HAROLD E. EDGERTON

PAPERS

MC 25

Series III

Laboratory Notebooks

Number 33

Dated Jan. 31, 1978 to Oct. 6, 1981

$3.40

3.60 = 4.533 x
75

COOP COMPUTATION BOOK

152 NUMBERED PAGES / 11¾ x 9⅜ INCHES

NAME	NUMBER
STROBE LAB HAROLD EDGERTON MIT 4-405	33

Course.....

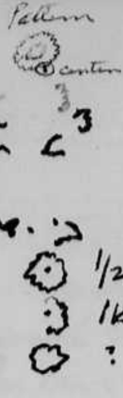
Used from JAN 31 19 78, to OCT 6 19 81

HARVARD COOPERATIVE SOCIETY
1400 MASS. AVE., CAMBRIDGE, MASS. 02138

TECH. COOP
84 MASS. AVE. CAMBRIDGE, MASS. 02139

Feb 2 1978 9:15
May 16 78 7:30 am
July 25 78 am 3
July 27 78 am C

Nov. 27 79 am.
AUNE 19 1980 1/2 HR
" " " 1 HR LATER
Sept ?. 1981 ?



Harold E. Edgerton.
M.I.T. 4-405
Cambridge Mass
02139

MIT 617 ~~864~~ 253-4629. 494-8783
Home 617-494-8783. private line outside at M.I.T.

Home 100 Mem Drive
Apt 11-7A.
Cambridge Mass 02142
(617) 864-4790.

TITANIC p28 Location.
Britannic Wreck KEA Island Greece
37° 42' 5" N 24° 17' 2" E. 115 M deep

Laser Induced discharge phenomena RAIZER Book.
Consultants bureau N.Y.-& London.

Titanic p28 Tribe-Moran 267.5362.

H. Birdseye. ann McNeill cardness Harrington 259-8032 Home 259-5507 office.
Power Road Lexington mass.

Adolf. Vancourt shutter p79.

HAROLD E. EDGERTON

PAPERS

MC 25

Series III

Laboratory Notebooks

Number 33

Dated Jan. 31, 1978 to Oct. 6, 1981

Notebook # 33

Filming and Separation Record

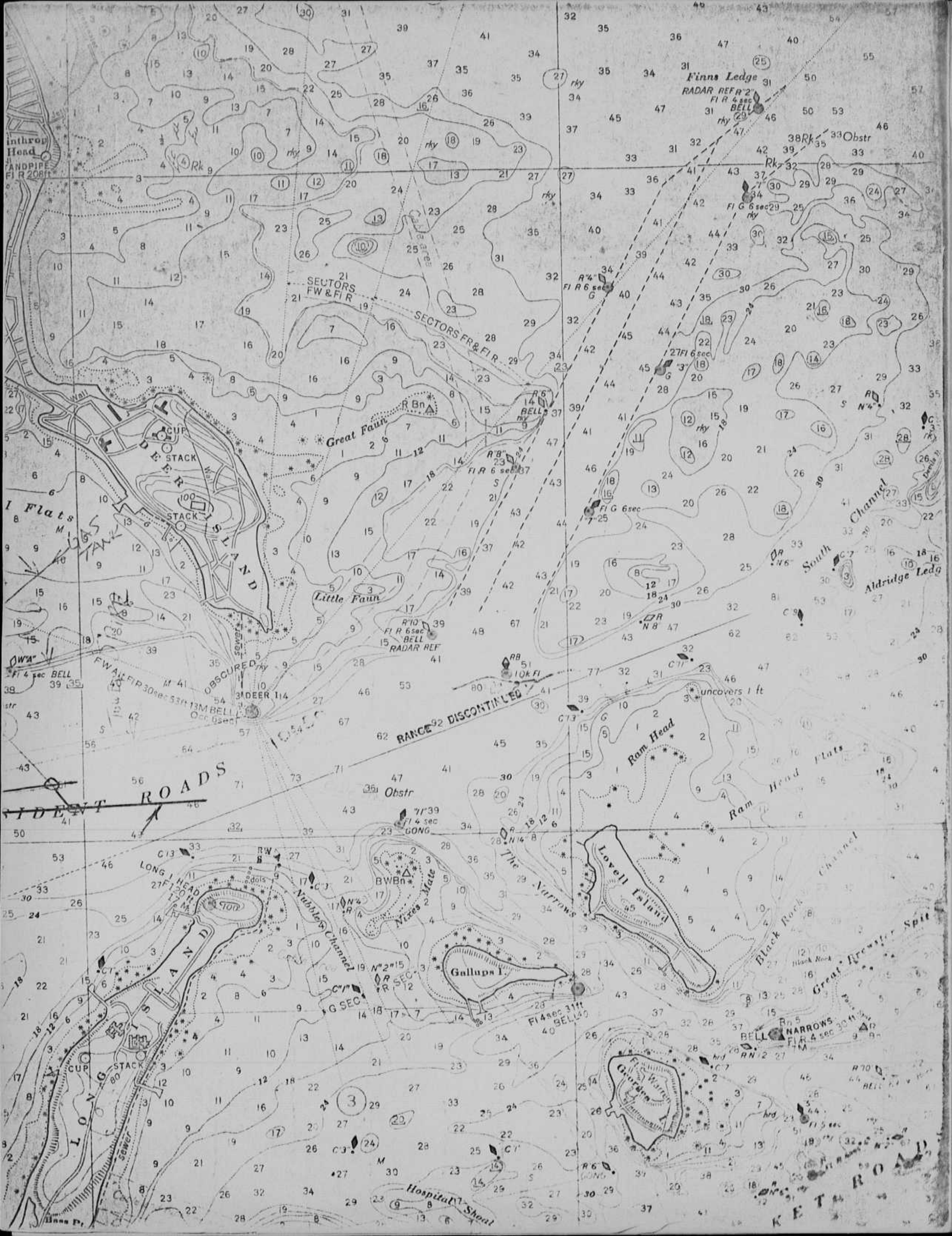
___ unmounted photograph(s)

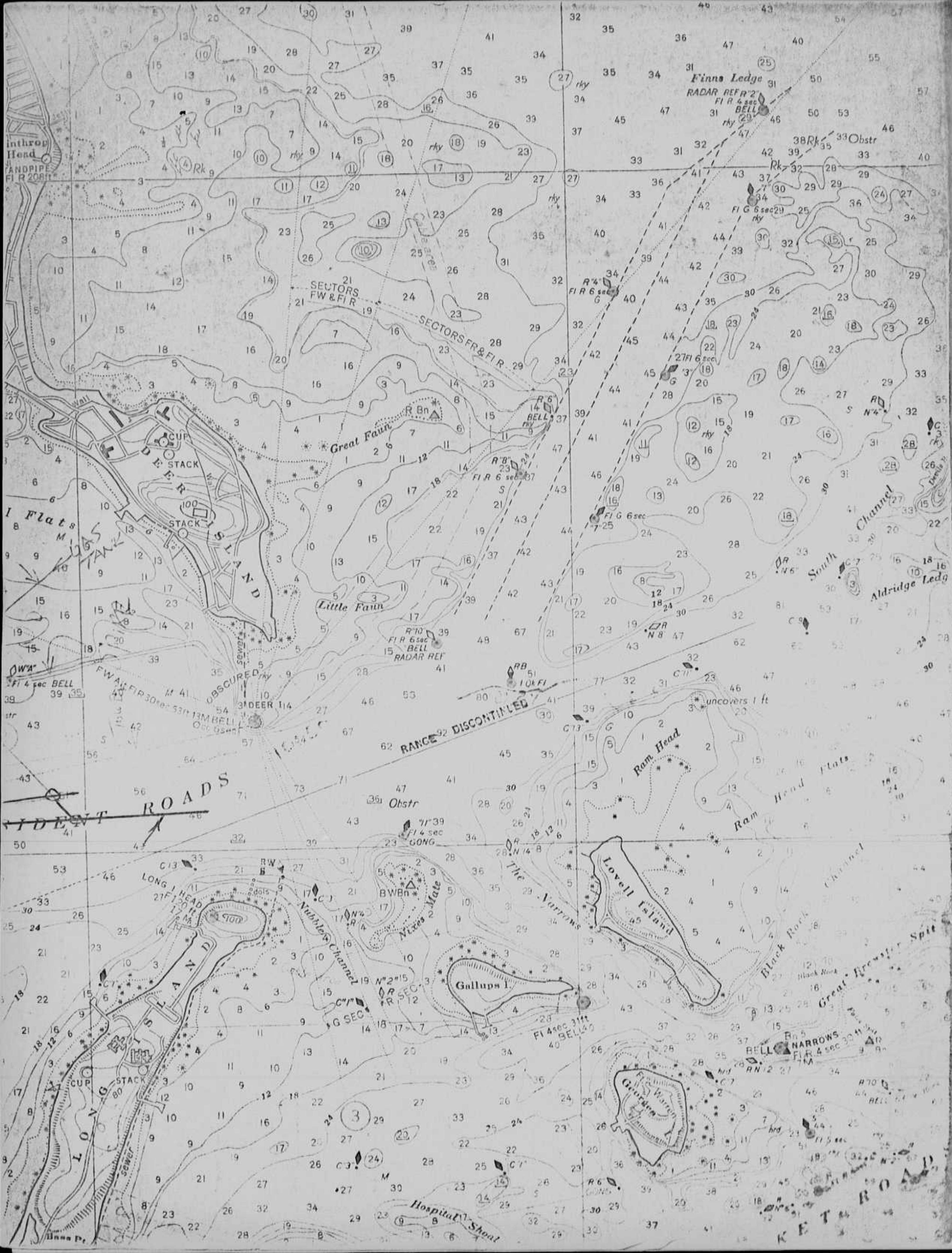
1 negative strip(s)

3 unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page ____ and ____.
inside front cover

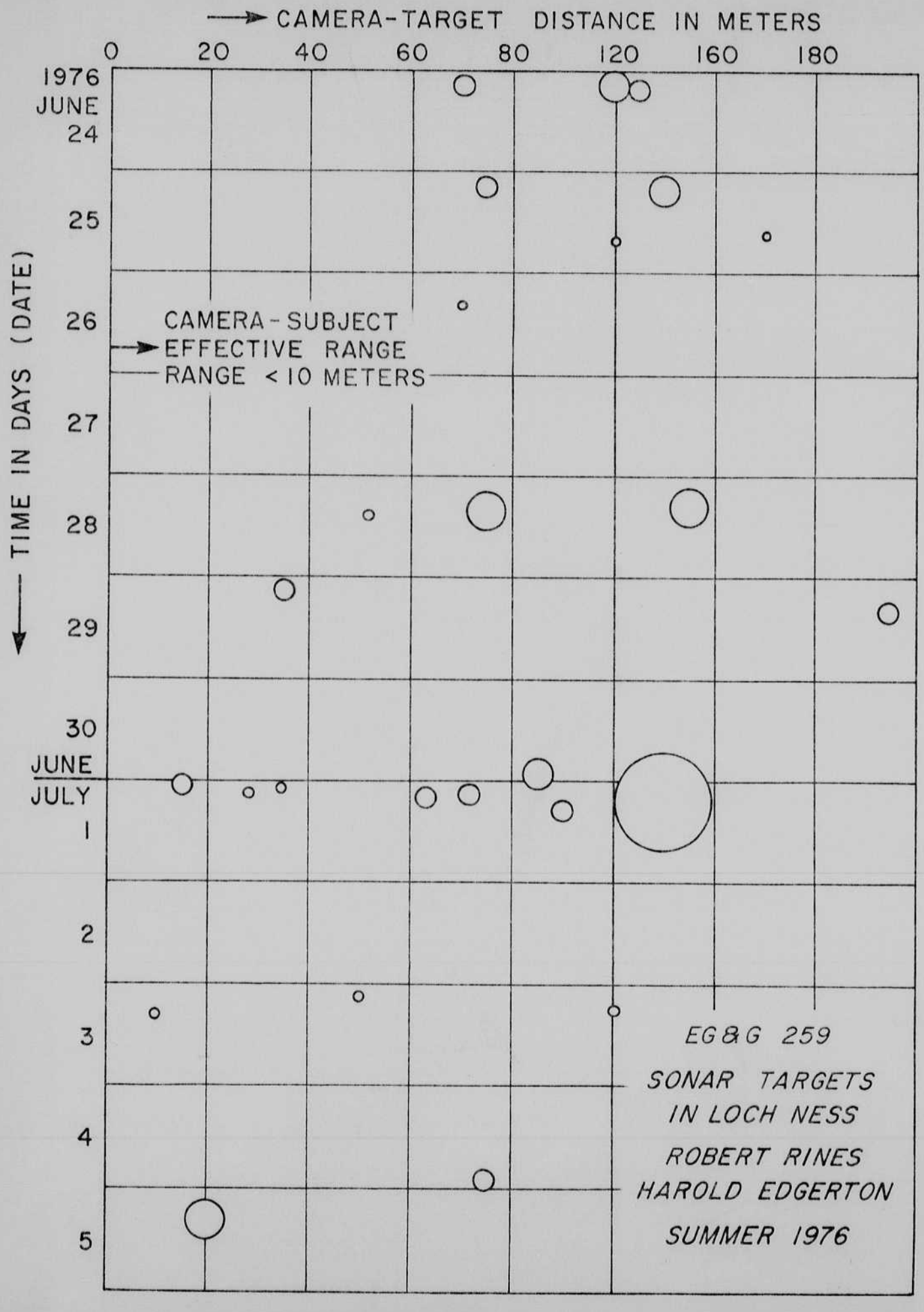
Item(s) now housed in accompanying folder.

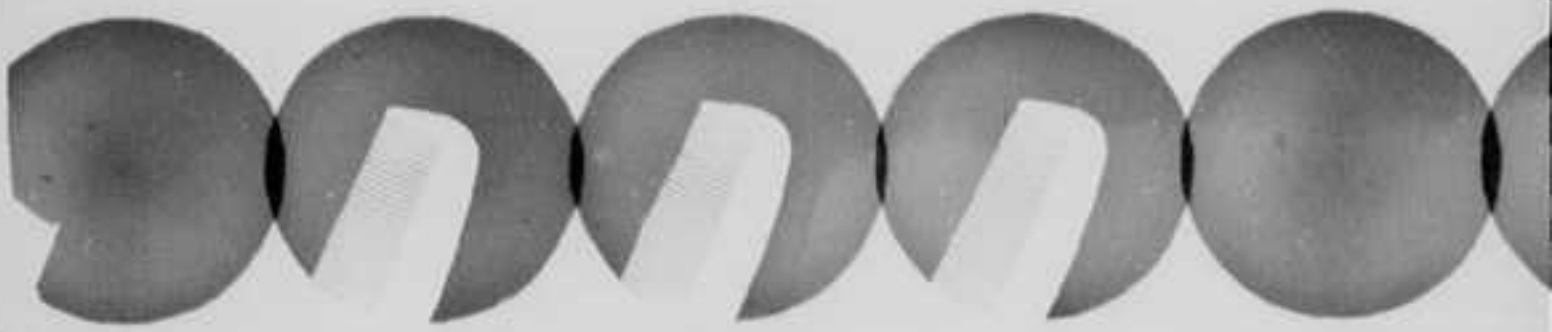

Finns Ledge
RADAR REF
BELL
Winthrop Head
STANDPIPE
SECTORS FW & Fl R
SECTORS FR & Fl R
Great Faun
R Bn
DEER ISLAND
STACK
CUP
Little Faun
RADAR REF
OBSCURED
DEER I.
RANGE DISCONTINUED
ROADS
Obstr
South Channel
Aldridge Ledge
Ram Head
Ram Head Flats
uncovers 1 ft
GONG
LONG I HEAD
Nubble Channel
BWBn
Nixes Mate
The Narrows
Lovell Island
Black Rock Channel
Great Brewster Spit
Gallups I.
G SEC
R SEC
LONG ISLAND
STACK
CUP
Georges I.
NARROWS
BELL
Hospital Shoal
Bass Pt.

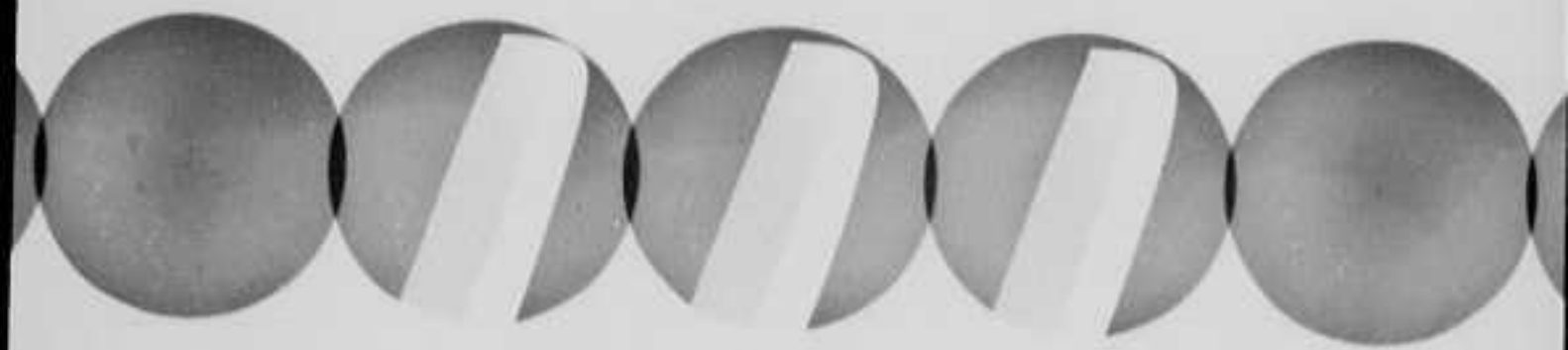


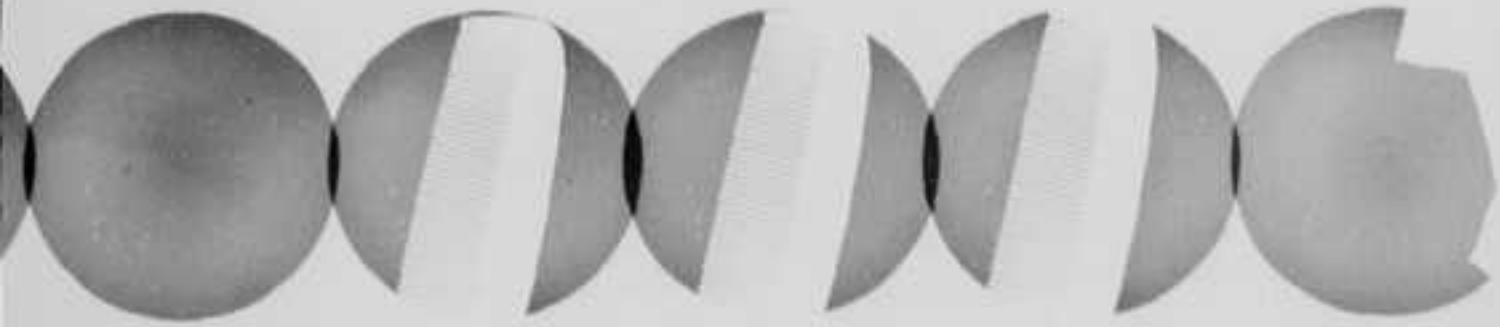
Finns Ledge
RADAR REF R"2"
Fl R 4 sec BELL
Winthrop Head
STANDPIPE Fl R 20
SECTORS FW & Fl R
SECTORS FR & Fl R
R Bn
Great Faun
DEER ISLAND
STACK
CUP
Little Faun
R"10" Fl R 6 sec BELL RADAR REF
OBSCURED
DEER I.
RANGE DISCONTINUED
South Channel
Aldridge Ledge
Ram Head
Ram Head Flats
uncovers 1 ft
ROADS
Obstr
"11" Fl 4 sec GONG
The Narrows
Lovell Island
Black Rock Channel
Great Brewster Spit
Nubble Channel
Nixes Mate
BW Bn
LONG I. HEAD
LONG ISLAND
Gallups I.
Georges I.
Fort Warren
Fl 4 sec 31ft BELL
BELL
NARROWS
Hospital Shoal
Sewer
Bass Pt.

C. & G. S. 246


CAMERA-TARGET DISTANCE IN METERS
0
20
40
60
80
120
160
180
TIME IN DAYS (DATE)
1976
JUNE
24
25
26
27
28
29
30
JUNE
JULY
1
2
3
4
5
CAMERA-SUBJECT
EFFECTIVE RANGE
RANGE < 10 METERS
EG&G 259
SONAR TARGETS
IN LOCH NESS
ROBERT RINES
HAROLD EDGERTON
SUMMER 1976







Jan. 31, 1978 Harold E. Edgerton
M.I.T. - 4-405 STROBE LAB.

The sun will be lined up with the 77 mass ave entrance today at 4:45 pm. If the weather is clear I will take a series of photos of the sun at 5 minute intervals, 1/1000 sec at f8, on plus x film with a D = 2 filter at f 25.

A sequence of photos was made yesterday. There was a cloud at the horizon, or rather just above the horizon.

Feb 2, 1978 Jerry Hall 890-3710 and Menzies came in for lunch. They are with EG&G. At this time they are writing a proposal for some oceanographic task.

A side scan is proposed to take an initial observation of the bottom. Then a towfish DS will help get into the desired area so that photography can be used.

Feb 6, 1978 Monday - Conference with Chas Miller.
Underwater T.V. for quick observation worth when sonar is being performed.

1. High intensity screen since the equipment will be used ~~at~~ in daylight.

2. High sensitivity camera with automatic gain control so that auxillary light is not needed.

3. Operation from a 12 volt battery via rotary converter.

4. A tungsten lamp on the 12 volt battery for illumination if desired for dirty water or great depth.

The cable will be 100 feet for most uses.
A separate cable will be used for the lamps.

Specs will be obtained for standard equipment to do the above.

Esther and I went to Wash D.C., stayed at the Jefferson Hotel on Feb 3 and attended a dinner at the Corcoran Art Gallery where Sam Waxman's photo collection are being exhibited.

M T W Th F
3 4 5 6 7 8 9 10

Feb 10 1978 Friday.
Harold Edgerton

Tumbler. ~~Jatt~~ Holly Greeley, 30/sec.

On Monday Feb 6 the snow started about 4 pm. Bob Rines and Virginia Senter were at our house for dinner. Carol Rines was delayed in N.Y. they left about 7 in Bob's car. The snow was coming down. By Tuesday Feb 7, it was still snowing badly.

Chas Miller and Bill MacRoberts had a time getting home on Feb 6. It was 8 or 9 pm with heavy traffic and blinding snow.

Some 27" came down with a strong wind and a big tide. All sorts of "records" were made. Some 3000 cars and trucks were stuck on Route 128 and 38.

It is now the 10th and there is a "state of emergency" on. No private cars are allowed on the streets because of the snow-removal problems.

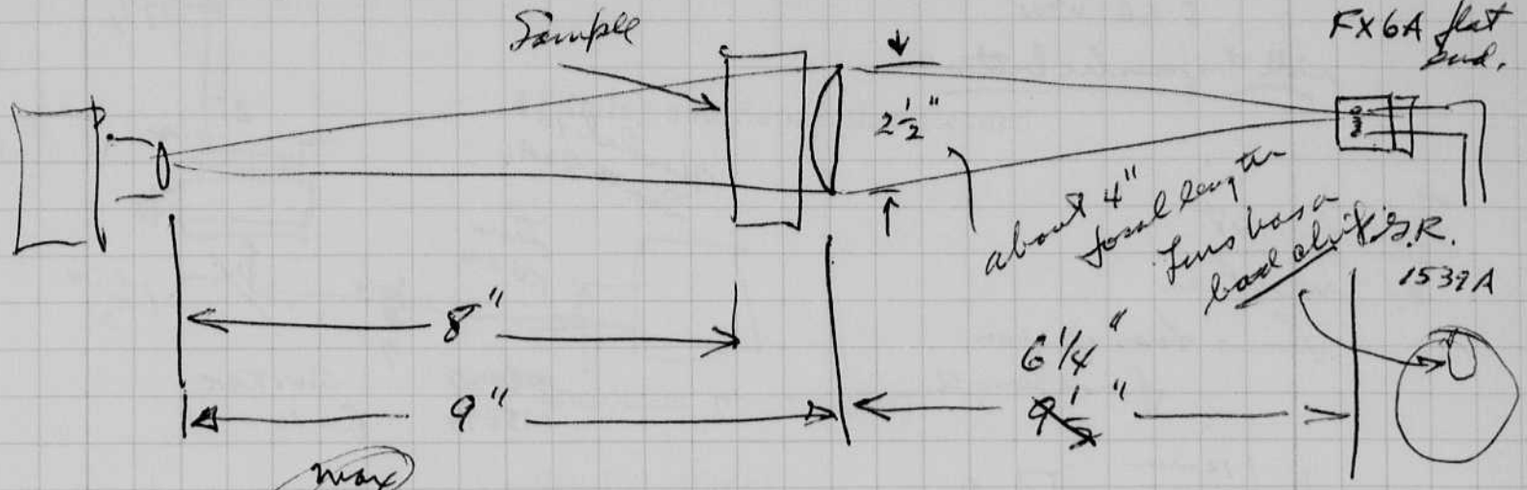
I have been in the lab on the 8, 9, and today working with prints and many projects. It looks like things are not going to be normal for some time.

I go to Washington D.C. on Feb 13 to give a lecture about the finding of the Monitor. Then on the 16 I will be at Raleigh N.C. with Terry Tice to attend a meeting about the Monitor.

Feb 11 1978. Driving ban is still on in eastern Mass due to the storm!

Feb 18 1978 Sat
Harold Edgerton 16mm movies of cells for Prof Bream.

Ilfograin CK 7302 positive was loaded into a 16 mm cassette for the under water elapsed time camera.



12.02 Start. max ITN ITN f1.6 9" focus.
ITN ITN f1.6 9"
1.6 2 2.8 4 5.6 8 11 16 22
6.6 → f22 1111
1.6 ITN
Blank 6. end exposure tests.

Images of the arc is placed on the camera lens.

Dev 1½ min in 1 to 3 Dektol at 72°C.

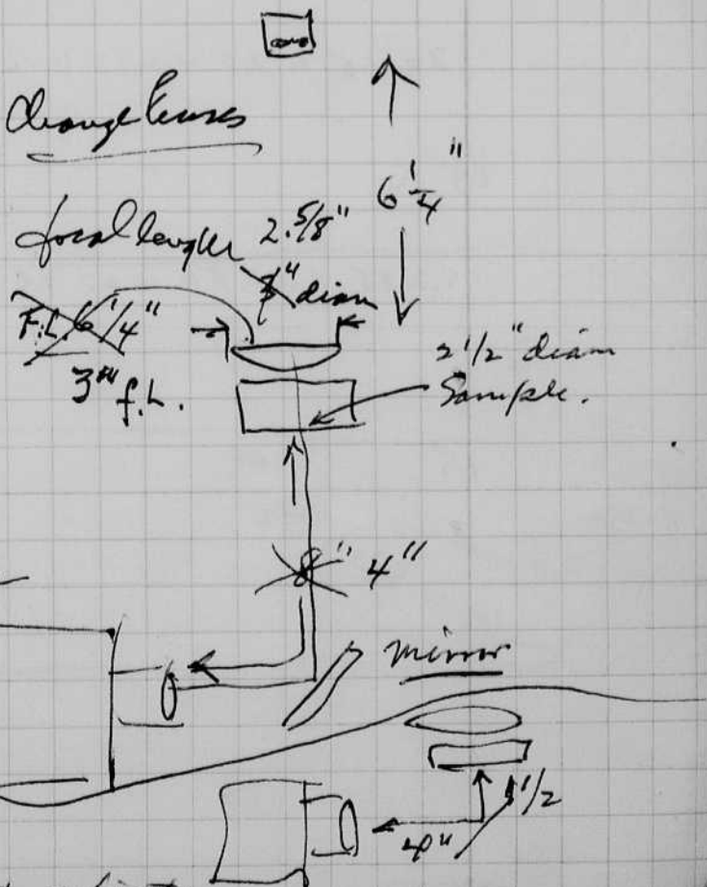
12.35 Comment Exposure at f16 and f22 was about right!
at f1.6 the film was over exposed badly.

Vertical set up next

? Will the focus be ok. with the lens full out and at f22?, I try it..

3.52 pm Start ITN f1.6 (max)
2 2.8 4 5.6 8 11 16 22
f1.6 ITN f16 111
med f.16.
f1.6 111
f 1.6 2. 2.8 4 5.6 8 11 16 22
f1.6
3 Blanks

Orange Lens



III Camera moved away 2" more
(max) f 1.8.
kept 2 2.8 4 5.6 8 11 16 22
f1.6 — Blanks. off.

Observation - All seem out of focus. Lens is too close to subject!

2 Feb 10 1978 Friday.

3 4 5 6 7 8 9 10 M T W T F

Harold Edgerton

Tumbler. Holly Bradley. 30/sec.

On Monday Feb 6 the snow started about 4 pm. Bob Kines and Virginia Dentler were at our house for dinner. Carol Kines was delayed in N.Y. They left about 7 in Bob's car. The snow was coming down. By tuesday the 7, it was still snowing badly.

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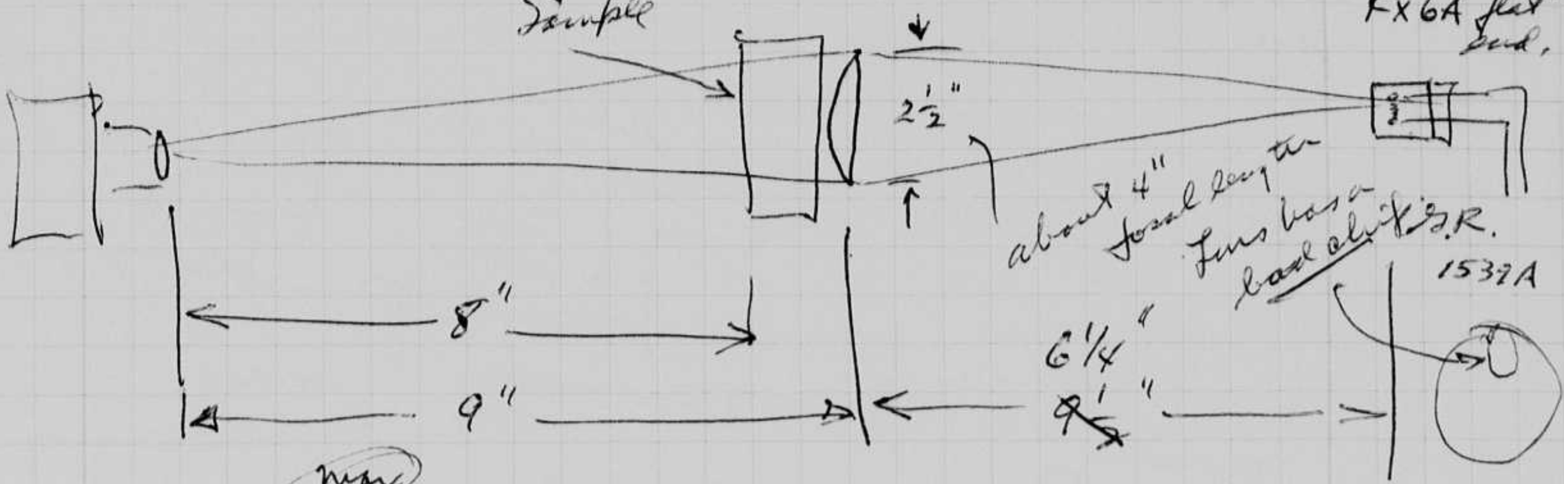
Feb 11 1978. Driving ban is still on in Boston. Mess due to the storm!

Feb 18 1978 Sat
Harold Edgerton

16 mm movies of cells for Prof Green.

Finegrain EK 7302 positive was loaded into a 16 mm cassette for the under water elapsed time camera.



(max)

12.02 Start. 𝍸𝍸 𝍸𝍸 f1.6 9" focus
𝍸𝍸 𝍸𝍸 f1.6 9"
1.6 2 2.8 4 5.6 8 11 16 22
I 1.6 ⟶ f22 ||||
1.6 𝍸𝍸
Blank 6. end exposure tests.

Image of the arc is placed on the camera lens.

Dev 1½ min in 1 to 3 dektol. at 72°c.

1235 Comment Exposure at f16 and f22 was about right!
at f1.6 the film was over-exposed badly.

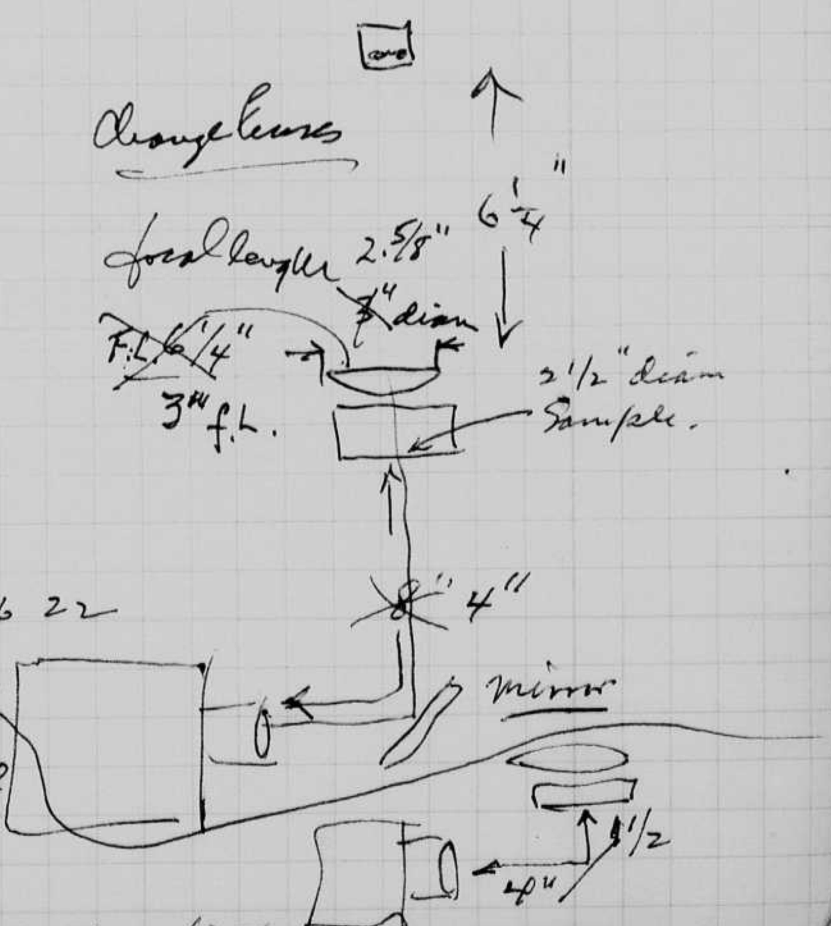
Vertical set up next

? Will the focus be ok. with the lens full out and at f22?

Try it..

(max)

3.52 pm Start 𝍸𝍸 f1.6
2 2.8 4 5.6 8 11 16 22
f1.6 𝍸𝍸 f16 |||
med f.16.
f 1.6 |||
f 1.6 2. 2.8 4 5.6 8 11 16 22
f 1.6

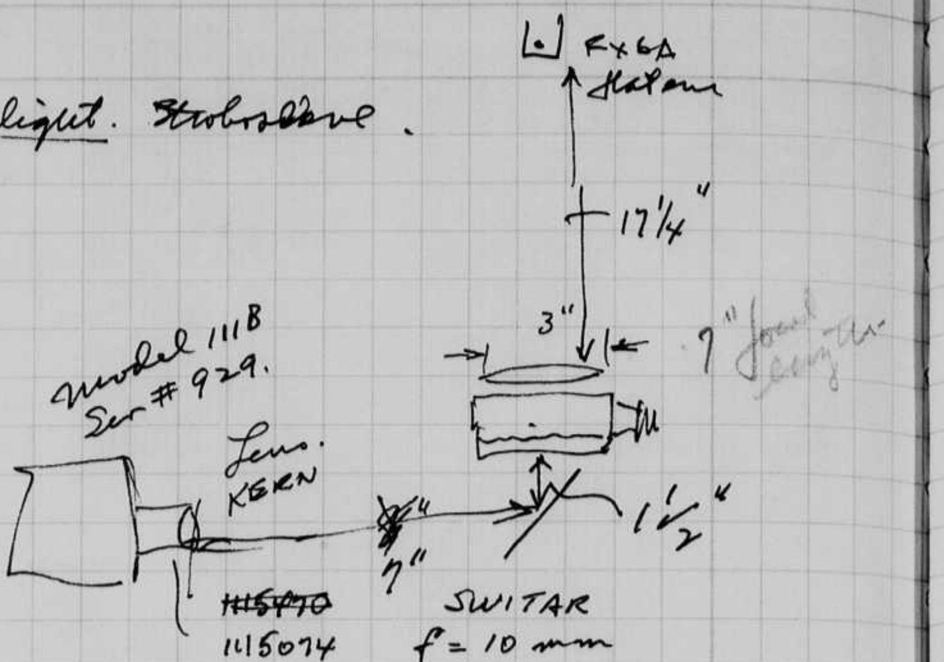


3 Blanks

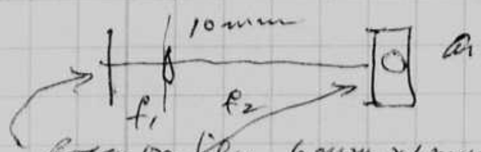
III camera moved away 2" more
(max) f 1.6.
light. 2 2.8 4 5.6 8 11 16 22
f1.6 — Blanks. off.

Observation – All seem out of focus. Lens is too close to subject!

4:32 Loaded with 7302
TXX: f 1.6 max light. Strobe above.
f 2 2.8 4 5.6 11 16 22
f 1.6 TXX
will the focus be better?



Feb. 20 1978
H. E. Edgerton
Lens has 10 mm focal length.



area on film 6 mm x 6 mm
area on subject = 6 x 6 cm

Simple lens calc. Do these apply for the Switar lens?

$\frac{f_2}{f_1} = 10$

$\frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{F}$

$\frac{f_2}{f_1} + 1 = \frac{f_2}{F}$ $1 + \frac{f_1}{f_2} = \frac{f_1}{F}$ $f_1 = F\left(1 + \frac{f_1}{f_2}\right) = F\left(1 + \frac{1}{10}\right) = 1.1F$
$= 11. mm.$

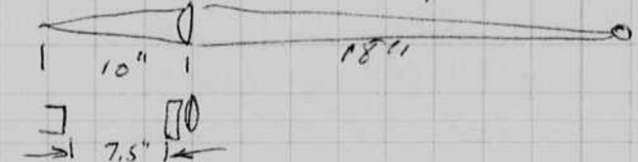
a 1 mm extension is reqd.

$f_2 = F\left(1 + \frac{f_2}{f_1}\right) = 1 + 10 = 11$ cm

Image = ~~2.2~~ 2.2 mm

22 1.5. 2 2.8 4 5.6 8 11 16 22 1.5 1.5 covered. 7.5" to lens front.

IV



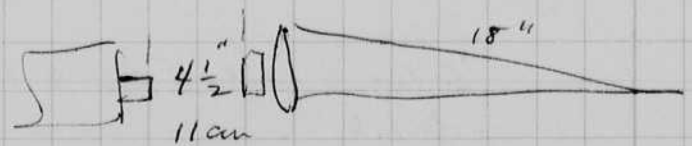
1.5 2 2.8 4 5.6 8 11 16 22 1.5 1.5 Blank

V

1.5 "

Image = 3.4 mm. Filler

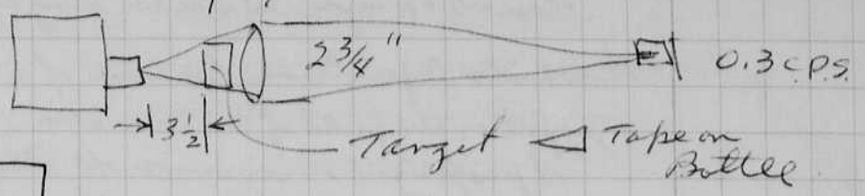
Same in life



VI

Feb. 21, 1978.
Harold Edgerton

Change field lens 3"

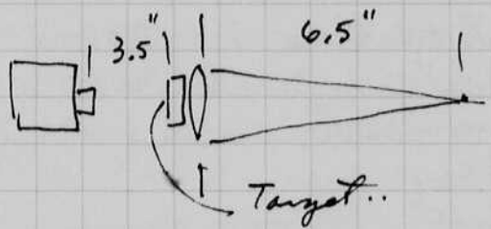


Focus 7302 film.

∞	1.5 ------	22 1.5
8"	1.5 - - -	22 1.5
8" + 1 turn out	1.5 ------	22 1.5
8" + 2 turns out	1.5 ------	22 1.5.
7"		

Experiments for field of view and exposure. VII

Note · The photos taken at the 8" setting were excellent all others were out of focus.
The field was not uniformly illuminated due to the alignment of the illuminating system.
I will now try again with more emphasis on the alignment.



VIII

no subject

8" 22 16 - - - 22 1.5. no subject. alignment poor?

8" Subject 22 - - - - - - 1.5. alignment still N.G.

VIII

The lens (field) is not fully illuminated!
I should try a longer focal length lens?

Another lens has a f.l. of 7" and a diameter of 3.1".

Nov. 13, 1978 More work on the V.W. camera has been done by Mike Roberts. We changed the lens to a Leitz 35mm to get a better picture size. Now a 35mm Hoplins lens is to be tried. It is f 11.

A conference with Rines was held on Sat night Nov 11 in Concord at his home on Spaulding road Dear Rines and Henry Curlis were there. Rines is preparing a report on the 1977 summer expedition where 4 automatic cameras were in use.

A conference is now needed for the 1978 expedition.

Notebook # 33

Filming and Separation Record

____ unmounted photograph(s)

__1__ negative strip(s)

____ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page __4__ and __5__.

Item(s) now housed in accompanying folder.

Mar. 15, 1978
Harold Edgerton

Eye photography - Byron Lichtenberg came in with examples made on Kodachrome 25 and Ektachrome of closeup of eyes. He used a ring light and a side light.

He wants 3 pictures/second of an eye at f11 (min) with the eye filling the field of the camera.

I proposed a microsecond illuminator as a light source. The equipment will be cleaned and a new lamp installed for the first tests. [Comparator - Holtzman Tech Square]

(margin: Bill Hutchinson)

Phone call from Draper lab. Saunders. who was referred to me by Malcome Johnson.

→ He suggested Gordon Hanson
NORD ONR 450 601-688-4825
MISS. 39529.

Fritz Goro 914-238-8788 called N.Y. about a meeting (to be held in N.Y.) about the visit of the 4 of Novosibirsk. I am not going to this meeting.

4 30 pm. I talked to Prof Reiche 253.4451 M.I.T. on leave. Called in Concord. who discussed the Visigothes in Italy.

They captured Rome in 410. then they buried their King in the Busento river in southern Italy in a marble square with his horse and many treasures.

Question can our sonar find this monument? It should be under the river. Most of the rivers in southern Italy are dry most of the time. They carry a lot of sediment when the heavy rains come. Often the rivers move.

Conrad Hartness called about folios. "Seeing the unseen". 401-884-0077 401-884-1450 Secy Providence

Therese Creiger 801 Water St Wellesley Mass 235-9476 2 photos 8x10 color 100

Bill Lane Box 601 Leominster Mass has art gallery.

Mar 16 78. Sam Wagstaff 1 fifth ave 212-477-0523 discussed the Metroy gallery MIT Gallery, photography. Exhibit to open Mar. 21, 1978

Mar 19 1978 Sunday Harold Edgerton

Lecture Fri Mar 17 at the Hopkins center in ~~Dartmouth~~ Hanover for the Montshire Mus of Science, Robert Chaffee curator. I showed slides of the strobe research and a short movie of the elapsed time study of sand dollars and star fish. Esther went with me. We saw many friends from M.I.T. who now live in that area.

March. 24, 1978.

A lecture was given ~~at the~~ for Montshire museum in Hanover on the 17 of march. Bob Chaffee curator. Walter Paine pres.)

on the 21 I went to N.Y. with Gus Kayafas to the opening of the exhibit of my pictures at the NEKRUG Gallery 224 East 68 th.

255 STROBE Life. → We took a millflash 120 cycle unit to mili for his nephew. 26 East 22nd CACHECANI (?). The equipment was tried and found to be ok. However the EG&G 255 unit (253?). did not work with its own oscillator, We took it to

Harry Groskinsky mili's young friend → Life-time Bldg on 50-51. MU3 5256 where mili has an office. After a tour of the place with ~~Bill~~ Geo. Karas, I fixed the EG&G 255 by taking it apart and reassembling. there must have been a faulty switch which cleared after disassembly.

Schneider - camera Repair man at Life

We had a noon luncheon at the P.I.A. (Photo Ind. Assn) at Sardis restaurant. (not mili). 44th west of Broadway.

Dave Eisendrath Harold Bibie Eastman Kodak Photo Contests. 5500 Shows!

Grace ~~Coward~~ (England) her husband has "creative camera"

Casey Allen 451 West end ave N.Y. 10024 "camera mag". N.Y. Uni.

"Art of Focus"

The opening of the exhibit was crowded 244 East 68 st (212) 288-7741-2. I took my single jet water squirter which with a strobe made an interesting display. Many of the visitors had never seen the unit before.

David Eisendrath,

Al Levin NIKON 623 Stewart ave Garden City N.Y. 11530 516 222 0200

Phillip Leonian Butterfly Art 170 Fifth ave 10010 212 989-7670

Casey Allen 451 West end ave New York 10024. (212) 787-5400. N.Y. Uni

April 5 1978

Harold E. Edgerton 100 Memorial Drive apt 11-7A 11-6A Cambridge Mass 02142

I left Tues mar 28 for Detroit, picked up a Hertz car and drove to Lawrence Inst of Tech, where Bob teaches physics. He and I had the afternoon together. Then we had a dinner that Esther sent at Bob's home in Pontiac, 178 Ontario St.

I went to visit the Ford Res and Development Lab on mar 29 early. After a quick arrival I put on a seminar talk about my work with strobe lamps and sonar. I guess that 150 people were there. Afterwards we had lunch with Dave Moyer, Brad Bates, Compton, and others. I saw many parts of the lab after lunch with Bob who came from L.I.T. after his morning class was over.

There was a meeting of the MIT alumni in Detroit that night at which I showed some slides and my elapsed time movie of Bar fish.

The next morning I left at 7:10 for Pittsburgh to visit the Westinghouse co. They showed me a lot of work that was under way. I gave a seminar at 3 pm about my strobe and sonar work. By 10 pm I was home in Cambridge.

After one day at home I took a plane for Norfolk Va. on Friday ~~morning~~ afternoon Mar 31. There was a meeting at the Halliday Inn where Mayor Vincent Thomas, Ed K and John Sears were present. Norfolk has given the workers in that area good salaries. The downtown area has been changed greatly.

The Monitor Foundation has some offices space in the Royster Building County & City Hall area P.O. Box 1861 23501 804 625-1862 phone John Newton in charge. There is a dock about 4 blocks to the south where a museum could be located for the Monitor display.

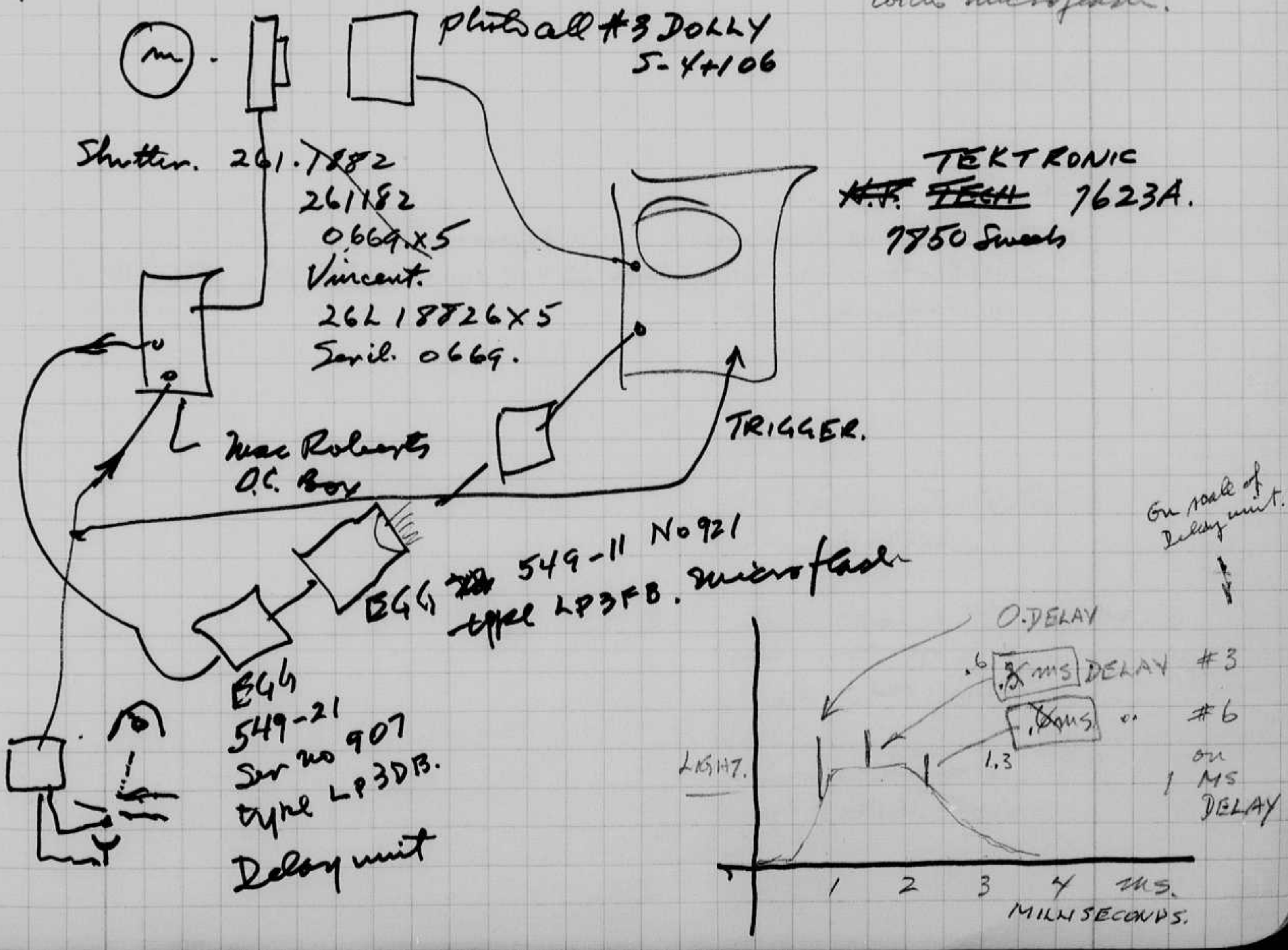
April 8, 1978 Sat. H.E.

I left Norfolk on Sunday April 2 for Raleigh N.C. where I stayed at the Holliday Inn. Bill Dixon met me at the airport. Bob Sheridan, and several others had dinner together and then assembled at the Cultural center of N.C. where Larry Tise and a few others gave talks on "Should the monitor be raised" He made it plain that he was against it. I gathered that this was his main goal in setting up the conference. There was a complete program on Mon. Apr. 3. John Newton talked – so did I. More of the same Monday night and Tues morning.

Jan Key, Maryanne Dixon, Bill Dixon and Marie Libby had dinner with me on Monday night Apr 3. Birthday Cake! by Jan.

I returned to Boston at 1 30 pm on Tues Apr 4. and went directly to the First National Bank Bldg to see Bachrach's photo gallery of portraits. Then a buffet dinner upstairs. I met Arnold purchasing dept of Bachrach's whose mother was named Edgerton from Vermont.

April 13 1978 H.E. & Sam Holtzman. Test of Vincent Shutter with microflash.



April 14 1978
Harold Edgerton MIT 4-405

I was in Rochester N.Y. with the I.M.P. Eastman House with Phil Condax. Andrew Vincent met me at the airport with his son Jeff. Dinner with Jack Evans and his wife and Mrs Vincent. I visited the Vincent camera shutter factory in the morning. Then I went to the Eastman House. All day session and evening. Jean ~~Boudier~~ Buerger was on the staff of IMP.

APRIL 13 1978

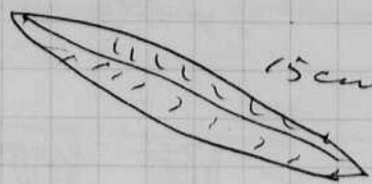
Note blur of club with 1 ms exposure.
The flash stops the action in 1/3 ms with the EG&G ~~EG~~ 549-11 microflash unit.

APRIL 13 1978

april ~~16~~ 17 1978

Harold Edgerton Pete Ortner.

Halosphaera Veridas  1 mm

Leptocephalus larvae  15 cm.

April 18, 1978 Bob Rines, Chas Wyckoff.

Reports from John Mills & Peter Milne discussed.

Expedition to pump up sediment in circles.
Look for artifacts, human. (Klein).
Klein mid July
Rines to supply boat. Re survey loch end.
Evan. Morrison Edinburgh Uni Date for pollen.?
John Mills again.
Decca.

Minolta — New lens — cameras. — 16 mm pictures.

~~Herriot Watt~~
Heriot-Watt College — ANGUS
Milne, Peter.

Apr. 22, 1978.

X ray 25 years ago experiments soft X rays absorbed
Arthur Gill at Royal Photo society.
Early work.

Zins 25 micro ~~ton~~
Zeiss micro summar
Leitz " Elmar.
} John Dean

El nickor
El Rochos.

Ph — tour, London.
Middx Poly, Harrow —
Arts Photographics & science.
London College of Printing.

Apr 29 1978 Open House — Many friends came to see the strobe lab.
Helpers Bill MacRoberts, Chas Miller, Sam Holtzman.
and several students.

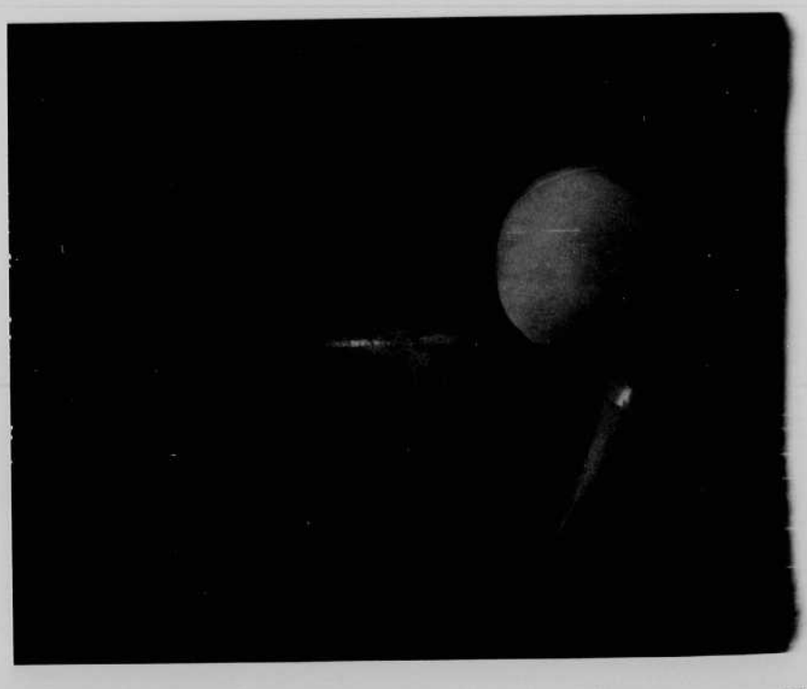
Apr 28. Saw 947 sonar for first time with Roger Caron & Pete Clifford
Apr 28 Open House at Klein factory in Salem N.H. 10th anniversary.
Duncan John & Esme (Newcastle England) were visitors at
100 Meml Drive Apr 21 to 25.
David Shaver — examples Apr 25. qualify exam, did ok.
Apr 25. Dinner for Stark Draper at M.I.T. club. Chair
Lecture for seniors Apr 26 - noon
" " Library committee Apr 26 night. — busy time.

