.

RM: ~300 c/m

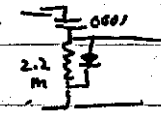
$22 \times 64 + 16 = 1422 = 284.4$ c/m

Trial run #5 PM → scaler: (counting loc) $4164+32 = \frac{257}{32} = 288 = 576$ c/m (low-RM ~ 270 c/m)

Just run to repeat of #4 (1 min) $4 \times 64 + 11 = \frac{267}{11} = 267$ c/m

Connection: PM → RM → scaler ? → only input strip for + input to scaler

? → PM pre-amp x16 with diff. out



PM T → LA → Scaler

Trial run Pressure: PM → LA → Scaler → R-M → Recorder

One minute: Sc: $51 \times 256 + 240 = 13,296$ c/m o.k.

RM: 13,000 c/m - 13,500 c/m

Counting the PM → RM → scaler. Same source location

RM: 14,000 c/m

Sc: $53 \times 256 + 4$ 13,572 c/m

PM-LA-scaler (16) RM 3 min (RM @ 8 secs from 2)

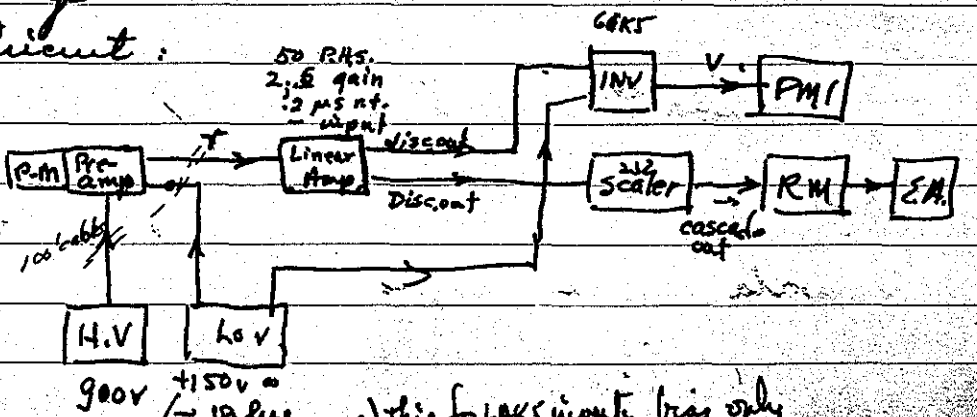
RM: ~~xxxx~~ 85-95 x 10 850-950 c/m

Sc: $104 \times 256 = 26624$ ct = 13312 c/m (832 c/m) (÷16)

Setup looks good - left on overnight.-

10-12-57 Re-checked tripping operation & found optimum settings.

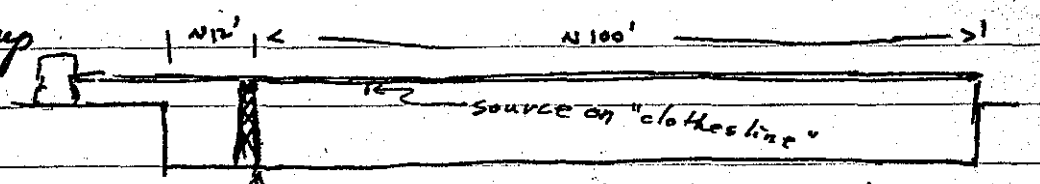
Circuit:



10-12-57 Found that at setting (then recorded) source tripped at ~3". It was noted that at other than optimum setting, PM-1 tripped upon withdrawal of source, this indeed being ~~a plus~~ bad. At right setting (all values of which will be recorded at later date - grab bag all that is needed) this "backward" behavior was not noted:

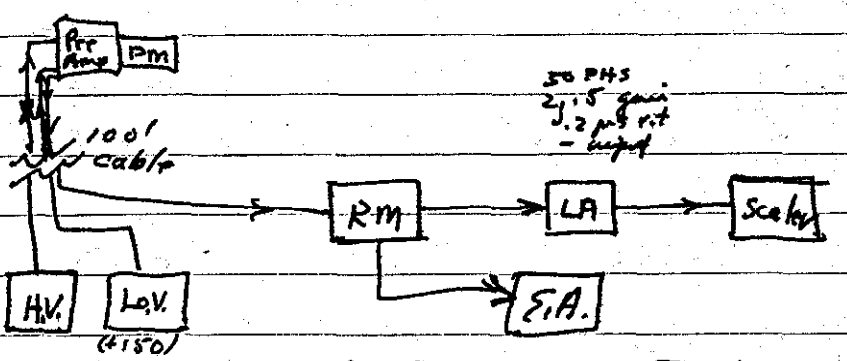
Low sensitivity tests on PM detector.

Set up



Boyce intercom was used to relay messages from roof to Rm 210.

Block diagram of circuit:



Fixed conditions (instrument settings) noted on diagram; data recorded on following page

10-12-57 P-M sensitivity data.

Conditions: - H.V. supply 900v

Rate-meter sensitivity at 8

Source of 5mg Ra. (Tolerance ∫12.5mr/h at 2')

Time of counts = 5 minutes ~~in~~ with one exception starred

Source distance (ft)	Rate meter scale	Rate meter meter	RM (c/m)	Scaler reg	Scaler x scale	Scaler + int	Total Count	Count Rate	Count Bkg	Net Count
20	3	65-75	195/225	3	256	247	10 15	203	10.253	192.7
15	3	130-140	390/420	7	256	77	1869	373.8	18.879	354.9
10	10	90-100	900/1000	16	256	184	4280	856	43.232	812.7
5	30	105-110	3150/3300	60	256	25	15385	3077	155.404	2921.6
3	100	90-95	9000/9500	172	256	141	44193	8838.6	446.394	8392.2
2 time = 1 min*	100	> 200	> 20000	79	256	207	20413	20413	1030.965	19382
20	3	80-90	240/270	74	16	13	1197	239.4	12.091	227.3
25	3	50-60	150/180	51	16	12	828	165.6	8.364	157.2
30	1	100-120	100/120	35	16	9	569	113.8	5.749	108.1
40	1	70-80	70/80	23	16	13	381	76.2	3.848	72.4
50	1	40-50	40/50	16	16	9	265	53	2.677	50.3
60	1	~40	~40	13	16	4	~212	42.4	2.141	40.3
80	1	<40	<40	11	16	10	186	37.2	1.878	35.3
Background source in safe in 201.	← - - -	1	~20 (FA)	~20	6	16	3	99	19.8		

Spot check at different conditions: H.V. = 800 v and Sens of RM = 2.

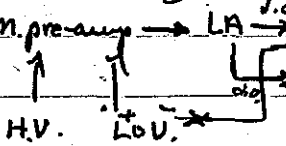
80	1	80-100	80/100	26	16	12	428	85.6		
Bkg	1	40-60	40/60	14	16	2	226	45.2		

10-16-57 Further Notes on Exp. of 10-12-57

Radiation mr/h	Total Count Rate c/m	Net Rate c/m
12.5	20413	20393.2
5.56	8838.6	8818.8
2.00	3077	3057.2
.50	856	836.2
.222	373.8	354.0
.125	203 / 239.4	183.2 / 219.6
.0800	165.6	145.8
.0556	113.8	94.0
.03125	76.2	56.4
.0200	53.0	33.2
.0159	42.4	22.6
.00782	37.2	17.4
Bkg	19.8	

(10 ↑ / ⑩ ↓ — order of readings)

10-15-57 Continued Observation of Characteristics of PM-counter-trip circuit.



1. Conditions - HV 900; LV+150

LA: gain 2, 0.5; rt-0.1μs; -input; PHS 50

RM fed from scaler cascade - RM set 8 secs.

Checked preliminary trips. worked all right.

Data needed - low voltage - values for min. for proper performance of PM-1:

using 9.5 mch Pr source -

V⁻ = 1 PM-1 trips occasionally. Meter jumps

Removal of source trips this unsatisfactory

at setting above R source (5 mg) trips at ~ 10 A this not good.

Adjusted V⁻ until no marked jumps noted on PM-1 meter V⁻ = 2 v.

at V⁻ = 2 v. R @ 40' Trips at odd times. no certainty -

occasional large bursts of input required to PM-1

Source 3' from inter wall detector. Radiation level ~ 5 mch

t = 1 min

Scaler: 454 ± 22 } good agreement

R-M: 162 x 3 = 486 }

Still tripping - trips on removal of source -

Set bias @ 4 volts source @ 3' not much jumping - no trip

However removal of source trips

when source moved away from point to ~ 20" or closer

trip inward @ 5"

Bias @ 5" trips 4½" - and removal ≈ 20"

6 v no source

7v Keys 4½" ; 17" on removal.

10v " 4" 10"

15v " 3½ 8"

15v 3-V" No keys on removal of sleeve -

Instrument Response Time: mi sweep dist 1"

Drop Time of Source	Total Response
.320	.362
.313	.362
.320	.358
.318	.368
.312	.368
5)1.583 (.3166	5)1.818 (.3636

.3636
.3166
.0470 / #7 max.

10-6-57 Check on E. end RM 8 @ 8000 -

Bkg w 20-c/sec Operating level w 10x c/sec.

150 Log N - panel 8 -
recorders in racks 4 & 5 -
remote meters on control panel -
(Record began as 1-14-53. Had been in use several months)

1-14-53 Log N recorder (2 power) bad. Replaced:
D.F.C. 1 - battery (1½v)
2 - 7F7's
2 - 7N7's

1-15-53 Seems OK.

2-20-53 Cables had been disconnected at Log N (W.G.) (Gilley & RAK)
600v battery supply shot. Put in fresh batteries -
Behavior: period up & down off scale - bad -
Just had checked out OK. with test sig. generator.

2-21-53 Recheck HV. OK.
Checked connector, cable - Tightened signal connector
Under observation - seemed normal.

3-10-53 Brown battery replaced (2 power)

3-17-53 Brown battery replaced (period sec.)

4-1-53 Recorder inoperative - Checked tubes - replaced
all 4 2-7F7, 2-7N7. OK.

4-6-53 No response to source - Responds to simulator.
Battery low (600v) Replaced - Still no response
to source -

4-7-53 Shortened battery lead cable - Worked OK. -

5-14-53 Recorder Tube Check:
2 power period -
replaced 2 7F7's replaced 2 7F7's

5-25-53 Response Check. OK. PB source.

7-9-53 Modified to increase sensitivity by x100 (Ghia previous work.)

11-10-53 OK.

1-23-53 C5 not reproducible - 1214 ran series of counters 4&5 after adjusting HV input lead, ½ min cts.

4 5 HV_5 = 1980

75^{54} 10^{9}

77^{13} 86^{3}

Varied HV_5 control - meas. OK. - counter had not previously responded properly to changes in HV -

2-4-53 Routine Check 4&5 . (Sig.: 60V, 1μs · negpos NICC 1022)

C4 Input sensitivity . pulse input on 118 strip, bypassing L. adjustments on strip full counter-clockwise.

Voltage values & pulse length read from meter NICC 1022.

Disc	100	75	50	25 +	- 25	50
Input	~ 1.85	1.15	.65	.30	> 20	> 20

Att: 32 Ω · put divider across output pig. tap out 5/100 51/40 scaler ratio ≈ 100:1 . Check on scope: - 3.95V ± 1 cm full gain X1 pre-amp scope - 3.95 ± 1 cm (51Ω) gain X100 "

Att 32:	D: 100	75	50	25 +	- 25	50
	~	.13	.08	.04	.045	.08
	In ->	-.13	.07	.03	.06	.10
16	.10	.064	.035	.015	.03	
8	.05	.03	.0175	.008		
4	.025					
2	.013					
1	.007 μs					

Square wave input. 75 output f. 1-a

2-9-53 Cs - Input by-pass L-C; - input +

Disc	100	1.24	1.50	
	75	doubling	1.1	1.5
	50	.65	1.5	
	+ 25	.19	1.5	
	- 25	>20	.46	
	- 50	>20	.80	
	100	75	50	25
Att 32:	.13	?	.065	.02
16:	.06	?	.033	.01
8:				
4:				
2:				
1:				

Noted peculiar behavior on Vert in desc. oregon 65-80. doubling. Ran scales with head input @ 16 & 50 v. ok. Turned disc. & re-set to 16-50 - didn't work - ??

Recheck at 60 v input - now no doubling.

	100	75	50	25 +
32	.15	.144	.15	.026
16	.07	.07	.07	.013 * hit knob
8	.034	.03	.017	.007
4	.0175	.0175	.0175	.0038
2	.009	.008	.009	.0019
1				

Seems to be some fault in discriminator panel control or associated circuitry. Found that reading at one setting would change by turning knob up to 100 & back (50).

2-9-53 Worked on C_5- disc. Made check:

	C_4	C_5-
C_4 & C_5- @ ~~gain~~ att: 16, disc: 75.	80	46
	79	48
att: 16, disc 80	90	100
	91	102
att: 16, disc: 75	80	46
	81	46
	79	46

Left at last setting ~ [H.V. on each counter = 1900 v.]

2-10-53 att: 16, disc. 75 {4: 79, 82 {5: 46, 46 checks with 2/9 readings

" 16, disc ~~80~~ 67.5 {4: 88, 87, 86 {5: 78, 74, 75-

" 16, " 80 {4: 90, 90 {5: 102, 100

" 16, " 85 {4: 91 {5: 107

" 16, " 90 {4: ~~94~~ {5: 116

" 16, " 95 {4: 92 {5: 121

" 16, " 100 {4: 105- {5: 125- ← extra ch. than - maybe sat.

" 16, " 75 {4: 79 {5: 46 VV

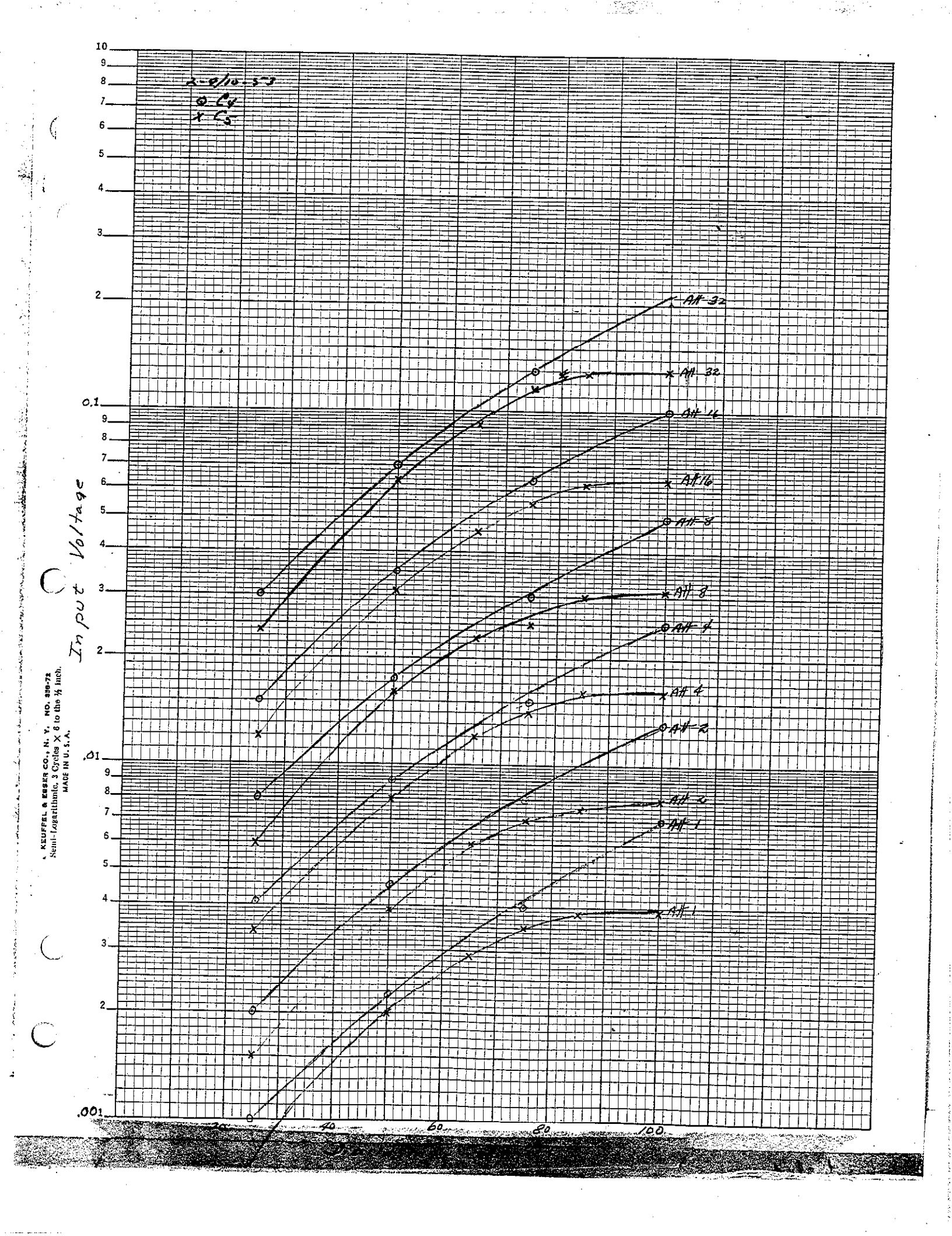
" 16, " 80 {4: 76, 76 {5: 30, 31

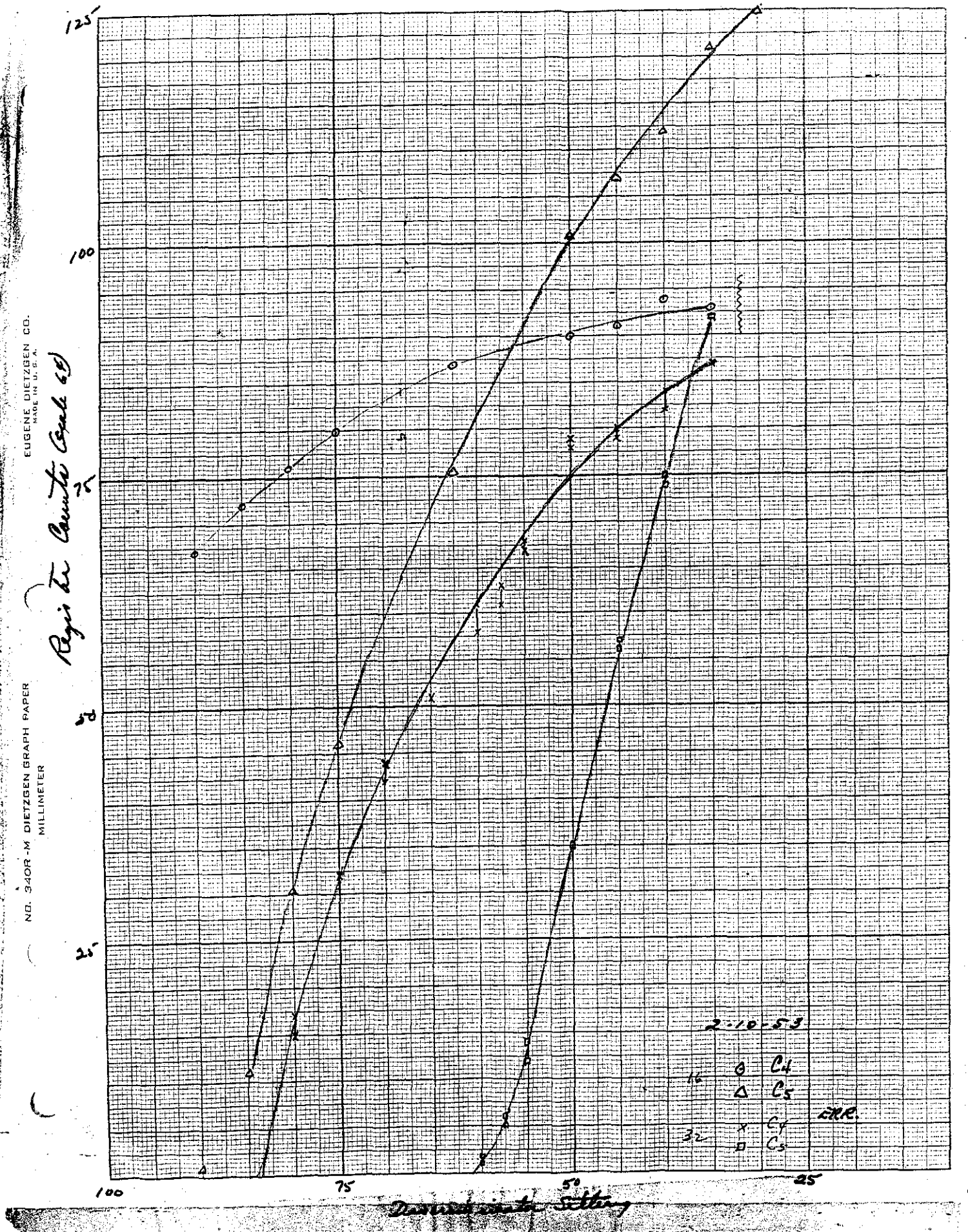
" 16, " 85 {4: 93, 71 {5: 11, 11

" 16, " 90 {4: 67 {5: ,

C_5- 60 v input check

Att.	~~100~~ 90	Disc: ~~85~~ 75	65	50	35
32	.13	.128 v	.116	.092	.064	.024
16	.064	.062	.055 d.	.046	.031	.012
8	.031	.03	.025 d	.023	.016	.006
4	.016	~~.015~~ .016	.014 d	.012	.008	.0034
2	.008	~~.0075~~ .0075	.007 d	.006	.0034	.0015
1	.0034	.0038	.005 d	.0024	.002	.00075


