HAROLD E. EDGERTON

PAPERS

MC 25

Series III

Laboratory Notebooks

Number ___

Dated January 4, 1955 to April 8, 1961

PLACE MIT
DATE 1/4/55
OBSERVER PCT & FJM
REMARKS HEE

ATTENUATION RATIO R	METER	D	METER XRAD INCIDENT FT. CAND. SEC.	LIGHT ECPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC.) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
1	92	1		92	900	125	50.8	1.81	3rd	No Reflector
1	94	1		94	900	125	50.8	1.85		
1	96	1		96	900	125	50.8	1.89		
1	100	1		100	900	125	50.8	1.97		
1	102	1		102	900	125	50.8	2.01		
1	103	1		103	900	125	50.8	2.03	1st	No Reflector
1	87	4		1392 348	900	125	50.8	27.4 6.85		
1	142	4		2270 568	900	125	50.8	44.8		0°
1	151	4		2416 604	900	125	50.8	47.6		0°
1	59	4		944 236	900	125	50.8	18.6		5° Left
1	118	4		1888 472	900	125	50.8	37.2		5° Right
	49	4		784 196	900	125	50.8	15.4		10° Right
	87	4		1392 348	900	125	50.8	27.5		7.5° Right
	160	4		2560 640	900	125	50.8	50.5		2.5° Right
	138	4		2208 552	900	125	50.8	43.5		0°
	107	4		1712 428	900	125	50.8	33.8		2.5° Left
	63	4		1008 252	900	125	50.8	19.9		5° Left

No Reflector

PLACE M I T
DATE 1/4/55
OBSERVER P.C.T. & P.J.M.

ATTENUATION RATIO B	METER	D	METER READ INCIDENT FT. CAND. SEC.	LIGHT FCPS	VOLTS E	CAPACITY (MFD) C	ENERGY $CE^2/2$ (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
1	68	1		68	500	245	30.7	2.22	1" Xe	
1	67	1		67	500	245	30.7	2.19		
1	107	1		107	600	245	44.2	2.42		
1	111	1		111	600	245	44.2	2.51		
1	145	1		145	700	245	60	2.42		
1	143	1		143	700	245	60	2.38		
1	170	1		170	800	245	78.5	2.17		
1	167	1		167	800	245	78.5	2.13		
1	190	1		190	900	245	99.3	1.91		
1	190	1		190	900	245	99.3	1.91		
1	192	1		192	900	245	99.3	1.94	↓	
1	58	1		58	450	257	26	2.23		
1	59	1		59	450	257	26	2.27		
1	102	1		102	900	125	50.8	2.01	1st	
1	102	1		102	900	125	50.8	2.01	↓	
1	114	1		114	900	125	50.8	2.24	2nd	
1	112	1		112	900	125	50.8	2.21		
1	114	1		114	900	125	50.8	2.24		

PLACE MIT
DATE 1/4/55
OBSERVER PCT+FJM
REMARKS H.E.E.

ATTENUATION RATIO R	METER	D	METER READ INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC.) $CE^2/2$	EFFICIENCY CP/W	LAMP	
1	110	4'		1760	900	252	101.5	17.3	3-1" Xa in parallel	2.5° Right
1	157	4'		2515	900	252		24.7		5° Right
1	170	4'		2720	900	252		26.8		7.5° Right
1	~~156~~ 155	4'		2495	900	252		24.6		2.5° R
1	152	4'		2440	900	252		24		7.5° R
1	170	4'		2720	900	252		26.8		10° R
2	91	4'		2920	900	252		28.7		10° R
2	110	4'		3520	900	252		34.7		12.5° R
2	66	4'		2120	900	252		20.8		15° R
2	68	4'		2180	900	252		21.4		17.5° R
2	31	4'		995	900	252		9.8		20° R
2	95	4'		3040	900	252		29.9		10° R
2	88	4'		2820	900	252		27.7		5° R
2	69	4'		2220	900	252		21.8		2.5° R
2	58	4'		1860	900	252		18.3		0°
2	43	4'		1380	900	252		13.6		2.5° L
2	25	4		800	900	252		7.9		5° L

PLACE M.I.T.
DATE 1/4/55
OBSERVER PCT, FJM & HEE.

ATTENUATION RATIO R	METER	D	METER X10^{-2} INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY C (MFD)	ENERGY (WATT SEC.) CE^2/2	EFFICIENCY CP/W	LAMP	REMARKS
2	85	4		2720	900v	363	147	18.5	3-1"Xe in Parallel	0°
2	78	4		2500				17.0		2.5°R
2	119	4		3810				25.9		5°R
2	119	4		3810				25.9		7.5°R
2	146	4		4660				31.7		10°R
2	147	4		4700				31.9		12.5°R
2	139	4		4450				30.2		15°R
2	116	4		3710				25.2		17.5°R
2	70	4		2240				15.2		20°R
2	32	4		1025				6.95		22.5°R
2	89	4		2850				19.4		0°
2	53	4		1696				11.5		2.5° L.
2	28	4		895				6.10		5° L.
2	139.5	4		4460				30.3		10°R

PLACE MIT
DATE 1/4/55
OBSERVER PCT+FJM
REMARKS H.E.E.

ATTENUATION RATIO B	METER	D	METER READ INCIDENT FT. CAND. SEC.	LIGHT FCPS	VOLTS E	CAPACITY (MFD) C	ENERGY $CE^2/2$ (WATT SEC.)	EFFICIENCY CP/W	LAMP	
1	110	4'		1760	900	252	101.5	17.3	3-1" Xe in parallel	2.5° Right
1	157	4'		2515	900	252		24.7		5° Right
1	170	4'		2720	900	252		26.8		7.5° Right
1	~~156~~ 125	4'		2495	900	252		24.6		2.5° R
1	152	4'		2440	900	252		24		7.5° R
1	170	4'		2720	900	252		26.8		10° R
2	91	4'		2920	900	252		28.7		10° R
2	110	4'		3520	900	252		34.7		12.5° R
2	66	4'		2120	900	252		20.8		15° R
2	68	4'		2180	900	252		21.4		17.5° R
2	31	4'		995	900	252		9.8		20° R
2	95	4'		3040	900	252		29.9		10° R
2	88	4'		2820	900	252		27.7		5° R
2	69	4'		2220	900	252		21.8		2.5° R
2	58	4'		1860	900	252		18.3		0°
2	43	4'		1380	900	252		13.6		2.5° L
2	25	4		800	900	252		7.9		5° L

PLACE MIT
DATE 1/4/55
OBSERVER PCT, FJM Jr HEE.

ATTENUATION RATIO R	METER	D	METER READING INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY ($WATT\ SEC.$) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
2	85	4		2720	900v	363	147	18.5	3-1"Xe in Parallel	0°
2	78	4		2500				17.0		2.5°R
2	119	4		3810				25.9		5°R
2	119	4		3810				25.9		7.5°R
2	146	4		4660				31.7		10°R
2	147	4		4700				31.9		12.5°R
2	139	4		4450				30.2		15°R
2	116	4		3710				25.2		17.5°R
2	70	4		2240				15.2		20°R
2	32	4		1025				6.95		22.5°R
2	89	4		2850				19.4		0°
2	53	4		1696				11.5		2.5° L.
2	28	4		895				6.10		5° L.
2	139.5	4		4460				30.3		10°R

PLACE M.I.T
DATE 1-20-55
OBSERVER R.M.S.

ATTENUATION RATIO R	METER	D	METER ANGLE INCIDENT ON CARD. SEC.	LIGHT FOOTS E	FOOTS E	CANDLE (MED) C	ENERGY CM²/12 (FOOT SEC.)	EFFICIENCY CP/C	LAMP	REMARKS
	.0004	1/2		.0001	200	.103	.002	.05	A-3	
	.0012			.0003	300		.0045	.067	A-3	
	.0039			.001	400		.008	.13		
	.0069			.0017	500		.012	.13		
	.0130			.003	600		.018	.17		
	.0220			.0055	700		.025	.22		
	.031			.0075	800		.032	.23		
	.041			.01	900		.041	.24		
	.057			.014	1000		.05	.28		
	.082			.0205	1200		.072	.29		
	.12			.03	1400		.098	.31		
	.17			.04	1600		.128	.31		
	.22			.055	1800		.162	.34		
	.30			.075	2000		.2	.38		
	.38			.095	2400		.288	.33		
	.46			.115	2800		.392	.29		
	.53			.13	3200		.51	.26		
				Self	3400 Flash					

PLACE MIT

DATE 1-20-55

OBSERVER RMS

ATTENUATION RATIO R	METER	D	DEPTH KNOWN INCIDENT FT. CAND. SEC.	LIGHT DOPS	VOLTS E	CAPACITY (MFD) C	ENERGY ($CV^2/2$)	EFFICIENCY CP/W	LAMP	REMARKS
	34			.51	400	10.6	~~.85~~	~~.6~~		
	.6			.9	500		1.33	.68		
	.8			1.2	600		1.91	.63		
	1.1			1.65	700		2.6	.64		
	1.42			2.1	800		3.4	.62		
	1.82			2.7	900		4.3	.63		
	1.2	2'		48	1000		5.3	.91		
	1.82			7.3	1200		7.6	.96		
	1.0	3'		9.	1400		10.4	.87		
	1.34 ~~1.54~~			11.8	1600		13.6	.87		
	1.69			15.2	1800		17.2	.88		
					2000		21.2			

PLACE MIT

DATE 1-20-55

OBSERVER RMS

ATTENUATION RATIO R	METER	D	INTR. KRAUS INCIDENT FT. CAND. SEC.	LIGHT DOPS	VOLTS E	CAPACITY MFD C	ENERGY ERGS/CM² (MAX. SEC.)	EFFICIENCY CP/W	TAMP	REMARKS
	.34			.51	400	10.6	.85	.6		
	.6			.9	500		1.33	.68		
	.8			1.2	600		1.91	.63		
	1.1			1.65	700		2.6	.64		
	1.42			2.1	800		3.4	.62		
	1.82			2.7	900		4.3	.63		
	1.2	2'		4.8	1000		5.3	.91		
	1.82			7.3	1200		7.6	.96		
	1.0	3'		9.	1400		10.4	.87		
	1.34 ~~1.54~~			11.8	1600		13.6	.87		
	1.69			15.2	1800		17.2	.88		
					2000		21.2			

PLACE MIT

DATE 1-20-55

OBSERVER RMS

ATTENUATION RATIO R	METER	D	MEAN ABSOLUTE INCIDENT FT. CAND. SEC.	LIGHT EQPS	VOLTS E	CAPACITY C (MFD)	ENERGY ($CE^2/2$) (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
		start			150					
		Self Flash			2600				A-2	
		start			320					
		Self		Flash	3500				A-4	
	.015			.004	200	1.04	021	.19	A-3	
	.086			.0225	300		.047	.48		
	.24			.06	400		.083	.73		
	.45			.11	500		.13	.85		
	.67			.17	600		.19	.89		
	.98			.245	700		.25	.98		
	1.40			.35	800		.33	1.06		
	.44	1'		.44	900		.42	1.05		
	.52				1000		.52	1.		
	.77				1200		.75	1.03		
	1.04				1400		1.02	1.02		
	1.4				1600		1.3	1.08		
	1.7				1800		1.7	1		
	.84	1½'		.26	2000	1.04 ~~10.6~~	2.1	.6		
	~~.086~~ .086			.129	250 ~~200~~	10.6	.33	.39		
	.16			.24	300		.48	.50		

PLACE

DATE

OBSERVER

ATTENUATION RATIO R	METER	D	METER KRLD INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC.) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
	27	3'			900	$\frac{525}{2}$				with spark
	33									Coil & spark shorted
	34									" "
	27	3'								with spark

PLACE MIT

DATE 1-20-55

OBSERVER RMS

ATTENUATION R RATIO	METER	D	NEPH XRDD INCIDENT FT. CAND. SEC.	LIGHT FCPS	VOLTS E	CAPACITY C (MFD)	ENERGY (WATT SEC.) CE²/2	EFFICIENCY CP/W	LAMP	REMARKS
		start			150				A-2	
		Self Flash			2600					
		start			320				A-4	
		Self		Flash	3500					
	.015			.004	200	1.04	021	.19	A-3	
	.086			.0225	300		.047	.48		
	.24			.06	400		.083	.73		
	.45			.11	500		.13	.85		
	.67			.17	600		.19	.89		
	.98			.245	700		.25	.98		
	1.40			.35	800		.33	1.06		
	.44	1'		.44	900		.42	1.05		
	.52				1000		.52	1.		
	.77				1200		.75	1.03		
	1.04				1400		1.02	1.02		
	1.4				1600		1.3	1.08		
	1.7				1800		1.7	1		
	.084	1½'		.126	2000	1.04	2.1	.6		
	.086			.129	250 200	10.6	.33	.39		
	.16			.24	300		.48	.50		

PLACE _____

DATE _____

OBSERVER _____

ATTENUATION RATIO R	METER	D	METER XPROD INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY C (MFD)	ENERGY ($CE^2/2$) (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
	27	3'			900	$\frac{525}{2}$				with spark
	33									Coil & spark shorted
	34									" "
	27	3'								with spark

A.C. T.V Camera Robot Flash

PLACE M I.T

DATE

OBSERVER H.E.E RNJ

ATTENUATION RATIO R	METER	D	METER XRXD = INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
1	95	5'		2375						AC TV Flash
	95			2375						
	95			2375						
1	130	5'		3250						130 W.S. Robot Flash
	130			3260						Revised 1-31-55

FT-427's for Underwater T.V.

PLACE M.I.T.
DATE Feb. 3 '55
OBSERVER E. Mack

ATTENUATION RATIO R	METER	D	METER XRAD² INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY C (MFD)	ENERGY (WATT SEC) CE²/2	EFFICIENCY CP/W	LAMP	REMARKS
X1	G.R. #113	3A.			4000	25	200			
	90	1		810				4.05		# FT-427 #1
				Starting Voltage	Med. Spark 1800V Strong Spark 800V					Min. start voltage with weak spark = 1800 volts.
					5" / 16	1" / 2				
	91			819				4.1		FT-427 #2 Min. start voltage appr. 4000 V. will flash even when time down to 2000 V.
				SPARKED THRU QUARTZ NEAR TUBULATION						
	92			828				4.14		FT-427 #3 Min. start weak spark 3000 V.
			Starting Voltage		Med. Spark 1500V Strong Spark 900V.					
	79			711				3.56		FT-427 originally used in T.V. breadboard (belongs to Photoswitch)
			Start Voltage		Med. Spark 1900V. Strong Spark 1000V.					Min. start weak spark 2200 V.

A.C. T.V. 100 u.s. Flash Unit #2227

PLACE M.I.T.

DATE Feb. 8 55

OBSERVER H.E.E. E.M.

ATTENUATION RATIO R	METER	D	METER XPXD² INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC.) CE²/2	EFFICIENCY CP/W	LAMP	REMARKS
	#113				900	230	100			
X1	140	4'	1000	2250						Meter and flash not lined up directly
	125		600	2000						
	115		500	1820						

50 msec Bird Unit. 3 - 1" gaptubes 5" ref.

PLACE M.I.T.
DATE Feb.
OBSERVER H.E.E. E.M.

ATTENUATION RATIO R	METER	D	METER XRAY INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC.) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
					900	125 carbide				Meter position
X2	148	4ft		4750						on center
"	114	"		3650						6" right
"	107	"		3430						6" left.
"	54	"		1720						12" left
"	147	"		4700						on center
"	27	"		860						12" right
"	95	6ft		4750						on center.

	C	R	E	1" gaptubes. Amp. x 50		I
	10/50	.11	1000	2.5	125V / .11 =	
	100	.11	1000	3.4 x 50 / 0.11		

FT-427
Dor Corporation

PLACE M.I.T.
DATE March 2 '55
OBSERVER E. Meek

ATTENUATION RATIO R	METER	D	METER XRAD² INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC.) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
	#113									
X4	98	3ft		3530	4000	100	800	4.4		
X1	84	3ft		756	4000	25	200	3.78		

Min. flashing voltage

Med. spark 5/16" long 1500V

Weak spark 4000V for reliable flashing.

Shallow Water Flash

PLACE MIT

DATE 3-3-55

OBSERVER HEF PMS

ATTENUATION RATIO R	METER	D	METER READING INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY C (MFD)	ENERGY $CE^2/2$ (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
2	150	3		2700						

Life test of 70 vs Bird Unit

PLACE MIT

DATE 3-9-55

OBSERVER Pmd

ATTENUATION RATIO R	METER	D	METER XROO INCIDENT FT. CAND. SEC.	LIGHT BCPS	SURGE E VOLTS	CAPACITY (MFD) C	ENERGY ($CE^2/2$) (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
										1 fpm
4	85	3'		3060	830					test started 1:00
	87	3'			820					
	84									
	81				810					2.05
	47				800					2.35
	80				800					2.36
	80				790					
	78				780					
	80				780					5.00 pm
	86				830					8.00 Am
	84				820					
	79				800					8:30
					760					10:15
					740					10:55
					720					11.55
					690					3:00
								Unit misses		

1" tube. 1 atmos. Xenon. 0.4 cm I.D.

PLACE 20D102

DATE Mar 10 1955

OBSERVER Edgerton.

ATTENUATION RATIO R	METER	D	METER READING INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY (WATT SEC.) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
1	34	1/4.		34	500	100.	12.5	2.72		Bare lamp.
1	76	1/4.		76.	750	100	28.1	2.71		
1	116	1		116	900	100	41.	2.83		
1	33	1		33	500	300/2				electrolytic
1	64	1			700					
1	90	1			800					
1	113	1		113	900		607 ~~405~~	1.86 2.		
1	125	1		125.	950					
1					900	260/2				

1" Gap 1 atmos Xenon tube

PLACE MIT
DATE 3-10-55
OBSERVER RMS.

ATTENUATION RATIO R	METER	D	METER X100 INCIDENT FT. CAND. SEC.	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C E	ENERGY $CE^2/2$ (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
	95	1'			900	131	53.5	1.78	A-9	
	97							1.81		
									A-7	
	90									
	98							1.83		
	100							1.87		
	102							1.91	A-10	
	105							1.96		
	97							1.81	A-6	
	98							1.83		
	97							1.81	A-8	
	102							1.91		
	103				900	87			A-8	Oil & Paper Cap
	98									

1" Gap 1 atmos Xenon Tubes from after Bird Life test Flash test

PLACE MIT

DATE 3-10-55

OBSERVER RMS

ATTENUATION RATIO R	METER	D	METER XRAD INCIDENT FT. CAND. SEC. LIGHT BCPS	VOLES E	CAPACITY (MFD) C	ENERGY (WATT SEC.) $CE^2/2$	EFFICIENCY CP/W	LAMP	REMARKS
	111	1'		900	131	53.5			
	112								
	113								
	114								
	104								
	103								

Comparison of Light Meters 1501-A
No 113 to No 500

PLACE MIT
DATE 4-6-55
OBSERVER P.M.S.

ATTENUATION RATIO R	METER	D	METER XRXD² INCIDENT FT. CAND. SEC.	LIGHT BCPS	E VOLTS	C CAPACITY (MFD)	ENERGY CE²/2 (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
										Rm Light on
1	35 34 35	5'								No 113
	29 29									off 500
	34 34									off No 113
	86 86	3'								113
	77 77									500
									FT-218	
	30 30	5'			2KV	100			N-85-142 L-5908-2	
	82 82 82	3'		738					686.2	
				660						
	85.5 85.5 85.5			769.5					706.6 L5908-1	
				689						

Hersey Sun Site
with A-C adapter

PLACE MIT
DATE 4-4-55
OBSERVER RMS.

ATTENUATION RATIO R	METER	D	METER READING INCIDENT FT. CAND SEC	LIGHT BCPS	VOLTS E	CAPACITY (MFD) C	ENERGY ($CE^2/2$) (WATT SEC.)	EFFICIENCY CP/W	LAMP	REMARKS
1	61	5'		1500						
	65									
	60									
	67									
	60									

FT-106

1000 Ω in plototube pickup on scope

Place M.I.T
Date May 10, 1955
Observer R.M.S.

R	Meter	D	WR	MED LIGHT PCMS	E Volts	Cap. (MFD) C	Energy W.s. CV²/2	Effy. CP/I	PHCP	Duration μ sec
	170	1'		170	450	508 E	51.5	3.3	1.4_{10^6}	180
	175			175				3.4		
	24 24			24	200	508	10.2	2.3	7_{10^4}	275
	69 69			69	300	508	23	3	5_{10^5}	230
	136 133			135	400		40.6	3.3	1.1_{10^6}	190
	11 11			11	200	300	6.0	1.84	6_{10^4}	190
	33 33			33	300		13.5	2.4	3.5_{10^5}	170
	66 66			66	400	300	24	2.7	7_{10^5}	150
	87 88			87	450		30.4	2.9	9_{10^5}	130
	4 4			4	200	100 O & P	~~.01~~ .2	2	6_{10^4}	80
	12 12			12	300		4.5	2.7	2.2_{10^5}	65
	25 25			25	400		8	3.1	7_{10^5}	50
	32 32			32	450		10.1	3.2	8_{10^5}	35
	1.4	3		12.6	300				10	
	.36			3.24	200		2	1.6		
	.06			.54	100		0.5	.11	3.1_{10^3}	100
	.15			1.35	100	300 E	1.5	.9	3.5_{10^3}	280
	.26			2.34	100	508	2.5	.9	10^4	400

FT-106

Place MIT
Date May 11
Observer R M R.

R	M Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/	PHCP Lamp	Remarks Duration in sec
	.2	3'		1.8	450	10.6	1.07 ~~10.7~~	1.7	1.7_{10^5}	10
	.18			1.62	400		.85	1.9	1.2_{10^5}	12
	.08			.72	300		.48	1.5	5_{10^4}	~~18~~ 16
	.028			.25	200		.21	1.2	9_{10^3}	18
	~~.012~~ .03	1		.03 ~~.27~~	100	~~.27~~	$.05^3$	.57	6_{10^2}	
	.062	1		.06	450	1	.107	.56	7_{10^3}	5 N
	.048			.048	400		.08	.6		7
	.036			.036	300		.045	.8		10
	.016			.016	200		.02	.8		
	.014			.014	100		.005	2.8		

20D102
H. E. Edgerton
K. J. Germeshausen
Ray Swanson

Place _____
Date _____
Observer _____

R	W Meter	D	WR	MFD² LIGHT RCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	.35X2	1		0.7	900	1.				1/8" gap.
							min start voltage = 600 volts			
1	.33	1		.66	"	"	3/5" gap.			multiple electrode
							1 atmos Xenon			Benedusen
1	.2	1		.4	"	"				Photon Tube.
1	.4	1		.8	"	"				1 microsec 1/2" long
										1 atm Xenon.
1	.18	1		.36						G.E. FT-106.
1	.22	1		.44			3/8" 1 atmos.			Ga. Xenon.
										Air-Gapped. Beacon.
1	.18	1		.36						Sylvania SA 809.

Place M.I.T
Date May 25, 55
Observer R.M.D.

R	W Meter	D	WR	MBP² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	107	5'				6				P.S. – 3 Circus Unit
	112									8 Ω's in Trans primary
	113									
						Int Cap				
4	135					25				
	134									
	136									
1	76	5'				4				P.S. – 4
	74									Heater in trans Primary
	74									
8	137	5'				25				
	150									
	148									

Time Filter

Raytheon Studio Unit
G.E. 503.
3 Condenser Banks.

Place M.I.T
Date 5-27-55
Observer P.M.J.

R	W Meter	D	WR	WHT LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CM²/2	Effy. CP/W	Lamp	Remarks
1	160	20'	160	64000	4 KV					
1	167			66800						
1	165			66000						

Robot Dry Bat. Underwater Flash.

Place MIT
Date 6-3-55
Observer RMS.

R	# Meter	D	WR	MKD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/"	Lamp	Remarks
1	32	10'		3200	460					
	31									
	32									

Silica Wet Cell Underwater Flash.

1	65	10'		6500						
	65									

Flico - Lite Model 109

Place M.I.T
Date 6-7-55
Observer R.M.

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CD²/2	Effy. CP/W	Vamp	Remarks
1	12	10'		1200						Low Scale
1	12									
1	24			2400						High Scale
1	24			2400						

Gleco - lite model 109

Place M.I.T
Date 6-7-55
Observer R.M.

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (TTD) C	Energy W.s. CD²/2	Effy. CP/W	Lamp	Remarks
1	12	10'		1200						Low Scale
1	12									
1	24			2400						High Scale
1	24			2400						

Double 110 FT

Greenewald flash unit

Place 20D102

Date June 10 1955

Observer Edgerton Max Roberts Greenewald.

R	W Meter	D	WR	MCP² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
				1600	1800	dct. 230/4			2FT-110.	

Duration 80 μs. as measured by Roy Swanson.

This will be used for humming bird photographing.

Heiland VII with Dry battery (510 volt).

Place 20D102
Date June 11 1955
Observer Edgerton Swanson.

R	W Meter	D	WR	WCP² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	
	74	4	16 74	1184						Heiland.
			64 112 1184							3# 2 oz.
22½°	58	4								
45°	16.	4								
Dry Battery										
1	67	4.		1070						
1	74	4		1180						
1	76	4		1220						
1	27	4	10 sec dly.							Shows batt dly time is 30 sec +. !
1	25	4	10 sec dly.							
	51		20							
	68		30							
	67		30							
	79		60							
Strobonar IV										4 pounds for power pack.
			157 16							
1	157	4	942 157 2512	2512						
2	78	4	156							
S.R Battery unit			78.	Battery Low.						
2	39	4								

Under Water T.V. Studies

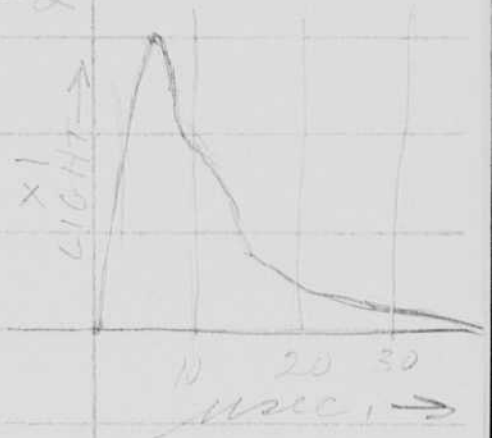
Place MIT
Date 6-13-55
Observer PMP.

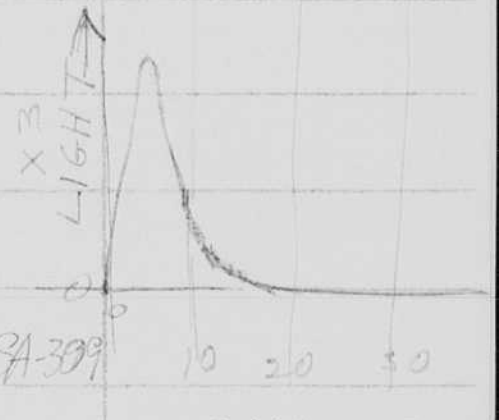
R	M Meter	D	WR	MCD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CD²/2	Effy. CP/W	Lamp	Remarks
~~87~~ 2	87	5		4350						350 n sec 7 last
~~88~~ 2	88			4400						
2	20	5		1000						60° angle
2	38	5		1900						30° angle

Small tubes made for Mr. Shrank of E.C.A.

Place M.I.T.
Date July 6 55
Observer G. Shrank

R	W Meter	D	WR	WRD² LIGHT RCPS	E Volts	Cap. (MFD) C	Energy ½ s. CP²/2	Effy. CP/W	Lamp	Remarks
		1 ft			400	1.0			E.C.A. #1 and #2	Peak 3 cm, Duration 11 μsec.



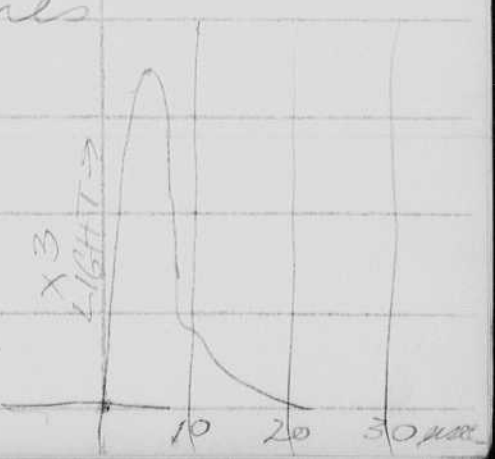


		1 ft.			400	1.0			SA-309	

SA-309 gives 2½ times more peak light than Shrank's tube

					400	1.0				

G.E. small 450 μ tube
1½" U tube 106?



Compare tubes for Sidbotac use.

Place M.I.T.
Date July 19 '53
Observer E.M.R.

R	Meter (A.G. Sensitive Meter)	D	WR	MMF² LIGHT DCPS	E Volts	Cap. (MFD) C	Energy W.s. Cm²/2	Effy. Cm/	Lamp	Remarks
1/400 sec	0.01 mfd.	6"								
4.7	Read									
	0.05	Diffuser			400	0.26			SA309 #1	Sylvania
Clarostat 517-2000 Ω	0.14	to			400	0.505				
	.5	Tubes			400	1.05				
	0.08				400	0.26			S55B	Kemlite afterwards plastic tube punctured.

Compare tubes for flotation use.

Place M.I.T.
Date July 20 53
Observer E. Mack

R	W Meter	D	WR	MBP² LIGHT DCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
0.01		6"			400	0.26			SA 309 #2	Scope and pictures 2" lens.
Mpk 1/200 f.47	0.08									#11 - 2 exposures 0.1 to 0.3
	0.08									#12 " "
	0.16					0.505	#14 and #15 were not usual tubes.			#13 skip.
	2.15									#14 " 0.3 to 1
										#15 " "
11	0.15					0.505				#16
	0.13									#17 " "
"	0.40					1.05				#18 skip
	2.41									#19 " 1 to 3
										#20 " 1 to 3
"	→ 0.03 high because of extra room light								5 probe with spatter shield	
	0.32 ave. reading					0.26				Heart film (A) lens. #1A 2 exposures 3 to 10
										#2A " "
"	0.81 ave. read					0.505				#3A skip
										#4A 2 exposures 10 to 30
										#5A " " 10 to 30
	0.08		With Multi-probe tubes the firing spark tends to make			0.505				
0.1 mfd	0.08									#6A 2 skip.
"	0.18					1.05				#7A 2 exposures - 10 to 30
										#8A " " - 10 to 30
			light meter jump down 0.01 - 0.04 below zero							
0.1 mfd	0.17					1.05			5 probe no spatter shield	no pictures because of tubulation on end
0.01 mfd	0.70		on 0.01 scale. Negligible			0.505				
0.01 mfd	0.21		on 0.1 mfd scale			0.26				
										lens.
										#9 2 skip 3 to 10
										#10 2 skip.
"	0.82					0.505			5 probe with shield	#11A one exposure
"	0.14	0 filter down							S-55-B #2	two exposures one about one high
"	0.09								SA 309 #2	one exposure.

Compare tubes for Strobotac use

Place M.I.T.
Date July 20 55
Observer E. MacR.

R	Meter	D	WR	M.P.^{2} LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
1/400 sec	0.01 m/R	6"			400					
f 4.7	Read									
Display tube 517-3006 Difference	0.03					1/4 0.26			SA 309 #1	
	0.11	CL tube no difference				1/2 0.505				
	0.38					1.05				
									SA 309 #2	
	0.36					1.05				
	0.11					0.505				
	0.03					0.26				
	0.06	- sp. band down				0.26			S-55-B #2	
	0.03	- sp. band up.								Spark band up tides occasional
	0.13	- sp band down				0.505				
	0.09	- sp band up.								
	0.45	- sp band down occasionally				105				
	0.65									
	0.26	- sp band up				1.05				
										Scope pictures end on at 8 in
	0.32	sp band up,				1.05				#1 - 2 mc/sec fig 1-3
	0.30	" " "								#2 - " "
	0.13	"				0.505				#3 skip "
	0.13	"								#4 - " 0.3 to 1
	0.08	"				0.26				#5 - " "
	0.07	"								#6 skip " 0.1 to 0.3
										#7 " "
										#8 " "
										#9 skip
										#10 skip
	0.03 high due to extra room light being switched on.									

S-55-B Kemlite tube after 156 hrs on Electronic Bracing 510 Stroboscope.

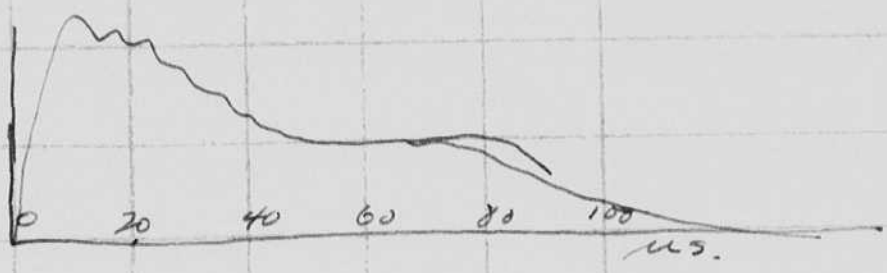
Place M.I.T.
Date Aug 18 55
Observer E. Mack

R	Meter	D	WR	WR² LIGHT RCPS	E Volts	Cap. (MFD) C	Energy W.s. C E²/2	Effy. CP/W	Lamp	Remarks
1/400 sec f4.7	0.01 mfd lead	6" Ctr flash tube to face of diffuser			400				SA303 #2	
Regulars 677-9080 Diffuser	.03					0.26				
	.11					0.505				
	.43					1.05				
	.98				500	1.05				
	.02-03				400	0.25			Kemlite S-55-B #2	
	.09					0.505				After 156 hrs life test Spark band up. Above slide does not arc area.
	.28					1.05				
	.03					0.25				Spark band down.
	.10					0.505				
	.28					1.05				

3 Tube Bird Flash

Place 20 D 102
Date Aug 22 55
Observer Edgerton

R	M Meter	D	WR	WBD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CV²/2	Effy. CP/W	Lamp	Remarks
1	100	4			850					
	180	4 M.			8					
	~~280~~ 200	4 M.		3200	850					
	185	4 M			850					other lamps.



1	90	10		9000	850 volts	2 lamps on the beam. G.F. = 105. Kodachrome.	

Heiland VII = 1000 to 1200 B.C.P.S.

35 Guide factor.

Place 20D102
Date Aug 22 1955
Observer Edgerton Mack. Berg. S.

R	W Meter	D	WR	MFD² LIGHT RCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	90	10'		9000	850V					Bird Beam unit 2 lamps on meter G.F. = 100

As delivered to Crawford Greenewalt on Aug 19 55.

Heiland VII

1000–1200

G.F. = 35

Deb. S. 6 jm
64356

1/2 lower

5-probe Gap lamp with (Gap #2)
Sputter shields after 23 hrs. operation at 60cy 1mfd 400V.
Compared to Sylvania SA309 #2

Place M.I.T.
Date Aug 29 55
Observer G. Mach

R	AC Sensitive Meter	D	WR	WRD LIGHT DCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
X400Ω +4.7	0.01 Mfd.	6"			400					Previous reading under same conditions
	.44					1.05			SA309 #2	0.36-0.43
	.13					0.505				0.11
	.03					0.26				0.03
	0.23					0.26			Gap Tube #2	When new: 0.32 | Down 28%
	0.54					0.505				0.81 | " 33.4%
	0.1 Mfd. 0.11					1.05				0.18 | " 38.7%
	0.11					1.05				0.18
	0.01 Mfd. 0.54		lamp turned 180° to look at other side			0.505				0.81
	0.24					0.26				0.32

Place M I T.
Date Sept 1955
Observer E. Mack

R	#113 W Meter	D	Duration M.S.	MBP² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy B.s. CP²/2	Effy. CP/W	Lamp	Remarks
X1	93	1ft			2000	14. in power supply			FT-214 II	
X1	96	"			"	14			FT-110	
X1	83	"	12 to 14 μsec.		"	13.55 Ext.			FT-110	
"	93	"	"		"	6" leads				
"	89	"	"		"	"				lamp is all flashing white + 18 sec and has deposited whitish gray substance in glass
	77	"				"				
"	79	"	20 μsec.		"	13.55 6ft #18. 2 wire cable added				
"	85 90 75 80	"	25 μsec		"	13.55 6" leads				FT-218?