April 14 1978
Harold Edgerton MIT 4-405

I was in Rochester N.Y. with the I.M.P. Eastman House with Phil Condax. Andrew Vincent met me at the airport with his son Jeff. Dinner with Jack Evans and his wife and Mrs Vincent. I visited the Vincent camera shutter factory in the morning. Then I went to the Eastman House. All day session and evening. Jean Buerger was on the staff of I.M.P.

APRIL 13 1978

Note blur of club with 1 ms exposure.
The flash stops the action in 1/3 ms with the EG&G 549-11 microflash unit.

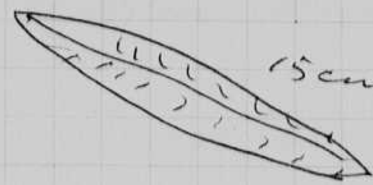


APRIL 13 1978

april 16 (17) 1978

Harold Edgerton Pete Ortner.

Halosphaera Veridas  1mm

Leptocephalus larvae  15cm.

April 18, 1978 Bob Rines, Chas Wyckoff.

Reports from John Mills & Peter Milne discussed.

Expedition to pump up sediment in circles.
Look for artifacts, human. (Klein).
Klein mid July
Rines to supply boat. Re survey loch end.
Evan Morrison Edinburgh Uni Date for pollen.?
John Mills again.
Deccs.

Nessatile - new fish - cameras. - 16 mm pictures.

~~Herriot Watt~~
Heriot-Watt College ... ANGUS
Milne, Peter.

Apr. 22, 1978.
X ray 25 years ago experiments soft x rays absorbed
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El nickel
El Rochas.

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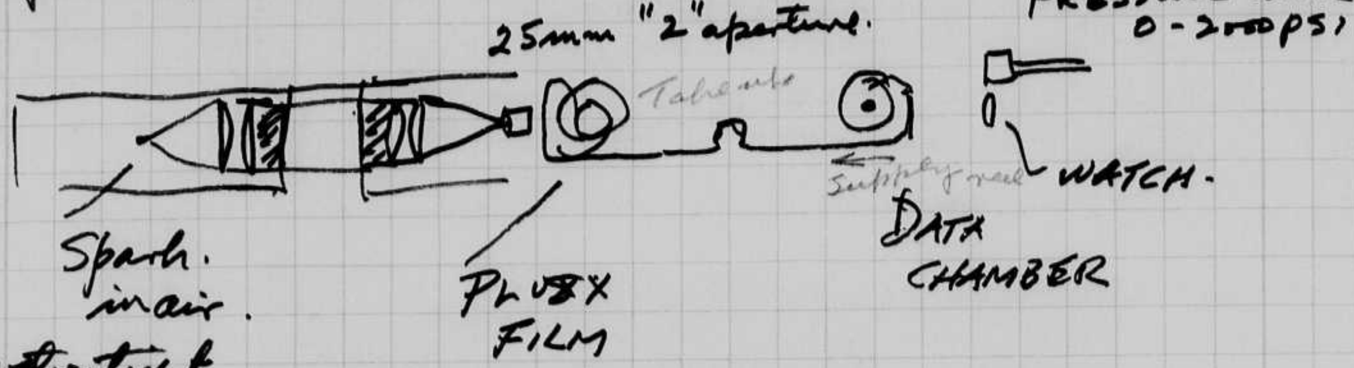
Lecture for seniors Apr 26 noon
" " Library Committee Apr 26 night. - busy time.

12 May 4 1978 Thursday.

~~Harold E. Edgerton~~

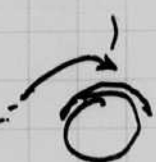
Test of planctor camera made with N.G. funds, gist animal.



Water tight cans with space in between for planctor.

Tested in Chas River at 6.51 pm. with Harry and Maria.

Log all p.m.

6:56 pm Rubber off.
7:05 on bottom.
7 06 3' above bottom
7:10 up to Surface Guard off: 
7 12 Splash
7 15 Bottom
7 17 3' off bottom
7 20 up to surface.

Developed 12 min in DK 50.

I hope to take this camera to Miami on the 30-31 of May to (MAY) work with Pete Ortner on planctum out of NOAA Ships in the Gulf Stream.

May 5. continue developing films of yesterday 12 min in DK50.

NOTE the timer clock and pressure gage photo is displaced 4 data images before the real time!

Interval about 4 seconds

100 ft x 16 frame/ft = 1600 frames.
4
60 | 6400 seconds
100 + minutes
1 1/2 hours. +

May 6 1978 Saturday.

The developed pictures from the bottom of the Edgerton Rover show a layering about 3' off the bottom, could this be the salt-fresh interface? Particles are shown in the water. I am not happy with the definition

Area covered = 3.5" long and 3.5" in diameter.

a 0.6 mm wire was used at the center and two 1.6 mm wires at two inch spacings to show depth.

May 9 1978 Robt Rines Harold Edgerton Sam Holtzman Dwane Marshall. Bob Needleman Chas Wyckoff Bill MacRoberts John Northrup

LOCH NESS program for 1978 Summer.

Rines goes to Scotland on June 10

Edgerton " " July 10 To work with John Mills

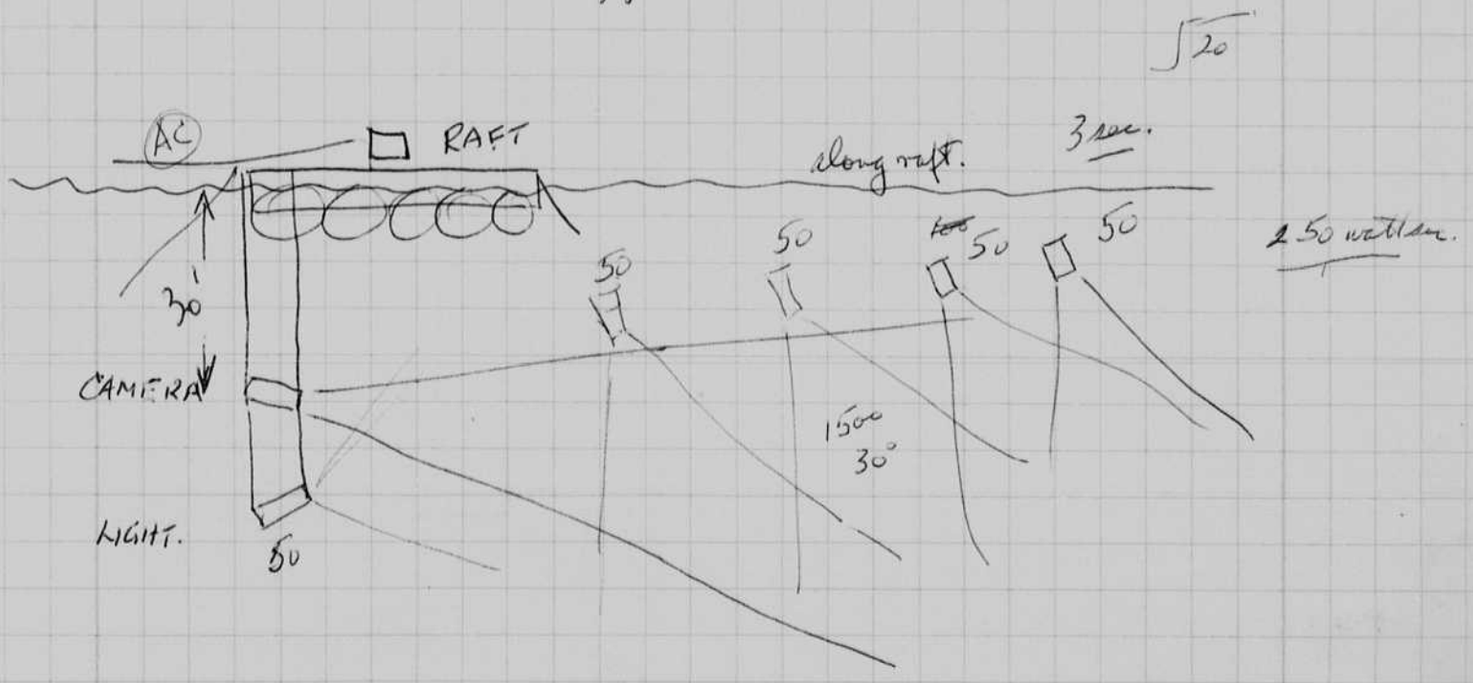
[Mills was in Boston on last Sunday and met with Wyckoff, Marshall, Edgerton at 11 am]

Comments (1) All cameras will be put on the raft,

(2) A wire to the shore will give the power,

(3) Camera at 30 ft down.

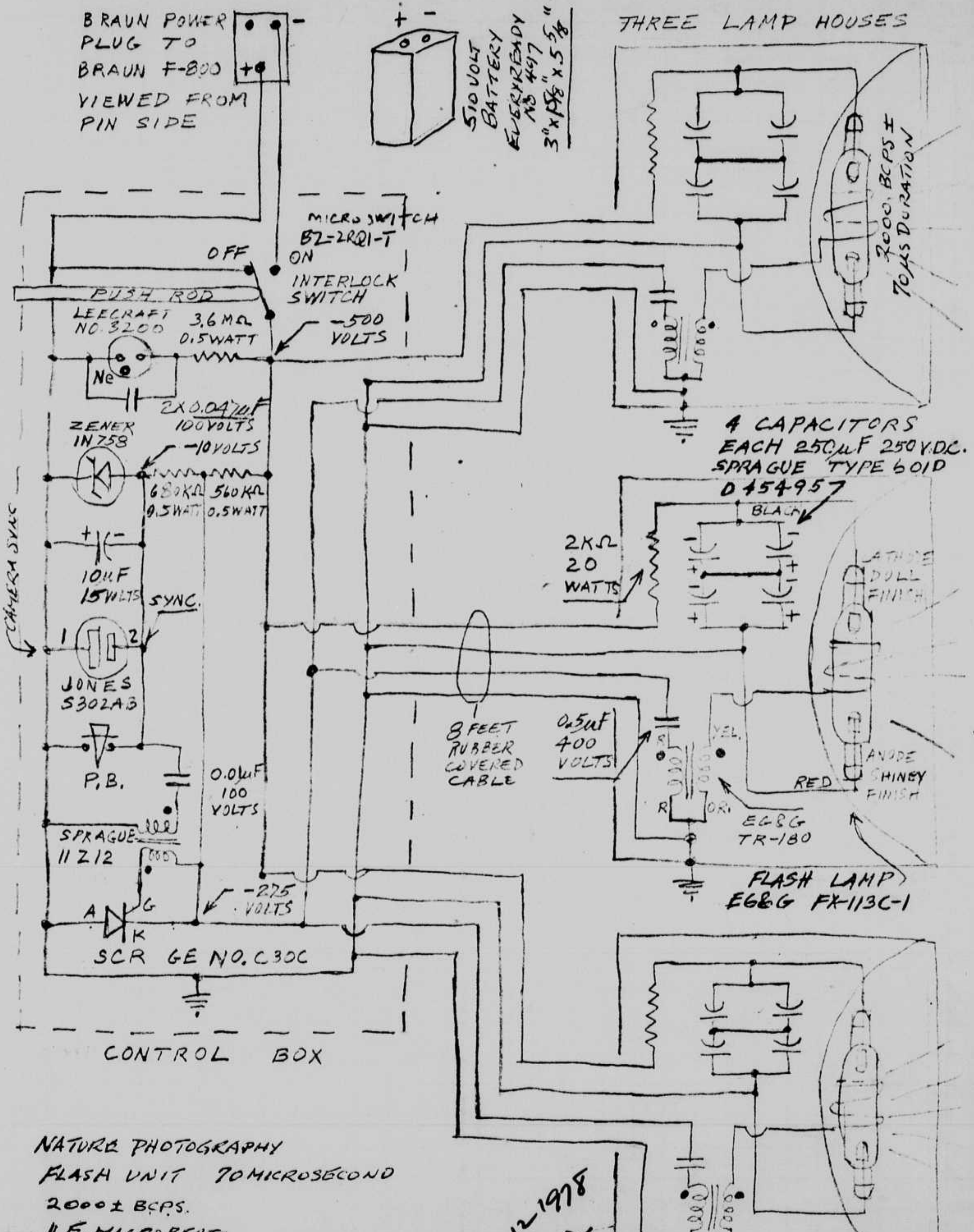
(4) Sonar trigger.



TOP ↗

Photos Taken in the Charles River, 3' off the bottom.
4 seconds between photos
5 photos / timing.

Note striations due to Fresh-Salt interface.



NATURE PHOTOGRAPHY
FLASH UNIT 70 MICROSECOND
2000 ± BCPS.
V.E. MACROBERTS
~~HAROLD EDGERTON~~ 1969 MODEL

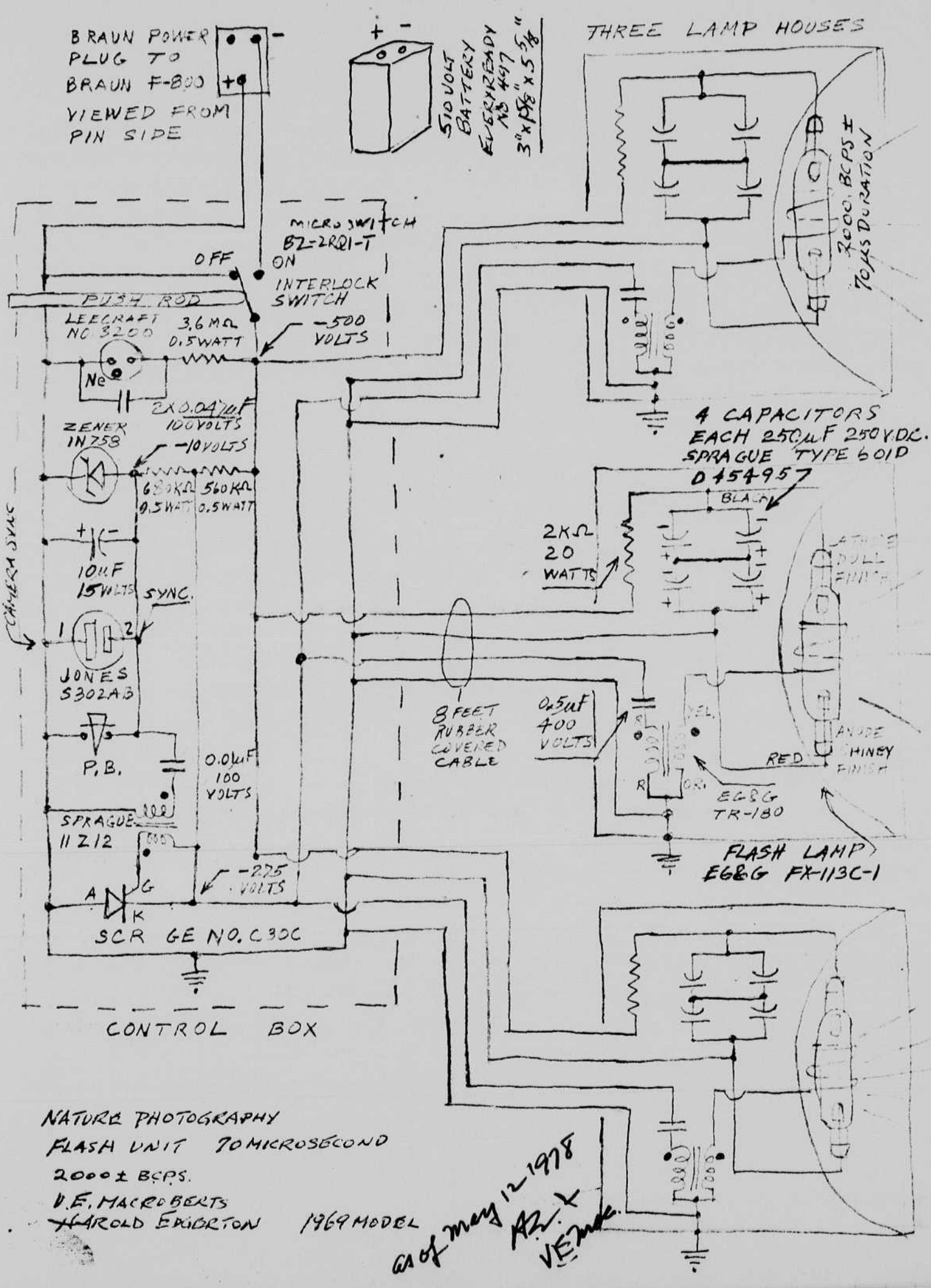
as of May 12 1978 H.E. & V.E.M.

TOP
↑

Photo Taken in the Charles River, 3' off the bottom.
4 seconds between photos

5 photos / 1 timing.

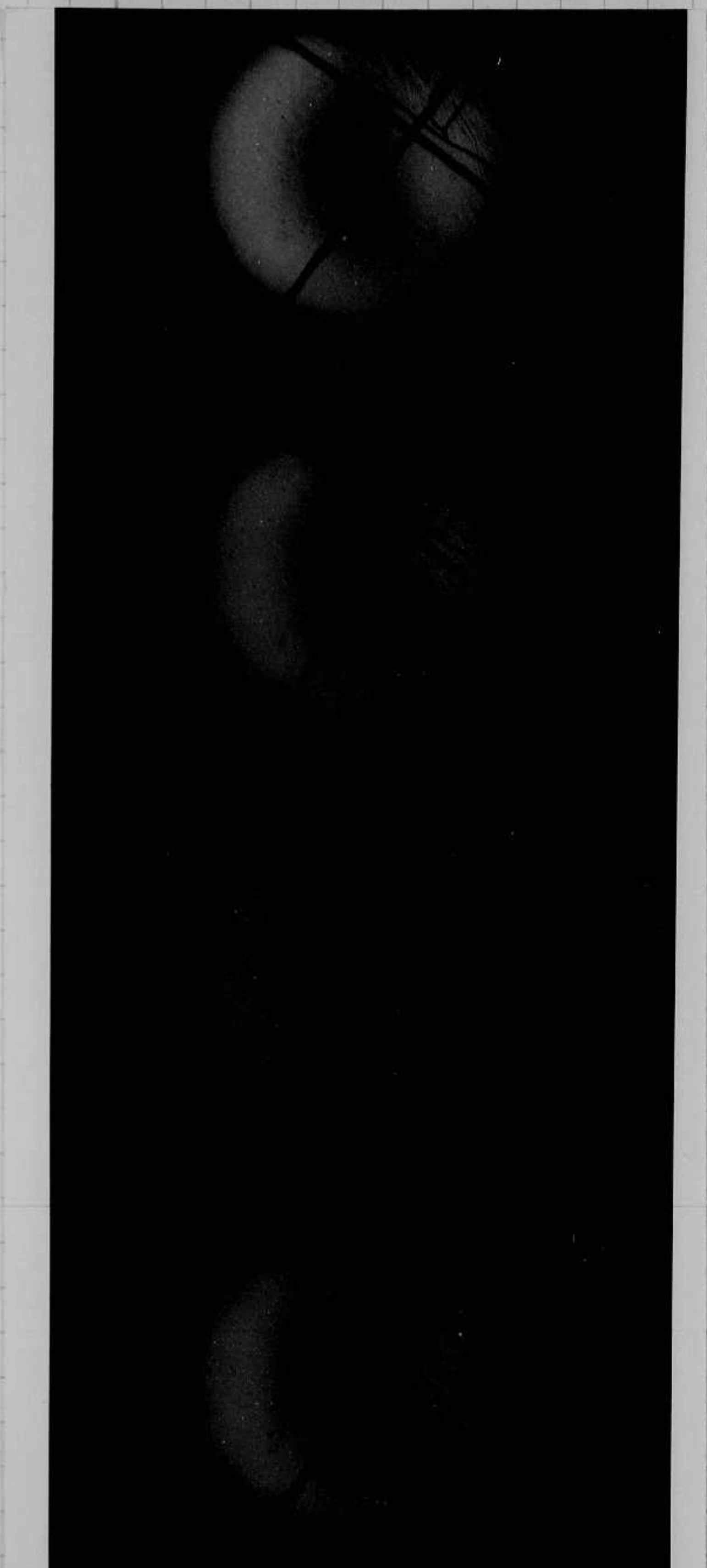
Note striations
due to fresh-Salt
interface.


BRAUN POWER PLUG TO BRAUN F-800
VIEWED FROM PIN SIDE
510 VOLT BATTERY EVEREADY No 467 3"x1 5/8"x5 5/8"
THREE LAMP HOUSES
MICRO SWITCH BZ-2RQ1-T
OFF
ON
INTERLOCK SWITCH
PUSH ROD
LEECRAFT NO 3200
3.6 MΩ 0.5 WATT
-500 VOLTS
Ne
2 x 0.04 µF 100 VOLTS
ZENER IN758
-10 VOLTS
680 KΩ 0.5 WATT
560 KΩ 0.5 WATT
10 µF 15 VOLTS
SYNC.
CAMERA SYNC
JONES S302AB
P.B.
0.01 µF 100 VOLTS
SPRAGUE 11212
-225 VOLTS
SCR GE NO. C30C
CONTROL BOX
8 FEET RUBBER COVERED CABLE
0.5 µf 400 VOLTS
2KΩ 20 WATTS
4 CAPACITORS EACH 250 µF 250 V.DC. SPRAGUE TYPE 601D 0454957
BLACK
RED
EG&G TR-180
FLASH LAMP EG&G FX-113C-1
ANODE SHINEY FINISH
NATURE PHOTOGRAPHY
FLASH UNIT 10 MICROSECOND
2000 ± BCPS.
V.E. MACROBERTS
HAROLD EDGERTON 1969 MODEL
as of may 12-1978 RV VE

TOP ↗

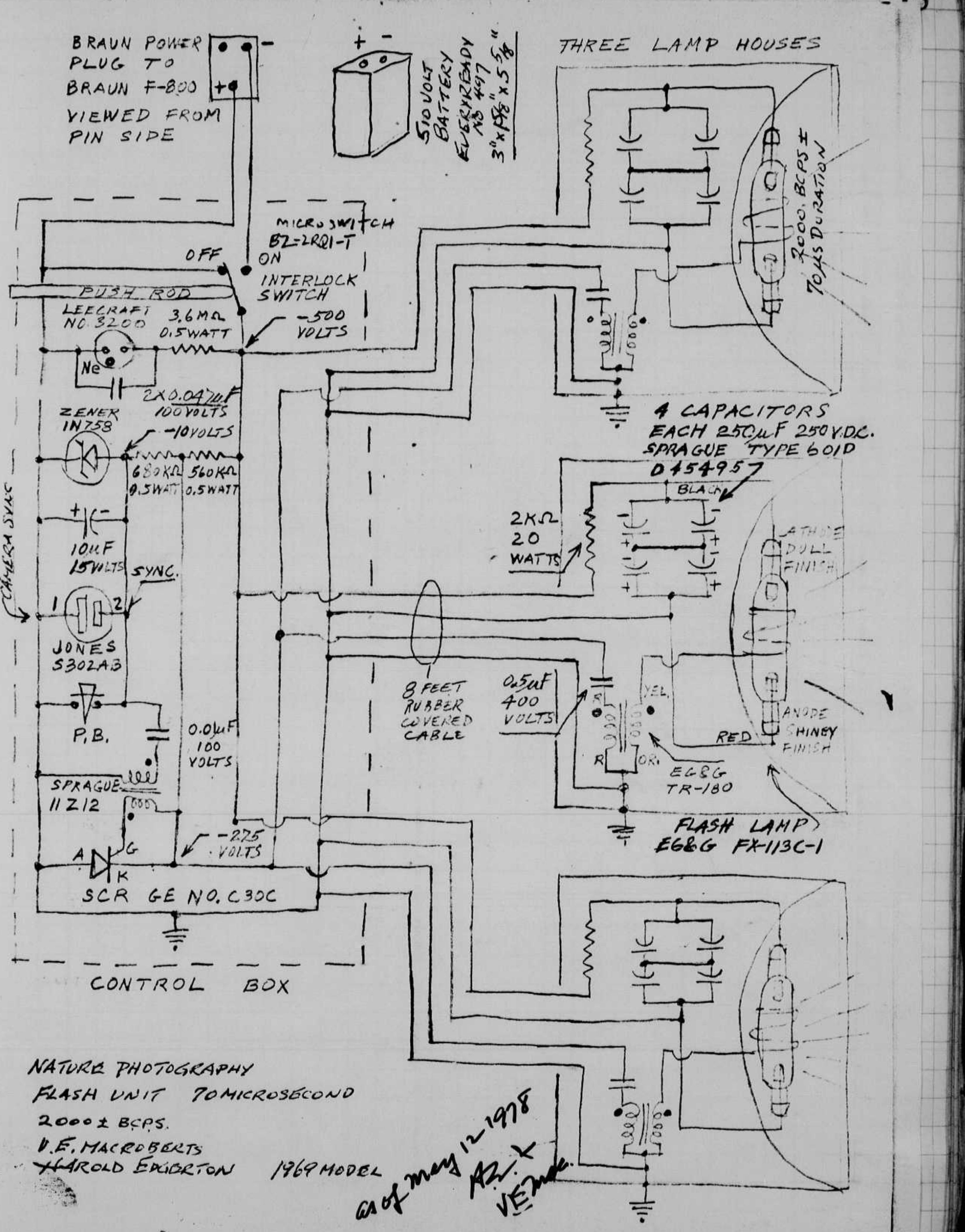
Photos Taken in the Charles River, 3' off the bottom.
4 second between photos

5 photos / timing.



Note striations
due to Fresh-Salt
interface.

May 12, 1978 Harold E. Edgerton.



NATURE PHOTOGRAPHY
FLASH UNIT 70 MICROSECOND
2000 ± BCPS.
V.E. MACROBERTS
HAROLD EDGERTON 1969 MODEL

as of May 12 1978 HEE. VEmac.

 May 13 1978 6:30 am Harold Edgerton
Sat.

A new small water drop unit has been developed during the past few weeks. This is for the trip to Japan in August to the High Speed Photo Convention.

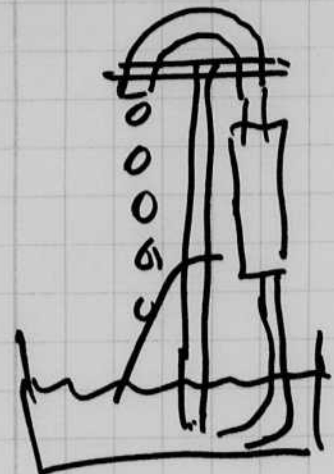


Photo made yesterday
at f 22 with 3 lamps 2000 BCPS
each at 70 μs at 1 foot ±.
Exposure over DK 50 6 min.

May 17, 1978 Barry Fohrman FOHRMAN
Rt 1 Box 50 HINCKLEY Ill 60520
815 - 286 - 3562

He sent a report "Phobos" about a project to find and photograph the Titanic.

41° 16' N 41° 46' N } Reported by sunk.
50° 14' W 50° 14' W

50.01 W 41° 32' N wreckage and boat found

The Titanic & the Californian 1965 Peter Padfield

Joe Carvalho 11 canal St Winchester Mass 01890 (1968)

May 18 78 Theresa Hanford. Globe phone interview
Phil Conell (?) photographer.

Yesterday: Dr. Yoram Paeti Technion Haifa called. He is the new director of the Ocean Inst that Ben Nun has established in Haifa. Israel

may 22 1978

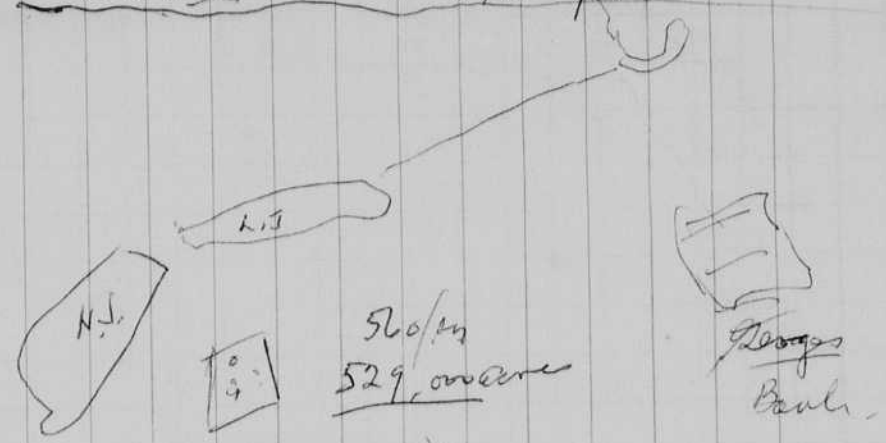
We took a 259 side scan to New London on ~~Station~~ Sat May 20 to survey the river. The records were left with John Ritter.

Hydrospace Sys Inc
231 Captains walk
New London Conn
06320
(203) 442.0431.

9.30 May 20 1978 New London Conn.

John Ritter
Ron Buccino

Campbell capt.
H. Edgerton



1,2 Billion for o.k.

30 x 30 miles

Gary Gill Marine Science Institute –
Don Sundy " "
Markie Engels UCONN

Lloyd Breslau
Groton
Avery point.

LANCE STEWART – UCONN SEA GRANT
Robert DeGoursey ↑
Univ of Conn Marine Lab

LV New London Dock at 10.30

Bill JANCEWICZ – HYDROSPACE SYSTEMS INC
Drafting
Perry Ritter
Ken Scott – H.S.I.
Engineer
R.A. Peabody III
J. Gulty
S. McNickle
K. ALBANESE } Thames Valley
W. SOBCZAK Norwich
Ralph E. Johnson
A. Peabody (Anne.)

Fred Dobbs – MAL
Univ of Conn.

H.T. LOESER – NUSC
Naval Under Sea Center

Notebook # 33

Filming and Separation Record

2 unmounted photograph(s)

____ negative strip(s)

____ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 16 and 17.

Item(s) now housed in accompanying folder.

Clear
River
Green

1/2
mm
x30

nage, and holy
of God were write; and in
's, spake to the holy Patriarks of
d what names were giuen to thing
the creation. And though I cañot
ine to much herein, yet I am refre
l, to haue seen some glimpse hereof
(as moyses saw the Land of ca=
nan afarr of) my aime and
desire is, to see how the words,
and phrases lye in the
holy texte; and to
discerne somewhat
of the same,
for my owne
contente.

BRADFORD'S Book

from Plymouth.

Hilton book.

H. Edgerton

18 May 27 1978

Harold Edgerton.

After several failures, the silhouette 35 mm camera shown on p 12 was operated off the MIT dock north of the U.S. Aquarium. Bill & I found that there was some daylight fog at the bottom at low tide on a dark cloudy day.

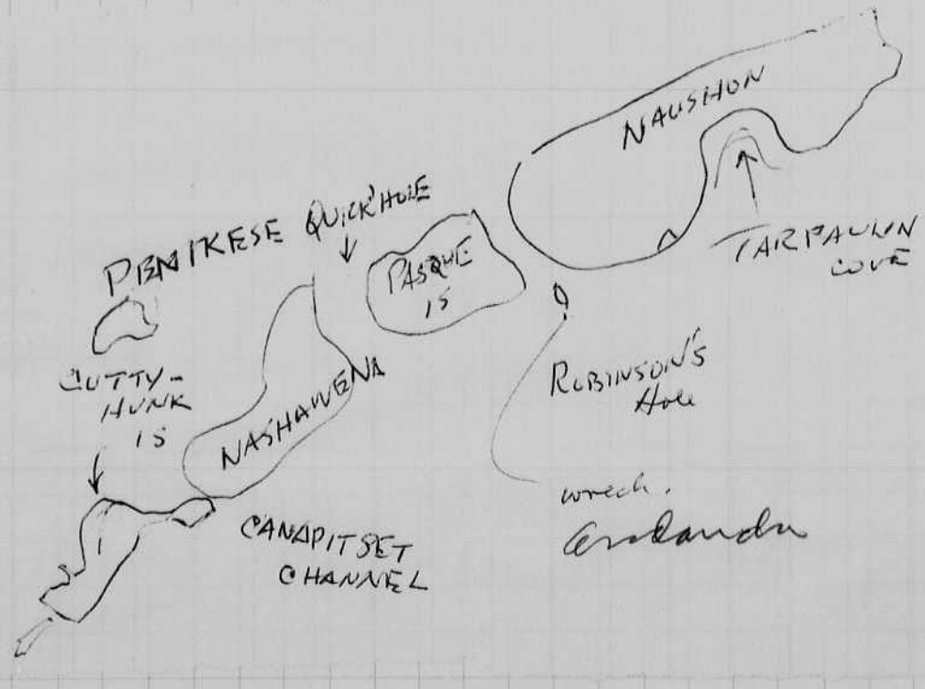
The assembly goes to Miami today on Eastern at 11 am. Pete or Ken will pick it up and me on Sunday May 30 at the air port. We will then try it out in the ocean off Miami where NOAA has a ship and a sonar device for finding concentrations of plankton.

305-361-3361
NOAA.

Alex Prud'homme was here yesterday and the day before to plan a Nat. Geo. Film. He plans to bring a crew for Aug 1 for a few days.

12 pages

Killian is driving on the next edition of Flash with new pictures. An 8 page color section will be used in the center. The layout was discussed yesterday. Ron Buchinsky is helping me make enlargements for the book.



Maurice Robbins saw a brass cannon years ago off Allen's Bird Island. (not on back side)

Check with Luther about this.

May 24 1978 H. Edgerton John Fish.
Brad Luther.

Kozak & Garry Klein Associates Salem.
RFD 2.

Dave Motherway Coast Guard R+D Center
Groton CT.
913-168 Eng

John Fish Brothers

Walt Lincoln USCG R&D Center

Harry Sites USCG R&D Center

6.54 Leave Fairhaven on RV/alert.
15 sec strobe. Recovery

Expedition on Luthers boat.
New Bedford MA

John Dwight 1925 Rum Runner Boat.	Ship sunk in 1925
Freighter Canadian. Ardandhu Rammed. wood & Hay 1911	Fish and Kozak dived on this.
Herman Winter 1911 Gay head. Year later.	This ship hit the Arandhu
Governor? Mary Double Deck 1942 Ferry from 19?? Newport to Portsmouth 200 ft	Picked Bottom or Rum boat.

June 2, 1978
Harold Edgerton

I went to Miami on May 29 to try the silhouette camera in the Gulf Stream off Miami with Peter Ortner.
We went out in the VIRGINIA KEY, a 65' T Boat with Neill as captain on the 30 and 31. Three lowerings were made. Several copepods and a ctenophore were photographed in silhouette.
The camera is now back in Boston. A plan to increase the light so that 7302 film can be used instead of Plus X.

June 16 1978. I went to New Bedford yesterday with the side scan sonar to use at a place where an air plane was lost 10 years ago.
Sarah Wood and Peter Kerabosh went along for the ride.
We used Bradford Lathers boat the ALERT. John Fish. Sam Raymond, Niki Raymond, and others were aboard.
The area was searched even if the wind was very strong.
One ship was sited on the bottom, the

Today I tested the Rotary side scan at the M.I.T. Dock and in the river from the ship MARY.

Harold Edgerton
Don Bernard
Arthur Paquette

Jan 27 1968
suspect that
2 men aboard.
CESNA 150
N6616F

DAVIS. Rum Run
KEHO.
YANKEE Canadian ship?

...ky GENNARI
Box 53
...ow Rd.
...t STOCKBRIDGE
MA. 01266
...32 - [redacted] 8586

June 17 1978 9:25am Chicago on American flight 57 (O'Hare)
Send Copy waiting for 15 minutes for Seattle to clear.

Rt 1 Box 50
PHOBOS

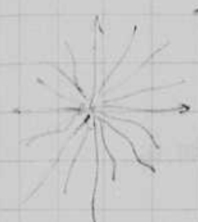
I will meet Barry G. Fohrman Hinckley Ill 815 286-3562 to discuss the TITANIC affair. He is trying to organize a group to find and photograph the wreck.

The Titanic went down in a spot where the depths are about 12,000 feet. This is mighty deep.

A side scan sonar at this depth would require a wire of about 3x and could only operate at slow speed. The magnetometer would have the same limitation.

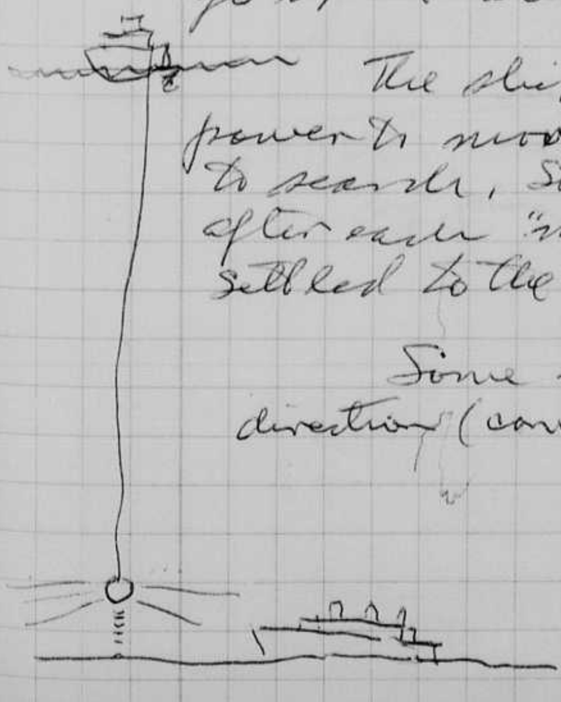
I propose the use of a side-looking sonar on a wire from a stationary (or nearly so) ship so the wire angle will be small.

A package could be made of a rotatable sonar system. However it might be better to make an array which operate in sequence to give a rotary sweep.



I would first try a 20° beam transmitter with 16 transducers that are switched in turn to give a "look" in all directions.

Perhaps a 200 meter, or even a 500 meter range could be used. The information would go up the cable to a recorder and display.



The ship could be given short bursts of power to move to a different ~~area~~ area to search. Some delay time would be needed after each "move" before the assembly settled to the bottom.

Some method will be devised to show the direction (compass) of each ping unit.

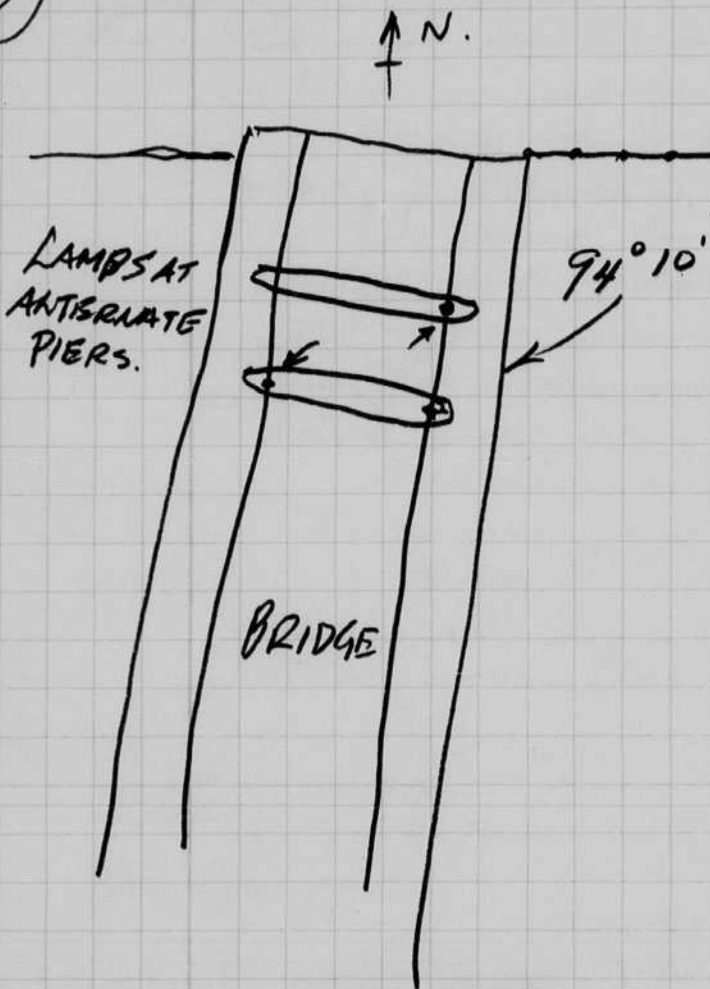
A side thruster would be helpful to keep a ship into the wind and to prevent rolling.

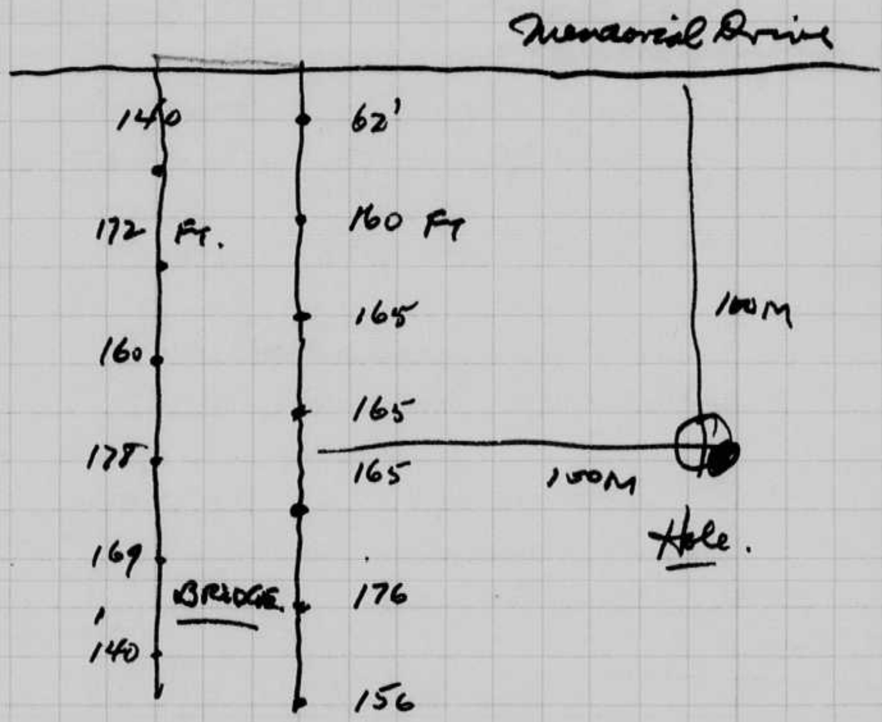
Read and understood — [signature] 6/19/78

June 17 idea cont'd.

George Field
Jim Keating
June B. Hesford
Barry I. Feldman
Dan Smith

June 24 '78 Meas of Harvard Bridge.





June 25 1978
Harold Edgerton

new title
Moments of Vision.

Killian is organizing the 3rd edition of the picture book Flash. We have a date on times to see Urbanski at the M.I.T. Press who will publish the book.

Criteria for photo selection.

1. Historically important - not before or better.
2. Pictorial quality finds pleasing.
3. Convey information technical or Scientific importance
4. Photo not achieved by any other way.
5 Helped others.

My technical book Electronic Flash Strobe McGraw Hill. is out of print. I hope to get a paperback out.
Urbanski says he is interested for the M.I.T. Press.
I gave him a copy - I called Hicks. Hicks says for Urbanski to write to McGraw Hill about it.

June 28, 1978 Conference at 10 am. with Killian & Urbanski in Bldg 9. Miss Betty Pigott was there too. Urbanski took the entire pile of text and pictures with him. The book will be called: Flash III
Moments of Vision (Handy poem book)
this is the title selected by Jim Killian.

24 July 29 1978

Harold Edgerton.

We returned from Loch Ness Scotland on July 25. Esther and Ellen Dixon, where we had been making a sonar survey from July 8 to 21 of the north end of the loch. A map of the circles was obtained.

Conference on July 26 with Killian, Urban, Bowsher, Steiner and H.E. about "Flash!" II. Spring is now the time! A layout of the first part was shown to us.

ITINERARY

Esther & Harold Edgerton
100 Memorial Drive, Cambridge, Mass. 02142

Ellen Dixon
855 20th Avenue Drive, NW, Hickory, N.C. 28601

July 3 Mon. Lv. Bos. - ar. London at 6:55am on TWA #754 ON JULY 4. 1978 — London.

" 4 Tue. Lv. London in rented Hertz station wagon, pick up sonar equipment at air freight terminal, call John Mills, Tel. no. 719-2408, drive to Salisbury to visit Stonehenge Museum, etc. — 75 Salisbury

" 5 Wed. Visit Stonehenge early or late - elapsed time photo of sun. Stay overnight at Bath or arrive in morning — 40 Bath

" 6 Thu. (Morning) ~~Visit Prof. Deryck Chesterman, University of Bath, School of Physics, Claverton Down, Bath, Tel: Bath 6941~~ — 100 Stourbridge

" (Afternoon) Visit Jeoff Holt, 16 Swincross Road, Oldswinford, Stourbridge West Midlands, tel. 75776 — 75 To M, 155 To Newcas

" 7 Fri. (Morning) ~~Visit~~ Prof. & Mrs. John Duncan, 8 Brandling Park, Newcastle-upon-~~Tyne~~ John was in a hospital in London. — 100 Edinburg

" 8 & 9 Sat & Sun. Enroute to Drumnadrochit, Inverness-shire, Scotland, c/o Gordon MacKintosh, Tychat House, Drumnadrochit, Tel. (045) 62-298 — 25 Perth

" 10 - 21 Work at Lochend with John Mills and George Reid (Tel: Dochgarroch 222) — 85 Aberdeen

" 22 Sun. Lv. Loch Ness for London in rented car, with sonar equipment — 175 Inverness

" 24 Mon. Ship equipment to Boston — 20 Drum.

" 25 Tue. Lv. London, TWA to Boston

Sat Aug 5 1978. Peter Throckmorton, Chas Sanderson at Plymouth Harbor on "Gen Arnold" wreck in Harbor with 5 KC. We spotted some targets near the site. More to be accomplished.

Aug 7, 1978

Harold Edgerton. Movies of Strobe Lab. for N.G. Soc. T.V. Program.

Alex. Pomasanoff. T.V. dir. Suite 1112, 6331 Hollywood Blvd La. 90028.
213-466-3234.
213-788-4598. Home.

Bertram van Munster - cameraman Nat. Geo. Soc.
3552 Summerfield Drive
Sherman Oaks, California 91423

Richard Bock sound Nat. Geo. & WGBH
247 Chestnut St
Cambridge, mass 02139
547-4743

EDWARD GARRICK TVNAT. GEOG. 6331 Hollywood Blvd
1974 Hillcrest Rd. 213/466-3234 LA 90028
L.A., CAL. 90068 213/876-9580 home TV filmmaker

Orlando Bagwell Asst. Cam NAT Geographic + WGBH T.V. Freelance Filmmaker.
791 Tremont St.
Boston, MASS.
353-1399

Bob Edgerton - Pontiac Michigan.

Bill MacRoberts M.I.T.
Chas Miller. M.I.T.
Jean Mooney.
Denise Denton.

Michael T. Peyland.
46 Lispenard St. #7E
N.Y.C. 10013 212-966-6356

Aug 8, cont. Skip King. Bullet in apple into Sabot rifle
color Prints from Boris lab were obtained and copied.

accelerator (Remington 30-06 Sprg. R 30069 55 grain ammunition.

Aug. 9, 1978. Bill's birthday. More movies by above crew

Aug 10. No movies today. Bob and I saw a take made in 1973 of a lecture about flash lamps by me. We also received a B.B.C. film which was run on T.V. in England in 1968 by Denis Short. Preparations for a Great Horned owl for the movies of Sci to be brought in by mom. Lockwood

 Aug 15 1978 100 Mass. Drive.

Harold Edgerton.

The movie effort of Alex. Pomsatoff ended Friday Aug 11. The goal was to make a movie for the Nat. Geo. Society. Invisible science?

See list of people on p 25.

Subjects. 1. Bullets thru apples
22 cal
30 cal and
22 sabot Remington.
This last bullet is high speed and it certainly makes an apple explode.

2. High speed movies of milk drops with a hycam and strobe.

3. The Stroboscope on drops - springs, discs etc. fans.

4. A juggler Skip Kirby with balls & clubs.

5. An Owl from the Mus. of Sci. Susan Lockwood.

On Sat I took my sonar (side scan) to WHOI where we went aboard the Asterias Capt. Dick Colburn. Jim Schroeter, Draper Lab, asked me to help him find a "lost" current meter. (Norwegian) Andreas?

This was supported by 3 Benthos glass balls, a wire and a 100 lbs of chain.

We did not find it. Several Rocks were located, buoyed and investigated by divers.

A single ball was suspended above the bottom 30 ft and observed. It could be seen about 30 feet from the side scan.

There were many biological targets in the water to reflect the 105 KC signals.

I suggest that we get an Edo transmitter of 12 KC and 20° beam for side looking.

Joe Watson   Aug 16 1978   100 Memorial Drive Camb Mass H. Edgerton
22 Valley View Sketty   617·864·4790   02142
Swansea SA2 8BQ U.K.   called with wife and 2 children

I saw his gas detector on Aug 15 and photo of his bone healing magnet.

Peter L. Sachs 548-2808 140 Bebe Acres Falmouth 02540 Aug 12
wants me to take a sonar record of a wreck near WHOI.

Look up Beta Max Home Video Sony & Panasonic.

Bldg 9. Fitzhaway for a year
Hayes in charge. (Hayes)
Norman Lang
Sally F.
Chris Strangio – Tape on microprocessors.

Grohe Steve 186 South St Boston Mass 02111
617 ~~[illegible]~~ 523·6655.

He took 8 X 10 color photos of the large reflectors 2 me at his studio.

Paul Wing   Masoneilan Int Inc Norwood Mass   BIRDS
V.P.   617 762 4600

outdoor bird studio   12 Weston Rd
Hingham Mass 02043
749 1996.

Peter Throckmorton   207 563-5570
Newcastle Maine.
We worked ~~at~~ Plymouth Harbor.
on the wreck of the Gen Arnold

Dentist 8/7 10 am   8/9 9 am.   8/11 9 am   Dr. Kite

Look up Thomas ~~Eg~~ Egerton in time of Queen Eliz I

Crimson Camera   686-5150   Don. Perrin. Cambridge Mass
Electron microscope JEOL Thomas Huber V.P.
477 Riverside Ave Medford. 391.7240
Met when Nilsson was here.

Bob Cooke Globe 929-3064
David Rodd Bos. Camera Club   973·7673 office   26 ½ 1073 home   Stony & Webster

TITANIC. Harold Edgerton
Aug. 16, 1978

Joe Carvalho 11 Canal St Winchester Mass. 01890 1968

The Titanic and the California 1965 Peter Padfield.

orig { 41° 16' N / 50 14 W }   41° 46 N / 50 14 W } corrected.

wreckage and boats. 50° 01 W   41° 32 N.

Portfolio   Vision Gallery   Mary Bret.   Total expended by HE 17,038.90

216 Newbury St Boston.

As of May 12 1978

Vera List	877.50	Dec 30 77
Wirtz	5000.	Feb 16
..	1500	Mar 8
..	500	Apr 22

Sept. 7, 1978
Harold E. Edgerton

I returned from Japan on Sept 5 where I had attended the High Speed Photography congress #13 in Tokyo. Esther and Nina Edgerton went along.

Sept 11, 1978. Sonar Focus Polaroid camera brought over by. Wm L Livingstone
Conie Baver } Teardrop square Designers. 864 6000
John Pasicka } 2734
Cromwell Schubarth 890 7000 7181 944 0453. Waltham.
Lecture Sept 11 1978 at Fantura Rest Randolph

Sunday last at Jerry & Penny Kriegel's home in Duxbury. Bradford lunch.
Mary Ellen and Welch and Margaret & Bob, Barbara Carr all there!

Visit to Washington on Friday Sept 6 to accept award from the Marine Tech Soc at the Park-Sheraton Hotel.

Saw Leonard Grant and Peter Purpura nancy Bong Bob Fassel at the Nat. Geo Society about the hydraulic strobe display. Suggested several improvements.

1. Time delay - ord light
2. Darker plane
3. Bigger jets
4. Brighter strobe
5. Remote resistor

Sept. 14, 1978

~~Harold E Edgerton~~

Poloround Wm Leatherman 2734
Tour

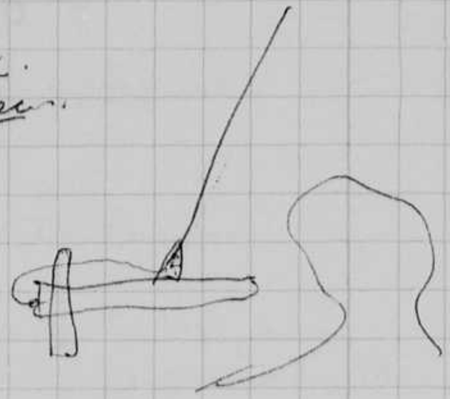
Toll
Rouses Point. 93 89 Alburg ~~Alburg~~ St Albans.

300 miles (250 miles)

Leave 5th early. Marina.

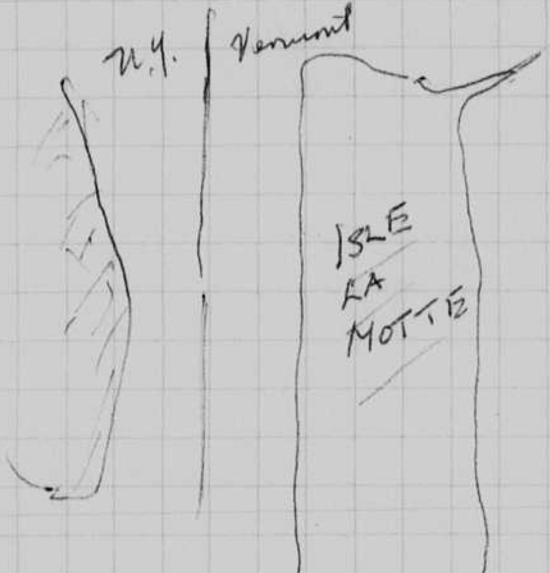
MARC THEORET
100 Boul. Souvenir
LAVAL, Quebec Tel. 514.667.4847

underwater [illegible] Quebec



my museum ANDRE LEPINE montreal museum consultant
1695 KENT
CHAMBLY TEL: 514-658-7430

BOAT: ROCHANDRE 60ft long. 250 diesel 12 volts,
CAPT: ROCH LEPINE



The CANADA or (MARS)
44 ft long.
11.4 ft wide.
15 guns.
for sale? [illegible]
John Sinclair

10 or 20 years ago Divers for 100 ft. Saw a wreck with Guns.

Harold Clay.

Sept 11, 1814
control of champlain
Com MacDonough american
37 guns carronade
(Saratoga) USN
Gazze

70 ft.

170'
Confiance
1500 Tons?

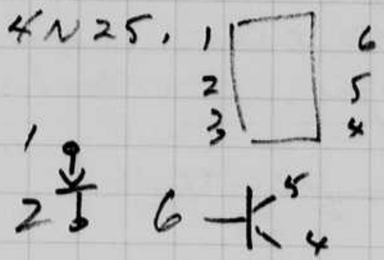
Sept. 16 1978

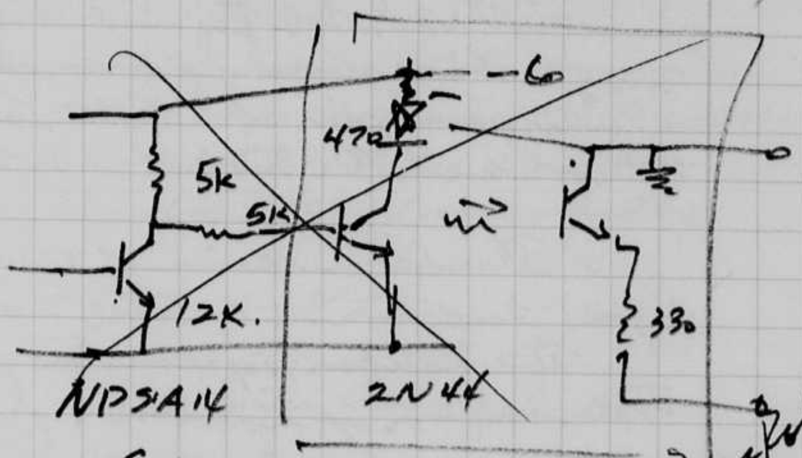
Harold Edgerton   Sound trigger for focus.

Ed Shenk. 864 6000 - 3983 Polaroid. 1- 692 7709 home.
4-409

Shadow set up for. 1 meter to transmitter 1 meter to 7302 film
Soldering iron on 50 volts. no detectable.
"   "   90 "   Barely detectable below air.

The object of these experiments is to show "visually" the sound wave.