2-9/10-53
⊙ C4
× C5
Input Voltage
Att 32
Att 32
Att 16
Att 8
Att 8
Att 4
Att 4
Att 2
Att 2
Att 1
Att 1
10
9
8
7
6
5
4
3
2
0.1
9
8
7
6
5
4
3
2
.01
9
8
7
6
5
4
3
2
.001
20
40
60
80
100
KEUFFEL & ESSER CO., N. Y. NO. 359-72
Semi-Logarithmic, 3 Cycles × 6 to the ½ Inch.
MADE IN U. S. A.



0-53 From curves (inserted 162-163) — signal from C_5 ≈ .063 volts
signal C_4 > 0.1 volts.

Run 32 att range found cut off point C_4 & C_5.

~~AA~~ 32; 35	4	86	~~88~~
	5	92	92
40	4	84	82
	5	74	75
45	4	79	80
	5	52	57
50	4	74	73
	5	33	35
~~55~~ 55	4	67	68
	5	12	14
~~57.5~~ 57.5	4	63	61
	5	5	6
60	4	61	58
	5	1	1.5
65	4	51	51
	5	0 1/64	1/64
70	4	44	42
75	4	32	32
80	4	15	17
85	4	0 (5/64)	

5-25-53 Response to PB source ok.

11-10-53 OK.

180 Service record on spare instrument sealers.

7-20/81-53

#1204 (mod 1010) -

Irregular count - 32, 64, 128 bites not off on reset -
Not ct. 64, 128 when selector in 256 position.
OK, with good #115 strip -
Resistance check found low R in cathode V104.
Found bad .01 capacitor.
Country now normal #32 bite remains off -
Found R119 high - replaced.

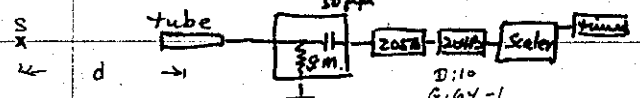
200 Instrument Development & General Servicing

12-22-50 In the mail: 2 Photomultiplier radiation alarms — Battery operated.

1-9-51 Made up pre-amplifier for B^{10} & counter tubes, feeding linear amplifier & scaler.

1-10-51 Check plateau of B^{10} lined counter tubes.

Test Apparatus: NICC 1090 H.V. supply; Atomic 208-B preamp & 204B amp.; Atomic 252 scaler; Nuclear 900A meter; Precision timer.



Source: 173 @ 2'

f: 3005. (5 m) GE 336

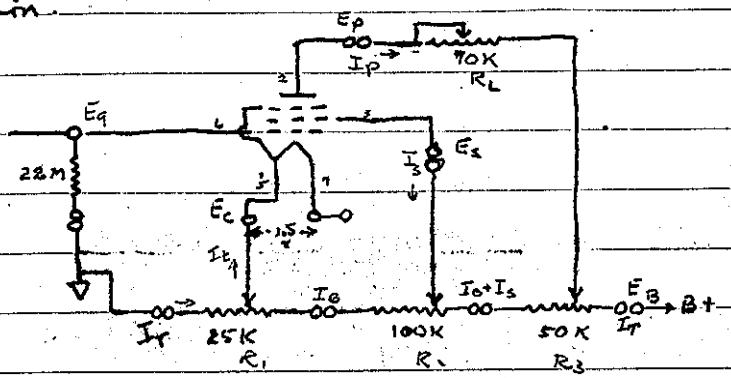
1-11-51 ORNL #317 BF_3 d=2' 9/2 1-12-51 ORNL #317 d=2' Dec. 20

	V_o	t_s	Scaler	Count	Rate c/m	V_o	t_s	Scaler	Count	Rate	V_o	t_s	Scaler	Count	Rate	V_o	t_s	Scaler	Count	Rate c/m
			x16					x256					x256					x256		
mct. Lab. dr.																				
N-284	400	100	0	0	0	450	100	0	0	0	1000	100	6	2	0.4	1300	100	0	12	2.4
(Bell)	460	100	1	3.6	18	500	198	1	454	908	1100	100	0	0	0.0	1350	220	7	2012	402.4
	500	100	6	6	1.2	487	359	0	59	11.8	1200	100	5	5	1.0	1400	178	36	9394	1878.8
	525	100	9	150	30.0	513 / 495	103	8	2151	430.2	1250	100	0 / 1	14 / 1	2.8 / 0.2	1450	55	79	20224	4044.8
	550	64	65	1054	210.8	525	207	24	6351	1270.2	1300	100	0 / 1	43 / 1	8.6 / 0.2	1500	224	51	13-50	5317
	575	64	92	5927	1185.4	537	92	68	17500	3500	1350	100	0	108	21.6	1550	113	56	14449	57794
	~~587~~ 587	64	231	14786	2957.2	550	229	122	31471	6294.2	1400	100	13	3582	716.4	1600	145	57	14739	58956
	600	64	299	19137	3827.5	563	179	157	40371	8074.2	1450	100	65	16884	3376.8	1700	95	59	15199	60796
	613	64	356	22796	4559.2	575	220	197	50452	10090.4	1500	100	122	31248	6249.6	1800	154	60	15516	62064
						587	224	223	57174	11434.8	1550	100	153	39411	7882.2	1900	114	62	15934	63744
						600	254	250	64054	12810.8	1600	100	164	42192	8438.4	2000	160	66	16956	67824
						613	234	273	70122	14024.4	1650	100	167	42937	8587.4	2050	100	69	17764	71056
						625	185	298	76473	15294.6	1700	100	168	43109	8621.8	2100				
						637	161	329	81725	16345	1750	100	170	43710	8742.0	1452				
						650	84	333	85534	17106.8	1800	100	176	45158	9031.6	2000				
						705	200	389	99784	19956.8	1850	100	172	34084	8809.8					
						750	100	441	113001	22600.2	1900	100	173	22310	8924					
											2000	100	89	22810	9124					

Incomplete call for service

1-16-51 ± 332 GE B⁻ etc. not responding in range of voltage of 336.

1-16-51 1L4 operating characteristics in circuit under consideration.



Voltage measurements with Vomax; current measurements with Simpson #260 or RCA WV-84A

(a) E_B = 135v; R_1 R_2 R_3 all ↓; R_2 max; I_T .8 ma (.64), I_S = 0, I_P = 0 (.005 ma) (.006 ma)

E_P = 133; E_S = 95v; E_C = 18.7v.

(b) changing R_2 only:

E_{B3}	E_P	E_S	E_G	E_B	I_T	I_P	I_C	Δ	Δ		
~~135~~	~~133~~	~~95~~	8.3	-	.8 ma	2 μa	2 μa				
135	133	95	8.0	-	.8	6.5	2.4				
135	132	95	7.1	-	.82	25.0	8				
135	129	95	7.0	-	.90	79	25.0				
135	125	94	6.5	-	1 ma	140	53				
135	113	93	6.0	-	1.1	230 μa	86 ma				
135	105	92	5.5		1.26	.4	.12				
135	95	91	5.0		1.41	.54	.18				
135	84.5	88	4.5		1.62	.70	.20				
135	73	87	4.0		1.81	.85	.25				
135	63	84	3.5		2.00	.98	.33				
135	48.5	82	3.0		2.26	1.17	.41				

202

1-16-87

b unit

E_B	E_P	E_S	E_C	I_T	I_P	I_S
135	45.5	80	2.8	2.35	1.22	.45
	42	79	2.6	2.91	1.21	.46
135	38.5	78	2.4	2.47	1.32	.52
	36	77	2.2	2.54	1.36	.57
135	33	75	2.0	2.60	1.44	.60
	31	73.5	1.8	2.65	1.42	.62
	246	72.5	1.6	2.72	1.45	.64
135	27	72	1.4	2.76	1.48	.69
	25.1	70	1.2	2.81	1.52	.35
	237	68	1.0	2.84	1.57	.80
135	22.4	67	.8	2.92	1.58	.80
	21.2	66	.6	2.95	1.58	.88
			<.1	3.05	1.60	.94
135	11	70.5 / 67.5	.6	4.03	1.70	1.53
	12.2		.25	3.88	1.69	1.40
	14.5		.5	3.65	1.65	1.20
	17.5		.75	3.45	1.60	1.02
	20.7		1.0	3.22	1.58	.87
	32.5		1.5	2.75	1.40	.60
	46.5		2.0	2.38	1.18	.40
	69		2.5	1.95	.90	.26
	88		3.0	1.61	.63	.20
	107		3.5	1.26	.37	.12
	117.5	71	4.0	1.05	.20	.062
	128		4.5	.92	.090	.027
	131		5.0	.85	.037	.009

E_S held constant

Atm R_L disconnected
Battery between
E_S point & gnd.

E_P	E_C	I_T	I_P	I_S
132	5.5	.81	.008	.002
133	6.0	.80	.001	<.001
135	19 / 6.5	.80	<.001	<.001
6.8	2.5	6.95	1.75	3.75
7.3	.5	5.45	1.75	3.32
8.3	1.0	5.37	1.74	2.78
9.6	1.5	4.82	1.72	2.30
11.2	2.0	4.36	1.70	1.82
14.0	2.5	3.86	1.68	1.40
22.0	3.0	3.22	1.52	.87
33.0	3.5	2.78	1.39	.66
52.0	4.0	2.38	1.18	.43
70.0	4.5	1.98	.92	.30
86.0	5.0	1.67	.68	.20
102.0	5.5	1.37	.46	.16
113.0	6.0	1.15	.25	.084
125.0	6.5	0.96	.17	.043
131	7.0	0.87	.058	.017
133	7.5	0.82	.018	.004
135	8.0	0.81	.004	.001

E_C	I_T	I_P	I_S
.25	7.01	4.64	1.40
0.50	6.65	4.43	1.32
1.0	6.00	3.98	1.18
1.5	5.35	3.53	1.02
2.0	4.73	3.04	0.81

E_S 96.5
E_S 135

E_C	I_T	I_P	I_S
2.5	4.17	2.62	.76
3.0	3.53	2.13	.70
3.5	2.94	1.70	.46
4.0	2.37	1.37	.40
4.5	2.03	1.00	.28
5.0	1.68	.73	.20
5.5	1.38	.53	.14
6.0	1.16	.30	.084
6.5	.98	.20	.045
7.8	.87	.058	.017
7.5	.83	.018	.004
8.0	.81	.004	.001

GE CR27 A1C 1083C2

Relay Check

1-2	coil	
2	common	
3	NC	
4	NO	

E_R	I_R	E_R	I_R
		Release	
1	.4	6.23	2.4
		Hold	
2	.8	8.4	3.25
		Release	
3	1.2	6.24	2.42
		Hold	
4	1.6	8.7	3.5
Hold		Release	
8.35	3.24		

Atm R_L disconnected
Battery between
E_S point & gnd.

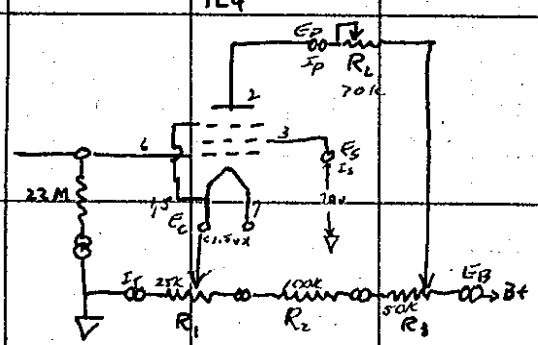
E_S held constant

E_B 135

R_L 0

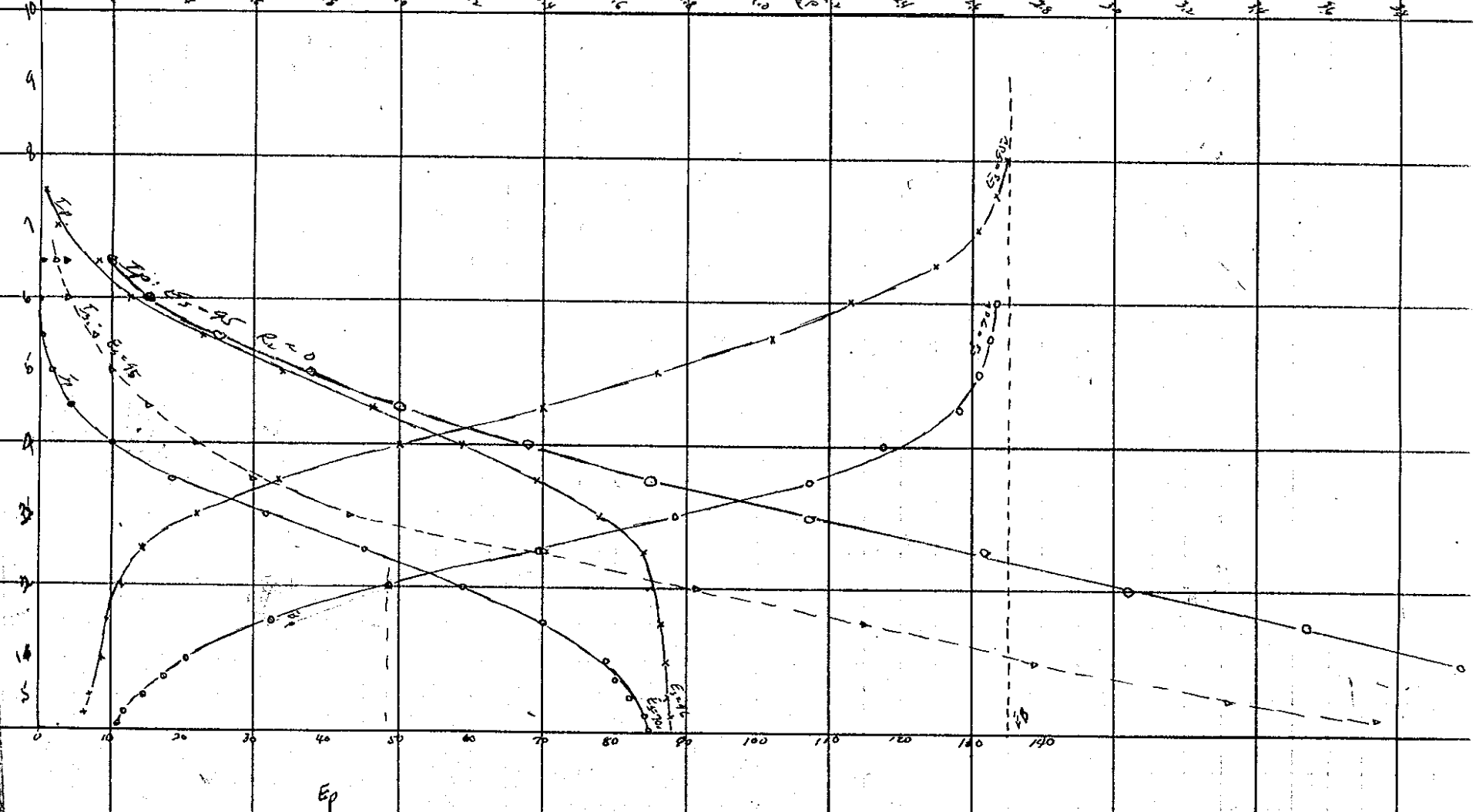
1-15-51

1L4



$E_B = 135$

$E_s = 70.5$



$\frac{1}{4} \times 10^3 = 2.5\,K\Omega$
$4/1.6 \times 10^3 = 2.5\,K\Omega$ } R of relay coil.

Holding current ≅ 3.3 ma

Drop current ≅ 2.4 ma

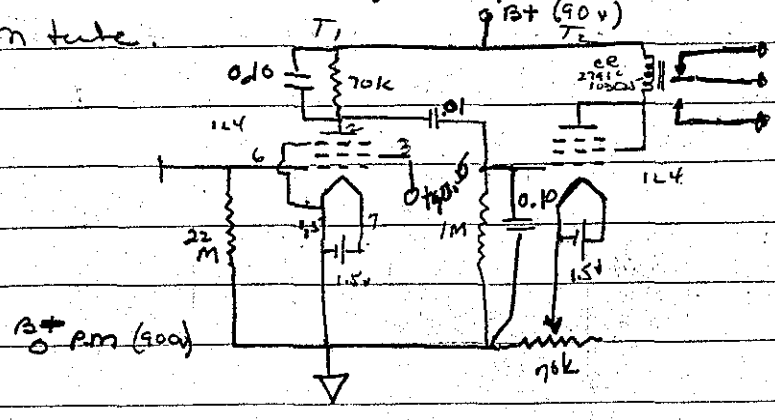
Set R at 2.1 KΩ to check range of Ip OK.