Multiprobe Leaf Tube #2 after 40 3/4 hrs. of operation at 1 mfd 400V 60~

Place M.I.T.
Date Sept 5 55
Observer E. Mack

R	W Meter (AC Sensitive Meter)	D	WR	MMF LIGHT RCPS	E Volts	Cap. ("Fd) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1/40 f4.7		6"			400					
0.01 mfd									SA309 #1	
	0.04					0.26				
	0.15					0.505				
	0.48					1.05				
	0.52									
	0.58									
#517-2000 Diffuser										
									Leaf #2	
0.1 mfd	0.11					1.05				
0.01	0.50					0.505				
	0.21					0.26				
0.1 mfd	0.11				400	1.05			Leaf #2	
0.01 mfd	0.53				"	0.505				
	0.14				"	0.505			SA309 #2	
	.42					1.05				
	.48					"				
	.42									

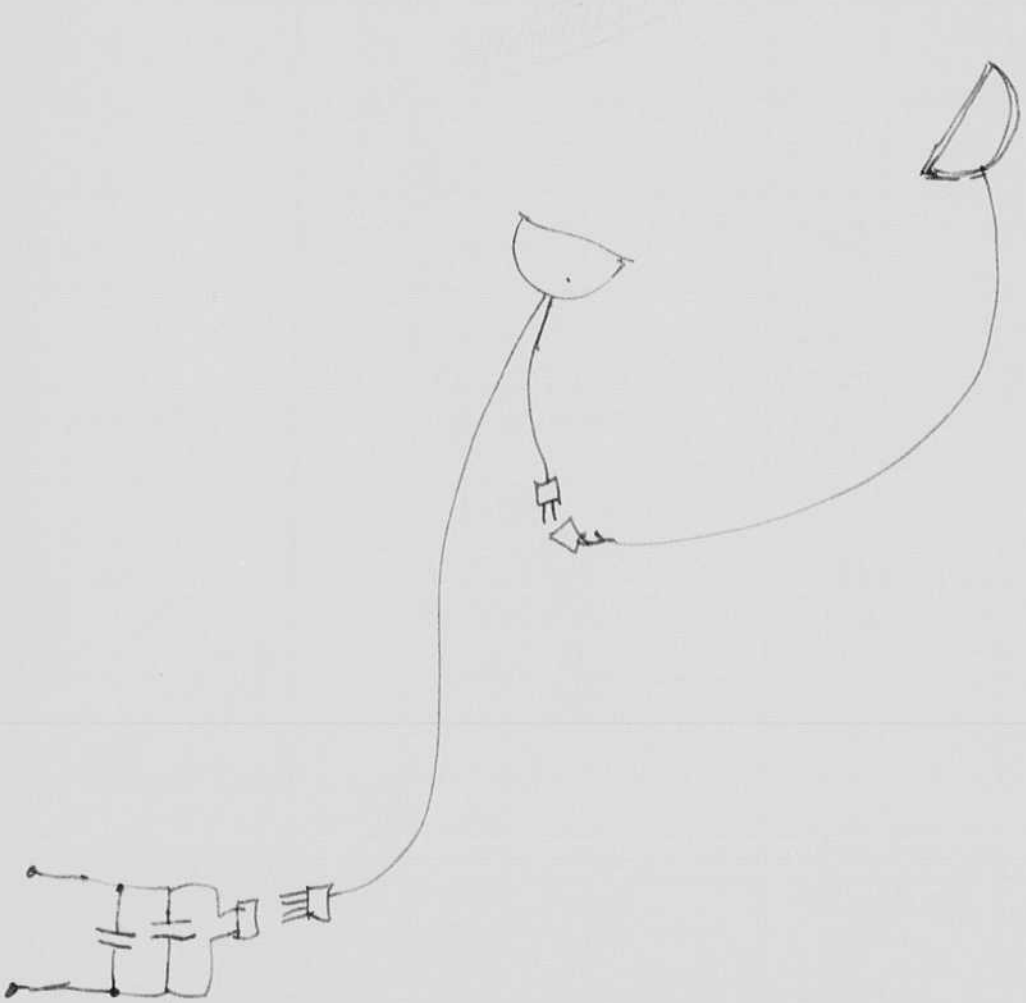
Sylvania SA 309

Compared

AC sensitive with Multiprobe 3/8" gap #1

Place M.I.T.
Date Sept. 2, 55
Observer E. Mack.

R	D	WR	MFP² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
f4.7 1/100 Diffuser	1.6 Lumens/ft² 0. Parallax 6" fieldradius								
.01 mfd	.53		.0212	400	1.05	.084	0.25	SA309 #2	
	.53								
	.46								
	.52								
	.53								
	.49								
	.47								
	.51	0.0202					0.24		
	.50								
	.17	.0068		300	"	.048	0.145		
	.31	.0124		350		0.065	0.19		
	.52	.0208		400		0.084	0.25		
	.76	.0360		450		~~0.105~~	0.34		Self flashing
0.1	.11	.044		300		0.131	0.37		
0.1	.17	.068		350		0.157	0.43		
mfd	.22	.088		600		0.189	0.465		
"	.34	.136		700		0.258	0.49		
"	.40	.160		750		0.293	0.55		
0.01 mfd.	.P1 average		0.0320	300		.047	0.68	Multiprobe Gap #1	
0.1	.13		0.052	350		.065	0.80		
"	.18		0.072	400		.084	0.86		
"	.23		0.092	450		.105	0.95		
"	.33		0.132	500		.131	1.01		
"	.40		0.160	550		.158	1.01		
"	.48		0.192	600		.189	1.01		
"	.63		0.252	700		.258	0.98		
"	.82 ave.		0.328	800		.293	1.12		


14 14mfd
2660v.

MIT
20D102

Place
Date Sept 31955
Observer Edgerton

R	W Meter	D	WR	WD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
x1	18.	1 ft.			1000.	1 ft. in power supply.				FT-218
	48				1500	14.				
	94				2000	14.				
x1	190	1 ft.			1000	100.				FT-218.
		Duration tests								
		50 μs.			1000	29				FT-218
		65 μs				50				
		140 μs.				100				
		25 μs.			2000	14				
x1	88	1 ft.	40		2000	14			FT-218 Two tubes in series	
x1	200+	1 ft	60 or 70		2000	28.			2 tubes in series.	
x1	170	1 ft.	50± 		2000	~~14~~ 28 + 17 μh.			1 FT-218	
x1	200+		60± 		2000	28 + 35 μh.				
x2	185/370	1 ft.	60±		2660	28 + 35 μh.			FT-218	
	Reflector - Weber Brass.					28				
x4	150	60° 2 ft.		2400	2660	~~28~~ μf + 35 μh inductance			FT-218	
4	70	28° 2 ft		1120	2660	14			35 μh.	

Quartz liner capillary tubes
Sealstik seals

Place M.I.T.
Date Sept 14 65
Observer E. Mack

R	Meter	D	# Duration	WSD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CV²/2	Effy. CP/W	Lamp	Remarks
0.01	.40	1 ft.	1 sec.	0.064	500	0.99			1 atmos ar.	Bore 1.5 mm Length 1/8"
0.1	.18			0.288	1000					
"	.40			0.64	1500					
	.98		4.3	1.57	2000					200 flashes 1950 V. Charged spark board.
	.51		3.0	0.815	1500					
	.22		2.15	0.352	1000					
0.01	.37		1.3	0.059	500					
0.01	.40		1.5	0.064	500					1.5 mm. 1/4"
0.1	.22		1.5	0.352	1000					
0.1	.60		2.0	0.96	1500					
0.1	.10	1.5 ft		0.36	1000					
0.1	.22	"		0.795	1500					→ another flash shattered quartz liner.
0.1	.22	"	1.5	0.795	1500					
			1.5-2.0		2000					→ Blew a part gritty 2nd or 3rd flash
0.01	.24	1.5 ft	1.2	0.0865	500					1.5 mm. 5/16"
0.1	.13		1.3	0.47	1000					
0.1	.26		1.3	1.94	1500					
0.1	.50		1.8	1.8	2000					
0.01	.15			0.054	500					
0.1	.11			0.396	1000					
0.1	.23			0.83	1500					
0.1	.44			1.58	2000					
0.01	.18	1.5 ft.		0.065	500					1.5 mm. 7/16"
0.01	.15		2.0	0.054	500					Hard starter at 500 V.
0.01	.95		1.5	0.342	1000					
0.1	.24		1.5	0.87	1500					
0.1	.42		1.6	1.51	2000					
0.01	.13			0.047	500					

Quartz liner capillary tubes
Sealstix seals

Place M.I.T.
Date Sept 1455
Observer E. Mack

R	Meter	D	Duration	W/m² LIGHT BCPS	E Volts	Cap. ("FD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
		1.5/t	μsec		500	0.99			1 atmos argon	Bore length 1.5mm. 1"
0.01	0.43		2.0	0.155	750					→ Doesn't arc in capillary.
0.01	0.91		2.0	0.327	1000					
0.1	0.21		1.7	0.76	1500					
0.1	0.37		1.8	1.33	2000					
0.1	0.11		2.7	0.396	1300					1.5mm. 2"
0.1	0.16		2.8	2.525	1500					Below 1250V flashes outside of capillary
0.1	0.29		2.2	1.04	2000					
0.1	0.73		2.3	2.52	2500					
0.1	0.20			0.72	2500					→ Something has changed radically
0.1	0.08			0.288	2000					
0.01	0.40			0.0288	2000					

FT-218's for Greenewalt

L in series - 35 μh. - 0.1+ ohm.

#113

Place M.I.T.

Date

Observer

R	W Meter	D	WR	MND² LIGHT DCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
X1	37	2			2600	14			#1	With 35 μh
"	32	"			"	"			#1	Inductance shorted
	37	"	Duration		"	"			#2	With 35 μh.
	34	"			"	"			#2	Without L
	40	"	69 μsec		"	"			#3	With L
	36	"	30 μsec		"	"			#3	Without L

Mark II Sensitometer
as revised Sept 6, 1955

Light meter 113

Place MIT
Date 9-27-55
Observer RMS.

R	W Meter	D	WR	WR^2 LIGHT DCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
1	20									
1	20									$\frac{1}{100}$ sec scale
1	107									
1	107									$\frac{1}{1000}$ sec
1	0									$\frac{1}{10,000}$ meter wouldn't register such a small amount of light
1										
1	13									$\frac{1}{1000}$ sec scale with metal screen attenuator

Measurements for Mr. Temple
David Taylor Model Basin

Place M.I.T.
Date Oct 3 '55
Observer E. MacR.

R	#113 Meter	D	WR	WR² LIGHT DCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/12	Effy. CP/W	Lamp	Remarks
X1	94	3	Time		2000	100	200		FX-1	
	50	3		450	2600	37				
	80	3	85 μsec.	720	2600	56				
	69	3	120 μsec.	621	2600	56				100 ft #14 Trex cable added
	63	3	90 μsec.	567	3000	40				"

22" tubes for Seward Unit. of Wash.

#113

Place M.I.T.
Date Oct 18 55
Observer E. Mack.

R	W Meter	D	WR	Min² LIGHT DCPS	E Volts	Cap. (FD) C	Energy W.s. CV²/2	Effy. CP/	Lamp	Remarks
X1	41	4			2000	100	200	3,27	FX-1-22"	#1
X1	72	4			2500	100	312	3,7	20 cm ke.	starting voltage 950 V
X1	42	4			2000	100			#2	#2
X1	74	4			2600	100				starting 1000 V.
X1	38	4			2000	100			#3	#3
X1	68	4			2500	100				starting 1900 V

Discharge with sparker is steady and more purple than #2 and #1

#3 tube is dead Oct. 1955

22" Tubes for Sard 2nd batch

#113

Place M.I.T.
Date Oct 19, 53
Observer E. MacR.

R	W Meter	D	WR	WR^2 LIGHT RCPS	E Volts	Cap. (MFD) C	Energy W.s. $CV^2/2$	Effy. CP/W	Lamp	Remarks
X1	42	4'			2000	100			#4	20 cm x e
"	73	"			2500	100			"	1000 " Starting Voltage
X1	43	"			2000	100			#5	
"	76	"			2500	100				1000 Starting V.
X1	40	"			2000	100			#6	
X1	72	"			2500	100				1000 V Starting

501 ~~to~~ 38.

Tests. Dept of Wm Johnson.

Place 20010
Date Nov. 3. 1955
Observer Edgerton

C	f Meter	D	WR	WP² LIGHT BCPS	E Volts	Cap. (MFD) C	Ener. W.s. $C^2/2$	Effy. CP/W	Lamp	Remarks
.01	calibration			3650 V = 3 cm						
.01	3000 cycles. ✓									Voltage of capacitor 12 Mfd.
.01	6000 ✓									
.01	10,000 ✓									
.01	12,000	Kicked out.								
.01	11,000	Kicked out								
.01	10 500									
Blank										
.04	3000		✓							
.01	8000	Light								
.01	6000	"								
.01	7000	"								
.04	3000	Light x 3								

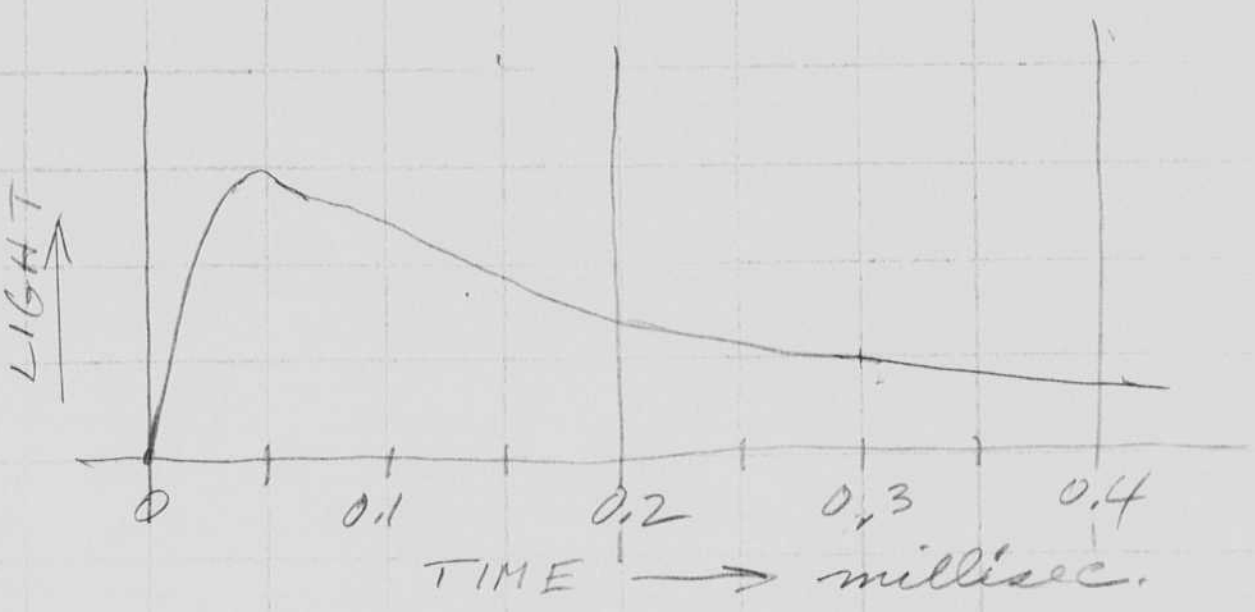
Sylvania

Sloan, Hodge.

M.I.T.
Nov. 9, 55
E. Mack.
R. Swanson

#113

X1	30	2ft	120	300	1075	48	2.5	Sylvania #4306



Minimum flashing voltage
140 volts with 3N4
and Model P spark coil.

Donut tube 2 ft diam
for Wind Tunnel.

Run from B.K 60 cycle stock.

Place MIT
Date Nov 11 1955
Observer Edgerton

Tester	D	WR	MUNI MCMS	E Volts	Cap. (mfd) C	Energy per flash ½CV²	Freq. CPS	Lamp	Remarks

935 photo tube Tube has 1 cm xenon.

10,000 ohms load to scope.

10 feet to tube in wood holder.

.22 volts.

Lowest capacity.

	Peak light	Duration	
(1)	0.22 volts.	60 μs.	$10^7 \times \frac{.22}{50} = \frac{1}{250} 10^7 = .7 \times 10^5$ c.p.h.
2	0.56 "	100 μs.	$= 1.4 \times 10^5$ h.c.p.
3	0.50 "	80 μs.	
4	0.4 "	200 μs.	

Calib ~~10.5 mfd 2000 volts mfd FX-50~~

30 volts = 1.5 cm. calibration

Stroboluxe = at 10 feet 10^7 cp (horizontal).

Deflection 1.6 cm = 50v = 10^7 h.c.p.

1/4" gap, atmosphere Xenon
.1" I.D.

Place MIT.
Date 11-16-55
Observer RJC.

Meter	D	ΔR	SEC⁻¹ DIOM RCPS	E Volts	Cap. (MFD) C	Energy Joules/cc E/2	Effy. CT/I	Temp	Remarks
.052	2		.208	1000	.5	.25	.84		Ships
.08	2		.32	1200	.5	.36	.9		½ Atm N = 18
.14	2		.56	1500	.5	.56	1		Old
.068	1		.068	600	.5	.09	.76		1 Atm. Nº 19
.15	1		.15	800	.5	.16	.94		Clean dd -
.065	2		.26	1000	.5	.25	1.04		
.104	2		.416	1200	.5	.36	1.16		
.164	2		.656	1500	5	.56	1.17		

FT106

Place 200/02
Date 12-3-55
Observer MC

Remarks

Filter	PHLP 104 D	NR	HCPS	E Volts	Gain	Energy	Eff. CT/γ	Temp	Remarks
7.5	.02		.02	400	1	.08	.25		Tube 93-6-175
10+	.04		.004	300	1	.045	.1		
25	.06		.015	200	4	.08	.2		
15	.6		.09	300	4	.18	.5		
10-12	.33		.34	400	4	.32	1		
50	.04		.02	100	15	.075	.26		
30	.5		.15	200	15	.3	.3		
20	3.3		.67	300	15	.68	1		
15	13		1.3	400	15	1.2	1.6		
75	.13		.09	100	27	.135	.67		
40	1.5		.6	200	27	.54	1.1		
25	7.5		1.88	300	27	1.21	1.55		
20	25		5	400	27	2.16	2.3		

Transportable (Chick Kane)

Place M.I.T.
Date Dec. 3, 55
Observer E. H. Mack.

W Meter	D	MR	LIGHT BOWS	E Volts	Cap. (FIO) C	Harry $\frac{1}{2}$ a.a. $\sigma^2/2$	Effy. CP/W	Lamp	Remarks
Duration				2500	75				
240 μsec.								One FT-220 lamp.	
120 "								Two FT-220 lamp.	

Dornitzer Units

Place M.I.T.
Date Dec 5, '55
Observer E. Mack, W. Scales, R. Swanson

	#113		Meter	D	Det.	AT² LIGHT TOTS	E Volts	Cap. (MFD) C	Energy ½CV²/2	Eff. CV²/	Unit Temp	
		5/t					450	525	~~450~~ 453		DB-1B	
X1	105			0°	2125							
	30			25°L								
	17			25°R								
	38			20°R								
	53			20°L								
	90			0°								
	74			0°			450	1050	108		208-B	FT-11 tube
	84			0°								
												Trouble?
X2	101	5/t		0°	5060				100		200B	
X4	108	"		0°	10800				200			
X2	103			0°					100			
X2	60			20°L								
X2	31			25°L								
X2	51			20°R								
	23			25°R								
X2	93			0°	Charging 25 sec.							

Greenewalt's Bird Unit
Modified Strobo - Research
200 w.s. unit.

MIT
Jan. 6, 53
E. MacR.

#113

	Meter	D	WR	LIGHT (CPS)	Volts	Cap. (MFD)	Charge (Joules)	Effy. CP/	Lamp	Remarks
		4'			2600	~~3XT~~				
X2	165			5300		3X14				3 lamps
X1	95			1520		14				#1 lamp
X1	108			1720		14				#2 lamp
X1	103			1650		14				#3 lamp

Duration $\frac{1}{3}$ to $\frac{1}{3}$ peak 30-35 μsec.
with 3 lamps.
(~~455~~ - 545.)

Changes.

2400 to 2600 volts.

① 1000 ohms between capacitors.

② ~~Modelectric~~ P coils

③ 1 mfd trigger capacitors

④ 0.5 mfd on OA4 tube.

⑤ Polarity correction on two lamps.

⑥ Inductance 6 uh in ground lead.

⑦ 3 capacitors instead of 4.

20,102

113.

Jan 8 1956 Sunday
Edgerton

	Meter	I	VR	Volts	C			Temp	Remarks
1	35	5 ft.		2000+	100				FX-1 Std tube.
1	34	5 ft		2000	100				" " "
	#306								
1	34	5		2000	100				FX-1 Std tube.

Probe as used in New York at Geo Grebb Studio. with Density 2 and Density 1 filters.
306 with probe.

20	5 ft.	2000	100.	FX-1
16	"	"	"	
18	"	"	"	

Light at meter = .34 lumen seconds per square foot.
candle foot candle seconds.

with probe. .034 lumen second per square foot
and D = 3 filter gives reading of about 18.

Roy says $\frac{1}{2000} = .0005$

$K = .022$

$L = k$ meter reading.

$.034 = k \times 18$ $\quad K = \frac{.034}{18}$ lumen sec / division

---

Light for Ektachrome as per Grebb studio on white wall.

$$L = \underset{\text{light at probe in Grebb studio}}{31 \times 4} \times \underset{\text{factor}}{\left(\frac{40}{55}\right)} \left(\underset{k}{\frac{.034}{18}}\right) = .0017 \text{ lumen sec / sq foot.}$$

$\frac{120}{18}$ 1 .034

or say .002 lumen sec sq foot.

$\frac{31 \times 4 .035}{18} = .00235$ lumen sec / sq ft. as read on ground glass at Grebb Studio
this is too high by a factor of 35-40/over 55.

Correct Effective light from white card $\underset{.002.}{=} .0017$ lumen sec / sq ft.
at film

Special light meter

Serial Number # 306

Place M.I.T
Date 1-9-56
Observer R.M.D

Meter	D	WH	MCP Light Time	K Volts	Cap. (MFD) C	Energy W.S. $CV^2/2$	Effy. CV/T	Lamp	Remarks
D=2.78 or 600	50	3'		2KV	98			F7-214 No 3	Probe 1501-P1 # 354
2	37	3'		2KV	98			1/	

White Card Light measurement using 300 W.S. A-C Polaroid Strobe. Measurement made with #306 Lightmeter

Output of Unit.

2 35 10' 7000

Guide Number Ektachrome H&D A. = 10

$DA = \sqrt{\frac{S}{C} 7000} = \sqrt{\frac{10}{20} 7000} \approx 60$

Probe 354 used on Ground Glass of 4x5 Speed Graphic 10 feet from white card. Camera diaphragm

off scale	10'	f-6
40		f-12
25		f-16
38	Probe aperature reduced to 1/4	f-8
32	Probe aperature further reduced	f-6

5000 w.s. Circus Unit
(Prototype Sun Flash)

#113 to go to Wharshaw Studio

Place M.I.T.
Date Jan 11 '56
Observer E. Mack.

	Meter	D	WH	LIGHT BEAMS	E Volts	C	Battery p.s. /2	Mfry. CP/$	Lamp	Remarks
X4	125	25'	500	3125[00]	4000	550	4400		FT-673	In 24" Sun flash Reflector

Light Meter Black Box Calibrator

Special meter 306

Probe 35A

Place M.I.T
Date 1-19-56
Observer R.M.L

	Meter	D	WR	LIGHT LUMS	E Volts	Cap. (MFD) C	Energy ft. c. sec/2	Effy. CP/W	Lamp	Remarks
1	30								33	FT-114A
	30									
	30									
	30								31	
	30									
	30									
	30								32	
	30									
	31								30	
	31									
	31									
	30.5								29	
	30.5									
	30.5									
		Hand starter							28	
	40									Probe
	40									

1/4" tube in Reflector
.005" diam

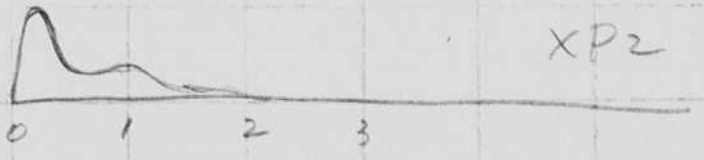
Supre & pinhole.

MIT
Place 20D102
Date Jan 21 1956
Observer Edgerton
Swedesen.

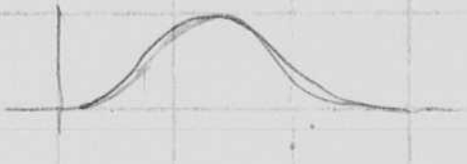
	Meter	D	WR	Light (C.S.)	E Volts	Cap. (MFD) C	Energy w.s. CV²/2	Effy. CV/"	Lamp	
82	10 volts	5 ft.		$3 \times 2.8 \times 10^6$		8.4×10^6 h.c.p.				with Reflector XP-2
82.	3.3 volts	5 ft		2.8×10^6 peak.	2000	10				FX-1 Std

microflash D2 filter

82 1 volt .5 ft. $\frac{2.8 \times 10^6 \times 100}{3.3}$ c.p. $\cong$ 90×10^6 c.p.



XP2 0.1 mfd.



MICROFLASH. D.R. with flint bulb.

XP-2

0.5 mfd

Airplane Beacon Lamp in Reflector
Type 2521 #7
#113
Horizontal distribution

Place M.I.T.
Date 3/13/56
Observer E. MacR.

35 ft.

40	0
40	2" R
39	4" R.
38	6" R.
37	8" R.
30	10" R
35	9" R
26	11" R.
22	12" R
19	13" R.
18	14" R

Airplane Beacon Lamp in Reflector
Type 2521 #7

#113 Horizontal Distribution

Place M.I.T.
Date 3/14/56
Observer E. Mack

N	Meter	D	WR	Lliff	E	Cap. (cm)	Cherry A.S. C'/2	Effy. CP/	Lamp	Remarks
		35'								Opaque calibration disc removed
	38		0							
	38		4" R							
	37		8 "							
	34		12 "							
	15		16 "							
	5		20 "							
	1½		24 "							
	24		14 "							
	8		18"							
	38		0							
	38		4" L							
	32		8" L							
	25		12" L							
	21		14 L							
	18		16 "							
	15		18"							
	11		20"							
	7		22"							
	5		24"							
	3		26"							
	2		28"							

From meter calibration sheet

$$\frac{\text{Sens. disc out}}{\text{Sens disc in}} = 6.444$$

$$\text{to BCPS} = \frac{38}{6.444} \times (35)^2 = 7.230$$

Airplane Beacon Lamp in Reflector
Type 252 #7
Vertical Distribution

#113

Place M.I.T.
Date 3/14/56
Observer E. Mack.

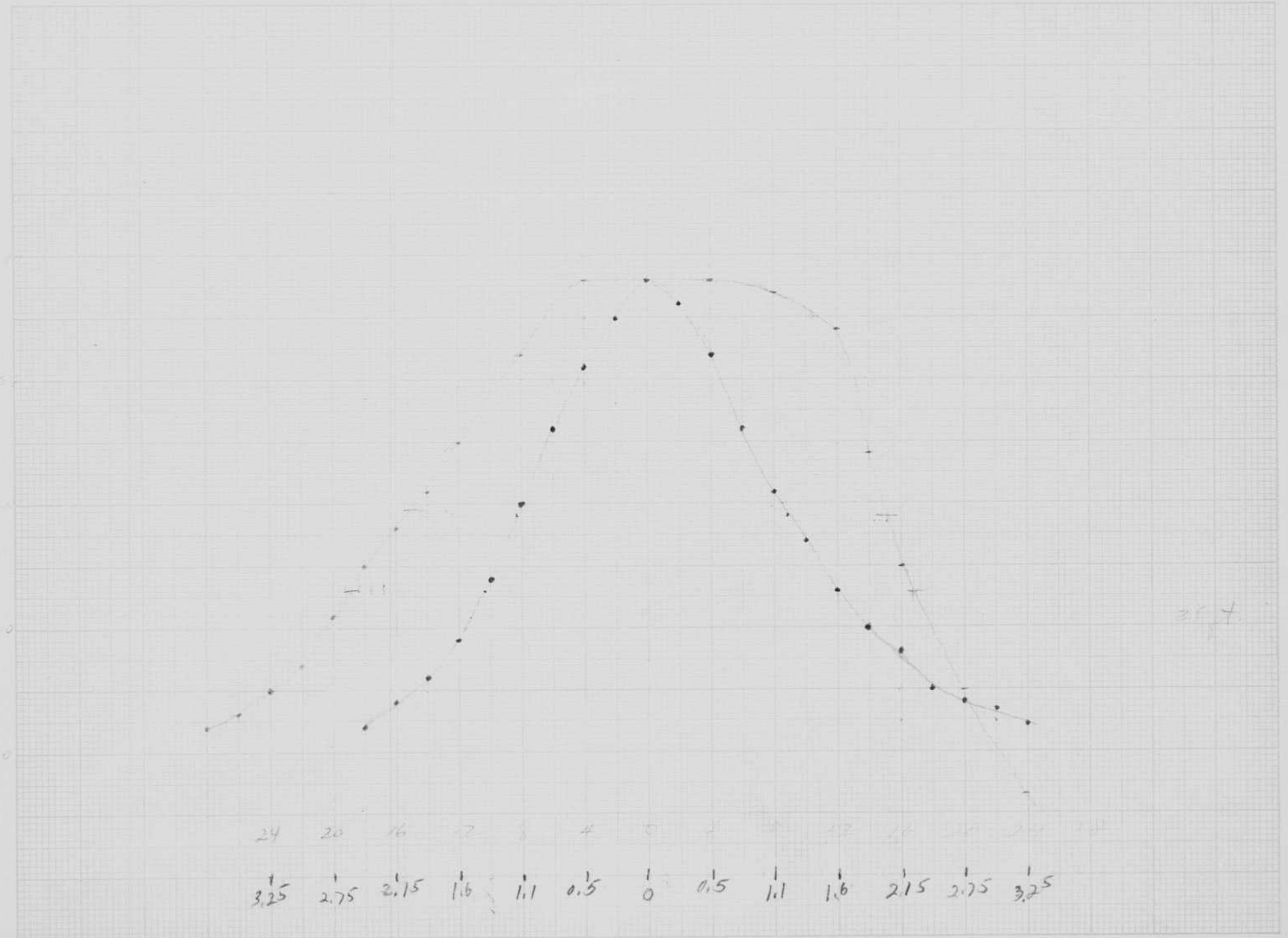
Meter	D	WR	MEAN LIGHT BEAM	E Volts	Cap. (MP) C	Energy W.S. C/2	Effy. CP/	Lamp	Remarks
	35'								Opaque calibration disc removed from meter.
→	38	0							
	36	2"R							
	32	4"R							
	26	6"R							
	21	8"							
	17	10"							
	13	12"							
	10	14"							
	7	16							
	5	18"							
	4	20"							
	3½	22"							
	2	24"							
	38	0							
	35	2"L							
	31	.4"							
	26	6"							
	20	8"							
	14	10"							
	9	12"							
	6	14							
	4	16							
	2	18							

G.R. # 113 Meter Calibration

Place M.I.T.
Date 3/14/56
Observer E. MacR.

Meter	D	WR	(1/2 LIGHT HOLES	E Volts	Cam. (TDC) C	Energy M.S. C'/2	Effy. CF/'	Lamp	Remarks
174	3ft			2000	40				Opaque calibration disk removed.
27	"			2000	40				Opaque disk in Meter as usually used And calibrated
Gear Ratio = $\frac{174}{27}$ = 6.444									
74	"		666	2000	100	200		FT-214 693	marked as output

calibration check


24
20
16
12
8
4
0
3.25
2.75
2.15
1.6
1.1
0.5
0
0.5
1.1
1.6
2.15
2.75
3.25

Airplane Beacon Lamp (Bare)
#2521 Ser. 7

#113

Place M.I.T.
Date 3/14/56
Observer E. MacR

N	Meter	D	WH	WH/C LIGHT WCPS	E Volts	Cap. (TP) C	Energy C.S. CP/2	Effy. CP/W	Lamp	Remarks
	6	1/f		6	850	35	12.7	0.472		Meter as usually calibrated
	36	1/f		$\frac{36}{6.44} = 5.6$ H.C.P.S				0.445		Opaque disc removed. See meter calibration sheet

122 VAC in. → $\frac{E}{850}$ at flash
850 setting

$$W.S. = \frac{35 \times (.85)^2}{2} = 12.7$$

Airplane Beacon Gap from Ser. # 7.
in External Set-up

Place M.I.T.
Date 3/15/56
Observer E. MacR.

#113

	Meter	D	MR	MM HG	E Volts	Cap. (MFD) C	Energy W.sec $CV^2/2$	Effy. CV/E	Temp	Remarks
X1	8	1/4.			850	35.6	12.8			Tech. inserts
X1	58	1/4			850	35.6	12.8			Opaque Att. Disc removed

Using ratio of 6.44 as previously found

$\frac{58}{6.44} = 9$ | 9 | 12.8 | 0.704

Multiprobe Gap
from experimental Strobolac

X1	7	1/4			850	35.6				

Calibrate A.C. light meter

Place M.I.T.
Date 3/15/56
Observer E. Mack R.

R	Meter	D	WR	Watt LIGHT INCPS	E Volts	Cap. ("FD) C	Energy W-s /2	Effy. EW/'	Lamp	Remarks
X1	Motor #113	3/ft			2000	100			FT-114 693 - HCPS	
"	72	"		648	"	"				

AC meter as set up (0.1 mfd setting)

1.0	10/ft	→	648	2000	100		FT-114 693	

Sens. = 6.48 lumen seconds/ft² full scale.

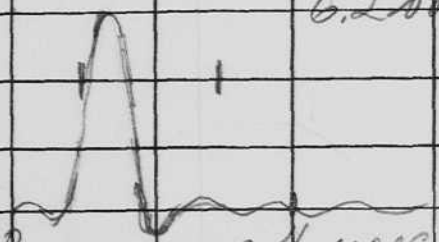
Multiprobe Cap ——— with AC meter

0.34	2ft		8.8	850	35.6	12.8	0.69

0.34 X 6.48 X 4 = 8.8 H.C.P.S.

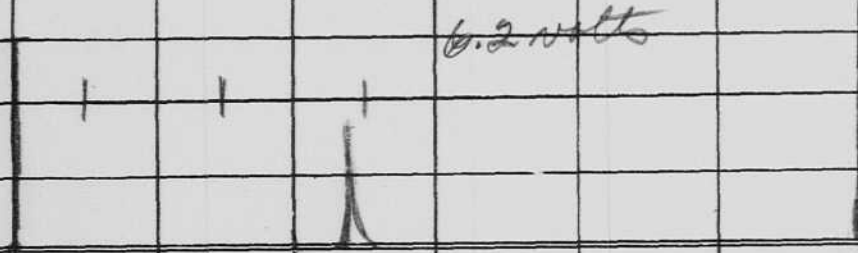
1st flash

6.2 volts



0.4 μsec.

6.2 volts



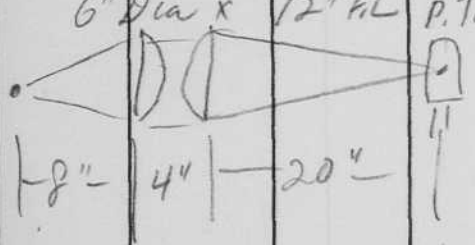
0 4 μsec.

0 6 12 13 24 μsec. →

Two flashes
Did at 5 μsec.

Two flashes
Dial at 20 μsec.

Cenco



Double Flash
Type No 2307E2 Ser. 14.

1st flash
0.005 mfd

2nd flash
0.01 mfd

Standard values.

7.75 KV.

Test Number	
Aperture	
Filter	
Meter reading	
Lumen seconds	
Capacity mfds.	
Voltage	
Shutter time	
Distance	
$\left(\frac{f}{d}\right)^2$	
Photocell type	
Tube Dimensions: Length	
Inside Diameter	
Gas	
Pressure cm Hg	
Identification	

REMARKS

M.I.T.

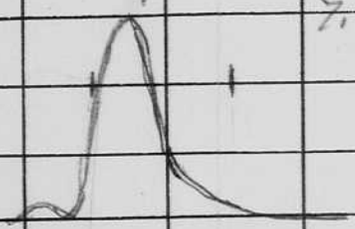
Observer E. Mack

Date Nov. 20, 36

Test Number	
Aperture	
Filter	
Meter reading	
Lumen seconds	
Capacity mfds.	
Voltage	
Shutter time	
Distance	
$\left(\frac{f}{d}\right)^2$	
Photocell type	
Tube Dimensions: Length	
Inside Diameter	
Gas	
Pressure cm Hg	
Identification	

1st flash

7.7 Volts



0.1 μsec/cm

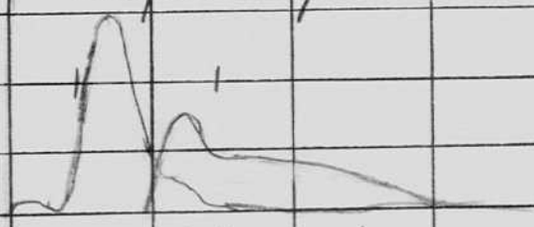
7.7 volts

0 4 μsec.

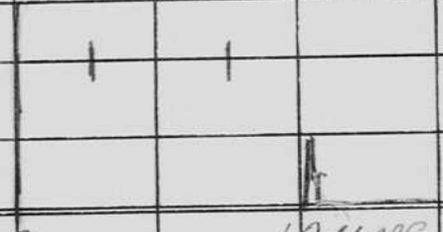
Two flashes

Dial set to 5 μsec.

2 flashes superimposed.



0 0.1 μsec/cm.



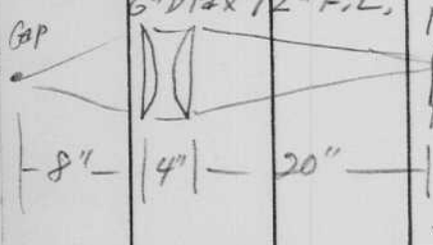
0 10 μsec

Two flashes

Dial set to 10 μsec.

Camera

6" Dia x 12" F.L.



Double Flash

Type No. 2307E2 Ser No. 14

1st flash

0.01 mfd

2nd flash

0.02 mfd.