Extra stage.

See Mac Roberts for circuit used and new circuits

Ed brought a large experimental Box from Polaroid.

(Shenk). He has designed a circuit above to trigger the microflash. We may have a problem since the microflash gives a big negative kick into the input circuit.
The above optical ~~[illegible]~~ coupler should overcome this problem of back coupling.

We quit at noon. Plan to continue tomorrow at 9am
I found the silhouette could just see the hot ~~[illegible]~~ air from the soldering iron at 90 volts.
I started to line up the Schlieren in the next room before I left.

3:45 pm. after lunch with Niki and Paul Stavrolakes of Port Jefferson NY,
Book of Pictures MOMENTS OF VISION. the Stroboscopic Revolution in photography
Frank Urbanoski in a Sept 7 letter outlines his thoughts about publication and pricing.

Mill arrived at noon on Sunday. Ed Shenk (Polaroid) and Chas Miller worked in the afternoon on shadow photos and Schlieren of the air. We could not see the 50kc waves.
Other photos were made of the oscilloscope and the circuits at Polaroid 7th floor

 Sept 23 1978.

~~Harold Edgerton.~~

Returned from Detroit on the 21 after a lecture to the Optical Society on the 19. Bob met me on the morning of the 19 at 10 am. We visited Stanford & St Iris Ov-shinsky home on 2700 Wakefield? Drive in Troy at 5 pm. Then went to the restaurant in Troy for the meeting as arranged by Gerald Marshall.

On the 20. Bob Fiz and I visited the O. Zimbalist Co in Troy, mich. where many demonstrations were made. then a very fancy lunch at the London Chop House before Bob took me to the airport to catch the plane to Boston.

I attended a session of the display in the Hynes Auditorium on the 22.

The Reticon system is of interest for the transmission of a picture from underwater.

Sept 25 78. G.E. Co Lynn - Turbines Jan Roos
Tom Mooney. 594-3007
they want high speed movies of a turbine blade break.

Lab assistant for 6.163 (Miller) is Chris Johnson.

Sept 27 1978 Geo. Hansel of Reticon called from Calif with John Skurla to discuss under water use of their Imaging systems. 910 Benicia ave Sunnyvale calif 94086. (910) 339 9343.

John Edmond Marine Chemistry Clinic Sept 1978

MICHEL DICK L.I.T. 356-0200 Pontiac. Detroit area.

Hooper Don R.I. School of photography.

Physics books Sears & Zemansky
Resnick and Haliday
Paul Tepler Oakland Univ Pontiac Mich
now Popular with Physics Classes

Sept 28 78 Dye Laser BEZDJIAN KRIKAR 3-3439 4-033 Javan lab
5-9520

(Fold Spec. Lab.) - Lasers

Sept 29 '78 Morning Side Scan of Chas River with Elghb 259 Louis Pinsault. Soph helped.
— Ulrano(?) did experiments with 300 wattsec each on strobe lamp.

Harold Edgerton.

M.I.T. 4-405 Louis Pinrault will be at 518 Beacon at 7am

on Thursday morning Oct 5 to go to Rouses Point N.Y.

~~Vermont~~ to help Marc Thoreault and LaPine.

We will search for a supply ship used in the 1812 war off Isle de la Motte.

(Hotel? (H. JILLSON) Rouses Point. N.Y)

Oct. 12, 1978. We returned from Rouses Point N.Y. on Oct 10 about 2pm. A wreck was found off Trembleau point rock about 2/3 of the way to LaMotte Island.

Oct 20, 1978. Lecture on the Photography of Birds Bugs Bats showing how special strobes were designed for special projects on Oct 12.

On Sat Oct 14 I gave a lecture at the Radio Amateurs meeting at the Boxboro Sheraton Hotel. I was asked by Don Pullin.

There was a tea at the Endicott house (MIT) by the Rosenbliths on Sunday afternoon Oct 15.

I went to Madison Wisc with Chas Wyckoff. We gave papers at the conference on high speed photography sponsored by the Extension department of the Univ of Wisc. Wm Hyzer was the organizer. I lectured about Xenon flash lamps.

2.2
.5
1.10

Oct 27 1978 H.E. & Bill MacR

Light from Beam Aircraft beacon Runway light.

.2 × 26 / .2 / 5.2 25 / 2.3 / 7.3 / 5.0

D. 18 yards. = 54 ft (18 × 3)

$$K = \frac{KUD^2}{R} = \frac{3.78 \times 10^6 \times \ldots \ 15^2 m}{10^3}$$ (1.1v)

Pickup. #2 Dottie 106 filter.

Duration. 1/3 = 80 us.

$= 93600 \times 10^6 / 10^3 / 10^3$

$= 93.6 \times 10^6$ BCP peak.

Output $= 80 \times 10^{-6} \times 93.6 \times 10^3$

$=$ 7484 BCPS.

$I = \frac{BCPS}{D^2} =$

$AD = \sqrt{\frac{7484 \times 25}{25}} = 86$

Let D = 10 M A = 8.6

D = 20 A = 4.3

D = 30 A = 2.86

$85^2 = 7225$

$90 = 8100$

$86 = 7396$

The 258 sonar was put into operation today for Louis Pinrault.

He plans to make a hydrographic survey of the Chas River Basin.

34 Oct 30 1978 Monday.

Harold Edgerton 4-405 MIT Cambridge Mass.

A lecture on the Photography of Atom Bombs was given on Oct 26 in 4-402. Movies and still photos of nuclear explosions were shown.

I went to New Haven Conn with Esther on Oct 24. a lecture was given at the Q club to the M.I.T. alumni group. On the next morning we visited the "Ancient Book" library at Yale.

(277 ft.)

Klein Side Scan was demonstrated on Oct 26 by Gary Kozaks for me and for Marcel Connor Corp of Engineers of Louisville Kentucky.

I went to Detroit on Sat 28 Oct with Donna Brzenski, Shiloa Widnall, Dagmar Pongi, Leslie Hruby Junior at M.I.T. (Aero dept) (Chemist) (Dejital Co.)

We gave lectures at 1 pm in Detroit and at Kalamazoo Mich. About 150 high school students and parents attended at each place.

Nov. 1, 1978 The Boston Camera Club were visitors in the Strobe Lab on Oct. 30. Some 80 people were here. Chas. Miller showed the multiflash Jay Nathan and Chris Johnson helped. Silhouette photos. Henry Wisenburg president

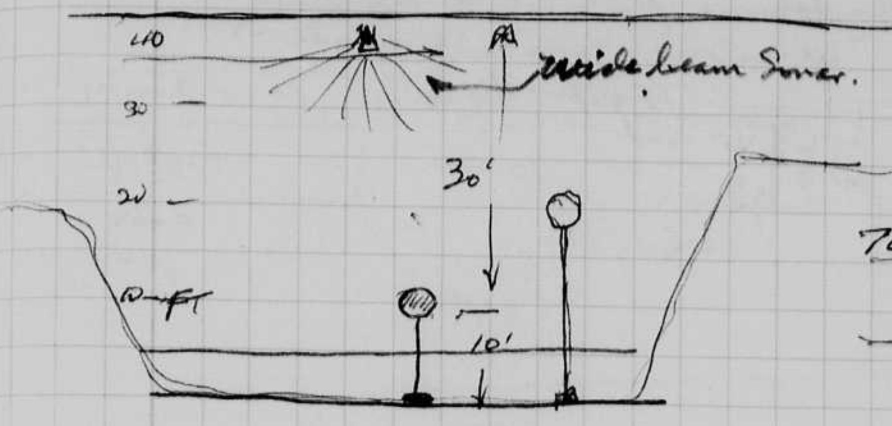
Last night I lectured to Otto Piene's class in ~~archite~~ 7. building 3. I showed xenon flash and techniques ending with a reel of movies about the atom bombs.

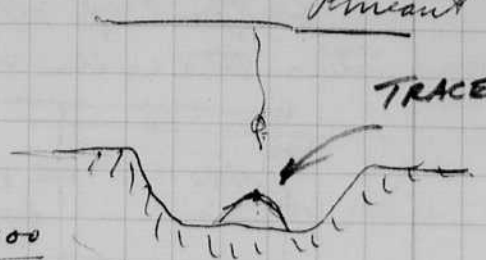
Nov. 5, 1978. Last night - N.E. Aquarium for the Diver's affair "Watermark" to raise money for the Cotting school for Handicapped children. Bill Carmichael is president Frank Stella organized the affair. Tomoshige Miyamura (Japan) and Jean Mooney were there and Esther. We had an early supper at Stella's restaurant. Eugenie Clark was a guest at the us. She showed some slides of her shark experiences.

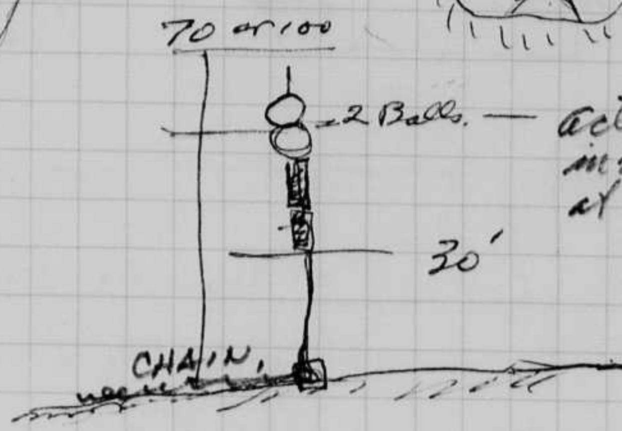
I am packing for a trip to Isreal to help Elisha Linder, Haifa Univ, locate an ancient wreck in deep water. Then we hope to get Link and Johnson to bring their submarines to the spot to conduct a research effort.

Dec. 1, 1978 H. E. Edgerton

Search for 16" Ball Glass Bottles · Conf with Lewis Panaant.? Pinicant







actual installation at H. No. 1.

H. Edgerton.

Dec. 3, 1978. Sees in Isreal with Elisha Linder, uni of Haifa, from Nov 6 to 26. We had a sidescan sonar (Klein) and the SHIKMONA Ship of the Oceanographic Inst for a survey of the off shore area. A Hanewell MINIRANGER was used for navigation.

Isreal Navy.
Oceanographic Dept
Geology Dept
Archaeology Dept
Hyerographic
Divers.
Students.

It was quite an effort. We hope to have a chart with lots of details.

A Byzantine wreck (700 AD ?) was pinpointed where some sherds were found.

A square modern barge was located.

A reef, RABA, was found and mapped.

CHARBONNIER Jean-Philippe Charbonnier 720.70.47.

Was in Paris at the Madison Elysees 34 Rue de Galilee on Nov 27 28 29. MIT Club 27. Agathe Gaillard Gallery Nov 28.

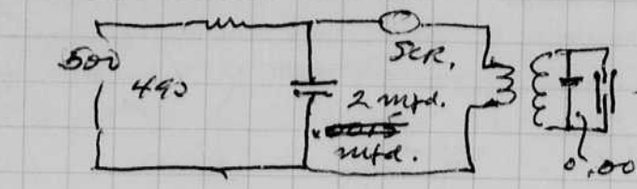
3 Rue du Pont Louis Philippe TEL. 277.37.73. PARIS.

Dec 18 1978

Harold Edgerton Bill MacRae Chris J.

Output of spark source for Silhouette camera

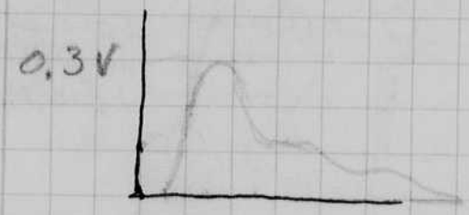
This was used in Florida with Pete Ortner



1/2 gap. 11/16 to 1/32 about 2 mm.

12" Ball operated 500 v photocell.

0.3 meter
0.3048



$0.3 \times \left(\frac{.3}{2.01}\right)^2 = cp.$

79" = 2.01 M 1 watt = 10^6 c.p.

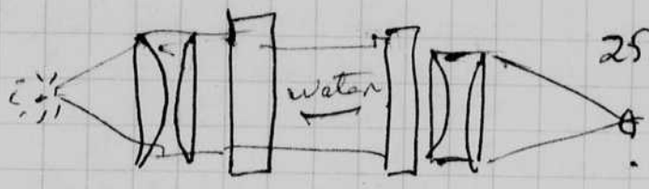
$= .0225 \times .3 = .00675 \times 10^6$

$= 6750$ BCP peak.

Dur = 0.15

Dur x Peak = 1012.5×10^{-6}

= .001 BCPS 0.001

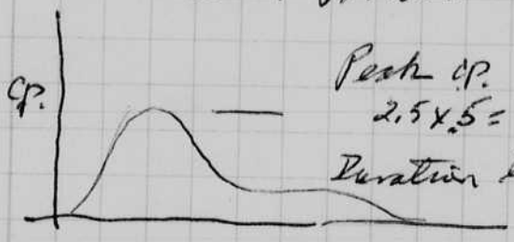


25 mm Lens at (3) not aperture!

1, 2, 4, 8, ... etc.

↑ open

Now use Strobe lamp FX 31 gap 1/8 gap in Xenon Flat front.



Peak cp. 1,15 = 4x the air gap

2.5 x .5 = 1.25 volts. = 25,000 C.P.

Duration longer = 0.2

out = $25,000 \times 12 \times 10^{-6} = .0056$ BCPS.

Note. Light is about 5x greater.

a factor of 10 should let me use 7302 film

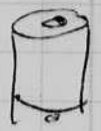
3.5 x .5 = 1.75 volts ⊜ on 39,200

Duration .82 x .05 = 400 mf = .4 ms.

$39200 \times .4 = .015680 =$ .0156 0.0156

Sprague 550 × 10^{-9} farads at the FX-33 lamp.

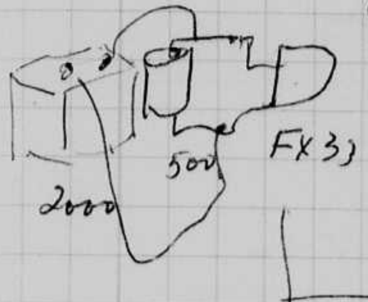
peak = 4 × .5 = 2 volt. = $\frac{6750\cancel{2}.}{.3}$ = 45,000 c.p. peak.
Dur = 0.1
output = 0.1 × 45000 × 10^{-4} = .0045 — **.0045**



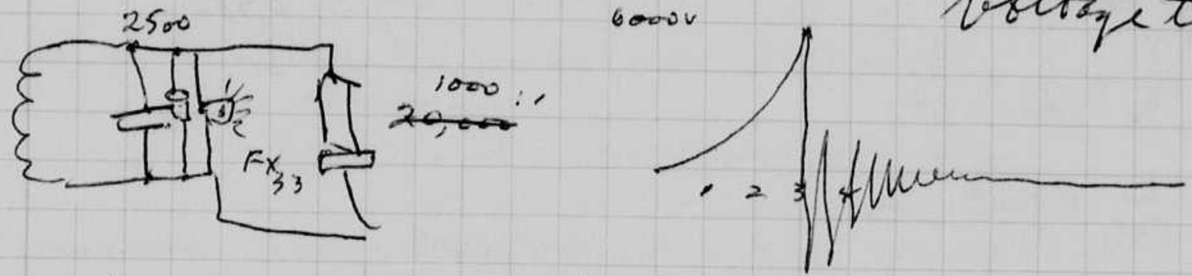
C = 500 20KV. DK-T5

Peak 2 × .5 = 1 volt. = 22,500 c.p. pe
Dur = 0.075 μs.
output = **.00168** BCPS

C = 2500

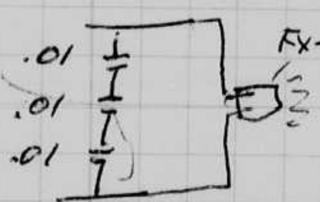


Peak 5.2 × .5 = 2.70 volts. = 61875 cp.
Dur. = 0.8 ~~μs~~ × 5 = .4 μs — **.02 BCPS**
~~= .01~~



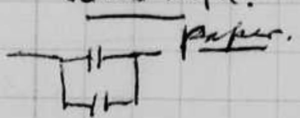
voltage transient.

4 cycles in 1 μs. f = 4 × 10^{6} cycles/sec.



.045 volts. 4.5 × 22500 = 101250 cp
Dur. 0.2 0.2 × .1 × 10^{6} × 10^{-6} ~~.01~~
= .02 — **0.02** BCPS

.005 mfd.



4.6 V × 22500 = 103500
Dur ~~.250~~ ~~.270~~ 300 — 300 — 0.031

Try this. 5.V .300 μs. — 0.03

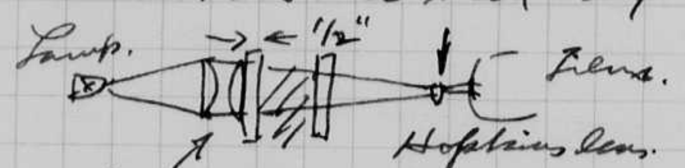
---

38 Dec 20 1938

~~Harold Edgerton~~

The quality of the pictures must be increased.

1. Use more light.
2. Fine grain film Blue Sens. 5302
3. Reduce thickness of glass plates on end from 1" to 1/2".
4. Use condensers on one side only. for example



Test for Resolution.

f.l. of Double lens system = 4½" (10 cm).

3¾" field of view of end of chamber

9.7 cm   Lens: 1.8 cm

F = 25 mm

on film 1.8 cm 18 mm

$M = \frac{9.7}{1.8} = 5.388 \cong 5.4$

$\frac{1}{f_2} + \frac{1}{f_1} = \frac{1}{25}$

$\frac{1}{5.4 f_1} + \frac{1}{f_1} = \frac{1}{25}$

$\frac{f_1 + 5.5 f_1}{f_1^2} = \frac{1}{25}$ $\frac{6.5}{f_1} = \frac{1}{25}$

neglecting glass windows.

$f_1 = 25 \times 6.5 = 162.5$ mm

$f_2 = 30.1$ mm.

New gaps .005   12" to cols...   volts ~~...~~ 3.6 × 22 500   81,000 CP.

Duration 300 × 10^{-6}

(1/8) FX33   output = 0.024 C.P.S.

.005 + 2 = .007 mfd   5V.

(1/8) FX33   Dur. .300 × 10^{-6} 0.033

5/16" gap.   .007   5.8V 350   0.0404.6

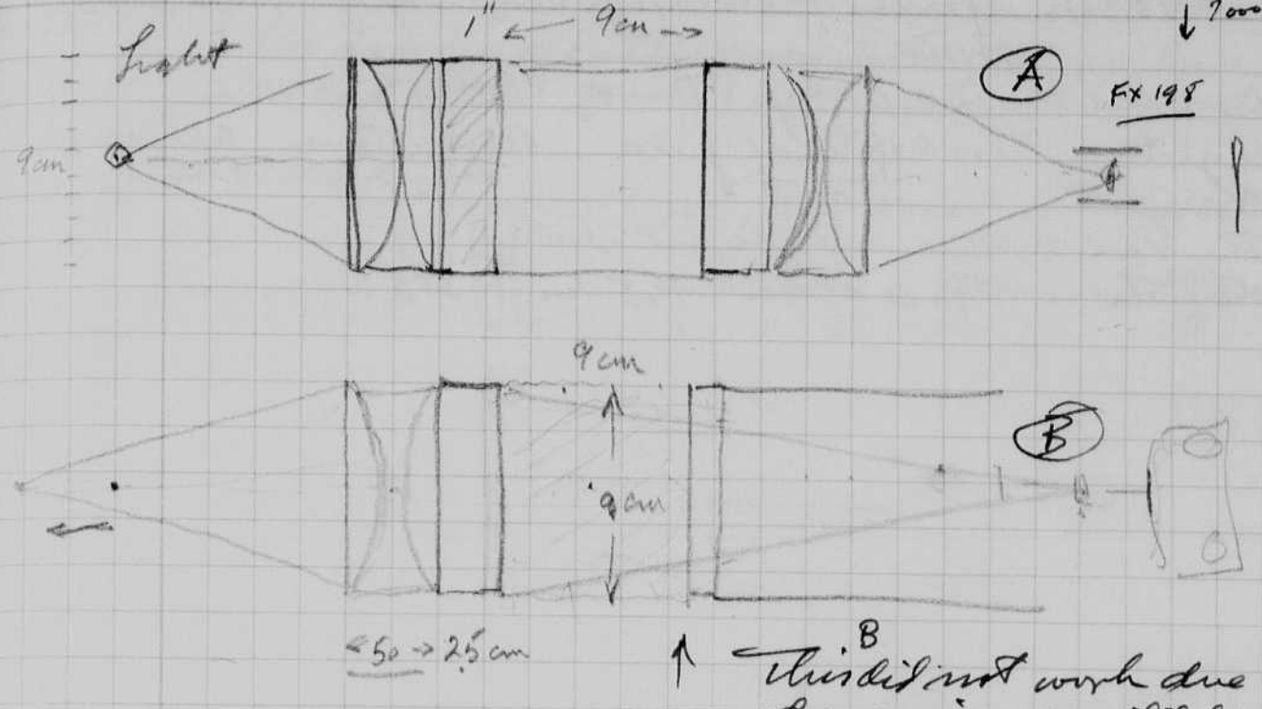
---

return 1/8 1/16   .005   5.5 600   voltage measured 6600 7000 volts instead of 6000.   0.051

FX 198

gain of 2

2 Atmosphere Xenon lamps.
.005 mfd
↓ 7000 v.



B this did not work due to dimensions available so I went back to the A system

Later A system was used with better resolution

Dec. 22, 1978 now oil into water between the lenses.

Exposure ok with 5203 film ~~Day~~
35 mm at f 4.5 on 25 mm lens
also ok at 6.3 on 25 mm lens.

pg. 11

The timing light on the clock was adjusted to be closer so the image was ok.
Exposure was weak with 2 caps on lamps.
Now changing to 4 caps on 6 V circuit.

Focus is not good enough!. I need a ~~needle~~ needle for a subject.
The field lenses destroy the optical quality.

Dec 23 1978 Test of Hoptains f11 35 mm f.l. Lens in ~~Barrel~~ Barrel.
6 turns in 2.2 cm from front edge.

f11 35 mm U.W Lens. Plot at center in focus. print made x 15 x 10

I also printed the 25 mm Lens plots of yesterday from M.C.

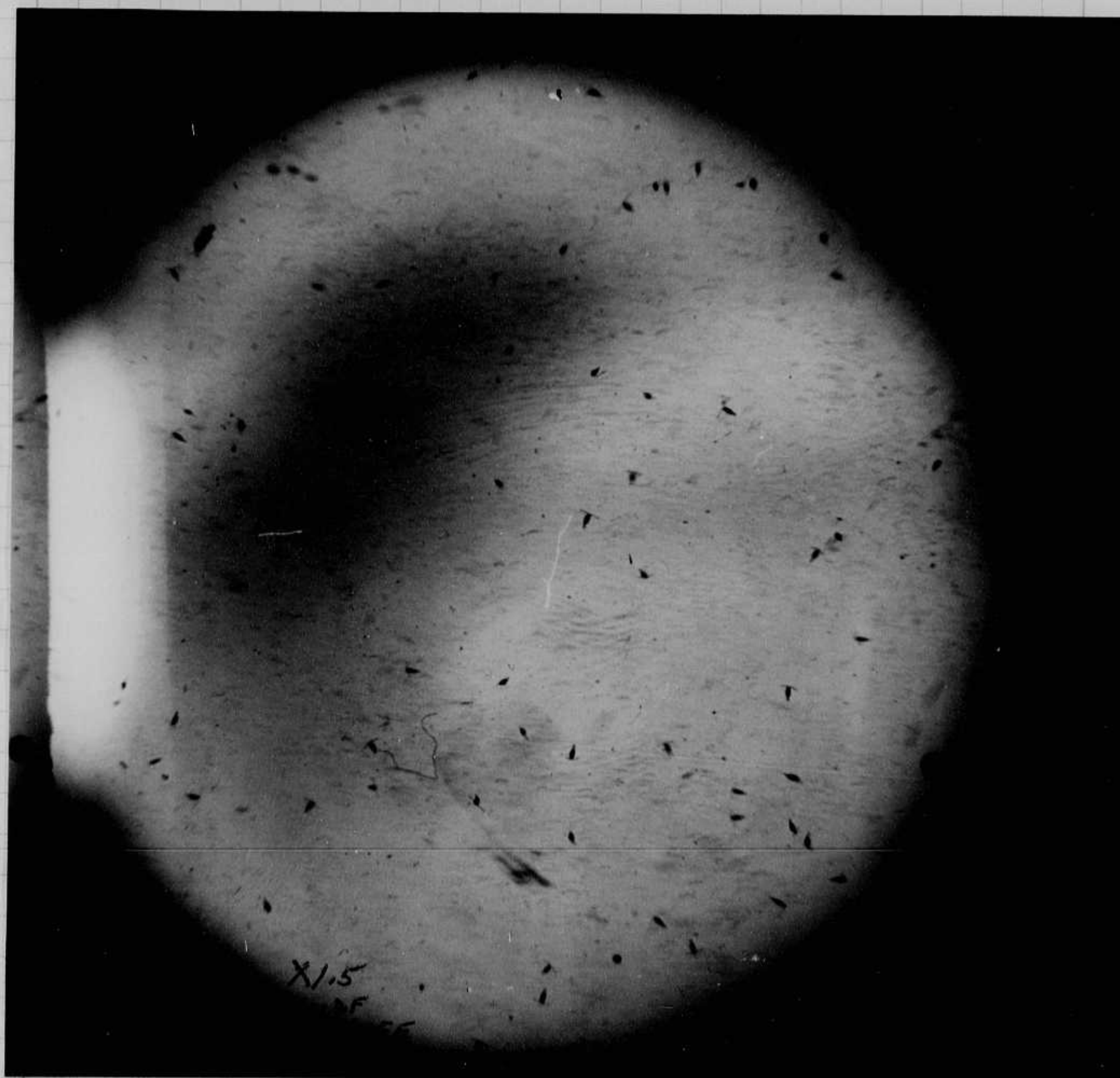
Dec 28 1978.
H. Edgerton
10 cm space tested with Copepods & Brine Shrimps. — ARTEMIA SELINA
Then cut to 4 cm by Dave Potter. Fisheries WH [?]
to get greater depth of field. Acartia Tonsa copepods from Kathy Smith at the New Eng Aquarium.
Dec 29 1978 H. Edgerton.
The 4 cm depth seems to be satisfactory.
(note) The depth is about 4.5 cm   385 cubic cm.

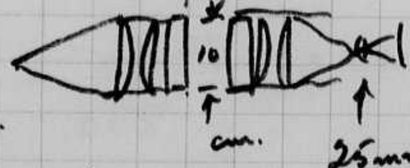
COPEPODS

ACARTIA TONSA

Copepods

X 1.51





0.05 cps.
.5 μs.
Xenon

25 mm f5.6 (could be f11)?
Volume = 385 cu. cm.

Jan 14 '79 4.5 cm changed to 4.1 cm.
[illegible] 99 mm

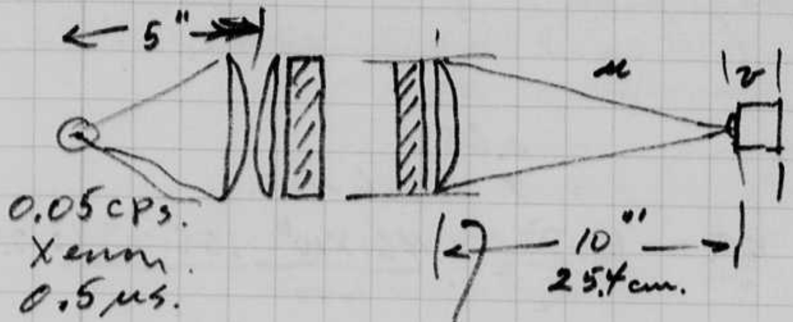
1978
Dec. 31 at Brandon 'Righmeyers' [?]
for Party - Belmont Mass.
Dean and Anne Holden
Ruth Ipsen
Janice Kispert
Betty & Frank Reintjes

Jan 1, 1979

Harold E. Edgerton.

Dinner at 100 mem. Shuttle: Milford & Marie, Bernie Allen & Kathy. 41

On deep sea plankton camera try 35 mm lens f 11 instead of the 25 mm f 4. This 35 mm lens is the Hopkins type.

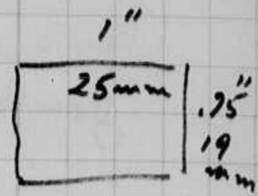


5302 FILM. F = 35 mm.

$R = \frac{4''}{?} = \frac{10\,cm}{1.9}$

$= 5.26$

$M = 1/5.26 = 0.19$



Try only one condenser lens.

Back off lens to cover 4" circle of field.

Then side illuminate subjects in the "water space". Adjust film back of the lens to give focus. adjust $\underline{v}$ for this.

Hyper equation.

$D = 2cfR(R+1)$ c = 0.1 f = 11 R = 5.26

$D = .2 \cdot 11 \cdot 5.26(6.26) = 72$ mm. depth of object volume.

$5 \times \frac{35}{25} =$

After some trials of 35 mm and a single condenser, I decided to go back to the 25 mm f 3.5 lens and the two 5.0" Double lenses.

Then we tried to stop the lens to (4) on the scale. Difficulty was experienced in filling the field. I went back to (2) on the scale. Then it was better. Also we tried to move the strobe about 1 cm beyond the focal point.

For this, the area was reduced. Then the equipment was put in the underwater cases. The performance was not very good. The field was not uniformly illuminated.

Now I must try again with a better line-up system.

Jan 9 1979 HE.

I was in Detroit (Pontiac) with Bob and his family on Fri. and Sat night. We went to a dinner party on Friday to Jan Hechman's apartment. She teaches biology at Bob's school and they drive together to work.

On Sat night Bob had 45± Folk singers club in for a jam session. Ellen, Bob & Jenny DETOUR with Guitar and Banjo.

Em, Nina & Sylvia went skiing on Fri and Sunday. We were home on Sun afternoon.

Dec 28 1978
H. Edgerton
10 cm space tested with copepods &
Brine Shrimps
ARTEMIA SELINA

Then cut to 4 cm by Dave Potter.
to get greater depth of field. Acartia Tonsa copepods for Kathy Smith at the New Eng Aquarium

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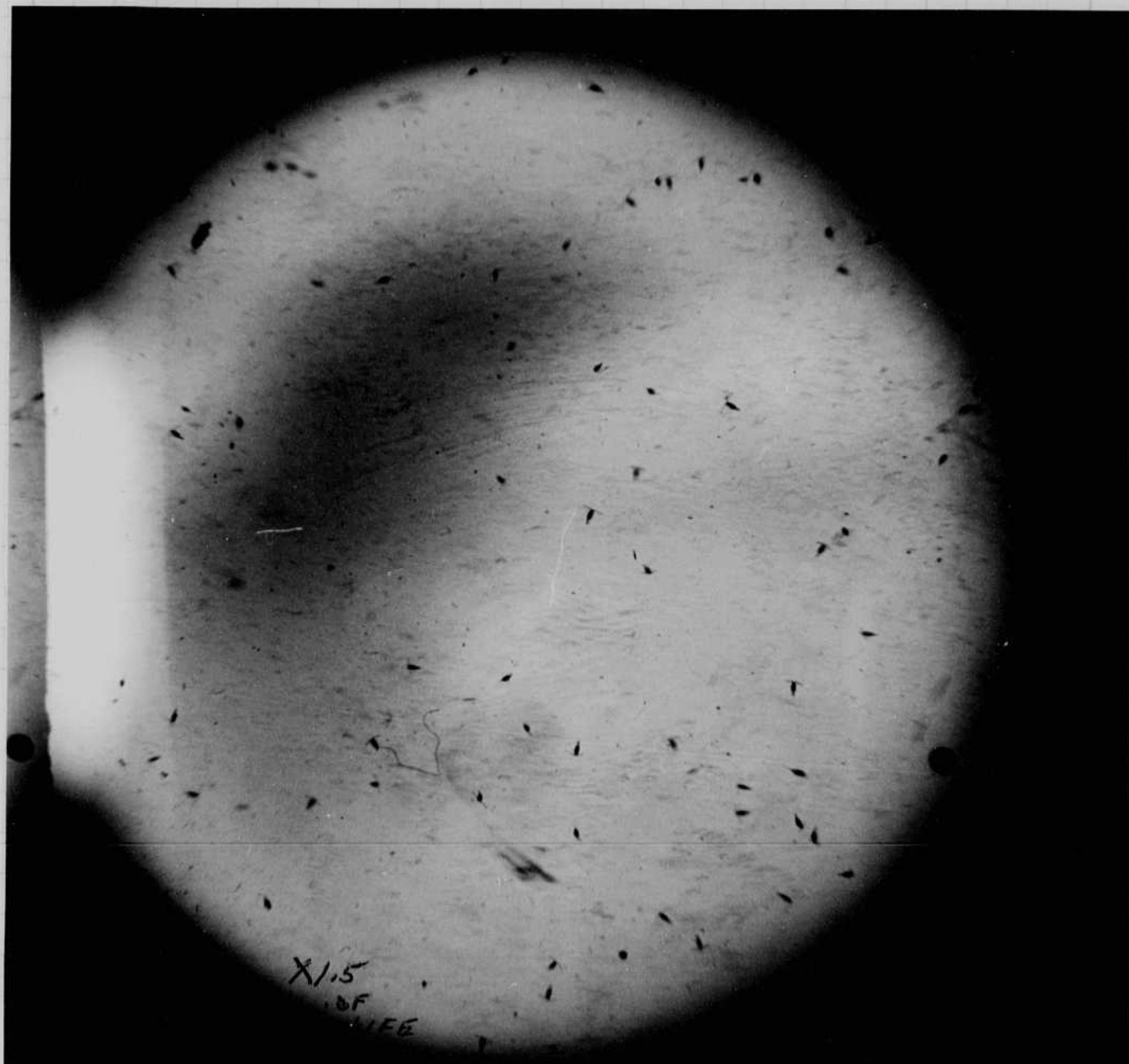
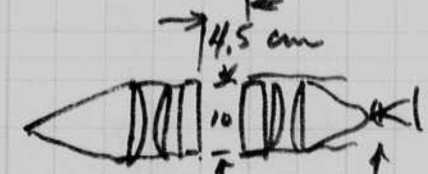
COPEPODS

ACARTIA TONSA

Copepods

X 1.51





0.05 cps.
.5 μs.
Xenon

25mm f5.6 (could be f11)?

Volume = 385 cu.cm.

Jan 14 '79 4.5 cm changed to 4.1 cm.

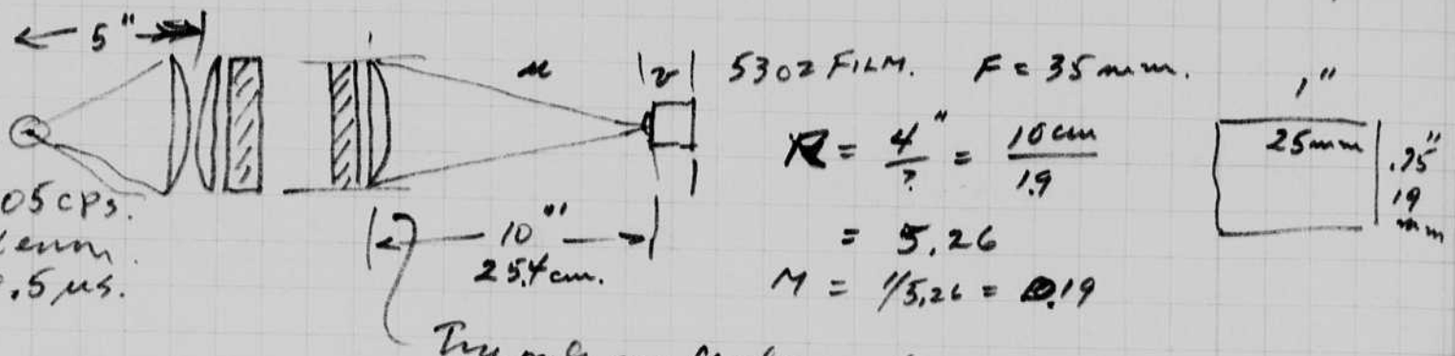
1978
Dec 31 at Brandon
Righmeyers
for Party - Belmont
Marcia.
Dean and Anne Holden
Ruth Ipsen
Janice Kispert
Betty & Frank Reintjes

Jan 1, 1979

Harold E. Edgerton.

Dinner at 100 mem. Shultz. Milford & Marie Bernie Ellen & Kathy.

On deep sea planktn camera try 35 mm lens f 11 instead of the 25 mm f 4. This 35 mm lens is the Hokeshima type.



Try only one condenser lens.

Back off lens to cover ¼" circle of field.

Then add illuminate subjects in the "water space". Adjust film back of the lens to give focus. adjust V for this.

Hyzer equation.

$D = 2cfR(R+1)$ $c = .01$ $f = 11$ $R = 5.26$

$D = .2 \; 11 \; 5.26 (6.26) = 72$ mm. depth of object volume.

$5 \times \frac{35}{25} =$

After some trials of 35 mm and a single condenser, I decided to go back to the 25 mm f 3.5 lens and the two 3.0" Double lenses.

Then we tried to stop the lens to (4) on the scale. Difficulty was experienced in fixing the focus. I went back to (2) on the scale. Then it was better. Also we tried to movedthe strobe about 1 cm beyond the focal point.

For this, the area was reduced. Then the equipment was put in the Underwater area. The performance was not very good. The field was not uniformly illuminated.

Now I must try again with a better line up system.

Jan 9 1979 HE.

I was in Detroit (Pontiac) with Bob and his family on Fri and Sat night. We went to a dinner party on Friday to ~~with~~ for Hoekema's apartment. She teaches biology at Bob's school and they drive together to work.

on Sat night Bob had 45 Jack singers club in for a jam session. Ellen Bob & I sang DETOUR with Guitar and Banjo. Mr. Nina & Sylvia went skiing on Fri and Sunday. We were home on Sun afternoon.

 Jan 9 1979 cont. Harold

I am busy with the preface for a paperback edition of Electronic Flash-Strobe. It will be printed by the M.I.T. press.

We also have Moments of Vision with J. Rhyne Killian almost ready to see the page proof.

There is a Woods Hole meeting today at the Meteorological building in Boston.

Jan 9 1979 cont 2 30 pm

MINOX EC 35

0.65V

T = 0.6 ms.

$$C.P. = \frac{KVD^2}{R_L} = \frac{461\times10^6}{1000}\ .65\ 1 = 299{,}000.$$

~~$299\times10^6 \times .65 \times 10^{-6}$~~ = 0,179 $\times10^3$ = 1790 ≈ 180. BCPS

21F 5.6 = 58 (for 100) 117.6

$$DA = \sqrt{180\ \frac{400}{25}} = \sqrt{180\times1} = \sqrt{2880} = \boxed{53.7} \rightarrow \boxed{117.6}$$

mfg.

BIRD

3 LAMP BIRD UNIT

$T = 60\times10^{-6}$

C.P. = 5V × 10 × 10⁶ C.P. × 4 (100 R)

all × 4 since [illegible] distance

output = 60 × 50 = 3000 B.C.P.S.

= 4 × 3000 = 12,000 BCPS.

Reading high compared to marks on the lamp housing.

Phoned Jan 14 79 472-5000 Room 1208

$$DA = \sqrt{12{,}000\ \frac{25}{25}} = \sqrt{1\ldots} = 109.5$$ ~~110~~

S = 25
D = 5 ft
A = f22

109.5/5 ft = f22.

Gjon Mili (Kay Rose called) broke wrist N.Y. Hospital Room 1208 682 York (682 York ave NY 10021)

Conrad Sandell Jan 11. 1979. "Bear" is 10 miles (west) from the 100 fathom curve.
240 miles east of Chatham mass
65° 35' W 49 fathoms
42° 25 N (300 ft).

There are plans afoot for a spring expedition to find and photograph.

Jan 14 1999. 100 memorial Dr. Cambridge Mass apt 11-7A (11-6A to).
Harold Edgerton.

Silhouette camera. 3.89" 1.6"

Volume of water exposed is 4.1 cm thick and 9.9 cm in diameter.
volume = $\pi R^2 \times T = \pi\ 4.95^2 \times 4.1 = 316$ cubic cm. = 19.2 cubic inches

Jan 15 1999 Test of camera Sil
#1 .005 Mfd depolarized in H.O. 2:1 for 2 min very black
The clock and pressure gage were exposed. #2.
Lights in room on for test of fog.
#2. The cap was reduced from .005 to .003 for #2
The lamp was moved 1/8" away from the big boss.

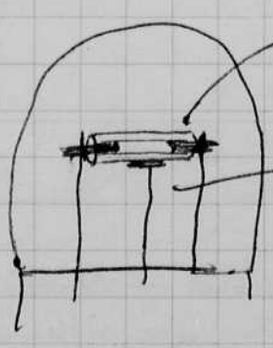
Mrs Roberts made an experiment outdoors. There is some fog due to direct sunlight when the camera is running but it will not bother when the camera goes into the water.

Jan 23. 1999 I was at B&H in Salem yesterday to return a microphone that Mac and I have been using for tests, We recommend that the spark voltage be reduced by the insertion of a resistor as outlined in a letter to Bruce Birnie.

X Harold Edgerton
100 memorial Dr.
Camb. Mass
Apt 11-7A

I saw Murzclver and Mc Lennon., Radford, Ryan McLeod etc at B&H.

Design of a lamp with a quartz tube for pressure after discharge. The normal FX 6A lamp which is a gap in a bulb has low efficiency since the gas expands after discharge This design will keep the gas in the arc path for a longer time. Then the gas will blow out and new gas come in if the discharges are a long time apart.



 Feb 2 1979 Harold Edgerton

The new book "Moments of Vision", with James R. Killian which is the best of Flash I (1939) and Flash II (1954) is now in the hands of the printer at the MIT press 35 Carlton St Cambridge Mass. The page proof is due the first of March. The books should be out in May. Robyn Sweesy is the editor.

Yesterday I gave the new preface of a new edition of "Electronic Flash Strobe" to Mrs. Helen Osborne. This book was dropped by the McGraw Hill Co about a year ago. It will be paper back reproduced by the M.I.T. press also. The time will be also May for books to be available.

Plans are being made for a trip to Florida to see the Harbor Branch people and ~~the~~ to do some experiments with Pete Ortner at Miami. Also I am scheduled to lecture at the Florida Atlantic University for their engineers week. Two lectures will be given. One on the xenon flash method of photography and the other on archeological uses of sonar.

FX 108 AU 7806

Silhouette equipment. (as is) 3 μs .3 c.p.s. ~~FX6A~~ Standard lamp.

.023 V × 4 × 10   2.3 .02 = .046 volts ×10 / 4 ~~10~~ = 0.0115 c.p. [illegible] 3 ~~μs~~.
V   D.   R

An FX198(?) 2 atmosphere lamp will now be substituted.
.027 volts. .054
$\frac{2.7}{2.3} = 1.17$

It was put in ~~[illegible]~~ but removed since it slipped. Several others were tried. The pins do not fit very well.

I then put in a 1/4" (?) gap lamp that seemed to have the same peak out put of the original. The source will be smaller.

Exposure with 8×10 color film Polaroid OK
Two lights at 45° at 9 ft crossed.
18,000 13 CPS cases. f 32 at 9 ft to subject.

Try 12 ft at f 16 tomorrow for Owl photos.

Feb 3 1979 HE. Owl photos at Mus. of Sci. Barbara Baker "Archimedes" & "Spooky"
Lindsey Harkness 5 photos/sec is the same as the wing rate.
Denise [illegible] & - - J. helped
Gene O'Connel of Polaroid brought an 8×10 camera along.

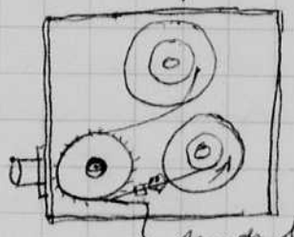
Color 8x10 f22 two lamps at 10 ft at about 45°. Dark background due to big room with no lights. Exposure ok.

Photos on Plus X also at f 22. OK. with 18,000 BCPS lamps T = ?
C = 1 mfd 4 Kv, R = 2? $RC/2 = \frac{2 \times 1 \times 4 \times 10^{-6}}{2} = \frac{56}{2} = 28 \times 10^{-6}$ seconds.
calculated duration 28 μs.
I think it could be about 50 μs. Wings appear to be stopped!

Feb. 7, 1979. Harold Edgerton.

Elapsed time camera design.

Several times I have thought of a continuous motion film camera for slow-rate operation.



synch by infra red on sprocket holes.

Perhaps a pulldown system would be better

Hugh Mulligan of EG&G. Waltham was in Tokyo to talk about plankton in the sea. We talked about the silhouette method of plankton photography using a small xenon lamps. He gave me a book of photos of the small animals in the sea. Most of the photos were made at 500 magnification.

To get 100 magnification is a lot of trouble of my negatives. I must try again the double magnification system. $\sqrt{500}$ = 22.4 501.7
22,3 500.86
22.2 492.84

Feb. 10, 1979.

A new lens came in this week. An f 1.9 55 mm Nikkor computar with an adjustment for different enlargements. I still had troubles trying to get x 20 enlargements. I finally settled on 17. x in the Eastman enlarger.

The lens could not be used in my Leica enlarger. I could not get it to go close enough to the film. Try again by holding the film lower.

 Feb 10 '79 H. Edgerton cont.

I went to the Aquarium (N.E.) this morning to test the silhouette camera. 100 feet of 5302 finegrain positive film was used. There is no problem with daylight except for the one frame that is exposed. The sun was shining today but it was very cold and windy.

The lights in the aquarium big tank did not expose the film at all. There were no streaks of light. The "daylight" going from MIT to the aquarium did expose one frame only - the camera was not running for the transportation.

Chris able dived in the tank. He squirted some brine shrimp into the active area when the exposures were being made. I noted that the water was not the same index as the water in the tank.

Greg Early, Don ~~Ma~~ Laughlin also helped with the experiment.

Kevin Campbell and Lisa M.E. dept went with me to the aquarium. She is studying the plankton bloom on Nahant beach area.

9.25 on in Lab }
7.31 off. }

Fog here to Aquar in Bus
10.01 in dark area
10.12 into water
10.15 5 ft off Bottom
10.18 second supply Brine
10 20 Shrimp
10.21 Brine }
23 Shrimp. }
(10.26 / 10.28) Algae
10.30 } Sand Particles
32 }
up to surface then down
10 35 Lower to Bottom after more rope used.
10 51 start up.
54 out of water
54.5 on deck.
11.00 end.

f 4 lens.

#2 or aperture (f 3?)

Processed in HRH 4:1 strength.
Density excellent.

I showed movies about the Monitor, loss and finding at the N.E. Aquarium on the evening of Feb. 19. There were 270 MIT alumni and children there. Then 70 stayed for a buffet supper.

Feb 11, 1979 Harold Edgerton

Bob Marx called last night to report on his trip to Israel. He is to work with Ben Eli, Robon and Elisha Linder in the 100 to 200 ft depths looking for Phoenician wrecks.

The chances of Link assistance is small since Link is not too well. He just had his heart pacer repaired because of a loose wire.

Sept & Christmas time effort in Israel. Coral Island in Red Sea. Dothan is enthusiastic.

Marx hopes to interest Chas. Mazel.

Sonar (side scan is needed). Penetrator too in Red sea.

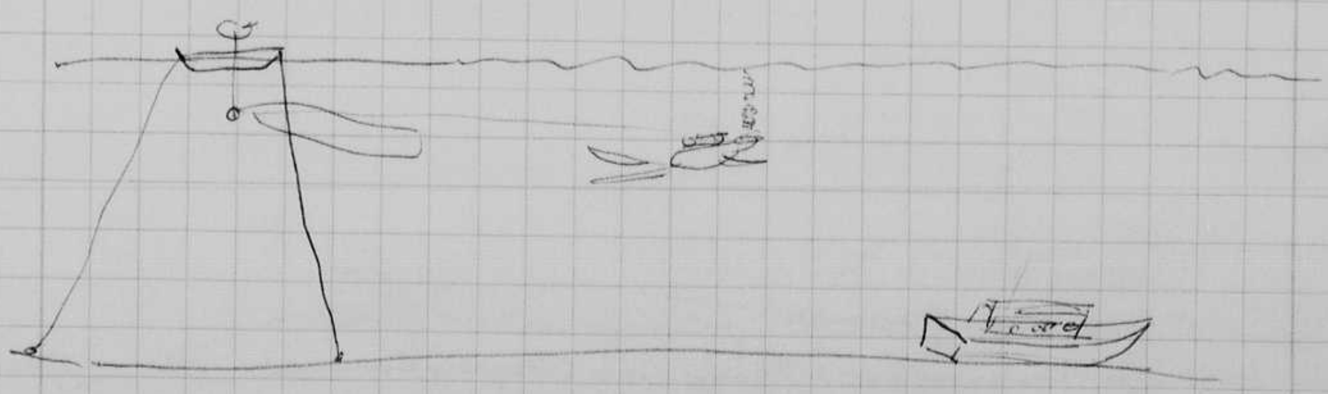
Spain Cadiz Bay. U.S. Navy has been doing penetration in the bay looking for lost bombs.

3 Sunken sites in this area Phoenician
Roman
Taresa (?)

Marx hopes to see people in Spain for authority.
Marx has a group in India (East) on ship wrecks.
Mar 10 Madrid - Bob Marx to go to Spain.
Von Robenbaum (?) metal expert.
April - Aug - Spain for project, then Israel.

Marx wants to rent or purchase a side scan sonar. He will also need a penetrator and a rotary side scan. HE to talk to EG&G about this.

Special Sonar for Diver contact. The important problem with divers in the control of their search. Often the people on the ship know where the diver needs to go but cannot get word to him. A loud speaker in the water might be the thing to use. Henry Kendall has one of these. ABS & Benthos is working on similar equipment.



 Feb 18 1979 Harold Edgerton.

I go to West Palm Beach at 8am tomorrow on Eastern airlines with Esther. We will be at the Harbor branch for 2 days. Then we go to the Florida Atlantic Univ at Boca Raton for 2 lectures. Also McAllister will furnish a boat for an experiment with the silhouette camera. Peter Ortner from NOAA will come to see this and help on Friday.

ESTHER & HAROLD EDGERTON, Florida Itinerary, 1979

February 19 (Mon.) Lv. Boston at 8am on Eastern #867, arrive W. Palm Beach airport at 10:59am

Pick up air freight equipment, check in at ~~Driftwood Inn~~ Harbor Branch apt #1

Call Harbor Branch Foundation (305-465-2400) in afternoon to unpack equipment

February 20 (Tue.) Equipment trial for silhouette photography with Marsh Youngbluth (H.B.F.) *Excellent results with C[illegible]*

February 21 (Wed.) Equipment trial for silhouette photography with Marsh Youngbluth (H.B.F.)

Seminar at Harbor Branch Foundation

4pm leave for Florida Atlantic University, Boca Raton (Campus housing)
8pm lecture at " " " " "
on "Xenon Flash," in the Cafeteria

February 22 (Thu.) Experiments with silhouette camera

8pm lecture at Florida Atlantic University, Boca Raton on "Underwater Archaeology," in the Cafeteria

February 23 (Fri.) Continue experiments with silhouette camera, with Dr. Pete Ortner (NOAA) - plankton photography *Pete did not come.*

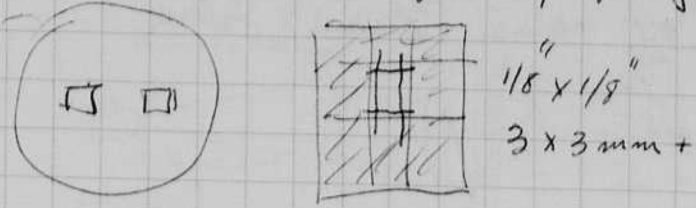
February 24 (Sat.) Pack and ship silhouette camera from Miami to Boston ✓

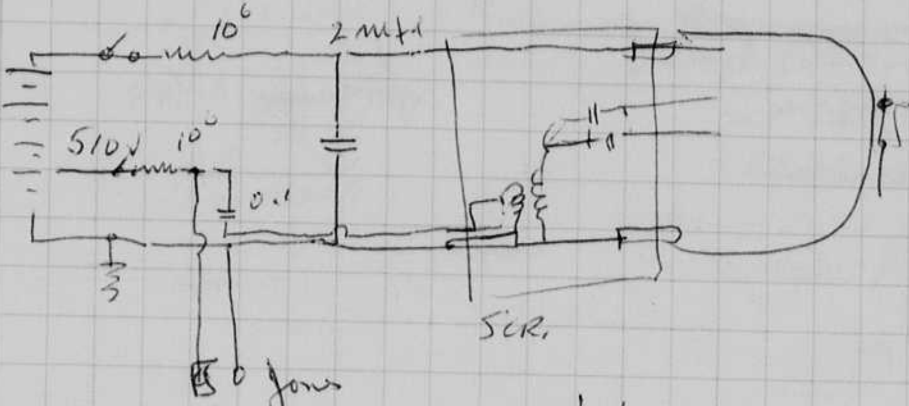
Drive to Sarasota to visit Margaret and Bob Robinson, 601 Mourning Dove Drive (813-366-2705) ✓

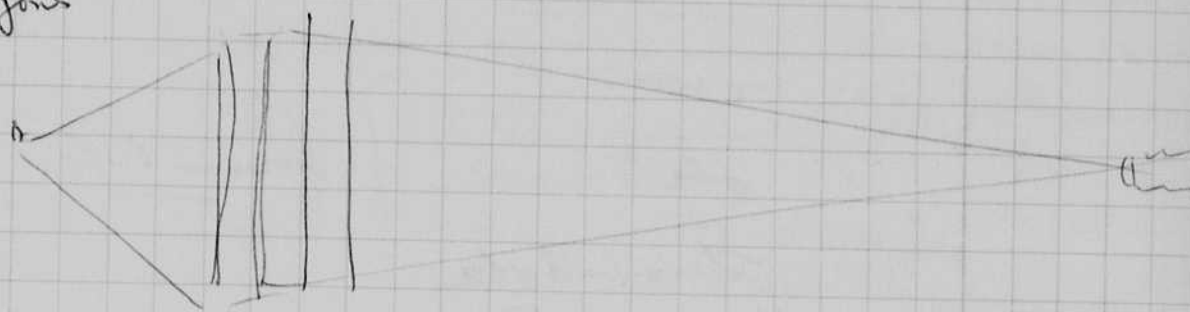
February 27 (Tue.) Lv. Sarasota at 12:53pm on Eastern #178, arrive Boston at 4:15pm ✓

March, 5, 1979 at Raleigh N.C. for a meeting of the Monitor Committee. Larry Tise. Sonny Cockrell Floyd Childress Gordon Watts. H.A. Searle.

Mar 6 1979.
~~Harold Edgerton.~~
Bill MacRoberts
Color Shadow photography.

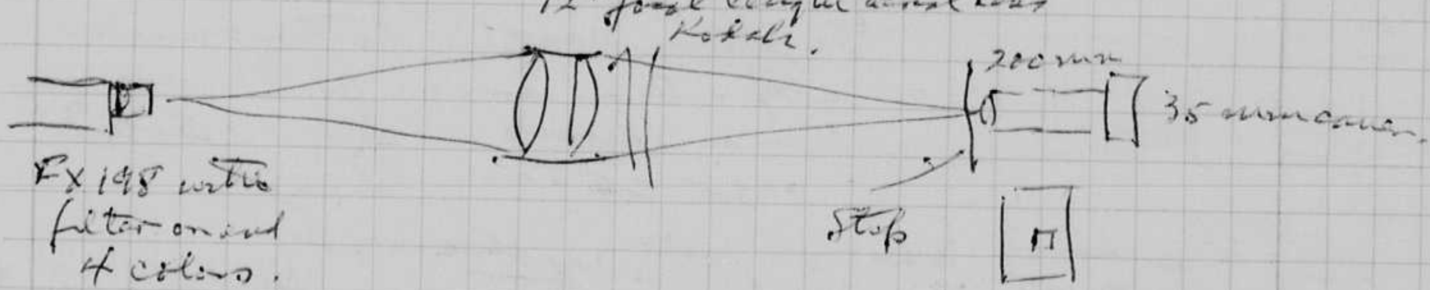




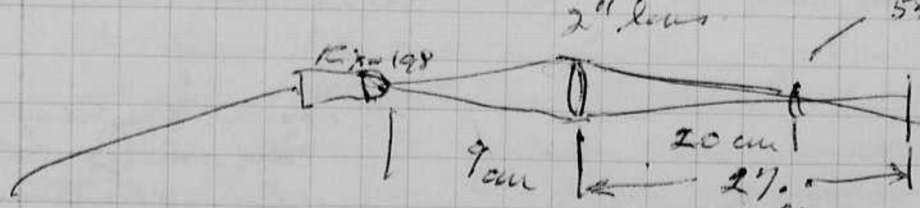


Mar. 9. 1979

Color Schlieren set up of yesterday.