16-51 Bleeder for PM wired. 10 1.5 Meg resistors. Resistance measurements show reasonably close values.

Voltage check using 1040 NICC supply. OK.

Mounted Anthracene x'tal on 931-A covered with Al reflector foil & black tape light shield. Tested for leaks.

17-51 Ran tests on 2 stage trip circuit to be used with PM tube.



Ran preliminary tests on circuit (931-A & 2 1L4's)

		3/10 1/19	1-14-61 0920
24PH Burgess ballast for filament		1.40 ; 1.49	1.33 ; 1.41
1467 Eveready	for screen 67.5 v	66	61 v
4 ~~463~~ Eveready	for plate 90 v	82 v	74 v
NICC 1090 for HV for PM.		"1400"	"1400"
& meter across NC contacts		trip @ 84"	
Ip set at 3 ma at 30 PM.			2.75 ma

Set run to check stability.

~~Cal. Aft 0921~~

1-18-51 I_{B_1} = 3.6 ma; I_{B_2} = 1.3 ma

1-27-51 Initial battery & supply measurements

	Vomax	Simpson 1090	
E_{F_1}	1.50	1.46	
E_{F_2}	1.53	1.53	Tube 1300
E_{S_1}	67.4	67.4	
E_0	85	85	
HV	900 v.	1640	

1302 Set I_B at 2.0 ma - put ohmmeter across NO contact of relay.

Firing point can be set up to 3 feet for 5mg Ra

1-29-51 Further testing of P.M. alarm circuit.

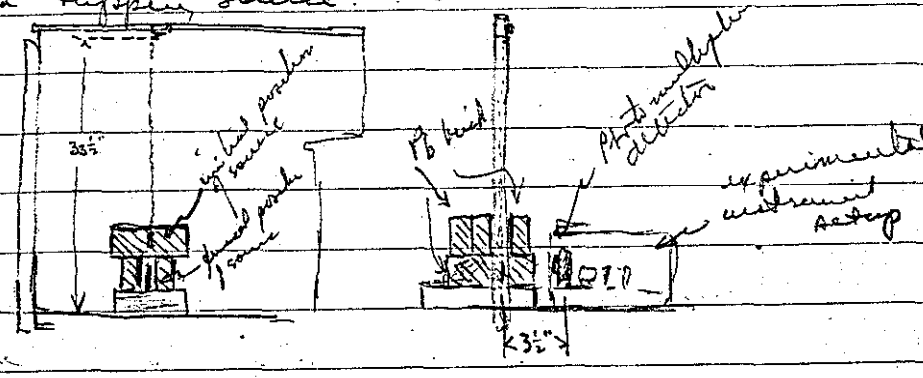
E_B = 82v E_c = 65v. E_{f_1} 1.50 E_{f_2} = 1.43 I_B = 2.9 ma Tube Set

C_g = 0

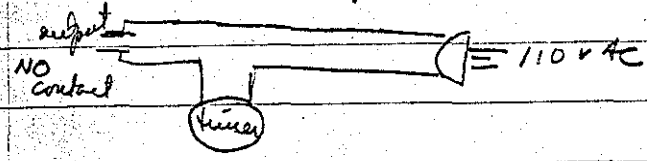
	I_R ma.	C_g mfd	Timing Triplidist
source not yet in room	2.8	0	(1 min)
	2.8	0	(25 sec)
	2.8	.01	(110 sec)
	2.8	.01	100 s.
5mg Ra	2.95	.1	$10^{\#}$
	2.95	.05	13
	"	.03	16
	"	.02	24 *
	"	.5	7
	3.00	.1	

1-29-57 Ran 32 hrs. at I_E 3.00 ma C_g 0.1 mfd with no false trips.
trip with 5mg Ra @ 10"
Tried reduced PM voltage - 600v Trip dist then 2"

1-30-57 Relay trip time tests:
Operating condition: I_E = 2.8 ma C_g = 0.1
5mg Ra tripping source.



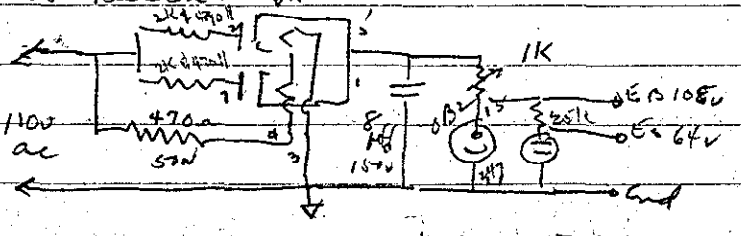
1-30/2-1 Constructing PM alarm -
2-2-57 Tested unit with batting supply
hold point .52 ; drop .38 Relay current indication
Set operating point at .48 . Trip distance was 9 inches.
Put timer in output to check for spurious tripping as below:



Set at 11:04,
OK 12:04
trip 12:05 reset 12:06 .58
16.00 .57
16.15 .96 no trip
battery drain so much as to be unable to trip.

2-3-57 Construction & Test of Low Voltage Power Supply for PM detector.

Tests were made to determine current rating of regulator output of supply built in exp. model 2-2-57. Components were adjusted to get proper values, 991 drawing too much. 6AL5



Battery Supply
E_{f_1} 4FH : 1.5v
E_{f_2} 4FH : 1.5v
E_{pm} 3-493 : 900v

Meter Dial

Operating Range - .50 16.5 Holding Value of Relay
.385 30 Drop Value of Relay

Set at .46 on meter & 20 on dial. to check for dynamic response. Measure in output.

~~1.37~~ 1340
E_{f_1} = 1.335v 1415 reading same E_3 = 61 v
E_{f_2} = 1.431 E_p = 103 v
E_{pm} = 885v

2-5-57 0835 Checked PM tripper after being on over weekend. Had tripped!
Meter held steady @ .46
Range .39 - .52 meter
30 - 16.5 pot
E_3 = 64 v E_{f_1} 1.33 E_{pm} = 870v
E_p = 103v. E_{f_2} 1.39

Set at .44 @ 0845 -

2-6-87 0915 Reading .44 on meter. Had been on continuously from 2-3-87, 1340 –

E_{f_1} = 1.29 v E_p = 103 v. Range: meter .39 ↔ .505

E_{f_2} = 1.34 v E_s = 61 v. Dial °29 ↔ °16

E_{pm} = 860 v.

Set @ 45 0930 for spurious trip test.

1405 OK

Checked waveforms on plate & screen supply – some ripple .1 v 2 volt peak

Trip distance recorded @ 7" same as set 0911 –

2-7-87 0830 had not tripped from 1405, 2/6/87 Trip @ 7".

Setting: .45 meter; °21 dial.

Voltages E_{f_1} 1.29 E_p = 105 v Range:

E_{f_2} 1.33 E_s = 63 v M .505 – .39

E_{pm} 860 v D: °15.5 ↔ °29

2-8-87 1530 not tripped. ~~Trip~~

Setting .45; °21 Trip @ 7'

Voltages E_{f_1} = 1.29 v E_p = 103 v Range

E_{f_2} = 1.33 v E_s = 61 v M: .50 ↔ .39

E_{pm} = 850 v D: °15.5 ↔ °29

2-9-87 0925 not tripped. Setting .45 °21

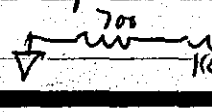
Voltages E_{f_1} 1.27 E_p = 103 Range

E_{f_2} 1.32 E_s = 61 M .50 ↔ .39

E_{pm} 850 ✓ D °15.5 ↔ °29.0

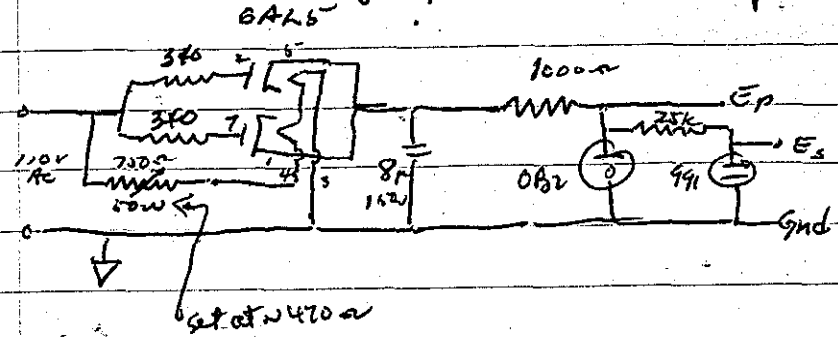
Trip dist = 7"

Replaced 50k helipot with 1K helipot # 700 on fixed

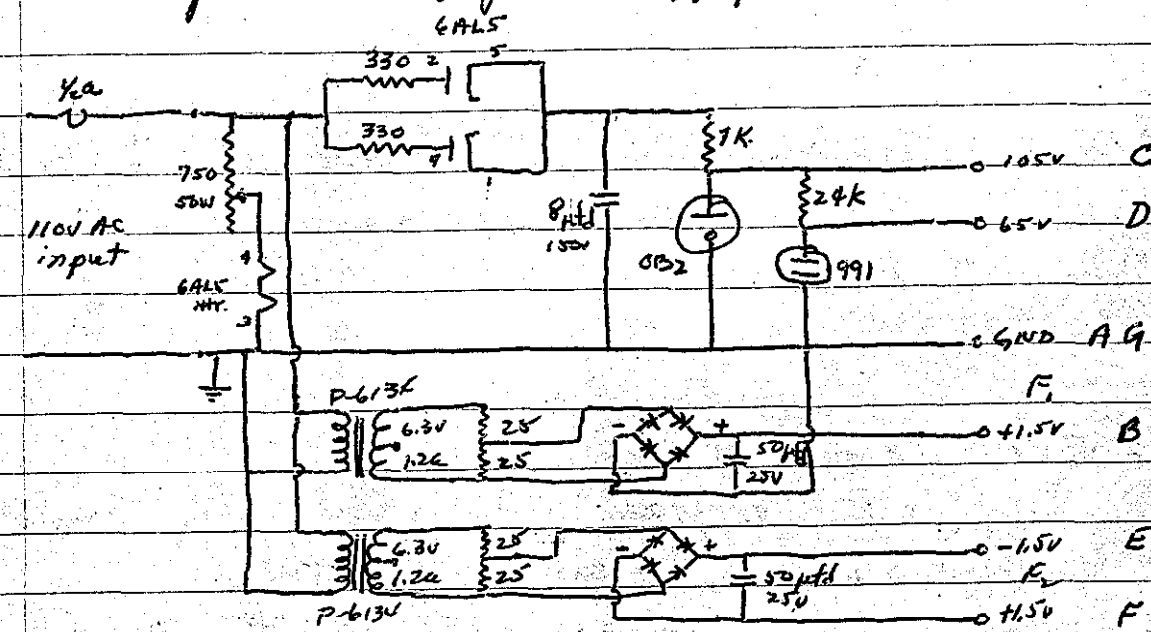


Range ±.60 ↔ 7.5

2-9-51 Plate & Screen Supply as tested satisfactorily.



2-20-57 Wired up low voltage power supply for R-M unit.



2-21-57 Mounted unit in box. Completed assembly was then

2-22-57 Setup for test Fire Reset

On 110~: Range: 2.02 7.99 Dial

	.49	.395	Meter Operate	
.85 setting 4.35	2.19 .495	8.05 .400	4.35	1110
	2.25 .49	8.10 .400	4.39	1114
	2.33 .49	8.36 .395	4.30	1125
	2.45 .49	8.85 .395	4.26	1156

	Setting		Trip		Reset	
2-22-51	1230 .415	4.30	.44	2.73	.355	8.80

Trip distance 7 inches.

2-23-51 0802 Unit turned on. Allow one minute warm up for regulators to take hold.

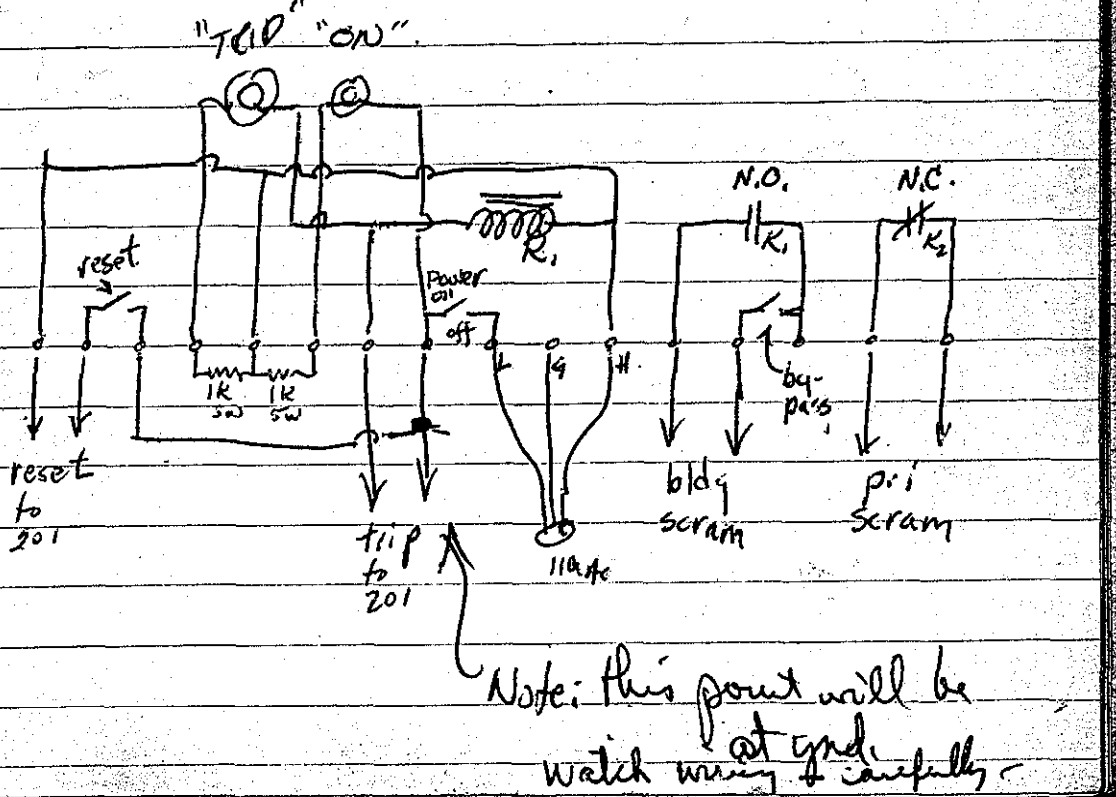
Setting 500. Trip distance: 7".

Meter #55

= Secondary Scram & PM2 Panel =

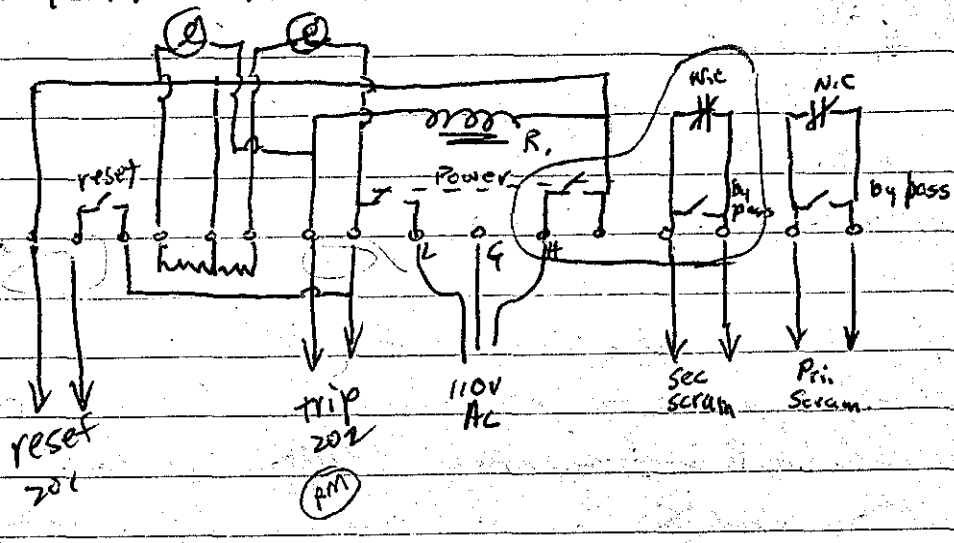
Built panel for rack mounting in 202 to give indication of tripping of PM-2, to reset PM-2, & to activate Secondary & Primary Scrams. Circuit checked out OK. when used in 210. —

Circuit 3



2-24-57

Revised PM-2 Panel as follows (revisions circled):



2-26-57 Tested PM-2 & Bldg Scram. set up in 201-202 OK.