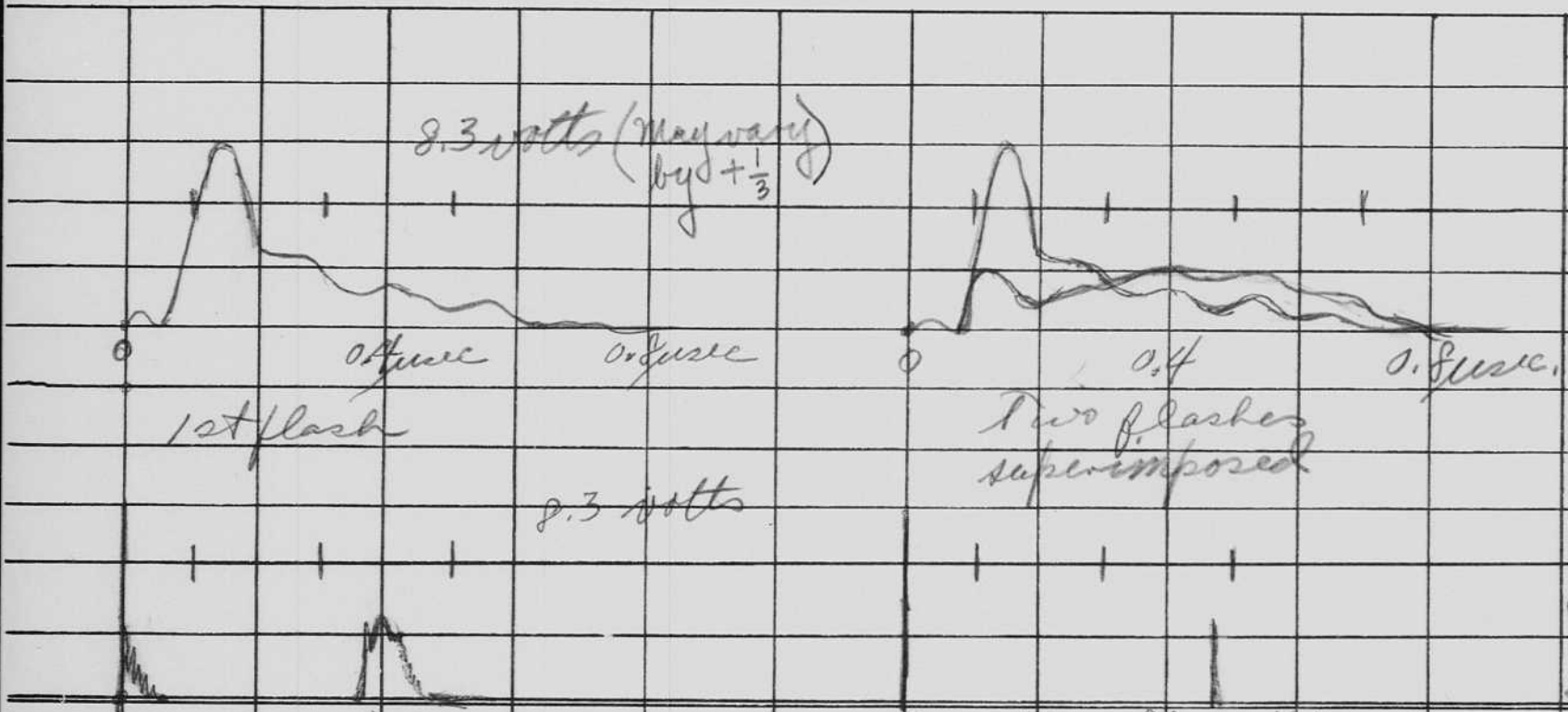
7.75 KV.

REMARKS

M.I.T.

Observer E. MacRae

Date Mar 20 56

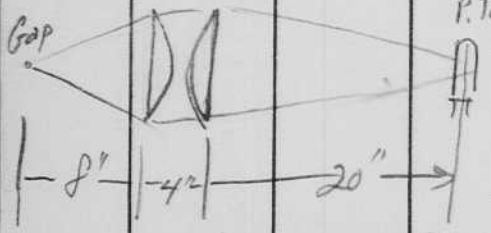


Test Number	
Aperture	
Filter	
Meter reading	
Lumen seconds	
Capacity mfds.	
Voltage	
Shutter time	
Distance	
$(\frac{f}{d})^2$	
Photocell type	
Tube Dimensions: Length	
Inside Diameter	
Gas	
Pressure cm Hg	
Identification	

Two flashes
Dial at 5 μsec.

Two flashes
Dial at 100 μsec.

Cenco
6" Dia. 12" F.L. Lenses



Double Flash

Type No. 2307 E2 Ser No 14

1st flash	2nd flash
0.03	0.06

7.75 K.V.

REMARKS

Date Mar 20 36

Observer E. Mack

M.I.T.

Beacon Lamp.
External Setup

#113

Place M.I.T.
Date Mar. 29, '56
Observer E. Mack.

#	Meter	D	WH	MAX LIGHT INCHES	E Volts	Cap. (CM) C	Energy C E²/2	Effy. CM/"	Lamp	Remarks
x1		1ft			850	35.6	12.8			
	10									With Standard Meter Calibration
	69	$\frac{69}{6.44} = 10.7$				$\frac{10.7}{12.8} = 0.835$				Opaque Disc Removed

Flat
Discharge Res. = 0.042 Ω
" L = 6 μh.

FK-1 lamp for use in Ritz propellor unit

#113

Place M.I.T.
Date Apr. 18 36
Observer S.W. and W.H.R.

# Meter	D	NR	MR² LIGHT Hours	E Volts	Cap. (MF) C	Energy Mag. $CV^2/2$	Effy. CP/W	Lamp	Remarks		
X1	3ft		ns cable-bare lamp						Flags beam .0075R		used.
105		105	935	2000	100	200		FK-1	7.0	Amps peak current 934.	130
86		86	775	2580	60	200			8.8	1065	90
83			747	3500	45	"			11.0	1465	70
82			737	3500	36	"			13.5	1800	55

Repeat above with #14-2 cond. cable in series with lamp.

73			657	3500	36	200			8.0	400	90
69			621	3000	45	200			2.5	334	120
64			576	2580	60	200			2.0	267	160
76			685	2000	100	200			1.4	187	280

Recheck without cable

82			737	3500	36	200			15.0		60

FT-524 lamps as used in ship propellor units.

Place M.I.T.
Date Apr. 18 56
Observer E. MacRae and W. H. Roundy

	W Meter	D	WR	WR² LIGHT DIST	E Volts	Cap. (Mfd)	Energy ½CV²	Effy. CV/	Lamp	
			FT 524							
V	111	3	222	2000	3800	80	580		FT524	125
V	104	3	222	"	"	"	"		FT524	165

with 35 ft of #16 two cond. cable

#113 FX-1 lamp for use in ship propeller-flash unit.

Place M I T.
Date 25 Apr 56
Observer E. Mack.
W. H. Rundy

	Inter	D	NR	Max. LIGHT OUTPUT	E Volts	Cand. (Cand.)	Cherry f.s. 1/2	Kfxy. Cm/	Lamp	Watt-sec. per 55 52 flash	Flash duration in Sec
X1	79	3		713	3500	36	200		FX 1	9.4	70
	68			612	3000	45	200			8.0	80
	65			589	2581	60	200			6.5	110
	74			466	2500	100	200		Y	5.5	180

→ with 50' of cable using H.V. conductor (#14) and grd. return of B.I.W. aven cond. cable used in circuit unit.

with 50' cable - Isolated unit

X1	83	3		947	3500	36	200			13.5	45
	78			702	3000	45	200			10.5	60
	77			693	2560	60	200			9.5	80
	90			810	2500	100	200			7.5	140
	79			713	3500	36	200		FT 524		100

FT-24 for strobe use
Shutz Propellor Strobe.

#113

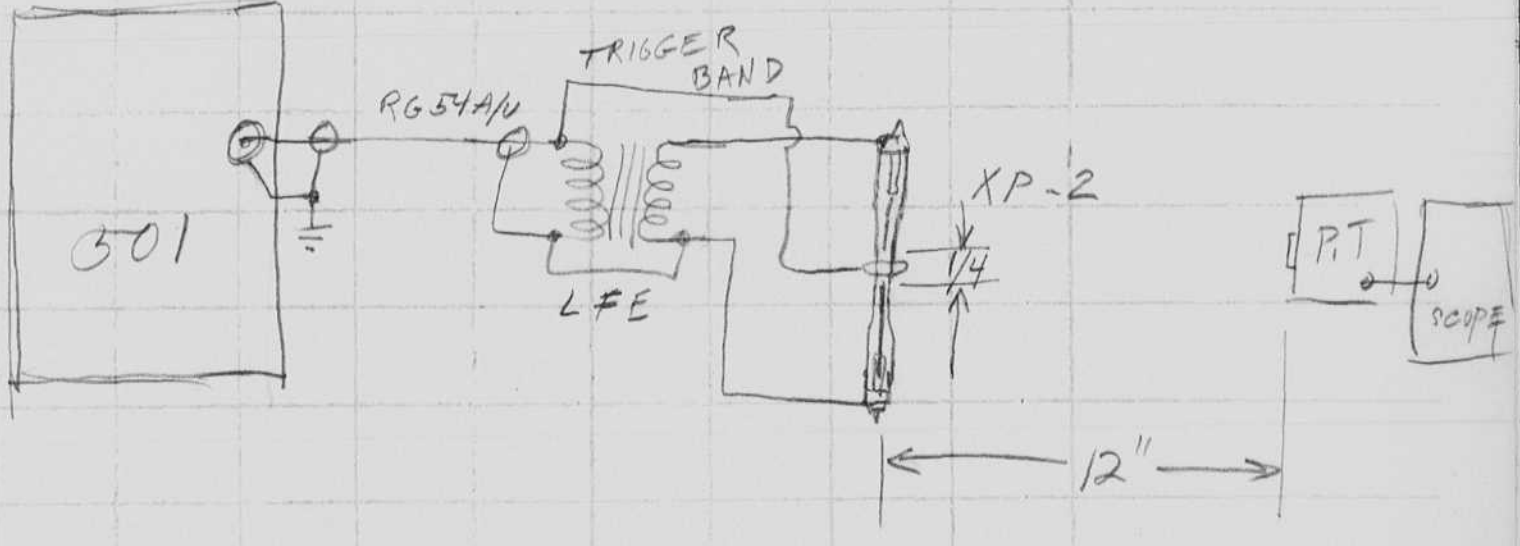
Place M.I.T.
Date Apr. 20, '56
Observer S. MacR
W. H. Rowley

	N Meter	D	WR	Watt-sec/in² LIGHT OUTPUT	E Volts	Cap. (Mfd)	Energy ft-lbs/in²	Effy. CP/	Temp
x1	9	1/4			4000	1			FT-24
	5	"			3500	1		←	
	15	"			3500	2			
	10	"			3500	1.5			

Tests on gap tubes on 501 (Prototype Model) using matching transformer LFE.

M.I.T.
June 14 '56
E. Mack, Bob. Zdy.

Distance from P.T.	Attenuator setting Volts Peak.	Duration $\frac{1}{2}$ usec.	Trig.	Cable RG-54A/U	Bare lamps.
1 ft.		1000 cycles/sec. for 0.1 sec.	0.01		
2.2	1			35 ft	1/4" x 1.050" gap flag electrodes preserve luminous
2.2	1			7 ft	
2.8	3/4			10 ft	FX-2 #1 used
3.4	3/4			10 ft	FX-2 #2 new
6.0	1			35 ft.	XP-2
8.0	1			7 ft	XP-2 More erratic with short cable Position of trigger band important (Near gnd. electrode)



Test on XP-2 gap tube
on (30 stroke)
Serial #41

Place M.I.T.
Date June 15 '56
Observer E. MacR.

Peak volts	D	Dur. μsec.	Freq.	Volts	Cap.	Energy (Joules) E = ½CV²	Mr Peak H.C.P. x 10⁶	Lamp	Remarks
0.21	6ft	35		1000	10		0.14	FX1	For standard light output. Gives 0.4×10⁶ P.H.C.P. at 10 mfd, 1000 V.
1.4	1ft.	1.0	1000 cy/sec		0.01	Setting	0.028	used FX2	Bare lamp. 10ft RG-54 A/U cable
4.0	1ft.	1.5	1000 cy/sec.		0.01	Setting	0.212	XP-2	With matching trans. and 7ft. of RG-54A/U cable.
4.4	1ft.		1000 c/s.		0.01			XP-2	60 machine new trans. box

Place M.I.T.
Date Sept. 6 56
Observer E.M.S. R.M.S.

	Meter	D	NR	[illegible] LIGHT UCPS	E Volts	Cap. [illegible]	Energy [illegible]	Eff. cp/	Lamp	
X1	105	3ft		945						Heiland VII
										Heiland V

Place M.I.T.
Date Sept. 12 56
Observer G. Hunt R. Dalton
Re Data - Curves

#	Meter	D	WR	Min² MOM RCPS	E Volts	Curr. (Tube)	Energy (Tube)	Effy. CPI	Temp	
	>0	3 ft		630	2000	~~100~~	200	3.15	FT-214 6.3 HLPS	R. Cameron
		2 ft		156	2000	30	60	2.6	#1 R4336	
	5	1 ft		155	2000	30	60	2.6	#1	measured from front of card
		2 ft		48	2000	12	24	2.0	FT 524	
		2 ft		136	2000	30	60	2.27	"	
		1 ft		47	2000	30	60	2.1	"	measured from front of card
		1 ft		41	2000	12	24	1.7	"	
	14 12	3 2 ft		176 55	2000	30	60		FT 214	Both grids & light curve on 2 1/2 volt 925 PC. = 11.5 HLPS with shields
	24	10 ft		2400	2000	30	60		R4336 #2	
	47	10 ft		4700	2000	30	60		R4336 #1	
	4	5 ft		350	2000	30	60	5.1	"	0°
	96							60°		5°
	13									10°
										12½°
	2	5 ft								15°
		1 ft		2800						0
		2 ft		3000						5
	2	10 ft		3200						10
		10 ft		4700						15

Point source for
Holcomb experiment, 1&2.

Place 20 D 102
Date Oct 10 1956
Observer Edgerton
Latist.

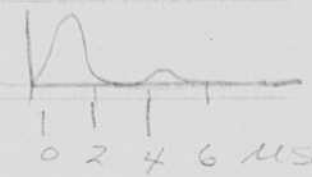
Meter	D	WR	MMF LIGHT MPS	Volts	Cap. (mfd) C	Energy ½ CV²	Effy. CP/J	Jump	Remarks

F-1 Std table. 100 mfd 2000 V Red Blue Red Black.
cable of scope 0.96 meter ×10 filter 2 glass. 935 phototube
4×10⁶ cp per cm on scope at (0.3 to 1 volt range) max gain. 0.5/2

XP-1 1000 volts 2 mf

Peak light $0.3^{.4}$ to $0.5^{.6}$ ×10⁶ c.p. Duration about 3 m s.

PCP	D.				
~~.7×10⁶~~	3 μs		1000	2	~~2~~ XP-2
.5×10⁶	1.5 μs		1000	0.75	
.8×10⁶	1.5 μs		1500	0.75	
.9×10⁶ to 1.2×10⁶	1.5 μs		1900	0.75.	



.4×10⁶	3 μs	1000	2	Sprague. 1.2×10⁶×1 C.P.S.
.9×10⁶	3 μs	1500	2	
1.0 / 1.3×10⁶	3 μs	1900	2	
1.×10⁶	5 μs	1000	6	
1.6×10⁶	4 μs	1500	6	
1.8×10⁶	?	1900	6.	tube busted after 6 or 8 pops.

0.4×10^6 CP × 3×10^{-6} = 1.2 C.P.S.

Produces photo at f5.6 Scotch light at 34 ft.
Royal Pan film.

XP-1

Place
Date Oct 17 '56
Observer Edgerton

Meter	C.P.	Dur. M.S. WR	CP² LIGHT INTS	E Volts	Cap. (MFD)	Energy W.S. CP/2	Effy. CP/	Lamp	Remarks
	0.1×10^5	2 ms	.02	500	0.5				Does not fill tube.
	$.2\times10^5$	3 m.s.	.06	500	1.0				Does " " " 1/3±
	.3 "	4	.12	500	2.0				" " "
	.7 h.9 "	6	.54	500	5.0				" " "
	1.2×10^5	12	1.4	500	10.0				" " "
	$1.6\text{-}2.\times10^5$	25	5.0	500	25.				" "
	2.5×10^5	35	5.75	500	55				Lord starter

Note that peak is reached in about 20 ms. Probably the circuit time constant is responsible.

TIME

$.7\text{-}.9\times10^5$	2	.18	1000	.5		
1.5×10^5	5	.75	1000	1.5		
1.8×10^5	7	1.26	1000	2.5		
2.5	12	3.0	1000	5		
3.5	15	5.25	1000	10		note double peak Due to dual? or gas surge?
2.5×10^5	100	25.	475	180 ∈		Sprague D11496.

Effect was bright through D3 filter. Seems to fill the gap.

1.8×10^5	1.5	.27	1000	.5 mfd (.36F)	Sprague clipper to terminal of tube.
3.5	1.5		1500	.5	
4.5	1.5		2000	.5	

XP-2.

Place
Date Oct 17
Observer Edgerton

Meter	C.P. D	Dur ~~sec~~ μs.	CT^2 MCPS	E Volts	Exp. (Sec) C	Energy $CT^2/2$	Effy. CT/T	Lamp	Remarks
	2×10^5	1.5	.3	1000	.5	Sprague	(.405).		
	3.5 "	"		1500	.5				
	4.5 "	1.5	.	2000	.5				

Double flash #16

Place
Date Oct. 7 1956
Observer Edgerton

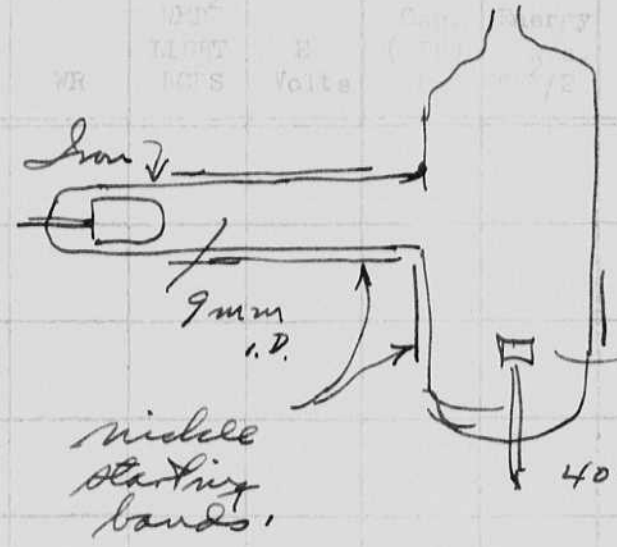
Filter	D	WR	Sec LIGHT DUR'S	E Volts	Cap. (Mfd)	Energy Watt Sec. (J)	Effy. (%)	Lamp	Remarks

peak light here about .016 $\times 10^6$ c.p.
Duration about 0.2 or 0.3 μs.
No lens

$\frac{2+9}{3} = \frac{18}{3} = 6$

Microscope tube
Improved type made today

20D102
Oct 18 1956
Edgerton

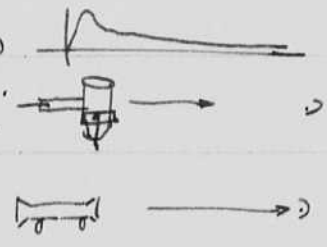


Scale 1 to 1.

10 cm xenon

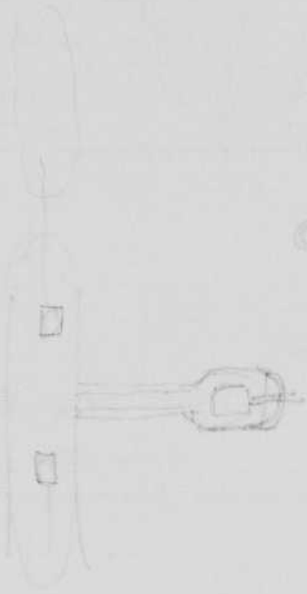
0.35V.=		40 μs.		450	100	
	Calibration ×10⁶	μs.		FX-1	1500 V	25 mfd 2×10⁶ B.P. = 300 ft.
3V	2 c.p.	40		1500	25	FX-1 Std tube for calibration.
	.35×10⁶	60		500	100	paper above micros cope tube.
.9	.6×10⁶	200		475	525	elec
	1.2×10⁶	300		475	1050	elect.
	2×10⁶	200 + ? 400		475	2100	elect. Long after-glow

Tube shows slight crazing in the anode arm. Anode arm warmer than the rest of the tube.



	.7×10⁶	500	350	475	2100	elect. Warm cathode tube

30 mfd at 1500 volts does not fill the small tube with light in my microscope lamp. The arc seems to stay on the bottom side.



Suitcase unit
Aluminum unit H. Bird.

M.I.T.
20D102
Place
Date Oct 18 1956
Observer Edgerton
Remarks

#	V Meter	D	WR	MIL LIGHT HOURS	E Volts	Capac. (MFD) C	Energy per flash Ergs/2	Effy. Cp/W	Temp
2	130	5	260	6500	2600 ±	?	one FT-220.		

as loaned to Polaroid Herman Edgerton.
for use in an airplane.

Ship Propeller Strobe
for David Taylor Model Basin

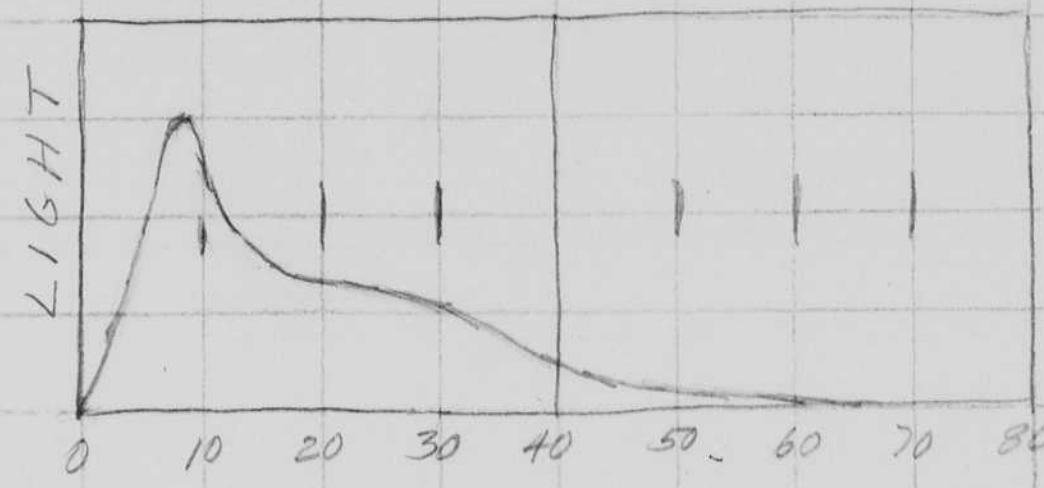
Place M.I.T.
Date Nov 1 56
Observer E. MacR.
Tom M.

	Meter	D	WR	MP LIGHT BCPS	E Volts	Cap. (mfd) C	Energy $\frac{1}{2}CE^2$	Eff. CF'	Lamp	Remarks
x2	120	5ft		240×25 6000	3500	37			G.E. FT-24 #1	Capacitor #1
x2	123	5ft				37			G.E. FT-24 #1	Capacitor #2
x2	147	5ft			3500	37				Kenlite Cap. #2
									G.E. FT-24 #2	Cap #2
				As strobe						
x1	70to72	10ft			3500	1.0			G.E. FT-24 #2	

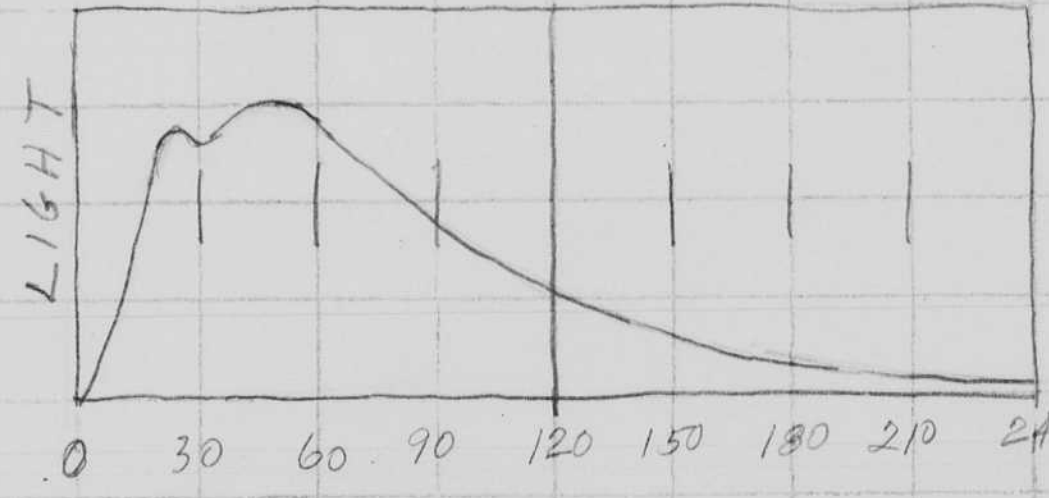
← running as strobe at 20 c.p.s. for 10 sec.

Ship Propellor Strobe for David Taylor Model Basin

Place M.I.T.
Date Nov. 1, '50
Observer E. Mack, Dom. M.



1.0 mfd
at
20 c.p.s.
FT-24
#2



37 mfd.

FT-24
#2

1" I.D. Job No 2522

#113

Underwater Lamp

D. Taylor Model Basin

Place M.I.T.

Date Dec 6 36

Observer FEE, L. Mosk.

#	Meter	D	Deg.	Lumens	E Volts	(Mil) C	cp/2	Mtry. CP/"	Lamp	Remarks
									FX-1	in half cylinder reflector (aluminized)
X1		4 ft.			3500	25.5				6 3/8 long
77			0°							13/16 diameter
89			10R							axis 1 3/32"
102			20R							lamp set 9/32
102			30R							from inner
107			40R							circumference
104			50R							
80			60R							
28			70R							
79			0							
95			10L							
100			20L							
	102		30L							
	96		40L							
	95		50L							
	32		60L							
	17		70L							

1" I.D. Lab. #2522

Underwater lamp.

for D. Taylor Model Basin

#113

Photo M.I.T.
Date Dec. 10, 56
Observer E. MacR.

A	Meter	D	WR	LIGHT FC-S	E Volts	(FC) C	Candlepower CP/2	Effy. CP/W	Lamp	Remarks
X1		(4+) angle			3500	35.5			FX-1	in half cylindrical reflector
	84	0								
	92	20								
	94	40								
	96	60								
	52	70								
	12	80								
	84	0								
	101	20								
	92	40								
	44	60								
	7	70								
	87	80								
	77	10"	down							
	59	20"	"							
	54	25"	"							
	76	10"	up.							
	62	20"	"							
	44	30"	up.							
	33	30"	up.							
	46				3570	35.5				Bare lamp.

Min. starting voltage with spark coil in box attached to stray switch unit is 1500 V.

114
104
10
105.

Special FX-1s. Tungsten anode cylinder comp cathode.
Sent to Colorado Mt Evans for Univ of Wash. Prof Sond.

Place MIT
Date 12-10-56
Observer R M N

	Meter	D	WR	LIGHT INCPS	Volts			Eff. CP/W	Lamp	Remarks
1	112	3			2000	100	200			tube No. 1
	114									1
	106									2
	108									
	106									3
	107									
	114									4
	114									
	107									5
	107									
	105									6
	106									
	104									7
	104									
	108									8
	109									

Color tests.

FT.503

Spotlight 18" Reflector.

Place
Date
Observer

N	Meter	D	WR	MBP LIGHT DC'S	E Volts	Cap. (MFD) C	Energy W.S. $CE^2/2$	Effy. CP/W	Lamp	Remarks
	800	1½ ft.		[redacted]	3500? 4000	25				

$800 = IT = \frac{CA^2}{S}$

$A^2 = 800\frac{S}{C} = 800\left(\frac{25}{15}\right)$

$A = \sqrt{800 \times \frac{25}{15}} = \sqrt{1400} = 33.$ f number for guess.

Used f 22 ~~on~~ 2 1:1 reduction. ~~4~~ 80

f 16 on 4 2:1 enlargement ~~45°~~ 80

22 " 2 2:1 " ~~45°~~ 80

f 22 on 2 2:1 enlargement 110° light.

Duration = 70 μs

FT 503. 25 mf.

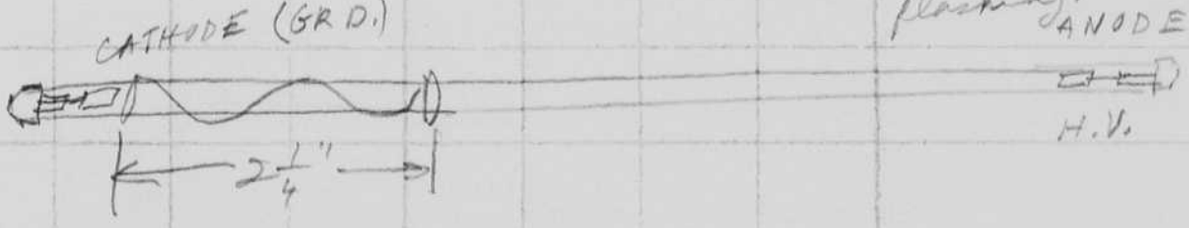
Underwater lamp assemblys for D. Taylor model basin as shipped.

Place M.I.T.
Date Dec. 15, '56
Observer E. Mack.

#	Meter	D	WR	MFP RIGHT PCPS	E Volts	Cap. (MFD) C	Energy ½CE²/2	Effy. CP/J	Lamp	Remarks
X1		4/+			3500	37	227		#1 FX-1	for 13/16 half cylinder reflector in glass tube
"	104			1648	"	"			#2 FX-1	" "
"	102			1632	"	"				

Duration both lamps 1/3 peak - 75 μsec.

Spark band covers only 2 1/4 inches of arc region near ground end (cathode) of flash tube, to avoid self flashing.

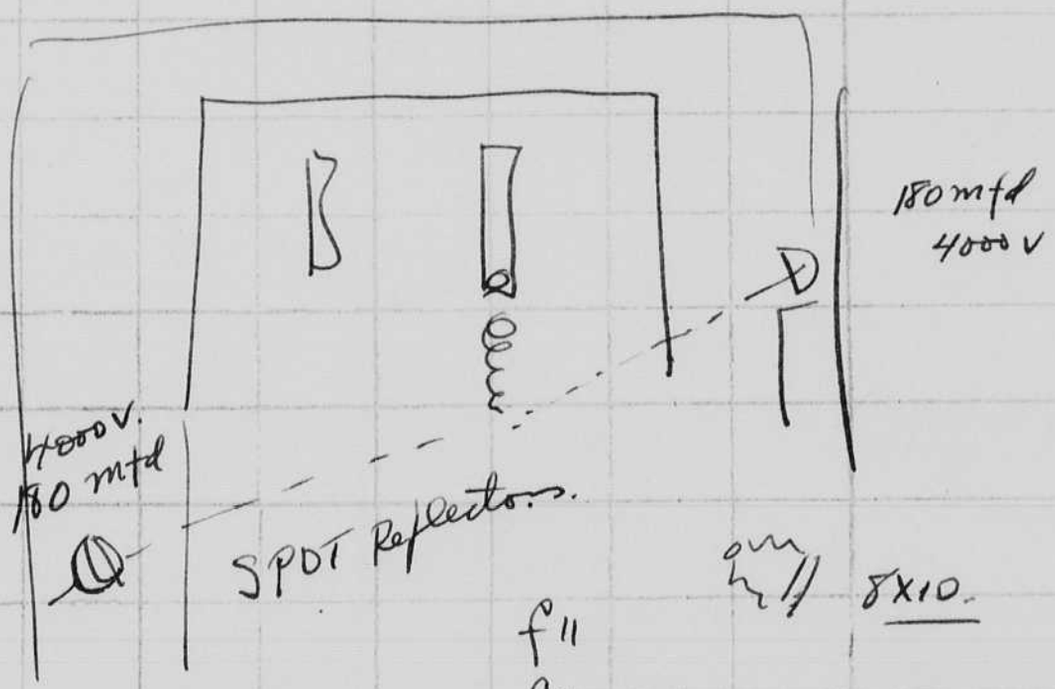


Arcus units

for color tests.

Place MIT
Date 12/18/56
Observer PMe

#	Meter	D	MA	WATT² LIGHT DCPS	E Volts	Cap. (MFD) C	Theory W.S. CP/2	Effy. CP/I	Lamp	Remarks
1	120	40 ft			4000 V.	200				
	120									
	130									
	135									
	135									



f11
f16.

Ektacolor ASX 25

Photos ok at f11 on Pan x B&W film.

Circus Unit
10 inch. Reflectors

Color film ASA25
c = 15.

MIT
12/27/56
RMP

Meter	D	WR	MCP LIGHT DCPS	E Volts	Cap. (VD) C	Hours M.C. CP/2	G.N. Effy. CP/W	Temp	Remarks
92	25 (est.)		57,500	4KV	200		300		Unit No I
92									10
92									
83									
~~76~~							300 -		No 2
83									
83									
28									
28	25 N.		11,400.		25		167		No 2 Single Flood
									18 inch Reflector
24									
24							160		No Resistor Mult.
24							160		No 3
24									18 inch Ref
									No Resistor

9^2 9.3.

$GN = \sqrt{\left(\frac{25}{15}\right) 5800} = \sqrt{3866.7} = \frac{30}{40}$

$GF = 30$

5800

3220

58

1932

31

31

31

31

1100

400

36

3

2475

$3fN \times f = 100$

$f = \frac{100}{3} = 33$

Circus Unit

M.I.T.
12/28/56
RMP

4	114	10'	456	45,600	4KV	200	Reflector 4A P.S. 3 Resistor Heater
4	114						
4	114						
4	125		500	59,000			8Ω Resistor
4	125						" "
1	58		58	5800		25	" "
1	58						" "
	11			1100		6	" "
	11						" "
	8		8	800		4	" "
	8						" "
~~4~~	~~132~~					200	
4	132						Reflector 3A
4	132						
2	113	25	226	141,000		200	Reflector 3
2	113						

Arcus Unit

MIT
12/28/56
RMP.

X	2	132	25	264	165,000	4KV 200a	Reflector 3
		132					BS. 1
X	1	8	3		72	Int.	Reflector 4

Duration

15	μ sec.	Int
30	μ sec	4
40	μ sec	6
90	μ sec	25
800		180
900		360

Inductance in Banks
" "

$\frac{11+10}{2} = 20$

FX-1 lamp

M.I.T.
Jan 31, 51
E. MacR.

	Meter	D	WR	Volts			lamp	Remarks
X1	#113	1/f		2000	10	20	FX-1	→ Base lamp on test set
	51							
X1	33			"	"	"		→ With approx 250 ft. of special David Taylor simplex 4 cond cable in series with lamp. (50' ft of #6/4 conductor)

Peak light without cable is about 3 times peak light with cable

Duration 24 μsec. no cable
60 μsec. with 250' cable

3

FT-214 Helix

M.I.T.
Jan. 31, '57
E. Wack.

Meter	D	WS	LIGHT DOPS	E Volts	Sen. (mm)	Theory e.s. cm/2	Effy. (%)	Temp	Remarks
X1 #113	1ft	Junction		2000	10	20			
47		55 μμc							Bare lamp no cable
35		8 μμc.							250 ft Specid Simplex cable (500 ft #14 wire)

Peak light nearly halved by 250 ft of cable.

600 mfd unit
Al Box A.C. operated.
FT-220 Lamp.

GR306

20D102

Jan 30 1957
Edgerton
H.&E.

	Meter	D	WR	DCFS	Volts	C	Cap. Energy W.S.	Effy. cp/	Lamp	
~~1~~	~~GR306~~	~~3ft~~	~~3.95~~	~~35.55~~	~~920~~ ~~480~~	~~12000 MFD~~			~~FT220~~	electrolytes.
~~2~~	"	3	4.40							600 mfd = C.D. 300 mfd. 12 cans in par. - series.
2	~~44.0~~	~~3ft~~	88	792.	920	600	253.	3.13	~~Sylv. Ref.~~ 220.	
~~4~~	31	~~3ft.~~	124	1120	820	600 +525				525 mfd = 3 sprague 4 cans in Ser - par.
4	38	3	140	1300	870	"	426.	3.05		214 220 coil bare.

↑ This table was old and rather yellow.