5302 film
Exposure
check at f 4

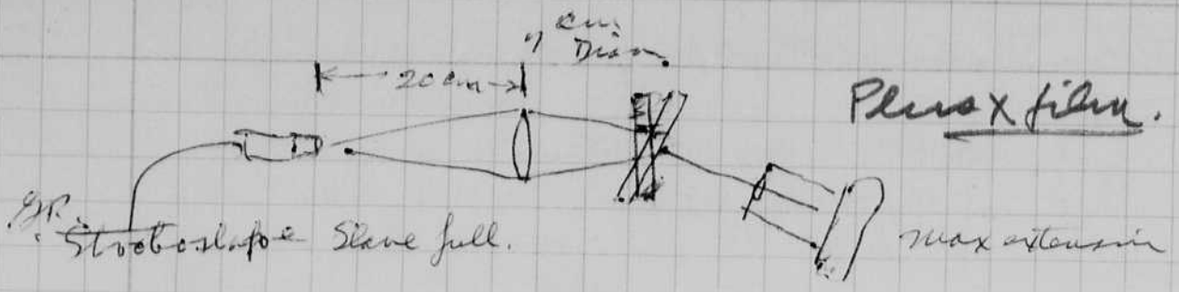


5302

2" lens 0-8 Med f 11 over
9-15 High f 11 over
22 Low f1 OK

Black.
3" lens 23-24 Low OK
24-25 Med over
26-27 High over

cont.



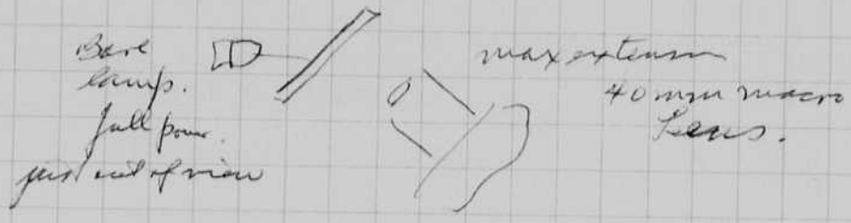
Plus X film.

f 3.5 ~~over exp.~~ X correct

f 8 thin

f 16 under

focus N.G. why



f 3.5. over

f 8 ok

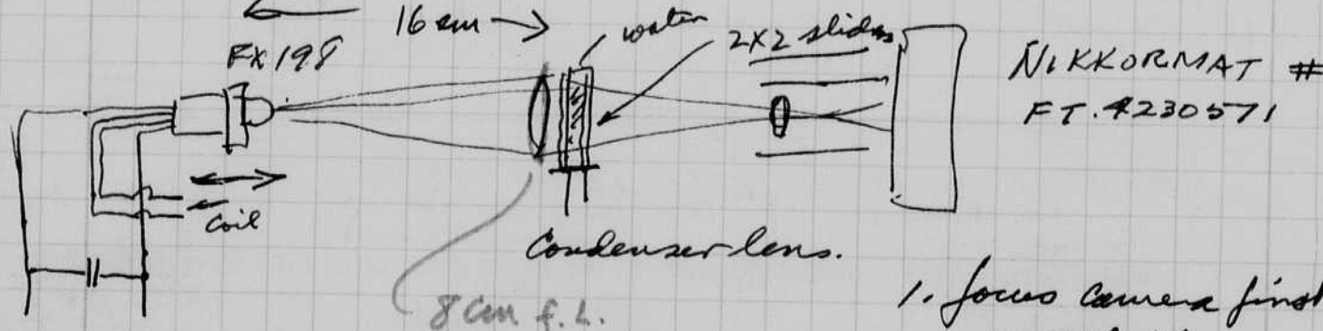
f 16 thin but ok.

focus N.G. why?

March 11th, 1979 Harold Edgerton.
Sunday.

Conclusions. Field lens backlighting is great and very efficient for light.

Suggestion. Make a battery operated strobe unit for a camera for 1:1 using a 55 mm. Means Milston-D Auto.
1:3.5 f 55 mm 662559.

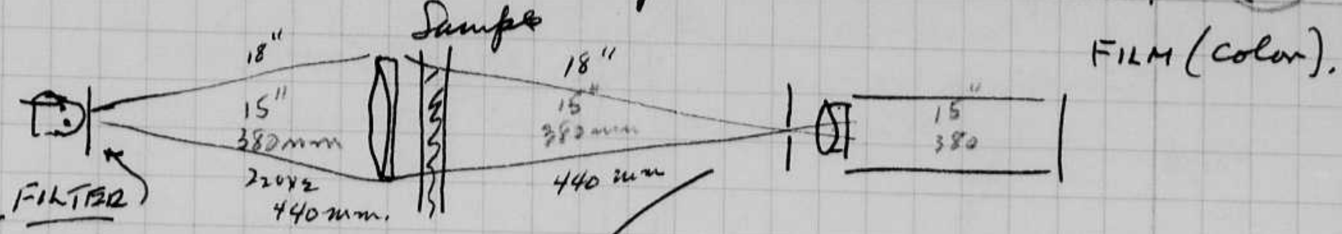


1. Focus camera first on subject.
2. Put lens behind the subject
3. Focus the lamp so the image hits the lens aperture.
4. find amt of light needed for exposure.

Design strobe to match →

color schlieren.

1. Is a Doublet lens needed for the condenser? (yes)



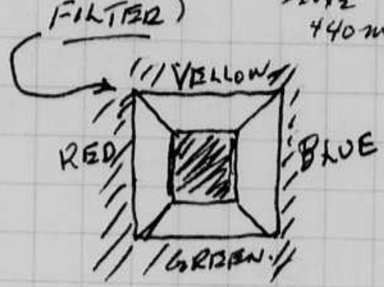
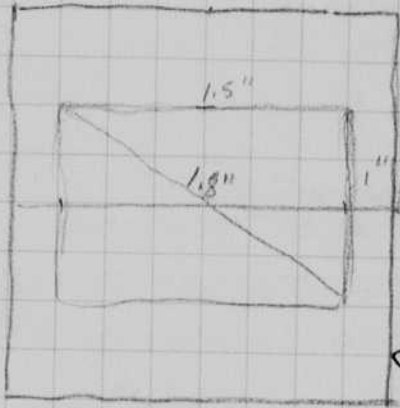


Image filter onto a plane.
cut hole to match the
black square.
focus lens for 1 to 1 or greater
magnification.

$\frac{220}{52}$ = 4.23 f

\$ 51.25 Edmund Sci for
lenses.
2 41266 220 mm
1 41049. 172 mm

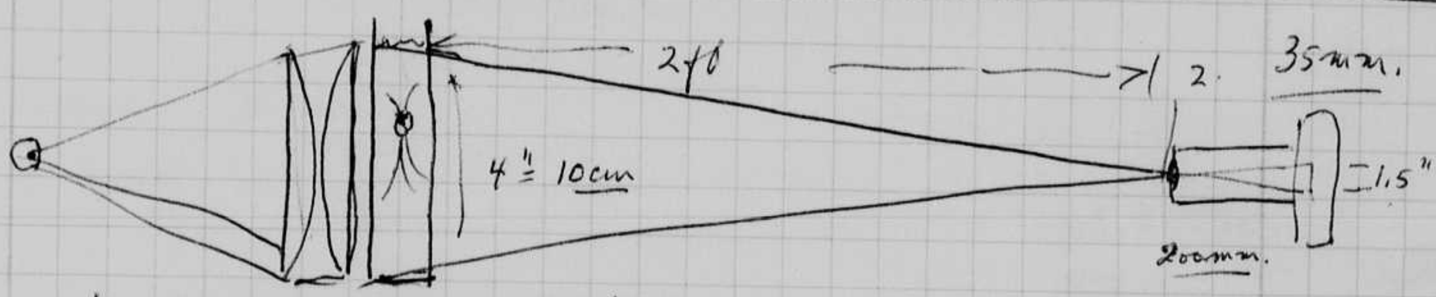


√3.25 = 1.8 × 2.54 = 4.57 cm = 45 mm
45 mm 191 mm f.l.

6183 45 mm 191 mm
40970
5117

2.54 [illegible] 3.8 [illegible] mm
15"

Edmund Sci
41,049 45 172 mm \$7.25 p52
2" × 2.54 = 50.8 mm
41,266 22.50 220mm 52mm diam P53
Ordered Mar. 11, 1979.



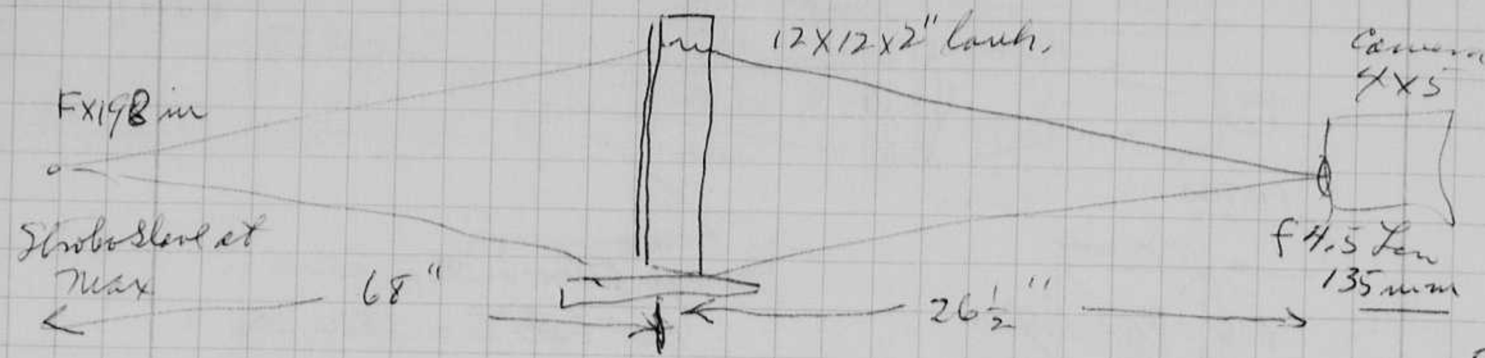
$\frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{F} = \frac{1}{200}$ $f_1 = 10$ cm $f_2 = 3.8$ cm $\frac{10}{3.8} = 2.63$ $\frac{2f}{2.63}$ (24 in) $= 9.1" \times 2.54 = 23$ cm.

March 12 1979 Monday. Marsh Youngbluth at the Harbor Branch Foundation - (Johnson bio. lab.) could use an "on board" photo system for taking direct shadow photos of large transparent animals in the sea. I propose to set up a system of 10"×10" area and 2" depth for ship board use. I will probably use a plastic fresnel lens for the back lighting scheme. I also plan to use a 4×5 camera with 5302 fine grain positive film. However a 35 mm camera system will be available and probably more convenient for routine use.

Mar. 14, 1979.

Harold Edgerton

Tests of 10" diam Fresnel Lens.



folder
5302
2 min.
Dev.

#1 f4.5 Lamp bulb in frame (Small) 1/500 sec.

#2 f 11 Ceran W-s/p & Clip. 1/500 sec. focus at center

#3 f4.5 1/500 ~~focus on clear side~~

4 # 4.5 Salt water from capillary 1/500 focus on front

4:30pm 5 4.5 Salt at angle. 1/500 focus at center
Lens spaced 1/4" back.

5pm 6 4.5 Salt. Straight down Lens back 2" from glass
Rough side in

Bell wa...

#5 →

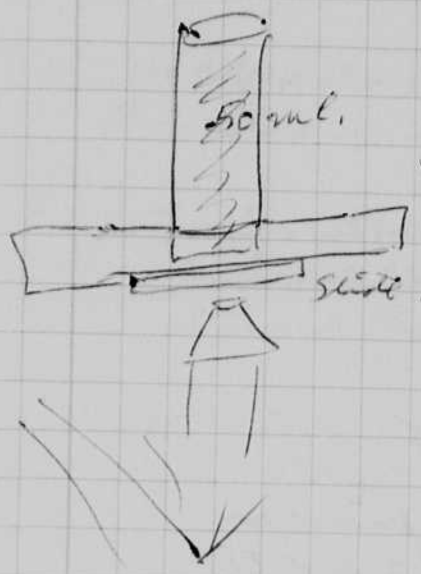
Cover
Glass
thickness
0.13 – 0.17 mm

Phytoplankton
A. GOWEN &
A. MULLIGAN
1978

Mar. 16, 1979

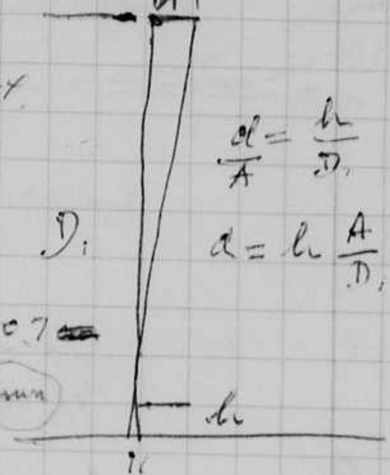
Harold Edgerton

Hugh Mulligan was in at 11 to discuss the plankton photography.
He explained how he takes 50 ml of water and treats it with formalin + $CaCO_3$(?). Then the material settles after 12 hours so he can study it with an inverted microscope



Penumbra

Let $h = 0.1\text{ mm} = 10^{-4}$
$= .01\text{ cm}$
$D = 100\text{ cm}$
$A = 0.7\text{ cm}$
$\frac{A}{D} = \frac{0.7}{100} = .0007$
$h\frac{A}{D} = .007 \times .1\text{ mm}$ ~~$\times .00007$~~
= ~~.00007 m.~~
= ~~.7 micron~~



Shadow = = .0007 mm = (0.7 μ) ✓ (0.2 mm)

The cover glass is about 0.13 to 0.17 so the penumbra will be about double say 1.4 μ.

film 7302
200 lines/mm
200×10^3 lines/m
200,000 lines/m
$\frac{1}{200,000} = 5\times10^{-6}$ m/line
= 5 μ
with EK 343
2000 lines/mm
= 0.5 μ

1. Decrease A (lamp) dimension from .7 cm to 0.35 cm by rotating the lamps.
2. Increase the height to 1.5 m or 2 from 1 m.

These changes will decrease the shadow edges to 0.35 μ.

Diffraction

$I = \sqrt{2 d \lambda}$ $d = h' = 0.2\text{ mm} = .2\times10^{-3}\text{ m}$ ✓
$= \sqrt{2 h \lambda} = \sqrt{2\ 0.2\times10^{-3}\ .4\times10^{-6}}$
$= \sqrt{0.4\times10^{-3}\ .4\times10^{-6}} = .4\sqrt{10^{-9}} = .4\sqrt{10}\sqrt{10^{-10}}\text{ m}$
$= .4\times3\times10^{-5}\text{ m}$
$= 1.2\times10^{-5}\text{ m}$
$= 12\times10^{-6}\text{ m}$

$\lambda = .4\times10^{-6}\text{ m}$

Diffraction = (12 μ.)

Conclusion diffraction is the largest error!

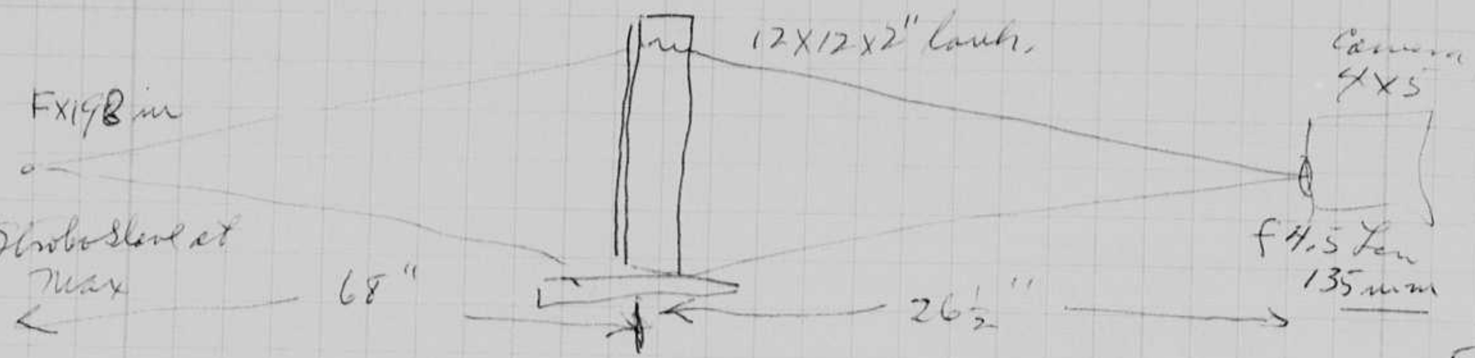
(A) go to U.V. $.3\times10^{-6} = \lambda$ Diffraction still bad.

(B) Reduce the subject to ~~distance~~ film distance.

 Mar. 14, 1979.

Harold Edgerton

Tests of 10" diam Fresnel Lens.



Film 5302 2 min. Dev.

#1 f4.5 lamp bulb in frame (Same) 1/500 sec.

#2 f 11 Ceran Wasp & Clip. 1/500 sec. focus at center

#3 f4.5 1/500 focus on clear air

4 # f4.5 Salt water from capillary 1/500 focus on front

[illegible] 5 4.5 Salt at angle. 1/500 focus at center Lens spaced 1/4" back.

5pm 6 4.5 Salt. straight down Lens back 2" from glass Rough side in

Full moon

#5 →

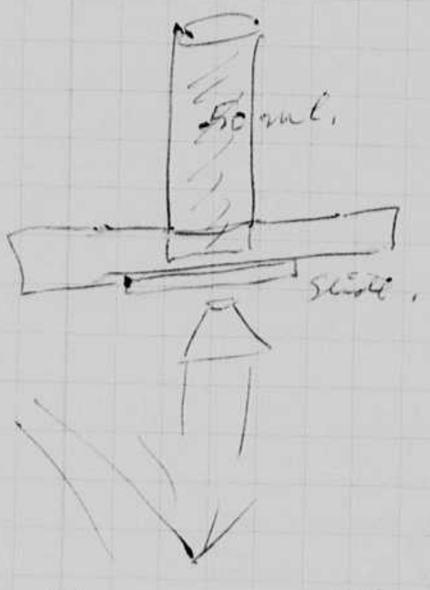
Phytoplankton
A. GOWEN &
A. MULLIGAN
1978

Cover Glass thickness 0.13 – 0.17 mm

Mar. 16, 1979

Harold Edgerton

Hugh Mull[illegible] was in at 11 to discuss the plankton photography.
He explained how he takes 1.50 milliters of water and
treats it with formalin + $CaCO_3$(?). Then the material
settles after 17 hours so he can study it with an
inverted microscope



Penumbra

$h = 0.1\text{ mm} = 10^{-4}$

$= .01\text{ cm}$

$D = 100\text{ cm}$

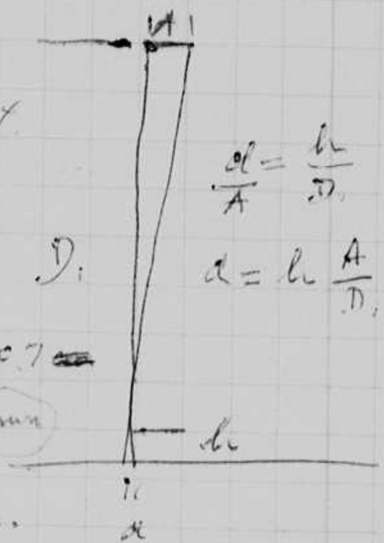
$A = 0.7\text{ cm}$

$\frac{A}{D} = \frac{0.7}{100} = .007$

$h\frac{A}{D} = .007 \times .1\text{ mm}$

~~$= .00007\text{ m}$~~

~~$= .7\text{ micron}$~~



$\frac{d}{A} = \frac{h}{D}$

$d = h\frac{A}{D}$

$1\text{ mm} = 1000\,\mu$

Shadow = $.0007\text{ mm} = 0.7\,\mu$ ✓ (0.2 mm)

The cover glass is about 0.13 to 0.17 so
the penumbra will be about double
say $1.4\,\mu$.

film 7302
200 lines/mm
200×10^3 lines/m
200,000 lines/m
$\frac{1}{200{,}000} = 5 \times 10^{-6}$ m/line
$= 5\,\mu$

with EK 343
2000 lines/mm
$= 0.5\,\mu$

1. Decrease A (lamp) dimension from .7 cm to 0.35 cm by rotating the lamps.

2. Increase the height to 1.5 m or 2 from 1 m.

These changes will decrease the shadow edges to $0.35\,\mu$.

Diffraction

$x = \sqrt{2 d \lambda}$ $\quad d = h' = 0.2\text{ mm} = .2 \times 10^{-3}\text{ m}$ ✓

$= \sqrt{2 h \lambda} = \sqrt{2\ 0.2 \times 10^{-3}\ .4 \times 10^{-6}}$

$\lambda = .4 \times 10^{-6}\text{ m}$

$= \sqrt{0.4 \times 10^{-3}\ .4 \times 10^{-6}} = .4\sqrt{10^{-9}} = .4\sqrt{10}\sqrt{10^{-10}}\text{ m}$

$= .4 \times 3 \times 10^{-5}\text{ m}$

$= 1.2 \times 10^{-5}\text{ m}$

$= 12 \times 10^{-6}\text{ m}$

Diffraction $= 12\,\mu$.

Conclusion diffraction is the largest error!

(A) go to U.V. $.3 \times 10^{-6} = \lambda$ Diffraction still bad.

(B) Reduce the subject to ~~distance~~ film distance.

 Mar. 16, 1979.

Test in 45cm in Box Studio

I 4mf flat FX6A Single drop 4mfd 1/8" hole 7302 exp. ok.
Copepod side view.

II 4mf " " " " " " " "
copepod top view

(343 film not available)
III 4 mfd. " 1/8" hole ? 4160? ok expose
Copepod Side view

Grain can be seen with a microscope
40 X TL 170 NA 0.65 and x5 eye piece on
Unitron microscope # 32189. on I and III.

I could not see grain on the 343 emulsion. (old may of 1978)

Conclusion: ① go to 343 for future efforts to
improve resolution!
② Filter so U.V. does the exposing.
③ keep subject less than 0.2 mm.

X10 enlargements made of II and III of
a small Copepod. (4154 copy)

The grain on III is worse than II. I must go to 343!

A. Exposure zero on 343 12 mfd @ 50 v

Increase caps by 46 mfd to 58 total. $\frac{CE^2}{2}$ = 58.1 watt sec.
Series lead tin lead 9 turns 2" diam.
to 46 mfd.

B. Exposure very weak. Dev 3 min

C. Lamp bare at 46 cm. Developed 5 min.
Exposure still weak.

Allow glass 0.2 mm thick reduces the exposure?

The next picture was made with the water on the emulsion. A large brine shrimp was in the puddle of water. F X 6 A at 36 cm fm film 343.

D. No Copepod – Probably under my thumb.
E. Brine Shrimp large.

F. Water directly on the film – No glass.
No brine shrimp.
1 Small Copepod.

Mar 21 1979. Loran C. North Star 6000
Digital Marine Elect Co.
Bedford airport.
on ship. "Skyertin" at Aquarium.
A 14052.3
B 25 894.7
later (14062.0
25 89 14.7

H. Edgerton

Ud101 [illegible]

May 22, 1979.

I saw Steve Boyd and Pete Wiebe on May 22 at 10 am. We inspected the sea off the main wharf. I then returned to Boston and packed my gear for a return on May 23. The silhouette camera was lowered off the dock at 1:23 pm — and brought up at 2:30 ±. In between, Steve brought up some plankton in the standard net towed with a 100 micron hole size. It took only a short time to capture many creatures. The net was clogged by the small plants.

The film in the silhouette camera was jammed after about 20 ft. I think it was not loaded properly. The take up reel was not snapped into position, therefore the pictures were up spaced, also the timing clock photos were not in place!

The camera was reloaded and put in the water again, this time ~~condensation on the window~~ caused a problem!

The direct shadow photos were taken. One was water about 7 mm deep. The other was a thin Stikker layer. Pete Wiebe oil [illegible] has these two negatives.

I returned to Boston to unload my gear and pack for a trip to Detroit and Chicago.

P.M.A. convention where I got an award.

May 29 1979

Harold Edgerton

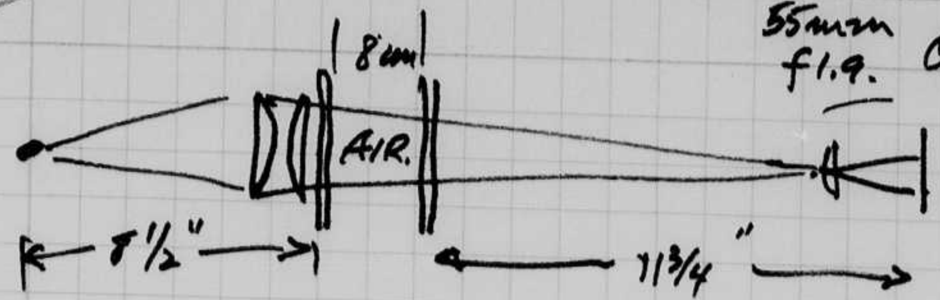
I am just back from Chicago where I attended the PMA convention in the Hilton Hotel.

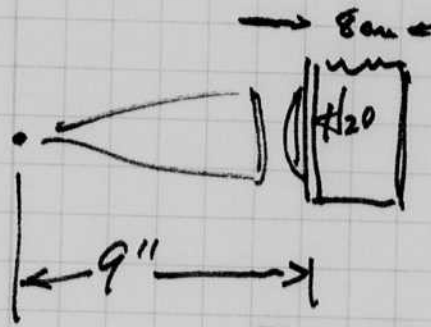
The electronic flash lamps are everywhere. Even the Polaroid co has one on their SX60 camera.

U.V.

march 29 1979.

55 mm
f1.9. Compular.



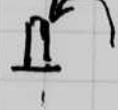


with water the focus
is closer.

mar. ~~30~~ 31. 1979 See p57.

We have been working on
a layout of the equipment
so the new system above
can be employed. The circle
just fills the frame which is
3/4 of an inch or 1.905 cm.

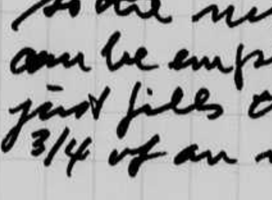
The data frame will be eliminated
because of the above optical system
which takes more length than p 39A.
The one above is the same as p 35 B.

 24 mlt water Inductor

on
Apr. 5, Thurs. 4 pm.
R+2 - ~~left~~ Go straight
along Jim left.
Lowel
2 miles left 6' storm
Radar 1007.

I go to Mrs
Ken Reads' room
to pick up the
strobe. ~~for~~
Loch ness.

45 cm



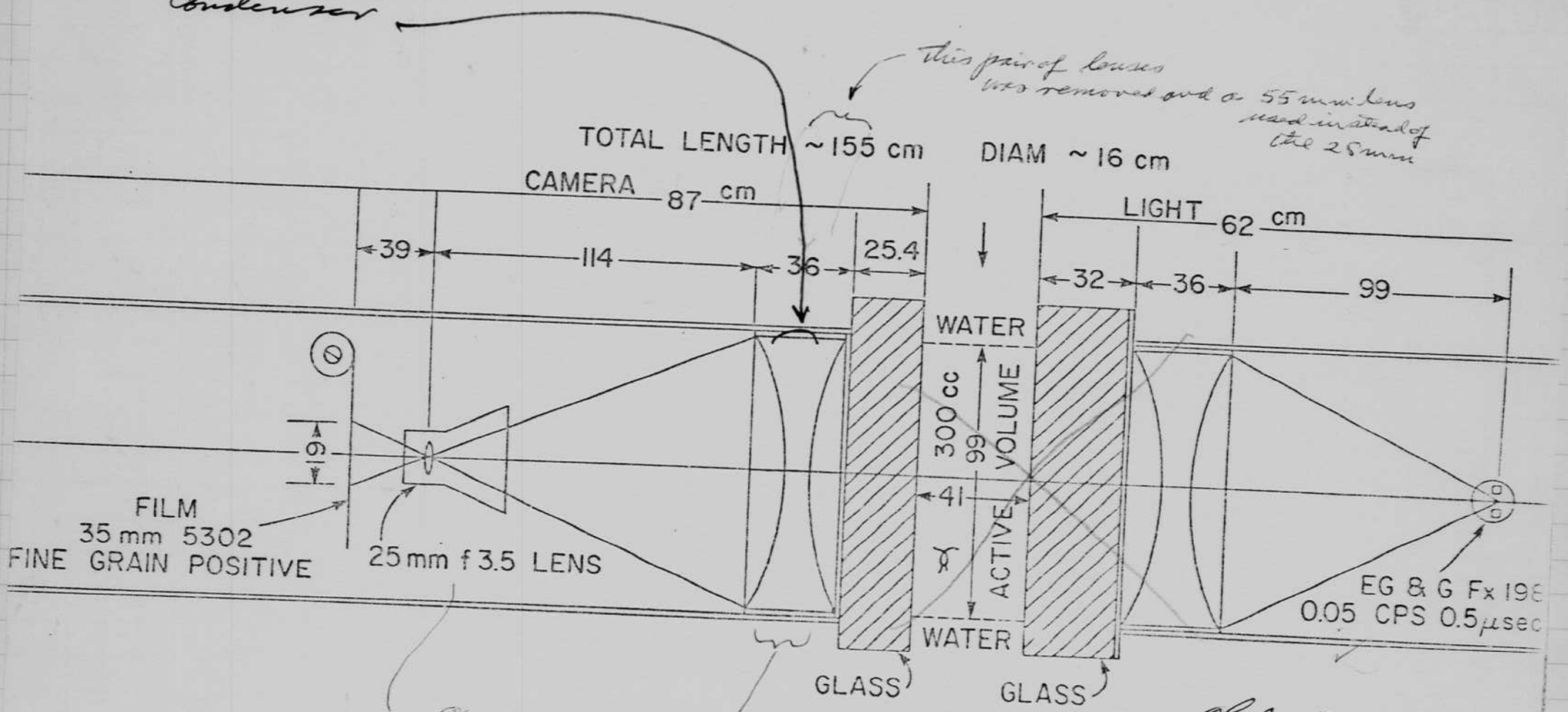
343 neg ~~into~~ EK Enlarger
X10 on 5302

5302 neg into 4x5 x4 = 40X

See new design without this condenser

Old design finished March 30, 1979.

this pair of lenses was removed and a 55 mm lens used instead of the 25 mm



Apr 16 '79 now use 55 mm f 1.9 lens

Apr 16 '79 This removed for improved model

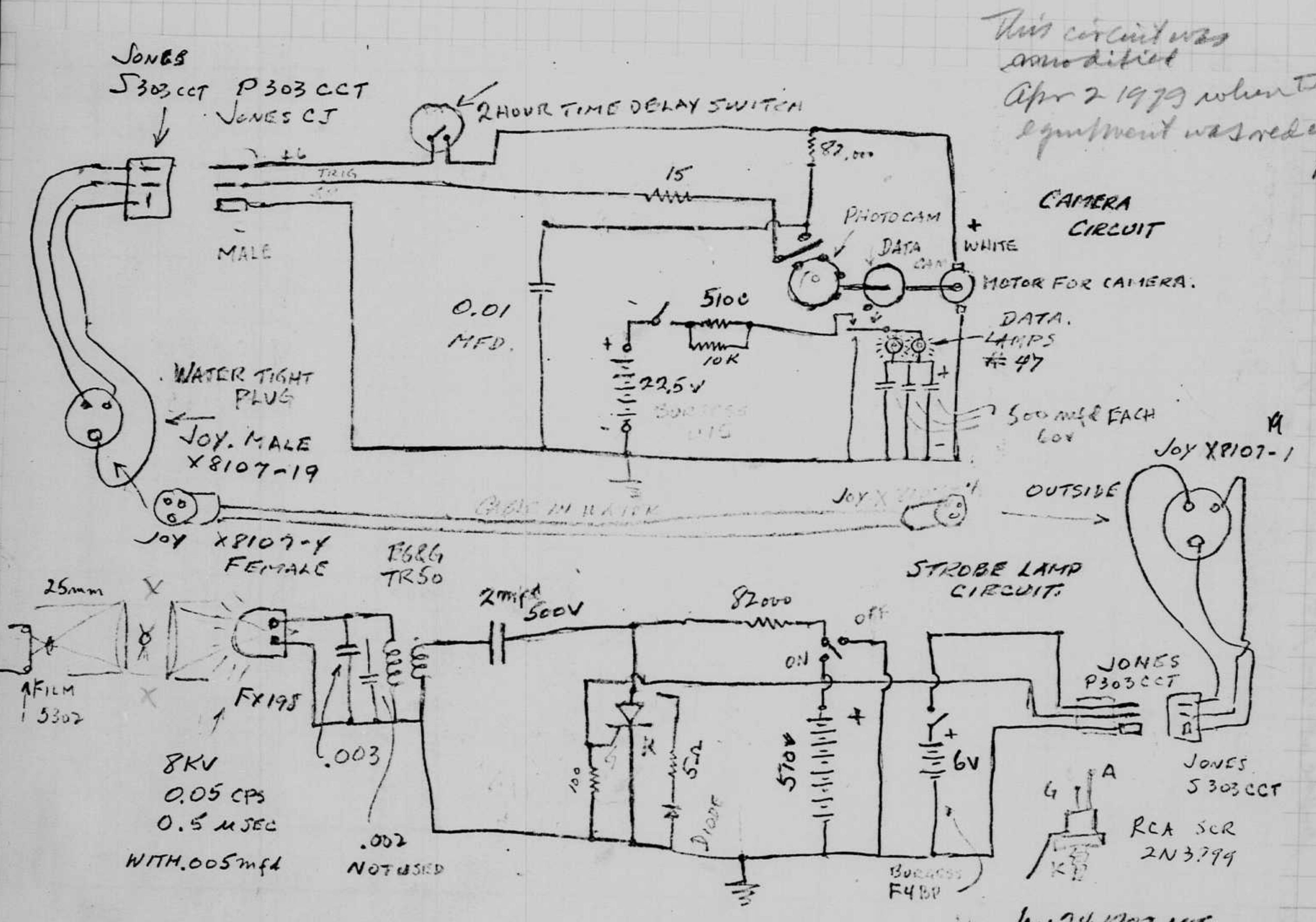
old system, not used

PLANKTON CAMERA
MIT JAN. 1979 H. EDGERTON
ALL DIMENSIONS IN MILLIMETERS

drawing

Mar 31 1979

This was used in Florida many feet deep. Now being redesigned for better optic resolution

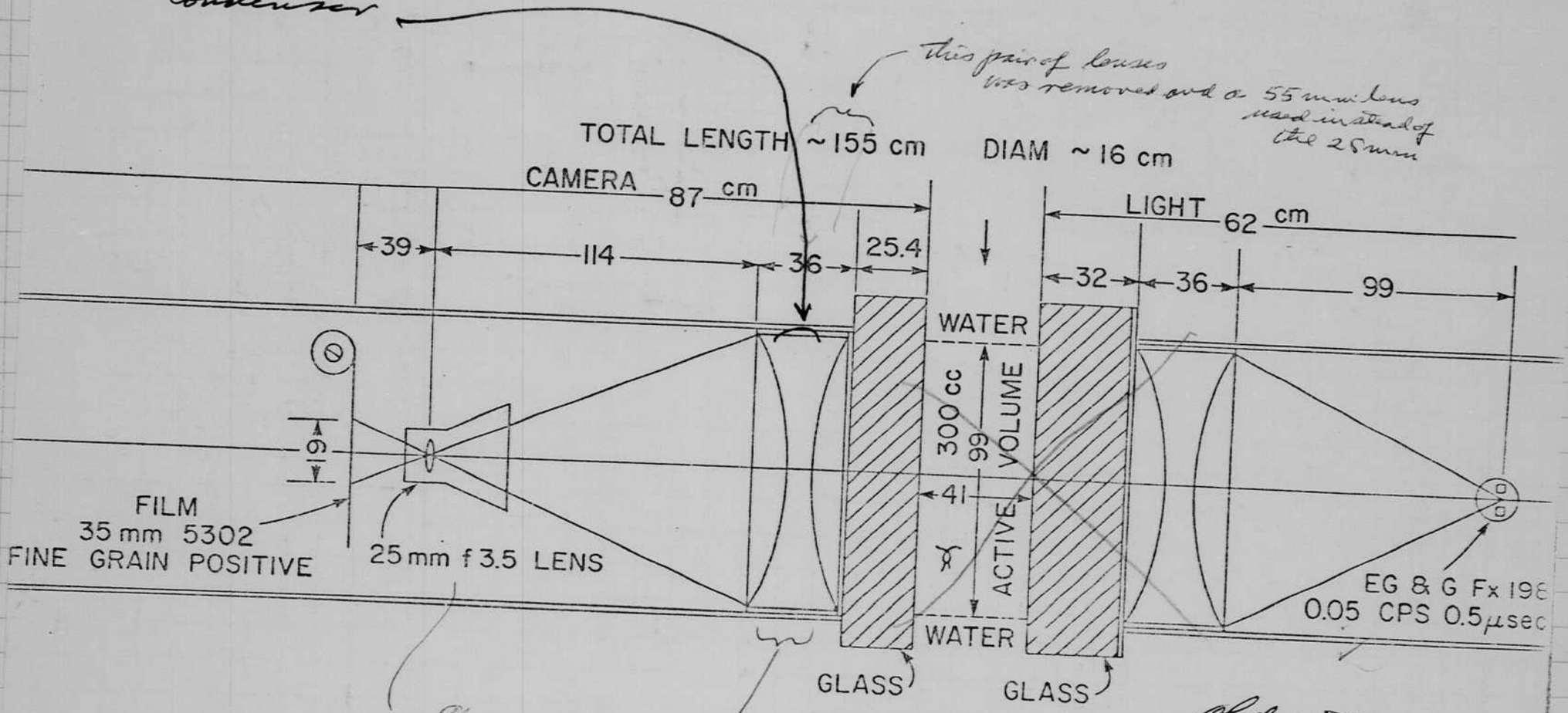


PLANKTON CAMERA.

JAN 24 1979 MIT
HAROLD EDGERTON
BILL MACROBERTS.

See new design without this condenser

O.D. design finished March 30, 1979.



Apr 16 '79 now use 55 mm f 1.9 lens

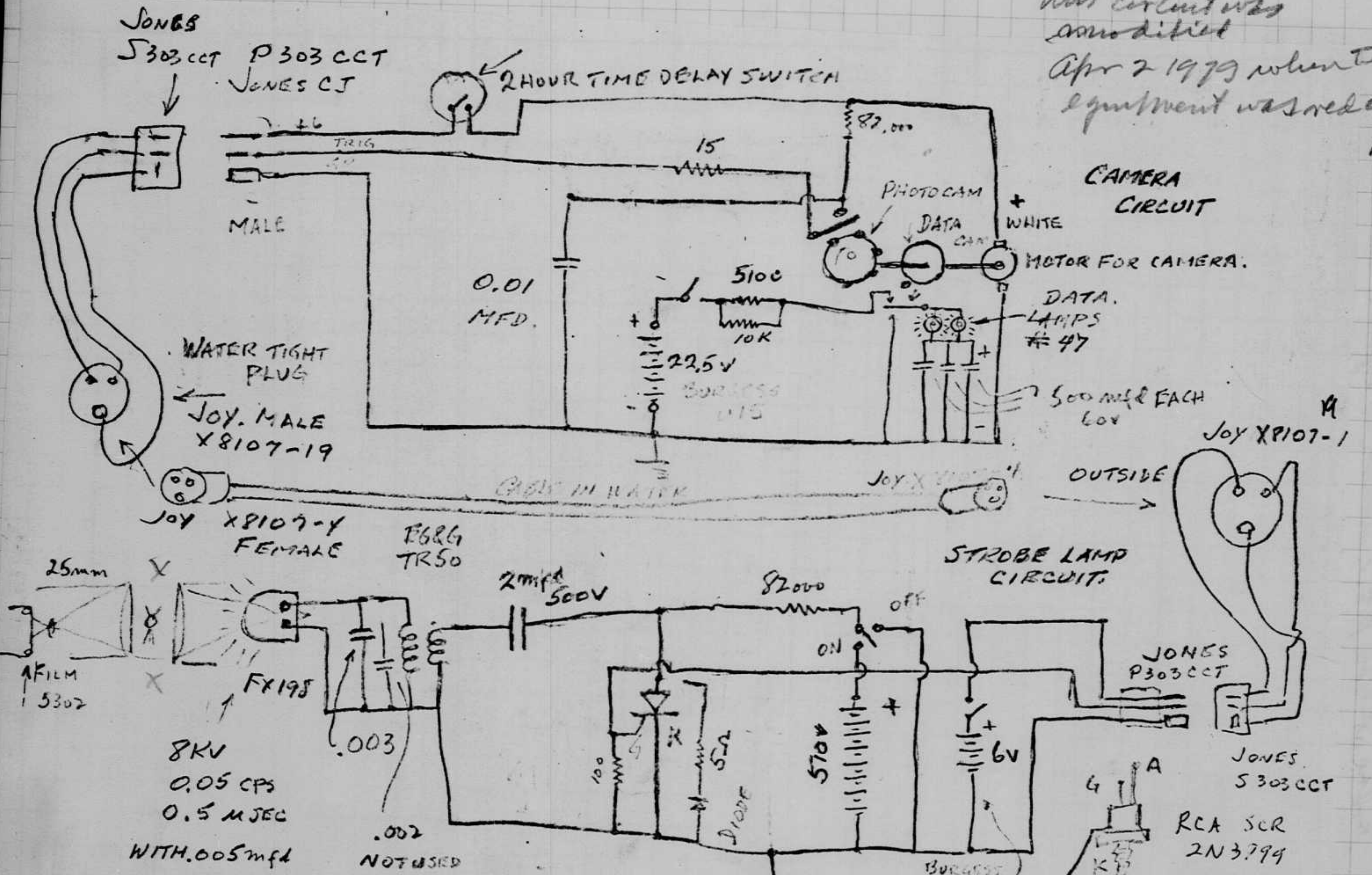
Apr 16 '79 This removed for improved model

old system

PLANKTON CAMERA
MIT JAN. 1979 H. EDGERTON
ALL DIMENSIONS IN MILLIMETERS

Camera

This circuit was modified Apr 2 1979 when the equipment was redesigned. HEE



PLANKTON CAMERA.

JAN 24 1979 MIT
HAROLD EDGERTON
BILL MACROBERTS.

This was used in Florida during Feb trip. Now being redesigned for better optic resolution. Mar 21 1979

 Mar 31 1979 Harold Edgerton

Window tests.

1/4" plate glass over 4" pipe
broke at 100 p.s.i. which is equivalent to about 200 ft.

A glass plate 1" thick showed breaks at
3000 p.s.i. or 6000 feet deep. Seed Edgerton and Hoadley
paper. Cameras & Lights for Under water use
July 1955 Journal of the SMPTE Vol. 64. p345–350
curve on page. 347.
Safe working depth 3000 feet.

Tests on S.O. 323 Eastman Film.
24 mfd in series with inductor
added to the U.V. unit. 48 cm to subject

16,	8,	4,	2,	1	0	flashes	
.63	.4	.27	.15	.07	—	Density	Developed 2 min in Dektol 1:2 (1 day old)
2.13	1.20	0.65	.38	.21	.02		Devel in old HRP 1:2

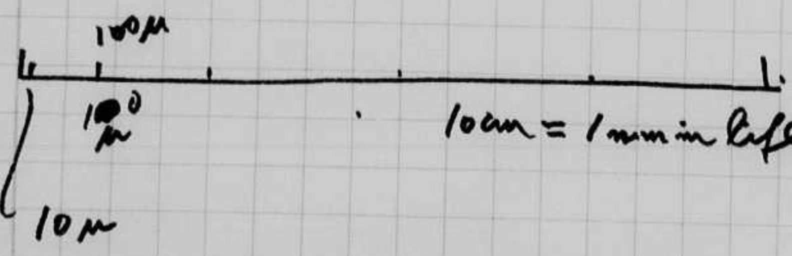
New 1:2 HRP Developer, { .63 no glass one flash. 35 mm slide glass (1) 0.13 !
This shows that the U.V. is effective! }

I put liquid from the green water, then a slide over it, The water flowed out under the slide, This should be enlarged for resolution determination.

Enlargements were made on 7302 film
X10 Then this neg was
Rephotographed at X4.

Then enlarge on paper X2.5 to get 100.

0.1.0 mm = 100 mm = 10 cm. ≈ 4".



10cm = 1mm in life = 1000μ

Apr 3 1979.

Harold Edgerton

1977 Laser induced Discharge Phen
RAIZER YU.R.
consultants bureau N.Y.

Hugh Mulligan and John Clay from EG&G brought in some plankton from a ~~dredge~~ net haul on Georges Bank.

Two 8X10 films were made on 7302 with 2 mf at 900 v at 80 cm

coil ~~FT-506~~ 1-4X5 film on SO343 at 46 cm with 26 mfd at 900 v this was excellent.

FY 506 coil

Another in the evening was not so dark so I decreased the depth to 30 cm. this was OK, I used some wetting solution on this last photo to make the film smooth.

~~FX 506~~ U.V. Lamp 26 mfd 900 V.

FX 265 with coil FY 506

There was a long telex message from Cairo about a side scan project in Alexandria to look for the light house and for the French fleet that was sunk by ? in the Napoleonic wars.

Notebook # 33

Filming and Separation Record

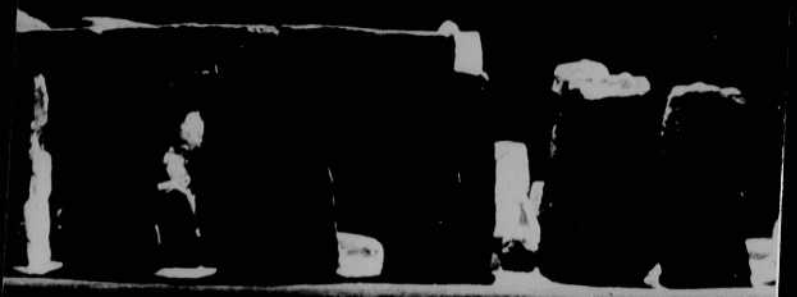
1 unmounted photograph(s)

____ negative strip(s)

____ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 60 and 61.

Item(s) now housed in accompanying folder.



Stanhope

Strobl illuminated -

Notebook # 33

Filming and Separation Record

1 unmounted photograph(s)

____ negative strip(s)

____ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 62 and 63.

Item(s) now housed in accompanying folder.

Nematode worms

Ushant

N.E. aquarium

Bill Fowle

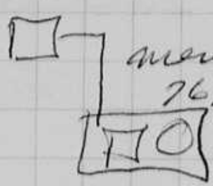
 April 5, 1979

Harold Edgerton   Test of Point light Source
Chris   Effect of series inductance
on the 23 mfd of capacity

900 V.
FX 265.

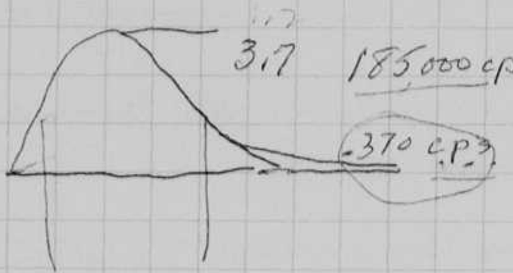
Visual
929 + W 106
#3

red light Marsha Walsh
"Mary" Zanganas
visitor from corp
member
Carl Muller

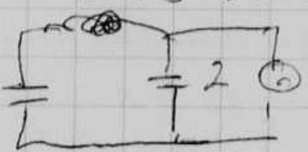


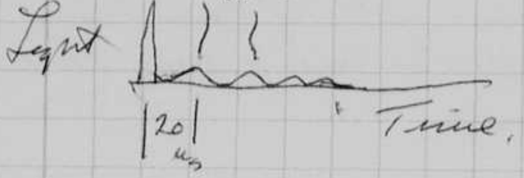
.37

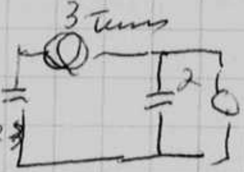
(2)

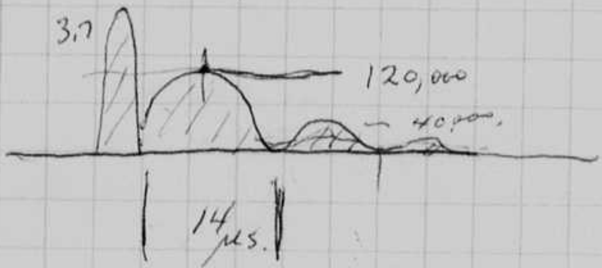


Dur 2 μs.







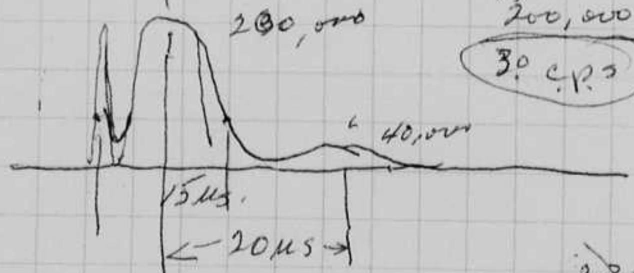


120
15
600
120
1.800000

+23

$\frac{1.80}{.37} = 4.8$ 1.8 cps.

Inductive removed
clip leads



15
200,000
30 c.p.s

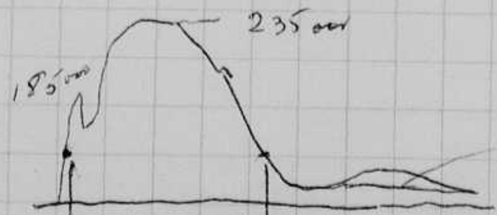
3.0 cps.

$\frac{25 \times .9^2}{2}$ mfd = 10 watt sec.

$\frac{3}{.37} = 8X$

Clip leads out,

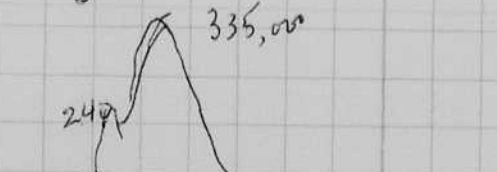
~~.235,000
12.
2.82~~



3.29

235
14
3.29

Shortened leads



4.02

4.02 cps   12 μs.

April 7 1979

Harold Egerter

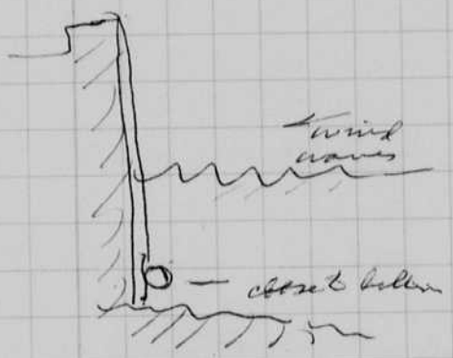
Yesterday I was 76 years old.

The silhouette camera in its new form was finished and loaded yesterday. See next page for afterboard circuits.

I went to the Marine lab at Nahant operated by NEmi arriving about 8 am. Bill Towle, the student caretaker let me in to see the place. Then he helped me take the camera to the Nahant Harbor.

The camera was lowered about 6 feet to the bottom at 8.42 and left there until 9.15.

Then we went back to the Marine station where I met Tim Sebens and 3 others, Students).



Towle is doing a thesis on Nematodes. We made a date for tomorrow at 3 pm, he will have some samples to photograph.

Also he may catch a siphonophore to be photographed with the back light system of p 52.

Towle had a CLIONE that he caught yesterday

full size sketch

12.25 noon Film is now processed, dried and studied.

Comment. (1) I should run the film through water first to get the emulsion wet before going into the developer. This may eliminate the "gaps" where the development is not complete. These defects were noted in Florida. I am quite sure they are caused by entrapped air bubbles which flatten and prevent processing.

(2) the windows collect bubbles from the water. I suggest that they be rinsed with a wetting agent to help the bubbles to escape.

 April 9 1979 Harold E Edgerton

The film of Apr 7 at Nahant harbor showed many animals with filaments similar to those of the Barnacle.

Bill Fowle says they are a

X swimming phase of the barnacle.
No X

X these are "casts" or "moults" from the Barnacles.

(margin: big error [?]) These were the only life that I observed on the ½ hour of pictures.

I used f 11 on the aperture of the 55mm lens. The photo did not fill the circle so I guess that the light was not perfectly aligned with the aperture of the lens. I propose to test this again in the lab and then maybe change to f 5.6 or 6.3 from 11.

April 9 cont HE

Judy Henderson Student
Interstitial flatworm
Notocaryoplanella glandulosa
Black Wehling.
① unnamed Hydroid

2. Nerilla (archiannelid)

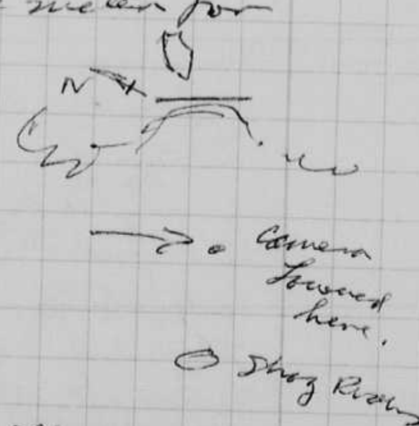
Caprellid.

Bill Fowle 581-7370
Nematodes. Several photos were made of these.
Ken ~~Saton~~ Sabens
Robt Shepard Director
Nathan Reisner. Director Emer.

April 12 1979. I took the silhouette camera to Nahant and with the help of Bill Fowle lowered it one meter for

1150 into water
1220 Lowered to Bottom.
1225. Started up to surface

(margin: about 0.5 mm long.)



The depth was about 20-30 feet.
I observed a few copepods on the films they were very small.

There are some fogged spots on the film that appear to be from sprocket holes. We think these may have been put there when the film was put on the reels. We could see no reason for the fog otherwise. Bill put a circular gate on the frame.

April 17 1979
H. Edgerton

Experiments with filters.
A "black glass" filter from Chas Miller is supposed to pass only U.V.
A 1mm thick glass slide.

Exp #1 7302 film
FX6A 4 mfd ~~[illegible]~~ 450 ~~B~~ Portable equip.
47 cm to the film

		0	1	3	7	flashes
(A)	no filter	.03	1.38	2.53	3.25	Density.
	Glass	.03	1.23		2.11	
	UV Black	.03	.49	1.24	1.89	
	Glass + Black	.03	0.48	1.35	2.	Should be less?

Exp 2. 323 film
49 cm 22 mfd
450V 1:2 HRP dev
2 min.

		0	1	2	4	8	
(B)	no filter	0.03	0.12	0.32	0.71	1.26	Density
	Glass		.04	.04	.06	0.4	
	UV Black			.03	.08	.11	
	U.V. Black + Glass						

Repeat with 7302
no filter 47 min FX 265
Glass plain
Glass Black. U.V.

7302 has a resolution of 6 μ 323 = 0.5 but takes a lot more light.
Diffraction is very important.
Try 7302 with U.V. for most experiments.
All with 4 mf 450V
FX 268
1.5 min in yesterdays HRP dev 1:2

		0	1	2	4	8 flashes
C.	NO FILTER	.03	0.66			
	U.V. Black.	.03	0.20	0.48	.88	1.40

(?) will black U.V. filter aid in defination??

12 mfd. 450 A265 (D)	NO FILTER	.02	.95	1.48	1.93	2.40
7302 1.5 min	U.V. Black	.02	.36	.74	1.14	1.60

12 mfd E. U.V. Black 7302 Grand Bank Sample Plankton 3 min | 53 cm to film
22 mfd F. U.V. Black 7302 " " " " 3 min.
4 mfd G. NONE 7302 2.