2-27-57 Trip distance too short - took PM to 210 for adjustment

3-1-57 PM-2 tripping @ 1". Needs checking — do. secs.
Replaced 1st 1L4 neon o/k. & check in 210.
lowered foil supply to 1,250V

2-22-57 **Proportional Counter Check** See p. 210

Source #171 ORNL #317 BF_3 t=300 sec Repeat t=120 sec

2π 1 in. broadside PHS 40

Volts	Scaler	Count	Rate	Volts	Scaler	Count	Rate	Volts	Scaler	Count	Rate
0	0 01	1	0.2	1000	x64 0 14	14	14				
1200	0 47	47	9.4	1100	0 17	17	17				
1300	0 30	30	6.0	1150	0 53	55	55				
1400	0 29	29	5.8	1200	2 09	128	128				
PHS 15					5 43						
1400	x64 23 36	1508	754		16 32						
					13 09						
					4 40						
1350	1 11	75	37.5		0 15						
1450	94 14	6030	30 15		2 46						
					1 50						
1500	258 19	16529	8,264.5	1400	161 34						
1550	317 42	20330	10,165		181 62						
					12 03	(PHS 50)					
1600	347 16	22224	11,112		17 09						
1600	347 51	22259	11,129.5		20 31						
1700	360 39	23079	11539.5		29 55						
1750	363 42	23274	11637.0		28 12						
1800	372 41	23849	11924.5		rest -						
					47 05						
1850	385 61	24701	12350.5		new scaler						
1900	403 25	25817	12908.5	1400	0 03						
	x256		305 ks	PHS 0	0 04						
1950	35 x 201			PHS 15							
				1400	7 40						
2000					9 49						
				1450	26 26						
2050					26 39						
				1500	52 60						
2100					50 49						
				1550	82 34						
2150					81 57						
				1600	91 29						
2200					93 04						
				1700	91 32						
2250					94 43						
				1800	501 16						
2300											
2350											
2400											

MEPA Scaler #171

3-7-80 Checked 5819 probe on Lucite Amp & Scaler
- H.V 900 v (NICC 1090 p.s) L.A. settings: PHS 10
Output Resistor for 5819 = 100 k gain 32 - 1
Rate Limit 0.2 μs
Input -

Time	Scaler	Count Rate		
10m	767 761	509	50.9/m	Bkg - 5 kg Ra source in lead safe.
	9 10	626	62.6	" Avg 54.9
	8 08	513	51.3	
1m	8 17	529	529	Source @ 12'
	11 43	747	741	Avg 734
	11 07	711	711	
	11 39	743	743	Source @ 9'
	21 31	1375	1375	@ 9' 1353
	20 51	1331	1331	
	41 11	2635	2635	@ 6' ~~2585~~ 2568
	39 40	2536	2536	
	39 38	2534	2534	
	161 43	10347	10347	@ 3' 10344
	163 17	10449	10449	
10m.	8 41	553	553	Bkg - source at down

HV = 1000 V:

Bkg	2m	263	191	95.5	Avg 82.0
		249	177	88.5	
12'	1m.	24 57	1593	1593	1623
		25 53	1653	1653	
9"		44 53	2868	2868	2946
		48 53	3105	3105	
6'		107 33	6881	6881	6981
		109 35	7081	7081	

Power supply better @ 1000 than @ 900. —

214

2-26-57 Counter Tube [illegible] Characteristic Curve

[2.1 AS 641, 0.2 μs;]
Time 1 min.
Tube ORNL 317
D_η =

Volts	PHS 20 Scaler	PHS 20 Rate c/m	PHS 40 Scaler	PHS 40 Rate c/m	PHS 60 Scaler	PHS 60 Rate c/m	10 min. 3/28 Bkg PHS 20 Scaler	10 min. 3/28 Bkg PHS 20 Rate	1m PHS 20 Scaler	1m PHS 20 Rate
1200	×64 0 9	4	×64 0 1	1	×64 0 2	2	×64 0 3	0.3		
1300	0 5	5	0 0	0	—	—				
1350	0 4	4	—	—	—	—				
1400	0 7	7	—	—	—	—	0 21	2.1	0 10.4	1
1450	34 17 ×256	2193	0 0	0	—	—	3/28 9 25	2.5	×256 55 48	9.0
1500	64 232	16,616	0 5 ×256	5	—	—	X16 2/2 9/57 0 1	1.7	115 150	29.5
1550	182 46	46,638	11 80	2846	0 6 ×256	6			205 00	52.4
1600	231 117	59,253	61 195	15811	4 105	1129	66 15	107.1	243 09	62.2
1650	263 171	67,499	158 28	40476	44 207	11491			248 64	63.5
1700	270 53	69,173	230 241	59112	155 384	39404	155 4	248.4	253 225	64.9
1750	273 84	69977	263 168	67496	237 41	60713				
1800	275 112	70572	267 247	68559	259 19	66323	155 0	249.5	255 74	65.3
1900	280 65	71745	272 134	69766	270 75	69195	162 3	253.5	259 119	66.4
2000	280 71	71751	269 87	68911	263 138	67446	186 5	298.1	260 243	66.8
2100	286 179	73345	267 214	68556	259 143	66447	224 17	359.6	272 84	69.7
2200	304 133	77957	269 133	68997	257 242	66034	253 N	405.9	249 65	76.6
2300	369 19	94983	240 145	74435	269 67	68931	220 9	352.9		
							Volts 2400			
							216 13	202.9		
							2500	215 7	344.7	
							2600	124 4	1488.0	

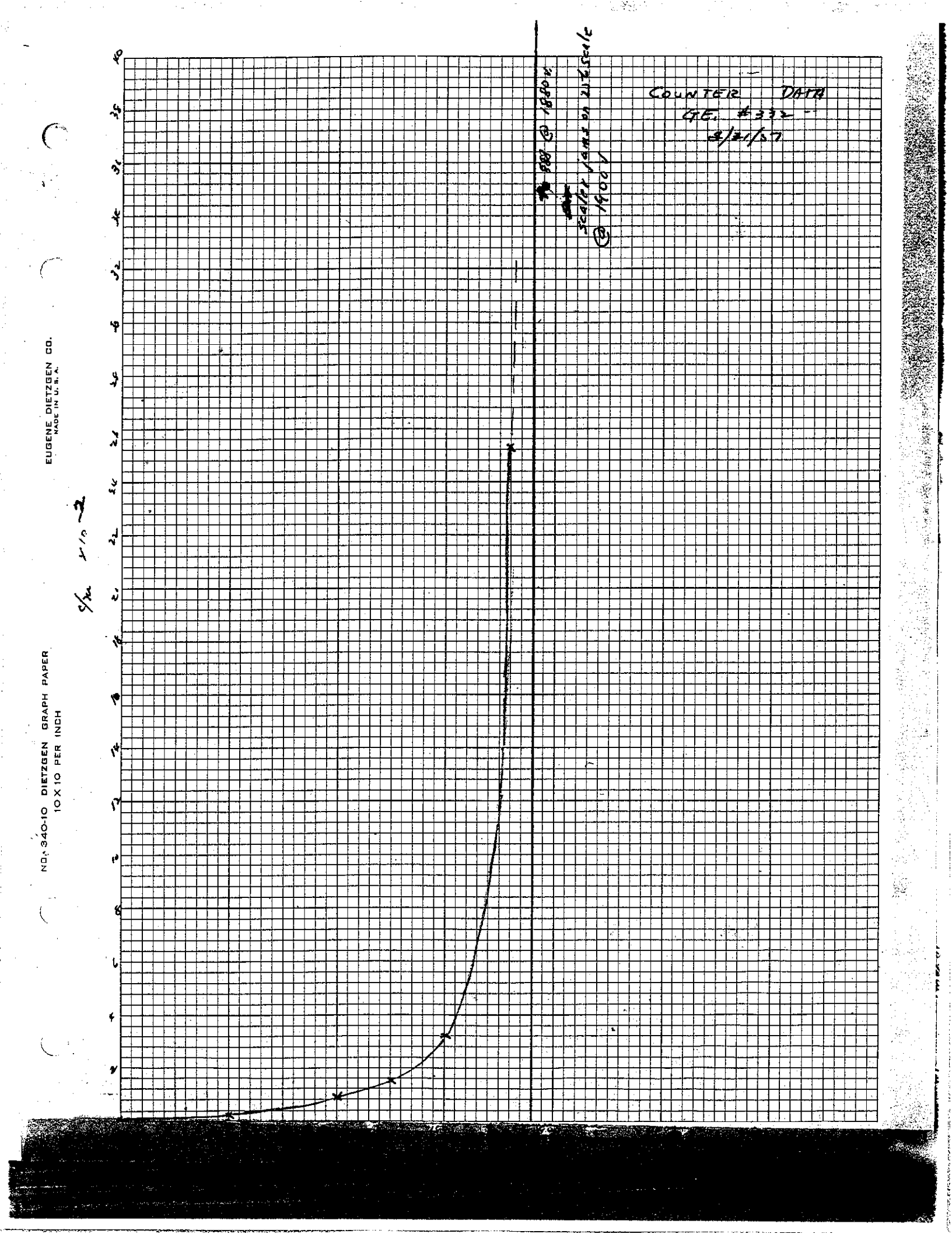
3-27 Bkg with no applied voltage. (PHS 20)

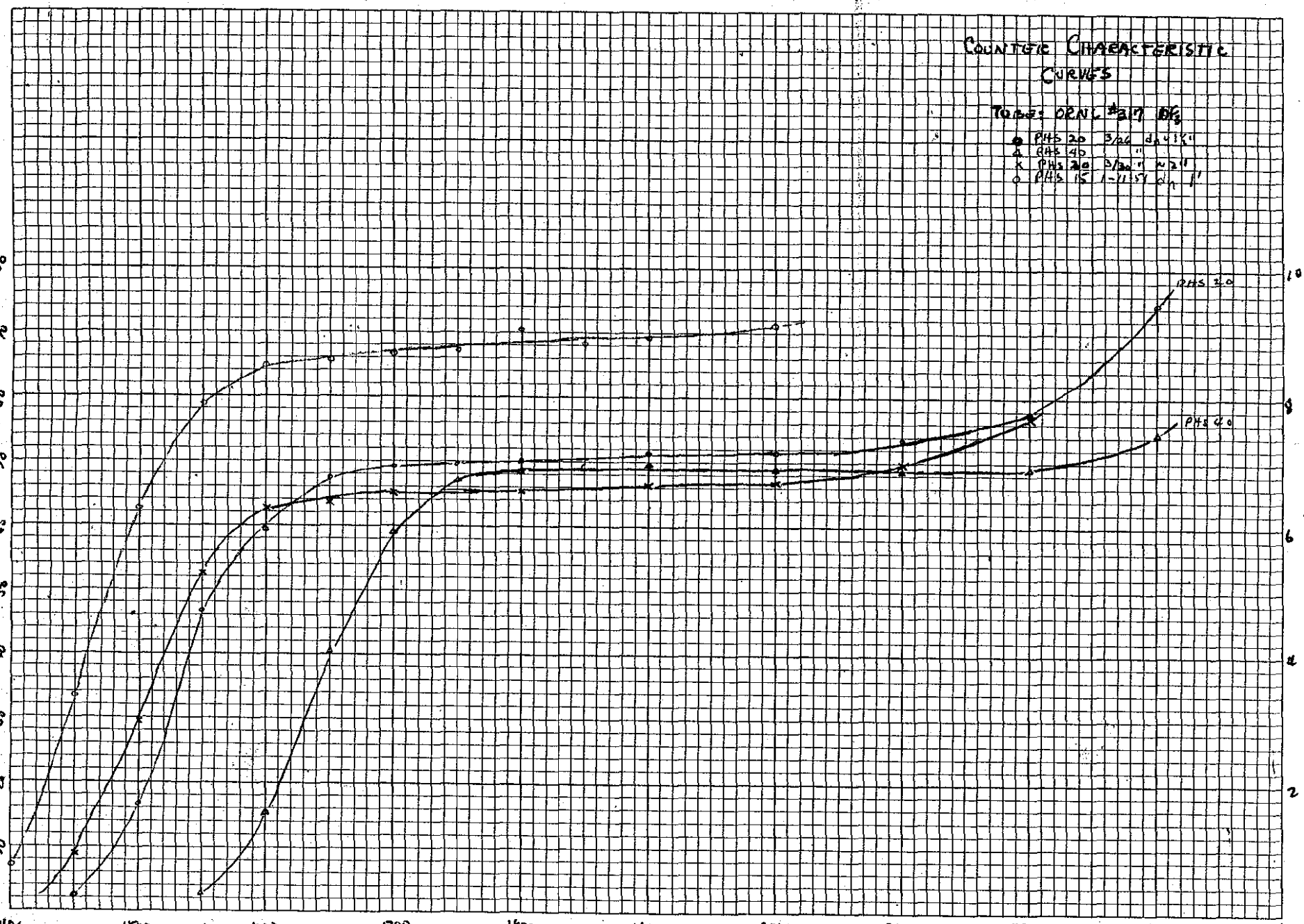
Time 20 m

Count 151

Rate 7.55 c/m

Note: Bkg: source @ 210' / 3/29 source in vault


COUNTER DATA
G.E. #332
8/21/57
@ 1900 V
Scaler Plateau
@ 1900 V
Sr 90
EUGENE DIETZGEN CO.
MADE IN U.S.A.
NO. 340-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH



3-31-57 Found Preamp EP-25 wired wrong. rewired input stage - now same operation as several days ago when CVK worked oscillator meter on x1 hi sens. position only -

Prepared GE 332 B^{10} lined counter for counting rem. Check of Characteristics of GE # 332 - suspected of being bad $\ell_x = 1\frac{1}{2}$" LA 1-6V, 0.2μs -, DHS 20. 5 min.

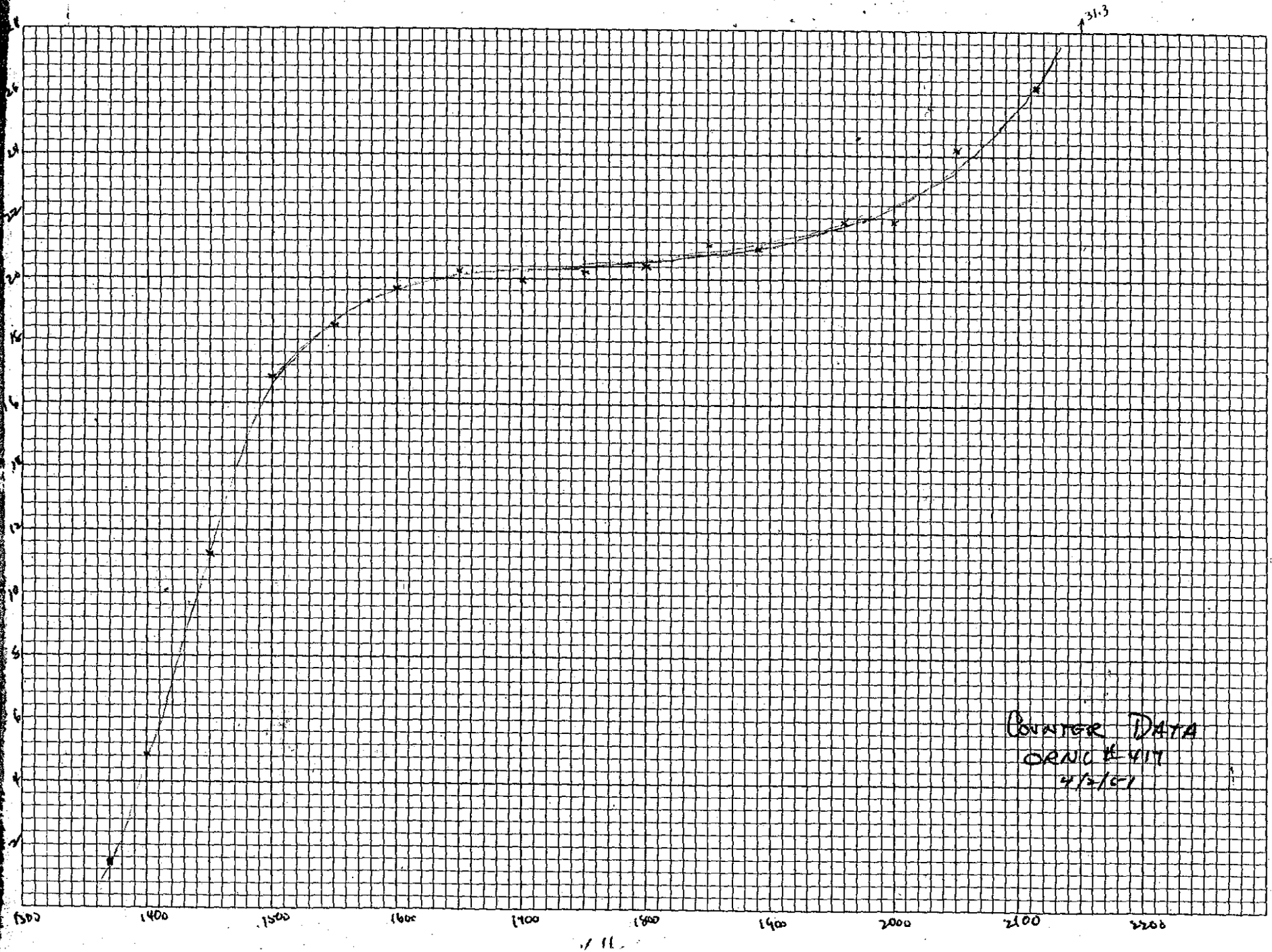
Volts	Scaler x64	Count	Rate
1500	1 60	124	24.8
1600	2 31	159	31.8
1700	6 58	442	88.4
1750	11 47	751	150.2
1800	25 3 / 5 min	1625	325.0
1850	39 39	2535	2535
1900	discharge (jam)		
1850	347 x256	88832	88,832
2000			

ORNL Tube #417 - source 17" N 2' LA source at PHS

4-2-57	Volts	Scaler ×64	count 5 m.	Rate Scaler
	1300	0 35	35	7.0
	1350	4 38	2m. 244	1.47
	1400	7 35	2m. 484	484
	1450	17 41	1124	1124
	1500	26 20	1684	1684
	1550	28 55		1847
	1600	30 47		1967
	1650	31 44		2026
	1700	31 11		1995
	1750	31 41		2025
	1800	31 52		2040
	1850	33 06		2118
	~~1890~~	32 57		2099
	1900	34 15		2191
	2000	34 17		2193
	2050	37 60		2428
	2100	41 03		2629
	2150	49 01		3136
	2200			
	2250			
	2300			
	2350			
	2400			

NO. 340-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH

EUGENE DIETZGEN CO.
MADE IN U. S. A.



COUNTER DATA
ORNL # 417
4/3/61

6-8-57 Checked PM-2 - would not test trip by adjustment of heliport. 2nd 124 tested bad; replaced OK.

6-10-57 PM-2 tripping under safe conditions - replaced one of 3 300v batteries. trip distance = 7'

6-15-57 Photomultiplier Data.

(earlier data recorded on p. 212)

Voltage	Rise Time	Gain Coarse	Gain Fine	Pulse Disc.	X	Scaler register	Scaler int.	Count	Time	Rate	Source Disc
600	0.2μs	32	1	100	16						Bkg

Noted irregularity of counting - counts with cap off

Stop for repair.