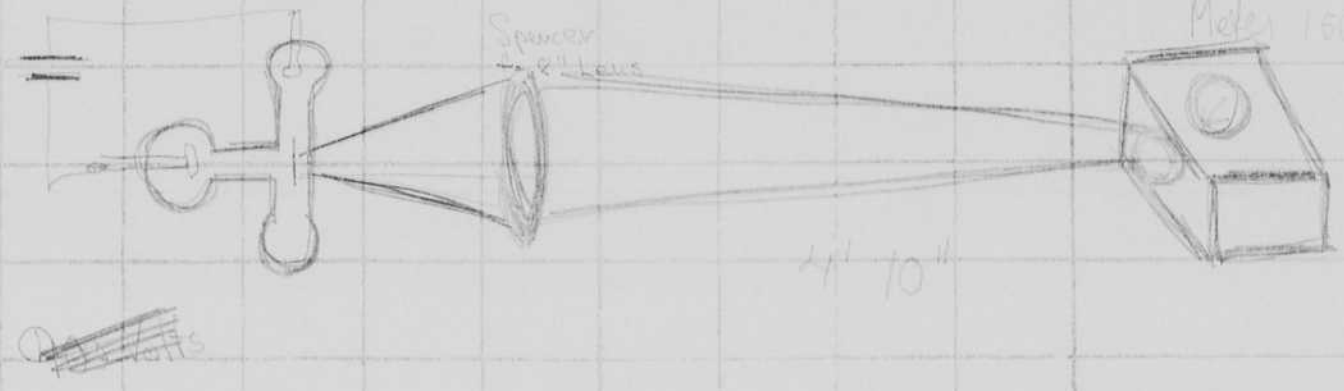
16	48	3	~~[illegible]~~	6900	920?	600	253.		220 in Reflector Sealed Beam type
16	55	3		7900	920	600	253.		Beam candle power

Microscope lamp

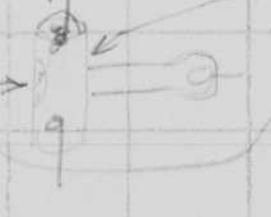
450
150

Date 20 D 102
Date Feb. 9, 1957
Observer H. Edgerton
P. Seitz

#	Meter	D	WR	LIGHT OPS	E Volts	Cap.	Theory f-no.	Exp. CM²	Lamp	Remarks
7	38	—	152	—	900	600	272			
4	41		176		900	600	242	.725		
11	40		160		900	600	242	.67		
8	35		280		900	600+225 825	334	.84		White deposit on tube except where hit by blast from side lamp. Crazing on large tube.
16	24		384		900	900+150 1050 mfd	4/25	.905		
16	26		416		900	1050		.98		
16	23				900	"	"			
"	25				"	"	"			
"	23				"	"	"			



Still runs ok at 60 cycles with 1 mfd 360 volts.



XP-1

20D402
Feb 9 1957
Edgerton
Scaggs

	N	Meter	D	WR	WATTS/CM² LIGHT RCPS	E Volts	Cap. (MFD) C	Energy W.S. CM²/2	Effy. CP/W	Temp	
1	28		1/2	28	7.0	460	180 C	19	0.37	XP-1.	Sprague D11496. P 221
					$\frac{180(10^{-6})(460)(460)}{2}$				$1.8(7.6)(2.8)(10^{-6+2+2})$		
1	37		1/2	37	9.25	460	250	26	.35		D 17490 521 Sprague 450-450.
			DURATION		2.5×30 μs = 75 μs.						
1	26-31		1/2			490	180				Sprague 4100 5A

$\frac{9.25}{0.1} = 93.$ C.P.S./sq.cm.

$\frac{1}{5} \times \frac{1}{5} \times 2.54 = .1$

$125(1.25)(6)$

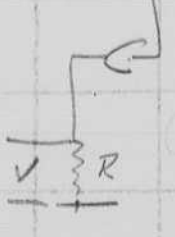
Peak light 22.5" to scope

3 cm = 1 volt. calib.

3 cm = $.28 \times 10^6$ C.P.

$i = kl.$

$IT = 0.28 \times 10^6 \times 75 \times 10^{-6} = 21.$



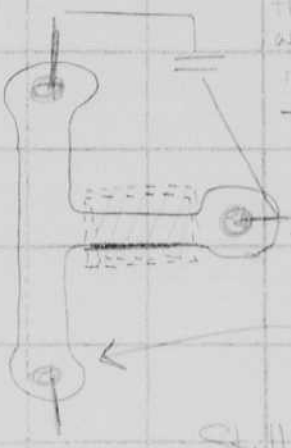
$V = iR = klR$

light according to G.R. meter.

Microscope Lamp (cont'd)

Mode 20D 102
Date Feb 9 1957
Observer [illegible]

#	Meter	D	WR	$\frac{MCP}{LIGHT}$ / BCPS	E Volts	Cap. (MFD)	Energy $\frac{watt\ sec}{CP/2}$	Effy. CP/	Lamp	Remarks
16	21				900	105a				With tin foil wrapped around the tube as marked with the dotted lines, ney the shaded area
16	22				900	105a				The area around the iron anode was deeply blackened
										The white deposit at the bottom of the tube began to flake off.

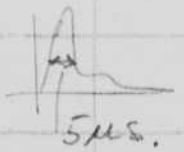


Still runs O.K. at 60~ with 1 mfd. and 360 V.

Duration test.

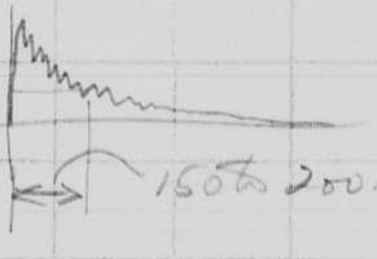
900 550 μf →

1 mfd 360 x 2

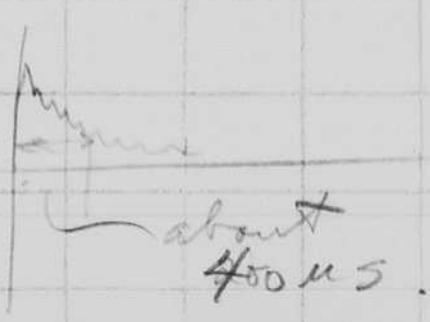


5 MS.

450+150 900 V



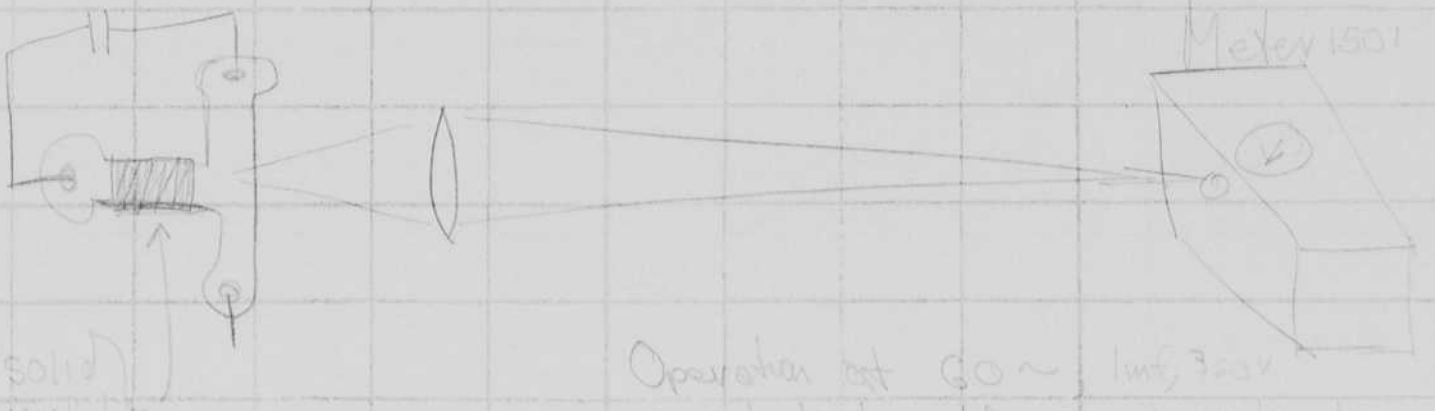
900+150 mfd 900 V.



Microscope lamp #2

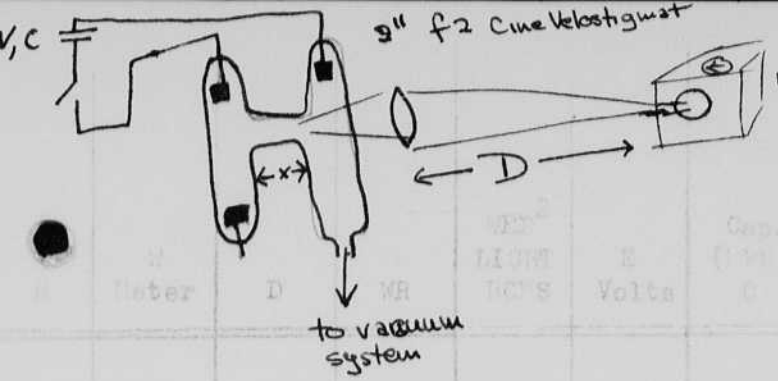
Place 20D 102
Date Feb. 9, 1957
Observer Edgerton, Germeshausen & Grier

#	Meter	D	MR	MF² Light Bats	E Volts	Cap. (mfd) C	Energy w.s. cm/2	Exp. cm/"	Lamp	Remarks
16	20		820		900	1050	425		Unconnected	End blew out



Operation at 60~ 1mf, 900v good, but with a circular type of image

Tubulation blew off at the Bay.



H_1 - Intensity Lamp

$X = 3/4"$ = Tube A
$X = 1\frac{1}{2}"$ = Tube B

Place 20D192
Date Feb. 6, 1957
Observer H. Edgerton + R. Gallagher

						Pressure cm Xe	
1		3'	500	100 μf	A		would not fire at 500 volts
		"	750	"	A		Would NOT fire at 750 volts
2	32.5 lumen sec/ft²	"	1000	"	"		
2	16	"	800	"	"		— minimum
2	23	"	900	"			
1	47	"	900				

Above data taken with weak batteries — meter changed 1947 meter

$(9)^2(10^4)\left(\frac{10^2}{2}\right)(10^{-6}) = 40.5$

1	56	3'	56	900	100 μf	40.5	A	3.3cm
1	69	"	69	1000	"	50	"	"
1	39½	"	39½	800	"	32	"	"
1	26	"	26	700	"	24.5	"	"
1	18	"	18	600	"	19	"	"
1	11	"	11	500	"	12.5	"	"
				400	"			

Meter reading not significant, but the tube still fires at 400 V. + 100 μf

over

High Intensity Lamp (cont.)

20D102
Feb. 15, 1957
H. Edgerton + P. Gallagher

	Meter	D	WR	WT LIGHT BCPS	Volts	Cap. C (μf)	Energy per flash ft-lbs WS/C	Effy. CP/	Lamp	Pressure Xe cm
1	27	3'			500	100μf	12½		B	3.3
"	35	"			600	"	18		"	3.3
"	45	"			700	"	24½		"	"
"	57				800	"	32		"	"
"	66				900	"	40.5		"	"
"	78				1000	"	50		"	"
1	97				1000	100μf	50		B	6.2
1	40				500	"			"	"
1	52				600	"			"	"
1	60				700	"			"	"
1	77				800	"			"	"
1	87				900	"			"	"
1	25				400	"			"	"
1	13				300	"			"	"
1	108				1100	"			"	"
1	118				1200	"			"	"
1	138				1300	"			"	"

No visible crazing after these tests

H. Intensity Lite (cont.)

20 D 102
Feb. 15, 1957
H. Edgerton + P. Gallyon

#	Meter	D	WR	(MJ)² LIGHT RCFS	E Volts	Cap. Energy (MFD) C	E²C/2	Eff. CE²/T	Lamp	Pressure cm Xe	Remarks
1	151				1500	100 μf			B	6.2	Slight signs of crazing
1	170				1700	100 μf			"	"	slight whitening of glass
1	19.5	35"			500	100 μf			A	6.2	
	46				750						
	79				1000						
	115				1250				"	"	
	150				1500	"			"	"	Some white deposit on tube - no crazing
					1750	"					Tube fails to start
	156				1750	"					changed spark band
	75				1000	"					
	15				500	"					Some white deposits - both tubes show green color no crazing
	After running on the pump										
	69				1000						Changed gas to get out impurities
										6.5cm	
1	74	35"			1000	100 μf			A		Fresh gas - still shows a little green
1	72				1000	"			"	"	with Tesla coil
1	65				"	"			"	"	Shows more green
1	60				"	"					
	117				1500	"			"	"	
	132				1750	"					
	62				1000	"					
	30				750	"					Very green - decided to throw it out

$68\frac{3}{2} = 34(3) = 102$

$68\frac{5}{2} = 170$

Hi Intensity Light (cont.)

20D102
Feb 15, 1957
H.E. + P.G.

								Press	
	60	35"		1000	100	7	6.5		Same gas as in last expt
	—			750	100				Won't start
	—			1250	"				Won't start
	122			1500	"				Green — threw out gas
	135			1750					
1	68	35"		2000	100μf				Standard tube Calibration 50 cps/cm²

Electrolytic (Sprague) # D18349 rated 525μf @ 450
marked 605μf

4 am pressure

		35"			A		Green after one experimental flash
1	43	"	500	605μf	"		Some crazing after one pop
1	43	"	500	"	"		
1	34	"	500	"	"		
1	41	"	500	"	"		
1	33	"	500	"			
1	34	"	500	"			

5.7 am pressure

1	44	"	500	605μf	A		
1	47	"	500	"	"		
1	46	"	500	"			
	46½	"	500	"	"		
	44	"	500	"	"		

High Intensity Light (cont)

20 D102
Feb. 15, 1957
H.E. + P.B.

7.2 cm pressure = 7.2 cm (Xe)

1	48	35"		500	605 μf	A	
"	38	"		"	"	"	
	44	"		"	"	"	
	35	"		"	"	"	
	37	"		"	"	"	

11 cm pressure (Xe)

1	38	35"		500	605	A	(after 2 skips)
	40	"		"	"	"	
"	29	"		"	"	"	
			3 misses				Green no worse than when run was started
	27	"		"	"	"	

New Capacitor added — marked 607 μf - same type

11 cm pressure (Xe)

107	35"		500	1212	A	
		miss				
110	35"		500	1212	A	Cleaned off a ○ ¼" diameter (i.e. white deposit blasted away)
143	"		"	"	"	
147	"		"	"	"	
141	"		"	"	"	
145	"		"	"	"	
123	"		"	"	"	
125	"		"	"	"	
113	"		"	"	"	

A third C added — marked 530 μf — same type

11 cm pressure (Xe)

119	35"	450	1212 +	A	
		~~500~~	530 μf		
137	"	475	"		few craze marks on end of tube

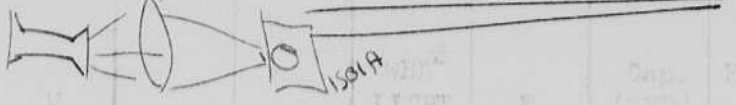
High Intensity Light (cont.)

Place 20D 102
Date Feb. 15, 1957
Observers H. Edgerton & P. Gallagher

N	Meter	D	MR	Mil LIGHT OUTS	E Volts	Cap. (MFD) E	Energy w.s. ft²/2	Eff. CP/	Lamp	Remarks
		35"				605 μf				11 cm pressure
1	67				500	~~605 μf~~			A	
1	30				500	300 μf			"	
1	57				800	300 μf			"	Very green w/ Tesla coil
	87				900	"			"	

Tube sealed off at 5.6 cm pressure (Xe)

Again: Tube A has capillary tube = 3/4" length
" B " " " " " 1 1/2" "



Phillips tube

With power supply built by EG+G for tube

20 D 102
Feb. 26, 1957
H. Edgerton + P. Gallagher

	Meter	D	WR	LIGHT HOURS	Volts		
1	132	35"			500	rated 100 W.S.	
2	67	"			500	"	
2	145	"			500	rated 200 W.S.	
4	75	"			"	"	Anode glowed red
4	125	"			500	500	

Microscope lamp!

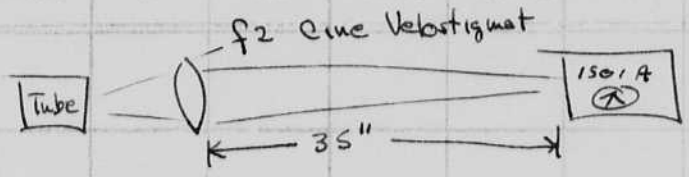
With same EG+G power supply

2	20	35"				rated 200	White deposit covered side of tube opposite hole
1	30	35"				200	

1
1
2
2
2
2
1
1
2
2
2
2
2
4
4
16

Comparison of light output of Various tubes

20D 102
Date Feb. 28, 1957
Observer P. M. Gallagher



FX-1 — Beat up tube - ends ove white

1	36	35"		1400	100	100 ws
1	28	"		"	"	"
2	17	"		"	"	"
2	36	35"		2000	100	200 ws
2	35	"		"	"	"
2	15	"		1400	"	100 ws
1	27	"		"	"	"
1	27	"		"	"	"

*FX-1 New looking tube
Hard starter

2	37	35"		2000	100	200 ws
2	38	35"		"	"	"
2	38	35"		"	"	"

Microscope lamp

With Phillips lamp power supply

100 ws

Phillips tube w/ Phillips lamp power supply Gallagher March 1, 1957

2	58	35"	100 ws	
4	28	"	"	
4	58	"	200 ws	Tube self Flashed 20 secs after triggered flash, and held over a bright pink.
		Tube still operates at 100 ws		
16	38	35	500	Very noticeable holding over - duration ~ 5-10 sec.

f2 Biotar screw

* New Standard

Dutch

150/9

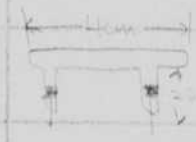
Tube 20D102

Date Nov. 9, 1950

Observer H.E. Edgerton

#	Meter	D	WR	Mc² LIGHT RAYS	E Volts	Cap. (1000) C	Energy ½CE²/2	Effy. CP/W	Temp	Remarks
2	48	35"			860	2×50μF = 225μF				With D. Cahlander's power supply + H. Edgerton's triggering circuit for sparking @ 60~
4	44	36"			860	2×450 = 1460 μF				
4	45	36"			"	"				
8		26"			800	900μF	POW!!			Have reached limit of experiment success, almost died (end blew off tube)

HERE'S Quartz tube – same setup as before (above)



2	52	36"			860	2×450μF in series = 225μF				Swell @ 60 c/s
2	54	"			860	"				
2	55	"			860	"				
2	53	"			"	"				With black paper shield in front + back
2	55	"			860	"				
4	41	36"			860	450				60~ skips a little other seeing hit
4	41	36"			"	"				
4	(34)				860	225				With trig triggering tube (service) taken out
4	(34)				860	225				

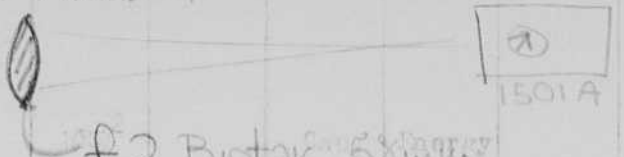
The H tube

Operation at 60~ skips a little

Drawing not approvable

2	47	35"			860	225				
2	48	"			"	"				
2	45	"			"	"				
4	49	"			850	450				No sign of crazing
4	45				800	450				

H.E.E. lamp for Fundus camera!



f2 Biotar 58 mm

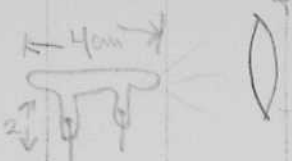
20 cm pressure Xe

Place 20D102
Date March 9, 1957
Observer HEE Edgerton + P.T. Gallagher

#	Meter	D	WR	Light BCPS	Volts	C	Min. Eff. CP/J	Lamp	Remarks
	Quartz tube								Tube enclosed in Bakelite cylinder w/fan to cool tube.
4	33	36"			860	220 μf			Operation @ 60 ~ reasonably good — a little flicker
4	32	"			"	"			
4	33	"			"	"			
4	33	"			"	"			
8	34	"			840	460 μf			Flicker slightly more pronounced (@ 60 ~)
8	35	"			845	"			
8	35	"			855	"			
8	35	"			855	"			
8	35.5	"			855	"			
8	49	"			830	675 μf			Skips worse after big flash, than semi-stabilized
8	49	"			845	675			Tube examined without disturbing set up — No drastic cracking - just a little at the walls at the end
8	49.5	"			850	675			
8	49.9	"			855	"			
	Cylinder put back together:								
8	44	36			855	675			
8	44	"			845	"			
16	29½	"			845	900			
16	27	36			850	900			
16	27	"			850	900			After operation for ~10 min @ 60 ~

Considerable increase in heat after flash — can be felt by holding hand over air exit vents.

H.E.E. Lamp for Fundus camera — tube w/ 10 cm pressure Xe.
f2 Biotar 58mm



1501 A

Place 20D102
Date March 9, 1957
Observer H. Edgerton + P. Gallion

X	Meter	D	WR	Watt LIGHT SECS	E Volts	Cap. (MFD) C	Energy Watt Sec. $CV^2/2$	Effy. CP/W	Lamp	Remarks
4	34	36"			860	450 μf				Skips unsteadily "SUPER COLOSAL BAD" H.E.

Real hard starter — gave up. P.M.G.

Calibration — FX-1

~~2~~	35	36"			2000	100				
2	33	36"			2000	100				

H - tube

Very stable @ 60~

4	38	36"			860	450				
4	38	36"			855	450				
4	35.5	"			850	450				
4	35	"			"	"				Beginning to crate; white stuff ouerd.

With lens covered = no reading

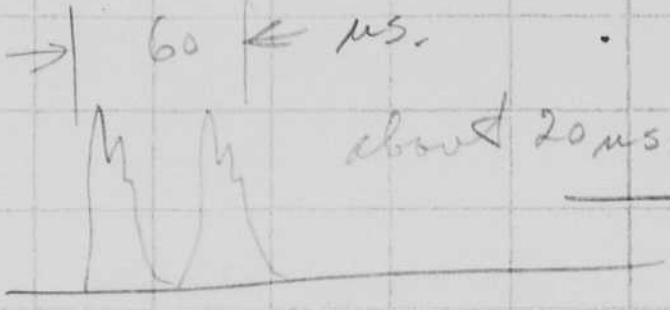
Underwater Strobe 8 per sec
for Sounds Lab.

20D102

Place
Date Mar 12 1957
Observer Edgerton
Edwards
MacRoberts

#	W Meter	D	WR	WD² LIGHT BCPS	E Volts	Cam. (FPM) C	Energy W.S. CP/2	Effs. CP/"	Lamp	Remarks
1	17	3 ft	17/153		~~3500~~	4	24		FX-1	1" Pyrex pipe
1	15.	3 ft			3500	4	24		FX-1	

angle 60° with
dot any fall off.
Actual same
increase at ± 30°



25 Bank

$$TI = \frac{CA^2}{S \cdot S.}$$

BCPS

$$IT = \frac{CA^2}{S} = BCPS$$

$$A = \sqrt{BCPS \frac{S}{C}} = \sqrt{150} = 11$$

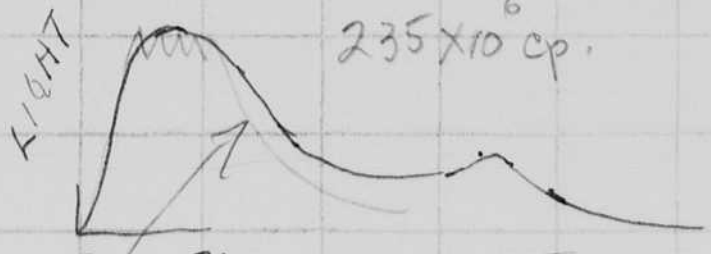
Beacon 2521 Jar No. 4. with Inductance & new socket by Roy Swansen!

MIT 20D102

Apr 9 1957

Edgerton

47 feet to center of lamp. P.C. at last spot.



} 0.2 volts/cm.

of beam – about 4 or 5 feet diam at 47 feet.

5.3 ft FX-1 15 mfd 2000 volts.

peak 3×10^6 candle power

$$\text{Beacon} = 3 \times 10^6 \times \left(\frac{47}{5.3}\right)^2 = \underline{\underline{235.}} \times 10^6 \text{ c.p.}$$

$$\text{BCPS} = 40 \times 235 \times 10^6 \times 10^{-6}$$

$$= \underline{\underline{9400}} \times \quad \text{BCPS.}$$

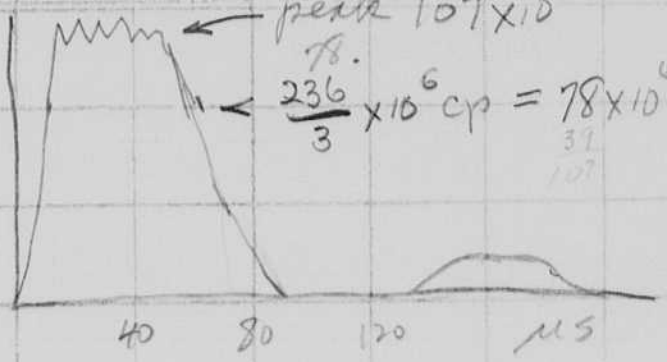
Beacon

old wood case
10" BSL Reflector
Xenon gap.
Inductance 

2-D 102

Place
Date apr 9 1957
Observer Edgerton

#	Meter	D	WR	LIGHT BCPS	E Volts	C	Duty Energy (WS)	Rise Sec/2	Fixy. Cr/T	Temp	Remarks



Duration = 70

BCPS = $\frac{70 \times 107}{749}$ = 750 B.C.P.S.

the lens was cleaned
the window cleaned
the lamp position adjusted
then the peak output was
about the same as 2521 #4
but the angle was smaller.

Guess BCPS = 8000

1/2" gap XP-1 type as used for Dynamite cap photos.

Place 20 D102
Date Mar 11 1957.
Observer Edgerton.

#	Meter	D	WR	MEC LIGHT DCPS	E Volts	Cap. (MFD) C	Energy Wat. CP/2	Effy. CP/J	Temp	Remarks
1	21	6"	21	5	2100	5	10	1/2	XP-2	1/2" gap.
1	21	6"	21	5	1350	5			FT-21K	FT-21K tube.

For Orea test with Hall scheduled for 7 pm

Double Ended Multi probe lamp.

Place M.I.T.
Date After 2-4-57
Observer E. Wall

#	G.R. #113 W Meter	D	WR	CP/in² LIGHT HORS	E Volts	Cap. (MFD) C	Theory CP/2	Effy. CP/I	Lamp	Remarks
X1 ?	31	6"		7.75	800	actual 4 m/d	12.8	0.6		Possibly meter attenuation could have been set at 2.
X2	31	6"		15.5	"	"	"	1.2		

Single ended Beacon lamps # 125

X2	16	6"		8	800	4 m/d	12.8	0.63		
X1	31	"		7.75	"	"	12.8	0.6		

After asking people in the lab if they had changed the attenuator it is believed that attenuator had been set at 2.

9mm. FX-12

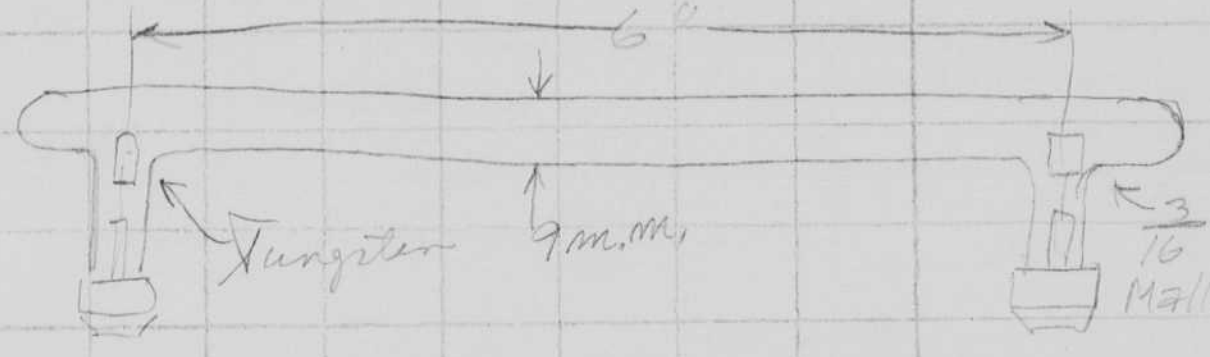
Place M.I.T.
Date May 23'57
Observer H-E-E
Recorder MacR.

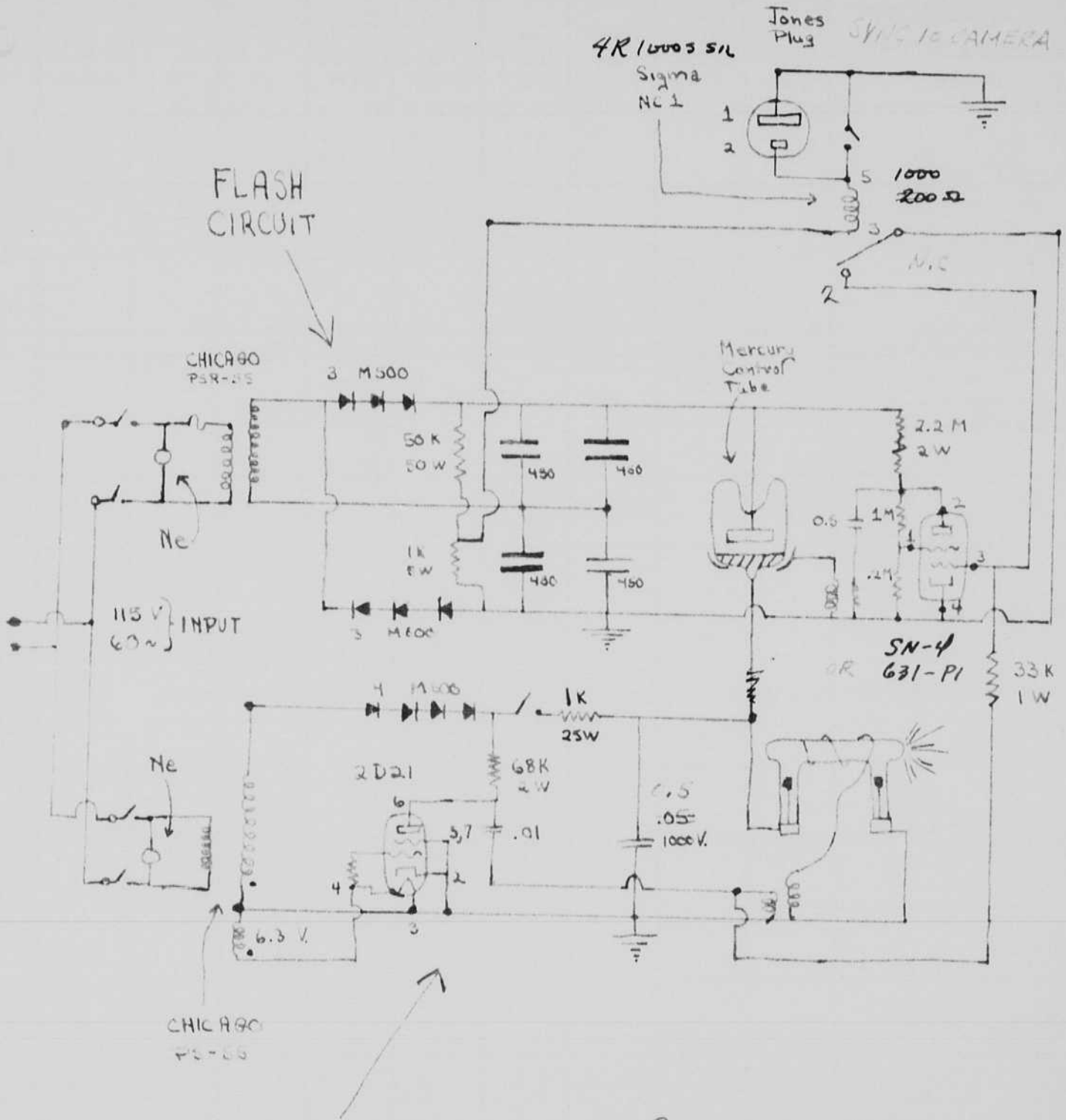
#	Meter	D	WR	WSec/LIGHT RCVS	E Volts	Cap. (MFD) C	Energy Watt Sec E=½CV²	Effy. CP/W	Lamp	Remarks
					2000	1			#1	Breakdown 600V
					"	1			#2	Flashing voltage
					"	1			#3	400 to 600
					"	1			#4	increased to 400 to 1100 V after
					"	1			#5	3 flashes with 155 mfd 2KV.
					"				#6	
					"	1			#7	
	Tube has darkened				2000	155			#1	3 flashes, then flashing volts 1100
	Tube clear dep some				2000	232			#1	3 flashes starting voltage about the same
	same as above				2000	350			#1	same as above
	Tube clear dep, Melted tracks on anode				2000	450			#1	Starting voltage after 3 flashes 1250 V.
					700	400			#2	Starting at 700 V
	Clean				2000	400			#2	3 flashes then starting volts = 660
					500	400			#3	500 starting volts
	Clean				2000	400			#3	
					400	400			#4	Starting volts 400 V.
	Clean				2000	400			#4	Starting volts 450 after flashing 3 times
	Black deposit near anode opposite aperture				2000	400			#5	950 S.V. increased to 1100 volts for 3 flashes
	Some melter metal on walls near anode (very light)				2000	400			#6	S.V. 800 increased to 1150 volts.
					2000	400			#7	S.V. 550 increased to 800 V.

9 m.m. side electrode lamps.

Place M.I.T.
Date May 23 '57
Observer H.E.E. & Mack

M Meter	D	WR	MEC² LIGHT RCP'S	E Volts	Cap. (MFD) C	Energy ½CV²	Effy. CP/J	Lamp	
					1			#1	flashing at 500 volts
				2000	400			#1	after 3 flashes start at 650 volts
					1			#2	starts at 500 volts
				2000	400			#2	after 3 flashes start at 700 V.





COMBINATION LIGHT

60 cycle plus flash

200 Watt sec.

H. Edgerton H.E.E.
MIT, CAMBRIDGE, MASS.
FEB. 23, 1957

Microscope Lamps.

Place M.I.T.
Date May 29 '37
Observer Edgerton

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CP²/2	Effy. CP/W	Lamp	Remarks
~~2ft~~ X1	87	2ft	87	348	900v	675.	X			Using Toggle switch to connect in additional capacitors
X1	72	2ft		288	900v.	~~450~~				
	60 cycle light			84 div in 1/2 min.				2.8		168 lumen sec / sq ft / 60 sec. = 2.8 lumen/sq ft.
X1	114				900v	675				Using toggle switch
"	91				"	"				" " "
"	92				"	"				
"	92				"	"				" " "
X1	112				"	"				Using slip leads
"	112				"	"				" " "
"	113				"	"				
"	116				"	"				" " "
X1	89				"	"				Using switch
"	96				"	"				" "
		Changed capacitor wires to different pole of switch								
X1	110	2ft			900v	675				with switch
X1	74	2ft			900v	450				

"Microscope Lamps.

MIT
Place 20D102
Date May 29 1957
Observer H.E. Edgerton
Mac Roberts

R	W Meter	D	WR	WR^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE^2/2	Effy. CP/W	Lamp	Remarks.
1	106.	2		424	900	675.				
1	50	2.		200	"	"			← with 3 ohms in series.	
1	70	2		280	900	450			~~zero~~.	
1	33	2		132	900	450			3 ohms.	
				above shows that 3 ohms in series cuts the flash output by a factor of 2.						
New Lamps. with 10 cm xenon.									May 30 1957 cont exp.	
1	38	2			900	450				
1	44	2			900	450				
1	22	2			900	450	3 plus ~~1~~ ohms in series.			
1	51	2			900	675				
1	47	2			"	"				
1	41	2			900	~~675~~ 450				
			Lamp chips on 60 cycle. (a little, not bad)							
1	67	2			900	450				
	35				900	450 + 3 ohms.				
1	109	2			900	675				
			New Lamp 25 cm xenon.							
1	67	2		268	900	450			Flashed on pump with 135 mfd paper at 2KV with 5 cm xenon	
1	107	2		428	900	675				
1	51	2			900	675 + 3 ohms.			Some white deposit on ends.	

Super Strobotron.

D.R. Serial 132 Type 1532A

Place 20D102
Date May 31 1957
Observer Edgerton

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	100	3	100	900	2000	10?				

$DA = \sqrt{BCPS \frac{S}{C}} = \sqrt{900 \frac{160}{10}} = \sqrt{9000}$

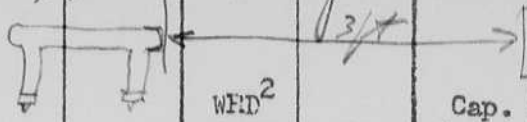
DA = ~~30~~ 80.

Tri-X guide factor

~~f11~~

10 f8.

Microscope and Kenders lamp.



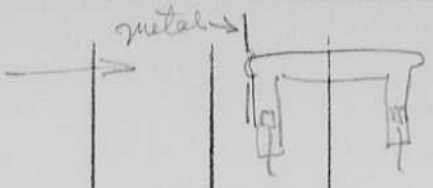
Place M.I.T.
Date June 5 '57
Observer G. MacR.

R	W Meter	D	WR	WFD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE^2/2	Effy. CP/W	Lamp	Remarks
X1	17	3		153	900	225				
"	35	3		315	"	450				
"	53	3		477	"	675				

Large Beacon Lamp BL-2 #3 (Rotary switch for trigger unit) (capacitor unit) (External capacitor)

Place M.I.T.
Date June 6 57
Observer E. Mack R.