Harold E. Edgerton.

I went to WHOI on Fri Apr 20 with Edtim & took a 100 ft roll of picture with the "in situ" camera so remodeled in regards with a condenser system on one side where the flash lamp is located.

The film was processed yesterday. I found only one animal on the 1600 pictures! It was a small gel ball probably a medusa. I found no copepods. There are many small particles in the water.

Stephen Boyd made a plankton haul and found plenty of animals. Photos of these were made in the lab with the shadow system using 4 mfd at 450 V from an FX 265 ultra violet lamp.

I learned that development of the film requires that it not ride up on itself. If the layers are not packed vertically, then there is developer trapped in the areas of the holes. This causes increased development in these places. The film must be wound loosely so that it falls into place for each turn.

I am scheduled to go to Cairo on May 1 to try the sonar at Alexandria for

(1) the ancient lighthouse Pharos which was destroyed in an earthquake.

(2) the Napoleon fleet sunk by the English in 1800 off Alexandria.

Today I am checking my sonar for the expedition

April 24 1979.
Harold Edgerton.

Meas. made yesterday by Chris. Johnson.

Photo pickup DIANA 400 Ω 85" This is an S4 (Blue sens) surface.

		CP.	μs	CPS
Gen. Radio Strobotac Hi		190,000	2.4	456,000
	Med	80,000	1.5	120,000
	Low			

Battery Unit. 265 U.V. Lamp. 435 V (450 / 510 V volt Battery)

4 mfd	25,000	6	150,000
12	37,000	11	407,000
22	42,000	13	546,000
22	46,000	"	585,000

I used the 4 mfd adjustment at WH 01 on last Apr 20 with great success.

May 1.
Sonar sent to Cairo April 26 - Shipped on the 29 via TWA Rome.

I took the silhouette camera & WH 01 on Sunday. Photos were made with Miebl and Boyd in a tank with introduced plankton x 200 concentration.

Calypso arrives in Norfolk June 2.

Sun June 3 1979. Test of Television housing for under water camera to be used on the Coast Guard Expedition to search for the BEAR 30 miles east of Boston.

9.20 am. Hydraulic test 16" shell Bldg 5-007
Pressure of water 70 psi on WEKSLER gage.
9:23 80 psi goes up slowly.
100 Hose blew off. Repaired
9.27 Okay now 100 psi
9.29 120 max that could be put on - leaks.

10.25 180 psi all ok after leaks were eliminated.
10.30 150 psi Holding.
10:31 160 Holding.
10.40 0 end of test. Ok at 160# sq inch

Dr. Harold E. Edgerton - Itinerary

Tues. May 1, leave Boston and arrive Cairo, Egypt on May 2

" " 15, leave Cairo and arrive Paris, France

" " 16, leave Paris, France and arrive Boston

Thu	17	A387	3:10p	5:00p	Bos-St. Louis	Cox Family, 415 Wicksworth Ln. Sunset Hills,Mo. 314-821-5989
Fri	18	E93	2:45p	6:10p	St. Louis-Raleigh	Dr. Danforth, Chancellor Washington University
Sat	19				Velvet Cloak Inn Raleight, N.C.	Marie Libby and Bill Dixon's wedding 919-876-9505
Sun	20	EA685 AM167	9:56a 11:45a	10:55 1:40p	Raleigh-Chi-L.A.	Hawkins Galley, 213-550-1504 Clark Plaza Hotel213-278-9310
Mon	21					
Tue	22				Sheraton Inn Airport,6pm	MIT Club,S.D. Greg Schaffer Carol & Jim 714-436-3864
Wed	23				SAMSO Officers Open Mess, 6:30pm	MIT Club,L.A. Ed Ashburn Hyatt 213-670-9000-Ron Stone
Thu	24	WA684	10:00a	12:20p	L.A.-Seattle	Seattle Art Museum/MIT Club Merrill House , 206-323-0143
Fri	25	WA615	7:50a	9:03a	Seattle-San Fran.	Margery Aronson
Sat	26					
Sun	27	WA795	10:10a	11:16a	San Francisco-L.A.	Holiday Inn China Town, L.A. 1640 Marengo Dr.(213-223-3841)
Mon	28		BOOK FAIR - CONVENTION CENTER,L.A			(Confirmation #12174J5U014)
Tue	29	A12	9:20a	5:30p	Los Angeles-Boston	

22, MIT CLUB, SAN DIEGO (Sheraton Inn Airport, Barcelona Room, 6pm)

23, MIT CLUB, LOS ANGELES(SAMSO Officers Open Mess, 2400 E. El Segundo Blvd, 6:30p)

24, SEATTLE ART MUSEUM, (University of Washington, Kane Hall, 6:30pm)

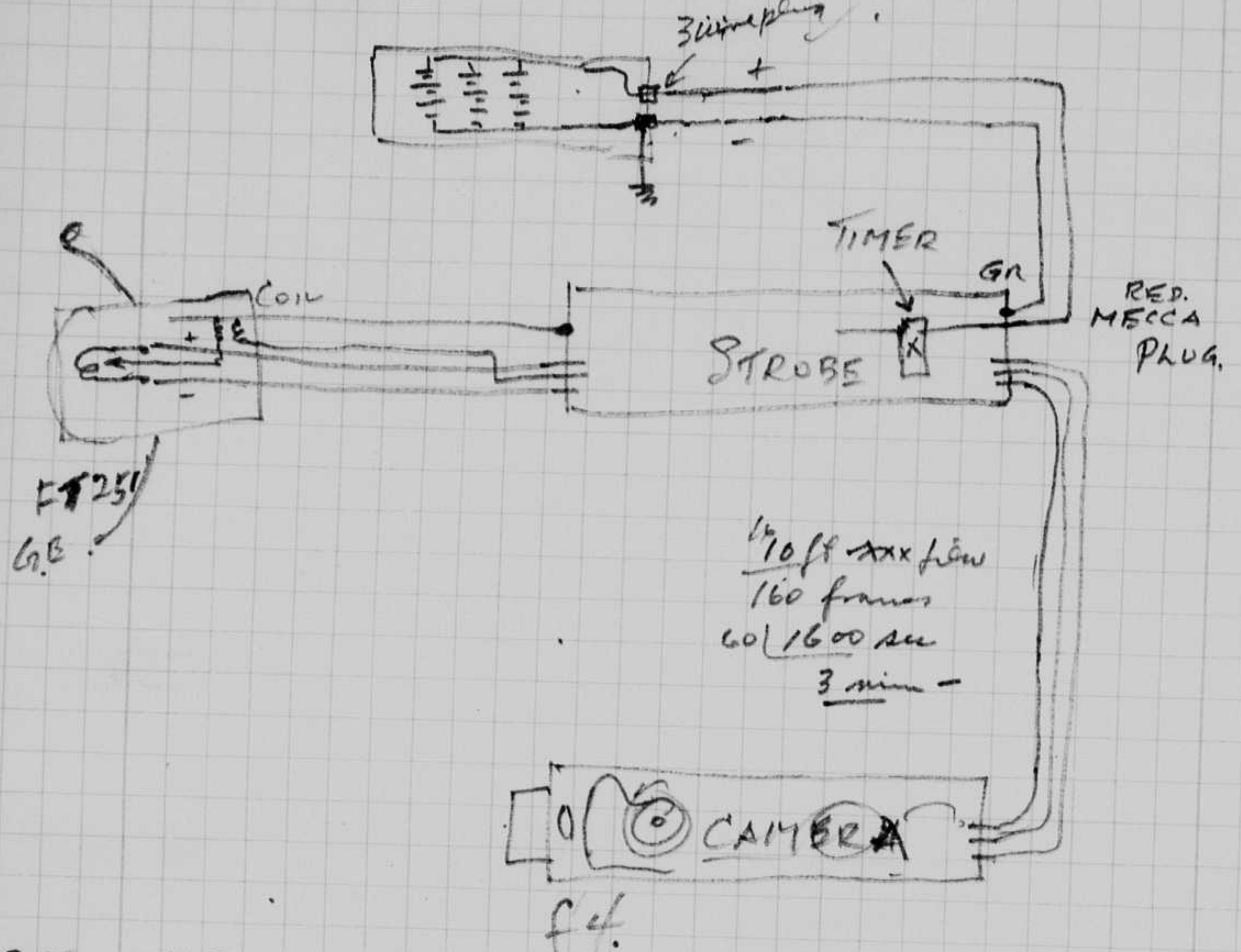
June 8 Leave Boston and arrive Norfolk, Virginia (CALYPSO expedition to USS MONITOR site)

June 15 Leave Calypso at Moorehead City, N.C. and arrive Boston

	June 22 - 25	New England Aquarium's 10th birthday party missed
Seminar	June 25 - 29	MIT, High-Speed Photography Seminar
Sonar	July 11 - 19	Atlantic Ocean - search for the BEAR.
Camera	July 23 - 27	Miami, Florida - plankton photography, P. Ortner (?)
	Aug. 1 - 28	Cape Hatteras, N. C. - MONITOR site (1 week for HEE)
Seminar	Aug. 27 - 31	Photography workshop, Venice, Italy
Sonar	Sept 3 - 8	Survey of Amalfi Harbor, Italy. Sonar? penetrator.

SUMMER PLANS '79
Harold E. Edgerton

 June 21 1939 Harold Edgerton & Bill MacRoberts.
D.W camera for cornelius.



± 3:45 pm start. 11 sec interval f 4. Lamp & reflector not on.

4:08 pm Reflector on at 10'. 12 sec interval.
5.30 14-15
5.35 ± off for
off for processing film.

Battery open ckt volts = 5.9 volts
With 2 Amp load = 5.85 "
" 5 Amp load = 5.7+ "

June 23 1979 — Harold Edgerton 4-409 M.I.T.
Silhouette camera. In Situ.

This is being tested for use in the High Speed Seminar next week.

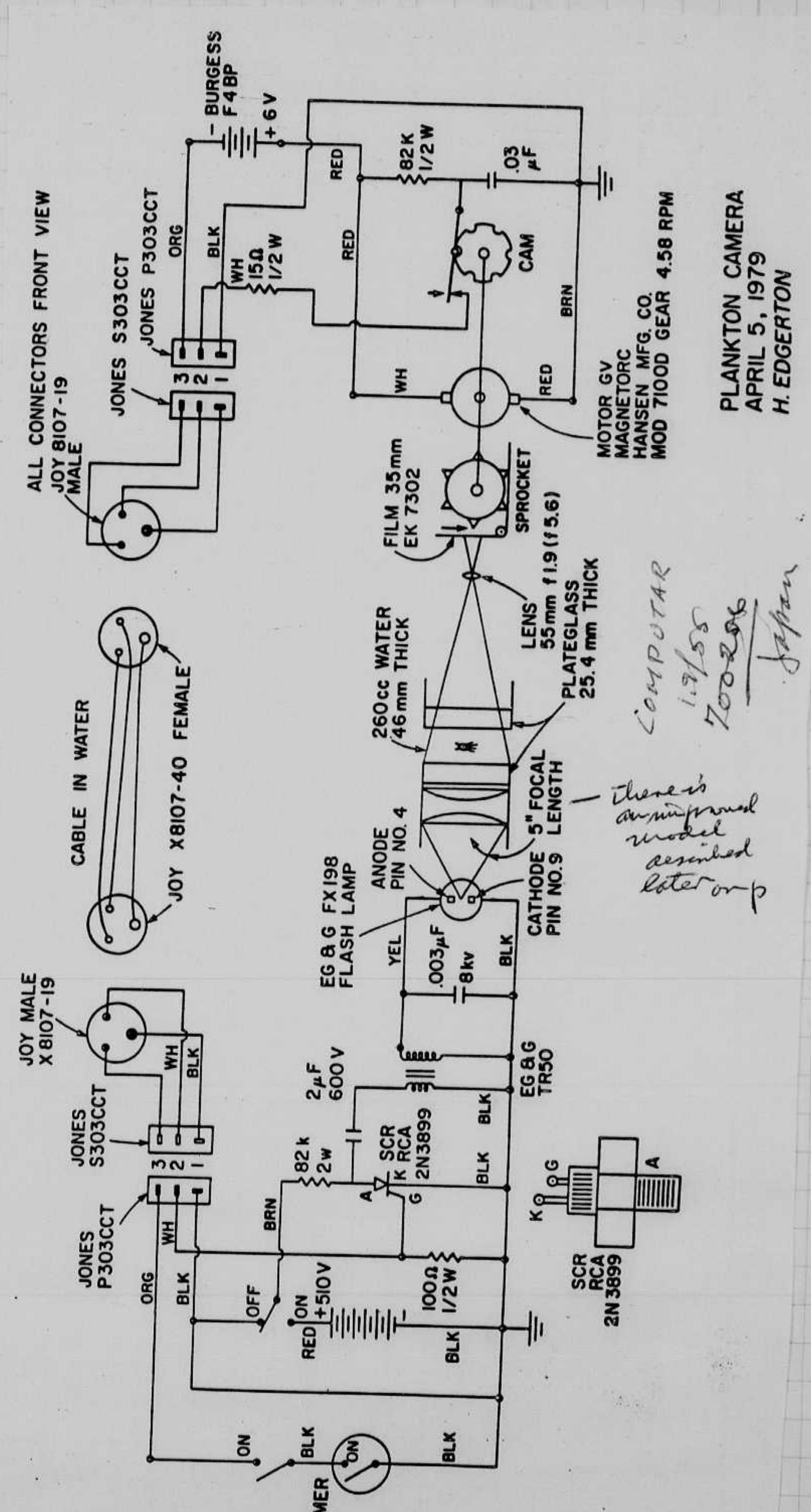
Battery on
H.V. = ~~460~~ 450 volts
L.V = 5.8 volts.

Loaded in light 10 mcs
Plus
2:37 started at
5 second intervals
6 ft of film = 16
× 6
96 frames
× 5
60) 480 sec
8 min

2:45 sign put in frame
2:50 sign put until 2:55.

I could just see the 2:50 marks.
12 ft of film went through. The camera should be loaded in the dark!

Bob Sholberg arrived at 7pm. He stayed at my apartment.



there is an improved model described later on p

COMPUTAR 1.9/55 7002?? Japan

72 June 29 1979 Harold E. Edgerton

The High Speed Photography and Videography Seminar ended Today. We had 26 eager students and a big list of instructors.

Special Summer Program 6.51s

TECHNIQUES IN HIGH-SPEED PHOTOGRAPHY AND VIDEOGRAPHY

June 25 through June 29, 1979

Roster of Registrants

Mr. Ronald J. Bortner
Naval Weapons Support Ctr.
Crane, IN 47522

Mr. George B. Brill, Jr.
General Motors Corp.
General Motors Proving Ground
Safety Research & Development Lab.
Milford, MI 48042

Mr. Charles D. Bullock
USABRL, ARRADCOM
ATTN: DRDAR-BLP
Aberdeen Proving Ground,
MD 21005

Mr. Clarence A. Cassidy
Spin Physics, Inc.
3099 Science Park Road
San Diego, CA 92121

Mr. William F. Cullinane
Pratt & Whitney Aircraft
7-TST-1
400 Main Street
East Hartford, CT 06108

Mr. Leo S. Derlak
Western Electric Co.
P.O. Box 900
Princeton, NJ 08540

Mr. Vernon C. Draxler
Honeywell, Inc.
23100 Sugar Bush Road
Elk River, MN 55330

Mr. George E. Garland
AVCO Systems Div.
201 Lowell Street
Wilmington, MA 01887

Mr. Gary V. Graves
Cabot Corp.
Concord Road
Billerica, MA 01821

Dr. Nathan Klein
Ballistic Research Lab.
Aberdeen Proving Ground,
MD 21005

Prof. Ronald J. Kopczyk
Clemson University
110 Freeman Hall
Clemson, SC 29631

Mr. David E. Larch
Mead Co.
1368 Research Park Drive
Dayton, OH 45432

Mr. Charles A. Ledger
Scott Paper Co.
Scott Plaza 3
Philadelphia, PA 19113

Mr. Chin-Yuan Ma
Polytechnic Institute of New York
Dept. of Chemical Engineering
333 Jay Street
Brooklyn, NY 11201

Mr. Orman McClure
Naval Surface Weapons Ctr.
P 22
Dahlgren, VA 22448

Mr. Larry D. Reynolds
EG & G Idaho, Inc.
P.O. Box 1625 - ARA II
Idaho Falls, ID 83401

Mr. Christian R. Winther
Spin Physics, Inc.
3099 Science Park Road
San Diego, CA 92121

July 1, 1979.
Harold Edgerton
Eric Edgerton.

Morning Photo of a Brine Shrimp + print.
afternoon. Test of Vincent shutter 1/100 second.

#1. 1 ft from 100 watt lamp (blue) 7302 film.

1/100 sec. A A/2 A/4 A/8 A/16 A/32 A/64 A/128 / A/256.

over exp.

very dim.

#2. Microscope illumination LS. 15. 58295 EGG.
water V lamp on string. no exposure on film at high (x4). why.
Does the lamp fire late.

#3. ~~#64~~ A/128 Tungsten plus LS15 at (x2) setting.

4 x
5 x

#6 A 64. V.W. Flash unit in contact. 7302 film.
This last photo showed density about same on both the tungsten and the Xenon lamp.

July 3, 1979 Test of camera Graflex
127 mm G 28066 f 4.5
Film at ∞ 50 ASA 1/200 sec f 4.5? too much
7302 " at ∞ 1/5 sec f 4.5. 2 min old dev. Strong ok. Blue ok. ∞ ok.

Strobe test High on 60 cycle unit. Scotch lighter on stick.
40 ft from lamp with camera below
f 16 for 1/10 second. Ortho film # 4154 thick.

f11 ~~AA~~ Exposure fine for a second test #154.
DK 60 6 min 6k.

Boomerang by Bray Abbott 823 5465 Energy lab 31-122M
253-2482
See Sci Amer Nov 68 article by Dale Hanson theory & photos.

 ~~Sept~~ 9, 1979
July

Harold Edgerton

Last night at Nahant water Silhouette camera tested. This camera was used all week by the H.S. Summer with Harold Moffitt in charge of the demonstrations.

The 'Lampard Seabed'! only one photo was made. I saw no animals.

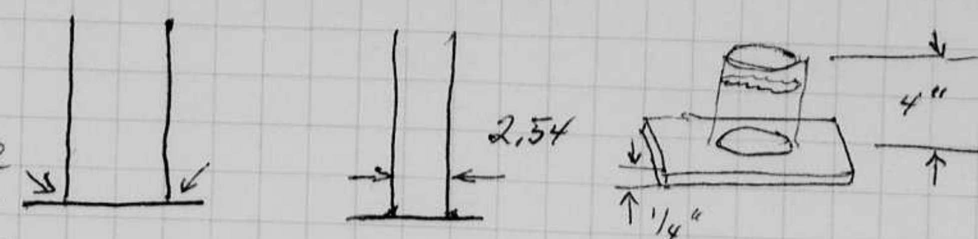
Bill Towle made a tow with a plankton net. I brought back some of the animals. and made shadow photos in the lab.

Nov 3 1979 B.V. at Nahant. Reisman ↓

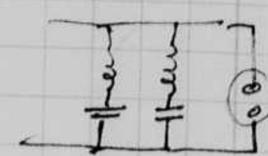
dead ↙ ↙ EVADNE ↘ ↓ TOW

DBX 201929
Harold Edgerton
Hugh Mulligan
Jerry Cura.

~~Shadow~~ Image.

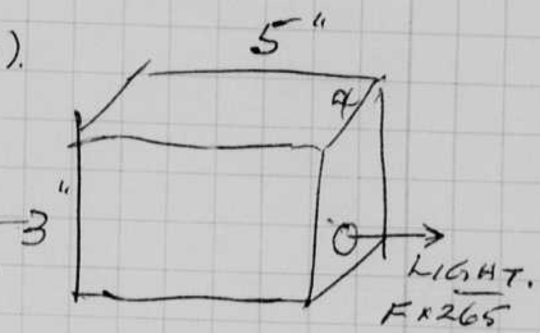


12 hours wait
Flash with light.



Alumina Box with 2 mfd 800 V
0.3 BCPS 3 μs (Dec. 1977).

FX-265 (U.V. Window lamp).



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25 mfd ~~800 volts~~
1.65 V at 1 meter 13.5 ~~15.5~~ μs.

929 +106 filter) (L) $= \frac{KVD^2}{R_L} = \frac{267 \times 10^6 \times 1.65 \times 1^2}{1000} = 442,000$

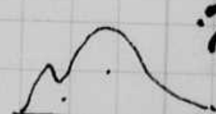
$442,000 \times 13.2 \times 10^{-6} =$ 5.967 ~~6.85~~ BCPS. **5.96**

---

929. 25 mfd ~~800 volts~~. 780V CRO 3.2V. 2.7×5 (13.5 μs) $R_L = 100$ K = 1.99×10⁶ 3 ft.

(25) mfd $L = \frac{1.99\times10^6 \; 3.2 \quad 9}{100} = 57. \times 10^4 = 570000$ **7.7**

$570 \times 13.5 = 7.69$ BCPS



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929 2 μf 780V CRO 2.1 VOLTS DURATION 2 μsec. **0.75**

(2) mfd $H.C.P. = \frac{1.99 \times 2.1 \times 9 \times 10^6}{10^2} =$ ~~3076~~ 376,000 ~~56000~~

$\times 2 \times 10^{-6} =$ 0.75 ~~4.520~~ ~~0.112~~ HCPS

Exposure ok on SO 343 High Resolution film at 50 cm (or 20 inches)
HRP 1:1 3 min D = 1.5

74 ~~Sept~~ 9, 1979
July
Harold Edgerton

Last night at Nahant water silhouette camera worked. This camera was used all week by the H.S. summer with Harold Moffitt in charge of the demonstrations.

The lamp and leaked! Only one photo was made. I saw no animals.

Nov 3 1979 B.U. at Nahant. Reisman ↓

Bill Towle made a tow with a plankton net. I brought back some of the animals. and made shadow photos in the lab.

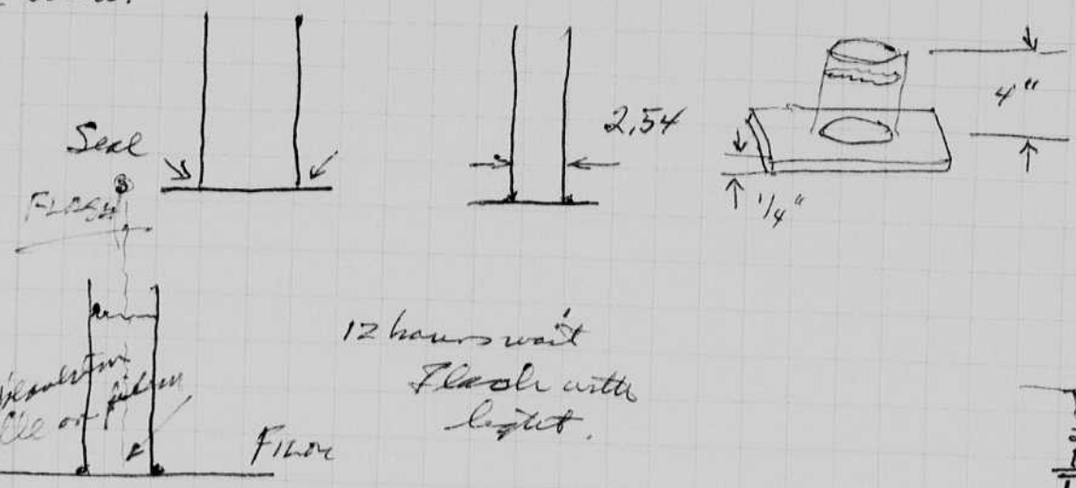
dead ↙ ↙ EVADNE ↘ ↓ TOW

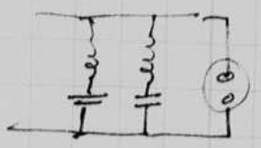
HEE

Dpt 20 1979

Harold Edgerton
Hugh Mulligan
Jerry Cuva.

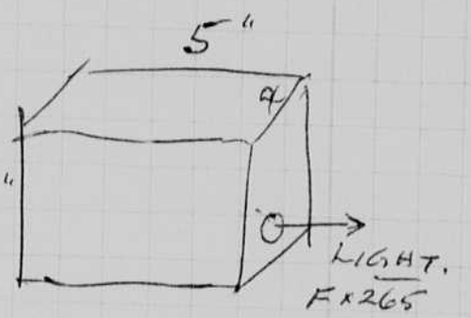
~~Window Lamps~~





Alumina Box with 2 mfd 800 V
0.3 BCPS ~~Bus~~ (Dec. 1977).

FX-265 (U.V. Window lamp).



---

25 mfd 800 volts
1.65V at 1 meter ~~13.5~~ 13.2 μs.

929 +106 filter) $L = \frac{KVD^2}{R_L} = \frac{268 \times 10^6 \times 1.65 \times 1^2}{1000} = 442{,}000$

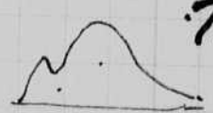
$442{,}000 \times 13.2 \times 10^{-6} = 5.967$ ~~6.851~~ B.C.P.S. **5.96**

---

929. 25 mfd ~~800 volts~~. 780V CRO 3.2V 2.7×5 (13.5 μs) $R_L = 100$ $K = \frac{1.99 \times 10^6}{3.2}$ 3ft.

(25 mfd) $L = \frac{1.99 \times 10^6}{100} \; 9 = 9.57 \times 10^4 = 570{,}000$

$570 \times 13.5 = 7.69$ B.C.P.S. **7.7**



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929 2 mfd 780V CRO 2.1 VOLTS DURATION 2 μsec. **0.75**

(2 mfd) H.C.P. $= \frac{1.99 \times 2.1 \times 9 \times 10^6}{10^2} = 376{,}000$ ~~3076~~ ~~56000~~

$\times 2 \times 10^{-6} = 0.112$ ~~4.520~~ HCPS (0.75)

Exposure on 7343 High Resolution Film at 50 cm (~ 20 inches)
HRP 1:1 3 min D = 1.5

H. E. Edgerton's schedule:

July 11, leave New London, Conn. aboard the USCG CONIFER to search for the USCG BEAR, 200 miles east of Boston and 60 miles south of Cape Sable Island, Canada.

July 18, Return to Boston, via Portland, Maine

July 22, Leave Boston, meet Eric Edgerton (coming from Pontiac, Michigan) at Miami. Work with Dr. Peter Ortner off the coast with plankton camera, aboard VIRGINIA KEY

July 28, Leave Miami for Chicago

July 29, Receive Nikon Special Award at the P.P.A. convention (luncheon at the Hyatt Regency O'Hare Hotel)

July 30, Return to Boston

July 28 - August 15. Joe Watson and family to visit

Aug. 10, Leave Boston for North Caroline
Aug. 11, Wedding of Mary Anne Dixon to Brett Hubbard in Hickory, N.C.

~~Aug. 13, Return to MONITOR site (1 week ±)~~ Cambridge Mass
14. Joe Watson at mass. General Hosp. Bos

Aug. 17, Dr. Tom Uyemura (Tokyo University) arrives for 3 day visit

Aug. 18, "Bradford Compact" picnic in Plymouth, Mass.

BRON H. SCHMIDT
800 645 9190

Aug. 23, Leave for Venice, Italy - workshop (photography course)

Aug. 27 through September 1 photography workshop - "Venezia '79 La Fotografia" sponsored by the City of Venice, UNESCO and the International Center of Photography, NYC

Sept 2 Leave for Rome

Sept. 3 Amalfi harbor with Prof. Robert Bergman for 10± days

Sept 13 Saclant Center, LaSpezia, Italy (?)

Sept 28 MIT's Alumni Officers Conference (lecture - Hyatt Regency evening)

Sept 29 Museum of Science ("The Story of the Monitor" for Kim Vandiver

Oct. 9 Toronto lecture for doctors (Dr. Lindgneau)

Aug 17, 1979 Yesterday I took Bob Marcia Bergman out on the Charles river and the hill scan and the two 12 kc penetrations. We took records of the area inside of the Duck Islands on the east side of the Basin. Several underwater targets were detected.
Then the equipment was packed for shipment to Italy Rome Amer Acad. We will meet at the Amalfi harbor beginning Sept 2.

Aug 22 1979 Harold E. Edgerton.

Blood Smears.

Two slides were obtained from the M.I.T. laboratory on the first floor.

These were put in contact with SO 343 fine grain film at 42 cm from an FX-26B with 25 mfd at 700 volts. This lamp produces U.V. light.

The first test was processed for 2 min at 70°? with 1:1 HRP. dev the contrast was too high.

The next test was processed with a 1:4 solution of HRP for 1 min.

I looked at these negatives with a microscope when the negatives were still wet. There seemed to be some clumping around the red corpuscles in groups. Could these be actual? I did look at the original smear before the experiment. The clumping phenomena was not seen apparent. I must reexamine these negatives tomorrow when dry.

The SO-343 film should resolve 2000 lines/mm. that is about ½ μ. The red corpuscles have a diameter of about 3 μ. The white corpuscles are larger.

Aug 23. '79 Negs not good enough. I increased the distance to 65 cm and repeated.

1. Exposure inadequate with 1½-min dev in yesterdays HRP 1:4.
2. Exposure thin (65 cm) with 3 min development in 1:3 fresh developer.

Sept 11 1979 Harold Edgerton

Just back yesterday at 3:15 pm from Rome. I have been in Venice for a week at the Photo. School, then I was in Amalfi with Bob Bergman and Jay Kaufmann for a week with Doran. Esther went on the trip.

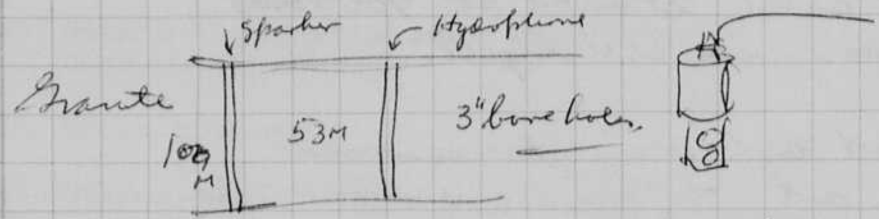
Sept 1st 1979
Harold Edgerton

54-1319 ~~6384~~ Brown.
3-6387. Ocean.

Miller of Geology Dept.
Sparker for velocity in Granite (566)
in H.E. Fletcher Granite Co.
Chelmsford Mass.

Chan Mole
Gene Simmons 3 6393

Barre Vt. Rock of ages. Granite. Miller 3.7014
Bentley Richter 802-476-3115 phone



Sept 23 1979. Test of Shutter 0664 Vincent. from Rochester.
H.E.
150 mm lens with 1/16" hole on shutter
open time about .001 seconds.
4.03 pm photo out of window in 4-405
Shows building in sunlight
plus blue sky on a clear day.

Plus x film 7 min DK 50.
1 exposure on half of plate.
4 exposures on the other half.

---

1 sky exp .46 fog 0.26.
4 exp .61

Roof Bldg 4 in Sun Golf club moving slow
1/1000 exp at 6 ft 4000 BCPS

Visitor with girl,
Prof. Moray.
(England)
working with
Sheridan in
M.E. Dept.

Outdoor Roof photo in direct sun
I swung the golf club but not fast.
Redo this with a synch connection to
fire the shutter.

	Lamp 1	Lamp 2 Side	Both Parallel
50 ws	1125	1000	~~1000~~ 750
100	2460	2400	~~2400~~ 1750
200	4500	4200	~~4~~ 5000
400			

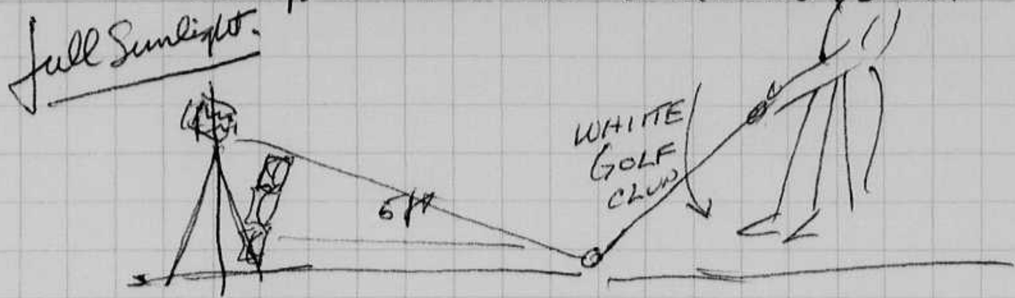
Novatron
1515 Fuller St
Dallas Texas 75218
patent 3,859,563

System 204
Lumedyne Port Richey
Florida

SN.1688

Sept 26 1979 Harold Edgerton Shutter tests. Vincent 1/4" hole 1/1000 sec. UNIBLITZ.

3 lamps 6000 BCPS total Birdseye 90 ws.



DK50 plus X film 7 min dev. NO BALL.

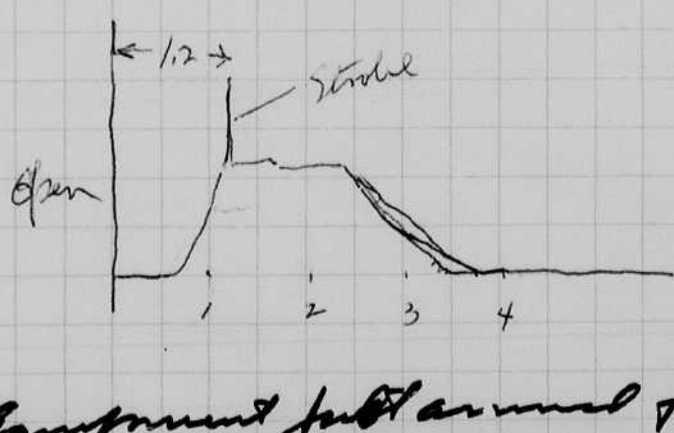
contacts cause shutter to operate. Then the strobe is synched to the open time.

Football made at 5 pm
Gordon Kelly coach
John Kirsch Grad. Nuclear } kickers.
Willy Schwartz Soph. Civil eng. }
Sinclair helped (freshman East campus).

Oct. 27. more photos of football made last night.
same as the day before.
Focus was too close by 2". action ok.
There were two kickers.
Gordon Kelly coach.
Chas Sands " Low kick.

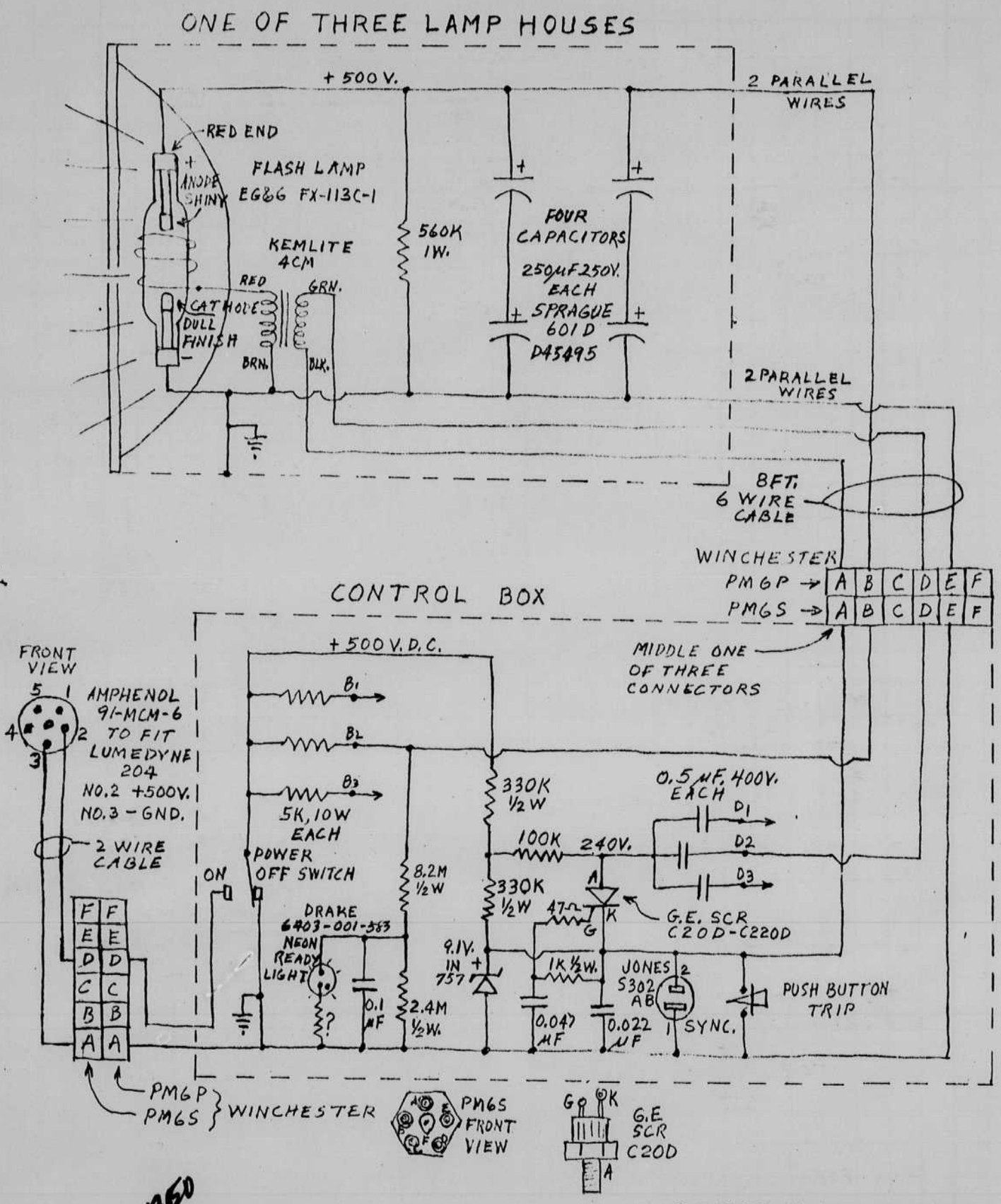
Chris Johnson meas. of delay and open time of Vincent Shutter II
H. Edgerton

Model 26 L18A26X5
S.N. 0669
6 mm hole.



Oct. 3, 1979 Equipment just arrived from Amalfi (Sonar)!

Connie Roosevelt Armor. Heritage called about pictures for a book on under-water archaeology. Throckmorton is writing a chapter. Others too.

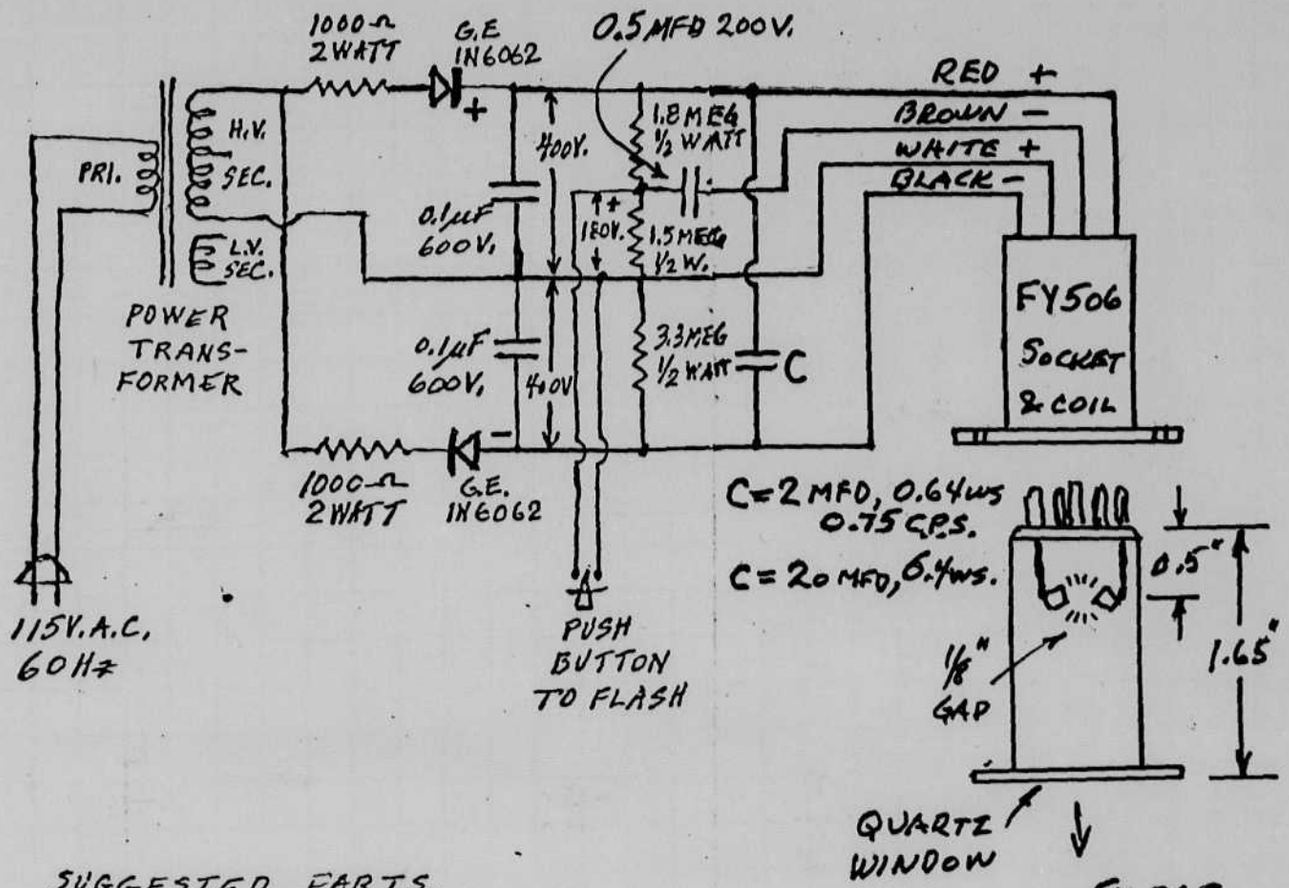


3 LAMP FLASH SYSTEM
APPROX. 2000 BCPS. 70 μSEC. EACH LAMP

THIS WAS USED IN VENICE. 1979 ON PIGEONS.

HAROLD EDGERTON OCT 3 1979.

V.E.M.
OCT. 3, 1979.



Fx 265
EG&G
35 CONGRESS ST
SALEM
MASS 01970
(617) 745-3200
USE 7302 EASTMAN FILM AT 1 METER FOR C = 2 MFD.

SUGGESTED PARTS.

POWER TRANSFORMER.
STANCOR PS-8416.
PRI. 117V 60HZ.
H.V. SEC. 250 V.C.T. @ 25MA.
L.V. SEC. 6.3V. @ 1.0A. (NOT USED)

~~TRIGGER TRANSFORMER.~~
~~TRIAD TF-11.~~

RECTIFIERS (TWO)
G.E. IN6062 1AMP. 800 P.I.V.

CAPACITORS (TWO) 0.1μF, 600V.
CORNELL DUBILIER WMF6P1.

CAPACITOR 0.47 OR 0.5μF, 200V.
CORNELL DUBILIER WMF2P47.

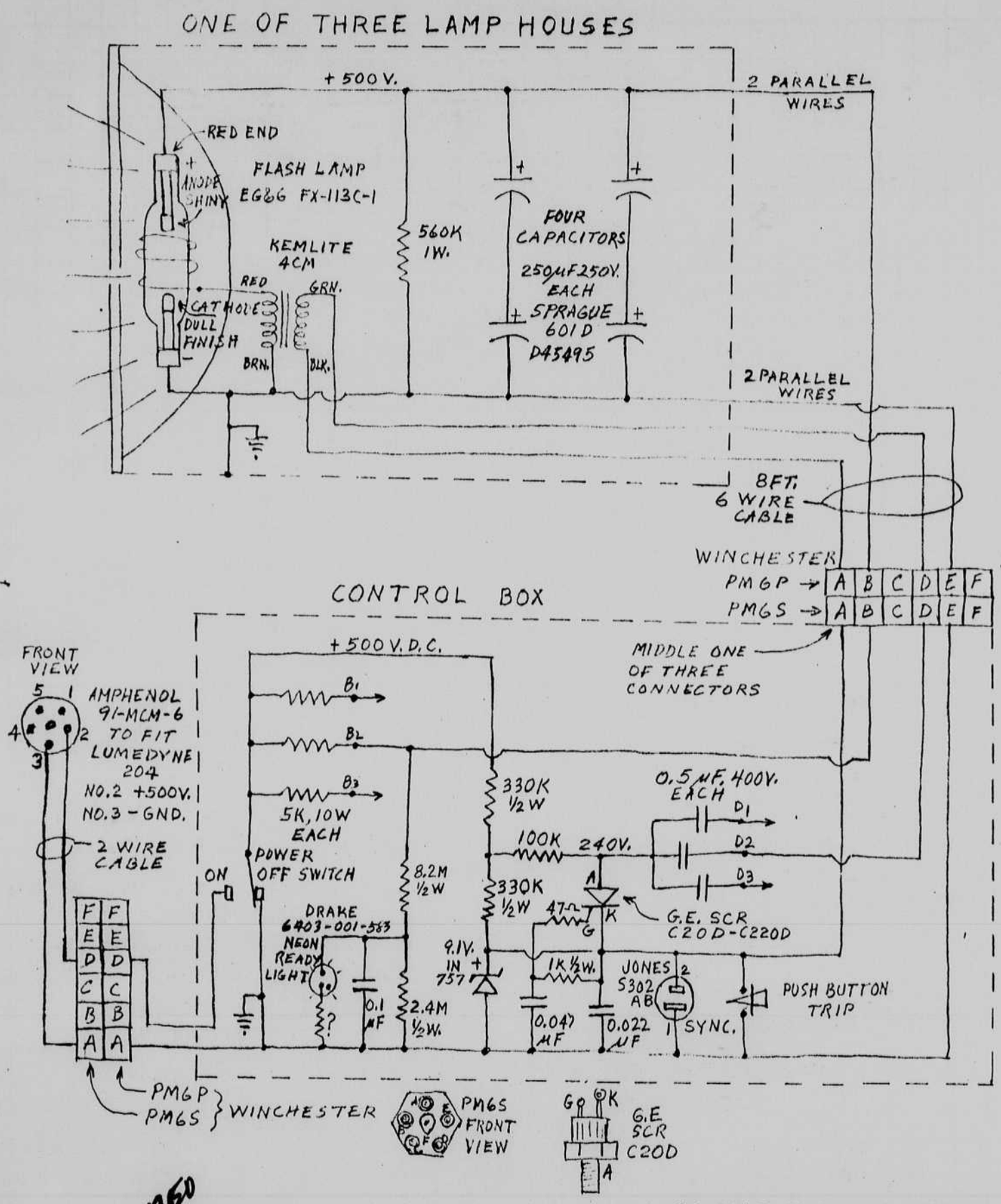
CAPACITOR 2μF, 1000V.
TRW TYPE 663UW

CAPACITORS CANNOT BE ELECTROLYTIC OR TANTALUM

SILHOUETTE STROBE LIGHT

~~HAROLD EDGERTON~~
REVISED AUG 14, 1979 H.E.E.

V.E.M.
7-15-77.

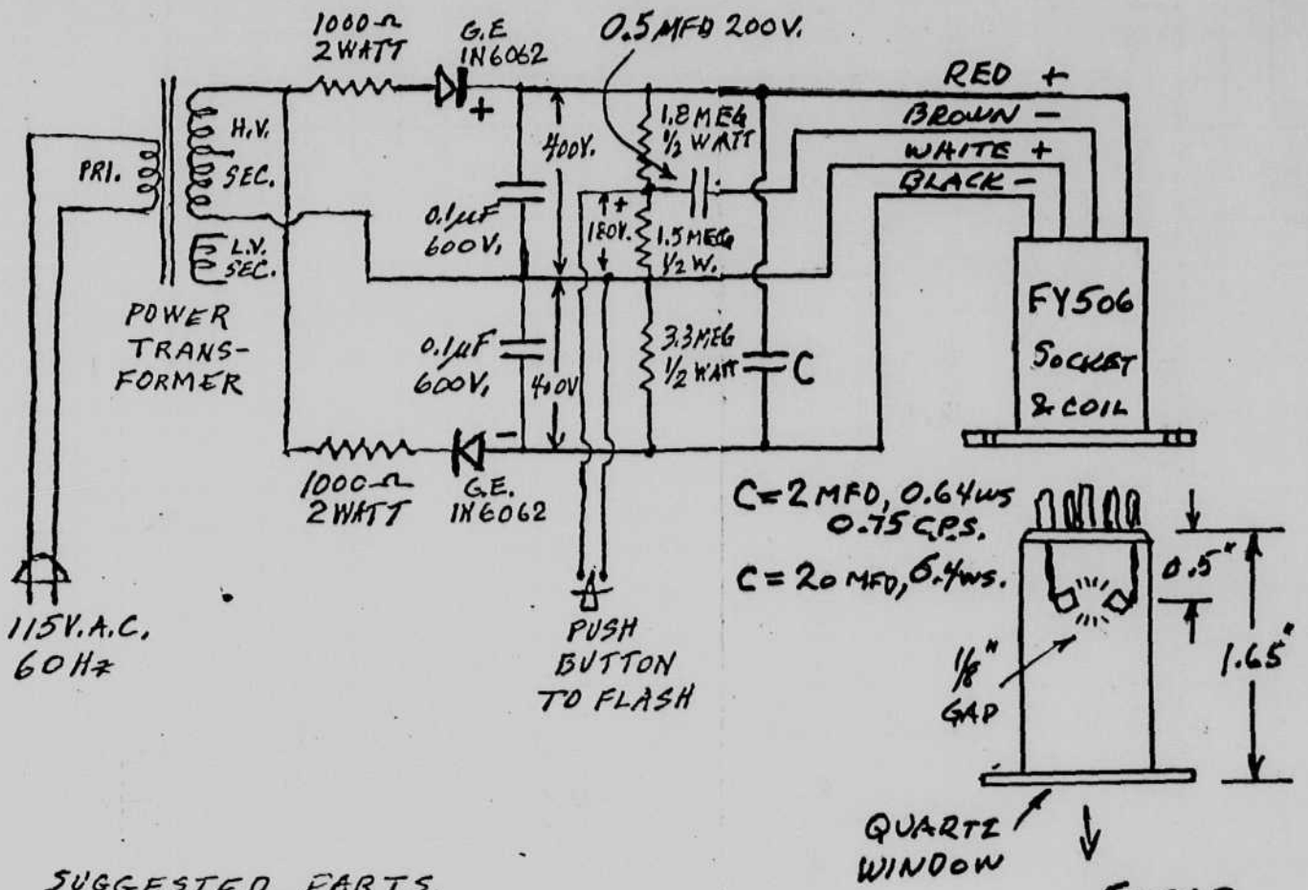


THIS WAS USED IN VENICE. 1979 ON PIGEONS.

3 LAMP FLASH SYSTEM
APPROX. 2000 BCPS. 70 μSEC.
EACH LAMP

HAROLD EDGERTON
OCT 3 1979.

V.E.M.
OCT. 3, 1979.



SUGGESTED PARTS.

POWER TRANSFORMER.
STANCOR PS-8416.
PRI. 117V 60HZ.
H.V. SEC. 250 V.C.T. @ 25MA.
L.V. SEC. 6.3V. @ 1.0A. (NOT USED)

~~TRIGGER TRANSFORMER.~~
~~TRIAD TL-11~~

RECTIFIERS (TWO)
G.E. IN6062 1AMP. 800 P.I.V.

CAPACITORS (TWO) 0.1μF, 600V.
CORNELL DUBILIER WMF6P1.

CAPACITOR 0.47 OR 0.5μf, 200V.
CORNELL DUBILIER WMF2P47.

CAPACITOR 2μF, 1000V.
TRW TYPE 663UW

CAPACITORS CANNOT BE ELECTROLYTIC OR TANTALUM

Fx 265
EG&G
35 CONGRESS ST
SALEM
MASS 01970
(617) 745-3200
USE 7302 EASTMANFILM AT 1 METER FOR C = 2MFD.

SILHOUETTE STROBE LIGHT

~~HAROLD EDGERTON~~
REVISED AUG 14, 1979 H.E.E.

V.E.M.
7-15-77.

SEPT.	PLACE	ORGANIZATION	CONTACT	TEL. NO.	SUBJECT	DAY OR EVE.	
28 Fri.	Hyatt Regency	MIT Alumni Officers	Nancy Whettley	3-8231	Monitor	6;00pm	1
29 Sat.	Museum of Sci. Boston, Mass.	N.E. Soc. of Naval Arch. & Marine Eng.	Kim Vandiver	3-4366	Monitor	6:00pm	1
OCT.							
9 Tue.	Toronto, Canada Sheraton Centre Hotel	Am. Soc. of Plastic & Reconstructive Surgeons	Dr. V. Lindgren	503-228-6301	High-Speed Photography	9:30am	1
13 Sat.	I.M.P. at Eastman House	PhotoHistory IV Symposium, Rochester, N.Y.	Rolf Fricke	716-724-4378	High-Speed	9:00am	1
	EE plans to arr. in Omaha on A.A. flt 416 at 6:03pm meet you at Airport Inn. M.L. after 7 pm.						
14 Sun.	Eastman House	" " "	" "	" " "	(Trade Fair)	10;00am-5:00pm	
18 Thu.		Engineers & Scientists of Milwaukee	Ed Farber Erhardt Koerper	414-646-2244 414-646-8141	High-Speed Photography	7:30pm	1
19 Fri.	Inst. of Sci. Auditorim,	Cranbrook Inst. of Sci. Michigan	Janet Johnson	313-645-3225	High-Speed Photography	8:00pm	2
20 Sat.	Bloomfield Hills	" "	" "	" " "	~~Monitor~~ "	8:00pm	
NOV.							
	Rockefeller Uni. E.68 & York Av.	MIT Alumni Center, 50 E.41 St., NYC	Jim Bidigare	212-532-8181	Monitor	6:00pm	
15 Mon.	Aurora, Neb.						
16 Tue.	Woodbine, Iowa		Jessie DeCou Mrs. A. Coe	712-647-2369 712-647-2015			1
17 Wed.	Lincoln, Neb.						
18 Thur		Engineers & Scientists of MIlwaukee	Ed Farber Erhardt Koerper	414-646-2244 414-646-8141	High-Speed Photography	7:30pm	
~~19 Fri.~~	~~Inst. of Sci. Auditorium~~	~~Cranbrook Inst. of Sci., Michigan~~	~~Janet Johnson~~	~~313-645-3225~~	~~High-Speed Photography~~	~~8:00pm~~	
~~20 Sat.~~	~~Bloomfield Hills~~	~~" "~~	~~" "~~	~~" " "~~	~~Monitor~~	~~8:00pm~~	
21-22	Pontiac, Mich.		The Edgertons	313-332-5675	9 Farmington High School 11, 1, 2. at Roper School.		

LECTURES. 4/12

4-406 & ~~Dark Room~~. 1979.

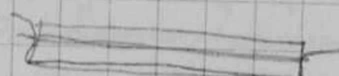
~~Oct 25 79~~ ~~Cabell Davis~~
~~David Potter~~
~~H S...~~

See p 81 for light.
22 μf 900 v FX 265

#1. ... Exposure ... ok. 68 cm

#2. Water on film. Same. ok. 68 cm

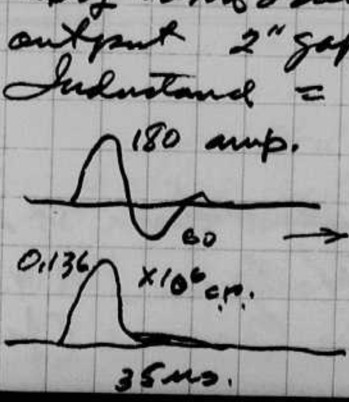
#3.  Cream layer. Same. 68 cm
Resolution very good

#4 
SAME SARAN WRAP 53 cm
Try to get a little more exposure.
Results – condensation on Saran wrap but Density much better – resolution excellent

#5 Sample drawn from bottom of Jar with pipette. placed directly 53
on film – Control

1979
on oct 24 yesterday.
Rosanna Rossi and Laurie Blatt Winfrey CAROUSEL
Italy on 15 West 55 th St.
Constants New York N.Y. 10019
12 vol. book. (212) 586-7969.
(Bertino)
We met at 100 mem. Drive at 2 pm to go over my slide collection of 1952.–1977. 123 slides were selected and taken to the coops for duplication. Rhodes Fairbridge Geologist of Calif is the editor.