Ran curve on linear amp - scaler, feeding 1 μs pulses in from pulse generator. For data see General Manual Book, p 23

6-18-57	Voltage	Gain C	Gain F	Pulse Disc.	Pulse level	X	Scaler reg.	Scaler int	Count	Time	Rate	Source Disc
Rise Time 0.2μs-	600	64	1	20	20	16	6	3	99	2 m.	49.5	Bkg source in Pb
input -		64	1	30	30	16	4	8	72	2m	36.0	Bkg source in Pb
Note ① Phosphate 8' distant 8" lead shield.		64	1	30	30	16	3	15	63	1m	31.5	Bkg
② Sources in Run 20 for testing.		64	1	40	40	16	5	2	82	3 m.	27.33	"
		64	1	50	50	16	3	3	57	3 m	17.0	"
		32	1	20	40	16	3	12	60	3m.	20.0	"
		32	1	30	60	16	2	8	40	3m.	13.33	"
		32	1	40	80	16	2	13	45	3m.	15.0	"
		32	1	50	100	16	4	7	71	7m.	10.14	"
		16	1	20	80	16	10	5	165	10m.	16.5	"
				30	120	16	1	7	23	4m.	5.75	"
				40	160	16	1	5	21	4m.	5.25	"
				50	200	16	1	8	24	6m.	4.00	"
		64	1	20	20	64	62	25	3993	1m.	3993	8
				30	30	64	28	49	1841	1m.	1841	"
				40	40	64	13	32	864	1m.	864	"
				50	50	64	4	48	304	1m.	304	"
		32	1	20	40	16 40	39 14	15 15	639	1m.	639	"

2-18

Volts	Pulse Height Discrim	C. Gain	F.	Level Pulse Ht	x	Scaler reg.	int	Count	time	Rate	Source Pos
600	40	32	1	60	16	4	3	67	1m	67	8'
	40			80	16	2	0	32	2m	16	
	50			100	16	1	8	24	2m	12	
	20	16	-1	80	16	2	10	42	5m	8.4	
	30			120	16	1	11	27	5m	5.4	
	40			160	16	1	5	21	5m	4.1	
	50			200	16	0	14	14	5m	2.8	
	20	64	-1	20	64	100	32	6432	1m	6432	6'
	30			30	64	46	49	2993	1m	2993	
	40			40	64	21	59	1403	1m	1403	
	50			50	64	7	16	464	1m	464	
	20	32	1	40	64	15	32	992	1m	992	
	30			60	16	4	14	78	1m	78	
	40			80	16	1	6	22	2m	11	
	20	64	1	20	64	143	25	9177	1m	9177	5'
	30			30	64	67	28	4316	1m	4316	
	40			40	64	30	12	1932	1m	1932	
	50			50	64	9	40	616	1m	616	
	20	32	1	40	64	23	20	1492	1m	1492	
	30			60	16	7	10	122	1m	122	
	40			80	16	1	9	25	2m	12.5	
	20	64	1	20	64	213	56	13688	1m	13688	4'
	30			30	64	103	54	6646	1m	6646	
	40	64	1	40	64	42	30	2718	1m	2718	
	30	32	1	40	64	31	61	2045	1m	2045	
	50	64	1	50	64	13	43	8275	1m	8275	
	30	32	1								
	40	32	1	60	16	10	4	164	1m	164	
				80	16	2	6	34	2m	19	

220

Volts	Gain C	Gain P	Pulse Dist.	Pulse Load	x	129	int	CC	Time	Rate	Source
600	64	1	20	20	256	91	223	22,519	1 m	23,519	Ir
			30	30	256	42	77	10,829	1 m	10,829	
			40	40	256	17	164	4516	1 m	4516	
			50	50	256	5	120	1,405	1 m	1,405	
	32	1	20	40	256	13	20	3,348	1 m	3348	
			30	60	64	3	47	239	1 m	239	
			40	80	16	2	7	39	2 m	19.5	
	64	1	20	20	256	204	195	52419	1 m	62419	2'
			30	30	256	190	92	48732	2 m	24366	1
			40	40	256	40	144	10386	1 m	10386	
			50	50	256	12	154	3231	1 m	3231	
	32	1	20	40	256	29	97	7521	1 m	7521	
			30	60	64	8	52	564	1 m	564	
			40	80	16	1	10	26	1 m	26	
			50	100	16	1	10	26	2 m	13	
	64	1	20	20	256	185	113	47,473	1/2 m	94946	1,5'
			30	30	256	86	86	22,102	1/2 m	44204	
			40	40	256	35	10	8970	1/2 m	17940	
			50	38	256	21	63	5439	1/2 m	5439	
	32	1	20	40	256	25	144	6544	1/2 m	13,088	
			30	60	64	15	6	966	1	966	
			40	80	16	4	13	77	2	38.5	
			50	100	16	1	3	19	2	19.5	

6-18

	Volts	Gain C	Gain F	Pulse Size	level	x	freq.	int	ct	time (sec)	Rate	Source
	700	64	1	20	20	16	25	14	414	2	207	Pdg ①
				30	30	16	7	1	113	1	113	
				40	40	16	5	12	92	1	92	
				50	50	16	5	10	90	1	90	
		32	1	~~40~~	40	16	10	11	171	2	85.5	
				~~60~~	60	16	3	5	53	1	53	
				~~80~~	80	16	3	5	53	1	53	
				~~100~~	100	16	2	9	41	1	41	
		16	1	~~80~~	80	16	2	8	40	1	40	
				~~120~~ 30	120	16	1	15	31	1	31	
				~~160~~ 40	160	16	2	4	36	2	18	
				~~200~~ 50	200	16	2	3	35	2	17.5	
		64	1	20	20	64	246	19	15763	1	15763	8'
				30	30	64	178	3	11395	1	11395	
				40	40	64	137	4	8772	1	8772	
5'				50	50	64	102	40	6568	1	6568	
		32	~~16~~	20	40	64	122	33	7841	1	7841	
				30	60	64	74	56	4792	1	4792	
				40	80	64	50	41	3244	1	3244	
				50	100	64	32	19	2067	1	2067	
		16	1	20	80	64	91	41	5865	2	2932.5	
				30	120	64	18	22	1174	1	1174	
				40	160	64	6	33	417	1	417	
				50	200	64	3	24	216	2	108	
		8	1	30	240	64	0	46	46	2	23	
				40	320	16	1	5	21	2	10.5	

b-1857

Volts	Gain C	Gain F	Pulse Disc	Level	x	veq	cal	Ct	term	Rate	Secs
700	64	1	20	20	256	150	175	38575	1	38575	5'
			30	30	256	108	183	27828	1	27828	
			40	40	256	81	136	20872	1	20872	
	32	1	30	40	256	76	175	19638	1	19631	
			30	60	256	46	43	11819	1	11819	
			40	80	256	30	188	7868	1	7868	
	16	1	20	80	256	28	59	7227	1	7227	
			30	120	256	11	68	2884	1	2884	
			40	160	64	14	45	941	1	941	
	8	1	20	160	64	10	55	695	1	695	
			30	240	64	1	16	80	2	40	
			40	320	16	1	3	19	#2	9.5	
	64	1	20	20	256	231	109	59245	1	59245	4'
			30	30	256	169	169	43433	1	43433	
			40	40	256	125	223	32223	1	32223	
	32	1	20	40	256	116	237	29933	1	29933	
			30	60	256	73	7	18695	1	18695	
			40	80	256	48	145	12433	1	12433	
	16	1	20	80	256	43	250	11258	1	11256	
			30	120	256	18	55	4663	1	4663	
			40	160	64	14	55	1591	1	1591	
	8	1	20	160	64	18	7	1159	1	1159	
			30	240	64	0	54	54	1	54	
			40	320	16	1	2	18	2	9.0	

6-19-57

U	C	F	Pd.	P.L.	x	veg	int	Ct	Time	Rate	Source
800	64	1	20	20	64	20	1	1281	1	1281	Reg
			30	30	64	9	32	608	1		
			40	40	64	6	11	395	1		
	32	1	20	40	64	5	63	383	1		
			30	60	64	3	18	210	1		
			40	80	64	2	1	129	1		
	16	1	20	80	64	2	1	129	1		
			30	120	16	4	9	93	1		
			40	160	16	3	15	63	1		
	8	1	20	160	16	3	8	56	1		
			30	240	16	1	14	30	1		
			40	320	16	1	11	27	1		
	64	1	20	20	256	125	116	32116	1		8
			30	30	256	102	106	26218	1		
			40	40	256	86	55	22071	1		
	32	1	20	40	256	81	113	20849	1		
			30	60	256	61	206	15822	1		
			40	80	256	47	62	12094	1		
	16	1	20	80	256	46	50	11826	1		
			30	120	256	30	200	7680	1		
			40	160	256	21	110	5466	1		
	8	1	20	160	256	19	152	5016	1		
			30	240	64	43	55	2807	1		
			40	320	64	23	34	1504	1		
			50	400	64	11	18	722	1		
	4	1	30	480	64	2	57	186	1		

(6-5)

To me Higher Data: divider resistors ea 571 M, except last dynode-gnd of 2.7 Meg.

Applied Voltage 600 v.

Pulse Level	Background Counting Rate	s.d. = 8' (1.83) c/m	net counting rate	ratio c/m / bkg	s.d = 6' (1.39) c/m	net c/m	c/m / bkg	s.d = 5' (1.00) c/m	net c/m	c/m / bkg	s.d = 4' (.925) c/m	net c/m	c/m / bkg	s.d = 3' (.55) c/m	net c/m
20	44.5 ± 4.96	3993 ± 63.2	3948.5	80.7	6482 ± 80.5	6362.5	130	9177 ±	9127.5	185	13688 ±	13638.5	276	23,519 ±	23,464.5
30	36.0 ± 4.24	1841 ± 42.9	1805	~~50.2~~ 51.2	2993 ± 54.7	2957.0	83.3	4316 ±	4280	120	6646 ±	6610	183	10,824 ±	10,793
40	~~27.33 ± 3.02~~	864 ± 24.4	836.67	31.6	1403 ± 37.5	1375.67	51.4	1932 ±	1904.67	70.8	2718 ±	2690.67	99.5	4,516 ±	4,488.67
60	17.0 ± 2.38	864 ± 17.4	287	17.9	464 ± 22.5	441.0	27.3	616 ±	599	36.2	825 ±	858	51.5	1,405 ±	1,388.0
80	13.33 ± 2.11	67 ± 8.2	53.67	5.03	78 ± 8.83	64.67	5.84	122 ±	108.67	9.15	164 ±	150.67	12.3	239 ±	225.67
100	~~15.0 ± 2.24~~	~~16 ± 3.83~~	1	1.07	11 ± 2.35	- 4.0	0.933	12.5 ±	- 2.5	0.835	19 ±	4.0	1.26	19.5 ±	4.5
120	10.14 ± 1.2	12 ± 2.45	2.14	1.18											
140	5.75 ± 1.2	5.4 ± 1.04	- 0.35	0.94											
160	5.25 ± 1.14	4.1 ± .905	- 1.15	0.78											
180	4.00 ± 0.82	2.8 ± 0.75	- 1.20	0.70											

Applied Voltage 900 v.

Pulse Level	Background Counting Rate	s.d. = 8' (1.83) c/m	net counting rate	ratio c/m / bkg	s.d = 6' (1.39) c/m	net c/m	c/m / bkg	s.d = 5' (1.00) c/m	net c/m	c/m / bkg	s.d = 4' (.925) c/m	net c/m	c/m / bkg	s.d = 3' (.55) c/m	net c/m
20	207 ±	15,743 ±	15556	71.2	38,571 ±	38368	186	55,245 ±	55038	286	111,000 ±	110,714	386	55,000 ±	54,714
30	113 ±	11,395 ±	11282	100.8	27,715 ±	27715	246	43,433 ±	43320	384	87,000 ±	86,714	770	43,000 ±	42,714
40	92 ±	8,772 ±	8640	95.4	20,780 ±	20780	227	32,231 ±	32,181	350	65,000 ±	64,714	705	32,000 ±	31,714
60	53 ±	4,742 ±	4739	90.4	11,766 ±	11766	223	18,645 ±	18,642	353	37,000 ±	36,714	693	18,000 ±	17,714
80	53 ±	3,244 ±	3191	61.2	7,915 ±	7915	148	12,433 ±	12,380	235	25,000 ±	24,714	466	12,000 ±	11,714
120	31 ±	1,174 ±	1143	37.5	2853 ±	93		4663 ±	4632	150	9,000 ±	8,714	281	4,500 ±	4,214
160	18 ±	417 ±	399	23.2	923	58.2		1591 ±	1573	86.5	3,000 ±	2,714	151	1,500 ±	1,214
200	17.5 ±	139 ±	90.5	6.18											
240	13.5 ±	22 ±	9.2	1.67	40 ±	26.2	2.9	54 ±	42	3.91	100 ±	72	4.67	50 ±	22
320	11.0	10.5 ±	- 0.5	0.955	9.5 ±	- 1.5	0.864	9.0 ±	- 2.0	0.818	17 ±	6	1.55	11 ±	6

6-14-57

Applied Voltage

Pulse Level	Background c/m
20	5881 ±
30	608 ±
40	345 ±
60	210 ±
80	129 ±
120	93 ±
160	63 ±
240	36 ±
320	29 ±
400	20.5 ±
480	15.3 ±
560	8.55 ±
640	0.70 ±

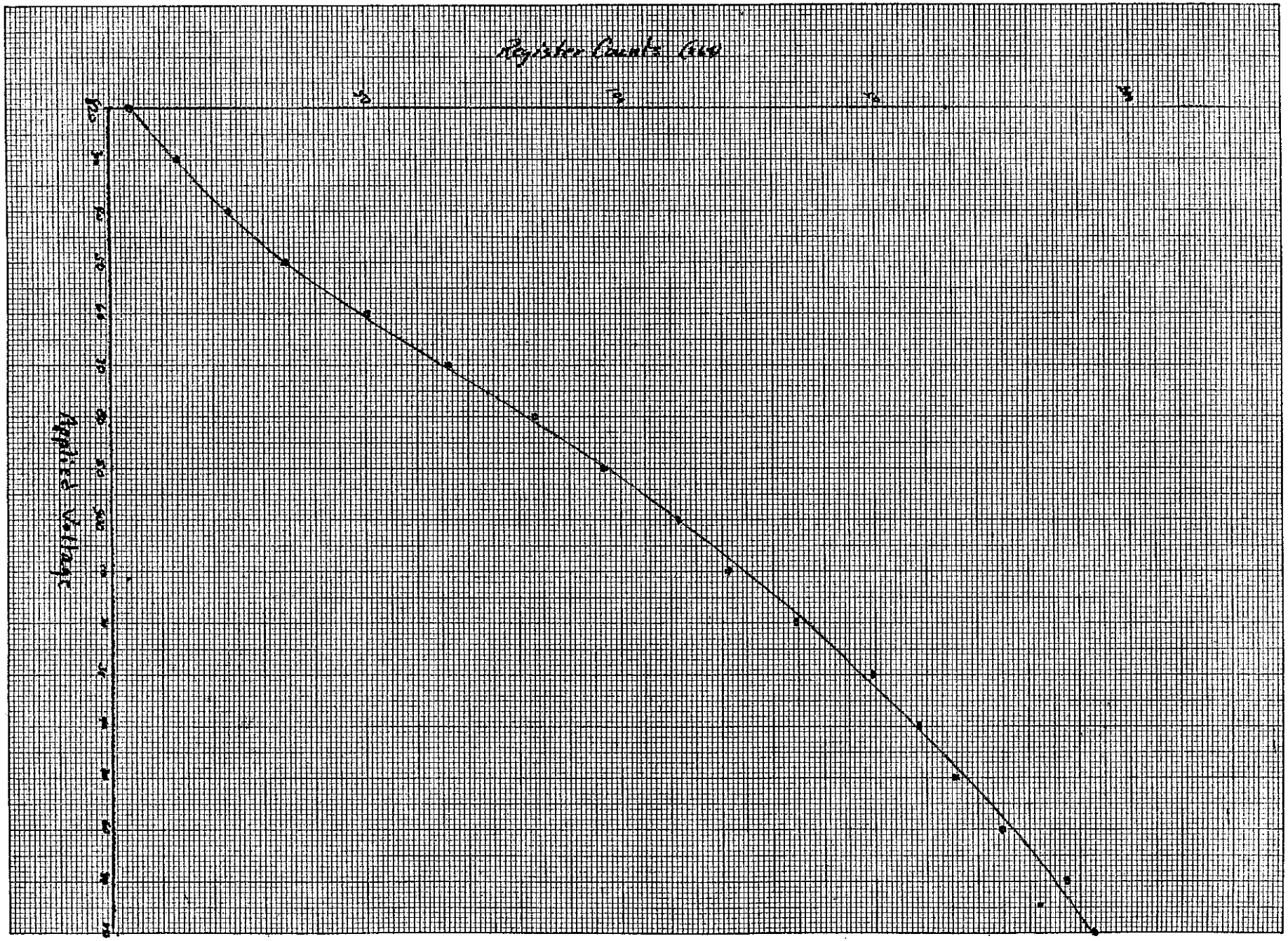
c/m/bkg	sd. = 2' (12.8) c/m	net c/m	c/m/bkg	sd. = 15' (22.2) c/m	net c/m	c/m/bkg
475	52419 ±	52,369.5	1058	94,946 ±	94896.5	1917
301	44,366 ±	44,330	676	44204 ±	44168.0	1224
165	10386 ±	10,358.67	379	17,440 ±	17912,67	657
82.6	3281 ±	3,214	190	5,489 ±	5422	319
17.9	564 ±	550.67	42.3	966 ±	952,67	92.5
1.30	26 ±	11	1.73	36.5 ±	23.5	2.56
	12.8 ±	3.14	1.28	14.5 ±	9.36	1.93

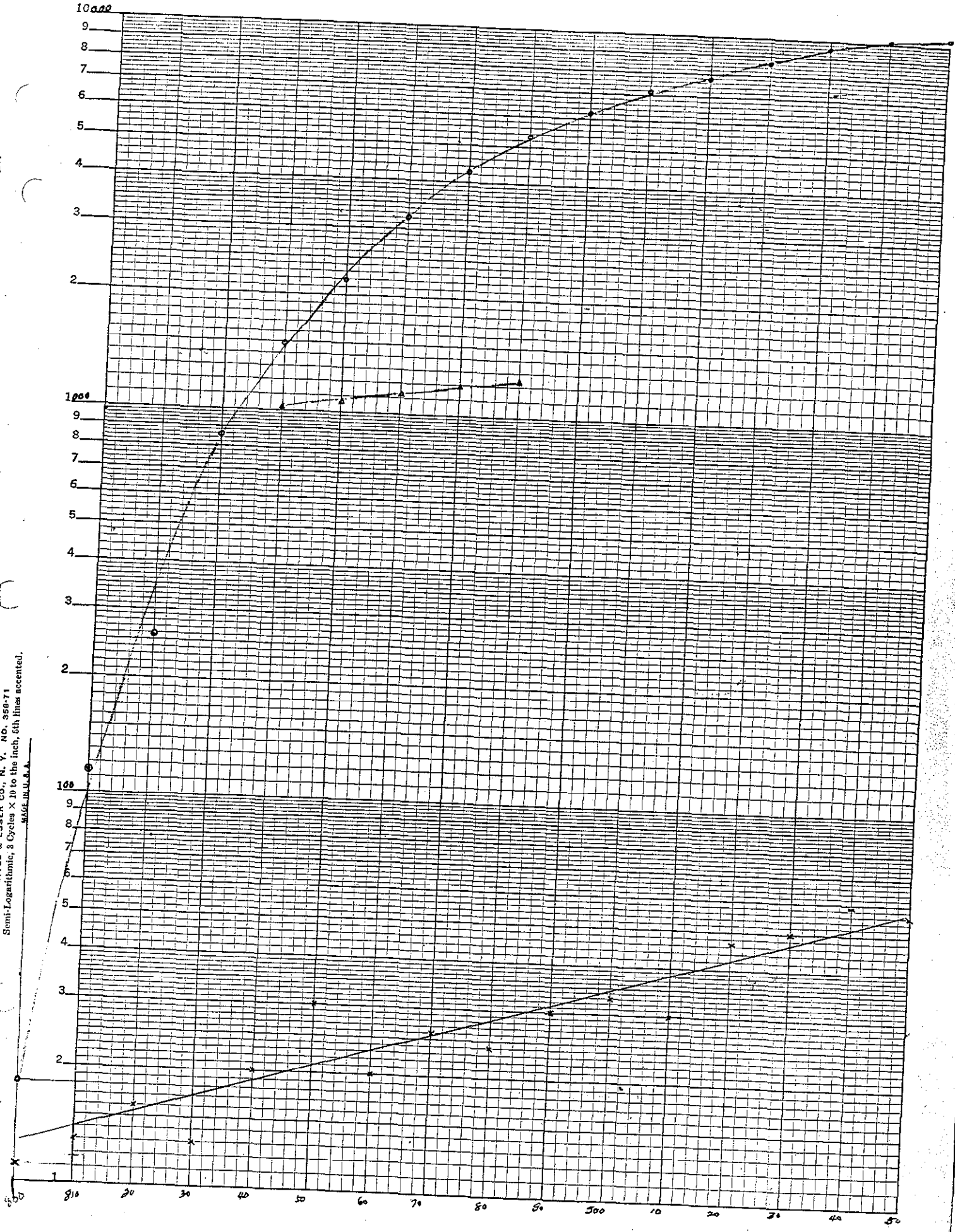
= 800V

sd. .8' (17.83) c/m	net c/m	c/m/bkg	sd. = 3' (2.00) c/m	net c/m	c/m/bkg	sd. = 4' (2,125) c/m	net c/m	c/m/bkg
32116		25.0	75238		58.8	113845	##	89
56218		43.8	62269		108.5	94028		154.8
28071		55.9	52249		132.1	79349		200.8
5822		75.3	38125		181.5	57350		273.0
2094		93.8	30864		234.5	45269		351.0
1380		107.8	18937		259.4	29688		348.0
5456		86.6	13545		225.0	20101		319.0
2807		93.5	6998		238.0	10797		358.0
1506		85.8	3977		140.X	5913		214.0
723		36.5	1821		89.7	2986		147
185		13.1	405		26.5	696		95.5
			58		4.44	82		9.54
			1		1.43	3		4.24