R	#113 W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
X1	44	6"		11	800	35.4	11.7	0.94		8 μh choke in series. Short leads capacitor to lamp.
										Missed control times
				June 7, 1957						continuing
	Had taken lamp set-up down. Noticed this A.M. Flat top electrode of lamp was bent down shortening gap. Beside it was O.K. Yesterday. Looks like somebody dropped it during the night.									
X1	47	6"		12	800	35.4	11.7	1.0		Minimum flashing voltage top electrode as cathode is 550 volts. As anode 260 volts
X1	47	6"			800	3.54				Beacon lamp #125 9 pin base.
"	43	"			"	"				another 9 pin tube
"	33	"			"	"				third 9 pin tube.
"	42	"			"	"				fourth " "
X1	~~37 to 46~~	"			"	"				BL-2 #3 with choke
X1	46-49 53	"			"	"				" no choke are not going to electrodes
				Shorten electrodes into better position						
X1	36-37	"			"	"				with choke
X1	46-47	"			"	"				without choke



microswitch lamp

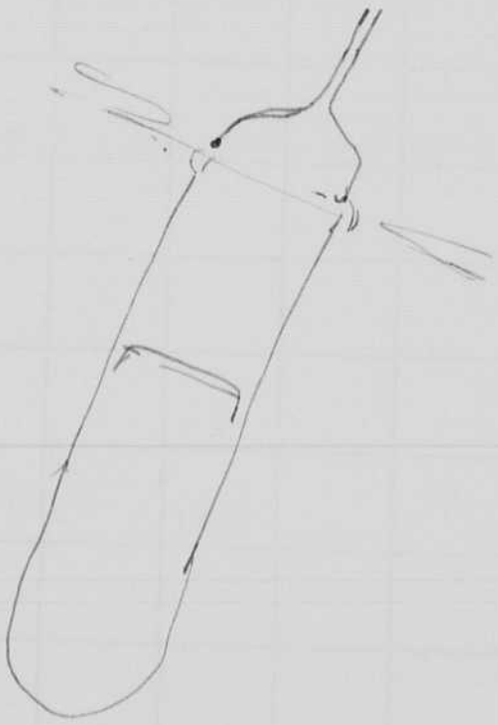
DO D102

Place

Date June 1657

Observer Edgerton

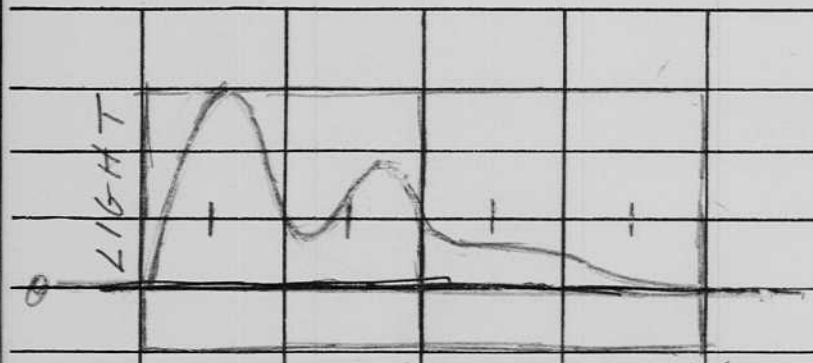
R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
	decib.									20 mfd, 1500 V
1	2×10^6 = 2 cm			D = 2½ ft.		R 2 ohms no filter.				FX-1
60 cps.	$\frac{.8}{100} \times 10^6$		peak	Duration =		10 ms.				50% flicker
100	W.S. .4 $\times 10^6$	250 m.s.	peak light.							
100	1.3/3	$\times 10^6$	peaks		250	ms				
200	1.7/3	$\times 10^6$	peaks		400	ms.				
300	2/3	$\times 10^6$	peaks.		700	ms duration.				
				done with 25 cm Xenon tube.						
				10 cm tube.						
60 cycle	peak is lower.			duration about same.						
	1 mfd 1500			Ipeak 0.2 $\times 10^{-6}$						
				Dur 8. $\times 10^{-6}$		1.6 c.p.s.				
	1 mfd 2000			.3 $\times 10^{-6}$		2.4 cps				
				8 $\times 10^{-6}$						

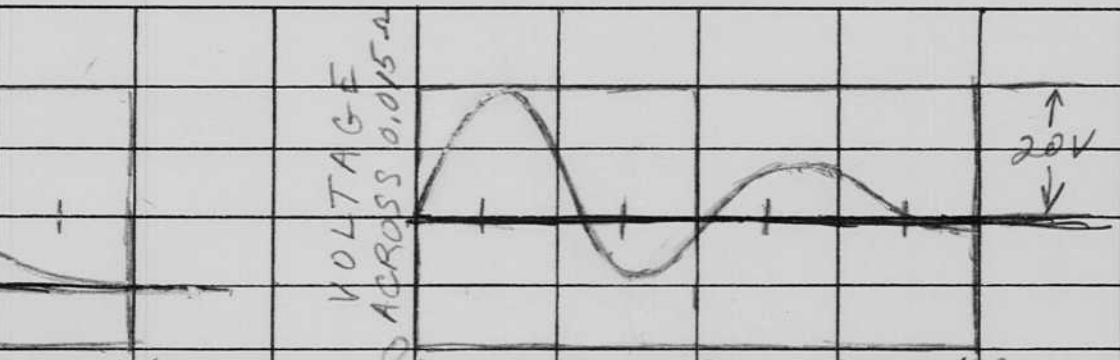


End-On

Place 20D102
Date June 18 1957
Observer Edgerton

R	W Meter	D	WR	WR^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
2	42	3	84	756	2000	100	200	3.7		FX-1 84/2 12 756
1	10	1/2	10	2.5	2000	3	6			Eudon. (20cm xenon)
	12	1/2	12	3.0	2000	3	6	1.5		"
	35	1/2	35	9.	"	"	6	1.5		Side view.
1	18	1/2	18	4.6	2000	4				
1	37	1/2	37	9.2	2000	8	16			
1	12	1/2	12	3.	1000	8	4	0.75		
1	21.5	1/2	21.5		1000	16.				
1	45	1/2	45		1000	32				
2	50	1/2			1000	63				
2	45	1/2			1000	63				10 cm 2 mm
2	24	1/2			1000	32				
1	46	1/2			1000	32				
1	20	1/2			1000	16				
1	55	1/2			2000	16				Silt flash
1	8	1/2			1000	8				





LIGHT

VOLTAGE DUE TO CURRENT IN 0.015Ω

To find lamp impedance!

$I_{peak} = \frac{20}{.015} = 1333$ A.

Impedance = $\frac{800}{1333} = 0.6\Omega$

Test Number	
Aperture	
Filter	
Meter reading	
Lumen seconds	
Capacity mfds.	
Voltage	
Shutter time	
Distance	
$\left(\frac{f}{d}\right)^2$	
Photocell type	
Tube Dimensions: Length	
Tube Dimensions: Inside Diameter	
Tube Dimensions: Gas	
Tube Dimensions: Pressure cm Hg	
Tube Dimensions: Identification	

REMARKS

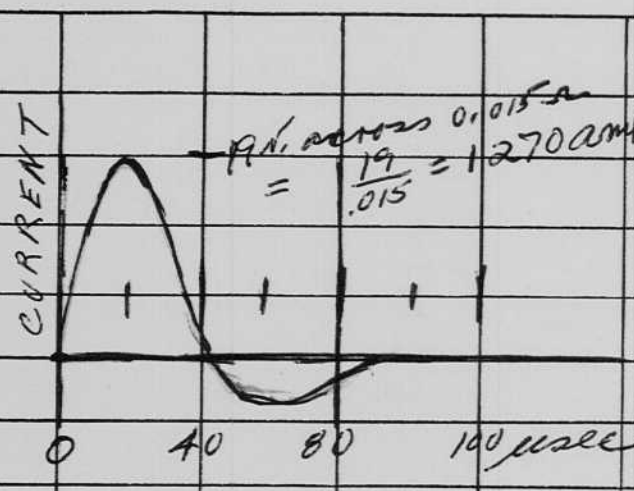
Multiparte Rep from Aircraft Buon #2521 Apr 1947

in External circuit

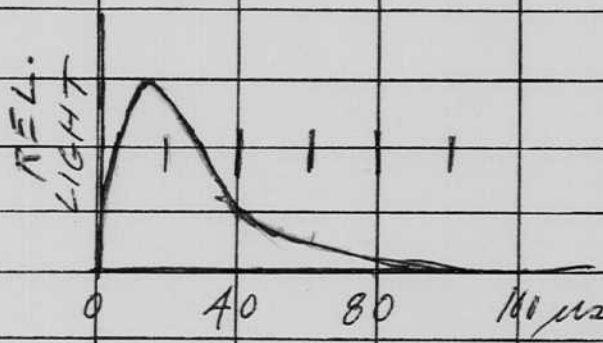
2200 v, 350 mfd. Discharge R = 0.043Ω L = 6 μh.

Date March 26

Observer L. Mack



Max. across 0.015 Ω = $\frac{19}{.015}$ = 1270 amps. peak



Test Number	
Aperture	
Filter	
Meter reading	
Lumen seconds	
Capacity mfds.	
Voltage	
Shutter time	
Distance	
$\left(\frac{f}{d}\right)^2$	
Photocell type	

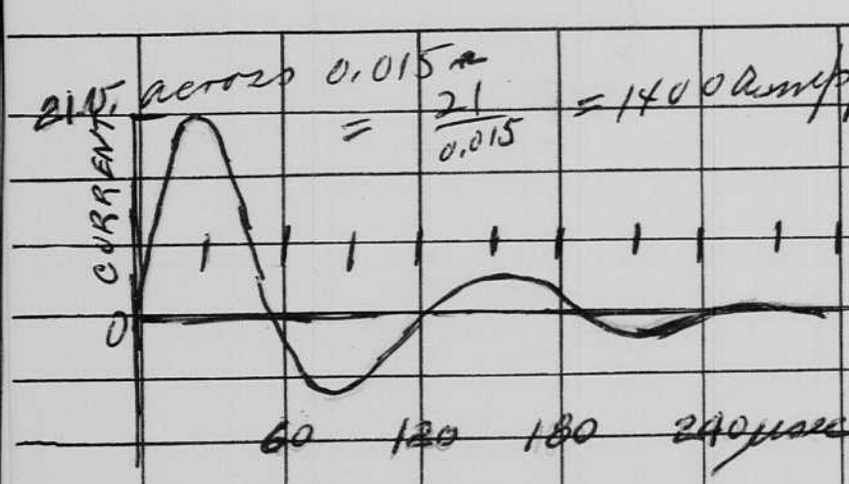
Tube Dimensions	
Length	
Inside Diameter	
Gas	
Pressure cm Hg	
Identification	

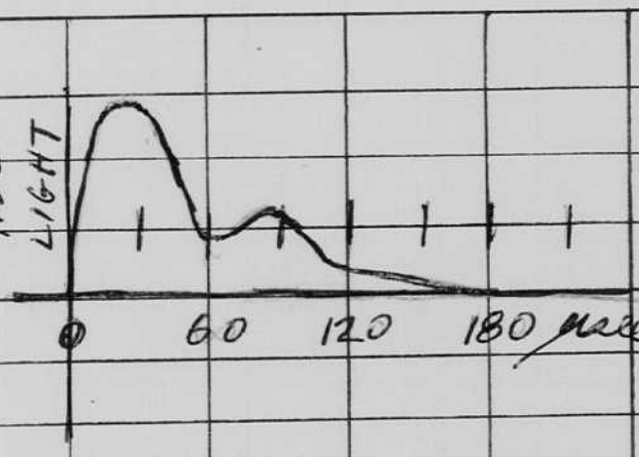
REMARKS

Aircraft Beacon #2521 #7
as received, but with 0.015 Ω
in grd. discharge lead to take
measurement of current.

Total series R = 0.239

Date May 31 '56
Observer E. Mack
M.I.T.





Test Number	
Aperture	
Filter	
Meter reading	
Lumen seconds	
Capacity mfds.	
Voltage	
Shutter time	
Distance	
$(\frac{f}{d})^2$	
Photocell type	

Note

Peak light approx. the same as when beacon was delivered. Integrated light up by about 50%

Inductances are 8 turns #16 SRIR wire wound in two layers on a 1⅛ dia form. Two inductances placed adjacent to each other. ~~4~~ 4 of two coils in series ~~12~~ 8 μh.

$R_{of\ coils} = 0.038\ \Omega$.

Tube Dimensions	
Length	
Inside Diameter	
Gas	
Pressure cm Hg	
Identification	

See preceding data sheet

Aircraft Beacon #2521 Ser. 7 with inductances changed. and with 0.015 Ω in grd discharge lead to measure current.

Total series R = 0.087 Ω

REMARKS

Date May 31 56

Observer L. Mack
W. T.

200 w.s. FLASH for Trieste

Place M.I.T.
Date June 29 57
Observer H.E.E. E. Mac R.

R	#113 W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE²/2	Effy. CP/W	Lamp	Remarks
X1	28	4/A			900	550			FT 218	28 V D.C. IN PVT
	80	"		3840	"	"				

85
.9
265

Microscope lamp as used for BAL tests last month

end on tube.

Place 20D102
Date July 13 1951
Observer H. Edgerton.

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
1	50	3'			900	1/2	60 cycle operation 1 sec on for reading.			End on tube 1½" from hole in AO holder.
1	50	3'			900	1	60 cycle oper. 3 or 4 sec.			"
4	38	3'			900	475/2	100			"
4	40	3'			"	"	"			"
8	47	3'		375 lb. 53 Slide	"	475	200			
16	37	3'		543 84	"	475 + 475/2	300			"
16	23	3'		370 62.3	"	475	200			
16	12.5	3'		200 28.4	"	475/2	100			
			FX-1 Slide tube in							optical set ups.
										FX-1.
			Light meter		3/0					
1	14	3'			2000	10		FX-1		Lamp image on the meter hole.
1	36	3'			2000	20				
2	44	3'			2000	40				
8	36	3'	288.		2000	100.				* a ¼" hole in a metal disc was used at the stop of the lamp.
16	18	3'			2000	100				
				optics removed.						
2	40	3'	80	720	2000	100	200	3.6	FX-1	
2	42.5	3'	85 +	765			200	3.82	"	
1	18	3'		1	1000	100	50			½" end on tube
1	18	3'	18.	162.	1000	100	50	3.3.		
				with optical	Condenser			AO		
4	26	3'			1000	100	50			Side view.
4	24	3'			1000	100	50	Line up poor.		End view.
4	34	3'	136.		1000	100	50	Good	Line up and focus of	
4	32	3'			"	"		Side view.	end view.	

*

"Endon" Tubes

Place MIT 20D102
Date July 13 1937
Observer H. Edgerton

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	21	3	21	189	450	620	629	30.5		1" "Endon". Side view
1	24	3	24		450	620				" "
1	28	3.			350	620 x 2				" "
1	54	3	54		450	"				" "
			with A0 optic							
4	58	3			450	620				Image of side.
8	36	3	27. 40.5		"	"				
8	32	"	25. 36.		"	"				

GR. NO 113 — B&L Eagle unit. — about 15 sec elapsed time. — 60 in 5 sec. 100 - 7 sec. 175 - 10. 230 - 15. 320 - 20. — M.I.T.

Place 20 0 10 2

Date 13 July 1957

Observer Edgerton & MacRobert.

R	W Meter	D	WR	WPD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	30	3'			875	820	314.		2"	60 hms 10 on scale.
1	30				875					Side view
1	35	3'			875					80 on scale
1	47	3'			875					50 " "
1	65	3'			875					70
1	98	3'			875					85
										Blew out Resistor wire.
1	135	3'		1210	875.		314	3.86		100
1	67	3'			875-					"End view" of lamps.
1	59.	3'			875					"
1	57	3'			875.					"
					List of units used at Rochester at B&L which gave satisfactory light 300 W.S. and series Hg tube.					
1	40	3'			?		300±		2" end on tube end view.	
					New Resistor installed 3 ohms					
1	32				875	820				10 on scale = 3 ohms
1	35			6						30
1	42									50
1	53									70
1	60									80
1	67									90
1	72									100
1	72									95
1	70		Blew.							90
1	68									90
1	64		Noise!							80
1	58									80

noon — Bill left for Whitman

cont.

Place _____

Date 13 July 1957.

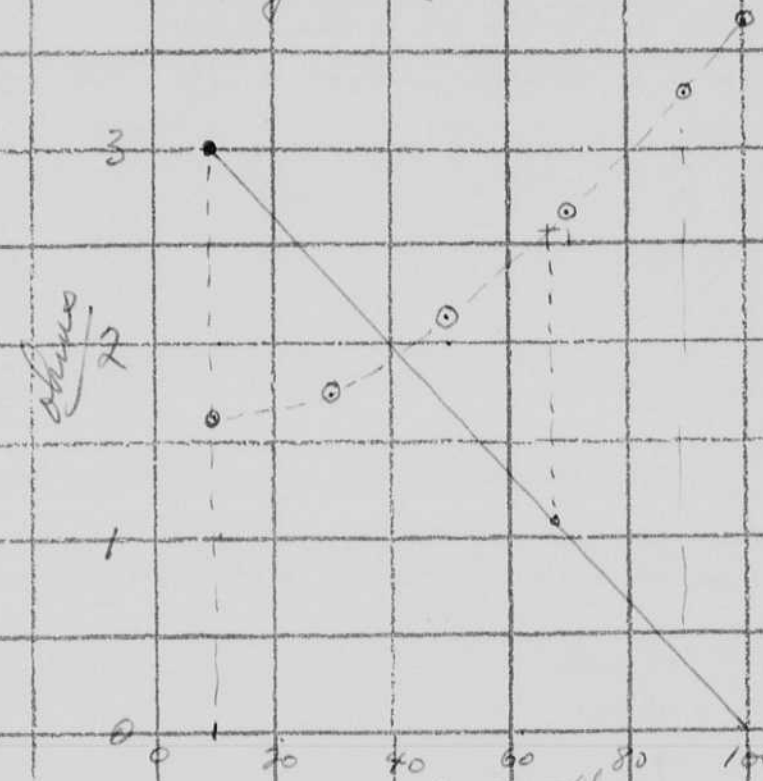
Observer Edgerton

2" "End on tube in B2 L. unit.

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	75	3'			880	820				100 columns.
	67									90
	59									80
	59									80
	58									80
	67									80

Sparks flying in box at Res. cover.

This shows a larger resistor is required.



Light	R
100 %	0
70	1.1
50	3.0
35	
25	6

Contacts.

50 watt ½ ohm resistor in series with the 2" T[illegible] tube.

M.I.T.

Place 20D102

Date 13 July 1957 230 PM

Observer Edgerton

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	25	3'								10 Dial = 4 ohms.
	27									30
	33									50
	44									70
	55		Sticks. Welded once on contact.							80
	70									90
	20		Actual res is 92 Ω							100
	60	86%	Grid Resistor device.							~~100~~ 90
	59	84%			875	820				90
	70	100					1/4 Watt Resistors taken from Pete's tube and used in Harold's tube.			100
	48	68%								80
	42	67								80
	40	57								70
	39	56								70
	30	43								50
	23.	33								20 and.
			2.6 m.s. — Duration about peak = 1							20
			0.6 m.s. peak ≅ 20 times.							100
						2.6 × 1 = 0.6 × 20 =		2.6/12. =		12/2.6 = 4.81 calc.
							↑		light	70/20 = 3.
							Could be in error.			I hold to guess.
			1.5 m.s. peak. = 3.3							70
			2 photos taken (2 exp on each negative) at							
			Resistance setting of 100 and 70							
			Panatomic X film ASA 25 f 22. Slight enlargement on film. Filter #1.18 used.							

Both on same film.

2nd example π tube

Place 20 D 10 2
Date 13 July 1950 340pm
Observer Edgerton

R	W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	80	3'		270	875	820.			#2. 70 Lamp.	Setting of series R=70 Side view.
1	38	3'			875	820			70	End view
1	40	3'			875	820			70.	" "
1	34	3'			875	820			70	
1	34	3'			"	"			70	
1	65	3'			875	820			100	
1	63	3'			875	820			100.	
1	63	3'			"	"			100	
1	61	3'			"	"			100	
1	63	3'			"	"			100	
1	37	3'			"	"			70	
1	37	3'			"	"			70	
1	37	3'			"	"			70.	

Photos of small π tube 1" between legs.

f 32 — 2 exposures. 620 x 2 mfd 450 volts.

f 22 2 exposures. 620 x 2 mfd 450 V.

25 μs wire

both on Panatomic X film ASA 25.

Density 4.18 filter. 1/4 on film. ±

620/2 at 600 or 700 V

μs.

100 200 300

900 v

with 10 mh in series

8	33	3'			900	620/2	with a	17 mh		with A.O. optics
8	36				900	620/2	"			

π tube 1 inch

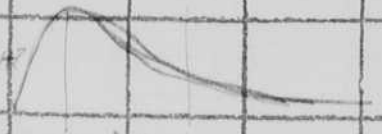
20D102.

Place

Date 13 July 57 5pm

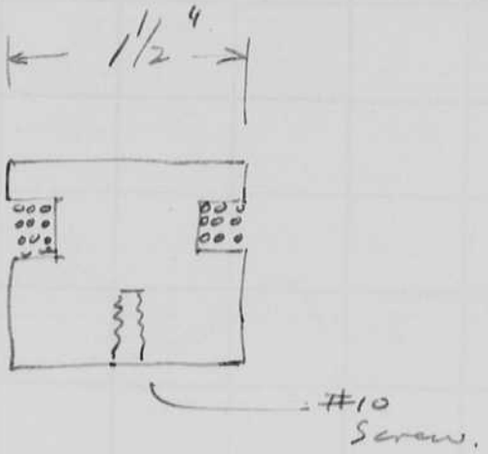
Observer Eby

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
16	32	3'			900	620 + 650 / 2		17 mh.		1" between legs
16	30	3'			950	Same		17 mh.		"
16	30	3'			950	"				"



Tube shows some white deposit

The 17 mh stops the rapid rise of current


1 1/2"
#10
Screw.

Microscope lamps.

MIT
20D102

Place
Date July 18 1957
Observer Shapton
Mac Robert

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
			used for		B&L test with			Retina camera.		
~~0~~1	12	3			900		100			100 W.S. end on tube
1	24	3			900		200			200
1	31	3			900		300			300.
			Equip to be sent to B&L 2252 #1							
1	34	3			900	-	300	with dial at		70 with 9 inch Inductance
1	31	3			900		300	"	" "	" No Ind.
1	54	3			900		300	Dial 100%	with 9 inch ind.	
	~~53~~	3			900		300	100.		35 inh. 0.1 ohm.

300 w.s. units shipped to B & L.
with 2" π lamp.

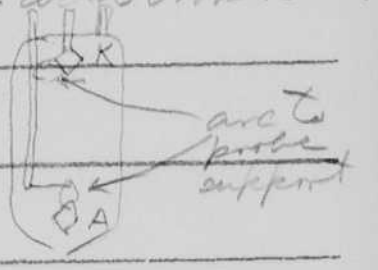
Place M.I.T.
Date July 19, 57
Observer E. Weeks

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
X1	~~48~~	3/1	.	432	875	820	300 nominal			Dial 100 to 155 uh in series as shipped

Beacon Lamp (2 atoms)

Special Spin Base Doubled Baker Electrodes

Place M.I.T.
Date July 25 57
Observer E. Mack

R	#113 W Meter	D	WR	WHD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE²/2	Effy. CP/W	Lamp	Remarks
X1	3	6"			500	8.42				
	6 to 14				800	"			→	Reads 14 when full arc. Reads 6 with broken arc.
										
X1	18-34	6"			800	27		with spk inductor		Reduced spark
X1	26-38	6"			800	35.4		spk inductor		500 Volts very marginal firing. 800 volts also marginal 50-50
X1	8-17	"			800	8.42		no inductance		
X1	25-33	"			800	27				
X1	27-46	"			800	35.4	11.7	0.96		
X1	45	"			800	35.4		spk ind.		Earlier beacon lamp # 125

Beacon Lamp
Special 8 pin base
Single Baker 8 electrode
40 cm Xenon

Place M.I.T.
Date Aug 20 '57
Observer E. Mach

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
	#113									
X1		6"								
		3to4			500	.042			L=8μh	
		14			500	27			L=8μh	
		17			500	35.4			L=8μh	
		33			800	35.4			L=8μh	
		21			500	35.4			no L	
		37			800	35.4			no L	
		41 42			800	35.4			lamp	#125 nine pin base 8 μh inductance in series

Comments 8 pin lamp minimum with Edgerton gap, flashing voltage about 400 but had broken arcs.

Reducing gap helps make cathode discharge and but raise starting voltage. OK at 600V

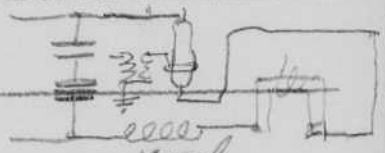
Usually fired at 500V.

Preferable to make center pin of base anode for heat.

Place M.I.T.
Date Aug 23, '57
Observer J. D. Mack

#113

1" T tube with small mercury control tube

R	W Meter	D	WR	WHR LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
X1	11	2ft			400	$\frac{632}{2}$ = 315		Side view		Hg Control tube 1/2" x 4" O.T. 1 1/2" gap.
"	31				600	"				
"	57				800	"				 140 μh.
"	78				900	"				
X1	33	2ft			600	$\frac{632}{2}$		Side view		Triggering the flash tube direct. Mercury tube out.
"	67	"			800	"				
"	85	"			900	"				

Firing voltages on Knife switch power supply.

Type trigger

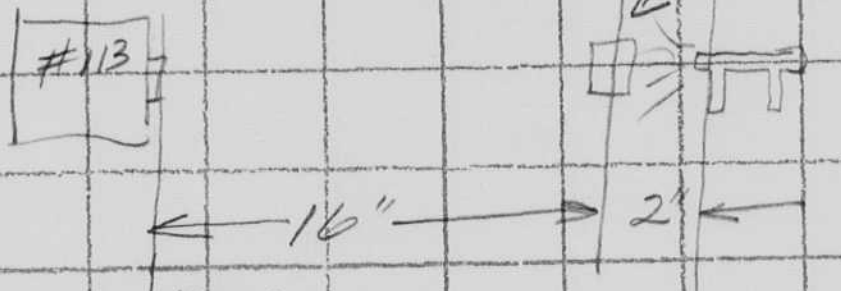
Hg tube only triggered	——	260 V.
" "and Flash tube	——	300 V.
Flash tube only	——	600 V. (marginal)
Flash tube only with 1/16" gap spark to gnd.	——	375 V.

π tube Comparison

Place M.I.T.
Date Aug 23
Observer O.E.Mack

R	#113 W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
X4	145				900	630/2			1" π tube	Hg trigger L = 140 μh.
"	140				"	"			2" π tube	Hg Trigger L = 140 μh.
"	137				"	"			"	Hg trigger L = 0
"	138				"	"			"	Direct trigger No Hg tube L = 0

50 mm f 3,5 Ernostar lens



Aircraft Beacon Lamp

8/pin base. Glass insulator support (73 m.m. Ht.)

Place M.I.T.
Date Sept. 3, 57
Observer E. Mack

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
X1	#113	6"								
	3				400	8.42				no series L
	16				400	27				"
	20				400	35.4				"
	10				600	8.42				" (Missed a couple of times at 600 V
	35				600	27				"
	43				600	35.4				"
	13				800	8.42				with 1μh series L
	41				800	27				"
	51				800	35.4				"
	19				800	8.42				no series L
	58				800	27				"
	71				800	35.4				"
	32				600	35.4				with 4μh
			All above tests center pin Anode.							
	71				800	35.4				no series L center pin Ht. Missed a couple of times
			Old Beacon Lamp #125							
	2				400	8.42				4μh series L
	10				400	27				"
	13				400	35.4				"
	6				600	8.42				" end on view
	31				600	27				"
	26				600	35.4				"
	11				800	8.42				"
	36				800	27				"
	45				800	35.4				"
	4				400	8.42				no series L
	10				600	8.42				"
	17				800	8.42				"
	23				1000	8.42				"
	35				800	35.4				4μh series L side view

Aircraft Beacon Lamps

Place MIT
Date Sept 10 57
Observer Edgerton

R	W Meter #1115	D	WR	WR^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
X1	44	6"			800	35.4			#125 end on	Black paper between lamp base and white porcelain socket.
	35				800	27				
f4.7 1/200 sec	Incandescent AC meter	2ft							#125 one end	"
0.01 mfd	12				400	0.71			"	
"	30				600					
"	60				800				"	
"	85				1000					Reading varies ± 20%
0.1 mfd	14				1200				"	
"	18				1400					
"	22				1600				"	
"	28				1800					
"	35				2000				"	
f4.7 1/100 sec										Spare beacon lamp 3/4" cap. Glass insulator
0.01 mfd	9-10				400					
"	28				600				"	
"	56				800					
"	96				1000				"	
0.1 mfd	9-10				1000					
"	13				1200				"	
"	17				1400					
	23				1600				"	
"	28				1800					Area inside tube at base sometimes lit. Not noticed. No arc between electrodes
	33				2000					

Compare FX-1 to FT-403

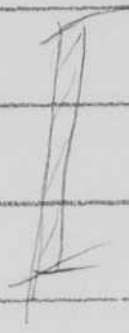
Place M.I.T.
Date 29 Oct 57
Observer E Mack

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE²/2	Effy. CP/W	Lamp	Remarks
f 4.7 1/1000 C									FT 403	
Cab. 0.01	7	1ft			700	1.0				
0.1	100	"			2500	1.0				
0.1	26 27	2ft			2500	1.0				
0.1	63 65	2ft			2500	1.0			FX-1	
0.01	13 16	2ft			700	1.0				
0.1	11	2ft			2500	0.25			FX-1	
0.1	39	1ft			2500	0.25			FX-1	
0.01	4 5	1ft			700	0.25			FX-1	
0.01	8	1ft			700	0.35			FX-1	✓
0.1	63	1ft			2500	0.35			FX-1	✓
0.1	100	1ft			2500	0.5			FX-1	
0.01	14 15	1ft			700	0.5			FX-1	

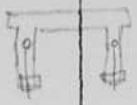
2" FX-1 tube

Place M.I.T.
Date 29 Oct 57
Observer E. Mack

R	Sensitive W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE²/2	Effy. CP/W	Lamp	Remarks
FX7 1/1000 CAP										
0.01	75	1ft			700	1.0				FX-1-2"
0.1	43	2ft			2500	1.0				
0.1	17	2ft			2500	0.5				
0.01	22	1ft			700	0.5				



microscope lamp.



20D102
Place MIT
Date Nov 21 1957
Observer Edgerton.

R	W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
		90° away.								
		CAO Spencer								
		FT								6R light meter.
				Beam C.P.S.	= 8²	15 = 960				15 lumens/sq ft. 100 W.S.
										B
	FT-230 1	20			1000	100	50	2/5 = .4	C.P./watt.	
	(efficient 100 W.S. x 5 lamps/ft.			C.P./watt	= 300	C.P.S.	with efficient lamp.)			
	FT 230 1'	17			1000	100	50	17/50 = 0.34		
	FT F x 19	1"	39		1000	31				
	F x 19	1"	34		1000	31				
		1"	43x2		1000	60				
		1"	37x4		1000	100				

Microscope Combination Lamps

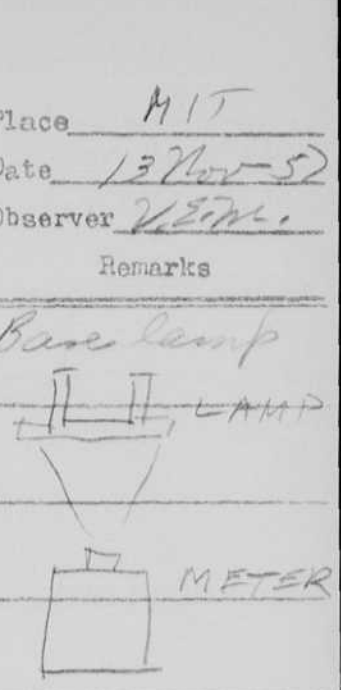
Place M.I.T.
Date ~~12 Nov '57~~
Observer E. MacR.

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
	1501A 306						Full charge Rheostat 100%			~~Varying~~ End of lamp in box. No lens.
X1	25	1ft					100			Used π lamp. 2 inch
X1	53	"					200			
X2	42	"					300			
X2	36	1ft					100			New 2" π tube
X1	17 17	2ft								
X1	37	2ft					200			
X1	42	2ft					300			
X1	35 37	2ft					200			
X1	17	2ft.					100			
X1	55 57	2ft					300			~~Wrg~~ Snapped 300 W switch on and off several times before taking reading.

2" π lamp #10 with 1/2 inch ends with combs. Mazda type supply.

Place MIT
Date 13 Nov-52
Observer V.E.M.

R	W Meter	D	WR	MCP LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
X1	ER 1501 A #306	3ft					100			Base lamp
X1	23	"		117			100			
X1	50						200			
X2	37	3ft					100			With trough reflector 3½ in long ½ in dia circle
X4	42	3ft					200			
X8	32	3ft					300			
				Reflector factor						
				74/23 = 3.22						
				168/50 = 3.36						
X2	31	3ft		648			100			Tube # ~~62~~ 14
X2	37	2ft		296			100			FT-218 Base side view
X2	40	2ft		320			100			FT-218, end view



Xenon 20 inch long. 9 mm O.D. 20D102

Beacon tube. 20 cm

Place

Date Nov 29 1957

Observer Edgerton.

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
		Critical			1400 / starting 3000	100	450.			Series ind. — 2 mh. R = 0.5Ω
					anode shows some effect. cathode shows none. !					$\frac{3000+100}{2} = 450$ W.S.
		Hard -			1250 V.					
1	39	9'			2000	100			Ref.	2 mh.
1	405	9'			2000	100			Ref.	no Inductc
1	39	9'			2000	100			Reflector	2 mh.
1	off scale	9'			3000	100			"	"
2	57	9'			3000	100			"	"
2	62	9'			3000	100			"	" another
2	60	9'			3000	100			"	" orig pos.
1	25	9'	2070		3000	100	450	4.5	no reflector (Wood).	
1	23	9'			3000	100			"	"
2	off scale	9'			3000	100			with reflector.	
4	35	9'	140	1130			450	25.0	20" tube. BCP/watt.	
					Reflector factor = 5.5					

Reflector spread 20" 9mm. straight tube in Chromalox I.R. reflector.

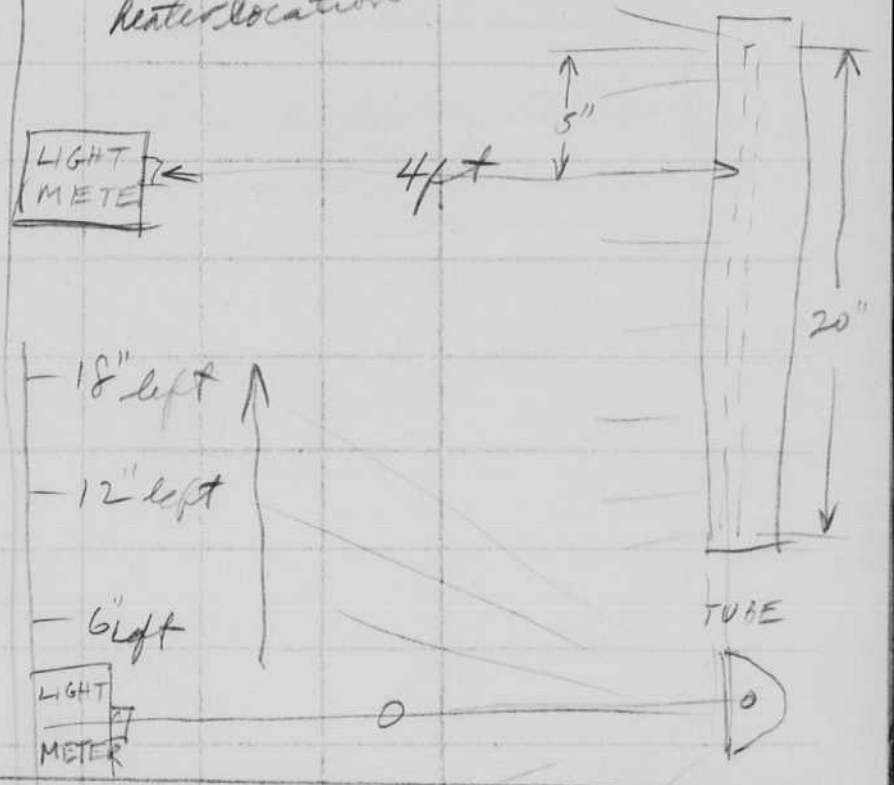
#113

Place M.I.T.
Date Jan 9 58
Observer W.B.W.

	No.	Meter	D	WR	LIGHT LUMS	E Volts	Dep. (EXT) C	Energy g.c. CP/2	Effy. CP/W	Lamp	Remarks
x2	99		4'	Beam		4010	37	Tube placed in usual heater location			With 60° half reflector on tube
	132			6" left							
	146			12" "							
	35			18" "							
	4			24"							
	126			14" "							
	61			16" "							
	37			18" "							
	22			20" "							
	100			0							
	106			6" right							
	134			12" "							
	94			18" "							
	60			20" "							
	16			22" "							
	3			24" "							
x2	118			0							No half reflector on tube
	150			12 L							
	27			24 "							
	92			18 "							
	60			20 "							
	36			22 "							
	133			6							
	117			0							
	128			6 R							
	110			12 R							
	48			18 R							
	29			20 R							
	25			22 R							
	23			24 R							
	14			36 R							

Included angle about 45° to 1/3 light of beam

Included angle about 45° to 1/3 light of beam but not such sharp cutoff.