Red Beacon for top of Earth Science Bldg. from Bill MacRoberts.
Bare lamp output 2" gap Brass ends 5 mm O.D.
Inductance = 36 μh.



output = 4.7 c.p.s. bare.

11, 1, 2. at Kiefer [illegible] LECTURES. 12

SEPT.	PLACE	ORGANIZATION	CONTACT	TEL. NO.	SUBJECT	DAY OR EVE.	
28 Fri.	Hyatt Regency	MIT Alumni Officers	Nancy Whettley	3-8231	Monitor	6:00pm	1
29 Sat.	Museum of Sci. Boston, Mass.	N.E. Soc. of Naval Arch. & Marine Eng.	Kim Vandiver	3-4366	Monitor	6:00pm	1
OCT.							
9 Tue.	Toronto, Canada Sheraton Centre Hotel	Am. Soc. of Plastic & Reconstructive Surgeons	Dr. V. Lindgren	503-228-6301	High-Speed Photography	9:30am	1
13 Sat.	I.M.P. at Eastman House	PhotoHistory IV Symposium, Rochester, N.Y.	Rolf Fricke	716-724-4378	High-Speed	9:00am	1
	EE plans to arr. in Omaha on [illegible] Flt 416 at 6:03PM meet you at Airport Inn. [illegible] after 9 pm.						
14 Sun.	Eastman House	" " "	" "	" " "	(Trade Fair)	10;00am-5:00pm	
18 Thu.		Engineers & Scientists of Milwaukee	Ed Farber Erhardt Koerper	414-646-2244 414-646-8141	High-Speed Photography	7:30pm	1
19 Fri.	Inst. of Sci. Auditorim,	Cranbrook Inst. of Sci. Michigan	Janet Johnson	313-645-3225	High-Speed Photography	8:00pm	2
20 Sat.	Bloomfield Hills	" "	" "	" " "	~~Monitor~~ "	8:00pm	
NOV.							
	Rockefeller Uni. E.68 & York Av.	MIT Alumni Center, 50 E.41 St., NYC	Jim Bidigare	212-532-8181	Monitor	6:00pm	
15 Mon.	Aurora, Neb.						
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LECTURES. 4/12

4-406 & Dark Room. 1979.

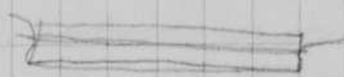
See p 81 for light.
22 μf 900 V FX 265

Oct 25 79. Cabell Davis
David Potter
K [illegible]

#1. [illegible] Petri Dish
[illegible] exposure [illegible] light ok. 68 cm

#2. Water on film. Same. ok. 68 cm

#3.  cream layer. Same. 68 cm
Resolution very good

#4  Same Saran wrap 53 cm
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Results – condensation on Saran wrap but
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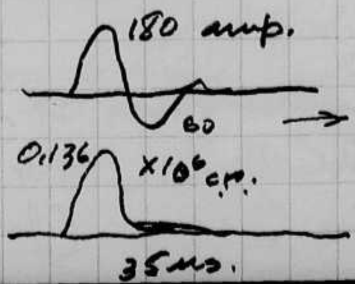
Red Beacon for top of Earth Science Bldg. from Bill MacRoberts.
Bare lamp output 2" gap Bremen 5 mm O.P.
Industand = 36 ms.



output = 4.7 c.p.s. bare.

11, 4, 2. at Kipper Sutter LECTURES. 12

84 Oct 31 '79 Dr. L. De Boer and — Dietmar Glogar (Austria)
from Maas[?] were 932-1605
here yesterday to do some 1605
exposure tests on Ages. GenRad Equip.

~~Harold Edgerton.~~

Test of U.W. Camera T.V. systems for use in the harbor.

f 11 5' on Benthos Lens

Stabs at 425 volts.

See print. 15' at f 11 Blackboard.

Nov 6 1979. Bishop showed me his microscope setup with a blood cell slide (dyed). 5 μ particles.

36-6th floor. 16 x 16 μ "reticon" array to pickup the image which is then displayed on a screen (C.R. tube).

A mirror sweeps the image across the reticon array.

Bishop just completed his D.Sc. degree in the E.E. Dept.

I am cutting a movie for the Nat Geo Fest Scheduled for Feb 7,8. 1980 at the Nat. Geo. meeting in Constitution Hall. MONITOR Search.

Nov 19

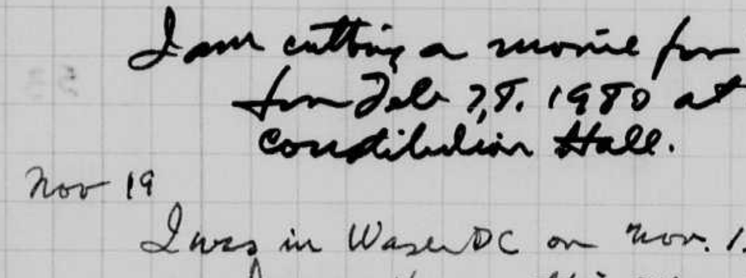
I was in Wash DC on Nov. 13, 14, 15 with Jerry Wiley and Joanne Hess cutting the Monitor film for the Feb 7.8 1980 showing in Constitution Hall.

8pm met with 4 students in Chem Eng Bldg to take multiflash photos of bubbles of air in flowing water. Sheila Konecke 409x-8580 Mark Marshall

Donna Kilian 5-7178 Baker Al Witkowski

#1. Plus x 4 ft ℓ lamps at high power 30/sec 4 sec.

#1 Plus x 2 ft lamps at low power 30/sec. 1/4 sec.



9 min in DK50 (2 weeks old?)

Nov 20 1979. Lloyd Breslau called from St Louis.

Shana Dennis (Hellenic) N.Y. called about prospects help in Greece (John Hall).

Nov 28 1979

Harold Edgerton.

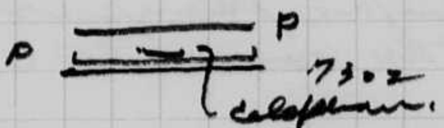
Channel 5 taken made a 5 min movie T.V.
in the strobe lab
Ray Goldsmith Good Day Show 449-0400
Peter Koerner
Alex Frisbie, etc. Gene O'connel of Polaroid helped.

Dream Show at Mus. of Sci. Allan Hobson
Ted Spragne photos.

Howard Rogers brought in
Polarizing film very thin in a frame

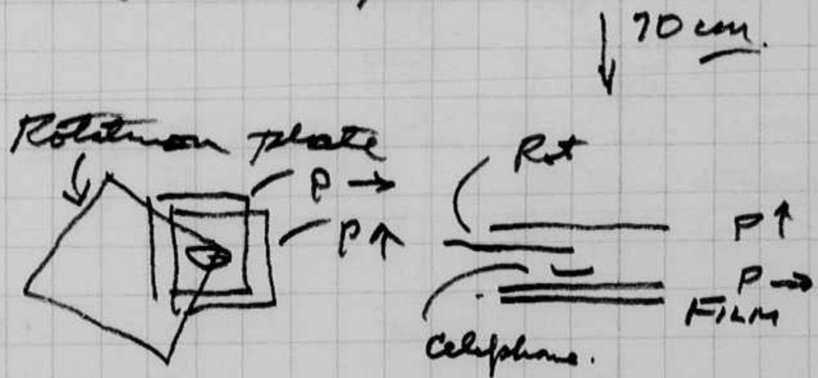
a polarizer in glass H.N. 385
a rotation plate.

B&W #1 7302 film 2 mfd FX 70 cm quartz window.



very Dim! Polarizers crossed.

B&W. #2 7302 film 24 mfd FX- 70 cm. more exposure.



Color
410 ƒ3 24 mfd.

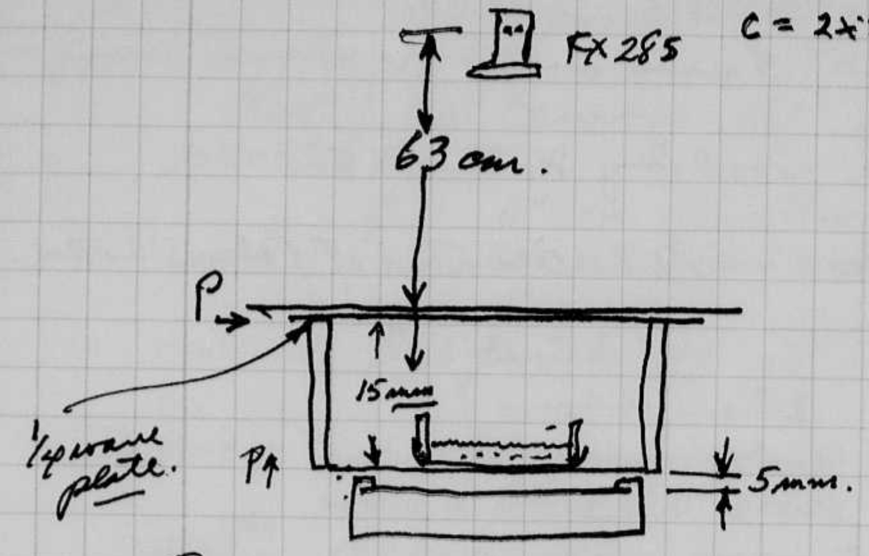
4107 5 2 mfds

Dec. 3. 1979 HEEdgerton. these color negatives
show real promise. I cannot
see color on the celophane!
next I will try copepods etc.

Dec 9 H.E. There is a blue background

 Dec. 5, 1979

Harold Edgerton. Color of Plankton.



POLAROID FILM HOLDER type 58 film

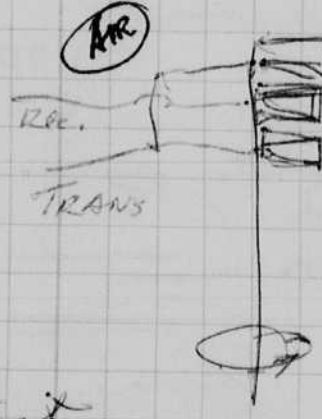
Exposure ok. Blue! not much color.

Dec 8 '79 the Blue can be eliminated with a yellow filter. I talked to A. Rogers. He can furnish a different type of polaroid to give a darker background.

Giannis Maemaris
Hellenic Res. Corp.
[illegible]

Dec 21, 1979. Returned from conference in ΕΛΙΚΗ Hotel of Dec 14-15, 16. to Boston on Dec 18. Bob Stiglitz was on the olympic plane with me and also was at the convention.

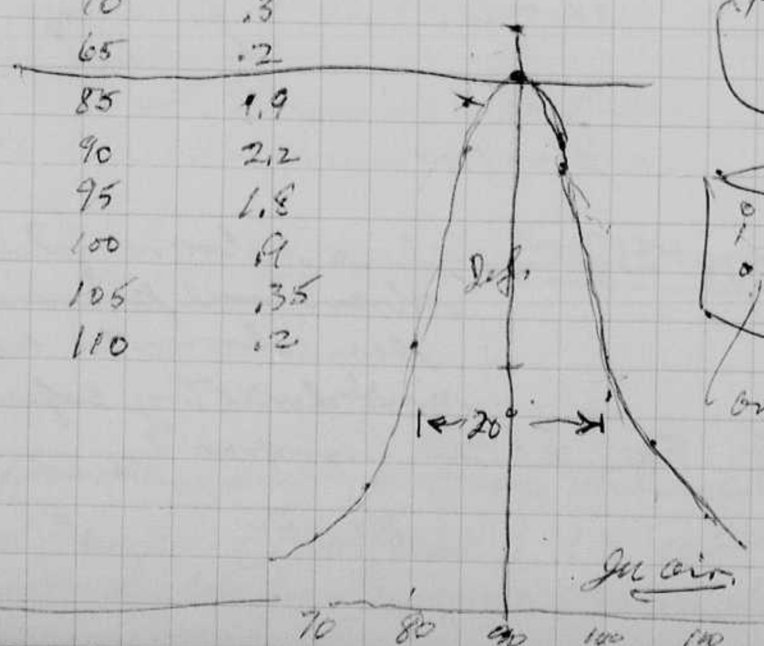
Dec 23 1979 Sonar display for Arch Convention Sheraton Hotel.



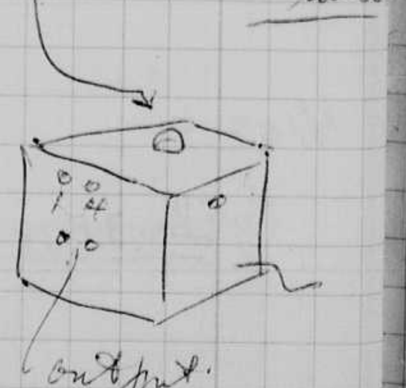
	V/cm	
90°	2.2 cm x 2 x .001	4.4 mV
85	1.9	
80	1.1	
75	.5	
70	.3	
65	.2	
85	1.9	
90	2.2	
95	1.8	
100	.9	
105	.35	
110	.2	

10 ft → Black Board

against Blackboard



1/4 mfd. output FX 6X trigger tube



Ellen Dixon helped me one day at this display.

Dec 24. 79. Mary Tom, Cleo and Ellen Dixon arrived ~~today~~ yesterday from Hickory N.C.
meas of vel of sound with scope type 545 no. 11920.

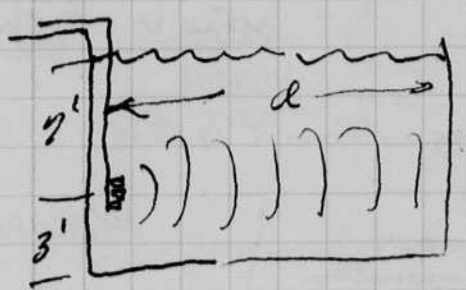
time between signals = 1.8 ms

21" | 1 foot. $v = \text{dist}/\text{time} = \frac{2FT(\text{travel})}{1.8} =$

Dec 26 '79 AE & Bill Moss.

frequency of transducer 80 μs. 12.5 cycles × 10³ /sec.
duration about 3 cycles. 80×3 = 240 μs.

Dec 27. 1979. Test in M.I.T. Pool. of 3 12kc transducers. 24 mS.
AE Edgerton & MacRoberts. Massa type with transformers.



$2d = v \times t \quad d = v\frac{t}{2} = \frac{5000 \times .0165}{2} = 41.25$ feet. Pool width.

0° 1.8 cm × 10 × 20 mv. = 3600 mv 3.3×5×.001 = 16.5 ms
3600 mv. = 3.6 v

5 & 10°	1.8 cm × 200
15 & 20	1.7
25	1.6
30	1.5
35	1.4
40	1.2
45	.8
0	1.8
5 10 15	1.8
20	1.8
25	1.7
30	1.6
35	1.6

Angle is more than 80° to ½ power!

note, the voltage received from a flat wall at 40 ft is 3.6 volts. (water) ~~(air)~~
" " " " " " at 10 ft is 4.4 mv (air).

 Jan 4 '80 Hydrophone Study
Harold Edgerton & Bill MacRoberts.

Output in tank. Massa with transformer 5Kc metal cover from
259 Bldg. via small driver box (high) Parallel resistor 100 [illegible]

#1 Clevite hydrophone in air. 1, 2, 3. f 8, 11, 16 multiple exp?
Spark driver slowed down to 500 in range.
4 f8   5 f11   6 f16   one shot on bulb.   x5 mv   0.5 ms.

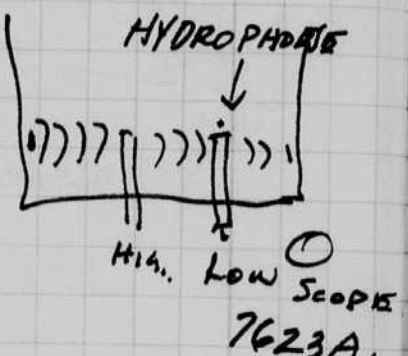
#2. 8 Ball.
7 f8   8 f11   9 f16.   x5 mv   0.5 ms.

#3. Blesh.
⑨ f16 Reticle on 4 ⑩ f16 Reticle on D.   x5 mv   0.5 ms.
11 f8 Ret full on Cut at 2.15.

above in air. Then MacRoberts and I took the equipment to the Swimming pool.

Hydrophone check with same source and setup. Processed Jan 5 80

Massa transmitter without trans.



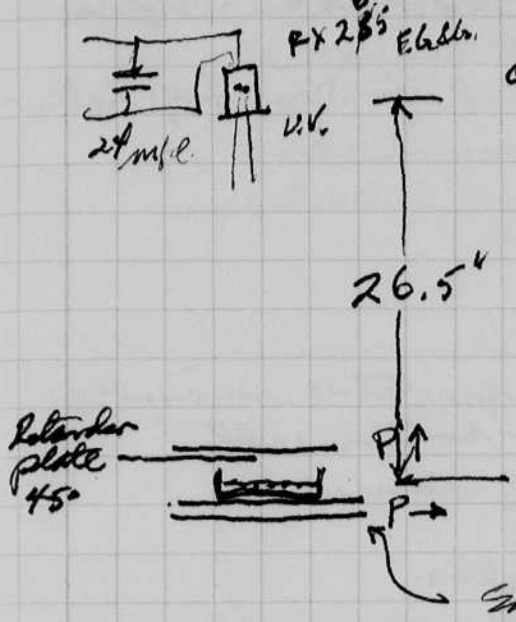
Hydrophone	mV.	Wall 2nd mV		
Chesapeake Brown	150	100	4000?	
8 ball #1	100	60	5000 [illegible]	
8 ball #2	20	–	–	Thick trace. Check for leaks.
Clevite Bendix Watch	100 mv?	–	–	Thin mess.
Massa cyl.	150	40	4000?	
Benthos Inshore.	54	14		

Jan 5. 1980 Sat. H. Edgerton. Color Shadow

Exposure tests

Silhouette color experiments. FX 265 Lamp.

Two polarizers were given to me by H Rogers via Helen. The ones used before passed the dark blue. see p 85.



out put. 24 mfd 800 volts 6.4 watt sec.

C.P.S. = about 10? Check with Scofe or meter.

(These were ok.)

Repeated Jan 10 with Retarder plate on negative neg. etc. ✓

Disk with plankton from Ortner, NOAA Miami.

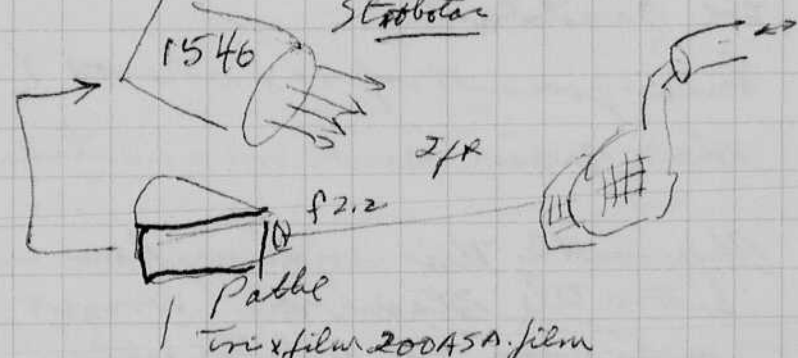
Eastman Vericolor II 4107 color negative

To be processed at Boris Lab. in Boston.

Feb. note Prints were made at The Nat. Geo. Society for Royce and [illegible]

Jan 12 1980 Harold Edgerton

LEHR Dr. John Lehr 732-6987 page 812 brought a dog lung and a variable frequency air source to actuate it. Perry Westerman



The speed of the camera seemed to vary or pump so we used the oscillator to run the pump. at 60/sec the photo were made at 16/sec at f4. These were the last few scenes of the 100 foot roll of film.

Chas Miller arrived about 10 am. to try T.V. and strobe.

Polaroid movie camera used with Strobolume. See Chas M. for data. Chas Miller

?. → The Pathe take up reel did not operate at the end of the test!

Jan 15 1980

Harold Edgerton Steve Blatman VI 4 VII Seniors
Blood Smears.

DEKTOL. Straight

#1 Contact. 27" to FX 265 with 25 mfd +. Thin

2. " 19" 2 min Dev Exp better

#3

#4

Developed 3 min in Dektol 1:1
Examined with a microscope. The images are not good enough for white cell analysis on the unstained samples.

Red cells. White cells.
5 to 8 μ
2 x larger.
2.5 x ".

Contact negs show diffraction problems with strobe using glass slides
Possibly quartz slides would improve the quality?
Enlargement of 10 x shows (onto 7402 film) ~~shows~~ grain and resolution problems.

Apparently this system does not compete with the ~~stain~~ (wright) method of measuring the white cells.
Will U.V. light show any thing else to help with a study of the cells?

Try U.V. Light
" Soft x rays. etc.

Jan 20, 80. I took the color silhouette equip to Nahant Yesterday morning and worked with Bill Fowle on his worms and amphipods.
9 4107 color negs exposed
6119 4 6119 Ektachrome 64 were exposed
56343 B&W. All with Saran wrap.

Feb. 20, 1980.

The Saran wrap sample holders for the expedition yesterday to Nahant had a "leak" problem for three ~~of~~ out of five. Apparently there are small holes that let the water through.

I learned that they should all be tested before they are used. It is easy to see where the leaks occur when the assembly is put on a flat white surface. The water shows up.

Feb. 2, 1980 Distance for SO 343 should be 40 cm to 7.7 cps 13.5 μs
my 25 mfd 750 v unit with an FX 285 (U.V lamp)

7302 Fine grain Pos Distance 80 cm 0.7 cps 3 μs
with 0.7 cps.

Photos of the SDN Bldg 7 2nd floor.
f 9 lens in ~~a~~ Electric Shutter.
5 minute time Start at 4.20.
(note one Double exposure
when the switch opened).
D = 2.98 filter (x 1000) ±.
A/2 (at f 9) which is f 18.
Plus x film 7 min Dev.

Images seems to be OK.
Lines about 3 ft to the north of
the centerline since there was a
banner hanging from the ceiling.

January 11, 1980

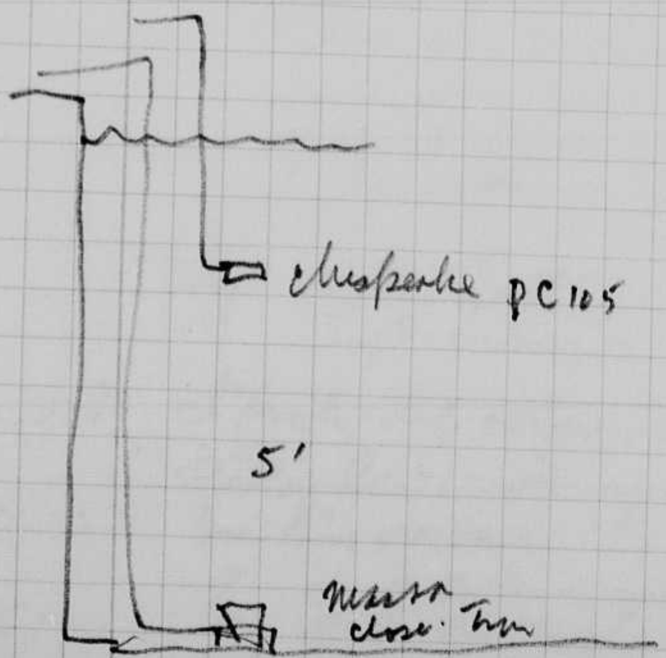
DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

Hydrophones tested - 5 feet to Massa 6KC from small driver, in MIT swimming pool - bottom of deep end by Harold E. Edgerton and Vernon E. MacRoberts

Hydrophones	Volts
8 ball, #1	0.6
8 ball, #2	0.75
Atlantic BC50	0.75
Atlantic BC32, #129	0.3
Sprague A6600	0.7
Clevite CB17AR	0.2
Massa TR25C	0.6
(Best) → Massa 6KC (no trans.)	30.0
2nd Chesapeake PC105	4.2
TR127, #1	0.14
TR127, #2	0.10
Sonar Brass	0.15
Benthos Snake	0.15

High power: 560V

I propose to use Massa as standard receiver. Note it gives 4.2V at 5' distance from a Massa excited by 0.1 mfd at 500 volts.



Long. Lat.

Possible wreck off Miami ???
Loran C 25 42.0
80 3.0
20 ft high.

1:19p JEFFERSON HOTEL

Hall, 8:30p

202-857-7706)

a, Fla.

05)

813-388-
Sarasota 4441

a Bay, 12noon lecture

H:813-839-9251)

813-381-0681,4305
orsett, 4pm seminar ?

. 305-655-8800

ent a car 800-654-3131

(W)305-395-5100
McAllister ext. 2372

682)

ay)

0 dinner at
Mr. Carreras
2621(H:584-5142)

Ft. Lauderdale

305-872-2331

" " "

eb. 19-22)

5-361-5761 x 346

6.30 pm.

305-465-2400

3:15p

eturns/roll.

January 11, 1980

DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

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High power: 560V

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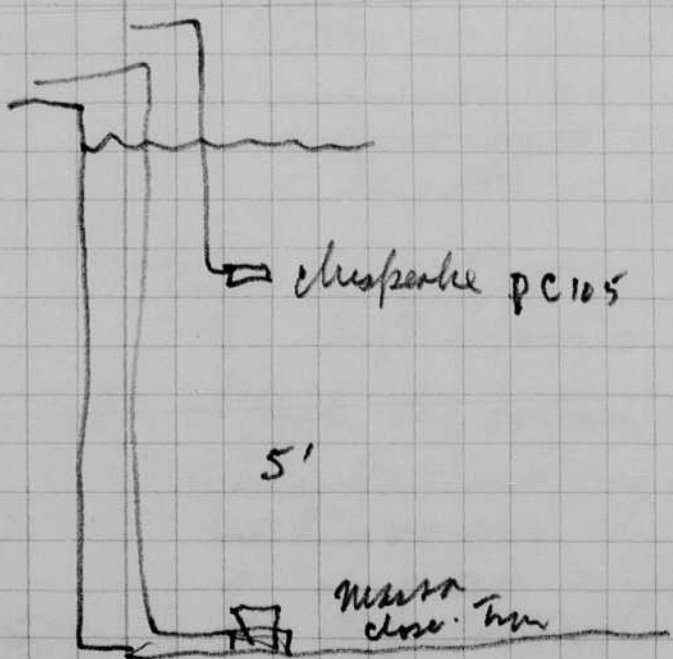

Possible wreck off Miami ???

Loran C 25 42.0 (Long.)
80 3.0 (Lat.)

20 M high.

1:19p JEFFERSON HOTEL

Hall, 8:30p

202-857-7706)

a, Fla.

05)

813-388-
Sarasota 4441

a Bay, 12noon lecture

H:813-839-9251)

813-381-0681,4305
orsett, 4pm seminar ?

. 305-655-8800

ent a car 800-654-3131

(W)305-395-5100
McAllister ext. 2372

682)

ay)

0 dinner at
Mr. Carreras

2621(H:584-5142)

Ft. Lauderdale ✓

305-872-2331

" " "

eb. 19-22)

5-361-5761 x 346

6.30 pm.

305-465-2400

3:15p

em

ectures/roll.

Room 4-405
& 20D-009
DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE Tel: 253-4629 or 494-8783
February 1980
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

OFFICE & LABORATORY PERSONNEL:

Edgerton, Harold, 100 Memorial Drive, Cambridge, 864-4790 (Professor)
Johnson, Chris, 318 Charles River Road, Watertown, 926-4126 (T.A.)
MacRoberts, Vernon (Bill), 105 Whidden Avenue, Whiteman, 1-447-4172 (Technician)
Miller, Charlie, 116 Bingham Road, Carlisle, 1-369-7074 (Lecturer)
Mooney, Jean, 27 Birch Road, Watertown, 924-7124 (Administrative Assistant)

COURSE 6.163

Aho, Kriss, 450 Beacon Street, Boston, 247-7775
Ayala, Mike, 405 Memorial Drive, Cambridge, 253-7764
Basseches, Stuart, 28 The Fenway, Boston, 536-4715
Catanese, Adrienne, 4 Ames Street, N-103, Cambridge, 494-8937, dl. 5-6689
Chin, Douglas, Baker 512, Cambridge, dl. 5-7262
Drascher, Ellen, 362 Memorial Dr., Cambridge, dl. 5-7120
Eglowstein, Howard, 474 Memorial Dr., rm. 205, dl. 5-7555
Holmes, Clarence, 471 Memorial Dr., rm. 407, dl. 5-7431
Glassman, Ed, 372 Memorial Dr., 494-8300
Goldberger, Michael, 28 The Fenway, Boston, 267-0908
Latham, Rich, 3 Ames St, 502 Munroe, 253-1000, dl. 5-6520
Leong, Robert, rm. c-327, 450 Memorial Dr, dl. 5-9542
McAllen, Rob, 28 The Fenway, Boston, 267-0908
Oker, Jim, 504 Munroe, East campus, dl-5-6504
Papageorgiou Nikolaos, 450 Memorial Dr., DL 5-9440
Peterson, Hal, 400 Memorial Drive, 494-8677
Phillips, Dean, rm. 628 Baker, 362 Memorial Dr., dl 5-7378
Plummer, David, rm. 514 Baker House, dl 5-7264
Schoen, David, 484 Beacon Street, Boston, 262-1099
Seltzer, Wayne, rm. 331 Baker House, dl 5-7331
Solomon, Monty, 2 Meacham Street, Apt. 5, Somerville, 628-1057 or 492-4800
Thompson, Pat, 460 Green Street, Apt. 4, Cambridge 661-9193
Trumper, Dave, 166 Magazine Street, Cambridge 864-0429
Turek, John, 428 Memorial Drive, Cambridge, ext. 3-3213 or 494-9833
Vasicek, Tom, 97 Bay State Road, Boston, 247-8691 or ext. 3-4704
Weiss, Steven, rm. 324 Baker House, dl 5-7324
Wilgus, Alexander (Sandy), 528 Beacon Street, Boston, 267-1801 or 247-2699, or ext. 7898

THESIS STUDENTS, ETC.

Denton, Denice, Walcott 312, dl 5-6357 or 3-2503 (rm. 20c-022)
Johnson, Michael, Hayden 312, East Campus, dl. 5-6327 or 3-2871
Lemme, Peter, Baker House 626, Cambridge, dl 5-7376 or 3-3161

Esther & Harold Edgerton
WASHINGTON, D. C. &
· FLORIDA TRIPS
February 6 - 23, 1980

Wed. Feb 6 Leave Boston for Washington, D. C. on DELTA #323 at 12:05p - 1:19p JEFFERSON HOTEL

Thu. " 7 Dinner at Geographic Society, 6:00p, lecture at Constitution Hall, 8:30p

Fri. " 8 Lecture at Constitution Hall, 5:00p and 8:30p (JOANNE HESS: 202-857-7706)

Sun. " 10 Lv. Washington at 5:10p on NATIONAL #405, Ar 8:09p in Sarasota, Fla.

(Mr. & Mrs. Robinson, 601 Mourning Dove Dr., Sarasota, 366-2705)

Mon. " 11 Visit - Dr. Wm. Taft, Mote Marine Lab, 1600 City Island Park, Sarasota 813-388-4441

Tue. " 12 "PIER PLACE" 800 2nd Av,NE, St. Petersburg - MIT Club of Tampa Bay, 12noon lecture

(Don Robinson H:813-867-6121; W:813-822-4336 A.H. Rodriguez H:813-839-9251)

" " 12 St. Petersburg Jr. College, 6605 - 5th North, St. Pete, Joe Dorsett, 4pm seminar ? 813-381-0681,4305

Wed. " 13 Lv. Tampa, UNITED #757, 11:30a - ar. W. Palm Beach 12:13p - Rent a car 800-654-3131 Holiday Inn, 100 Datura St. 305-655-8800

Lectures 4 & 8p, Florida Atlantic University, Boca Raton, Ray McAllister ext. 2372 (H) 305-426-0808 (W) 305-395-5100

Thu. " 14 Lecture MIT Club W. Palm Beach, 6p (Martin Antman H:305-965-3682)

Holiday Inn, 100 Datura St. W.P.B. 305-655-8800 (Lecture & stay)

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Howard Johnson Inn, 16700 Second Av., Ft. Lauderdale 305-945-2621(H:584-5142)

(305-565-5410)
~~Stay~~-Alicia/Geo. Wayne, 4280 Galt Ocean Drive, Apt. 12-A, Ft. Lauderdale ✓

arrive at 11am.

Sat. " 16 Newfound Harbor Marine Institute, Rt. 3, Big Pine Key, Fla. 305-872-2331

Sun. " 17 (Duncan Mathewson) " " " " " " " "

Mon. " 18* Put equipment aboard NOAA research vessel "VIRGINIA KEY"

Tue. " 19-~~20~~ 21 Aboard NOAA research vessel, Pete Ortner, Shailer Cummings 305-361-5761 x 346 Leonard Hill (from Feb. 19-22)

FRI ~~Sat.~~ " ~~23~~ 22 ~~Disembark from~~ " " RETURN TO BOSTON DELTA 132 at 6.30 pm.

~~Mon.~~ " 25 Harbor Branch Foundation, Ed Link, Dr. Youngbluth & Dr. Jones 305-465-2400

*Esther Edgerton, Eastern flight #42, lv. 12:25 - Ar. Boston 3:15p

FINISHED WORK ON VIRGINIA KEY THURS. FEB. 21 at 10 pm.
4 rolls of film (100 ft long) were processed on the
morning of the 22. Then Pete and I analyzed them
in the afternoon. 16 pictures/foot x 100 = 1600 pictures/roll.

Room 4-405
& 20D-009
DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE Tel: 253-4629 or 494-8783
February 1980
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

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Johnson, Chris, 318 Charles River Road, Watertown, 926-4126 (T.A.)
MacRoberts, Vernon (Bill), 105 Whidden Avenue, Whiteman, 1-447-4172 (Technician)
Miller, Charlie, 116 Bingham Road, Carlisle, 1-369-7074 (Lecturer)
Mooney, Jean, 27 Birch Road, Watertown, 924-7124 (Administrative Assistant)

COURSE 6.163

Aho, Kriss, 450 Beacon Street, Boston, 247-7775
Ayala, Mike, 405 Memorial Drive, Cambridge, 253-7764
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Catanese, Adrienne, 4 Ames Street, N-103, Cambridge, 494-8937, dl. 5-6689
Chin, Douglas, Baker 512, Cambridge, dl. 5-7262
Drascher, Ellen, 362 Memorial Dr., Cambridge, dl. 5-7120
Eglowstein, Howard, 474 Memorial Dr., rm. 205, dl. 5-7555
Holmes, Clarence, 471 Memorial Dr., rm. 407, dl. 5-7431
Glassman, Ed, 372 Memorial Dr., 494-8300
Goldberger, Michael, 28 The Fenway, Boston, 267-0908
Latham, Rich, 3 Ames St, 502 Munroe, 253-1000, dl. 5-6520
Leong, Robert, rm. c-327, 450 Memorial Dr, dl. 5-9542
McAllen, Rob, 28 The Fenway, Boston, 267-0908
Oker, Jim, 504 Munroe, East campus, dl-5-6504
Papageorgiou Nikolaos, 450 Memorial Dr., DL 5-9440
Peterson, Hal, 400 Memorial Drive, 494-8677
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94 Feb 26 1980

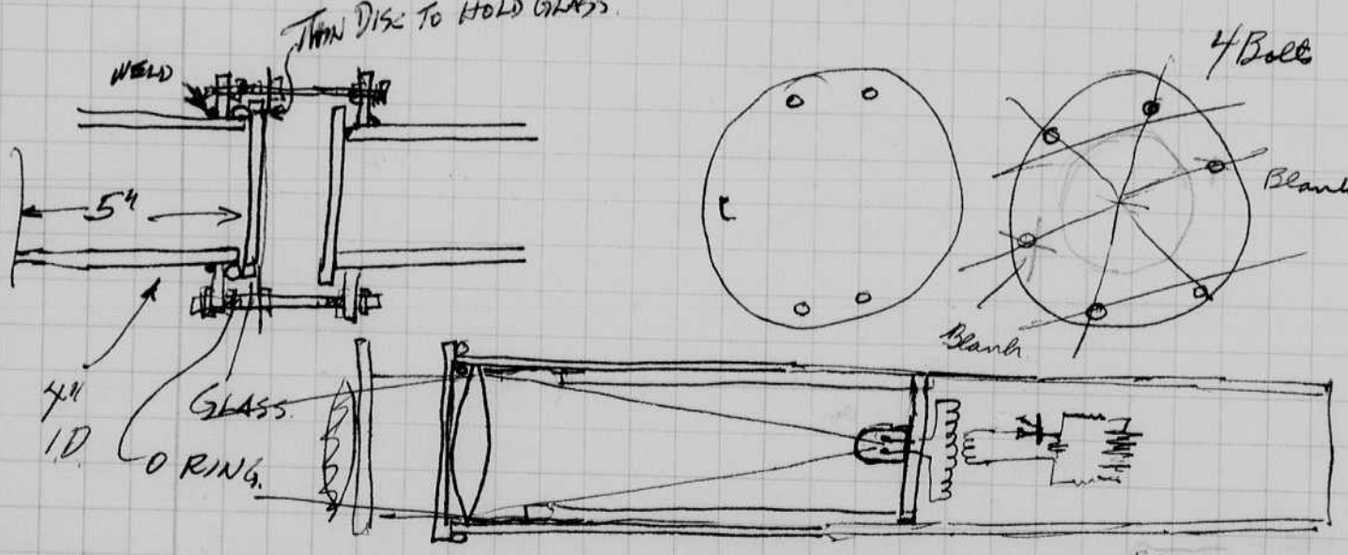
Harold Edgerton. Silhouette camera "in situ" model.

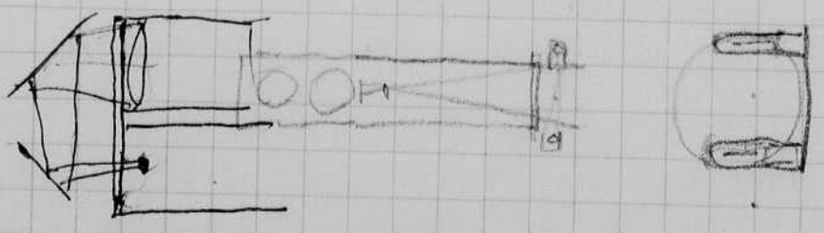
The design needs to be improved in several ways. (1). the speed should be greater such a 2 seconds per photo interval.
100 x 16 = 1600 photos in 3200 seconds.
3200 ÷ 60 = 53.3 minutes or 1 hour.

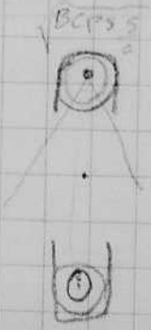
(2.) the speed should be constant so that a timer is not needed. This will involve some type of feedback system.

(3.) thin base film or longer longer pieces in a larger diameter camera are possible objective.

Mode of Present camera.
(1.) Reduce the window thickness
(2) Design for 500 ft only. (depth)
(3) Use as much of the I.D. diameter as possible.
(4.)







BCD's = DA D = 1/4 A = 11 DA = 3
BCD's = 9 5/5
BCD's = 9 25/25
BCD's = 9

Mar. 9, 1980
Harold Edgerton.
John Fehr. 932-6987 - page 812
Harv. Public Health Peter Bent.
Movies of Dog lungs.
BR. 1540 Ektachrome EF Daylight film.
ASA 160.

Perry Westermann Fal. Technician
Sigmund Westermann.

Read from Chart on p41 of Kodak Handbook.

Mar 20 1980 Reported movie good now want Dog or pressure. Fri. mar 21. 10:30

ASA 160 25 Guide number.

Closeup factor 0.9
Reflector factor ? = .5 G.N. = 12. estimate

Media wilmington

Lamp at 3 ft. 12.5 m.
3 ft f 4 = 12.

Speeds 15 and 40.

		Hz			
Am. 9.50	Roll 1.	0.9	24/sec f 4.	30 sec.	
	"	15	15 -	45 sec.	Synch below to show strobe effects.
953	"	15.	25 -	f 4.	

More to complete film —
10 20 film not gone.

Nat. Geo. T.V. special on Public T.V. Mar. 6. except in Boston where it will be one week later. Sep. 26.

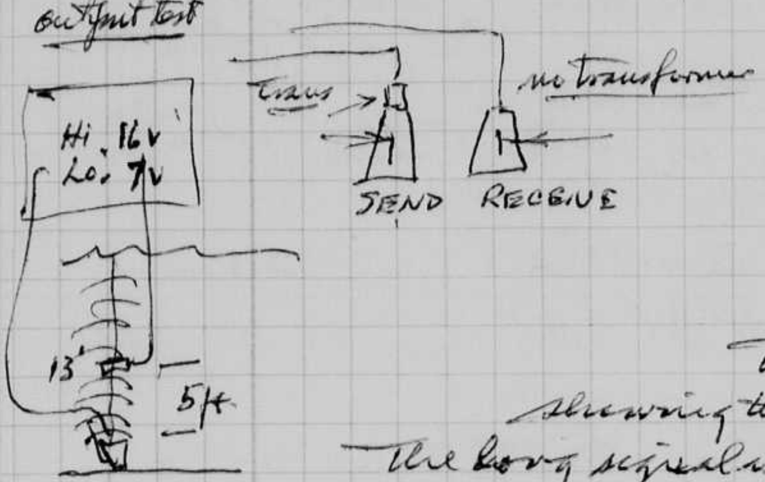
Yesterday the Boston Sea Rovers had a Clinic at B.U. all day.
Chas. Miller showed the Bear Sander
—— Showed the Monitor effort with Fish. N.C. film.
Boutteos (Church and Hayward showed the camera U.W in the exhibit space
Inuit wyhte of the N.E. Aquarium - Diver group.

Evening affair at the Hancock Bldg.
Fred Ryling and Linda Moulton were there.
~~McGuinness~~ Master of ceremonies (McInnis)
Bob Ballard got award diver of the year
He showed movies of the black jets (pacific ocean)
Christoff showed finding of camera.
After the meeting we had a social hour until 12.30
The titanic project was discussed in detail.
Peter Gimbel and wife were there. He is making a "serious" movie.
Ballard and Christoff says NBC and the news media do not show financial interest.

Sub-bottom Sonar.

Mar. 9, 1980
Hawk Expedition

Bill MacRoberts finished another assembly of the Massa transducers in a wood frame which gives cross insulation between transmitter and receiver.

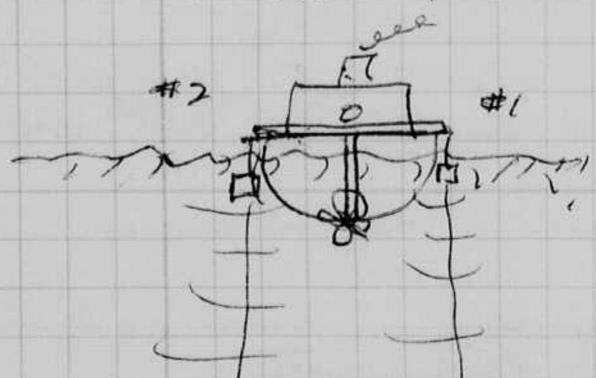


The bottom of the pool and the end both gave long signal reflections such as — ms.

Then we put the transducer on the bottom and looked at the surface.

This gave a short response showing that the basic signal is short. The long signal is probably due to penetration or, more likely, rough surface of the pool edge. It is mosaic tile.

Another pinger system is to be built so two penetrators can be used at the same time. They will be deployed on the two sides of the boat giving double cover which is useful for small targets.

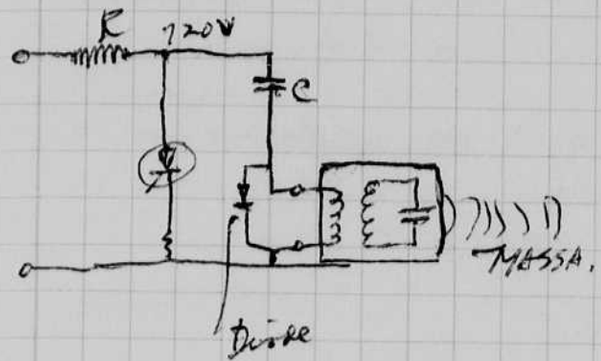


Mel Fisher in Florida at Key West wants me to keep looking for his 998 silver bars of 80# each. He promised me one if I found them. I think he is safe in making this offer.

The next step is to make two mini boom units to operate in the same manner. These should have a basic frequency of 1000 cycles/sec.

Phone call 3 pm from Tony Austin 8 Victoria Road
East Harwich 432-5486
wants to find the wreck of the "Whidah" 1717
Knows where a submarine may be inside the cape.

Many tests have been underway on the driver and sonar of p96. We hope to shorten the pulse and get greater peak power. The basic circuit is given below.

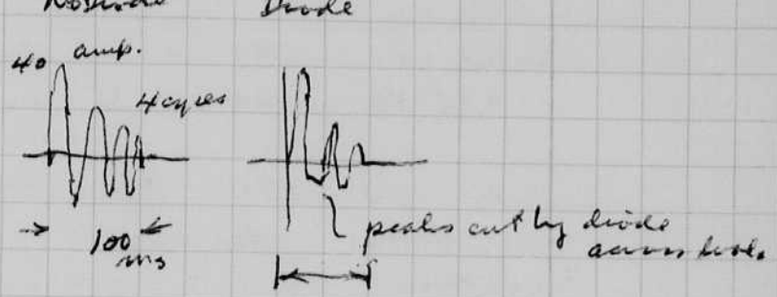


The diode across the output (transformer) seems to have an effect on the output. We tried both with and without.

freq of current in pulse.
1 cycle in 25 μs.
$f = \frac{1}{25}10^6 =$ 40,000 cycles

The crystal is 6 kc.

current in SCR.

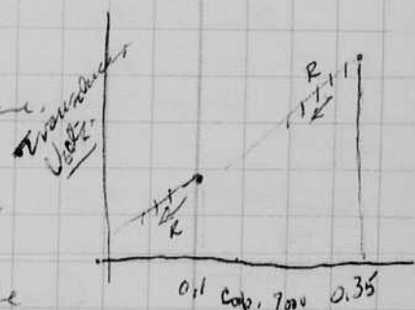


note oscillating current.

The next tests are to be accomplished in the M.I.T. Swimming pool.

After-tests in Pool.

(1). The Diode and 4.5Ω res on coil did not give startling result. Best without; not positive.



(2) The Series resistance did nothing - 80 ohms.

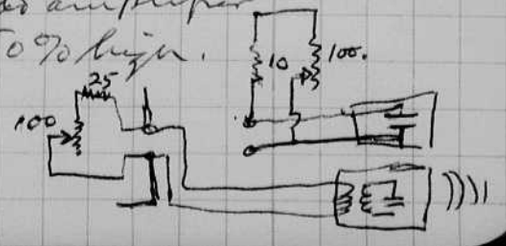
(3). 10 ohms or input to Hydrophone reduced the signal duration and amp.

(4) (80 - 10) ohms on coil. Settled on 25 for a value that stopped some of the fuzz.

(5) 5Ω to 10 on input to amp. in parallel with the transducer.

Test 75 ft to wall and. "Low" input - 0.1 mfd
Good record.

25 on transformer
10 on to amplifier
Gain 50% high.



Notebook # 33

Filming and Separation Record

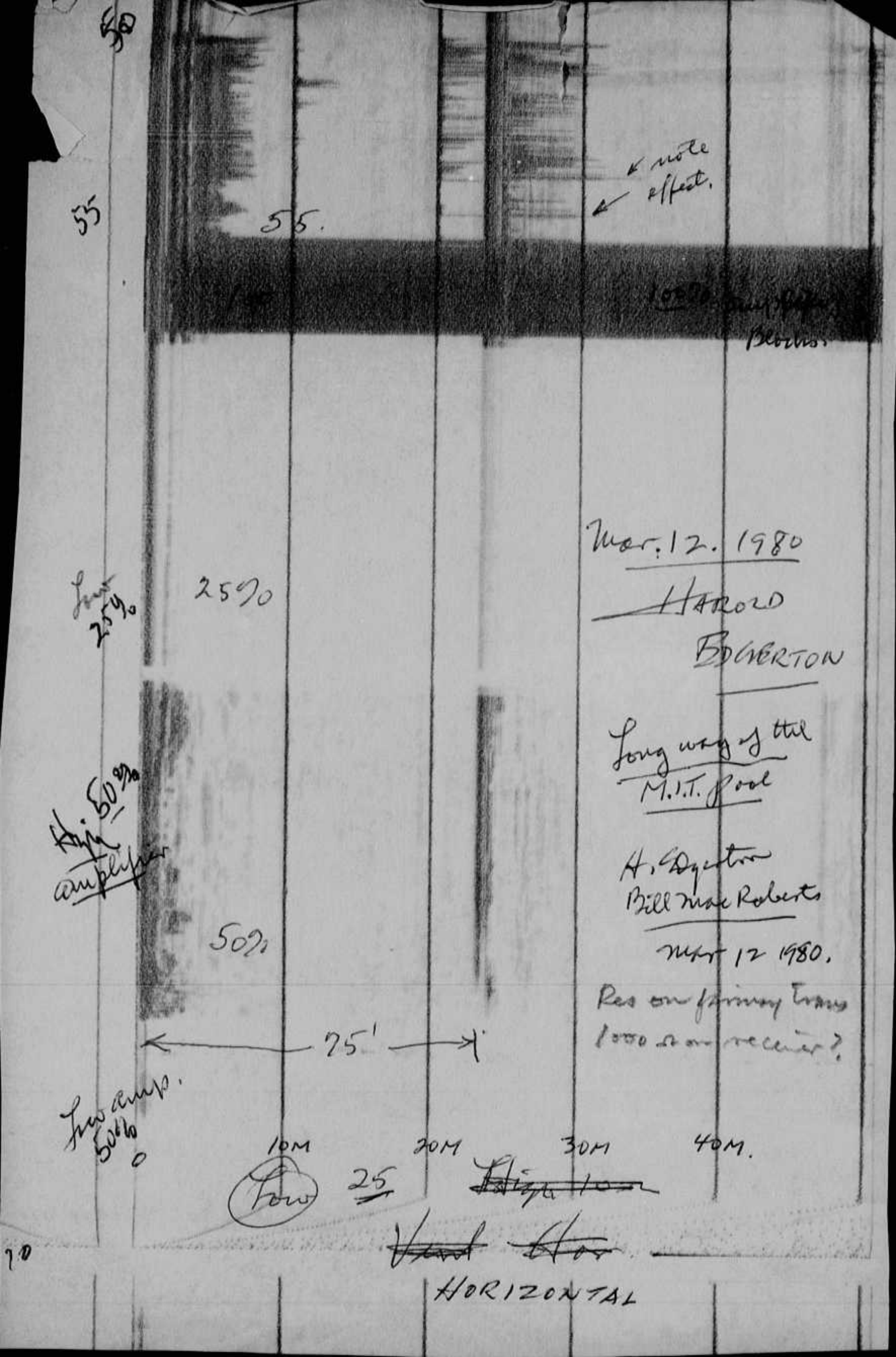
____ unmounted photograph(s)

____ negative strip(s)

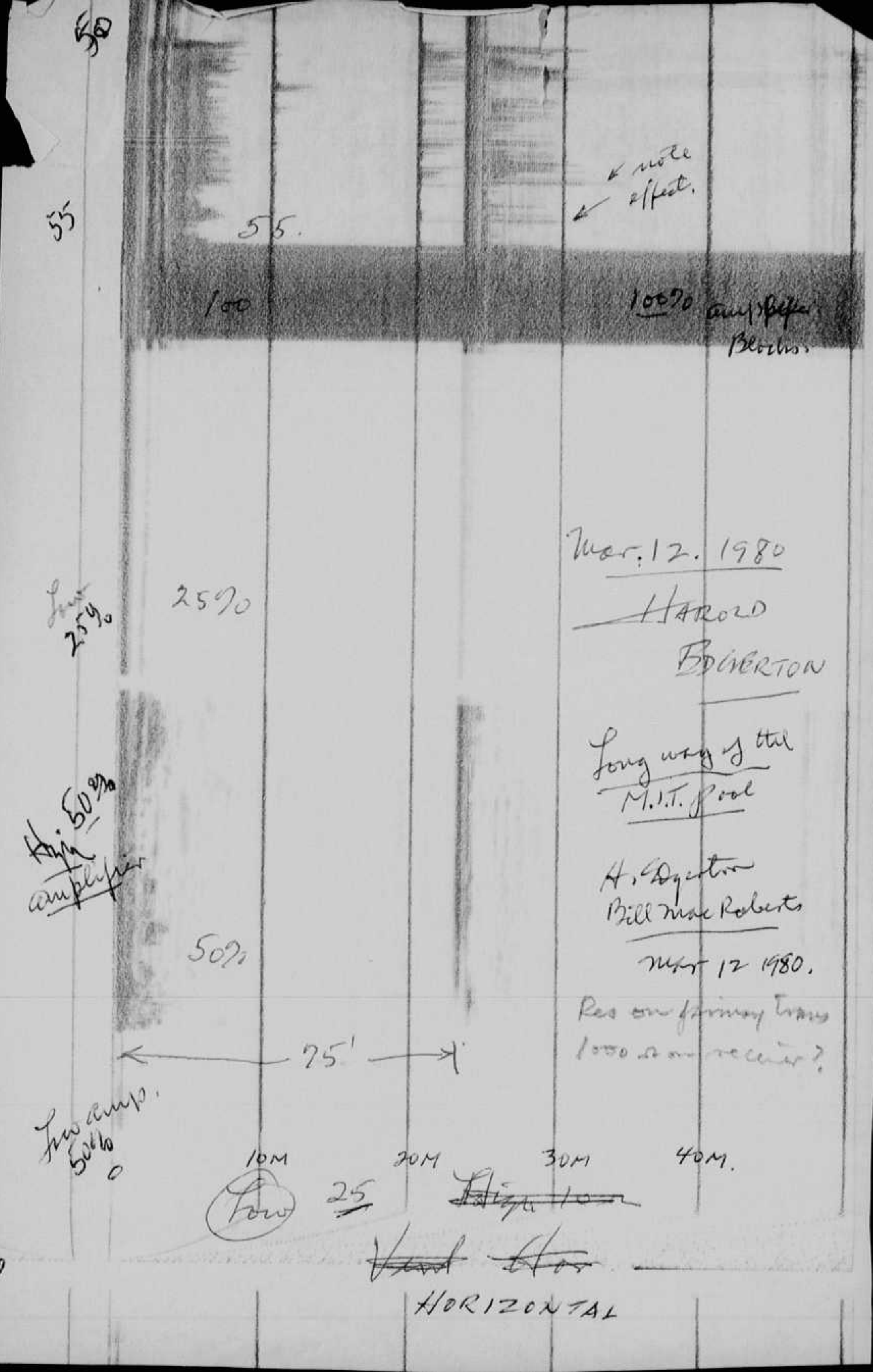
__1__ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 96 and 97.

Item(s) now housed in accompanying folder.



50
55
55.
← note effect.
Mar. 12. 1980
HAROLD
EDGERTON
Long way of the M.I.T. pool
H. Edgerton
Bill MacRoberts
Mar 12 1980.
Res on primary trans
1000 Ω on receiver?
Low 25%
25%
High 50% amplifier
50%
75'
Low amp. 50%
0
10M
20M
30M
40M.
Low
25
High 100
Vert
Hor
HORIZONTAL


50
55
← mole effect.
55.
100
100% amplifier Blocks.
Mar. 12. 1980
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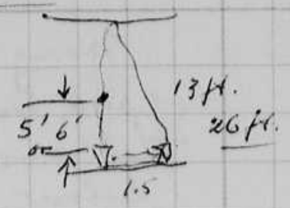
Res on primary trans 1000 on receiver?
Low 25%
25%
High 50%
amplifier
50%
75'
Low amp. 50%
0
10M
20M
30M
40M.
(Low) 25 ~~High 100~~
~~Vert~~ ~~Hor~~
HORIZONTAL
10

Mar 13 1980 MIT Pool 10 am — Surface Ref. Main Bang
H Edgerton Bill McRoberts

Transducer Tests 5,5 ms.
13 feet. (12)

C	C1	R1	C2	R2	Volts Surface Dur		
	0.1	~~R~~	Massa	10 Ω	.001		
	0.35	∞	"	10	.002		
	.35	∞	"	∞	.3		2+ hash.
	.10	∞	"	∞	.25 V.	? ✓	2 ms.
	.10	∞	"	10 carbon	.002±		2 ms diode.