6-19-87

V	Game C	F	Pd	P.L	x	req	int	Cy.	Time	R.	S
800	64	1	20	20	257	294	18	75282	1		
			30	30	256	243	57	62267	1		
			40	40	256	204	25	52249	1		
	32	1	30	60	256	148	237	38125	1		
			40	80	256	118	56	30260	1		
	16	1	30	120	256	73	249	18937	1		
			40	160	256	52	233	13545	1		
	8	1	30	240	256	27	86	6948	1		
			40	320	64	59	1	3777	1		
			50	400	64	28	29	1821	1		
	4	1	30	480	64	6	21	405	1		
			35	560	64	0	35	38	1		
			40	640	64	0	1	1	1		
	64	1	20	20	256	444	181	112845	1		4
			30	30	256	367	76	94024	1		
			40	40	256	309	245	99349	1		
	32	1	30	60	256	224	6	57355	1		
			40	80	256	176	213	45249	1		
	16	1	30	120	256	112	16	28688	1		
			40	160	256	78	133	20101	1		
	8	1	30	240	256	41	251	10747	1		
			40	320	256	23	25	5913	1		
			50	400	256	11	170	2486	1		
	4	1	30	480	64	10	56	696	1		
			35	560	64	1	18	82	1		
			40	640	64	0	3	3	1		





KEUFFEL & ESSER CO., N. Y. NO. 358-71
Semi-Logarithmic, 3 Cycles × 10 to the inch, 5th lines accented.
MADE IN U.S.A.

6-20-51 Bkg - @64-1,20, @900V jams 256 scaling

61 30 @ 4000 256 x 58 + 217/min

Bkg @ 700 V 8-1, 30 (RL 40) t= 1500s ± 25m Ct 21x16+9 = 345 = 13.8

40 320 t = 3m 2x16+4 23 = 11.0

6-21- Bkg @800 8-1, 50 400: 3m. at 3x16+13 = 61 = 61/3 = 20.3 g/m

4-1 30 480: 10m 9x16+9 = 153 = 15.3 g/m

35 560: 11m 5x16+14 = 94 8.55 c/m

40 640: 20m 0x16+14 14 0.70 g/m

6-22-51 Comparison response to Ra & Po-Be sources.

Set up: 1 5" 1 Pm. Source

S.d = 11"

Source Pm

24: 16-1, 30 (120) V=800

Ra on top end 212,

Ra.	Po-Be @ 8½" no source under Pb
3x64+16 = 208 c/m ± 14.4	2x64+54 = 182 ± 13.5
3x64+58 = 250 c/m ± 15.8	2x64+51 = 179 ± 13.4
3x64+54 = 246 ± 15.7	2x64+53 = 181 ± 13.5
4x64+2 = 258 ± 16.1	3x64+29 = 221 ± 14.8
3x64+37 = 229 ± 15.1	3x64+26 = 218 ± 14.7
Po Be @ Pb 64x66+14 = 4238 ± 65	Both sources only 5m. Pb. in 2" safe.
64x65+2 = 4162 ± 64.5	0x64+54+57 = 87 ± 7.35
64x65+2 = 4162 ± 64.5	3x16+12 = 60 ± 7.75
64x66+8 = 4232 ± 65	3x16+9 = 57 ± 7.55
64x66+27 = 4251 ± 65.3	

Ra under Pb: Po-Be air all position.

7x16+6 = 118 ± 10.9

6x16+7 = 103 ± 10.3

6x16+12 = 108 ± 10.4

PB173-175
Ixmi counts

9/25/07 PM counting: 5819+ Auth. 7958 LA 16-1 .2μs - 30

shield; 1" paraffin 8" lead - 1 sheet Cd. ; ~~[illegible]~~ 4m

133 x64 + 57 = 8569 4284.5 ± 46.3 } A
133 x65 + 57 = 8571 4285.5 ± 46.3 }

shield; 1" paraffin - 8" lead:

118 x64 + 56 = 7608 3804 ± 43.6 } B
117 x64 + 48 = 7536 3768 ± 43.4 }

shield; paraffin - lead - Cd.

133 x64 + 29 = 8541 4270.5 ± 46.2) A

~~x64~~

shield: Pb + Cd. 139 x64 + 48 = 8944 4472 ± 47.3 } C
138 x64 + 30 = 8862 4431 ± 47.1 }

shield; Pb 132 x64 + 13 = 8461 4230.5 ± 46.0) D
130 x64 + 18 = 8338 4169 ± 45.6)

Pb + Cd 2; 135 x64 + 21 = 8671 4335.5 ± 46.5)
139 x64 + 3 = 8899 4449.5 ± 47.1) C

Pb 132 x64 + 43 = 8491 4245.5 ± 46.1) D

Bkg. 8 x16 + 16 + 138 69 ± 5.87

9-6/10 Constructed master Ixmi control panel for use with counting systems in Rm 202.

10-1-57 Proposed Monitoring - Counting system for 201-202 -
Detection: 5819 of anthracene, detecting β's & neutrons
Preamps: with PM as a unit
The above units in 201. Cables necessary to join
to Rm 202: { 1 H.V. coax -
1 7 conductor lo. voltage - signal -
1 coax for signal

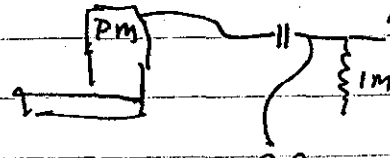
Rm 202 - C.R.M - (RCL) - E-A recorder
Scaler
Alarm circuit - auditory annunciator

(ref. p 140 H.)

11-14-5-1 Preliminary Runs on 5819-B, γ counter.

Source on Std (Reading on rate m 215 295.8 c/s vs. 1.2 c/s bkg
on 17,760 c/m vs 72 c/m)

Voltage +1105 ; Anode Resistor $10^6 \Omega$; Comp. Cap 80 μμf.



		Scaler		Counts	c/s	c/m	diff
	Time	x256	+				
in source	300 s.	39 x16	191	10175	3392	10-12 Kc/m	x5
out	300	6	2	98	.327	80-100 c/m	x ≡
scaler out from RM out:		x256					
	100 s	65 x16	12	1661-2	166.52	-	y =
	100 s	6	4	100	1.0	-	1

PM out circuit to Scaler: HV = 1100

		x256			
S. in	100 s.	18 x16	131	4739	47.39
S. out.	100 s.	3	8	56	.56

Change Anode Resistor. = no improvement =

PM – LA 2.5 g. .2 μs – PH 20 ; HV = 1100

					c/s
		x256			
S. out	100 s	3x16	12	60	.60
S. in	"	21	242		
S. i. PH 10.	"	41 x256	108	15616	156.16 c/s
S. o.	"	80	–	80	.8 c/s
PH 5		88 x256	+ 280	22788	227.88
		–	157		157

Cf. results on G.M. Rm 215 Std: 45 c/s. 2700 c/m

Bkg 0.45 c/s 27 c/m

11-15-57 β, γ scintillation head:

bkg H.V. 1100. 1 Meg Anode res.

Time seconds	Scaler x222 +	Count	Counting Rate	
1000	- 177	177	.177 c/s	Bkg.
1000	- 174	174	.174	Bkg.
200	- 78	78	0.39	Source in
H.V 1140 +5 100	19 40	4904	49.04	S. in.
	19 66	4930	49.30	
	18 22	4630	46.30	
	18 223	4831	48.31	
	x67			
1000	7 43	491	.491	S. out (on shield)
100	48 61	3133	31.33	S. in
"	- 42	42	.42	S. out.
"	47 34	3042	30.42	i
"	40 45	2685	26.85	i
"	41 38	2662	26.62	
"	- 48	48	.48	"
	35 12			
H.V. from Scaler "1075" 1145 100	x14 226 3	3619	36.19	S. in
	202 12	3244	32.44	
	205 11	3291	32.91	
	209 02	33.46	33.46	
+10V HV change *	161 15			
	116 7			
1000	22 3	385	.385	Bkg.

Conclusion: Power Supply not well regulated enough to run work.

11-16-17 Check on PM & HV Supply 12

12:21 Set HV 1150 zeroed on E.S. Vm.

12:26 1150 RM-EA .45 (x3)

13:15 1150 .24

13:35 1150 .25

14:50 1150 .18

11-19-17 13:40 7,0 RM 1150 EA(x3) .40 2.0'

Changed to - RC. — 1150 still noted drop in count rate

11-20-17 10:15 Zeroed on source in - RM x10 HV 1150

10:20 Mark 1 1180

21 1160 .65

11 20 M2 1160 .40 Seems to level off after dropping for 2 Scalers.

13 20 M3 1150 .30

13 45 AM 1150 .20

Bkg: 12 c/m

Source: 50x16 +7 = 807 c/m

1000 v RM scaler 2 Bkg: 17 c/m; Source: 12Vx16 +2 1986 c/m

1000 v RM scaler 2 scale by CF on RM input. Scaler seems incorrect

& adj. Disc. slope & Disc. gain controls -

Bkg (63 c/m) 3x16+15

Source 578 x16 +10 / 925-8 c/m

HV 1005 Scale 64: Source 148.5 Bkg .75

150.0

150.25

150 150.25

150.75 .75

.75

Background

		Source	Bkg	
11-20-57 3:37	HV = 600	24.5		
		26.75		
		27.75	.25	
			.25	

84/1 Bkg 15 min 293 1905 c/m
Source 5m 125 x 64 + 21 = 8021 = 1604 c/m

	HV = 950	92.25	
		88.75	
		~~88.25~~	
		91.75	
184/1		~~91.25~~	.50
			.50

Standard in HV @ -950

RM x10	SA	min
~~1345 P 11-20~~		
190	.72	3:35 P 11-20-57

11-21-57 Set HV - 950. Took reading on RM EM @ 0918 Source (<15 min) after Noon on SA .4 (.4 x 200 = 80 x 30 c/m)
(.38 x 200) 65 x 30 c/m - 0940
Checked HV had dropped very slightly - 0942
Checked scaler count: 100.75 (x64) in 1 min. 0945

	95.50		0947
	98.75		0948
	101.25		0950
Bkg	1.5	3 min	0955
	106.0		0956

Bkg - cleaned source pail
1010 Drill shut down equipment

232

RM on fast response - x30 for source

11-21-67

1022 Start up after drill.

1024 HV set to 950v

	RM	EA	Scaler (x64)	
1025	60-70 x30	.32	~~24 cpm~~ 94 cpm	1027
			95 cpm	
			91	
			91	
	~5700 c/m		90	1031
	~30 c/m	190/1	90	1033
			88	1035

1037 61 x30 .32

1043 Reversed polarity of HV — no coupling C (one in RM) — 12 — 11

+950 (Scaler A

1050 Cut off

1154 On

1200 Adj HV to +950

1207 Bkg: 12

Source: 12

Inverted coupling Cap at anode of PM HV jumper to >1100v.

Readjusted to 950v

1212	44 /m	source	2854 c/m	98.4/1
	2 /sm		29 c/m	

1228 115 x3 .6

3:05 p adj to 950 had dropped to ~946.

EA. from 1228 .6 to .53 not for accuracy

3:08	57	3:14	0
	55		0
3:11	54		
	55		

11-21-57

3[15] : Hook up for Scaler power supply HV 950 Scaler reads
Need P.S. trouble with scaler -
Set at 950 @ 3:33 - Scaler Meter reads 900v.
3:41 - 45^{54}, 48^{15} Bkg 41
$92^{60}/2$ (46^{30})

4:08 - NICC 950v sup → scaler Rm off input strip jack.
Rm. 10^4 c/m Sc: 142^{62} 9,150 c/m
Bkg: 52 c/m

11-23-57 Turned on HV 0815. Reading, without adjustment, 953 v.
(Scaler HV on. no load) NICC Power Supply. Adjusted to 950 on Electrostatic Vm.
Bkg. : $3^{16}/5$ 208/5 41.6 c/m
V 946 v. S: 117^{22} 0826
Reads: 140. to 950
Bkg: $44^{45}/60$ 0929
V 952 S: 152^{21}
153^{57}
153^{33}
153^{57}
153^{62}
Let run with source in HV V 951-2 - 5A .62 (RMX100) 0939
1230 [Check on Scaler HV Power Supply. Put 3.9×10^6 Ω resistor on as load to see if failure observed 11-21 recurred]
1:11 P 149^{53}/ RMX100 (130-140) 5A. 65 HV 950

Series of attenuator source & bkg counts taken, source 1m, bkg 0 m.

11-23-87 Time	Sample	Register int/time	ECt	CR	em	EA
1:17	S	149 42 / 1		9,578	13500	.66 2^2
1:19	B	3 21 / 5	223	44.6	40	.20 2^2
1:25	S	150 6 / 1		9,606	14000	.70 2^2
1:26:30	B	3 12 / 5	204	40.8	50	.25
1:32	S	145 19 / 1		9,298	13300	.67
	B	3 44 / 5	236	47.2	40-50	.22-.25
	S	146 59 / 1		9,403	13000-14000	.64-.69
cleaned S *	B	3 28 / 5	220	44.0	—	— HV881
	S	147 4 / 1		9,412	—	—
	B	3 18 / 5	210	42.0		
	S	149 34 / 1		9,570		
	B	3 34 / 5	226	45.2		
	S	146 4 / 1		9,350		
	B	3 47 / 5	239	47.8		
	S	147 13 / 1		9,421		
	B	3 30 / 5	222	44.4		
2:18	S	147 14 / 1		9,422		948
	B	3 40 / 5	232	46.4		
	S	146 5 / 1		9,349		
	B	3 12 / 5	204	40.8		
	S	145 39 / 1		9,319		
	B	3 59 / 5	244	48.8		
	S	145 24 / 1		9,304		
2:45	B	3 53 / 5	245	49.0		
	S: avg	9,419 ± 187		± 2%		
	B: avg	45.17 ± 4.63		± 10%		

11-23-57 3:49 Swapped HV Power Supplies - [NICC untouched] setting glass on Scaler. adj to ESUM reading of 9370 -

S 154 14/1 9875 c/m Ea. 65 2:52

left running to see if get faulty behavior of P.S.

3:45 EA dropped slightly - 148 43/1 EA. 60

adj. RM scale @ 8 from 1. RM 98-104×10³ Ea -

11:02 131 52/1

183 04/1

145 57/1

145 37/1

10 min avg 147.2

11-26-57 10:25 Rate Meter & Scaler Low voltage on

10:43 Scaler HV on Readings on ESUM 9370

	Sample	Register w/Min	Σ4	c/m	RM	EA.
10:44	Bkg.	3 15/5	207	414		
	B (Si slide)	3 33/5	225	45.0		
	S	128 24/1			80-90×10²	.43
	B	0 56/1				
	S	131 34				
	B	0 35/1				
	S	133 2/1				
	S	137 6/1			85-95	.45
11:06	"	136 59/1				
	"	137 54/1				
11:09	"	139 53/1				
	"	140 60/1				
11:12	"	—	—	—	—	.47
11:20	Sline	to Low limited HV @			~510⁴ c/m	~1-

(Dirid

11-27

11-26-37

12:20 RM $90-100 \times 10^2$ EA .47

Sc 145^{-32}

12:55 Cut off HV power.

1:15 P HV on (source in) Rough Check on count-

At 10 minute Register 148.7 or 148.7 x 64 / min

EA (48 ± 10)

1:38 P Run 10 min rough Check:

147	- 147	
295	- 148	
441	- 146	
590	- 149	
736	- 146	
882	- 147	
1032	- 149	
1181	- 149	
1328	- 147	147.6 89
1476	- 148	

1:49 P Run 10 min rough check continued without reset

20	1200	147.0	147.0
30	1800	2952	148.0
40	2400	4406	145.4
50	3000	5870	146.4
60	3600	7307	143.7
3:21 100	6000	8760	146.3
		14629	146.29

new HP lamp

(Divider up to now 3@ 510k 8@ 300k Counts 22M ¢/(M will.)