Reflector spread 20" 9mm. straight tube in Chromalox I.R. reflector.

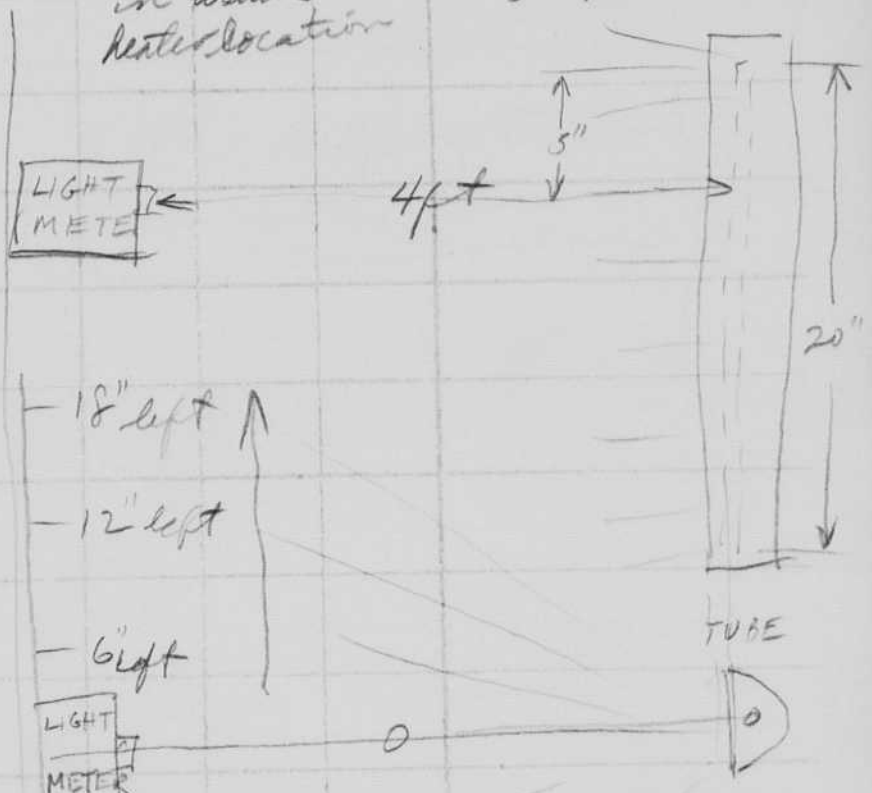
#113

M.I.T.
Jan 9 58
V.S.W.

x2	99	4'	Beam		4000	37	Tube placed in usual heater location	With 60° half reflector on tube
	132		6" left					
	146		12" "					
	35		18" "					
	4		24"					
	126		14"					
	61		16"					
	37		18"					
	22		20"					
	100		0					
	106		6" right					
	134		12" "					
	94		18" "					
	60		20" "					
	16		22" "					
	3		24" "					
x2	118		0					No half reflector on tube
	150		12 L					
	27		24 "					
	92		18 "					
	60		20 "					
	36		22"					
	133		6					
	117		0					
	128		6 R					
	110		12 R					
	48		18 R					
	29		20 R					
	25		22 R					
	23		24 R					
	18		36 R					

Included angle about 45° to ⅓ light of beam

Included angle about 45° to ⅓ light of beam but not such sharp cutoff.



20" x 9mm Vycor tube in
Chromalox I.R. Reflector

Place M.I.T.
Date Jan 10 58
Observer V.E.M.

	#	D	WATTS/IN² LIGHT / HOUR	E Volts	Cap. (MFD) C	Energy W.s. ½CV²	Defy. CP	Lamp	Remarks
X4	133	4ft	ANGLE 0	4KV	37	296			
		X4=532							
	156	624	3" Left	3.6°					
	120	480	6" L	7.12°					
	80	320	9" L	10.6°					
	46	184	12" L	14.05°					
	37	148	14" L	16.25°					
	128	512	0						
	98	392	3" R	3.6°					
	54	216	6" R	7.12°					
	31	124	9" R	10.6°					
	20	80	12" R	14.05°					
			14" R	16.25°					

With ball reflector on tube.

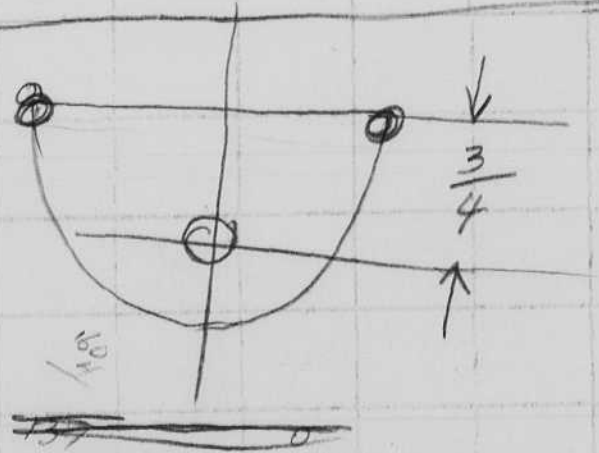
.0625

$\frac{9}{48}$ = tan⁻¹ 10.6°

total angle 21.2°
to 1/3 beam.

Bare lamp.

X1	63			4KV.	37			Bare lamp.	



45 9/45 = 10.6

X4 ~~135~~ 0

	137-140	548	1" left	1.35°					
	158	628	2" left	2.4°					
	155		3" left						
	133		0						
	100		3" R						
	114	456	2" R						
	128	512	1" R						

Light output of straight tube. 9mm O.D. x 20" arc length
Bare lamp in large black box

Place M.I.T.
Date Jan 10 58
Observers V.E.M + H.E.E.

	#113								
	Meter	D	WR	WEP LIGHT LUPS	E Volts	Cap. (WPD) C	Intensity C.P.S. $C^2/2$	Diff. (D)/C	Lamp
X4	92	8ft		23600	4KV	570	4570	5.18	9mm x 20" arc O.D. 20cm x e

2 mh. series inductance

9mm. O.D. x 20" arc length tube in Chromalox I.R. Reflector

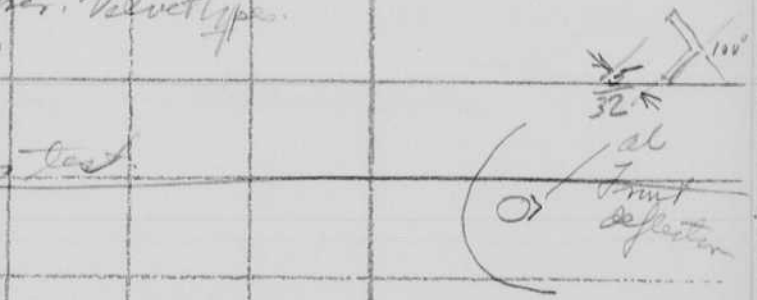
3/4 from front edge.

Place M.I.T.

Date Jan 10 58

Observer H.E.E. VEN

R	#143 Meter	D	ANGLE	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
X4	135	4ft	0		4KV	37	8.42 Reflector factor			without front aluminum or tube tube bore.
	130		R 1.15°				8.13			
	121		2.4							
	117		3.6							
	103		7.12							
	79		10.6							
	65		14.05							
	52		16.25							
	29		21.1	18"						
	16		24.6	22"						
	131		0							
	130		L 1.15°							
	125		2.4							
	123		3.6							
	107		7.12							
	83		10.6							
	67		14.05							
	54		16.25							
	29		21.1	18"						
	18		24.6	22"						
X4	17		0	Lamp with Blackjasper. Velvet type.						
X4	69		0	"	"	"				
	64									
	63			Bare lamp. previous test						
	141		0							
	145		0							
	138		R 1.15							
	132		2.4							
	120		3.6							
	82		7.12							
	51		10.6							
	36		14.05							
	30		16.25							
	13		21.1							
	6		24.6							
	152		0							
	145		1.15							
	138		2.4							
	133		3.6							
	98		7.12		150	0°				
	55		10.6							
	34		14.05							
	8		16.25							
	3		21.1							
			24.6							



22" Xenon Beacon.
9 mm O.D.

20802

Place
Date Jan 13 1958
Observer Hoag, Vernon Buck R.

R	#113 W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CF²/2	Effy. CP/W	Lamp	Remarks
1	38	4 ft.			2000	100			1000	1500 start.
1	72	"			2500					slip.
1	39	"			2000					
1	72				2500					
1	115				3000					
1	170				3500					
2	119				4000					
2	118				4000					← Small black spot on mirror.
2	117				4000					
2	118				4000					
										2500 start voltage
										2400 " "
										2400 " "
				Tube #2.						
2	17				2000	(Ships??) !!				1300 1500 1300 V start
1	36				2000					
1	35				2000					
1	112				3000					
1	165				3500					
2	107	4			4000.					1500 – 1700 start voltage.
	Lamp moved into 30 B 1304									
4	39	6'			2250	570 mf.		with 2 mh choke.		
4	72	6'			2770					
4	101	6'			3230					
4	101	6'			3250					
4	155	6'			3780					
4	135	6' B.C.			3780	with black cloths on the floor!!				
4	157	6' B.C.			4080				"	
4.	151	6' B.C.			4020	88 Var. (1.75 mfd)			"	in air
		Test started 9:45		7.05 pm	4000 V	13 sec intervals.			open	Horizontal
		off		720	Lamp shipping					
4	180*	on		745	745 with larger starting band.					* aluminum starting reflector.
4	183				825 still going ok.					Starting voltage 3700±

9mm. x22 in Lamp, in Chromalox I.R. Reflector and 4" I.D. Pyrex tube.

Place M.I.T.
Date Jan 23 58
Observer K.E.M.

R	#113 W Meter	D	Angle / WP	WP/D² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
X2		25 X			4KV	610			20cm	
	136		0							
	132		5°L							
	96		10°L							
	64		15°L							
	36		20°L							
	14		25°L							
	139		0							
	117		5°R							
	90		10°R							
	61		15°R							
	42		20°R							
	23		25°R							
	141		0°							
	143		2°L							
	141		2°R							
	125		4°R							
	139		4°L							

9 MM End On tube

Place MIT

Date 28 MAR 58

Observer BE Blaveland

R	W Meter 113	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	33	3.17	33	330	2000	100	200	1.65		
1	63	3.17	63	630	3000	100	450	1.52		meter calibration o/o
1	7	3.17	7	70	1000	100	50	1.40		
1	40	~~10~~ 3.1	40	400	2000	100	200	2.00		
1	74	~~10~~ 3.1	74	740	3000	100	450	1.63		
1	8	~~10~~ 3.1	8	80	1000	100	50	1.60		H.E. Edgerton Mar 29 1958
										* Rated electrolytic $\frac{525}{2} \times 5 = 1300$
1	90	3.1'	90	900	700±	1200*				
1	125	3.1'	125	1250	760	1200	346	3.52		
	142		1	1420	820	1200	4.02	~~4.02~~ 3.54		
	143		1	1430	840	1200		3.10		
1	145	3.1'		1450	850	1400	510	2.85		
1	93			930	↓	863	290	3.2		
1	24			240	↓	317	115	2.1		

TT $2\frac{1}{2}$ in

Place M I T
Date 2 APR 58
Observer R Rowland

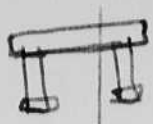
R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
						Battery				Reactors
1	110	3.1	110	1100	900	6 sect. 860				
1	105	3.1	105	1050	900	860	350			
1	53	3.1	53	530	2000	100	200			
1	50	3.1	50	500	900	317	130	4.2		
						Shaped tube				$2\frac{3}{4}$ in take
				6 MM	OD	Quartz		FX-1 tubing		
1	100	3.1	100	1000	900	860	350	2.85		
"	"	"	93	930	"	"				
"	"	"	90	900	"			2.60		
"	"	"	93		"					Later 10 min
			90							
	100 lbs									
1	50	3.1	50	500	900	2 sections 317	130	3.9	FT218	
1	80	3.1	80	800	2000	100	200	4.0	FT214	

Place M I T
Date 2 APR 58
Observer B Blanchard

R	W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	85	3.1		850	900	1,3,4 578	236	3.9	T 2½	
1	107 ~~112~~	3.1		1070	↓	1 to 6 863	350	3.3	↓	
1	107	3.1		1070	↓	1-4, 7,8 848	343		↓	
1	65	3.1		650	2000	100	200	3.5	FT 214 STD	sh. Q to 706
1	70	3.1		700	2KV	100	200		FT 214 STD	706 STD
	150	3.1		1500	900	848	343	4.35	FX-1	
	95	3.1		950		578	236	4.05	FX 1	
	50			500		317	130	3.85	FX 1	
	40			400		317	130	3.05	9MM	sideways ⊗
	90			900		578	236	3.80	9MM	↓
	140			1400		848	343	4.10	9MM	
	70			700					FT 214 STD	706 STD
	103			1030		578	236	4.35	FT 28	
	82			820		578	236	3.5	FT 506 GE	rated 1000 WS 900 V accordg to HEE
	120			1200		848	343	3.5	FT 506 GE	
	143			1430		1-8	4.0			

Place M I T
Date 2 APR 58
Observer B T Lanchard

R	W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (HFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	155	3.1		1550	900	1-4, 7-10 1116	452	3.45	FT 506 GE	
1	80	3.1		8000	850					Edgerton. I.D. 4mm 2 3/4" long. 
1	79	3.1		790.	900	750+	300	2.63		
1	62	"		620	600	1116	202	3.05		
1	81	"		810	700	1116	275	2.95		
1	81	"		810	800	"	360	2.25		
	78	"		780	700	"	275	2.83		
	78	"		780	800	"	360	2.16		
	82	"		820	900	"	450	1.82		
	70			700	700	"	275	2.53		
	60			600	600	"	202	2.95		SV 350
	82			820.	900	"	450	1.82		Shows altitude inversion especially +
	45			450	500	1116	140	3.20		2nd sample.
	65			650	600		202	3.20		
	84	"	→	840	700	"	275	3.05		
	87			870	800	"	360	2.42		
	83			830	900	"	450	1.84		
	70			700	700	1116	275	2.53	✓	SV 350
	60			600	700	518	142	4.20	FT-218	SV=50
	80			800	800	"	184	4.33	218	
	105			1050	900	578	233	4.50	218	
	Opal		Zeadrom 102 V at (1 foot units for)							2" from lamps for exposure



Dr Donaldson's flash tubes

Place M I T
Date 4 Apr 58
Observer H E Edgerton
B E Blanchard

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	29	3.1		290	500	~~525~~ 578	73	4.00		3V ≈200
1	42	3.1		420	600	578	104	4.02		
1	24	3.1		240	500	578	73	3.3		2 lamps in series
1	39	3.1		390	600	578	104	3.75		
1	58	3.1		580	700	578	142	4.08		
1	81	3.1		810	800	578	185	4.3		
1	107	3.1		1070	900	578	235	4.6		
	29.5				500					different tube same type

SAME TUBES TYPE-1 MAY 1958 — B E Blanchard

1	190	1		190	450	650	65	2.95		→ LIGHT 12 μh series L
1	168	1		168	450	650	65	2.6		→ LIGHT 12 μh series L
1	150	1		150	450	578	58	2.6		→ no series L

light comparison for movie unit

Place M I T
Date 7 Apr 58
Observer B. E. Blanchard

arbitrary units

R	W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. CE²/2	Effy. CP/W	Lamp	Remarks
	170				2400	.25	.72		FT 218	
	110					.25			9 mm TT tube	
	160					.25			6 mm TT tube	
	110					.25			short gap cement seal tube	
	60					.25			quartz lined tube	
	150					.25			FT-506	
	160					.25			FT-106	
	145					.25			german tube	
	195								Germanhanson Special tube	
	110								FT 214 spiral	
	140								Sylvania 1½ turn spiral For Stroboluxe Xe 35 mm	

noise light woke up mercury tube trigger

Place MIT
Date 8 April 58
Observer

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy w.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
1/47	115	.5			2400	.25	.72		FT 218	
~~1/60~~ 1/47	165	1	3.52	~~165~~ 3.52	2400	1	2.88	1.22		
1/47	180	1			2400	1	2.88			
1	45	.5	45	11	2400	2	5.76	1.9		
1/47	175	.5	.93		90 kv 1900	.5	.9	1.03		
1/47	125	.5	.66		90 kv 1900	.5	.9	.73		no mercury tube
1/47	110	1	2.34		1900	1	1.8	1.3		no mercury tube
1/47	145	1	3.1		1900	1	1.8	1.73		
1/47	100	2	8.5		1900	2	3.6	2.36		
1/47	85	2	7.25		1900	2	3.6	2.-		no mercury tube
	changed light measuring arrangement									
1/47	60	2	5.1		1900	2	3.6	1.4		
1/47	65	2	5.5		1900	2	3.6	1.55		no mercury tube
1/47	85	1		1.8	2400	.5	1.44	1.25		

USC Self contained strob

Courtesy Alexander

Fin-Solar Pal

Place MIT

Date 9 APRIL

Observer B E Blanchard
H E Edgerton

R	W Meter	D	WR	WD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CM^2/2	Effy. CP/W	Lamp	Remarks
1	55	3.1		550						D Pak
1	25	3.1		250						↓
1	17	3.1		170						
1	57			570						on AC powe
1	55			550						↓

$\frac{1400 \text{ mg} \times .5}{2}$

$= 350 \text{ mg}$

Lightweight flash machine lamps

Place MIT
Date 17 April 58
Observer P S Rowland

R	W Meter	D	WR	WR^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE^2/2	Effy. CP/W	Lamp	Remarks
1	108	3.1		1080	900	317 + 261 = 578	235	4.55	short tip off, 1	
1	70	3.1		700	2000	100	200	3.5	FT 14 STD	should be 706
1	112	3.1		1120	900	578	235	4.8	1	
2	145	3.1	290	2900	900	1400	570	5.1	1	
2	142	3.1	284	2840	900	1400	570	~5	1	13th flash
2	135	3.1							1	25 flashes (after) 26th flash
2	110	3.1	220	2200	900	1400	570		small bore	25 cm lamp double coil

U shaped Flash tube comparison

Place M I T
Date 29 April 58
Observer T E Blanchard

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CR²/2	Effy. CP/W	Lamp	Remarks
1	60	3.1		600	900	317	128	4.65	FT 218	SV 275-300
1	47	3.1		470	900	317	128	3.65	∩ 1	SV 350-400
1	67	3.1		670	2000	100	200		FT 214 STD LAMP	should be 706 BCPS
1	65	3.1		650	900	578	235	2.75	∩ 1	
1	67	3.1		670	900	578	235	2.85	∩ 2	SV 450-475
1	67	3.1		670	900	578	235	2.85	∩ 3	SV 350-375
1	105	3.1		1050	900	578	235	4.50	FT 218	
1	47	3.1		470	900	317	128	3.65	∩ 3	
	67			670		317			FT 218	

Place 20D102
Date 1 MAY 1958
Observer B E Blanchard

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks
1	117	1		117	450	578	58	2	FT 218	
1	85	3.1		850	900	578	235	3.6	FT 218	
1	102	3.1		1020	900	578	235	4.4	FT 218	new tube
1	160	1		160	450	578	58	2.8	FT 218	↓
1	70	3.1		700	900	578	235	3.0	6 MM SPIRAL TUBE	S.V. 700 volts
1	probe 115	2			1500	5			↓	
1	probe 110	2			1500	5			FT 218	
1	probe 30	2			1500	2			↓	
1	probe 12	2			1500	1			↓	
1	probe 130	2.8			1500	10			↓	
1	80	1		80	1500	25	28	2.9	↓	

B&L U tube

Place 20D102 MIT
Date 2 May 1958
Observer B Blanchard

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE^2/2	Effy. CP/W	Lamp	Remarks
1	~~68~~ 110	3.1		~~650~~ 1100	900	578	235	~~2.75~~ 4.70	FT 218	
1	65	3.1		650	900	578	225	2.75	20 cm U tube	Xenon
1	108	3.1		1080	900	578	~~225~~ 235	4.6	40 cm U tube	Xenon
1	55	3.1		550	900	317	130	4.25	40 cm U tube	Xenon

900 on Simpson
940 on Westar

150	130
170	112

UCRL Bubble chamber tubes FX-19 and FX-26

Place MIT 20 D 102
Date 5 MAY 1958
Observer B.S. Blanchard

R	W Meter	D	WR	WD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	110	3.1		1100	775	1084 12μh	325	3.4	FX 26	SV 600 
1	100	3.1		1000	775	1084 12μh	325	3.1	FX 26	
1	108	3.1		1080	775	1084 12μh	325	3.3	FX 19	
1	130	3.1		1300	900	1084 12μh	440	2.95	FX 26	
			8 MAY 1958							
	new power pack									
2	105	3.1	210	2100	940 ~~900~~	A			FX 26 1	
2	120	3.1	240	2400	730 ~~700~~	A+B			FX 26 1	
2	152	3.1	304	3040	940 ~~900~~	A+B			FX 26 1	450μs flash
		peak	60 × 100,000	cp	= 6×10^6	HCP				
2	112	3.1	224	2240	940 ~~900~~	A 1450	650	3.45	FX 26 2	long anode tubulation
2	121	3.1	242	2420	940 ~~900~~	A 1450	650	3.75	FX 26 3	long ~~anode~~ cathode tubulation
2	180	3.1	360	3600	940 ~~900~~	A+B 2595	1165	3.1	FX 26 3	
2	152	3.1	304	3040	940 ~~900~~	A+B 2595	1165	2.6	FX 26 2	
2	150	3.1	300	3000	940 ~~900~~	A 1450	650	4.6	FX 26 3	40 cm X ϕ
4	160	3.1	640	6400	940 ~~900~~	A+B 2595	1165	5.5	FX 26 3	" "
4	135	3.1	540	5400	940	A+B 2595	1165	4.65	" 3	"
4	130	3.1	520	5200	940	A+B 2595	1165	4.5	" 3	after 30 flashes "

12μh series L

FX-26 tube nr. 3 sent to Hugh Rodman at UCRL for testing 8 May 1958

110 at 1 ft 110 cps

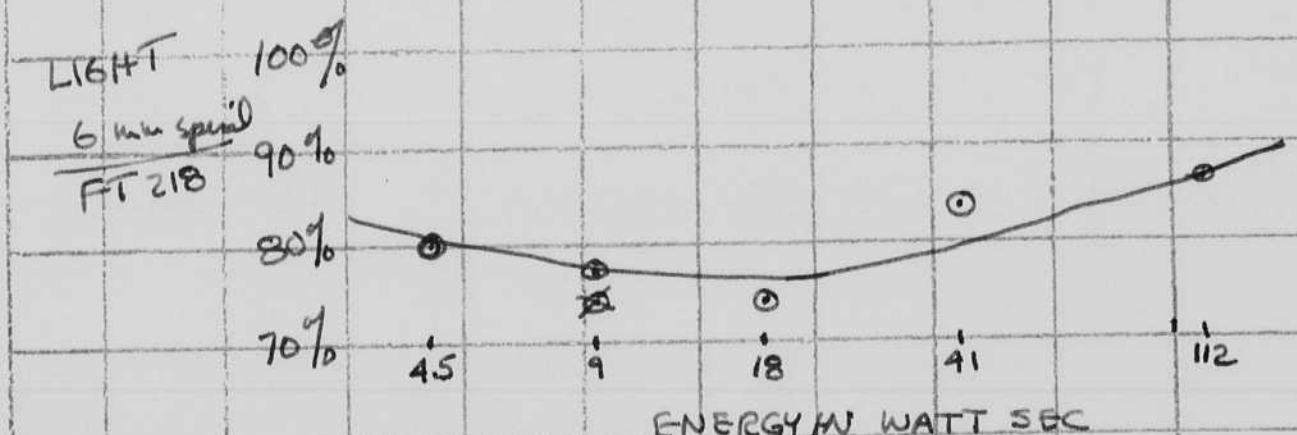
at 10 ft read 65 at one ft $\frac{6500}{110}$ W

59 x W

64/SEC MOVIE LIGHT

MIT
Place 20D102
Date 9 MAY 1958
Observer BE Blanchard

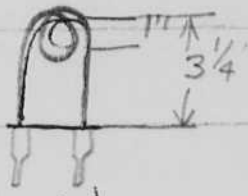
R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	~~130~~ 137	1		~~130~~	1500	4	4.5			
~~1/59~~ rel	77	2	~~113~~	~~5.2~~	1500	4	4.5	~~1.15~~	6 mm spiral	1=80% of FT 218
~~X~~ rel	95	2			1500	4	4.5		FT 218	
—	60	—		17	1500	8	9		6 mm spiral	78% of FT 218
—	78	—		22	1500	8	9		FT 218	
—	145	—		41	1500	16	18		6 mm spiral	74% of FT 218
—	195	55 CPS —		55	1500	16	18		FT 218	
1	105			105		32	41 ~~36~~ +		6 mm spiral	84%
1	125	1		125		32	41 ~~36~~	3.1	FT 218	
4	~~98~~ 85	1				100	112		6 mm spiral	87%
4	98	1		392		100	112	3.5	FT 218	



Light Weight Flash Unit TUBE #1

Place MIT
Date 13 MAY
Observer B Blank Mod

R	W Meter	D	WR	WD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	175	3:1		1750	900	1450 MFD	590	3.0	5 in 1	
~~1~~	155	3:1		1550	800	1450 MFD	464	3.3		
1	127	3:1		1270	700	1450 MFD	355	3.65		
1	85	3:1		850	600	1450 MFD	261	3.2		
1	53	3:1		530	500	1450 MFD	181	2.95		
1	31	3:1		310	400	1450 MFD	116	2.9		
~~2~~1	170	3:1		1700	900	1450 MFD	587	3.0		
~~2~~1	170	3:1		1700	900	1450 MFD	587	3.0		
~~2~~1	142	3:1		1420	800	1450	464	3.1		
~~2~~1	123	3:1		1230	700	1450 MFD	355	3.5		
~~1~~7	85	3:1		850	600	1450 MFD	261	3.2		
~~2~~1	56	3:1		560	500	1450 MFD	181	3.1		
~~2~~1	32	3:1		320	400	1450 MFD	116	2.7		
~~3~~1	163	3:1		1630	900	1450 MFD	587	2.8		



Tap 1

Sintered Baker Electrode Cathode

FX-11 Tungsten Anode.

Fill Pressure 35 CM.

~~10~~ 7mm OD Vycor Coil
9mm OD Vycor legs

Voltage left on 130 Volt on

Voltage left 110 Volt

Voltage left 100

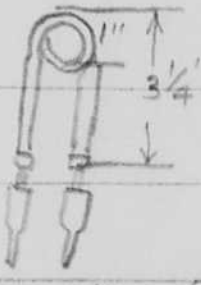
Voltage left Cap 160 Volt

Lamp II has Anode marked

LIGHT WEIGHT FLASH UNIT

Place MIT
Date 13 MAY
Observer MACKIE BLANCHARD

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CR²/2	Effy. CP/W	Lamp	Remarks
1	162	311		1620	900	1450 MFD	587		2	160 Volt Tst Start Voltage 500 Volts
1	138			1380	800		464			140 volt Tst
1	112			1120	700		355			120 Tst
1	78			780	600		241			100 volts Tst
1	53			530	500		181			100 volts Tst
1	30			300	400		116			90 volts Tst
1	143			1430	900		587			140 volts Tst



7mm OD Vycor Coil
9mm OD Vycor legs
35 CM Pressure ~~XENON~~
Two Baker Centered Electrodes
.010 Nickel Wire Trigger

Tan Rens for

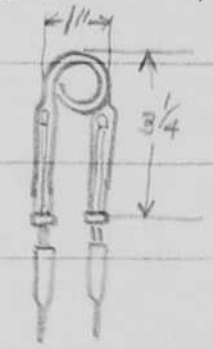
W E
150 900
140
130
125
119
115
114
110
110
110

110
110
110
110

LIGHT WEIGHT FLASH UNIT

Place MIT
Date 5/13/58
Observer Blanford Moore

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	200			2000	900	1450			3	
1	180				900					150 volt Tap
1	157				800					140 volt Tap
1	132				700					120 volts Tap
1	95				600					100 volt Taps
1	62				500					100 volts Tap
1	36				400					80 volt Tap.
1	175				900					
1	173									
1	168									
1	158									
1	152									
1	148									
1	150									
1	140									
1	142									
1	142									
1	142									
1	142									



Electrodes:-
Beker Cintered Barrel
FX-11 Tungsten
Pressure 35 CM

Check Procedure

1	62	3:1		620	2000	100μf	200	3.1	3	
1	70	3:1		~~620~~ 700	2000	100μf	200	3.5	3	FT 214 Standard Lamp

SHORT TUBE
E = 900 VOLTS MARKED

MIT
MAY 26
MACKIE

R	W MEIER	D	WR	WRD^2	CAP	E_{max} $CE^2/2$	EH CP/W E	F
2	135	3.1		2700	1450	590	~~4.75~~	4.6
2	140			2800			~~4.85~~	4.75
2	135			2700			4.63	
2	135			2700			4.6	
2	135			2700			4.6	
2	135			2700			4.63	
2	136			2720			4.62	
2	135			2700			4.65	
2	138			2760			4.70	
2	137			2740			4.68	
2	134			2680			4.52	
2	134			2680			4.52	
2	135			2700			4.60	
2	134			2680			4.52	
2	136			2720			4.62	
2	134			2680			4.52	

TEN MINUTE INTERVAL FOR COOLING

2	140			2800			4.75	
2	136			2720			4.62	
2	134			2680			4.52	
2	134			2680			4.52	
2	131			2620			4.43	
2	132			2640			4.5	
2	132			2640				

D = 3.1

MIT
MAY 25
MACKIE

R	W METER	WR	WRD Lgw	E volts	CAP MED	ENERGY WS CE²/2	EFF/CP/W
4	64	3N	2560	900	1450	590	4.4
2	135		2700				4.6
2	126		2520				4.3
2	122		2440				4.15
2	116		2320				3.95
2	116		2320				3.95
2	115		2300				3.9
2	115		2300				3.9
2	112		2240				3.8
2	112		2240				3.8
2	112		2240				3.8
2	115		2300				3.9
2	117		2340				3.97
2	116		2320				3.9
2	114		2280				3.86
2	119		2380				4.1
2	117		2340				3.97
2	116		2320				3.95
2	114		2280				3.86
2	115		2300				3.9
2	116		2320				3.95
2	118		2360				4.0
2	116		2320				3.95
2	112		2240				3.8
2	130						4.6

altitude adj

20 CM TUBE #5

XFX 29
MIT
JUNE 9
MACKIE

#	Meter	D	WR	LIGHT TOPS	E Volts	Cap. (PD) C	Theory μ coul $(C^2/2)$	Diff CP/T	Temp	Remarks
2	80	3.1		1600	900	1450	590	2.7	#5	
1	145			1450				2.45		
1	137			1370				2.3		wait 2 sec
1	134			1340				2.25		wait 2 m
1	144			1440				2.4		wait 3 m
1	142			1420				2.42		
1	138			1380				2.3		
1	134			1340				2.25		
1	136			1360				2.3		
1	138			1380				2.35		
1	137			1370				2.3		
1	136			1360				2.3		
1	130			1300				2.2		
1	142			1420				2.4		
1	140			1400				2.4		
1	145			1450				2.45		
1	144			1440				2.4		
1	137			1370				2.3		

TUBE # 6 XFX-29

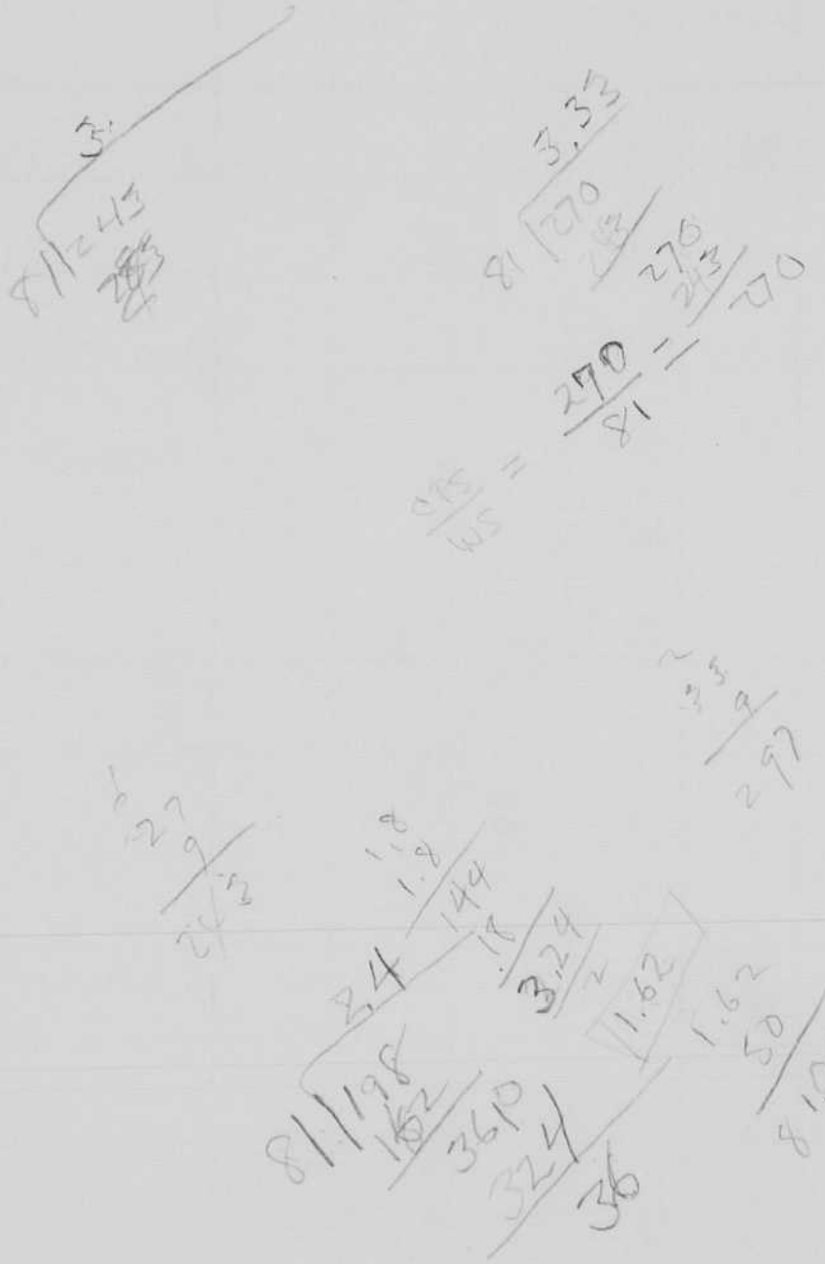
MIT
June 9
Machu

		___ CM								
	E Meter	D	WR	MEC² LIGHT DOPS	E Volts	Cap. (MFD) C	Energy W.s. CV²/2	Effy. CV/I	Temp	Remarks
2	125	3.1		2500	900	1450	590	4.2	6	
2	124			2480				4.2		
2	120			2400				4.1		
2	116			2320				3.9		
2	119			2380				4.1		
2	114			2280				3.85		
2	116			2320				3.9		
$\frac{1}{2}$	123			2460				4.2		
2	117			2340				3.95		
2	116			2320				3.9		
2	112			2240				3.8		wait 3 min
2	120			2400				4.1		
3	120			2400				4.1		
2	140			2280				3.85		wait 2 m
2	123			2460				4.15		
2	112			2240				3.8		
2	116			2320				3.9		
2	116			2320				3.9		

Peak light & Dur. Query FT-218

Flash 20-D-102
Date 23 JULY 1958
Observer D. SINCLAIR

	Peak Lum $\times 10^6$	Dur MS	E Volts	Cap (MFD) C	Factory Rec. CP/2	Effy. CP/	Lamp	Remarks
1								
2.4 x .2	.48	26	900	10				
~~3 x 2~~	4.5	25	2000	10				
3 x 2	6.0	38	2000	20				
	0.2	22	900	5				lamp skipped
Dist = 5 ft	0.18	25	"	10				especially with
IV = 10^6 CP	0.60	31	"	20				low values of
	1.0	70	"	50				capacitance.
3	1.2	150	"	100				
	1.5	350	"	270				electrolytic
	1.6	18	1800	5				
	2.7	23	"	10				
	4.0	30	"	20				
	6.0	55	"	50				
	7.0	110	"	100				
	6.0	150	"	130				electrolytic
4	2.4	500	900	530				electrolytic



QUARTZ # 218 CONT

20-D-102
23 JULY 1958
D. SINCLAIR

	Peak CP x 10⁶	Duration					
	5	16	3000	5			
	6.8	19	"	10			
	9	25	"	20			
	11	28	"	50			
	2.5	100	1800	55	electrolytic	tube # 1 CRAZED	
	2.3	100	1800	55	"	" # 2	
	3.2	120	1800	55	"	QUARTZ # 218	

LIFE TEST QUARTZ # FT-218

Start

1	30	3 ft.	30	270	1800	50	81	3.3	QUARTZ FT-218	TUBE # 1 (FOR LIFE TEST)
1	27	3 ft.	27	243	1800	50	81	3.0	"	" # 2
1	22	3 ft	22	198	1800	50	81	2.4	"	TUBE # 1 AFTER 1200 FLASHES