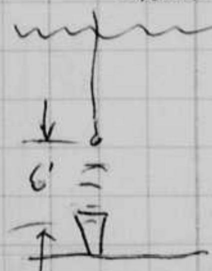


Main Bang. Std Massa ~~test~~ hydrophone ~~at Center~~. BC50

0.1	0	att	0 BC50 ?	0.3 V	.7 ms.
0.35	0	"	" BC50	0.45	1. ms.
0.1	80	att	0 BC50	0.25	0.5
0.35	80	att	0 BC50	0.45	.5
0.1	40	att	0 BC50	0.20	.5
.35	40	att.	0 BC50	0.43	.5
0.1	20	att	0 BC50	0.15	.5 – sharp peak at first
0.35	20	att	0 BC50	0.4	.5 –

Diode across input does nothing – very little

Small Atlantic hydrophone 6 above the massa.



0.1	20	att small 0	BC32	0.07	.5	Big spike.
.35	20	" "	"	.25.	.5	"

Conclusions, 1. Put Resistor across the coil 20 to 100 ohms (use 88)

2. Put Resistor on pickup Transducer 10 to 100. use 0

The resistor #1 on the coil shortens the pulse of sound.

3. Suggest use of hydrophone BC 50 for pick up instead of Massa (without trans)

May 15 1950
Harold Edgerton.

Yesterday I worked all day with Bill MacRobert on the generator 5 kc system.

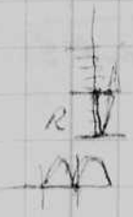
We decided on a Massa transducer with a standard transformer with a 47 ohm resistor across the input.

The output as measured with a "geo" hydrophone under the BC50 or BC52 seems to show a 3 cycle output at 5 kc with some ripples. The duration is about 0.5 millisec. (2½ cycles). Resolution is then

$2R = vt \quad R = \frac{1}{2}t = \frac{1700}{2} \times .5 \times 10^{-3} = .85 \times .5 = .425$ meter,

wrong should be $\frac{2 \times 17}{2}$ m since 2 should not be used.

$\frac{1.7}{2} .5 = 0.4$ meters ✓

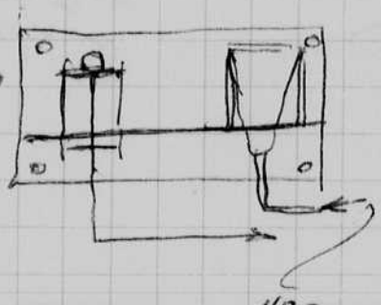


We decided to use the BC 50 instead of the Massa (without a transformer) as the receiver. A rubber support was made to hold the BC50. The spacing was about 1'1½ feet. It was put into the wood frame that Bill made last week.

Input 0.1 mfd 750 v into the Massa with transformer.

Output from 75' away in the 17 pool into the BC 50.

Amp Low gain 25% showed a clear picture the wall 75' away.



I was not able to get a good picture of a Butterfly swimmer with this combination.

In the lab, in air, we used 0.35 mfd at 750 volts into the Massa. Then the BC 50 required High gain at 53% on the control, at 55 the amplifier went into oscillation.

It is about time to try this out on the river and in the harbor. I have many records to compare. Some were made with the BC 49 25¢ using two Massa transducers.

 March 18 1980 Harold Edgerton

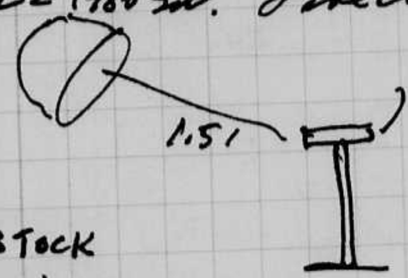
Steve Ettelson 6644. Frisbee mechanics 60 ft/sec

Edward Hernandez. 734.8644 10 r.p.s.

Mar 22 1980 Sat. Firecracker experiment. Daylight Ek. 64

Blue Background. 4" away

#1



f 22. Lens.

7. flashes before actual micro flash. on open flash.

Photo triggers on micro flash. for explosion.

RODENSTOCK
YSARON f 150
1: 4.5. in Multiblitz Shutter.

#2 Edge fogged.

micro flash at 1.5 ft. Daylight Ek. 64

f 22

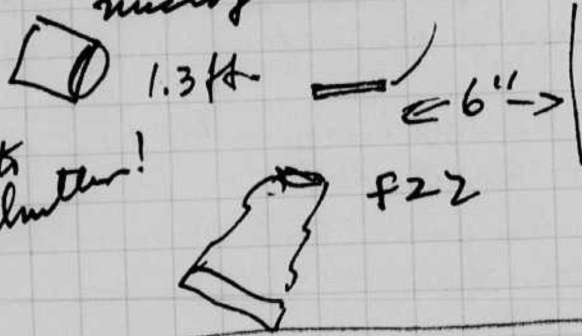
no initial flashes.

Photo cell triggered flash. 6" away from firecracker

Brown Background -

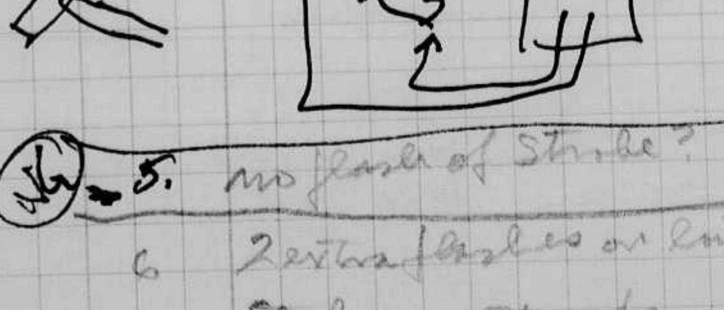
note: Synch on fast shutter does not fire micro flash!.

#3. micro flash # 551. 2 Duds before explosion!.



This one synchs to the fast shutter!

4



Good job.

wires on firecracker

~~triggered the shutter.~~

then the shutter triggered the micro flash.

? Photo cell also on.

(NG) #5. no flash of Strobe? NO Photo cell exposed & fired again

6 2 extra flashes or line up! no Photo cell

Strobe went O.K. wire trip of shutter.

N.G. fire cracker fell off stand.

April 13, 1980. Harold Edgerton

Princetown Plasma
Bell. Tel. Lab.

I have been busy with lecturing etc.
The Side Scan sonar has been under study.
I am trying to get better results with the Penetration
equipment. We now have two penetrators, one on
each side of our survey ships. 5KC Massa. See p 96.
one has a Massa recorder with out a transformer
for a hydrophone.
the other has a BC-50 atlantic hydrophone.

A capacitor in the marking amplifier has
been increased by 0.2 mfd to get lower frequency
performance.

April 10 Princetown - Ned Sahloff. M.I.T. club. Strobe
11 Bell tel Lab. - Michael Lesh Strobe.

14. Chicago Art Mus School Martha Ograine Strobe.
15. Oakland Uni; Rochester Mich. Dean Mohamed E. Ghausi
Lecture on Monitor
16. Photo of Staff at 10 am in Bldg 7.

May 5 1980 Harold Edgerton,
on Apr 17 I attended the EG&G meeting at the Copley Plaza.
18 Council of the arts
19. Earth Watch affair Brian Rosborough
21.22-23 Benthos Underwater Seminar
Harold Moffett & Pat.
24
25 Lecture at Polaroid
26
27 Dinner at Hazens (Helen Gardner visitor)
28 BBC all day Christopher Haws
Lecture at Mus of Science & Guides
29
30 } Raleigh N.C., with Larry Fiske committee
on the Monitor
Saw Bill Dixon and Muriel for dinner
Mary Anne Hubbard for lunch

May 1.
2. Dance for Rosenblith
3 Open House 12-5

Lecture to students for Howard Curtis JSHS

5 today I got a new Hoover comm.

Notebook # 33

Filming and Separation Record

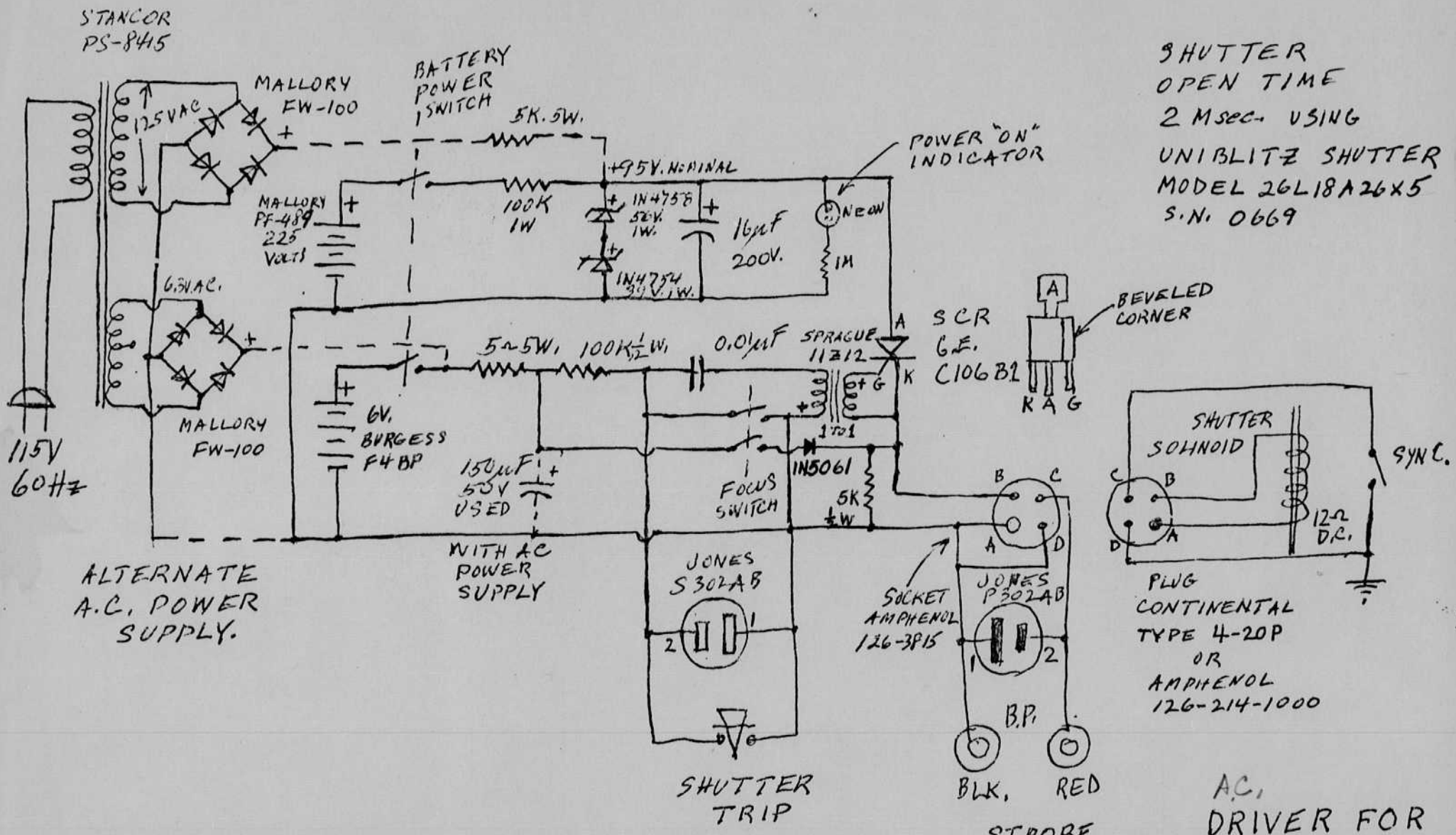
1 unmounted photograph(s)

___ negative strip(s)

1 unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 100 and 101.

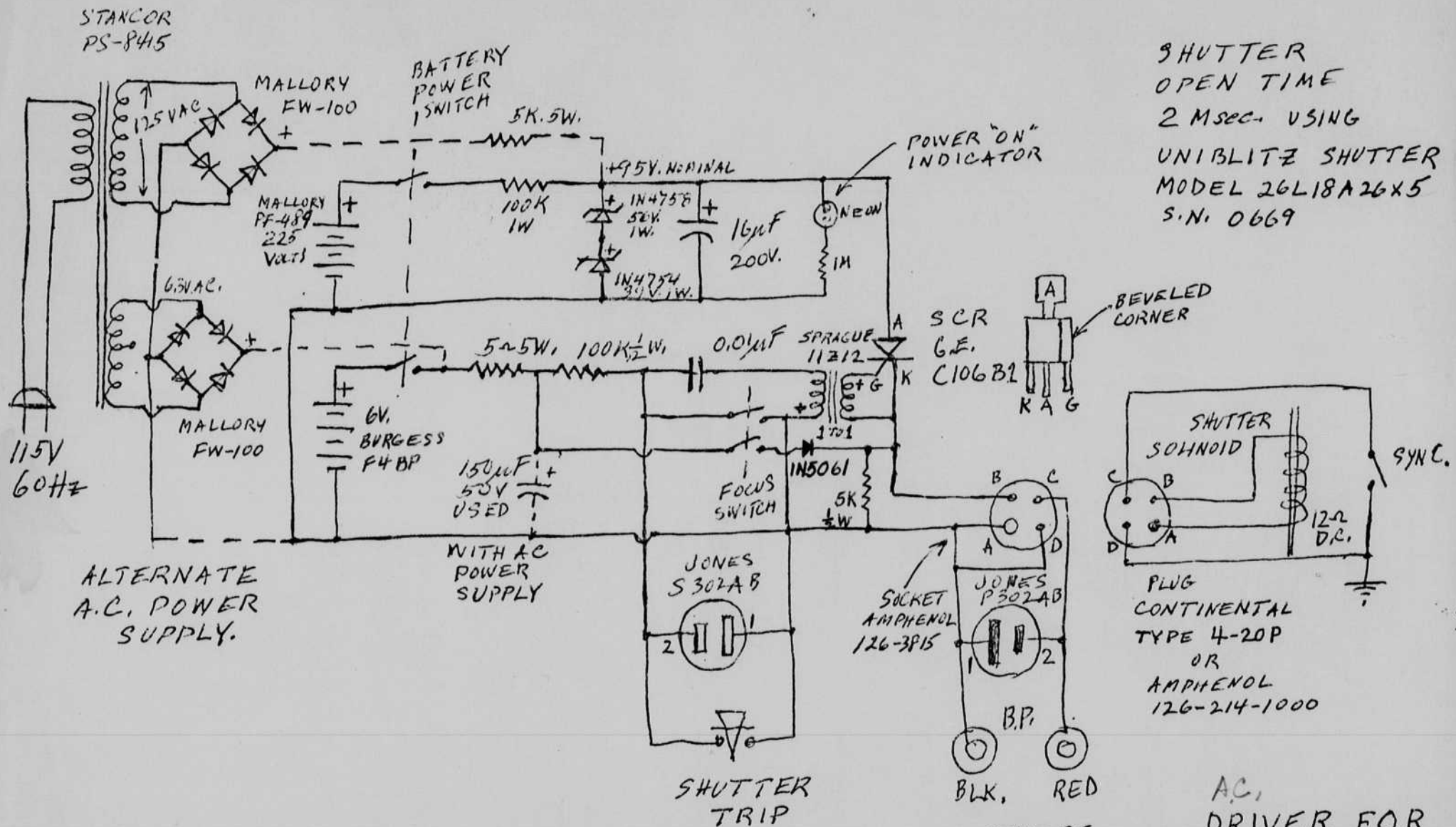
Item(s) now housed in accompanying folder.



SHUTTER
OPEN TIME
2 Msec. USING
UNIBLITZ SHUTTER
MODEL 26L18A26X5
S.N. 0669

A.C.
DRIVER FOR
UNIBLITZ
SHUTTER

9-20-77
V.E.M.



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S.N. 0669

A.C.
DRIVER FOR
UNIBLITZ
SHUTTER

9-20-77
V.E.M.

Pumping a
flash lamp in 1938±

Fred BARSTOW

GRIER

M.I.T. Bldg 10
H.J. Edgerton

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____ negative strip(s)

__1__ unmounted page(s)
(notes, drawings, letters, etc.)

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INTERDEPARTMENTAL 617-494-8783

MASSACHUSETTS INSTITUTE OF TECHNOLOGY CAMBRIDGE, MASS. 02139

from the office of Jean Mooney, Room 4-405

August 12, 1980

To: The Friends of Doc Edgerton

On Saturday morning, August 9, Doc Edgerton had a mild stroke while working with his side-scan sonar at the MIT Sailing Pavilion. It was a very hot, humid day. He was taken to the Mt. Auburn Hospital by the MIT Campus Police. A blood vessel broke on the right side of his brain, he is not paralyzed, his mind is alert, but he is suffering from a headache, and terrible dizziness. Last night the doctor put him on solid foods. His condition is listed as fair, and, at the moment, he is not receiving visitors. Esther Edgerton called me on Monday, August 11 (I was away for the weekend) and told me of his ordeal.

Esther doesn't know how long Doc will be in the hospital. If any of you would like to send a card his address is: Mt. Auburn Hospital (Rm. 710), Mt. Auburn St., Cambridge, Mass. 02139.

As some of you may know, he was in between oceanographic expeditions. In early June he helped survey half of the Richelieu River with his grandson, Eric Edgerton, and Andre Lepine; in early July he worked off the coast of Charleston, South Carolina with Peter Throckmorton, Clive Cussler, Wayne Gronquist, Dan Koski-Karell, Walt Schob, Derek Goodwin, Bob Johnson and Bill Thompson searching for the Civil War ships HUNLEY and HOUSATONIC. On July 20 he and Esther left for Ft. Augusta, Scotland to work with Dr. Ian Morrison and John Mills searching for a sunken dredger in Loch Oich. They returned on August 5, and he began preparing for his next trip to look for a sunken German U boat off the coast of North Carolina with John Newton and Dr. Bob Sheridan. September was to be a month of rest and enjoyment of Paul Grey's inauguaration as M.I.T.'s 14th president. October and November are filled with lectures and a possible oceanographic expedition with Charlie Mazel to find the MEDUSA off the coast of Mauritania.

We believe that Doc will recover and will go on to complete his commitments!

Jean

August 15

August 13 Doc got out of bed for the 1st time, and back almost as fast - extreme dizziness. August 14, he was up twice with great effort. His mind is perfect - he recalls the experiences of Aug. 9 his past expeditions, friends and best of all - this morning, the hospital listed his condition as <u>good</u>! This will be my last note.

J.M.

May. 19, 1980.

Harold E. Edgerton

4517

Elizabeth Goldring and Otto Piene with others brought Prof Hulten Pompidou center on Sat May. 17 for a visit to the strobe lab.

I spent sat 17 and Sun on the river and in the harbor with the sonar as rebuilt with massa transducers and transmitters and receivers.

I put 39 ohms across the output which also had a transformer in the top of the massa. There was a lot of noise in the pickup circuit which consisted of a massa transducer without a transformer. I used a 100 ohm resistor to reduce the output.

Excellent records of the tunnels were made. However the geological features were not so clear as I would hope.

May 20 1980

Photos made at game in Engine lab. with Rolf Sterbahl, Fred Buckingham. Don Bode, Kenny Hill, Fish in cans of a water spray.

EG&G microflash. 25 μs at 1 meter f 11 Plus X film.

10 min in DK 50.

1 scale

2-20. Examples

2 and 3 not marked.

June 5. 1980 Lecture yesterday at Hilton Hotel on Rt 128 John Magee of A.D.L. Conference on new technique.

Sunday June 1. I went with Henry Kendall and David Shorb to the islands in the Boston Harbor to try a rotary side scan and a Benthos Diver phone. The sonar was too weak. MacRoberts and I are working on it today trying to get improved sensitivity.

June 6 1980 H.E. & Bill Mac. STROKE AUG 1980 103

Spring & Summer schedule for Harold Edgerton

Room 4-405 DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

1980

May 22 MIT Strobe Lab, Ice Cream Party (left over from HEE's Birthday Party) 4:30p
" 22 GTE Sylvania, Waltham, 7pm lecture
" 25 - 26, Cousteau Society Advisory Board meeting aboard Calypso, Norfolk, Va.
" 28 Museum of Science, Boston, Ma. party for Brad Washburn, 4:30pm
" 29 Schlumberger-Doll Research Center, Ridgefield, Conn. lecture 3:30p (Howard Austin)
" 30 Tall Ships arrive in Boston Harbour
" 31 Cliff Garboden, Boston Phoenix writer, 11:30am, lunch at 100 Memorial Drive
June 1 Boston Harbor with side scan sonar (Henry Kendall)
" 2 MIT Graduate, Killian Court, 10am
" 3 A.D. Little, Colonial Hilton, Wakefield, Ma. 12noon lecture, Kathleen Fliegel 864-5770 x 3420
" 4 - 6, Assoc. of Sci. & Technology Centers meeting at the Museum of Science
" 5 - 6, MIT Technology day for Alumni
" 5 MIT Night at the Pops
" 9 - 13, Techniques In High Speed Photography Seminar, Strobe Lab
" 9 Wine & Cheese Party for Yohay Ben-Nun, 8pm (Hochberg home, 51 Prospect Av. Newtonville)
" 9 Lecture 8:30 to 9:15am - June 10 lecture 10:15 to 10:40a - June 11 lecture 11:15
" 15 Leave for Montreal, Quebec, Richelieu River survey, Andre Lepine, 514-658-7430
" 21 Return from Montreal, at 1:49 Delta
" 24 Institute of Media Art, at Amherst, Ma. "Issues in Technology '80" Sonya Gillespie 259-0068
July 8 Charleston, S.C. to look for the HUNLEY sub Dan Koski-Karell 703-524-3749, Clive Cussler 303-526-0317
" 19 Lecture at Biological Photographers Assoc. 50th meeting, Sheraton, 8pm, Hy Schafer
" 20 Leave for Prestwick, Scotland and survey on Loch Oich
Aug 9 ~~Prof. Satterfield's daughter's wedding (& Michael Salour's birthday)~~ HEE STROKE
" 14 ~~- 16 Plymouth, Mass. Bradford celebration~~ Harold Edgerton MT AUBURN HOSPITAL for 2 weeks +
" 18 - 22 Search for the U 701 sub, off Cape Hatteras
Sept. 8 MIT registration
" 22 ~~- 29, Woods Hole Oceanographic Institution, 3rd Internat'l. Congress on History of ocean~~
" 22 The Invisible World, Channel 2, 8pm (REPEAT)
" 26 Paul Gray's Inauguration at MIT, KILLIAN COURT, 10am ✓
Oct 6 - 10, University of Wisconsin , John Leaman high speed photo course
" 7 Banquet lecture " "
" 8 Morning lecture " ") before Wisc.
" 16 Optical Society of America lecture at ITEK, Bob Gonsalves (W)473-3023 (H)935-1785, 6pm
" 19 Washburn Award ✓
Nov 20 Afternoon lecture, Electro Optics/Laser Conf. Hynes Auditorium, David Whitehouse
PEO Society

May 19, 1980.
Harold E. Edgerton

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B.H. 6 microflash. 25 g at 1 meter
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10 min in DK 50.
1 Hole
2-20. Examples
2 and 3 not worked.

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Nov 20 Afternoon lecture, Electro Optics/Laser Conf. Hynes Auditorium, David Whitehouse

PEO Society

May. 19, 1880.

Hans

June 5.

Increase of gain of amplifier in Rotary.
Actual gain ~~———~~ at end of test. = 260/.

Initial standard 0.01 volt input — 0.12 volts output $\frac{0.12}{0.01} = 12$
final gain. 0.01 " " — $\frac{2.6}{0.12} = 21.67$

All 0.01 V. input
measured by Bill Mac Roberts June 6, 1980
~~Gain~~ Output — R911-150 Ω shorted 0.9 volt
also R913-75 Ω (parallel) removed 1.75 volts
also 7.5 Zener replacing 5.6 volt zener } 2.6 volts
and paralleling 360K with 340K }

Reduced to 1.85 volts output
with 150 Ω added across output.

Overall gain new/old = 21.67 factor.

June 24 1980 Tuesday.

Last week I was in Chambly Quebec with Eric to help Andre Lepine, Bob Dufour etc survey of the Richelieu River. We did the 45 miles from Chambly to the St Lawrence. Two wrecks were found. Both were barges.

I am not satisfied with the Rotary Side Scan. The improvements mentioned above are not enough. Perhaps the noise is too much and the gain also. I plan to check the gear today and see if it operates the same as before the trip.

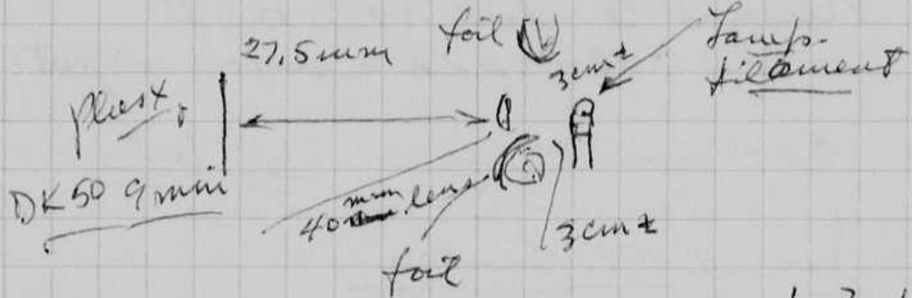
Idea - Move the electronics down to the transducer. The leads are too long now

July 1, 1980 Monday
Harold Edgerton.

Experiments for closeup photo of insects.
Wael set up two FX 6A lamps with aluminum reflectors, These were put 1.7" from a tungsten lamps – small size. An exposure was OK at f 11 at 2 to 1 enlargement on Plus X film.

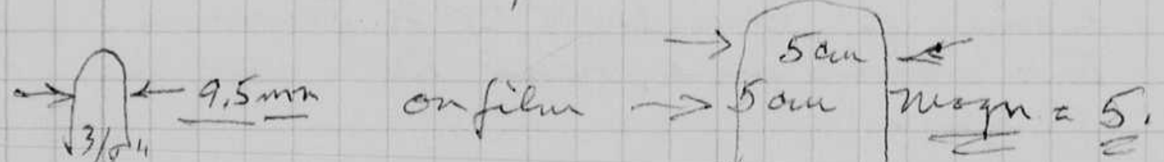
Two lamps blew up so we are now trying some inductors, 1st exp – 11 microhenries – Duration increased from 17 to 100 us
Now we plan to use a smaller inductance.

Now a 40 mm Zeiss lens was substituted for the 150mm 1/4.5 Rodenstock Ysaron lens.



1, 2, 4, 8.
Two photos made at X8 on lens. one with the lamp on the other with the lamp off.

Blue Background 2cm back.

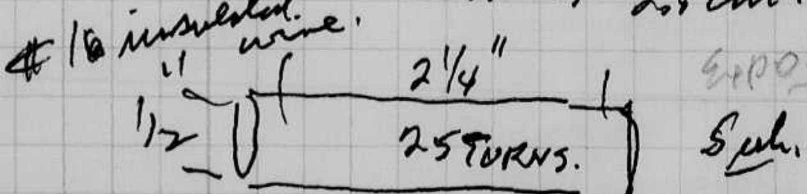


Exposure was ok.

July 2 1980 Bug put in field. X16. Plus x Same results
Blue background 2" behind.

one lamp 2 cm
" " 2.5 cm.

10.9 H.C.P.S
30 us.



4pm. - Vert of Wing – Same mosquito.
Background 8 cm away lamps at 2 1/2 cm
Set at 8
magn 2.50 / 4.8 / about 4.8

40 mm f4.5 1
0.3 2
9 4
→13 8
16
30

Exp. O.K.!

Aug 8 1980 H. Edgerton

Returned Aug 5 from Prestwick Scotland.
I went ~~there~~ on ~~Aug~~ July 30 with Esther
to work with John Mills and Dan Morrison.

We sonar surveyed Loch OICH which is
next to Loch Ness. The goal was to find a barge with
a steam drill, lost in 1805±. If there it is below the
sediments. Mild Stroke on Aug 9. Spent 2 weeks + in Mt Auburn Hospital
Dr. Hatem recommended by Jerry Letvin.

Sept. 11, 1980 Mary Lou went home to Hickory NC this am.
We had some social affairs with her daughter [illegible]
and husband Kaplan Kay. They are now at the
children's Hospital in Boston - working!

Robert Edgerton and Nina were here a week or so
ago.

Sept 17, 1980 I was in Mt. Auburn Hospital with a slight stroke
from ~~Sept~~ Aug 9th to ? 2 weeks 2 days. I am now at
home learning to walk. I was at my office today for a
short time.

Sept 25, 80 I am still dizzy with some double vision but I do
get to M.I.T. for a few hours each day. Elisha Linder and
Avner Raban were here for lunch yesterday. (Israel).
Ajiro Miki spent a night here. ~~He is~~ working on a book of photos
There will be an exhibit on Nov 12 of the Int Cent for Photography on Fifth Ave. Then his book will be issued.

July 23 1980 [illegible]

Edgerton Enjoys Busy Summer

Dr. Harold E. Edgerton, Institute Professor Emeritus, recently returned from Charleston, S.C., where he participated in a search for the remains of a Civil War submarine.

Dr. Edgerton used side-scanning and penetration sonar in the fruitless search for the small Confederate underwater vessel, named *Hunley*, which vanished after sinking the *Housatonic* outside the Charleston breakwater.

Dr. Edgerton also used similar techniques in working this summer with a Canadian group seeking historical artifacts along a 45-mile stretch of the Richelieu River between Lake Champlain and the St. Lawrence River. And he was scheduled to leave Sunday for Scotland where he will collaborate with an archeologist searching for barges and the first steam dredges employed in building the network of canals in the British isles.

Oct. 18, 1980 Still recuperating from the stroke. The double vision
has improved. I am now walking without a cane. I go to
the office at M.I.T. 4-405 for a few hours a day. I went to Lebanon
and to Wisconsin last week. Also gave a lecture to the Opt. Soc in
the Itek plant. Bob Gonsalves took me to the place on Rt 128.

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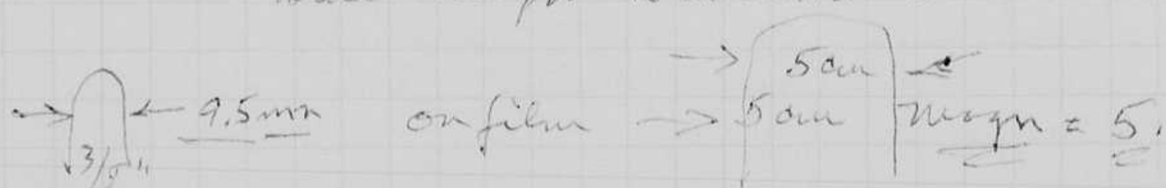

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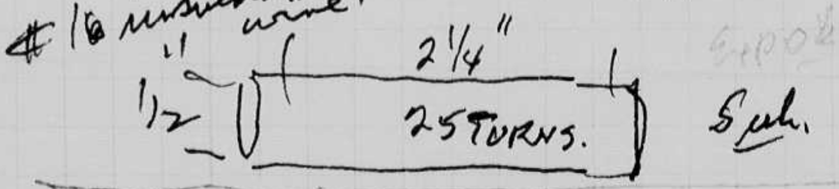

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Magn 250/48 about 1/48 Background 8cm away lamps at 2 1/2 cm 6.3 2
9 4
Set at 8 →13 8
16
30

Exp. 8. OK.

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July 23 1980 Tech Talk

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ESTHER & HAROLD EDGERTON, 100 MEMORIAL DRIVE, CAMBRIDGE, MA. (617-864-4790)

(October 4 - 13, 1980 - ITINERARY - Lecture at the University of Wisconsin-Extension,* Milwaukee and visit farms in Iowa and Nebraska)

Sat. Oct. 4 Lv. Bos 9a (AA #89) - Ar. Chi. 10:29a
Lv. Chi 12:55p (U #593) - Ar. Omaha 2:15p
(Pick up Avis car - Lincoln drop off)

Visit with Mrs. Sam (Jessie) DeCou at Rose Vista 712-647-2369, Woodbine, Iowa
Drive to Aurora and stay at

Ken's Motel, Aurora, Nebraska 402-694-3141

Sun. Oct. 5 Visit Aurora and Grand Island (Cliff Williams 402-694-2006 (W) 694-6111)

Mon. Oct. 6 In the morning, inspect farms - Howard Anderson 402-362-3701

6 In the afternoon, conference at National Bank of Commerce, Lincoln
Oscar Clarke 402-472-4321

Visit the University of Nebraska, Prof. Rod Soukup 402-472-3771

Tue. Oct. 7 Mary Lou leaves for Hickory, N.C.

Wed. Oct. 8 Lv. Lincoln 9:30a (United #972) - Ar. Chi. 10:47a
Lv. Chi. 11:40a (NW #435) - Ar. Madison 12:18p
(picked up at airport by Dick Sherwin, Elk Grove, Ill. 312-640-8233)

Stay at the Madison Inn (across the street from Conference Center*)
601 Langdon Street, Madison
608-257-4391
Contacts: John Leaman or Bill Hyzer 608-262-1122*

6p Social hour & dinner, 7p "Strobe Photography: Its First 50 Years" (HEE)

Thu. Oct. 9 Morning lecture 8:30a - 10a "Electronic Flash Techniques" (HEE)

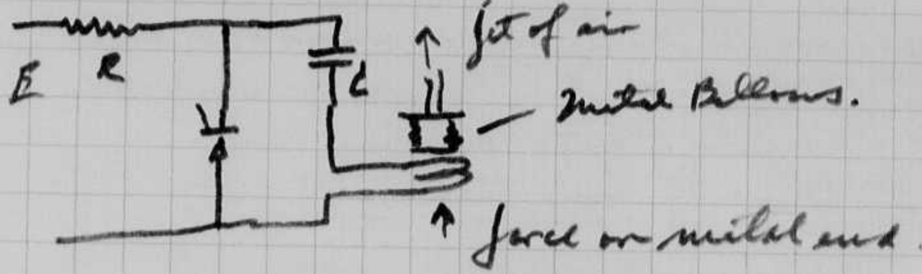
Lv. Madison 1:30p (Rep #982) - Ar. Chi. 2:10p
Lv. Chi. 4:05p (AA #182) - Ar. Bos. 7:10p

American Airlines (Boston) 542-6700

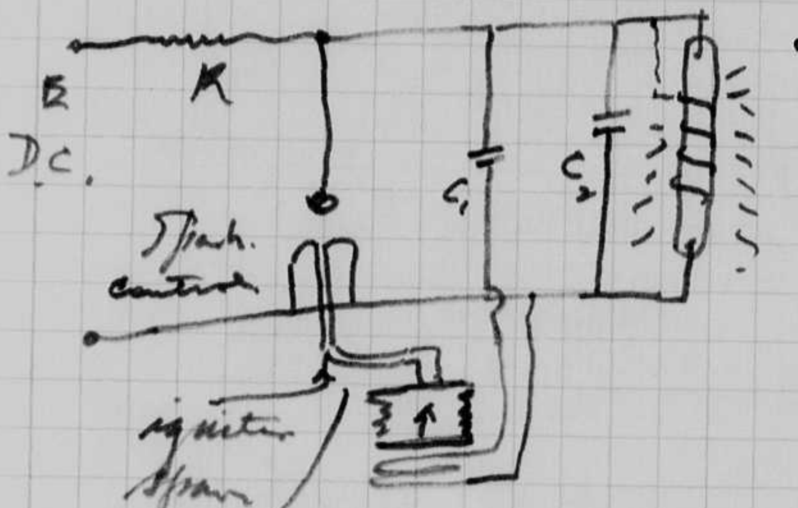
Randy Gustafson NB Comm.
Kearney Nebr. 308. 234. 1743
Nat. Bank of commerce.
Oscar Clarke
Howard Bowman

Oct 28 1980 sit. Harold Edgerton. 100 mem Drive. Cambridge Mass.

Air pulse system.



Ellen Jaxon
Hill Hams
Box 1.
1912 West club
Bonbons
Durham
27705



air jet to blow out the arc.
the prevents hold over, thus allowing
the frequency to increase of the flash lamp.

The coil could be in series with the lamps or in the charging circuit.

Oct 28 1980 HE Edgerton.
Photo of micro flash lamps.
181 image on plus x film. f 22
one flash of micro flash power with extension. 8" +.
No more lamp showed arc wander.

Point Source f 5.6 on plus x, arc over exposed.

Anne Robinson of Earthwatch called.
Square lamp to Warren Seamens.
Called on Muriel in the Graphic arts in E.R. Bldg. I am scheduled to lecture on Nov 4 Wednesday at 4 pm. This is in the old General Radio Bldg. on Mass ave.

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Lv. Chi 12:55p (U #593) - Ar. Omaha 2:15p
(Pick up Avis car - Lincoln drop off)

Visit with Mrs. Sam (Jessie) DeCou at Rose Vista 712-647-2369, Woodbine, Iowa
Drive to Aurora and stay at

Ken's Motel, Aurora, Nebraska 402-694-3141

Sun. Oct. 5 Visit Aurora and Grand Island (Cliff Williams 402-694-2006 (W) 694-6111)

Mon. Oct. 6 In the morning, inspect farms - Howard Anderson 402-362-3701

6 In the afternoon, conference at National Bank of Commerce, Lincoln
Oscar Clarke 402-472-4321

Visit the University of Nebraska, Prof. Rod Soukup 402-472-3771

Tue. Oct. 7 Mary Lou leaves for Hickory, N.C.

Wed. Oct. 8 Lv. Lincoln 9:30a (United #972) - Ar. Chi. 10:47a
Lv. Chi. 11:40a (NW #435) - Ar. Madison 12:18p
(picked up at airport by Dick Sherwin, Elk Grove, Ill. 312-640-8233)

Stay at the Madison Inn (across the street from Conference Center*)
601 Langdon Street, Madison
608-257-4391
Contacts: John Leaman or Bill Hyzer 608-262-1122*

6p Social hour & dinner, 7p "Strobe Photography: Its First 50 Years" (HEE)

Thu. Oct. 9 Morning lecture 8:30a - 10a "Electronic Flash Techniques" (HEE)

Lv. Madison 1:30p (Rep #982) - Ar. Chi. 2:10p
Lv. Chi. 4:05p (AA #182) - Ar. Bos. 7:10p

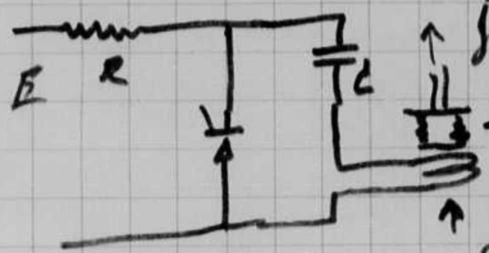
American Airlines (Boston) 542-6700

Randy Gustafson NB Comm.
Kearney Nebr. 308-234-1743

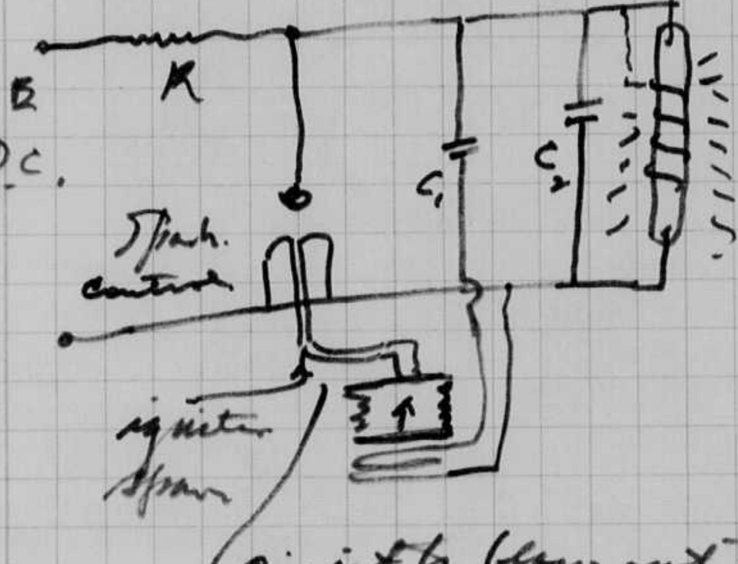
Nat. Bank of commerce.
Oscar Clarke
Harold Borman

Oct 25 1980 sit. Harold Edgerton. 100 mem Drive. Cambridge Mass.

Air pulse system.



Ellen Jurson
Hill Hams
Box 1.
1912 West club
Bourbon
Durham
27705



air jet to blow out the arc.
this prevents hold over, thus allowing
the frequency to increase of the flash lamp.

The coil could be in series with the
lamp or in the charging circuit.

Oct 28 1980 HE Edgerton.
Photo of microflash lamps.
1:1 image on plus x film. f 22
one flash of microflash power with extension. 8 ft.
No two lamps showed arc wander.

Point Source f 5.6 on plus x, are overexposed.

Anne Robinson of Earthwatch called.
I gave lamp to Warren Seamans.
I called on Muriel in the Graphic Arts in 12 R. Bldg. I am scheduled
to lecture on Nov 4 Wednesday at 4 pm. This is in the old General Radio Bldg.
on Mass ave.

Oct 22 Wed 1981. 100 noon Dr. Harold Edgerton

I gave a one hour movie about the Monitor on monday Oct 20 in 10-250.

Bob Marx gave a lecture on shipwrecks in 24-100 on Oct 21 at 7pm. Then I took him to the M.I.T. Press where we saw Tom McCorkle. I proposed that his book on underwater archeology be reproduced by photo offset into a paperback edition.

MIT Sole Assistant

Today I discussed with John Mahony the photography of footballs.

1. Repeat old system in the dark with color film. Synch with wires on the far side of the ball.

2. Arrange to do the same in daylight with a Vincent shutter. The delay of .001 second must be compensated for by triggering before the foot hits the ball!

I believe that an exposure of 30 μs will be adequate.

Assume 30 ft/secon velocity.
Distance = vxt = 30x12x30x10^{-6} inches = .0108".
1/100 = .0100
should be ok. We could even use the 70 μs bird lights.

Oct 23 1980. The double vision is going away slowly. I begin to notice the improvement.

I am still diving and skating in my nude. Every day shows improvement.

Oct 28 1980 sat. Harold Edgerton. 100 mem drive. cambridge mass.

Ellen Jaxon
Hill Hamp
Box 1.
1912 West club
Bourbon
Durham
27705

-wing
flash lamp.

-n. 8 ft.

scheduled
-eneral Radio Bldg.

Notebook # 33

Filming and Separation Record

____ unmounted photograph(s)

____ negative strip(s)

__1__ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 106 and 107.

Item(s) now housed in accompanying folder.

Room 4-405 DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

1980

October 17, 1980

MEMORANDUM: COMMENTS ON SUB-BOTTOM SONAR SYSTEMS FOR PENETRATION

FROM: Prof. Harold Edgerton, Room 4-405

Sonic penetration of mud and sand, to locate underwater archaeological targets, seems to be one of the technical problems still to be solved. I have numerous devices in my Stroboscopic Light Laboratory that we periodically bring out to try again and again.

1. My latest device uses two 5Khz transducers on a mount. One transducer produces a pulse of sound in the water, and the second receives the echo. Two are necessary to work in shallow water, otherwise, the ringing in the transmitter is still strong when the echo returns from close targets.

2. I also have a small 12Khz arrangement, somewhat like No. 1, which seems to work fine under some conditions.

3. A third unit uses two 12Khz transducers in sonic reflectors to reduce the beam width.

4. A fourth device uses a one meter diameter cone with a 5Khz transducer as a transmitter. A separate hydrophone is needed since this system rings for a long time.

5. The EG&G UNIBOOMER (Waltham, Mass.) system is a fifth way to go. It has a well designed unit with lots of power and has made some remarkable records of geological subjects. However, it may lack resolution for small size, shallow subjects.

All of these systems need to be retested in the sea. I have several areas that offer targets; such as,

a. The vehicular tunnels under Boston Harbor (12 ft. below the bottom)
b. An area off Long Island, in Boston Harbor
c. Mud covered targets, in the Duck Island area of the Charles river, between Boston and Cambridge

It is my impression that targets of 6 ft. below the bottom and shallower should be detected by all of the above devices.

There is no ocean current in the areas that we will survey, so excavation with an air lift or blast will be accompanied by clouds of mud that will not clear away quickly.

I favor the units assembled above in (1 and 2) because of convenience of operation. The No. 1 equipment is an improvement of the system used in 1972! I refer you to my letter report of June 29, 1972 for results at Halieis.

I recommend that probing, air lifting or propeller blasting should be accomplished concurrently with the sub-bottom surveying.

 Nov 3 1980 Monday. Harold Edgerton

I went to W91 (Wind tunnel) to ~~obs~~ watch an experiment with Chas. and Marlin. We met Dale Carlson 2610 (1916). who ran the experiment for us. A sheet of liquid water with Bentonite clay was used to show flow characteristics of a sheet of water

Shirley Wignall.

More experiments were made on Sat without too much of a result.

Nov 6 I took the microscope lamp to W91 to expose paper. Carlson took out the diffuser and put the polaroid on both side. The flow pattern could not be seen on the photos. I used E4 with a 1/4" length of the lamp.

Nov 7. Lecture at room 5-314 for the Ocean Eng. Group. I showed 4 - 800 ft rolls of movies - mostly on the Calypso.

Nov 27 1980 I lectured about "strobes and Sonar" at the Laser Convention in the Hynes Auditorium on Nov 20 at the invitation of David White house.

Fred Taylor and Lynda Moulton were married on Nov 21 in Stow.

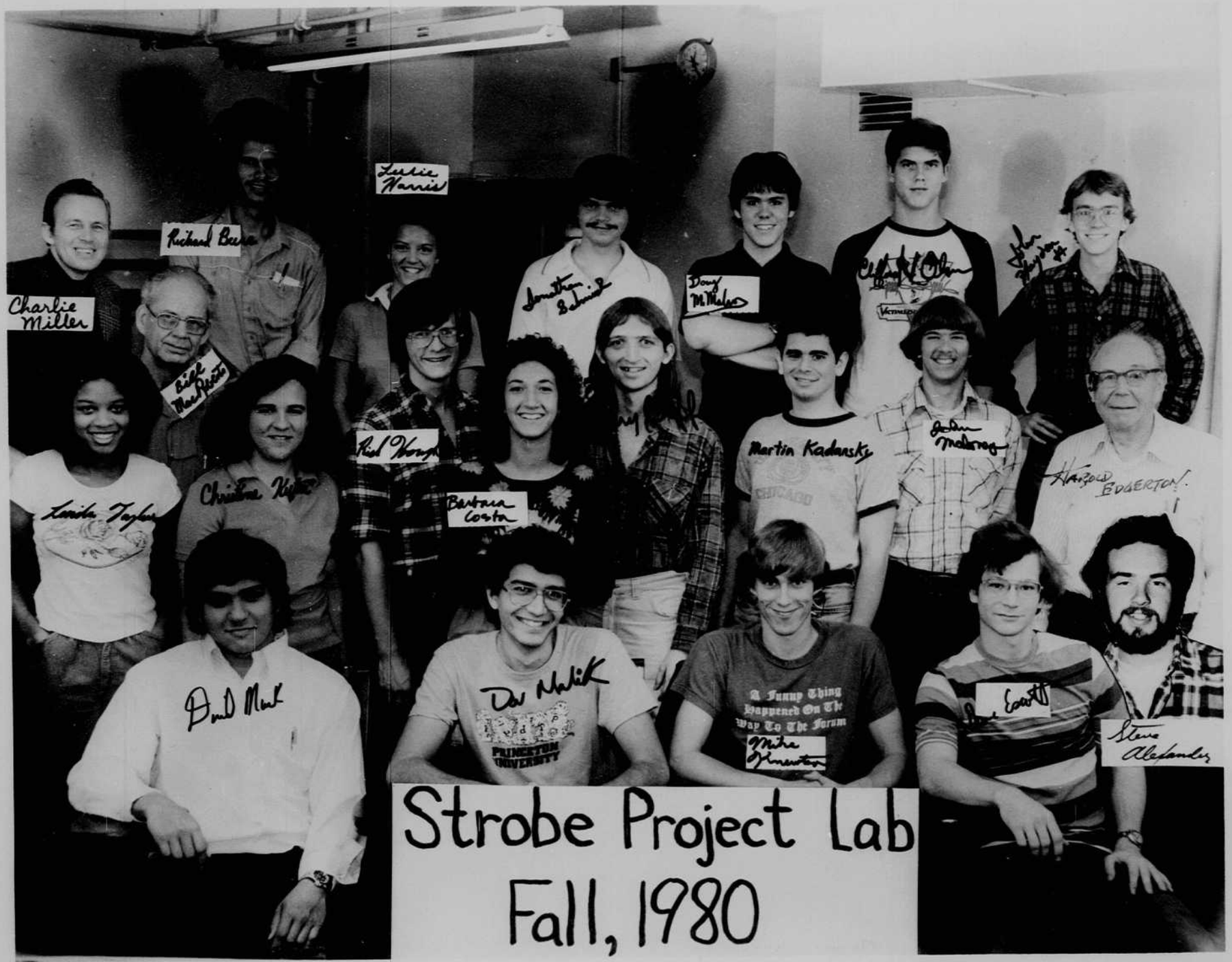
Nov 27 1980 Sea Serpent Survey.
Omni Sept 1980 p 18.
Nature papers 19 72-80

Dov Bakst 54-349 Geologyist from Israel.

The Elect Eng Visiting Committee was at MIT last week.

Joe Keithley gave me a #130 volt ampere - portable.

MacRoberts and I rebuilt the 5" mud penetrator with a Backe Double mass transducer for penetration. It will be shipped to Chas Maisel in Mauritania next week Dec 1. to search for the remains of the Medusa.



Strobe Project Lab
Fall, 1980

MIT Students, 1980 fall class.

 Nov 3 1980 Monday. Harold Edgerton

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MIT Students. 1980 fall class.

 Nov 28 1980 Harold Edgerton.

Film tests. Dark Room

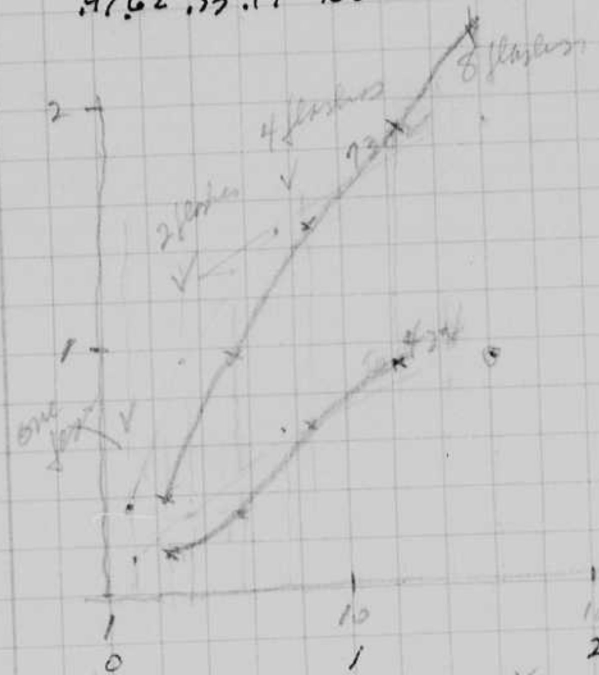
Lamp 6426 265 V.V. at 25 at 63 cm. 2 mfd 0.7 C.P.S. 3 μs.

7302. 8 4 2 1 flashes DK50 1 to 2 water 1 min

1.91 1.43 0.96 0.57 0.04.

SO424 8 4 2 1 " " " "

.97 .62 .33 .17 .06



D ? is .7 cps the right figure?

$I = \frac{CP}{D^2} = \frac{0.7}{.63^2} =$ 1.76 lumen sec/sq meter

.396

	IT	$\log_{10}$	D
×8 =	16.1	1.21	1.91
4	7.06	.85	1.43
2	3.52	.55	0.96
1	1.76	.25	0.57
	.04	.	0.04

$\log_{10} 10 = 1$

$\frac{0.7}{D^2} = 10$ lumen sec/sq m

$D^2 = \frac{0.7}{10} = 0.07$

D = .265 m = 26.5 cm

other films.

SO 343

2414 ?

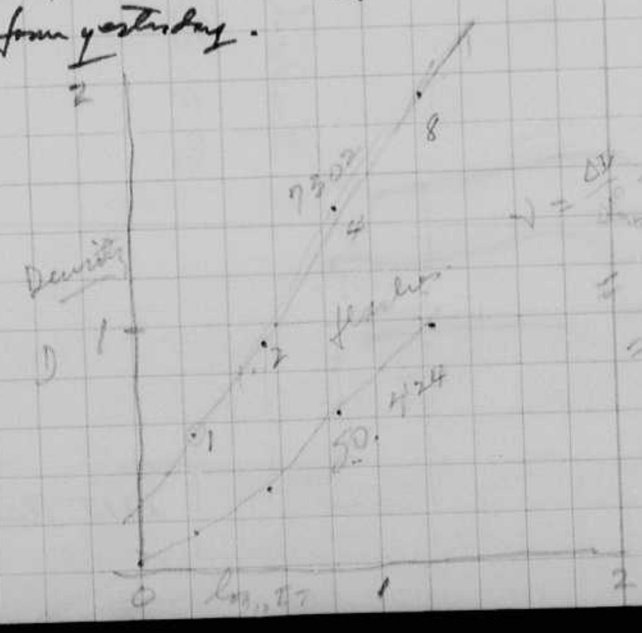
Nov 29 1980

Fx-265 at 27 cm to film.

Graded strip 1.91 1.45 0.96 0.57 0.04 density. and 0. clear.

Dev 2 min in ~~DK50~~ Dektol 1:2 from yesterday.

7302 and SO424.

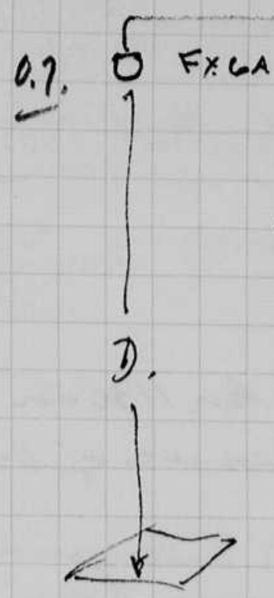


$\gamma = \frac{\Delta D}{\Delta \log_{10}} = \frac{1}{.65} = \frac{1.3}{1.} = 1.4$

Nov 30 1980 film exp tests.
H E Edgerton

0.7 cps at 63 cm to film
8+4+2+1+1
16 8 4 2 1 flash exposure
7302 and SO 424.

	IT	Log_{10} IT	D 7302	424	323
1 FLASH	1.76	.25	.68	.17	–
	3.52	.55	1.0	33	–
	7.06	.85	1.44	62	.06
	16.1	1.21	1.93	99	0.13
	32.2	1.51	2.37		0.29
	0		.04	.04	–



.6 .8
.6 .8
.36 .64

Arrange variable Distance from lamps.

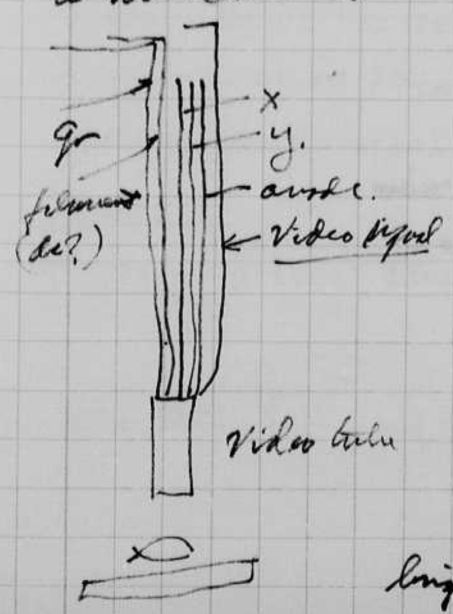
IT to go from
1.2, 4, 8, 16
32, 64. 128 256.
Adjust C and V and D.