11-27-51

			Remarks						
	0810	–	Lo Volts on Rm-Scaler	HV 950 165 59/1	¢/m 10619	Ca 56×2×10⁴	820 0 16	16	
	0815 45"	–	count on	0 56/1	56		4 3	259	
	t=0 m. (0816 45)	–	HV on. 5 min. 1458	940 0 29/1	53		810 1 53	117	
	1m.	120	75×10² RM, .87×2×10⁴ EA	158 29/1	10141		0 13	13	
	2m	240	120/m at start)	930 149 29/1	9564	Ca 50	800 0 11	11	
	9m	1089	84×10²; .4×2×10⁴	0 27/1	50		0 18	18	
	10m	1214	125/m						
	24	3050	95×10²; .44×2×10⁴	920 0 47/1	47		950 166 22/1	10626	
	25	3183	133/m						
	45	5940	50-35×10²; 56-47×2×10⁴						
	46	6079	133/m	134 24/1	8605	Ca 45	0 53/1	53	
	½ 2m	143 46/1	9,198 c/m S	910 121 19/1	7763	.39	860 0 62	62	
11:50·45	½ 4m 2h 44m	77 33/100	49.6 c/m B	0 32	30		1745 24/1	11190	
	2h 45	196 23/1	9367 c/m S	900 0 33	33		870 182 29/1	11842	
		2236 6/15	9,541 c/m S	111 36/1	7140		1 12/1	76	
	11:18	cut off HdLv.		890 96 62/1	6206		884 1 1/1	74	
	12:00	Rm on		0 30	30		192 62/1	12350	
t=0	12:07	Scaler L & H on		880 0 24	24		HV off – run 30 min to see if any appreciable count in –		
	0m10s	count on		83 60/1	5372				
	m s 1 16	90,	HV low "906	870 66 10	4234				
	2 16	217,	127	0 26	26				
	3 10	345	128	860 0 20	20		30 min	0.000 c/m	
	4 18	474	129	50 15/1	3215		175 14	530	
	5 10	603	129	850 34 29/1	2196				
	10 10	HV off – run		0 30	30				
¢ new divider ¢P 10M ¢ 9.1M Counts 1M	37 m.	HV on Adj for 950		840 0 20	20				
	39	182 43/1		23 15/1	1490				
	41	4 28/1		830 13 33/1	855				
	47	169 7/1		0 13	13				

Lunt RM 175 950 (100)

11-28-81

0740 RM on.

0746 HV on - Reading 545 * Time after HV on.

Time*	Reg. Counts		E.A	RM
15-16	2568 / 2352	156	~10000 c/m	.52x2x10⁴ ~ 10400 c/m	100-110x10²
20-21	3287 / 3131	156		.51x2x10⁴ ~ 10200 c/m	
25-26	4064 / 3910	154			
1110 / 14:10/11 3h 24-25	31684 / 31527	157		.51x2x10⁴ (154.6)	
11:15	Power off				
12:53	Power (HV) on -				
1h 12-13	11256 / 11200	156		.51x2x10⁴	
1h 39-40	15583 / 15272	311 / 155½			
4:13 3h 20-19	30673	155			
19	30518	155			
18	30363	154			
17	30200	151			
16	30058	151			
15	29907	156			
14	29751				
3h 24-25	31434 / 31281	153		(153.3)	

During day rise in voltage (perhaps cool) to 550

11-24-57 11:02 RM on & EA on - put source in tray -

11:10 HV on & clock turned.

Time -	Elapsed time(m)	Reg'ds Counted	Ra	RM.
	2 560			
	3 429	140/m	.44x2x10^V	
	6 853			
102	5 710	143/m		
	10 1418	141.8/m		
12:40	16 35 - 13620	144/m	.46-47x2x10^6	
	36 - 13264			
	39 14196			
	40 14339	143/m		V 946

Removed ESVM

				SA
1435 240P	10 min count (Std)	1435x64+37	9187.7 c/m	.46-47x2x10^6
257P	Bkg - 20 min	21x64+0	44.8 c/m	(205.1/1)
324P	10 min count (Std)	1439x64+21	9211.7 c/m	.46x2x10^6

11-30-57 0821 HV on - (source in overnight

0822A	10 min count Std	1368x64+37	8758.9 c/m	.44x.2x10^6
0833A	60 min count Bkg	169x16+2	45.1 c/m	
0935A	10 m. ct Std.	1345x64+42	8612.2 c/m	
0946A	60 m. ct Bkg.	174x16+2	46.43 c/m	
1049A	10 m. ct Std	361 + stopped after 29 min		Ea Ball Rn source
1101A	10 m ct Std.	1427x64+63	9139.1 c/m	
1119A	60 m ct Bkg	163x16+10	43.63 c/m	
1221P	10 m ct Std	1519x64+34	9725.0 c/m	
1232P	60 m Bkg	178x16+3	47.53 c/m	
134P	60 m Rn 20	171x16+0	45.60 c/m	
2 36P	10 m Std	1484x64+14	9499.0 c/m	

240

11-29-51

Data on GM counters in Rm 215 on expts run 10-18/26-51

Standard.

			Time		Rate	
C_1:	10-18	826x16 +15	5	13231	2646.2	
		846x16 +11	5	13547	2709.4	
	10-19	860x16 + 7	5	13767	2753.4	1.785% +48.9 2705.0
		844x16 +13	5	13517	2703.4	2.17% −58.9
	10-26	1715x16 + 15	10	27435	2743.5	
		1664x16 + 0	10	26624	2662.4	
		1696x16 +14	10	27150	2715.0	
C_2:	10-18	973x16 + 5	5	15573	3114.6	
		240x64 +42	5	15402	3080.4	
	10-19	973x16 + 0	5	15568	3113.6	+21.6
		953x16 +15	5	15295	3059.0	3092.0 −34.0
	10-26	1933x16 + 1	10	30929	3092.9	
		1943x16 +15	10	31103	3110.3	
		1925x16+ 0	10	30800	3080.0	
C_3	10-18	850x16 +1	5	13601	2720.2	
		865x16 +7	5	13847	2769.4	
	10-19	851x16 +11	5	13627	2725.4	+ 36.6
		845x16+10	5	13530	2706.0	2737.4 − 31.4
	10-26	1716x16 + 11	10	27467	2746.7	
		1733x16 +12	10	27740	2774.0	
		1700x16 +0	10	27200	2720.0	

11-29-57

	C4: 10-18	818x16 +6	5"	13094	26188	
		834x16 +1	5"	13345	2669.0	
	10-19	795x16 +10	5"	12730	2546.0	+102.9
		824x16 +2	5"	13186	2637.2	2566.1 -858
	10-26	1581x16+14	10	25310	2531.0	
		1553x16+3	10	24803	2480.3	
		1550x16+3	10	24802	2480.3	

11-30-57 C 2 20m Pkg 28x16+11 = 22.65 c/m

11:30 A 5m Aer 20 1586 +5 = 99.10 c/m

12-3-57 10:35 20 am. put same in.

10:36½ 3m ctsl 319x64+27 6814.3 c/m

10:40½ bkg 70m 156x66+16 3586 c/m

11:57 std 4m ct 439x64+7 7025.75 c/m 39-35 x 2x10⁶

continued with standard in.

12:55 relocated work cleaning up & putting on C-5 um &

check Voltage E 945

12:57 S 183 57/1 11,769 c/m .57 x 2 x 10⁶

12:58 B 21x16+11 (5m) 69.4 c/m

1:05 S 184 61/1 11,837 c/m

1:06½ S continued to check for drift

2:15 E = 945 Kiers unchanged

3:22 S 1m: 190 47/1 12,207 c/m

12-4-57 0828 Placed source under tube. Turned on HV.

0829 std at 177 46/1 11,374 c/m E 945

0831 Bkg at (60m) 231 x16 +5⁻ 61.68 c/m 0830 945

0835 STK in - for extended count. 0545 945

1100 std (1m) 178 24/1 11,416 c/m

3:00 P std (1m) 175 42/1 11,252 c/m 3:30 P . 0952

12-5-57 0815 Power on (HV) 945 12

0822 std 1m (64) 170 17 10,897 c/m

0823½ bkg -60m (x16) 214 2 57.10 c/m

0848 std 1m (x64) 167 56 10,744 c/m

2:06 P std 1m (x64) 165 40 10,600 c/m

2:09 P bkg 60m (x16) 205 13 54.86 c/m 952

(no spurious counts from overnight Lo V only)

12-6-57 1110 A power on (HV)

1112 std 1m 145 64 9324 c/m

left source on and counter on for extended recording

to see if drift overnight

12-7-57 0806 A std 1m. 140 51/1 9011 c/m 952

1043 A " 132 52/1 8,506 c/m

1047 - disconnected tube assembly from scaler HV supply. Reconnected for negative supply (Nicc Power supply)

Set voltage at 950 (ESV on panel outer scale)

Let run for HV to reach stability -

12:27 P std 1m (64) 128 27/1 8219 c/m ± 80

12:29 P bkg 60m (x16) 255 12 39.73 c/m bkg.

12-7-57 2^{13}P - std 1m (x64) 129^{30}_{1} 8286 c/m ± 91

12-10-57 12^{20}P HV on (950-)

12^{21} std 1m (x64) 110 7040 c/m

12^{23} bkg 40m (x16) 9^{3}_{6} 37.35 c/m

1^{06}P std 2m (x64) 208^{52} 6,682 c/m

Noted slight downward drift on S-A during day. Left on over night.

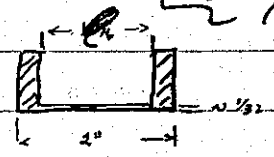
12-11-57 Rate dwel head dropped a little from that of 12-10-57.

0928 std 1m (x64) 94^{40} 6,057 c/m

0930 bkg 60m (x16) 133^{8} 35.60 c/m

1035 Took head apart. Noted that crystal had slipped down & was no longer intact with PM- Surface slide was scraping surface.

Made plastic (lucite) holder for crystal.



12-12-57 Put ears on holder to hold it in place under PM tube.

Made ears 7/16" long & sanded down to snug fit in tube housing (2 7/8" i.d.)

0930 set up for count

0932 HV scale on .946

0937 bkg 5m (x16) 14" 49.0 c/m

std 1m x64 50^{2} 3202 c/m

1007 std 1m x64 51^{51} 3318 c/m

1010 std 1m x64 50^{50} 3250 c/m

12-12-57 put mineral oil on top of crystal -

std 1 in x64 15-31 991 c/m

took out mineral oil & replaced x'tal

std 1 in x64 63-40 4092 c/m

Does account for oil of no significance - except as indicating that position of tube re crystal is critical. Noted that slight change in position of tube, the covering of tube collar 1/32" on one side, would reduce count from 4000 to 1000 c/min.

Still has much attenuation when 3/64" lucite.

Cut out hole in cover, leaving lip enough to hold crystal in place.

Replaced crystal & tube.

In position of reasonable count - RM indicates 11000 c/m

1.40 172 00 11,008 c/m

1.42 171 " 10,955 -

1.44 170 30 10,910 c/m

170 "

172 15-

screw holes aligned → 55 15-64 + 4 in 2 m.

outgoing: 171 5-

Reversed x'tal orientation.

163 31

x'tal back as before

164 22 .868

Tube removed then 188 -

210 P 207 8 13,216 c/m

12-12-17 Bkg 3m 14 x16 + 0 74.6 c/m Avg: --
3:00 P 207 7 13,255 c/m SH. 13,255.5 c/m
Std to Rm 215.

12-13-17 11:30 HV on -
11:31 Bkg 60m (x16) 297 79.22 c/m Rm ~~20~~ 80 c/m 169/1
12:41 Std 1m (x64) 208 57 13,363 c/m Rm ~ 13-14 Kc/m
After std ran bkg to see how trace on EQ behaved.
2:52 std 1m x64 209 24 13,400
" 207 6 13,254 Avg: 13,303.8 c/m
" 208 22 13,334
" 207 29 13,277
" 207 6 13,254

12-14-17 08:12 HV on.
08:14 Bkg 5m (x16) 23 4 74.4 c/m
0819 Std 1m (x64) 208 38 13,350 c/m
0821 std 1m x64 207 12 13,260 Avg. 13,256.4 c/m
" 205 52 13,172
" 209 00 13,376
0827 " 205 11 13,124

1100 30 x 64 for a group of I foil. (GM 215 176 x 64)
Left E.M to trace curve

Data on I decay →	T	Sc	T	Sc	T	Sc	T	Sc	T	Sc	T	Sc	T	Sc	T	
0	1:35	125 36	8	203	115 63	76 m 2:11	102 11	24 m 2:19	97 33	32 m 2:27	87 00	40 m 2:36	77 30	48 m	69 41	
2	1:57	122 57	50 m		110 49	48 m	102 58	28 m	95 24	34 m	87 14	42 m	74 39	50 m	68 55	
4	1:54	119 31	42 m		109 54	20 m	98 28	28 m	95 09	36 m	83 26	44 m	73 46	52 m	64 46	
6	2:01	118 62	44 m		104 41	22 m 2:17	100 15	30 m 2:25	90 26	38 m 2:33	80 45	46 m 2:41	70 45	54 m	64 35	

Exp in 108 during

12-14

T	SC.
56	63^{24}
58	61^{16}
(2:55) 60	60^{05}
65	56^{62}
70	53^{19}
75	49^{49}
80	47^{37}
85	43^{19}
90	41^{12}
~~95~~ 95	36^{06}
100	36^{15}
105	34^{41}
110	31^{43}
115	29^{54}
(3:55) 120	27^{12}

12-17. 1100 HVac

11:10 began bhg - 66x^{416} 816^{13} 76.80 c/m

12:25 std 1m^{x64} 207^{27} 13,275 c/m

206^{20} 13,204 c/m Avg -

205^{10} 13,130 c/m 13,240.4 c/m

208^{15} 13,327 c/m

207^{18} 13,266 c/m

12-18-57 0820 HV on.

0824 std 10m x16 2045 49 13,092.5 c/m

1m 204 16 13,072 c/m

0840 bkg 61m x16 263 5 69.07 c/m

12-19-57 0839 HV on

0840 bkg 60m x262 16 188 71.40 c/m

0941 std 1m 203 33 13,025

1m 201 50 12,914

1m 201 52 12,920 12,949.4 c/m

202 21 12,949

202 11 12,939

12-20-57 1230 HV on

1232 std 203 54 13,046

201 20 12,884

207 6 13,254 13,015 c/m

201 22 12,886

202 3 12,931

204 33 13,089

12-21-57 1202 HV on.

1220 bkg x16 50m 222 64 bkg 71.12 c/m

1230 std 1m 198 35 12,708

202 20 12,948

201 5 12,869 12,816 c/m

200 34 12,834

198 49 12,721

12-26-57 6815 Tunnel on low voltage equipment.
Setting for counting check of PM detector -
1020 KV on -
1021 bkg (x16) 3m. 19 75,00 c/m
std (x64) 1m 195 42 12,522 c/m
- 198 9 12,681
- 158 26 12,698 12,691.8 c/m
- 159 24 12,760
199 62 12,794

bkg

12-29-57 1058 std x64 1m 199 43 12,779
197 52 12,660
201 24 12,892 12,647.2 c/m
194 3 12,419
158 6 12,486
bkg x16 5m 432 5 116.1 c/m

1-2-58 2:50P bkg x16 5m 23 8 75,20 c/m
std x64 1m 189 29 12,125
189 34 12,130
190 15 12,171 12,128.4 c/m
190 61 12,221
187 23 11,991

voltage low - not good -
190 41
190 17

1-3-52 8:25 HVam

8:57 Bkg - non sum.

12:00 Bkg - x16 40m 168 10 67.45 c/m

1-5-52 8:17 HVam.

8:36 std x6 1m 191 3 12,277 c/m

193 19 12,371

191 23 12,247 12,320.6 c/m

194 05 12,461

191 23 12,247

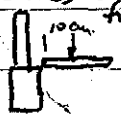
8247 bkg x16 30m 132 9 20.70 c/m

1-9-52 Mueller. Work input operating from RCA rate meter.

Check of inputs A: CK 1020 tube (Input B not connected)

a. filaments on; b. Aplate voltage on c High voltage on Scaler

source (plaster cube) in 10 cm. from edge & pressing



Volts	response	Reading on Rate Meter multiplier	"c/m"	Scaler c/m	
≤ 800	f	~~10~~	—	—	
810	f	10	—	—	
830	f	3	100	7^{44}_{--} +14	462
840	f	30	60	58^{64}_{--} +33	3745
850	f	30	70	65^{14}_{--} +11	4171
860	f	30	81	66 +29	4253
870	f	30		68 +16	4368
880	f	30		68 +9	4361
890	f	30		69 +28	4444
900	f	30		70 +42	4522
920	f	30		(?) 67 +37	4325
940	f	30		70 +33	4513
960	f	30		69 +52	4468
860	f	30		65 +21	4181

1-9-82 Monitor

Check on input B:

Volts	Register	c/m
<800		
810	50 + 11	3211
820	64 + 26	4122
830	65 + 49	4209
840	64 + 50	4146
860	67 + 14	4302
880	66 + 9	4233
900	69 + 39	4455
920	70 + 26	4506

Both voltage supplies connected:

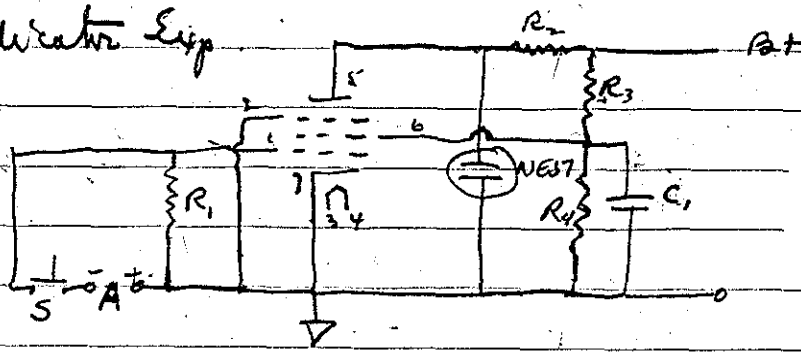
B @ 900: 70 + 29

A @ 900: 71 + 63

B & A same in A position 83 + 2

3-13-52 Level Indicator Exp

6AU6



i.e. B+ = 300 ; A = 6v.

R_1 = 1 meg R_2 = 50K ; R_3 = 500K, R_4 = 300K, C_1 = .25 μfd.

plate volts with S open too high

found R_1 too high, giving voltage on pin 1 = -1v.

voltage readings with 2 K.Ω in R_1

E_p = 160v E_s = 20v } S open

E_g = -.31v.

E_p = 213 E_s = 87v. } S closed

E_g = -2.74

S open: $I_1 = \frac{3.1 \times 10^{-1}}{2 \times 10^3} = 1.55 \times 10^{-4} = 155\ \mu a$

$I_2 = \frac{140}{50} \times 10^{-3} = 2.8$ ma

$I_3 = \frac{280}{500} \times 10^{-3} = .56$ ma

$I_4 = \frac{20}{3} \times 10^{-5} = 67\ \mu a$

S closed $I_2 = \frac{87}{50} \times 10^{-3} = 1.74$ ma

$I_3 = \frac{213}{500} \times 10^{-3} = .426$ ma

Removed R_4: change in E_p less

R_2 = 5.1K E_p higher.

R_2 = 500K. Little E_3 swing ~10-90 v

E_p swing ~20-80

Now R_3 & R_4 R_4 = 3K 20w ; R_3 = 6K 20w. I_{34} = 35 ma.

E_3 swing 78-92 better regulation

E_p 0-72 too low

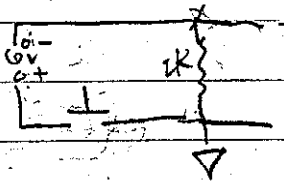
R_2 = 100K I_b = 35 ma

50 SC 50 SC

E_p 3-147 v. I_b = 37 34 ma

E_3 78-92 v

wired as shown!