LAMP EXPLODED AFTER 1713 FLASHES

Peak light & Dur. Quartz FT-218

20-D-102
23 JULY 1958
Observer D. SINCLAIR

Calculation

	X10⁶	Dur μs	Volts	C	
2.4 x .2	.48	26	900	10	
~~3~~	4.5	25	2000	10	
3 x 2	6.0	38	2000	20	
	0.2	22	900	5	lamp skipped
Dist = 246 in.	0.48	25	"	10	especially with
V = 10 cm	0.60	31	"	20	low values of
	1.0	70	"	50	capacitance.
	1.2	150	"	100	
	1.5	350	"	270	electrolytic
	1.6	18	1800	5	
	2.7	23	"	10	
	4.0	30	"	20	
	6.0	55	"	50	
	7.0	110	"	100	
	6.0	150	"	130	electrolytic
	2.4	500	900	530	electrolytic

QUARTZ # 218 CONT

20-D-102
23 JULY 1958
D. SINCLAIR

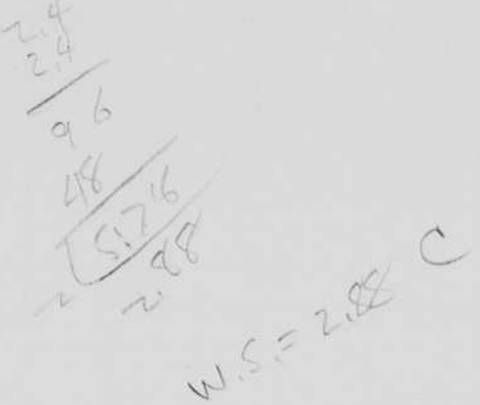
Peak CP x 10⁶	Duration					
5	16	3000	5			
6.8	19	"	10			
9	25	"	20			
11	28	"	50			
2.5	100	1800	55	electrolytic	tube # 1 CRAZED	
2.3	100	1800	55	"	" # 2	
3.2	120	1800	55	"	QUARTZ # 218	

LIFE TEST QUARTZ # FT-218

Start

1	30	3 ft. 30	270	1800	50	81	3.3	QUARTZ FT-218	TUBE # 1 (FOR LIFE-TEST)	
1	27	3 ft. 27	243	1800	50	81	3.0	"	" # 2	
1	22	3 ft 22	198	1800	50	81	2.4	"	TUBE # 1 AFTER 1200 FLASHES	

LAMP EXPLODED AFTER 1713 FLASHES

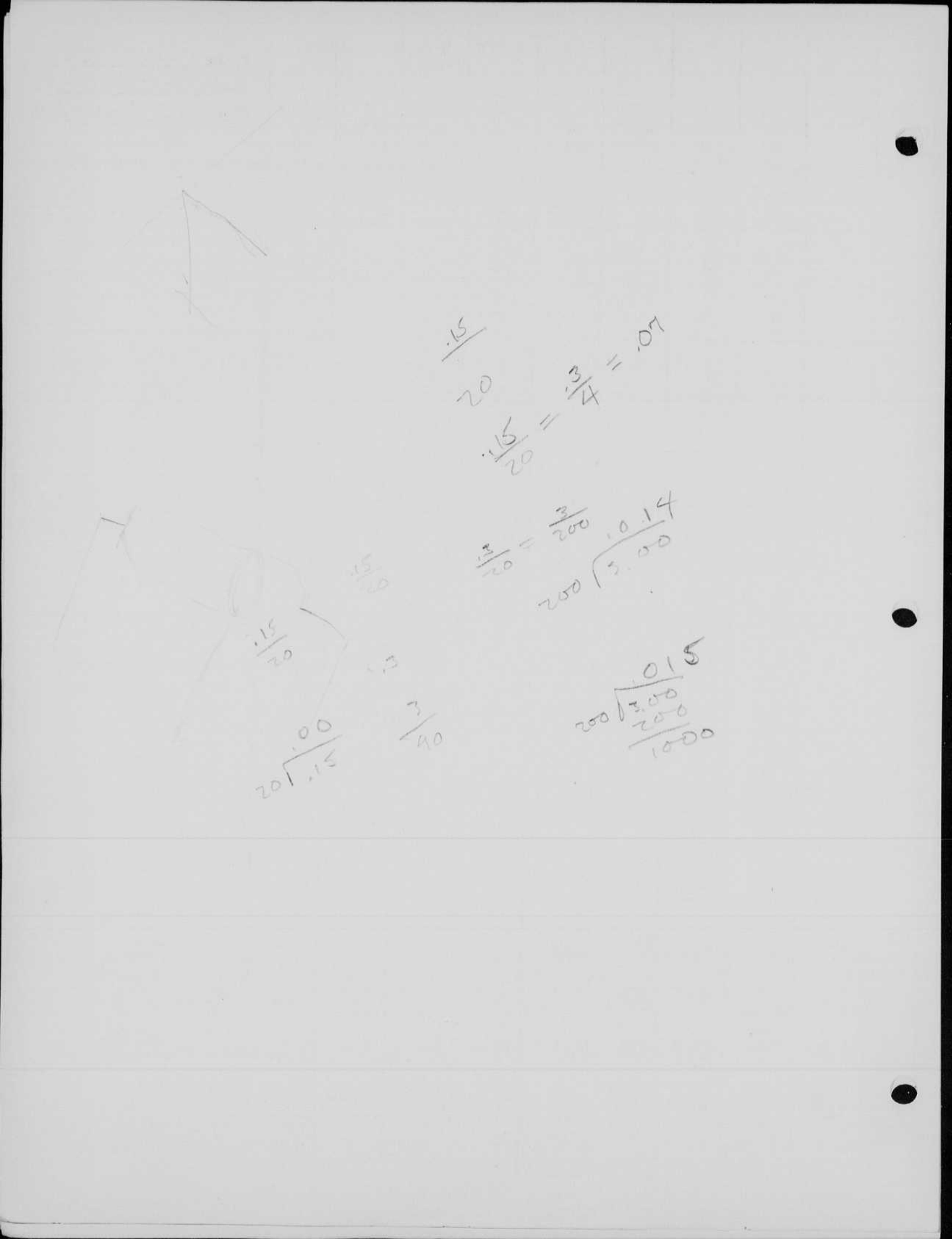

W.S.= 2.8% C

TUBE FOR EYE PHOTOGRAPHY

Plate 20-D-102
Date 23 JULY 1958
Observer D. SINCLAIR

PEAK LIGHT (x10⁶)	DURATION μsec			
.35	5		2400	.25
.59	8		"	.5
.65	10		"	.75
.90	12		"	1
1.0	14		"	1.5
1.2	17		"	2.0
1.3	23		"	4.0
1.5	30		"	6.0

R	N	D	NR	NRD²	E	C	CE²/2	CP/N
1	5	½ FT	5	1.25	2400	.25	.72	1.67
"	11	"	11	2.75	"	.5	1.44	1.91
"	19	"	19	4.75	"	.75	2.16	2.2
"	26	"	26	6.5	"	1	2.88	2.26
"	41	"	41	10.25	"	1.5	4.32	2.38
"	63	"	63	15.75	"	2.0	5.76	2.74
"	120	"	120	30	"	4.0	11.52	2.6
"	160	"	160	40	"	6.0	17.28	2.32


.15/20
.15/20 = 3/4 = .07
3/20 = 3/200
.14
200 | 3.00
.15/20
.15/20
.3
.00
20 | .15
3/40
.015
200 | 3.00
200
1000

LARGE CERAMIC TUBE

Mode 20-D-102
Date 7/24/58
Observer D. SINCLAIR

PEAK LIGHT (10⁶ CP)	DURATION μsec.	K Volts	Cap. (μfd)	Energy Joules	Efficiency %	Temp
.007	6	1000	1	.5		
.015	9	"	2	1		
.1	11	"	5	2.5		
.2	17	"	10	5		
.32	21	"	20	10		
.4	26	"	50	25		
.6	35	"	100	50		
.1	6	2000	1	2		
.2	9	"	2	4		
.4	11	"	5	10		
.7	20	"	10	20		
1.0	23	"	20	40		
1.2	30	"	50	100		
1.5	40	"	100	200		
.17	6	3000	1	4.5		
.3	9	"	2	9		
.6	12	"	5	22.5		
1.3	15	"	10	45		

	1.7	22		3000	20	90					
	2.1	45		11	50	225					

$\frac{.15}{20}$

$\frac{.15}{20} = \frac{.3}{4} = .07$

$\frac{.3}{20} = \frac{3}{200}$

$200\overline{)3.00}$ $.014$

$\frac{.15}{20}$

$\frac{.15}{20}$

$\frac{3}{40}$

$20\overline{).15}$ $.00$

$200\overline{)3.00}$ $.015$

200

1000

LARGE CERAMIC TUBE

Mirror 20-D-102
Date 7/24/18
Observer D. SINCLAIR

PEAK LIGHT (10-6 CP)	DURATION (MSEC.)	K Volts	Cap. (MFD)	Energy (WATT SEC.)	Rep. Rate (P.P.S.)	Temp	Remarks
.007	6	1000	1	.5			
.015	9	"	2	1			
.1	11	"	5	2.5			
.2	17	"	10	5			
.32	21	"	20	10			
.4	26	"	50	25			
.6	35	"	100	50			
.1	6	2000	1	2			
.2	9	"	2	4			
.4	11	"	5	10			
.7	20	"	10	20			
1.0	23	"	20	40			
1.2	30	"	50	100			
1.5	40	"	100	200			
.17	6	3000	1	4.5			
.3	9	"	2	9			
.6	12	"	5	22.5			
1.3	15	"	10	45			

Place
Date
Observer

#	Meter	D	VR	Off (Light On)	Volts	Cap. (Off) C	Energy (Cap.) CV/2	Eff. CV/I	Temp	Remarks
		1.7	22		3000	20	90			
		2.1	45		11	50	225			

FX-28 @ 40 CM ZENON 8-28-58

#1 225 Volts Starting 20 CM
Flashed 2 times at 150 Watt/Secs
Rechecked Starting Voltage 225 100 Volts

#2 225 Starting Volt 20 CM
Flashed 2 times at 100 Watt/sec
Recheck 225

#3 200 Starting Volt. 20 CM.
Redeck 225
Flashed 2 times at 100 Watt/Secs

725 / 4 | 2890 — 362 / 4 | 1450

729 / 4 | 2915 — 362 / 3 | 1086

@ 40 CM ZENON

#1 300 V STARTING

#2 400 V STARTING

#3 325 V STARTING

725 / 3 — 729 / 3 — 243

2(725) = 2187

2187 / 2 | 2180 — 1090

ALL THESE READING WERE TAKEN WHILE TUBES WERE STILL ON THE SYSTEM—

$$\frac{8100.00 \times \frac{545}{1000}}{2} =$$

$$\frac{545}{81}$$

$$\frac{545}{4360}$$

$$\frac{}{44145.00}$$

$$\frac{1301}{441} =$$

pm 4-410
August 29, 1968
Bob Edgerton

#	Meter	D	WR	MRF Light Input	E Volts	Cap. (MFD) C	Energy w.s. $CV^2/2$	MFy. CV/"	Temp	Observer Remarks
1	149	3/4	149	1301	900	1090	441		FX 28	tube # 3
	135									after 5 discharges starts at 450 V.
	132									

FX-1 Flash Tubes with sample electrodes from Baker batch #2

MIT 4-405
20 Oct. 1958
VEM + JT

1	92 93	3 ft.	837	2000	100	200	4.18	#85	#85 has no scratch on glass at anode end.

Slight sputtering on glass near anode; heavier sputtering on glass near cathode.
Minimum starting voltage before flashing at 200 w.s. was 850 volts. After approximately twenty flashes at 200 w.s., minimum starting voltage was 1050 volts.

1	96	3 ft	864	2000	100	200	4.32	#84	#84 has two scratches on glass at anode end. (one end of #85); very

Sputtering on glass near anode (about the same amount as at cathode end of #85); very slight sputtering on glass at center of tube.
Minimum starting voltage before flashing at 200 w.s. was 1000 volts. After approximately ten flashes at 200 w.s., minimum starting voltage was 1100 volts.

FX-1 Flash Tubes with Simple electrodes

from Baker Batch #2

Place MIT 4-405
Date 10 oct 58
Observer JT

R	M Meter	D	WR	WKB² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CK²/2	Effy. CP/W	Lamp	Remarks
1	85	3ft		765	2000	100	200	3.82	#85	
1	82	3ft		738	2000	100	200	3.69	#84	

FX-12 with simple electrodes from Baker batch #2

Place MIT 4-405
Date 19 Oct 58
Observer JJ

R	W Meter	D	WR	MHD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CF²/2	Effy. CP/W	Lamp	Remarks
1	76	3ft		684	2000	100	200	3.42	#85	
1	76	3ft		684	2000	100	200	3.42	#84	
	Readings questionable because of inconsistency of meter. (Low battery)									
										22 Oct 1958 JJ (Battery replaced, calibration tested)
1	83	3ft		747	2000	100	200	3.74	#85	
1	93	3ft		837	2000	100	200	4.18	#84	
	Comparison of these readings with those of October 2 and October 10 indicate that these earlier readings may be low; we had trouble with the meter even on the October 2 tests.									

New FX-1 for comparison with Mazda being eff. tested

Place MIT
Date 25 Oct
Observer JT

R	W Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	102	3ft		918	2000	100	200	4.59	#76	

EGG 1½ stem Vycor tube in 24 per sec. V.W. Strobe. for Dick

M.I.T.
Place 4-405
Date Nov 12 58
Observer T.E.M.

R	#113 W Meter	D	WR	MMD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
									Bare lamp.	Input
X1	57 58	1							side view.	112 Volts A.C.
										30 ft Simplex Special V.W Cable or 3 ft leads. No difference in light.

FX-1a with Lample electrodes
from Baker Patch #2

MIT 4-405
19 Nov. 58
JJ

1	72	3ft	648	2000	100	200	3.24	Standard FT-214 for calibration	
1	70	3ft	630	2000	100	200	3.15	#85	Arm start – 500 r. No self-start at 4400 r
1	80	3ft	720	2000	100	200	3.60	#84	Arm start – 500 r. No self-start at 4400 r
1	72	3ft						Standard FT-214 after test	

4-405

Constean Turtle Unit

without Reflector - Side view

Place M.I.T.

Date Nov 25, 58

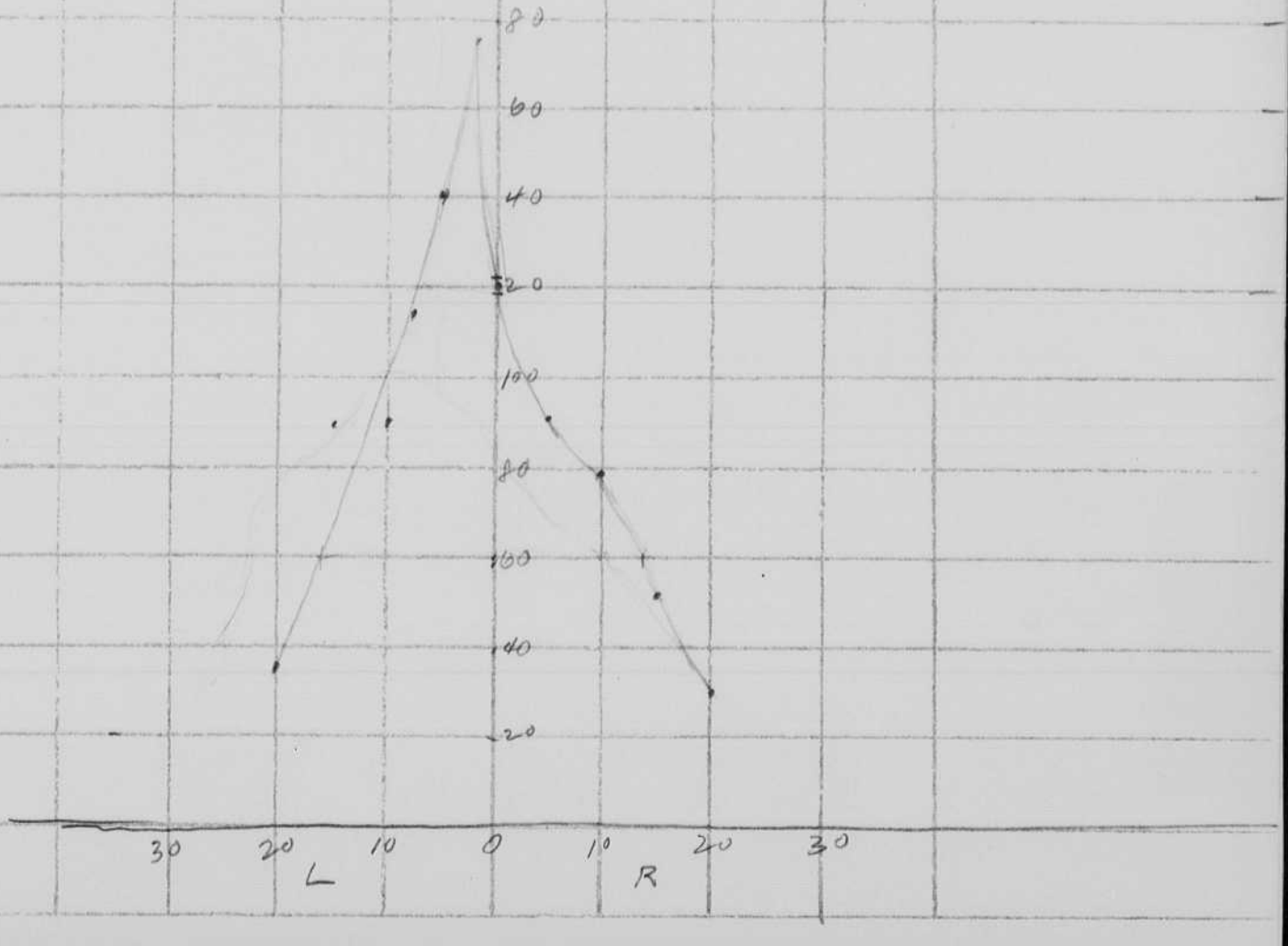
Observer V. Lyuba V.E.W.

R	#13 M Meter	D	WR	WRP² LIGHT BCPS	E Volts	Cap. (MFD) a/part.	Energy w.s. CP²/2	Effy. CP/W	Lamp	Remarks
X)	39	3/4		351	840	550/2	85	4.14	#1	Duration 400 μsec.
	87	"		783	840	550	170	4.6	#1	Duration 600 μsec.
	40	"		360			85	4.23	#2	350 μsec.
	83	"		747	840	550	170	4.3	#2	600 μsec.
	41	3/4		369	840	550/2	85	4.4	#3	350 μsec.
	83	"		747	840	550	170	4.4	#3	600 μsec.
	40			360			85	4.23	#4	320 μsec.
	88			802	840	550	170	4.7	#4	600 μsec

DISTRIBUTION OF LIGHT. TURTLE LAMP

Place 4-405
Date Nov 26, 58
Observer V.E.M.

R	M Meter	D	~~M~~	WHT² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
X1		6ft	Angle		840	$\frac{530}{2}$	85		#1 FT-28	Specular Reflector & Stainless Lamp 1½" in from back.
	118		0							
	91		5°R							
	79		10°R							
	53		15°R							
	30		20°R							
	122		0							
	140		5L							
	89		10L							
	90		15L							
	36		20L							
	175		2½L	6300						
	114		2½L							
	120		0	4420						

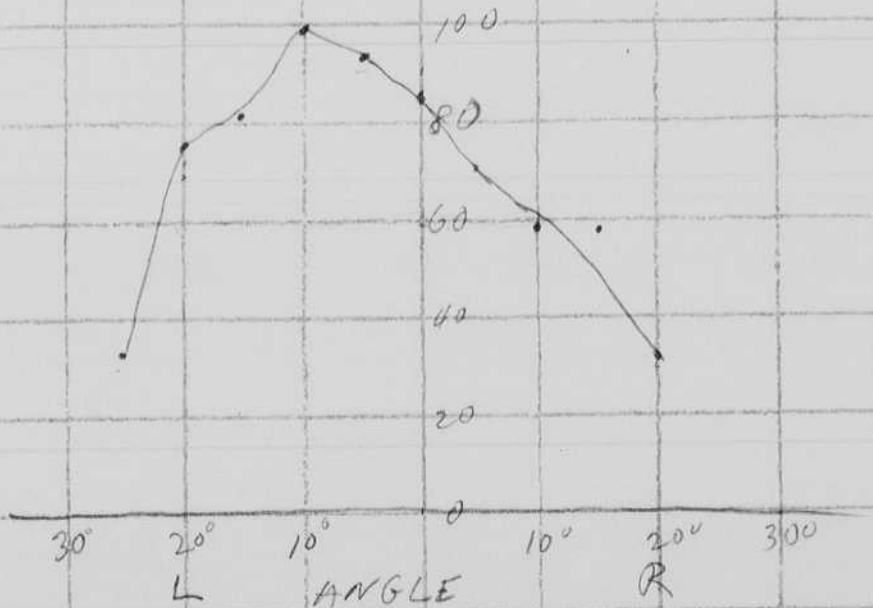


Reflector factor = 17

LIGHT DISTRIBUTION
TURTLE LAMP

Place 4-405
Date Nov 26
Observer VEM

R	W Meter	D	WR	WBD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
X1	#113	6ft	Angle		240	550/2	25		#1 Frst	Specular reflector Stainless 8" Dia. Lamp center 15/16 from rear
	25		0							
	71		5R							
	58		10R							
	58		15R							
	32		20R							
	25		0							
	73		5L							
	98		10L							
	82		15L							
	76		20L							
	33		25L							



125
16
750
125
2000

2,55
783 | 2000
1566
4340
3915
4250

87
16

LIGHT DISTRIBUTION
TURTLE LAMP.

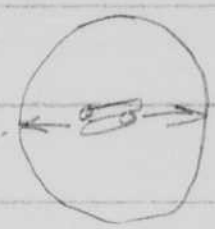
Place 4-405
Date Nov 26 '58
Observer V. E. Jn.

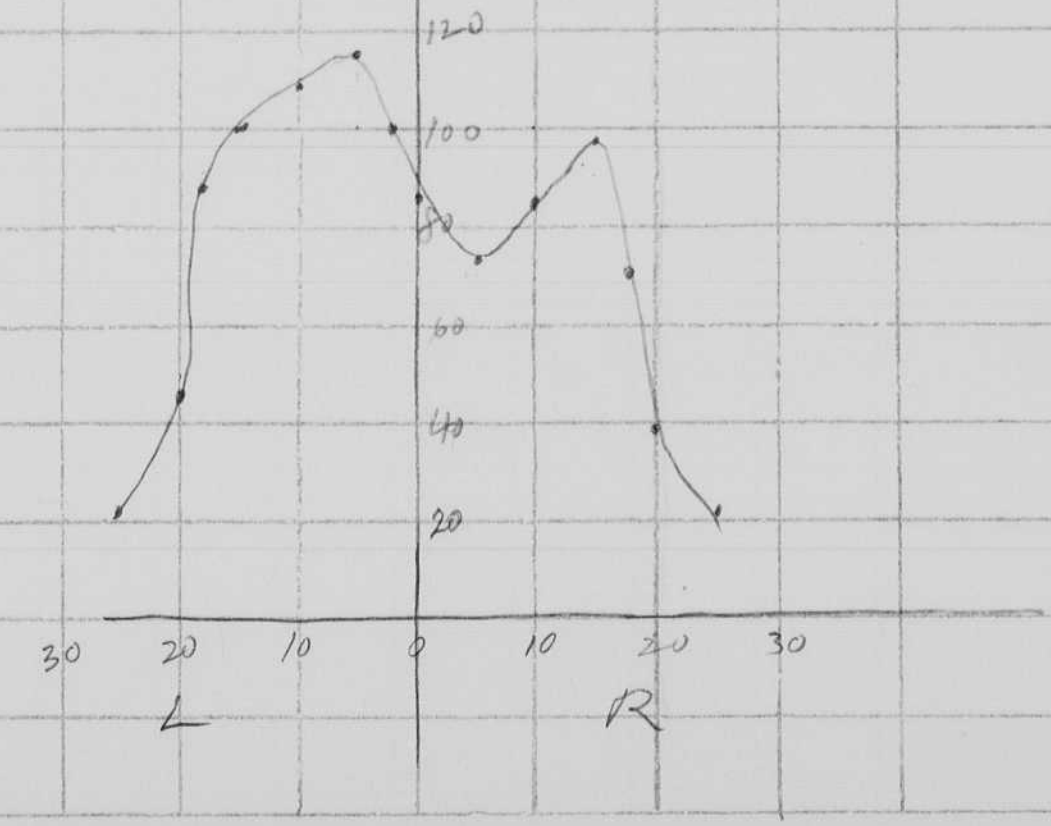
R	W Meter	D	~~W~~	WEB² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy ½ s. CP²/2	Effy. CP/W	Lamp	Remarks
X)	#113	4ft	Angle		840	550	170		#1 FF-28	Stainless 8" reflector painted flat white.
	120		0							
	124		10R							Lamp center
	130		15R							
	125		25R	2000	Reflector factor 2.55					1½" from
	122		30R							back of reflector.
	115		40R							
	106		50R							
	89		60R							
	43		70R		Reflector edge hides lamp.					
	121		0							
	125		10L							
	129		20L							
	125		30L							
	110		40L							
	101		50L							
	82		60L							
	33		70L							
	82	4ft.	0		840	550	170			Stainless reflector 8" Dia. sandblasted finish. L.C.L = 1½"
	27		10L							
	85		20L							
	72		30L							
	68		40L							
	82		20R							
	70		40R							

Light Distribution Tuttle Lamps.

Place 4-405
Date Nov 28 58
Observer V.C.M.

R	W Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
x1		6ft	angle		840	552/2	45		#1	Specular reflector
										1 5/8 L.C.L. from back of reflector
	86		0							
	74		5°R							
	86		10°R							
	97		15°R							
	38		20°R							
	16		25°R							
	70		17½°R							
	87		0°							
	116		5L							
	108		10L							
	100		15L							
	43		20L							
	22		25L							
	88		17½L							
	100		2½L							





24/sec. strobe for Navy (Dibb)

Place M.I.T. 405 st
Date Dec 5. 51
Observer V.E.M.

R	#113 W Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
X1		1								Bare lamp. EC + C.
	31/32									1½ turn Vycor
										18 ft of Simplex Special twine cable.
										110 volts A.C. input.

3.33
3.33
99 99 3.12
9 9

1 mfd.
3 mfd
10 mfd.
30 mfd

580
750
1000
1250
1500
1750
2000

68
2 | 136

609
120

80
160
17
15

Reused in V.W. lamp sent to NEL San Diego

$5 \times 20 = \frac{1000 \text{ b.s.p.}}{d^2} = M. = 100$

$d^2 = 10$

$d = \sqrt{10} = \cancel{3.33}\ 3.15.$

4-405

Place

Date Dec 20, 1958

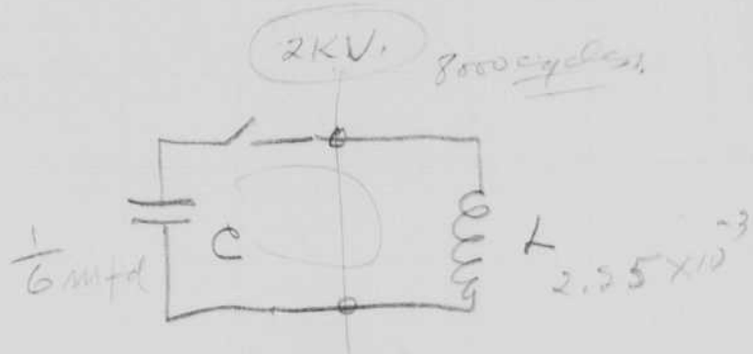
Observer H E Edgerton V. Shudra.

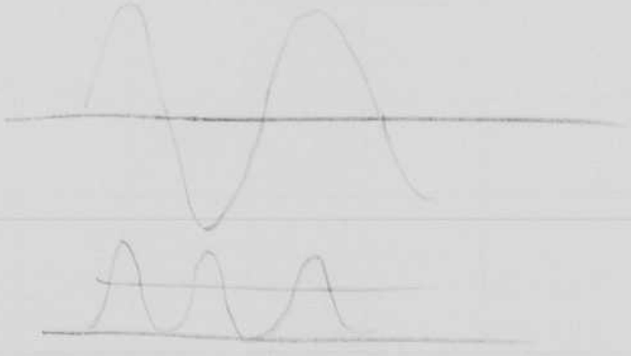
R	W Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	75	3.15	~~35~~	250	2000	100	200.	3.75.	⟵	V C M. FX-1
	57	1	57	57	2000	10	20	2·85		
	40				1750		15.3	2.62		
	26				1500		11.3	2.30		
	16				1250		7.8	2.05		
	9				1000		5	1.8		
	4				750		2.81	1.43		
	—				500		1.25	~~2.00~~		
	76				2250		25.3	3.0		
	100				2500		31.2	3·2		
	121				2750		37.8	3·2		
	147				3000		45.	3·27		
	165				3250		~~57~~ 58.	3·13		
					3500		61.			

Place _____
Date _____
Observer _____

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
	30	1			3000	3	13.5	~~2.65~~ 2.22		
	26				2750	3	11.4 ~~2.27~~	2.28		
	20				2500	3	9.40	2.13		
	17				2250	3	7.60	2.24		
	12.5				2000	3	6.00	2.08		
	9				1750	3	4.60	1.96		
	5.5				1500	3	3.39	1.62		
	4				1250	3	—	—		
	9				750	20	5.62	1.6		
	19				1000		10.	1.9		
	38				1250		15.6	2.44		
	62				1500		22.5	2.75		
	93				1750		30.5	3.05		
2	46	92			1750		30.5	3.02		
2	63	126			2000		40.	3.15		
2	86	172			2250		50.7	3.40		
2	111	222			2500		62.5	3.65		
2	135	270			2750		76.0	3.65		
2	158	316			3000		90.0	3.5		
4	91	364			3000		90.	4.03		
4						~~30~~ 30				
1	32				1000		15	2.13		
1	62				1250		23.4	2.65		
1	110				1500		33.8	3.26		
1	103				1500		33.8	3.05		
2	51		102		1500		33.8	3.02		
2	74		148		1750		46.0	3.22		
2	103		206		2000		60.0	3.44		
2	136		272		2250		76.0	3.58		
4	68		272		2250		76.0	3.58		
4	87		348		2500		94.0	3.70		
4	105		420		2750		114.0	3.69		
4	122.5		490		3000		135	3.63		

2.25×10^{-3}





4-405

Place

Date Dec. 1958

Observer H Edgerton
V. Sundra.

R	W Meter	D	WR	WR^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP^2/2	Effy. CP/W	Lamp	Remarks
1	50		50		2000	10	20	2.5		U tube.
1	108				2000	20	40	2.7		
1	10				1000	10				1/2"
1	15				1250	10				
1	34				2000	10	20	1.7		

Place Y-409
Date 24 Dec 58
Observer Edgerton + Germeshausen

R	W Meter	D	WATTS/SEC / CM³ ~~WR~~	H.C.P. / CM² → ~~MBP~~ LIGHT DCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
	97		1050	66	400	525	42		FX-11	Research on Hg Tube conditions
										~~Remove Hg Tube From Circuit~~
	70		1050	48	400	525	42		FX-11	Hg Tube in
	95		1050	65	400	525	42			Hg Tube shorted out
	68		600	47	300	"	24			"
	50		410	34	250	"	16.5			"
9/cm	112		78	77			100		~~FX~~ " TUBE	
9/cm	270		156	185			200		" TUBE	
9/cm	480		234	330			300		" TUBE	

HCP / cm^2 ↓

f/2 ↑ SUMMITAR

G.R LIGHT METER

Place 4-405

Date 24 Dec

Observer H. Edgerton, J. Cooney, Mc Roberts

LENS TO METER R	W Meter	D	~~Watt-sec~~ CM^3	LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CP^2/2$	Effy. CP/W	Lamp	Remarks
91 cm	11		50	8	1000	50	25		SALAMI TUBE	
91 cm	23		114	16	1500	50	57		S.T.	
91 cm	35		200	24	2000	50	100		S.T.	
91 cm	23		100	16	1000	100	50		S.T.	
91 cm	40		226	27	1500	100	113		S.T.	
91 cm	8		13	5	1000	50	25		FX-1	
91 cm	23		29	16	1500	50	57		"	
91 cm	46		50	31	2000	50	100		"	
91 cm	13		25	9	1000	100	50		"	
91 cm	37		57	25	1500	100	113		"	
91 cm	73		100	50	2000	100	200		"	
36 1/8"	22		260	15	200	525	10.5		FX-11	in series with Mercury Tube
	33		410	23	250	525	16.5		"	
	47		610	32	300	525	24.5		"	
	57		800	39	350	525	32.0		"	
	83		1050	57	400	525	42.0		"	

Nov. 5, 1958.

Large reflector 200 mfd @ 4KV
scale factor ¼ R=4 distance 18'10"
with black baffle box D^2WR light meter # 113 (G.R.)

-30°	5		1100
-25°	10		14200
-20°	31.5		42500
-15	75		106000
-10	123		175000
-5	138		196000
0	128	132	185000
5	~~135~~	138	196000 × $\left(\frac{18.10}{12}\right)^2$ = 195,000 B.C.P.S.
10	86	95	135000
15	47	50	71000
20	7	20	20 28300
25		7	10000

18.83
353.

D^2WK

Motorola 2N62
RCA 2N404

Nov. 5 1958

long tube scale ½ z distance 15' 10"
200 μfd with block box

			D^2WR
+35°	12	10	500
+30	10		500
+25	10		500
20	17		855
15	36		1810
10	62		3120
5	100		5000
0	140	7040	
-5	130		6530
-10	73		3680
-15	52	2610	
-20	23		1160
-25	10		500
-30	7		350
-35	7		350

$D^2 = 251$

with 600 μfd scale ¼

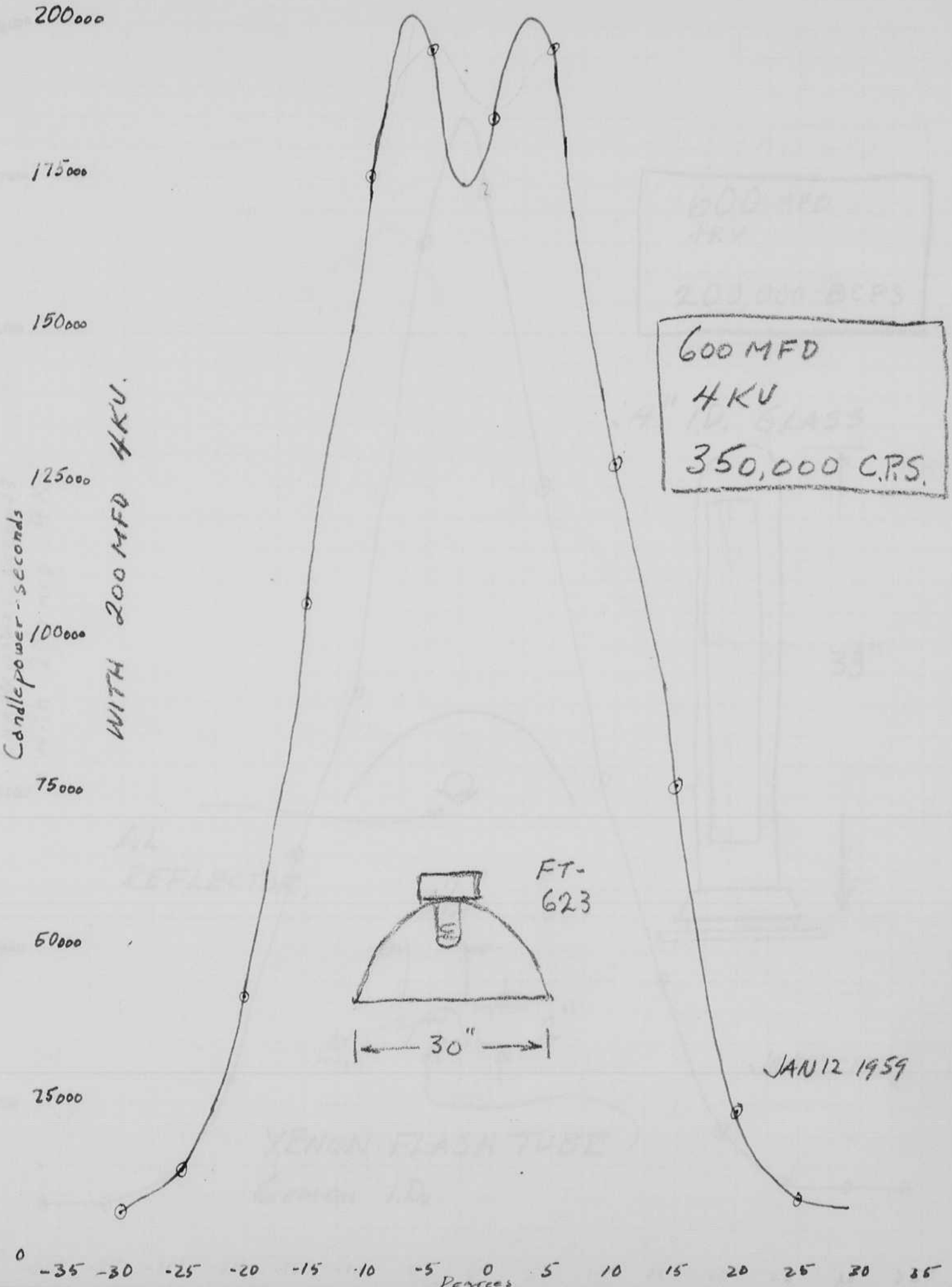
15' 10"

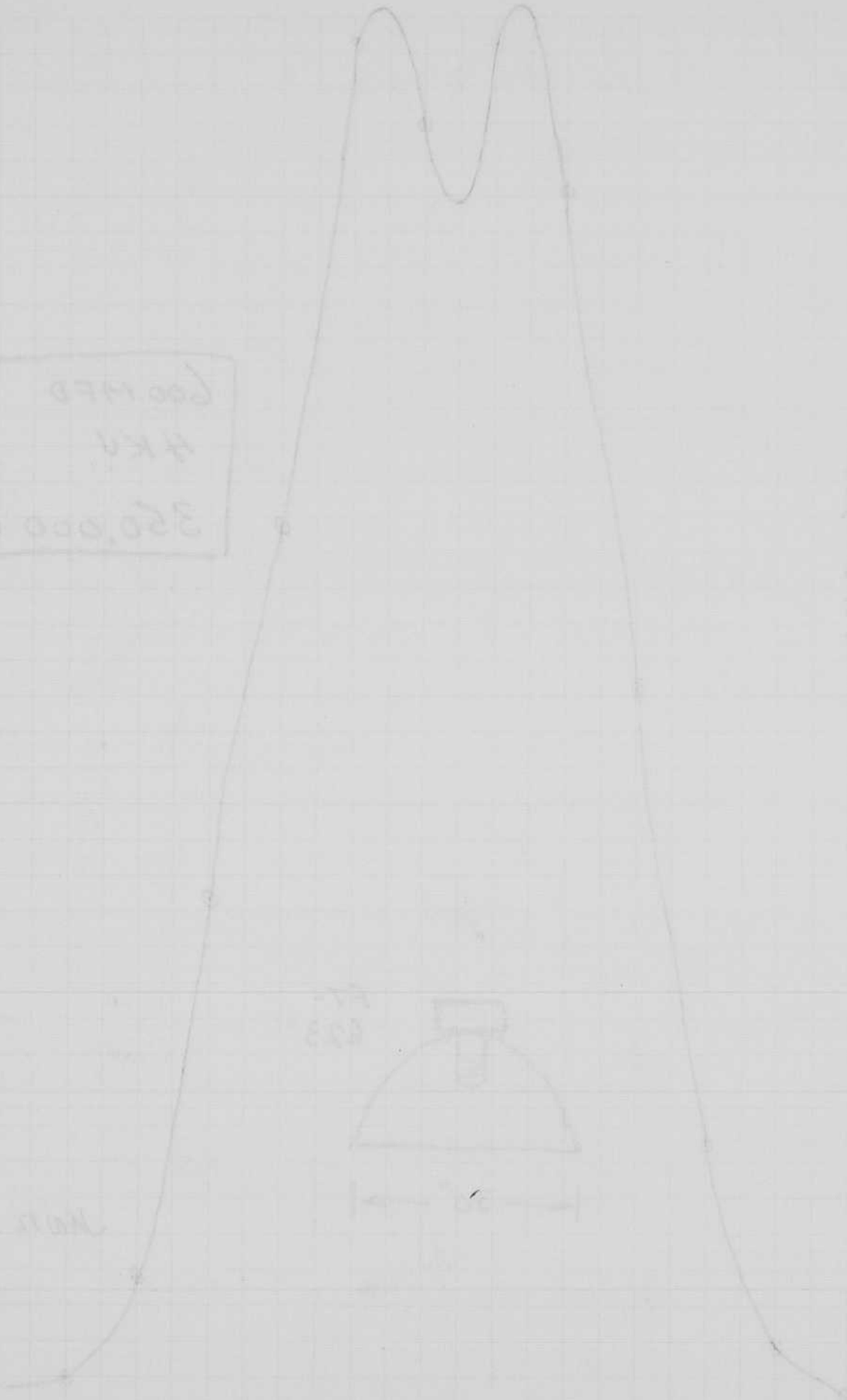
0° 180

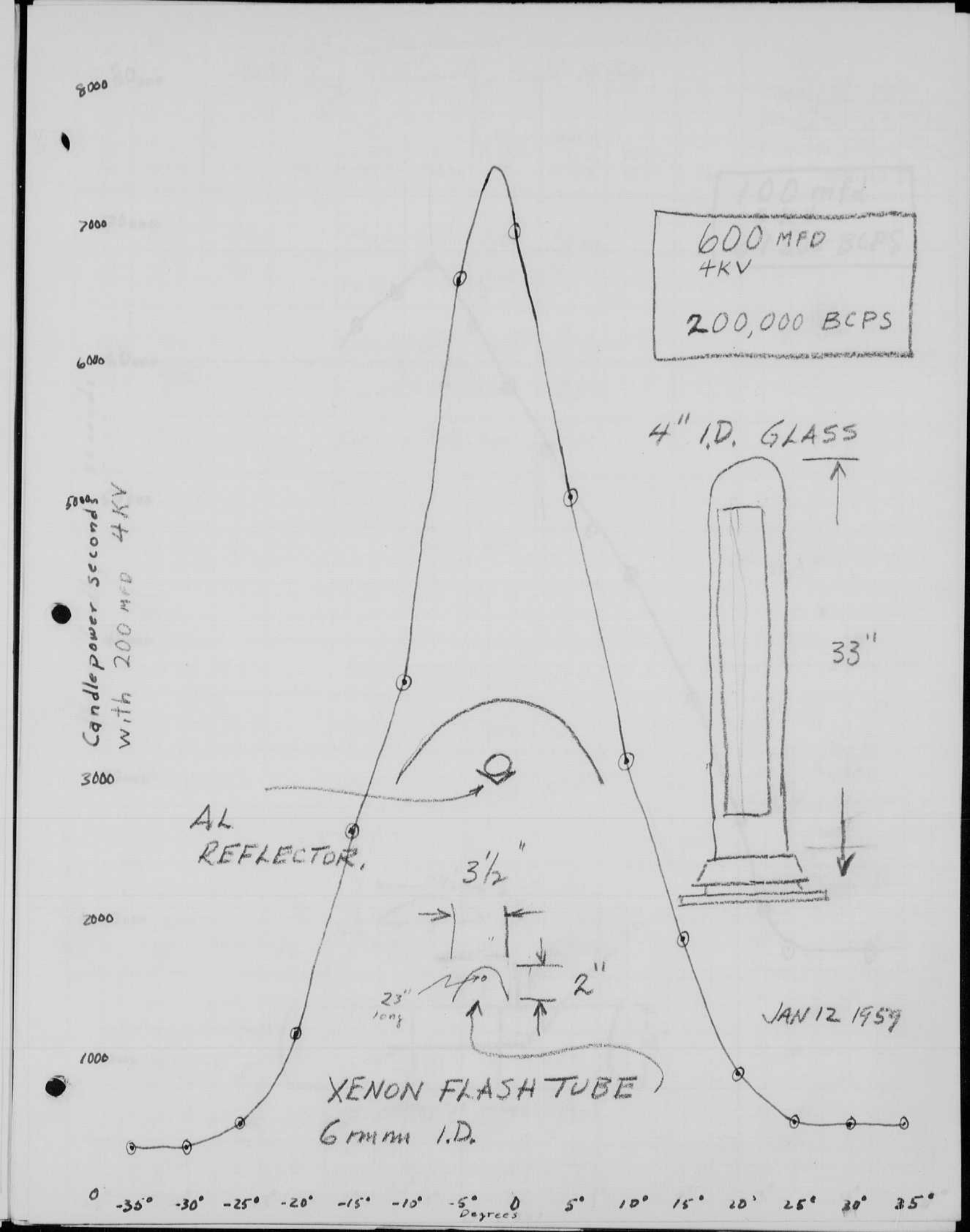
$140 \times 2 \times \frac{(15.83)^2}{250.} = 70,300$ B.C.P.S. / 200 μfd.

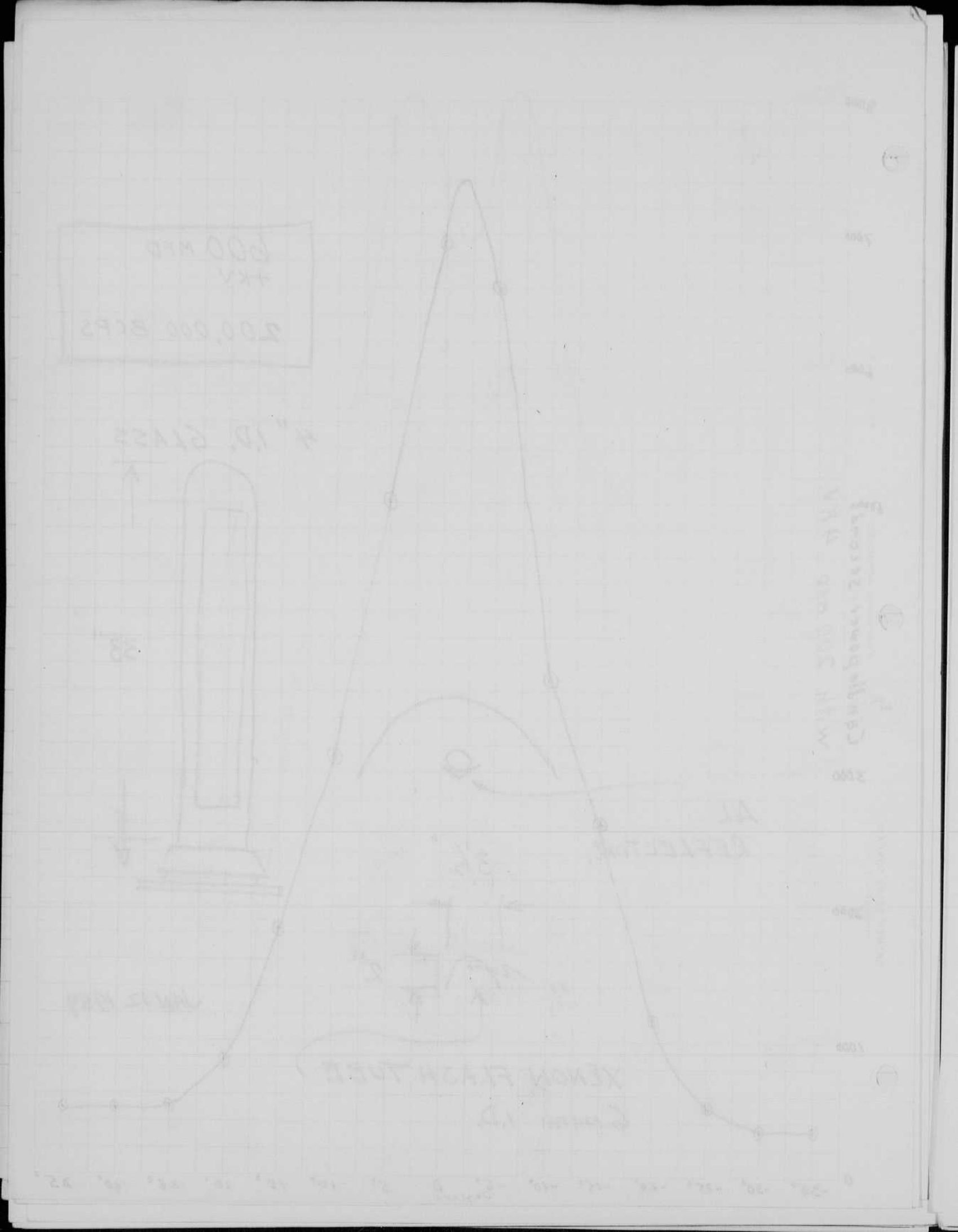
$180 \times 4 \times 250 = 180,000$ B.C.P.S. 600 μfd.

Degrees - -10 -5 20 25 30 35


200000
175000
150000
125000
100000
75000
60000
25000
0
Candlepower-seconds
WITH 200 MFD 4KV.
-35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30 35
Degrees
600 MFD
4 KV
350,000 C.P.S.
FT-623
30"
JAN 12 1959



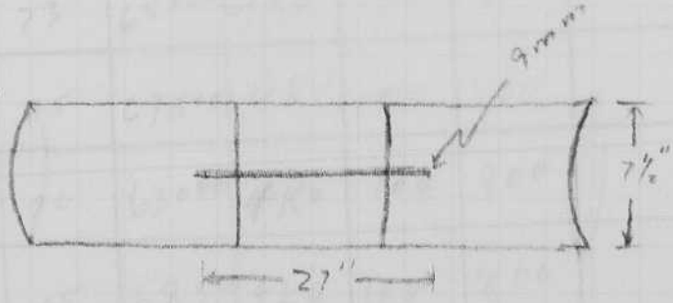

8000
7000
6000
5000
3000
2000
1000
0
Candlepower seconds
with 200 MFD 4 KV
600 MFD
4KV
200,000 BCPS
4" I.D. GLASS
33"
AL
REFLECTOR.
3½"
2"
23"
long
JAN 12 1959
XENON FLASH TUBE
6 mm I.D.
-35° -30° -25° -20° -15° -10° -5° 0 5° 10° 15° 20° 25° 30° 35°
Degrees



100 mfd
4 KV
67500 BCPS

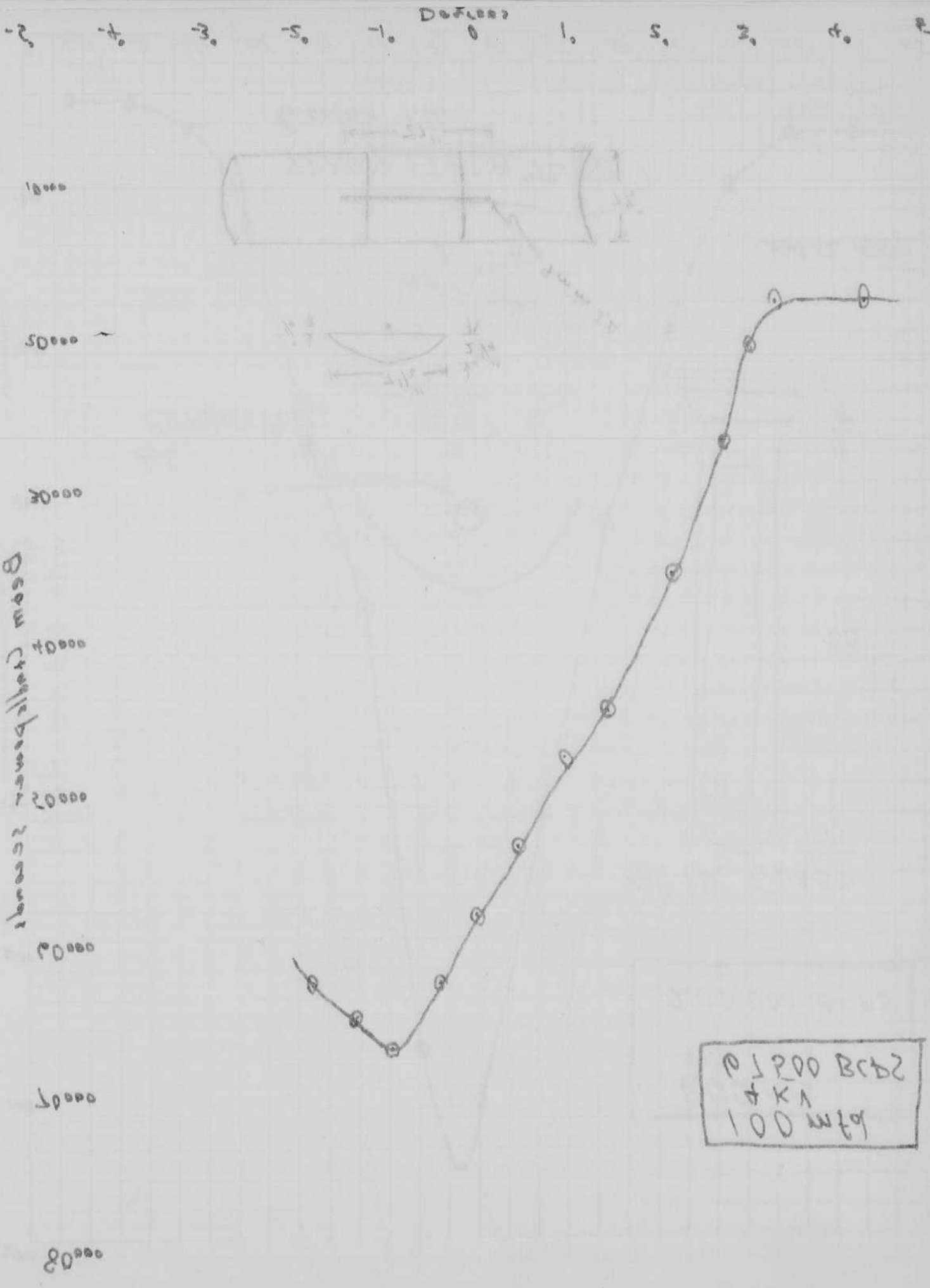
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000

Beam Candlepower seconds



-5° -4° -3° -2° -1° 0 1° 2° 3° 4° 5°

Degrees


Deflection
-2.
-4.
-3.
-5.
-1.
0
1.
5.
2.
4.
3.
10000
50000
30000
40000
20000
50000
70000
80000
Increasing Pressure (psi) Mass
P1P00 BCB2
+K1
100 wtg

623 in Reflector designed in M.I. by Schwartz Oct. 1959.

Place 4-410
Date Jan 12 1959
Observer Shpetner
Remarks B.J

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	
1	145	30		130,500	4000	200	1600			Lamp #1 misses
1	150	30		131400	4000	200	1600			" "
4	90			324,000	4000	600	4800			Lamp #2 also misses
4	95			342,000	4000	600	4800			
4	90			324,000	4000	600	4800			
2	110	30			4000-	600				long tube operates with trigger tube removed.
1	65	3'		585	2KV	100	200		9mm SD	Black background
4	140	3'		5040	2KV	100	200		"	metal reflector factor 8.6
32	100	3'		28800	4KV	100	800		"	not higher eff at higher voltage
1	70	30'	70	63000	4KV	100	800		9mm 24"	2'6" from floor lamp 3'3" -1.8°
1	73	30'	73	65000	4KV	100	800		"	2'9" -1.43° lamp from "long tube"
1	75	30'	75	67500	4KV	100	800		"	3'0" -.95°
1	70	30'	70	63000	4KV	100	800		"	3'3" -.47°
1	65	30'	65	58500	4KV	100	800		"	3'6" 0°
1	60	30'	60	54000	4KV	100	800		"	3'9" +.47°

Place 4-410
Date 1/20/59
Observer RKJ

R	W Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	53	30'	53	48000	4KV	100	800		9mm 2"	4' +.95°
1	56	30'	50	45000	4KV	100	800		"	4'3" 1.43
1	40	30'	40	36000	4KV	100	800		"	4'6" 1.8
1	35	30'	30	27000	4KV	100	800		"	4'9" 2.4°
1	20	30'	20	18000	4KV	100	800		"	5'7" 3.3°
1	20	30'	20	14000	4KV	100	800		"	5'4" 4.3°

Compare flash tubes at low voltages

Place M.I.T.
Date April 11 55
Observer H.E.E.

R	M Meter	D	WH	WH.D² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks V.E.M J.H.
X1	32	1ft.			2KV	10mfd	20	1.6	FT-43	
"	82	"			"	20	40	2.05	"	
"	10	"			1KV	20	10	1.0	"	
"	35	"			1500	20	22.5	1.55	"	
"	15	"			1KV	20	10	1.5	FT-506	
"	42	"			1500	20	22.5	1.87	"	
"	96	"			2000	20	40	2.4	"	
"	20				1000	20	10	2.0	FT-509	
"	60				1500	20	22.5	2.67	"	
"	120				2000	20	40	3.0	"	
"	79				2000	20	40	2.0	FT-517	

Divide by 400/W to get lumens/sq ft. 48/sec Strobe

FT-29

Place 4-410

Date May 22 1959

Observer H E Edgerton

R	2R 118 W Meter	D ft.	Lumens WH	WH²D² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	40	1.5	10	22.5	1500	8	9	2.5		FT-29.
1	110	1.5			1000.	"				
1	22				2000	"				
1	14				2500					
1	9.5				3000					
1	48	1.5			1000	16				
1	15	1.5	22.2	50	1500	16	18	2.75		
1	10	1.5			2000	16.				
	2R. meter 206									
1	25	1.5		56.2	1500	16.	18	3.1		
	11	1.5		24.8	1500	8	9.	2.75		
	19	1.5			2000	8				
	30	1.5			2500	8				
	45	1.5			3000	8				
	10	1.5			1000	16				
	24				1500	16				
	45				2000	16				
	37 x 2 74	1.5			2500	16				
	50 x 2 100	1.5			3000	16.				

FT-29

Tube #2

Place 4-40
Date May 22 1959
Observer [illegible]

R	W Meter	D	WR	WKD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
	24	1.5			1500	16				made by Tuttle. EG&G.
	12	1.5			1500	8.				
	7, 8, 9, 10 all show the same output as above.									

Place 4-405

Date July 13 1909

Observer [illegible]

R	W Meter	D	WR	MKH^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP^2/2	Effy. CP/W	Lamp	Remarks
4	40	4'	160	112	400	.5			3210	Flickering [illegible]

G.R. 50 Watt

FT-417 flashtube at low energies

Place M.I.T.
Date July 17, 58
Observer E. Mack

R	W Meter	D	WSD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
X1	7	6"	.22	3000	0.1				Duration
"	12		.446	3500	"				8 to 10 μsec
"	22		.688	4000	"				
"	25		.782	4300	"				
X2	37		2.31	4300	0.2				
X2	30		1.88	4000	"	1.6	1.29		92 μsec.
X2	17		1.06	3500	"				
X2	10		.625	3000	"				
X2	18		1.13	3000	0.3				
X2	32		2.0	3500	"				
X2	50		3.12	4000	"	2.4	1.3		
X4	25		3.12	4300	"				

Light attenuator reduces reading on meter increases sensitivity of meter by 8.

CA8 no 0.

4-405

Place

Date Aug 8 1959

Observer H. Edgerton
Sam Ragsdale

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP^2/2	Effy. CP/W	Lamp	Remarks
1	40	3'	40	360	900 v	525 x 2			FT-218	no reflector not sync.

Bausch & Lomb.
525 x 2 mfd. Fx-21 lamp
As returned from Rochester.

4-405
Place
Date Aug 8 1959
Observer Edgerton

R	W Meter	D	WR	WP^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP^2/2	Effy. CP/W	Lamp	Remarks
1	18 19	15"	18	~~18~~ 25 28.	400	525.			Fx-21	10% Res Setting 10%
1	26 27	15"	26	~~26~~ 41 41	"	"				15% 15%
1 1	42 42	15"	42	~~42~~ 65 65	"	"				25 25
2	23 24	~~46~~ 15"	46. 48	~~46~~ 72 ~~48~~ 75						25% 25%
2	43	15" ~~86~~		86						50
4	44	15" ~~196~~		~~176~~ 275						100
				WITHOUT MERCURY ARC TUBE.						
1	22	1		~~22~~ 34.						10%
1	30			~~30~~ 47						15
1	46			~~46~~ 72						25
2	26			~~52~~ 81						
2	51			102 160						50 Some misses!
4	49	196		~~196~~ 305.						100
1	19			19 30.						10%
		15 sec 10 5	40 35 26	25%						

XFX-29

GR. #113

Place M.I.T.
Date Aug. 17 '55
Observer J. E. M.

R	W Meter	D	WR	WR^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CM^2/2	Effy. CP/W	Lamp	Remarks
X1	12	3ft		108	4000	6	48	2.25	Vacuum	2-Tube self flash.
"	24			216		12	96	2.25	Not too clean.	
"						25	200			Blew up when it self flashed at 4050 V.

Bruce & Towle.
525 x 2 mfd FX-21

Place 4-405
Date Aug 23. 1927
Observer Edgerton

R	W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
meter #306 2.2.										
1	27	1'		27	450	1050			FX21.	10%
	32			32						20
2	32x2			64						25
4	40			160						50
4	60			232						100

no mercury tube.

Spark increased to 0.35 mfd.
1/2" spark.

Lamp bleeds up!! another lamp with miss

				54						18%
				88						15%
				128						25%
				256						50%
				432						100%.

FX-29 1½ turn spiral EG&G.
9mm O.D. QUARTZ
6th mm - ?

Place 4-410
Date Nov. 19, 1959.
Observer H. Edgerton

R	W Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
1	112	3			600	1145*			FX-29.	
1	118?	3			750					
1	150?	3			900					meter goes to left on scale.
	meter #306.									
4	51	3	204/4	1836	900	1145*	470		FX29	
4	52	3	208	1872			470		FX29.	
4	10				450	1145*			FT506	G.E. Quartz Spiral
4	58		232/4	2088	900	1145*			"	
4	55				900	1145			"	* plus 100 mfd paper.

Oscillograms.

Place 4-410
Date Nov 18 1959
Observer ~~H.~~ Edgerton

R	W Meter	D	WR	WR^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE^2/2	Effy. CP/W	Lamp	Remarks
Fx-1 Standard tube 32 mfd paper 1500 volts. Peak assumed to be 2x10^6 h.c.p. peak.										46" to p.c. 10 volts on C.R. 2x10^6 C.P./cm.
	50 μs. 1 cm = 2x10^6 c.p.				1500	32			Fx-1	
	60 μs.		2x10^6 c.p.		1500	32			FT-506	
			1x10^6		900	1145			"	
	1500 μs.		1.2x10^6		900	1145.			"	
	700 μs.		4x10^6		900	1145			Fx-29.	
Roll 1										
~~#1~~	500/cm.		2x10^6/cm.		900	1145			Fx-29	
#2	100/cm		X ~~Gun~~ in front of P.C. !!!							
~~#3~~	100/cm		2x10^6/cm		900	1145				
#4	Blank.									
5	100/cm		~~1~~x10^6 cm.		900	1145			FT-506.	
6	500/cm		1 x10^6		900	1145				
7	"		"		"	"				
8	200/cm		1x10^6		1000 ~~1500~~	100 mfd. 100 mfd.			Double.	
9	200/cm		0.5x10^6		2000	100 "				
					all over exposed.					
Roll 2										
~~1.~~	~~500/cm.~~		~~1x10^6 cm.~~		~~900~~	~~1145~~			~~FT-506~~	
1	10 μs/cm		1x10^6/cm C.P.		1500	32.			FT506	
2	500 μs/cm		1x10^6 C.P./cm		900	1145				
3	10		1x10^6		900	1145				
4	10		1x10^6		900	1145			Fx-29	
5	100		2x10^6		900	1145			Fx-29	
6	500		2x10^6		900	1145				
7	10		2x10^6		1500	32				
8 9 10	10		2x10^6		1500	32				
11	10		2x10^6		2000	10				
12	10		2x10^6		3000	10				

MICROSCOPE ILLUMINATOR LAMP

Place M.I.T.
Date Feb 3 '60
Observer W.E.M.

R	C.R. #113 W Meter	D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
1	45	1/+			880	690/2				1/2" gap tungsten anode 1 Atmos N₂
2	145	"	290		"	"				2" π lamp gap length = 3"
2	130 122		260		"	"				1" π lamp gap length 1½ in'
2	58 60	"	120		"	"				1 3/8" FX-1 type quite dirty
"	30 31	"	60		"	"				1" FX-1 type clean
"		"			"	"				
"	126 124	"			"	"				1" π lamp again
"	21	"			"	"				1/2" gap again
1	39 41	"			"	"				" " "

all tests with 120 μh series inductance

All lamps broadside to meter

Greenewalt Flash Unit
Aluminum Suitcase
3-lamps

Place M.I.T.
Date Mar. 5, 60
Observer F.E.W.
Recorder J.E.E.

R	W Meter	D	WR	WRD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	
X1	180	3ft		1620	2250	14 mfd	88.6		FT220	Duration 50 μsec.

Microscope Illuminator

E.B.B.S. LS-15-P3 S.N. 8

Place M.I.T.
Date Oct 31 22
Observer L.E.W.

R	W Meter	D	WR	MFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Remarks
X1		1.5ft			875	320	122			Bare lamp 1½ ft. above lamp house.
						(edd/2)				
	143			322				2.7		100% Xenon light setting
	74			167						50%
	41			92						25%

Microscope lamp LS-15-P3 serial 8

Place Nov 2, '60
Date M.I.T.
Observer V. E. Noll

R	W Meter	D	WR	WFT^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CM^2/2	Effy. CP/W	Lamp	Remarks
X1	#113	1.5ft								
	141			317	880	320	124	2.56	Setting 100%	Bare FX-33 outside of lamphouse
	72			162		$(\frac{640}{7})$			50%	
	39			88					25%	
	170			383					100%	FX-33 in glass tube with close fitting ½ mm al. reflector 1 3/8" long.
	95			270					50%	
	53			119					25%	
					117 volts input					

Microscope Illuminator #113

LS-1 SP3 Serial No. 8

117 watt input

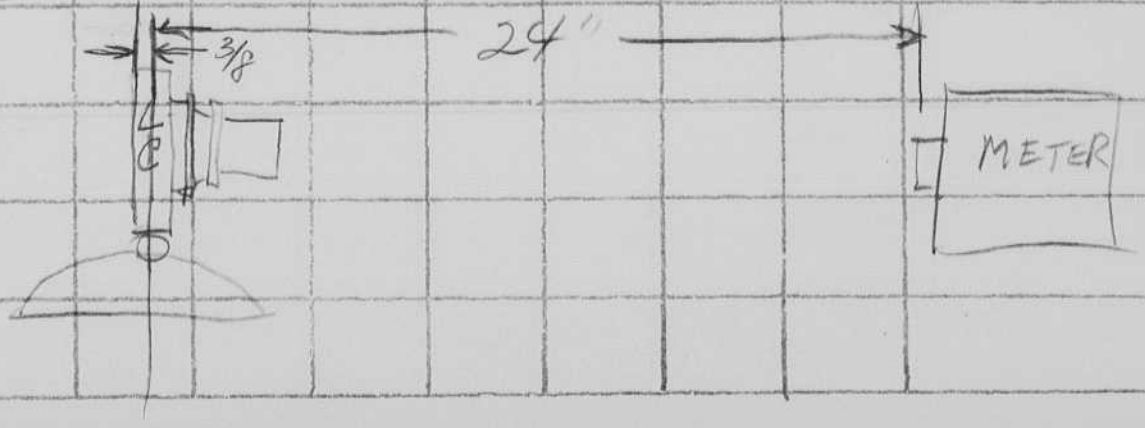
FX-33 on Ft. meter diffuser

Place M.I.T.

Date Nov 2, 60

Observer W. E. M.

R	W Meter	D	WR	LIGHT BCPS	E Volts	C Cp. (MFD)	Energy W.s. $CP^2/2$	Effy. CP/W	Lamp	Remarks
X4		2 ft.			870	320	121		Xenon flashing	FX-33 lamp mounted in A.O. #135 ill.
X4	168	672			watts	(640/2)			100%	
X4	88	352							50%	Arc on descent lamp focussed to a line centered on light meter diffuser. Lens bag roll projects 15/16 in.
X4	47	188							25%	
X4	81	324							25%	Focussed for Optimum light Xenon
X4	150	600							50%	meter diffuser Lens bag roll
X8	78	624							50%	projects 1 1/8 in.
X8	145	1160							100%	



2.8×10^6 A.C.P. / mth

$\frac{317}{2.8 \times 10^6}$ B.E.P.S.

$\frac{317}{2.8 \times 10^6} = \frac{5580}{x}$

$317 = \frac{2.8 \times 10^6 \times 5580}{317}$

$= 49.3 \times 10^6$

Microscope Illuminator LS-15-P3 Ser No 8

Place M.I.T.
Date Nov 2, 60
Observer [illegible]

R	#113 W Meter	Distance from lamp center to diffuser D	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
		1 ft.			8 KV.	320	121		Setting	
X8	145		1160			(640/2)			25%	Tungsten lamp focussed on diffuser. Lens barrel projects about 1 1/4"
										Xe flash covers about 2/3 width of diffuser.
X8	185	1 ft.	1480					Image about 1/2" x 2"	25%	Focussed for max. Xenon light on diffuser. Lens barrel projects 1 3/8"
		Believe this O.K. because of 3/8" hole in cal. disc under diffuser.								
X8	92	1 ft	735						25%	Lens barrel all the way out.
X8	15	"	120						25%	Lens barrel all the way in.
X8	190	1 ft	1520						25%	Focussed for max Xe light. Lens 1 3/4 out.
X32	47	"	1500						25%	
X32	90		2880						50%	
X32	174		5580						100%	

Microscope Illuminator LS-45-P3 Serial No 8

Place M.I.T.
Date Nov 2, 60
Observer [illegible]

R	#113 W Meter	Distance Xe flash to diffuser	WR	WR² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CE²/2	Effy. CP/W	Lamp	Remarks
		1 ft.			870V.	320	121		setting	
X8	145		1160			(640/2)			25%	Tungsten lamp focussed on diffuser Lens barrel projects about 1 1/4" Xe flash covers about 2/3 width of diffuser.
X8	185	1 ft.	1480					Image of about 1/2" x 2"	25%	Focussed for max. Xenon light on diffuser lens barrell projects 1 3/8"
		Believe this O.K. because of 3/8" hole in cal. disc under diffuser.								
X8	92	1 ft	735						25%	lens barrell all the way out
X8	15	"	120						25%	lens barrell all the way in
X8	190	1 ft	1520						25%	Focussed for max Xe light. lens 1 3/4 out.
X32	47	"	1500						25%	
X32	90		2880						50%	
X32	174		5580						100%	

Place Y-405
Date 18 FEB 60
Observer S. BENTON

R	W Meter	D	WR	WRP² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	T Peak light	Remarks
1	13	1	→	13	500	50.3	6.33	2.05	LASER OLD	~~500~~ 60	2×10⁵
1	20	1	→	20	600	50.3	9.11	2.2		~~60~~	3×10⁵
1	28	1	→	28	700	50.3	12.4	2.26		~~60~~	5.6×10⁵
1	42	1	→	42	800	50.3	16.2	2.59		~~60~~	8 ×10⁵
1	53 55	1	→	54	900	50.3	20.5	2.64		~~60~~	1.3×10⁶
1	67 68	1	→	67	~~1000~~	50.3	25.3	2.64		50	1.75 ×10⁶
1	26	1	→	26	500	4.96 99.73	12.39	2.10		~~110~~ ~~2.3~~ 102	2.6×10⁵
1	43 44	1	→	43	600	99.73	17.81	2.45		90 ~~120~~	4.6
1	65	1	→	65	700	99.73	24.26	2.69		80	~~8.3~~ 8. ×10⁵
1	91	1	→	91	90	99.73	31.6	2.88		75	1.25 ×10⁶
1	118	1	→	118	900	99.73	40.2	2.92		75	1.8 ×10⁶
1	145	1	→	145	1000	99.73	44.7	2.92		~~50~~	2.5 ×10⁶
1	~~22~~ 28	1	→	28	500	99.73	12.39	2.26	LASER NOW	90	~~3.0~~ ~~3.0~~
1	43	1	→	43	60	99.73	17.81	2.45		~~75~~ ~~80~~	6.
1	68	1	→	68	700	99.73	24.26	2.8		90	8 ×10⁵
1	93	1	→	93	800	99.73	31.6	2.94		75	1.25 ×10⁵
1	114 100	1	→	114	700	99.73	40.2	2.84		75	17.5 ×10⁵
1	145	1	→	145		99.73	49.3	2.92		50	2.5 ×10⁶

Place 9-405
Date 8 FEB 60
Observer ~~Berton~~

R	W Meter	D	WR	WFD² LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP²/2	Effy. CP/W	Lamp	Y	Peak Light	Remarks
1	~~288~~ ~~284~~ 74	1		74	405 408 500	605 40 601 301	37.55	1.97	ASR M22	400	~~316~~ ~~305~~ 24	2.11 x 10⁵
	157			157	607	301	54	2.91		420	2	4.2 x 10⁵
2	91			182	700	301	73.5	2.48		380		7.2 x 10⁵
	128			236	800	301	116.1	2.46		250		1.1 x 10⁶
	167			334	900	301	123.5	2.7		210	32	1.6 x 10⁶
4	~~318~~ 315			460	1000	301	150	3.07		~~300~~ 200		2.15 x 10⁶ ~~1.10⁶~~
					500	605 601 498 605 502 >50						
	125			500	600		135	3.7		700		1.05 x 10⁶ 2.1
8	49			792	700		189	4.3		700	53	1.75 x 10⁸

$\frac{25}{200}$

$\frac{25}{23}$
$\frac{75}{50}$

$\frac{200}{5600}$

$\frac{25}{50}$

Most. 50 lumens/sq ft

Tomato case
X-Bird unit - 1955

Place 4-405
Date April 8 1961
Observer Edgerton

R	W Meter	D	WR	WIN^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. CP^2/2	Effy. CP/W	Lamp	Remarks
~~5~~ 8	28	5'	5600		920	$\frac{250}{2}$ x 3.			#1	3 · FX-33 tubes in parallel in same reflector
8	33	5'	6600						#2.	
				Braun Hobby white unit						
2	12	5'	600							
1	23	5'	575.							
2				Heiland	HR-40.					
2	35	5'	1750							

Place__________________

Date__________________

Observer__________________

R	W Meter	D	WR	WRD^2 LIGHT BCPS	E Volts	Cap. (MFD) C	Energy W.s. $CE^2/2$	Effy. CP/W	Lamp	Remarks

CONTINUED
ON
NEXT REEL