2000

E_p swing

I_b " 36-33

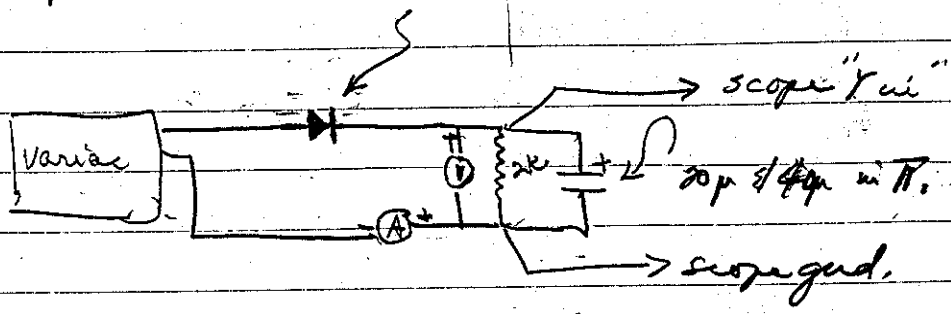
E_3 " 78-92

3-14-52 Checked at E_{bb} of 100 v. Not satisfactory. 2nd light remains on for long time before finally cutting off. High B+ seems to be needed.

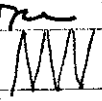
4-16-52 Testing rectifier for power supply. Have found that with #45 (1½w) rca bulbs 100 V. is enough voltage for satisfactory operation. Checking on the rectifier for B+ supply.

S.P. anode → cathode direct use of current (non electronic flow)

4-16-52 Rectifier: Motorola # 48B478111 - 130v 75ma -



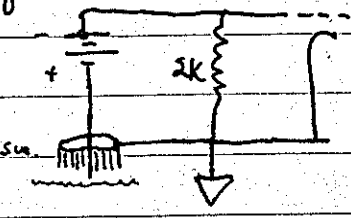
Variac at 110 v.
V = 125 volts.
A = 40,5 ma.

scope

ripple 2-4 volts

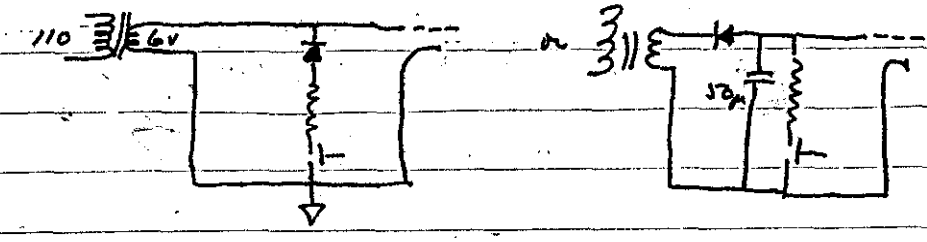
Capacitance increased from 60 to 100 μfd.
V = 127 volts A = 41,5 ma.
No capacitor: V = 43 v,
A = 33 ma,

4-21-52 Checked breadboard ckt.
Lower light on 47.6 cm. Off 47.5 cm.
Upper light on 47.7 cm. Off 47.6 cm.
Power supply delivering 103 v @ 18 ma.

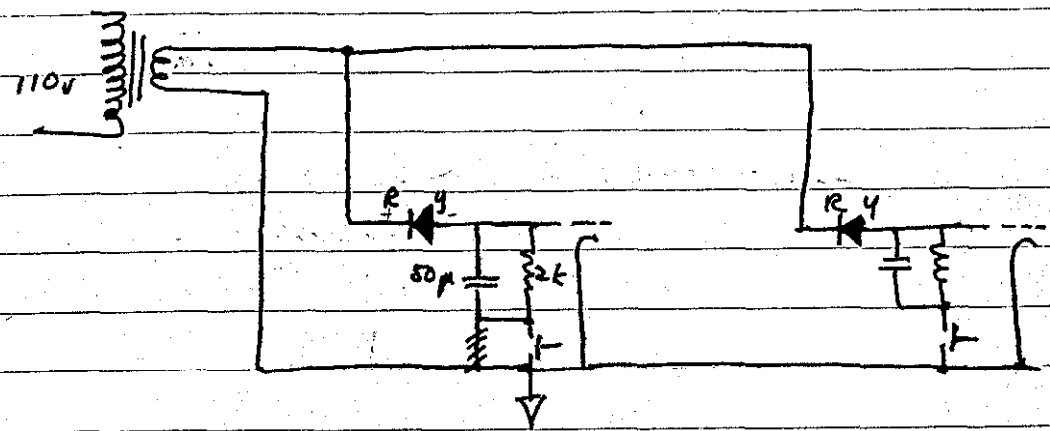
Rectifier bias supply —
Existing grid ckts, each stage separate -



4-21-52 - Rectifier supply:



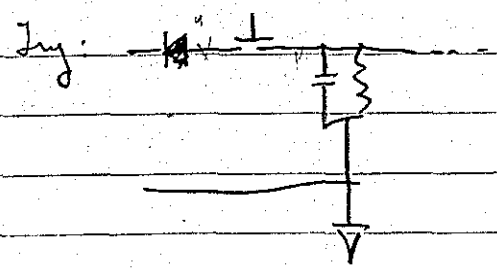
To two stages:



$\frac{C}{50\times10^{-6}} \quad \frac{R}{2\times10^{3}} = 100\times10^{-3} = .1$ sec.

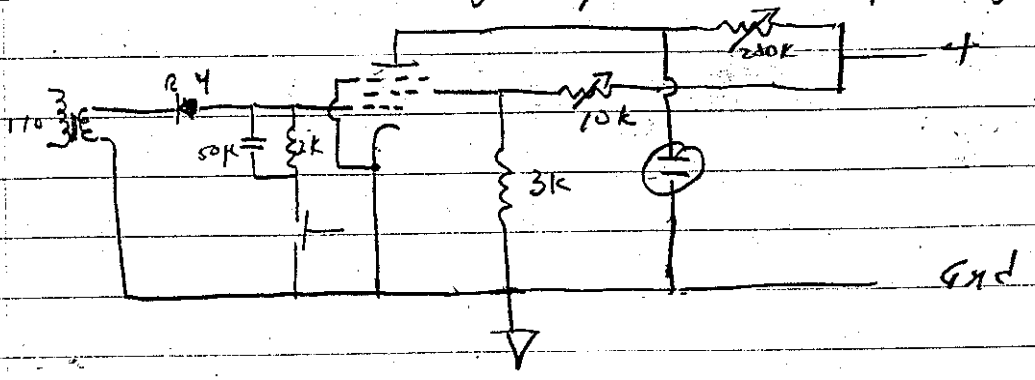
Higher RC, time of discharge may be too long for tight cut off.

Above wiring - Tubes do not cut off grid drops to -3.5v Plate to +35-40.

Try:  This out - need one side of center tap.

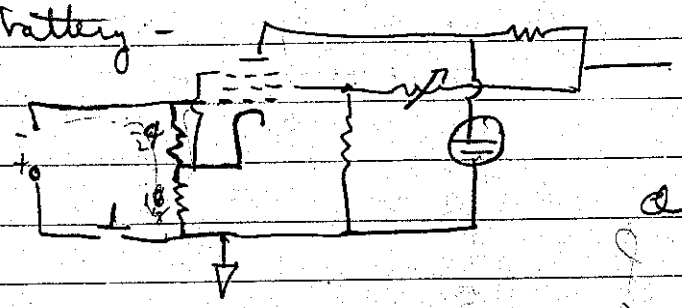
$\frac{3.7v}{2\times10^{3}} = 1.8\times10^{-3} = 1.8$ ma $\qquad \frac{7v}{5.0}\times10^{+2} \quad 1.40 - 140\Omega$

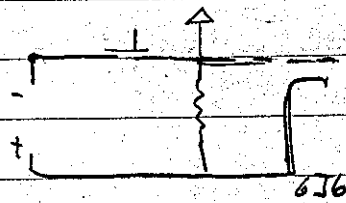
4-22-52 Checked cht with scope after rewiring single stage. 4-

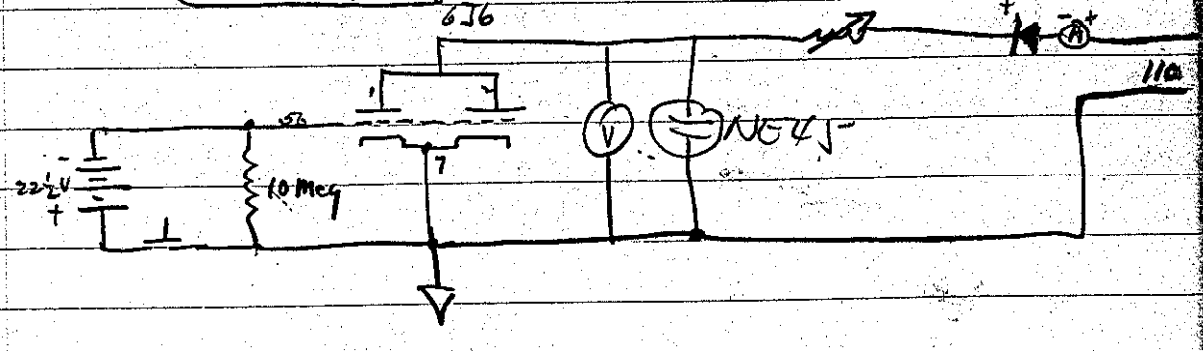


This not workable, when cct opened, ac appeared on grid.

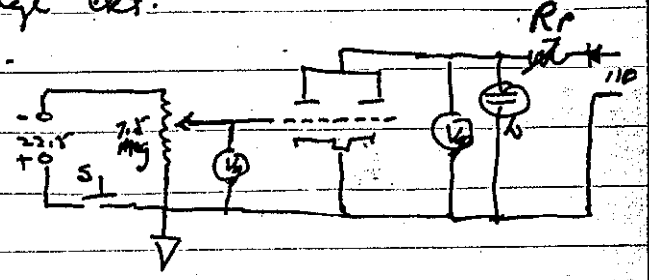
Back to battery -







4-23-52 Further tests on single stage ckt.
change in grid for test.



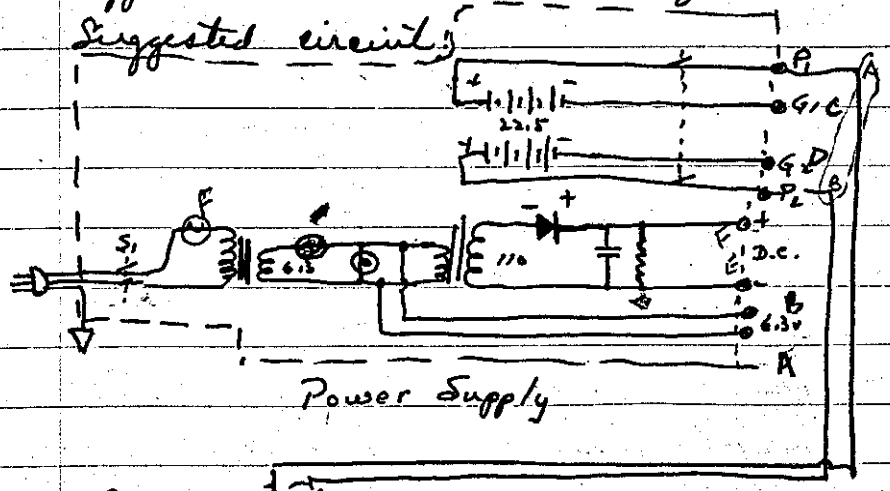
S - liquid level probe.
V_g - Vernier, V_p - Simpson -

S	V_g	V_p	R_p	L
c-o	19-1.6	81-48		ON-OFF
c-o	18-1.4	81-40		ON-OFF
c	17-~~1.5~~	81-~~38~~		ON
c	16-	81-		ON
c-o	15-1.3	81-38		ON-OFF
~~c~~	~~12~~	~~81~~		~~ON~~ OFF
c-o	10-1.25	81-34		ON-OFF
c-o	8-1.2	81-32		ON-OFF
c-o	6-1.1	81-30		ON-OFF
c-o	5-1.05	79-29		ON-OFF
c	4.5-	78-		ON
c-o	4.0-1.0	77-28		ON-OFF
c-o	3.5-1.0	73-27.5		ON-OFF
c-o	3.0-1.0	68-~~27.5~~		ON-~~OFF~~ on after reclosing
c-o	2.5-.98	62-27		ON-OFF not refire
c	2.0-	54-		OFF
c	2.5-	64-		OFF
b: Firing pt. c	2.9-	67-		ON←
b: Ext. pt. c	2.3-	61-		OFF

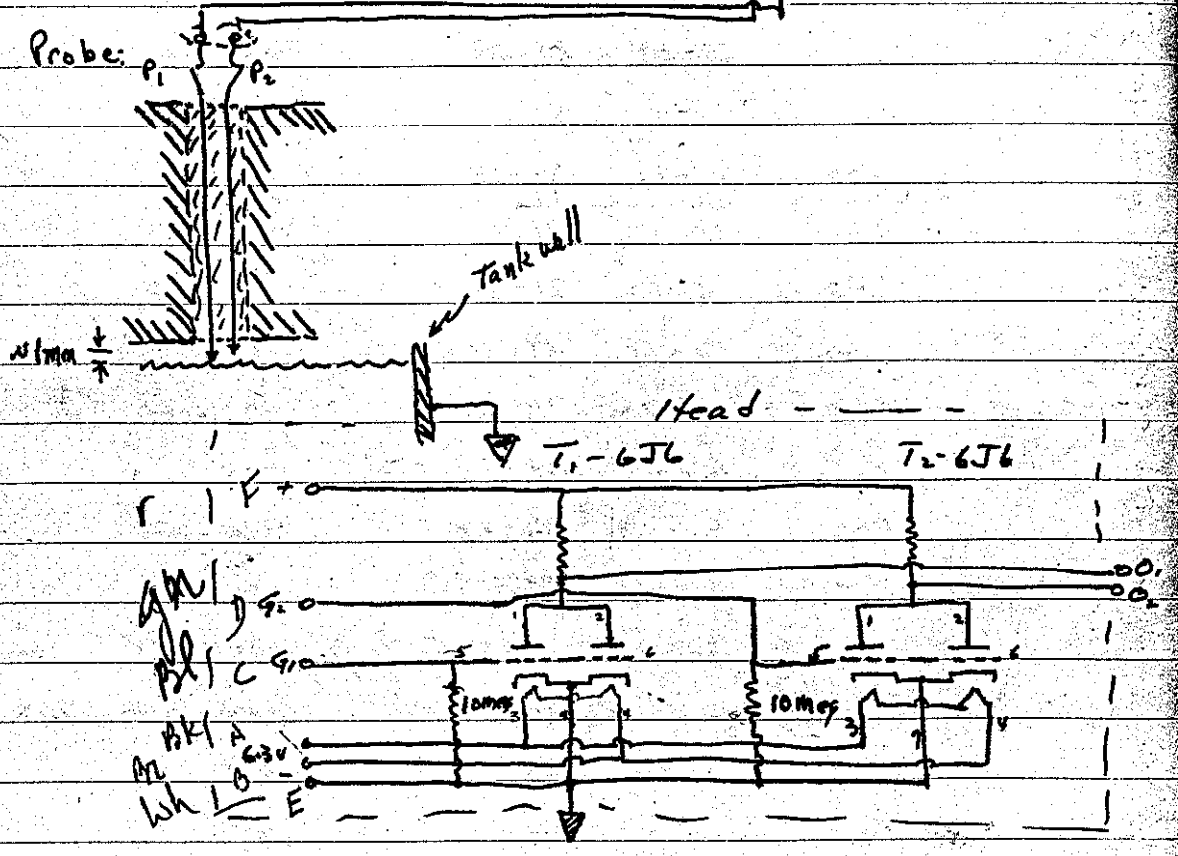
11a

4-23-52 Need to have isolation between 110 input & elec.
suggest 110-6.3:6.3-110 transformer.

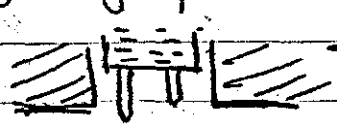
Suggested circuit:

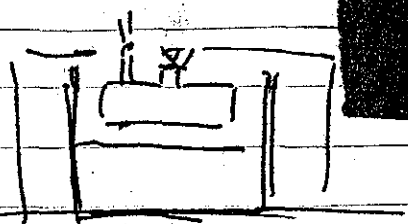


Power Supply



6-10-52 Shop test of finished model. Probe inserted in plunger can so that pins are on level with bottom, low pin projecting slightly below edge.





Plunger in battery jar.
Reservoir in breaker for incremental level changes.
Sight glass -

	L_u	U_u	U_d	L_d
~~Sight~~ Level	39.85 cm.	39.95	39.91	39.82
	29.90 cm.	39.01	39.95	39.90
Level probe	40.02 cm.	40.06	40.08	39.99

3-2/6-53 Probe circuit brought back to 210 for checking.
ERR-VGH Trying to overcome difficulty of continued light indication upon wetting insulator -
Film resistance causes current to pin indicators.
~~Operators off~~
Operators agreed to allow 1-2" of air from probe tips to insulator. This helped. Felt that alert operator not wet insulator with this leeway. Hollowed out insulator as core to help break any film formed.

5-30
10-30 Warning probe to extend 1/2" below contacts suggested. Further record book I p87-

More Service Data on R-M equipment -

4-10-53 Check of sensitivity & response of trip alarm ckt.

Many RM found in 210 shop - NICC HV P.S., pre-amp 6AK5 c.f.

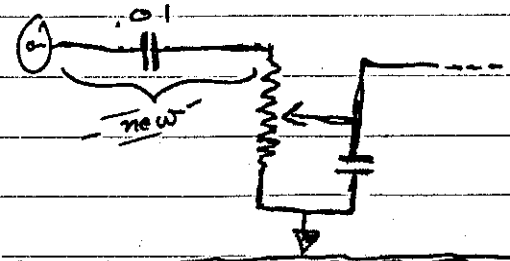
.001 μfd coupling in place to limit.

Artificial signal from 1.5v battery & voltage divider across

E_{in} across 2MΩ	E_p volts on 6SJ7	ΔE_p	Panel Mtr.
0	45	13	.84
.1	58	11.5	.81
.2	71.5	11.5	.78
.3	88	16.5	.73
.4	100	12	.70
.5	111	11	.67
.6	132	21	.635
.62	trip		
.8			

E_p	Panel Meter	E_{in}
20	.91	0
25	.90	
30	.885	
35	.875	
40	.86	
45	.84	
50	.83	
60	.805	
80	.75	
100	.70	

attached pre-amp had Ef drops from 40 → 20 v,
indicating slight positive grid voltage —
at 1200 volts — set keys with 5 mg Ra source —
Removed .001 from c.f. on panel — output of direct
Put .01 μfd in input line of alarm panel



11-10-53 Reported not responding to source AN-15 * keeping

A

B

C