$IT = \frac{CPS}{D^2} = 1$ $D^2 = \frac{CPS}{IT} = .07$

1	$D = \sqrt{.07}$ = .84 meters.	
2	$D^2 = \frac{0.7}{2}$ $D = \sqrt{.35}$ =	.59 m.
4		.42
8	$D^2 = \frac{.70}{4}$	.30
16		.21
32		.15

Dec. 2, 1980.
Under water television.
There is a need for a small T.V. without complications for exploration.
The pickup video tube should be as sensitive as possible so that ambient light can be used. Thus the depth will be limited to about 200 ft. Below 200 ft, artificial light will be needed. A tungsten lamp at d.c power is suggested so the ac pickup will be a minimum.

Discussed with Tom Raymond and Louis Pinault yesterday.



The anode voltage will be hand controlled from near the viewer. It could be spring operated to go to insensitive operation. The T.V. pickup video tube can be damaged by too much current caused by high sensitivity adjustment. The main trouble is caused by the sun when at the surface.

The viewer should be very bright so it can be seen on a ship.

Notebook # 33

Filming and Separation Record

____ unmounted photograph(s)

1 negative strip(s)

____ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 110 and 111.

Item(s) now housed in accompanying folder.

.09 .18 .28 .47

50424

.07 .18 .28 .46 .74

Dec 7 1980 Sat. Test of 2415 EK film.

11am Set 4x5 camera with film unit G.F. 80?
Resolution chart. in 4-411.
f11 at 8 ft. Lamp on camera, 1/100 second shutter.
DK50 in tank for 9 minutes.

Results. Exposure ok. Focus off some or lens N.G.? G 28066 Graflex 127mm. Optar.
Camera H. Edgerton Graflex. Press type.

Outdoors full sun 1130 am
f 8 1/400 sec. of Granite with M.I.T. back.

Dec 20 1980 Sat. Enlargements of several negatives.
Sam Raymond due this apt at 3, I called him to come earlier if possible.
Milldam Photo Gal. 44 main St Concord
369 0443
Exhibit Dec 15-30 1980 of my High Speed Photos

'81

Jan. 14. 1981 Lecture today on Stonehenge and Carnac.

Jan Morrison is here from the Uni of Edinburgh. He was also at the conference in New Orleans La on underwater archaeology. A paper was given on pans in the stone circles - He believes they were caused by spoil dumped from hoppers when the canal was made. I attended this conference too! Morrison gave a lecture on Jan 12 in 26-100.
I gave the following lectures
Jan 12 Atomic explosions
Jan 9. Bathyscaphe. 12 noon
" Birds Bullets Bat 4 pm.

Scheduled Jan 16 Elephant Rhino movies
Jan 19 Ocean expeditions.
Jan 21, monitor.
Jan 22 Gjon Mili.

Pete Arthur planned Jan 16 1981 21 of Jan - 26 Feb. Plankton trip

MILI file

INTERDEPARTMENTAL

MASSACHUSETTS INSTITUTE OF TECHNOLOGY CAMBRIDGE, MASS. 02139

from the office of Prof. Harold E. Edgerton
Room 4-405, 253-4629

January 14, 1981

Gjon Mili's Itinerary, January 21, 22 & 23, 1981

January 21

10:00a - Eastern shuttle from NYC to Boston

11:00a - Edgerton to meet Mili at airport

11:20a - 100 Memorial Drive, rest and light lunch

12:00 - Optional - attend H. Edgerton's lecture on USS MONITOR, rm. 4-402

2:30p - Meeting with Dr. Paul Gray

4:00p - Optional - attend Sam Raymond's lecture (Benthos) in rm. 4-402

5:30p - Dinner at 100 Memorial Drive OR with Lecture Series Committee (LSC) ?

January 22

12:00 - Lecture in room 10-250
12:55 - Lecture ends

1:15p - Autograph PHOTOGRAPHS and RECOLLECTIONS at MIT COOP Bookstore

3:00p - Visit to MIT Historical Collection (265 Mass. Ave.) Warren Seamans

- Visit to MIT Film Section/Visible Language Workshop " R. Leacock & Muriel Cooper

4:00p - Optional - attend Gene O'Connell's lecture (Polaroid) in rm. 4-402

5:30p - Leave for Travel Lodge, Brookline (1200 Beacon St.) 6:30 dinner

8:00p - Lecture for ASMP group (title: PHOTOGRAPHS and RECOLLECTIONS)

9:45p - 100 Memorial Drive

January 23

10:00a - Optional time - depart for NYC

 Sept. Jan 7 1980 Test of 2415 EK film.

11 am Set 4x5 camera with film unit G.F. 80?
Resolution chart. in 4411.
f11 at 8 ft. Lamp on camera, 1/100 second shutter.
DK50 in tank for 9 minutes.

Results. Exposure ok. Focus off some or lens N.G.? G 28066 Graflex 127mm. Optar.
Camera H.Edgerton Graflex: Press type.

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Jan 21 Monitor.
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Pete Orthner phoned Jan 16 1981 21 of Jan - 26 Jan. Planetarium trip

MILI file

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INFORMATION OBSCURED

I.A.P. (January 5-28, 1981) M.I.T. Strobe Lab, Tel. No. 253-4629
1010 Strobe Lab Lecture Series

DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE, MASSACHUSETTS 02139

(ALL MEETINGS WILL BE HELD IN ROOM 4-402)

on-1pm	4-5pm
-Speed Photography les Miller, Jan. 5 (Mon.)	
Hydrogen Thyratron . Germeshausen, Dave Turnquist G, Salem, Ma.) Jan. 6 (Tue.)	High-Speed Motion Pictures Charles Miller Jan. 6 (Tue.)
lieren Photography im Vandiver . 7 (Wed.)	Loch Ness Update Charles Wyckoff (Applied Photo Sciences, Needham, Ma.) Jan. 7 (Wed.)
nds in Xenon Flash Lamps McLennon, Bob Ryan &G, Salem, Ma.) Jan. 8 (Thur)	Doppler Speed Measurements Charles Miller Jan. 8 (Thur)
thyscaphes rold Edgerton, Jan. 9 (Fri.)	High-Speed Photography of Birds, Bats & Bullets Harold Edgerton, Jan 9 (Fri.)

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omic Explosions arold Edgerton, Jan. 12 (Mon.) ✓	Holography Stephen Benton (Polaroid) Jan. 12. (Mon.)
earch For the Lost Ship, Bear harles Miller, Jan. 13 (Tue.) ✓	
tonehenge & the Calypso arold Edgerton, Jan. 14 (Wed.) ✓	HAMILTON CLUB Elapsed time movies. Steve Lissman Co. N.Y. 212.825.6601 530.
Thur (15) Thursday	
Elapsed-Time Movies Harold Edgerton, Jan. 16 (Fri.) ✓	

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(18)

Jan 19 mon 4pm (Edgerton). when Recorder. when
21 SAM RAYMOND Wed. Instrumentation

Ocean Expeditions
Harold Edgerton, Jan. 19 (Mon.)

High-Speed Video
Charles Miller, Jan. 20 (Tue.)

Search for the Civil War Ship, USSMONITOR
Harold Edgerton, Jan. 21 (Wed.)

Photographs & Recollections
Gjon Mili, Jan. 22 (Thur.)

Polaroid Instant High-Speed Motion Analysis Syst
Gen O'Connell (Polaroid), Jan. 22 (Thur)

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Stonehenge & the Calypso
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Harold Edgerton, Jan. 16 (Fri.) ✓

Holography
Stephen Benton (Polaroid) Jan. 12. (Mon.)

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Thur (15) Thursday [illegible] 530.

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(18)

Ocean Expeditions
Harold Edgerton, Jan. 19 (Mon.)

Jan 19 mon 4pm ~~[illegible]~~ (Edgerton). [illegible] Recorders. [illegible]
21 SAM RAYMOND Wed. Instrumentation

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Search for the Civil War Ship, USSMONITOR
Harold Edgerton, Jan. 21 (Wed.)

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Gjon Mili, Jan. 22 (Thur.)

Polaroid Instant High-Speed Motion Analysis Syst
Gen O'Connell (Polaroid), Jan. 22 (Thur)

 Jan 25 1981 Harold Edgerton.

Our, Lecture Series at MIT for the IAP is now over.

Ian Morrison gave an excellent lecture about Tooh Neys circles - which he showed are due to the dumping of spoil from the canal.

Gjon Mili gave a noon lecture in 10-250 for the Lecture Committee. It was well received. Then he went to the Coop where Louise Stephenson and Alice Hoar had the place set up for a book signing deal. Some 30 books at $40 were sold.

In the evening he went to the $5 MP (magazine photographers) meeting. It was an enthusiastic meeting. Mili saw an exhibit of his photos at the MIT historical exhibit.

Jan Key was here for sunday dinner today. She is busy at the children's hospital where she is an intern.

Jan. 28, 1981. An experiment was made to find the effective film speed of 7302 Eastman fine grain film. I first tried S=10 with a 1125 BCPS unit. The results were under exposed. Then I tried S=2 which came out fairly well on an average scene. Perhaps S=1 would be better. I used a 6 min development in our tank of DK50 of unknown age.

Jan 30 1981 Sunlight f11 1/100 sec exposure on 2415 film
5 min devel. Looks ok - exposure to [illegible]
DK50? over exposed.

Copy f 11 1/4 (1/8) sec. on 2415. of Sarandoca Seaprobe.
5 min Devel DK 50? ok.

HE & Chas M. to Roof-Pond. Bldg f8 1/400 sec 4x5 2415 film
~~5 min~~ Devel DK 50 ~~under~~ exposed
The sun was also lower.

Joe Burley, - Bos. Ins. Wire.

for Tomorrow with Michael Solow - f 8 at 1/200 sec. 2415 film
Photo of Chas River for N6682N Cessna II.
Party for M.I.T. faculty of E4 & Committee & wifes at Fac Club ~~Gordon~~ Groom

Feb 3 1981 M.I.T. Second term started yesterday. About 25 students have signed up for the strobe lab.

Feb 6 1981 Harold Edgerton.

Yesterday at Polaroid with Vivian Walworth Quicoscope lab, with F6A and ExG. 3oz [illegible]ment, 8X10 color film

Vivian ~~Walfoole~~ Walworth

5X70 color film ASA 125

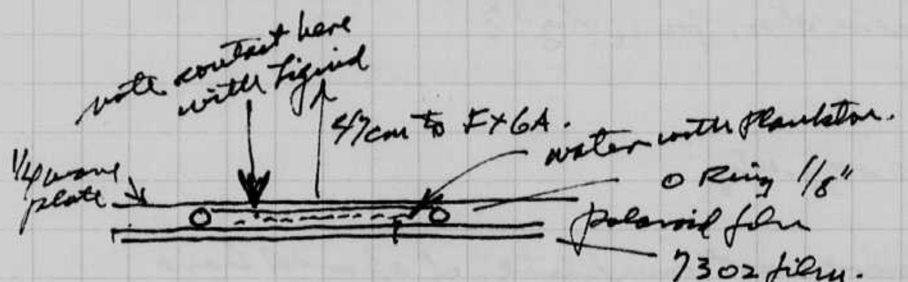
Nancy Pickens
Paul Burnett
Manny Chinve

		D	volts 4 mfd		
	1	40cm	1500	over	
	2	40	900	over	
	3	40	800	best	
1108	4	56	800	under	
1110	5	56	1000	ok	
	6	56	1000	ok.	Bio Subject
1126	7	56	1000	ok.	O Ring
1140	8	56	1000		Transparent B&W.
1145	9	56	1500	Better	Transparent B&W

#1 Today. 1P 1/4 plate P → 7302 film Real Plankton 1/8" Ring. 47cm to FX6A on 4 mfd 1500v
1500 on coal 4 mf. 5 min in Ektol. under exp.

#2 Polaroid film 1/8" rubber O Ring 1/4 plate. 7302 film
1500 v at 4 mfd 5 min. better. Exp ok. "

#3. Same but with Greased ring more water.
7302 1500 v 4 mfd. 5 min. Exposure ok. "



#4. I 4107 Vericolor prof. film 4X5 2/81. ~~1500~~ 900 v 4 mf 47 cm

#5 II 4107 Vericolor. " " " 2/81 (Exp 110) 1100 4 mf 47 cm

#6 III " " " NG 1300 4 mf 47.

IV " " 1500

Note all these are N.G. since the top polarizer "was off"

V (Shows some color.) ✓ 1500. 5/16" o ring O ring

Feb 8 1981 Sunday. 5/16" ring now cemented with Dupont cement. Density of polaroid $P_2 = .02$ .51-.52
" " " .42-.42

~~IX~~ 7302 with 2P + 1/4 no exposure!
7302 " 1P + 1/4 47cm 0.20 mfd 1500v Ok.
Exposure ok but could be more for Jenifer -

Cont Feb 8 1981 Harold Edgerton.
Trial for color exposures of Plankton.

	D	C	V	2		No
4102 Vari II film.	49 cm	4	~~1500~~	4	polaroid .42 density 1/4 wave plate.	VI
" "		4	~~1400~~ ~~1500~~	"	Two flashes Lucifer.	VII
		4	~~"~~ ~~1400~~	"	FOUR FLASHES "	VIII
" "	49.	4	1000	"	one flash	IX

All seem to be overexposed

7302.	49 cm	4	1500	4	one flash ok.	Clear Boston needs more water Lucifer ok
7302.	49 cm.	4	1500	4	" ok	water ok Lucifer ok
343	49 cm.	4	1500	4	10 flashes. ok. Lucifer	Exposure about Right.

finished about 8.30 pm. color ready to be processed at Boris Lab in Boston.

Analysis

I no color Bkg ok others overexposed — The top Polaroid was off
II no color Bkg ok, others — "
III no color Bkg ok - Exposure over? — "
IV overexposed — "
V Shows some promise Shows color - over exposed slightly.
VI, VII, VIII } all show no images in sharp focus, why? ?
IX. overexposed.
X. Over exp. NG. no ring. why.

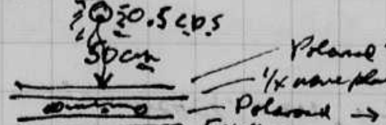
These color tests were not complete. I should have had exposures from under to over.

VI - IX are all out of focus and I do not know why. Try a B&W film in place of the color to see if images of the plankton come through in focus.

#V is the only example with any promise. It seems to be over exposed some with 4 mfd 1500 volts (?) at 49 cm

Feb 10. 1981. Battery flash unit FX6A - 12 mfd 450V 0.5 cps. .12 μs. duration.
(F. 7302 Film at 70 cm 5 min Lucifer & Worms. ok.
7302 Film at 50 cm 5 min. " " " ok

This film exposed ready for Boris tomorrow morning. { Color 4102 Vericolor II.



Subject 2. worms
1 Lucifer.
Film 4102 ASA 100.

Yesterday (Sunday) I had the top polarizer and 1/4 wave plate interchanged. On some I left the top polarizer off.

Q.162 Started lab this week on the circuits of the Strobe Lamp.

Feb 10 1981 Harold Edgerton.

Peter Ortner (Miami NASA) is taking a Benthos improved silhoutte camera to sea. A net will be used to concentrate the plankton. This camera operates at 2 pictures / second. There is "time" included on each frame. The camera is daylight loading. An FX6A lamp with standard circuit is used for a source. See camera design on page 71. This is the M.I.T. model which was tested in Florida with Pete Ortner before. I am expecting great things from this camera in the study of plankton and the Deep Scattering layers.

Feb 11 1981 — Bert

4107 slightly underexp. or about right. ?

Color Test, Bat operated unit 12 mfd 490 V. 0.5 cps out put FX6A
4107 Reversal Verichrome II, ASA speed 100.

Distance to film from lamp 50 cm ± 2.

Polaroid 0.42 1/4 wave plate 45° crossed Polaroid 0.42.

Subject 2 - O Rings with 1 Lucifer and 2 worms. on 1 mil plastic.

$I = \frac{cps}{D^2} = \frac{0.5}{.5^2} = 2$ lumen sec / sq meter. 2 ✓

Taken to Boon at 8.20 am Feb 11 1981. for processing.

X-70 film tested Feb 5 at Polaroid asa 75.

D = 56 cm Dial 1000 C = 4.6 cps = 1.2 for good exp 2 pol + 1/4 wave plate. X70

light X70 $I = \frac{cps}{.56^2} = \frac{1.2}{.56^2} = 3.83$ lumen sec / M^2 $\frac{DA^2}{}$ = $\frac{cps}{}\frac{S}{C}$ Reflected light

light 4107 $I = I_{X70} \times \frac{75}{100} = 2.87$ $\frac{cps}{D^2} = \frac{C}{S}$ $\frac{CA^2}{S}$

$2.87 = \frac{0.5}{D^2}$ $D = \sqrt{\frac{.5}{2.87}} = \sqrt{.1742} = .417$ meters.

	cps		
4.6 mfd.	800	800	0.81
	1000	1000	1.2
	1200		1.7
	1400		2.1
	1460		2.2

 Feb 1[2]3 1981 H. Edgerton.

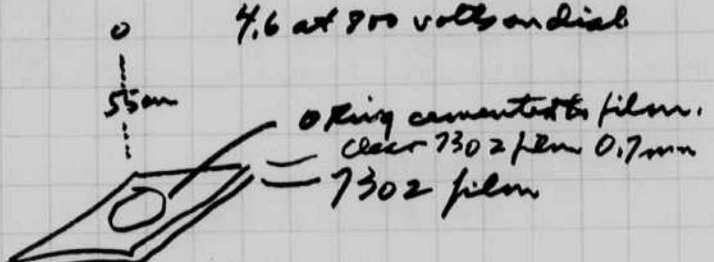
Left Cambridge at 8 am ± for Benthos visit. Esther went with me. Arrived about 10 - Ron Church visited the plant. Met Chris Nicholson 27 years old from Indiana. who is designing a U.W. survey instrument. He showed some movies at noon.

Then Esther picked me up at 1 and we went to see Pete Wiebe and Steve Boyd. Discussed plankton. Steve had two jars of life plankton - mainly copepods for me to take to Boston.

Evening. 4.6 mfd at 800 on dial exposure ok, 7302 B&W 55cm
4.6 " " 1000 " " ok. " " 55cm.

color 4.6 " " 800 Distance 55cm } trial exposures.
4.6 " " 1000. " "

I noted that the animals died when put in the thin layer of water on the film. Apparently they warm up and pass out. They must be kept cold.



check for exposure on color. 800 and 1000.

Feb. 13, 1981 The color pictures (Feb 12) were over exposed. Too much light.
Go back to exposure of Feb 11. $I = .5/50^2 = 2$ lumens/m².

Dial	Volts	C	CP. ×10⁶	Dur µs	CPS.
800	800	4.56	0.13	6.2	0.81
1000	1000	"	0.19	6.4	1.2
1200	1200	"	.26	6.4	1.7
1400	1400	"	.33	6.4	2.1
1500	1460	"	.35	6.4	2.2
800	800	2	.095	4.4	0.42
1000	1000	"	.14	4.6	.64
1200	1200	"	.19	4.6	.87
1400	1400	"	.24	4.6	1.06
1500	1460	"	.26	4.6	1.14

Data by V. MacRoberts MIT 02139 Feb. 10, 1981.

$\frac{0.81}{.55^2} = 2.67$

$\frac{1.2}{.55^2} = 3.99$

$I = \frac{CPS}{D^2}$

$D^2 = \frac{0.81}{2} = 0.405.$

$D = \sqrt{.405} =$ ~~.64~~ 0.64 .4096

$.638^2$ .407

$.636^2$

$.637^2 = .4057$

$D = .637$ cm.

$\frac{.81}{D^2} = 2$ $\frac{.42}{D^2} = 2$ $\sqrt{.21} = .48.$

$D^2 = .405$ $D^2 = \frac{.42}{2} = .21$

~~$\frac{.42}{.55^2}$~~

Calculations ~~say~~ say 63.7 cm should be used instead of 55.

Lighted function of V^2.

800 & 700 volts.

$\left(\frac{7.00}{8.}\right)^2 \times 0.81 = 0.765$

$\frac{0.765}{.55^2} = \frac{0.5}{.5^2}$ D^2

$D^2 = \frac{0.765}{2} = 0.3825$

$D = \sqrt{.3825} =$ .7×.7 = .49, .6×.6 = .36; 6.1×6.1 = 37.21, 6.2×6.2 = 38.44

≅ .62 m or 62 cm. Raise 700 volt lamps to 62 cm

$\frac{0.765}{.62^2} = 1.2 \times 3$ = 1.990. ✓ should be 2. ✓

$D = \frac{62\text{ cm}}{2.54} = 24.4''$

Exposures mark.	cps	V	std. Ω	D.		
I.	0.765	700	4.65	24.4'' 62 cm		several flashes accident?
II	.765	700	4.64	24.4	62. cm.	~~one~~ flash.
III	0.765	700	4.64	27.''	68.58 cm	

Several copepods and one arrow worm.

I cooled the film and ring into which the subjects were deposited. The sample has been in the lower part of the refrigerator since yesterday. I think some of the plankton has died and are accumulating on the bottom of the jar.

I lumens per/sq meter.

Exposures of yesterday were $.81/.55^2 = 2.67$ over

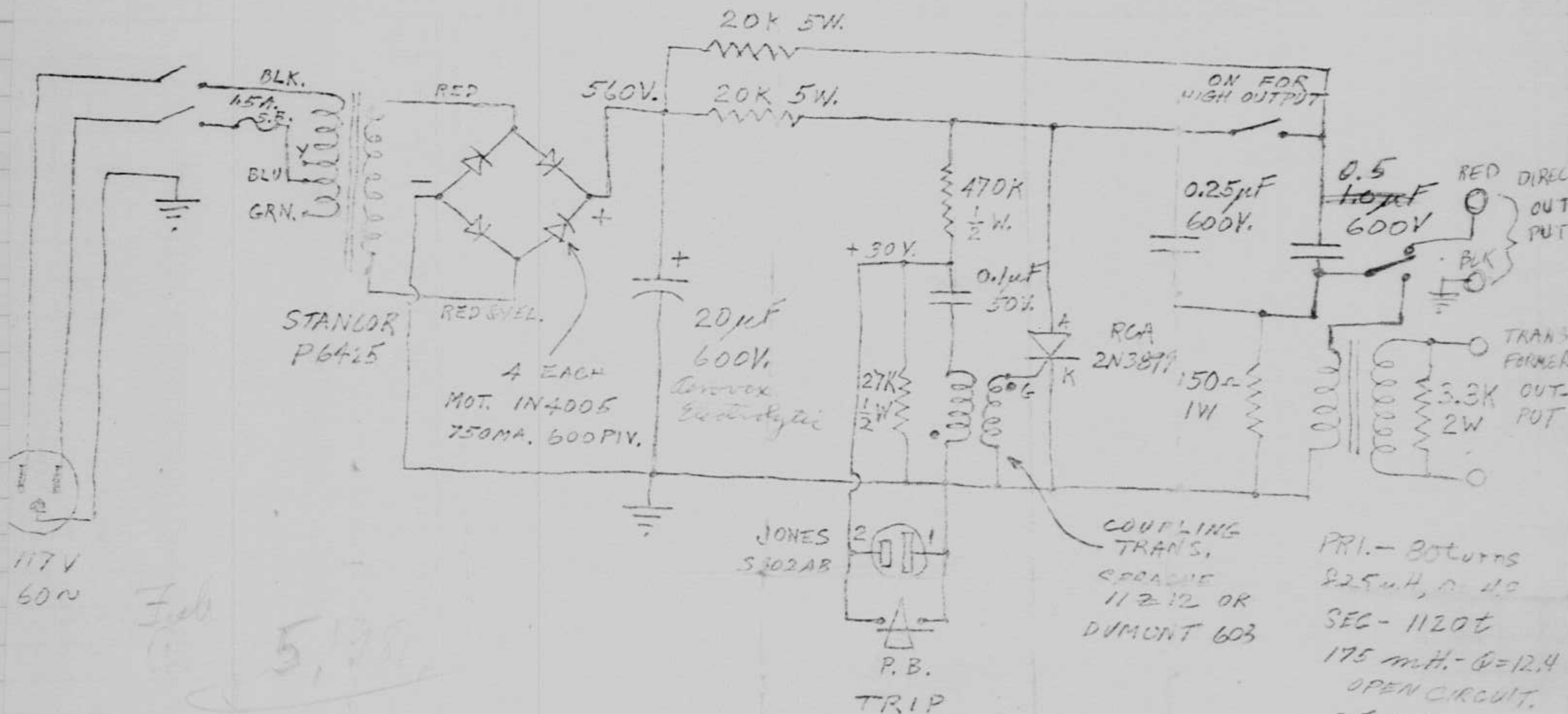
$1.2/.55^2 = 3.99$ over.

Today.					
I *	~~2.52~~	.765/.65² = 1.81	1.99	$\frac{.765}{.62^2}$ =	
II	~~2.52~~	~~.765/.68.58² = 1.6~~ 1.634 ~~1.87~~	1.99		one flash
III *	~~2.52~~	.765/.68.58 =	1.63		one flash

10 15 pm. !!! I just realized that I did not use the polarizers and 1/4 wave ~~plate~~ yesterday or ~~today~~! Throw out I, II, III and start over. This was the reason for the overexposure the test of Feb 12.

	cps	D		
New tests.	.81	.55 m	2.67	800 ~~1000~~ V
	.765	.65	1.99	700
	.765			

* could be several flashes! by accident.



PRI.— 80turns 8.25 mH, Q 4.9
SEC- 1120t
175 mH.- Q=12.4
OPEN CIRCUIT.
3.5 K.V. INTO
MASSA
TRANSFORMERLESS
TRANSDUCERS.
30301
29371

MINI PINGER
DRIVER.
FEB. 20, '70.
Y.E.M.

Circuit given to Ed Conley, Feb. 1981.
AB to drive Massa 612C

No Transformer on unit. There was a Transformer on the Massa Transducer

Feb 16 1981 Harold Edgerton Exposure Tests. 4107 color neg.

FILM.	D	Caps	Dial Volts	C.P.S.	T. μs		CPS/D²	comments				D.
I	55	4.6	1500	1460	2.2	6.4	7.27	Exp ok?	320°		x	.99
~~II~~	~~55~~	~~4.6~~	~~1500~~	~~1460~~	~~1.7~~			2 out? Foggy.				
III	55	4.6	1200 ✓	1200	1.7		5.61	warm	ok	210°	Purple color	.92
IV	55	4.6	1000	1000	1.2		3.97		ok	245°	color	.52
V	55	4.6	1000	1000	1.2 ✓		3.97		ok	320°	x	.92

March 9 1981 Working on "Sonic Scattering Layers Influenced by artificial light." Experiment of 1972 on Alcoa Seaprobe. Pete Webb gave comments and help.

Mar. 27. 1980 I replaced a 16 mfd capacitor in the strobe light on the Prudential Bldg yesterday. I had lunch with Tom. Harbie supt of the Bldg.

We discussed the purchase of an EG&G LS167 for $3080. Tom Alleri Tony Solomini (Geo Mansfield) said it could be made to operate at a 1.5 second rate - automatically.

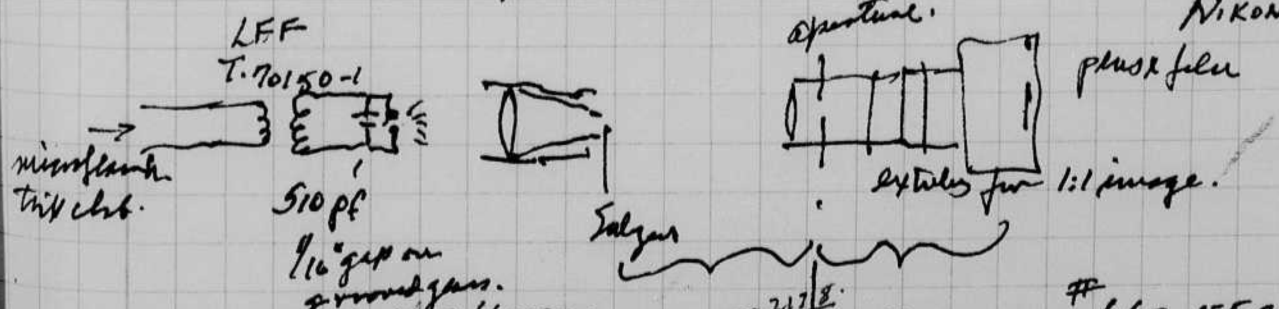
output 200 mfd 1300 volts FX 228C lamp $ 345.

Carlie Lens - Day 20,000 candela. 200 W.S. I wanted to know candela seconds!

Our old lamps has no reflector ??
354 watt sec.

Return from Calif on Mar 23 at 6.30 pm with Esther. Mary Lou, Chas, and Ellen were in Calif with us from the Mar. 12. See schedule on next page.

Exposures made on Plus x film Mar 28 1981



peak light = 6600 cp
Dur = 33 x 10⁻⁹
CPS = 0.000217 8.

f = 55mm f 3.5 # 662 559
micro Nikkor P auto.

Plus x Tests.

f 3.5. no p.		4 plots
"	"	"
"	"	"
f 3.5 paper		"
5.6	"	"
11	"	edge x
Black.		
16	P	
22	P	
32	no p	
22	"	
3.5	"	

Dr. & Mrs. Harold Edgerton
100 Memorial Drive
Cambridge, Ma. 02142

March 12, 1981

March 12 (Thu.) - Lv. Boston 9am (AA #291) to Chicago, leave 11:25a (AA #65) arrive San Francisco at 1:43p Stay at Holiday Inn (415-589-7200)

- Visit with Stephen Wirtz at his gallery (345 Sutter Street, S.F. (415-433-6879)

March 13 (Fri.) - Drive to Menlo Park - visit with Dave McCulloch and Dave Rubin (US Dept. of Interior, Geological Survey, P.A.B. of Marine Geology, 345 Middlefield Road)

- NOON Lecture for above group

- 3pm meeting with Michael Jameson (Dept. of Classics, 2nd Floor 22 B-C Stanford University, Stanford (Denice Denton (415-493-3100 x2004)

March 15-17 - Pacific Grove, meeting of the Society for Photographic Education Asilomar Conference Center, 800 Asilomar Blvd. (408-372-8016)
Ellen Manchester, Greg MacGregor (Gretchen Garner, Ed. of EXPOSURE)
Henry Flesch, EG&G, 15300 Ventura Blvd. Suite 324, Sherman Oaks (213-995-3700) (EGG Reticon (213-995-4663)

- Visit with Dr. & Mrs. Frank McWhorter, 148 Hacienda Carmel, Carmel (408-624-8261)

March 16 (Mon.) - Evening lecture to the Society for Photographic Education at the Asilomar Conference Center (History and Application of High Speed Photography)

March 18 (Wed.) - Stay at Long Beach Cities Center Motel, 255 Atlantic Ave. (213-435-2483)
and
March 19 (Thu.) - Visit Fay Garrett (714-892-2555)
- Visit Bill & Rhoda Bascom, 1900 E. Ocean Blvd. Long Beach (H: 213-432-4747: W: 213-435-7071)
- Visit Janice & Tom Binckes, 4202 Racquet Club Dr. Huntington Beach (714-846-8280)

March 20 (Fri.) - Stay at Valencia, La Jolla (714-454-0771)
and
- Visit Mary Koriagin, 636 Q Avenida Savilla, Laguna Hills (714-830-3615)
March 21 (Sat.) - Visit Carol & Jim Natland, 2102 Pleasant Grove Rd., Encinitas (714-436-3864)
- Visit Dr. & Mrs. William Pogue, 4661 Mission Bell Lane, La Mesa (714-460-9624)

March 22 (Sun.) - Return to ~~Long Beach Cities Center Motel~~, ~~255 Atlantic Ave.~~ (213-435-2483)

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Apr. 2 (Thu) Kjell Sandved, Smithsonian photographer - LSC Lecture "Curious Creatures and Mini-monsters, 8pm, MIT Room 10-250

3 (Fri) Williams Searle's lecture, MIT Room 5-314, Ocean Engineering Dept. 4p

5 (Sun) HEE to lecture for Dr. J.J. G. McCue's group at the Boston Boat Club, 5:30p

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Killian Award Lecture - Dr. Alexander Rich, MIT Room 10-250, 4:40p

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Compton Gallery, MIT, Reception 4-6p (3 M.I.T. Etchers) Opening

10 (Fri) Dinner party for Frank Scalli, Kings Grant, 6:30p

11 (Sat) Reception for "local" Class of 1985, Sala de Puerto Rico, 10-11:30a

HEE to lecture to MIT Educational Studies Program, rm. 26-120 at 3:30p (local high school students) Kathy X 4882 Pat Kittredge 253.4882. 6-120

Dinner at the Baddour's house in Belmont ~ 6:45

12 Sun - Italian 10 a.m. Sonesta

13 (Mon) NE Aquarium meeting, 12:30p on the top deck of Discovery

15 (Wed) Mr. Peter Bron from Switzerland to visit, arrives at 10a

Noon, visit EG&G in Salem, Ma.

Dinner/lecture at the Museum of Science, 5p, Mr. Pinchon (A-bomb movies)

16 (Thu) EG&G Annual meeting Copley Plaza Hotel, Oval Room
Open to public, 9:30a
Meeting called to order 10:30a Take slides.
Luncheon, 12p

3:30-4:30p lecture to the American Alliance for Health, Physical Education, Recreation & Dance
Hynes Aud, Prudential Center (Gladys & Dick Garrett)

6:30 dinner O'Keefes.

19 (Sun) Easter Sunday

20 - Esther N.C.

21 (Tue) 9:30 The Cousteau Society, NYC

6:00p St. Botloph Club, Prof. Roy Lamson

22 - Dinner 23 in class.

23 (Thu) 10a - lab tour, Carl Frey x3354, requested by Paul Grey

2p - lecture at Boston Public Library (requested by Roz Ridgeway, NEA)
"Monitor Wreck"

Dance Group dinner Fac. Club.

24 (Fri) 1-3p lecture for Prof. Letvin's class, room 31-161

24 - Hyndon Leaves for S.F.

27 (Mon) Birthday party for Don Severence at Faculty Club, 5p-m.

28 (Tue) MIT Club of Cape Cod, Coonamessett Inn, Falmouth, 6p (Sam Raymond) Take prize.

May 1 (Fri) Marshall Orr's lecture, rm. 5-314, Ocean Engineering Dept.

4 (Mon) Mrs. John Duncan arrives from England

7:15 lv. for Germany

11 (Mon) 3:40p return from Germany

13 (Wed) 7a - lv. for Ohio State University
10:40 ar. Columbus - luncheon/lecture with MIT Club of Central Ohio
(Harry Johnson class of 1932 will meet plane) Slides.
2:30 - Go to Morrison Tower, Ohio State, 196 West 11th Av.
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Dr. &
100 M
Cambr

March

March

March 1

March 1

March 1

and

March 1

March 2

and

March 21

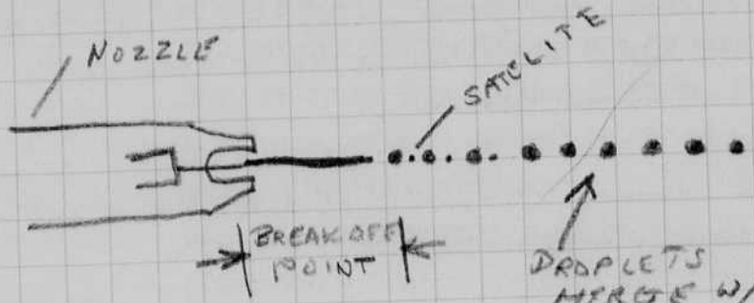
March 22

March 23

2.8×10^{-3} in March 31 1981 Harold Edgerton. Bill MacPherson
11-405 MIT 8 mm.

D = .05 mls. 6608

THIS EXPERIMENT IS TO DETERMINE VARIANCE OF BREAKOFF POINT OF A NOZZLE OF 8 mm INSIDE DIA. PUSHING 3 COLORS OF INK. THE BREAKOFF POINT IS DUE TO SURFACE TENSION & VISCOSITY OF THE INK WHICH IS THE VARIABLE INTRODUCED IN THIS EXPERIMENT



Carl Axel Hertz. Univ. of Lund. Sweden.
272-7070. 507.
DIETER JOCHIMSEN.
CRAIG SURPISE.
PAUL SCHWALM.
APPLICON INC. BURLINGTON MA 01803.
32 Second ave.

PRESSURE = 550 PSI
FLOW RATE (GEAR TIME/REVOLUTION) —

24.5

1-17. Plus-X ~~5X~~ film.
DK50 - 8 mins.

① BREAK OFF POINT APPEARS TO BE AT ~ 3 mm
VACUUM TURNED ON
PRESSURE 550 PSI.
INK: MAGENTA

#2: 0
1
2
3
4
5
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15 Film partly fogged.
16
17 See data taken by above group(s).
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~~29~~
30

 April 6 1981 Birthday! Party in Lobby
4-401 MIT.

Apr 7 1981 Dance Photos Marianne Oberhuber 661 0509 cambridge mass
wants multiflash photos of dancers. Visual Studies - Otto Piene.

Apr. 18, 1981. Sat night. A 1600 E.P.C. recorder was obtained yesterday from Ed Curley. It is a 9" recorder with a finger attached for seismic uses in shallow water, I plan to use it in Greece at Helieis for Michael Jameson of Stanford Univ. Esther and Sylvia Edgerton (Pontiac) are going with me, We may stop at Venice on the return trip to work on the third granite column which was lost in the harbor.

I am going over my sonar records, picking out good examples for a book Sonar - Images. It will be mostly pictures - like Bilderson Kenyon Stride. — etc.

April 23 '81. I was at the Cousteau Society Board meeting on the 21 at 777 3rd ave N.Y. - with 10 others to talk about the direction of the society.

Then at 1.15 I met with Peter MacGill at the Light Studios. 8th floor 724, 5th ave. He wants a display of my pictures.

May 3, 1981 Gus Kayafas is making exhibition prints 16x20s. A set of balloon photos has been here for weeks after being signed. Gus has an exhibit of my photos arranged for conn (Hartford) for June 9. also there is still interest in a display at the Light Studio in N.Y., as mentioned above (Mac Gill).

Esther went with me to the Cousteau show in Falmouth on April to show my high speed pictures to the MIT Alumni Club. Sam Raymond was there and took a video record of the screen and sound.

Mary Lou Dixon is home after her operation. Esther was there for about a week - returning just in time for this trip to the cape.

Marty Killeen and two others came in May 1 to take video shots in the strobe lab. of me and Chas Miller. It may be used in an "Science" 1/2 hour broadcast affair.

Jan and Lyndon Key came over last night. Popcorn and apple

ITINERARY - Prof. Harold E. Edgerton, Koln, Germany, May 4-11, 1981

May 4 (Mon) Lv. Boston (TWA #754) at 7:15p

" 5 (Tue) Ar. Frankfurt at 9:50a

Stay at Sonnenhof Hotel, Koenigstein (Tel. # 06195/802 300)
(Gerhardt Lander/will be at airport)

" 6 (Wed) Lv. Frankfurt (Lufthanza #850) at 9:40a

Ar. Koln at 10:25a (To be met by someone from DGPh)*

Stay at Crest Hotel, Durenerstrass, 287 (Tel. 435966)

Evening - party organized by Photokina at a Koln restaurant

" 7 (Thu) Morning - Press Conference

Reception - Koln City Hall - given by the Lord Mayor

Afternoon - "Kulturpreis" - award ceremony given by the Deutsche Gesellschaft fur Photographie (The Photographic Society of Germany)*

Convention Center West of the Koln Nesse (Fair)

" 8 (Fri) Lv. Koln with Dr. Alfred Loew for Ernst Leitz Company, Wetzlar (by car)

" 9 (Sat) Wetzlar, Germany (Tel. [06401] 29-1 [Zentrale]) & Telex 483849 leiz d

" 10 (Sun) " "

" 11 (Mon) Lv. Frankfurt (TWA #753) at 11:25am

Ar. Boston at 3:40p

* DGPh, Neumarkt 49, 5000 Koln 1, Tel. (0221) 214410

Dr. Hans Friderichs, President
Prof. L. Fritz Gruber, V. P. (Paulistrasse 10, D-5000 Koln 41 , Tel. (0221) 494249
Mr. Gert Koshofer, Sec. General

---

80 slides (35-mm)
~~400 ft. movie - elapsed time and high speed~~ No
12 plankton photographs, 8x10" + also color plates
~~? water drop exhibit ?? Maybe ??~~ No

3 Move of Vision
1. E.E.S. Book.
Look Ness M.I.T. Tech Review.
Post cards.

I went to EPC Lab (Ed Curley) at 9 am with Scot Flood at with the EPC 1600 recorder together with sonar records made yesterday of the tunnels in the Boston Harbor. The records were dim. We suggest

(1) more gain (x10 increase).
(2) Slower paper speed. Instead of 270 lines per inch, I propose 540 lines per inch.

We tried this in the lab on the ceiling. The air signal from the ceiling was improved. At 1 pm we broke lunch, stopping at the Boston Science Museum for lunch in the sky room. The show with the high-voltage generator was underway.

Dave and Dianne Collander were in the office when we returned.

The generator - gas tank, and an extension cord were picked up for tomorrow. I showed also to him a ground wire to put in the water. I hope the ignition noises are not transmitted into the sonar.

Ed Curley reports that an order for 900 of his machines is almost certain from the B.T.R. This will mean a big expansion for him.

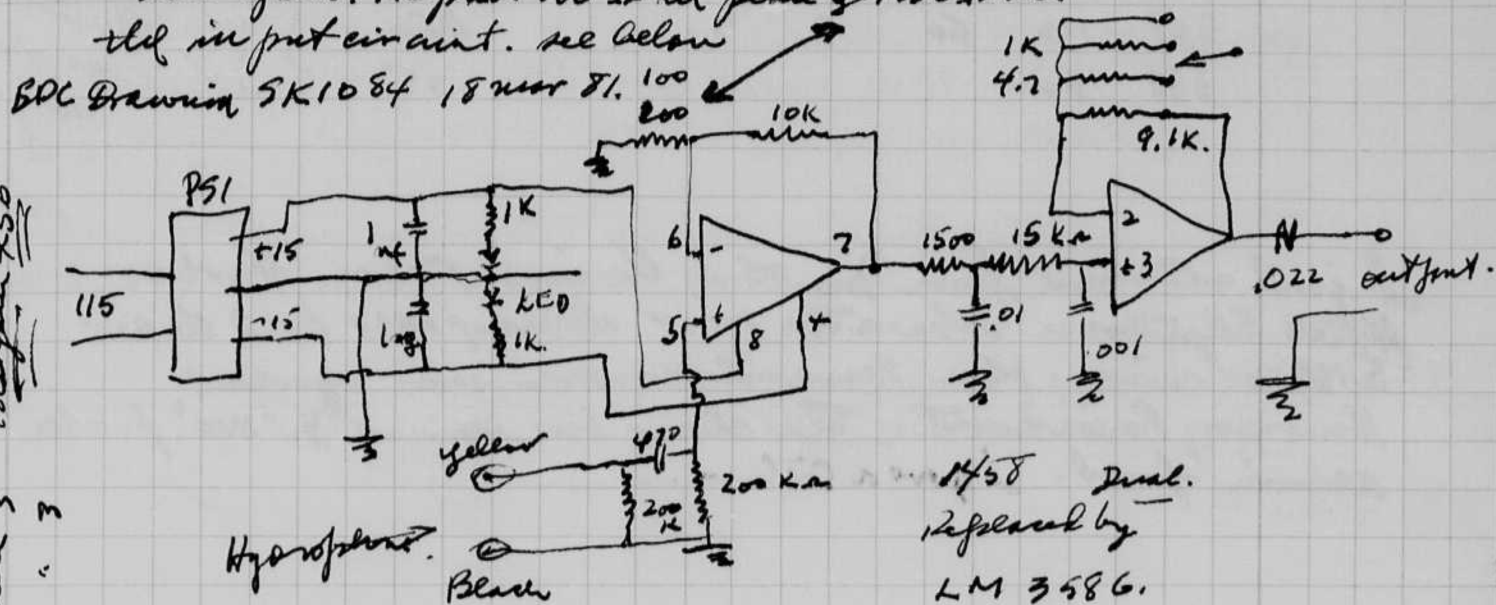
Mr White and daughter Alyson White 12 were visitors in the lab.

Sat May. 30, 1981 The amplifier gain in the EPC 1600 was increased by a factor of x10. However we found ~~that~~ it worked great in the water with 0 DB. In the lab in air the amplifier did not have any gain on the x10 DB and 10 DB switch settings. Chas Miller said the D.C. biases were disturbed by the change made above to get more gain. The ~~10,000~~ 1000 ohm resistor in the feed back circuit was changed by Mike Murphy to a 500 ohm one.

Yesterday we went out again at 4 pm to see if we could spot a sub-bottom feature along the wall in front of M.I.T. It was not found. However a layer was evident where sediment has built up against the granite wall.

May 31 1981 Harold Edgerton.

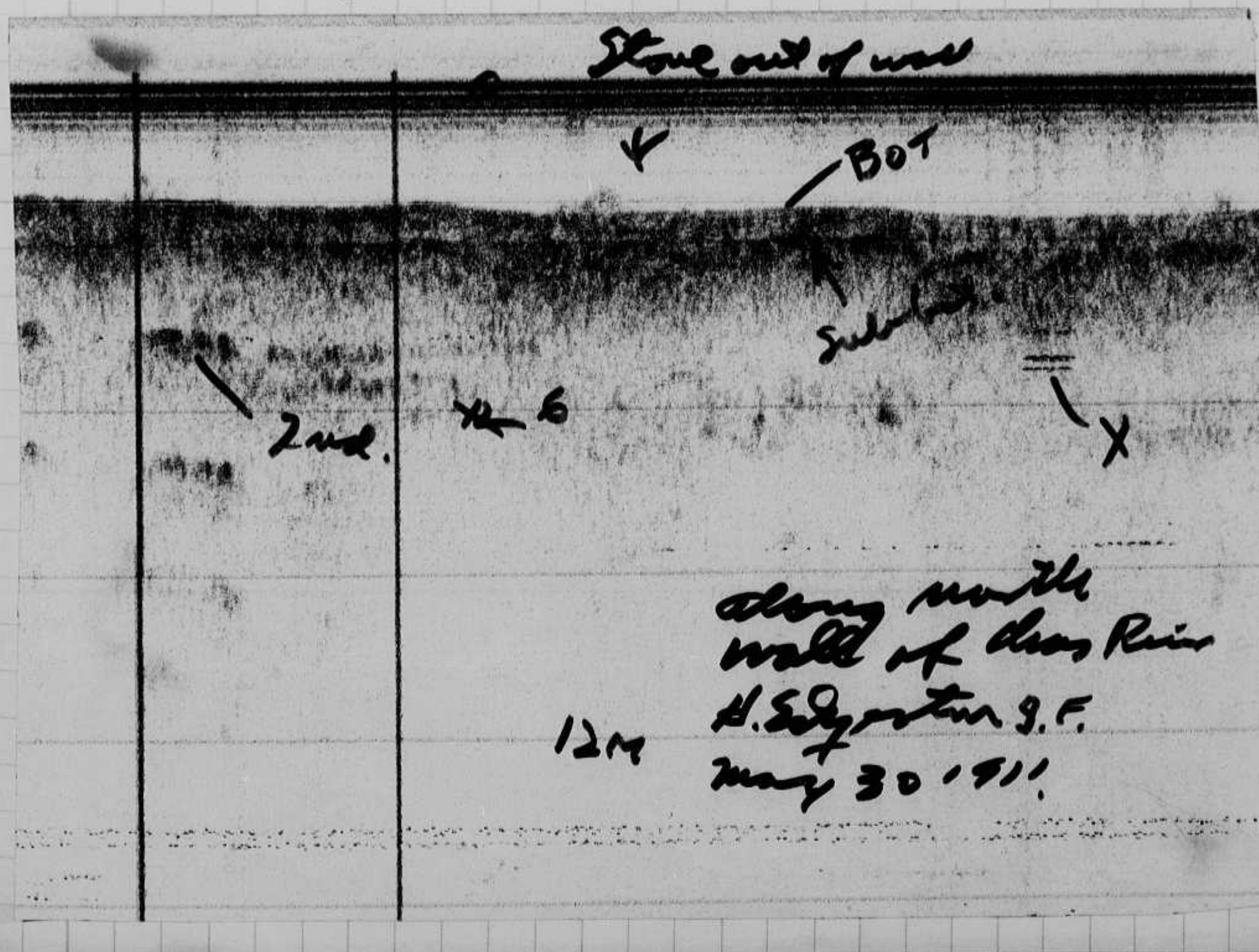
Amplifier in EPC 1600.
This was modified by Mike Murphy last week for more gain. He put 100 Ω in place of 1000 Ω in the input circuit. see below
EPC Drawing SK1084 18 Mar 81.



June 1 1981. By Bill MacRoberts.
Total gain 450
0 DB gain 50
10 DB gain 3
20 DB " 3

In the Charles River I only use the 0 DB switch setting (R=0?) and get good records in 3 meter water.

0 DB - 200 gain 1/2 power.
A second layer was noticed. I am very encouraged with these results!



 May 27 1981 Harold Edgerton. MIT 4-405

I went to EPC Lab (Ed Curley) at 9 am with Scot Flood at with the EPC 1600 recorder together with sonar records made yesterday of the tunnels in the Boston Harbor. The records were dim. We suggest

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Sat May 30, 1981 The amplifier gain in the EPC 1600 was increased by a factor of x10. However we found ~~that it worked great in the water with 0 DB.~~ In the lab in air the amplifier did not have any gain on the x12 DB and 10 DB switch settings. Chas Miller said the D.C. biases were disturbed by the change made above to get more gain. The ~~10,000~~ 1000 ohm resistor in the feed back circuit was changed by Mike Murphy to a 500 ohm one.

Yesterday we went out again at 4 pm to see if we could spot a sub-bottom feature along the wall in front of M.I.T. It was not found. However a layer was evident where sediment has built up against the granite wall.

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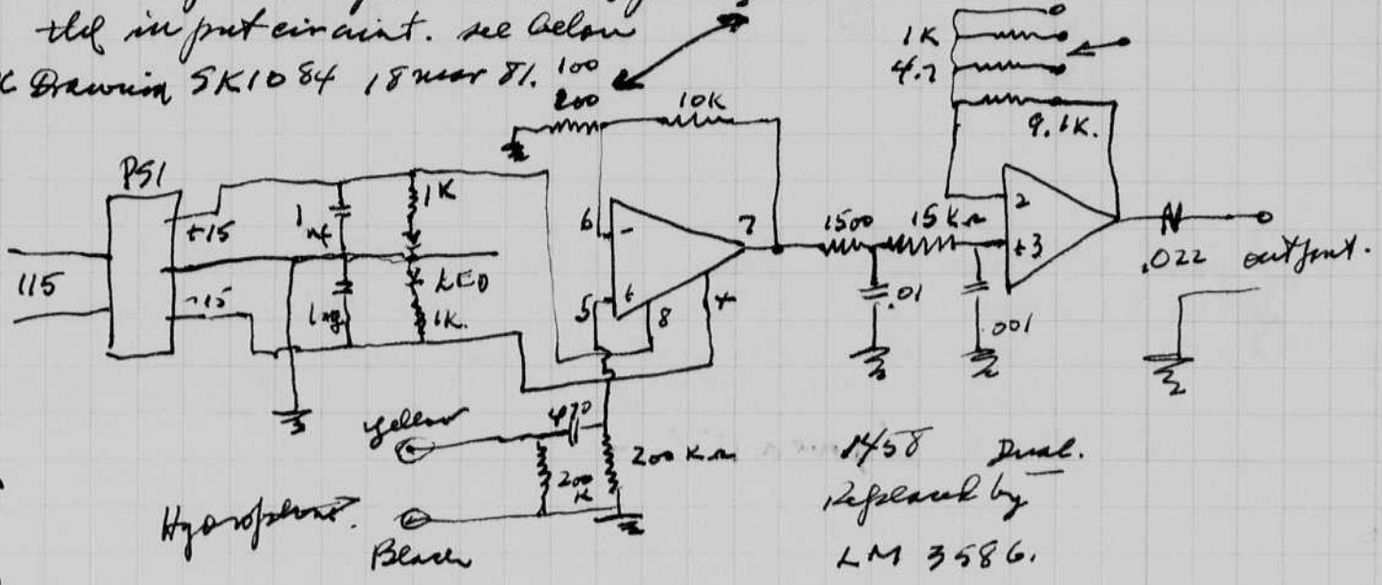
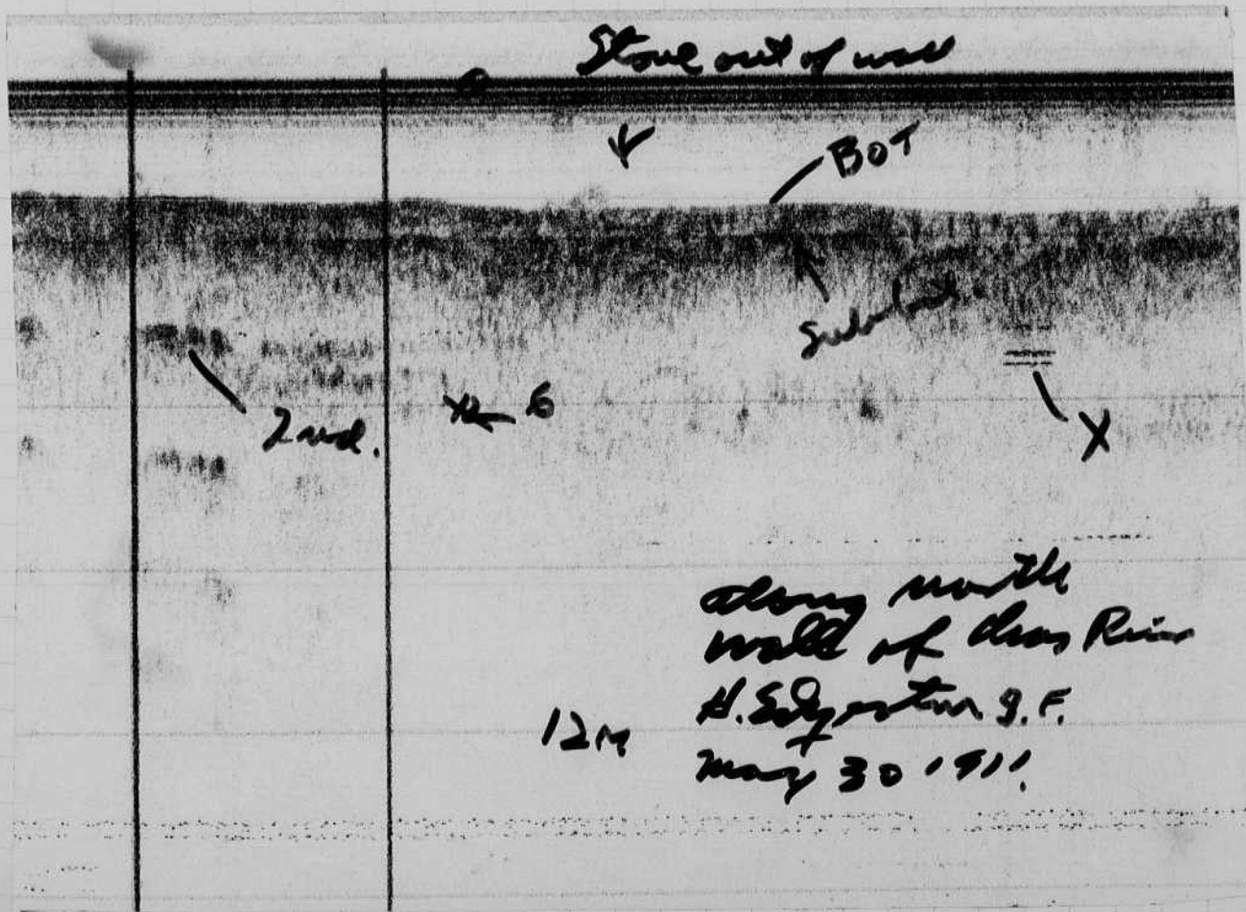
BBC Brawin SK1084 18 near 81.



June 1981. by Bill Murphy Records.
0 DB gain 50
-10 DB gain 3
-20 DB gain 1.3
Total gain 450

In the Charles River I only use the 0 DB switch setting (R=0?) and get good records in 3 meter water.

0DB - 200 gain 1/2 power.
A second layer was noticed. I am very encouraged with these results!



H.E. Bill Mark S. Flores. amp. tests.
June 2, 1981 5+ pm. Settings.

I.C.	R.	0	10	20	gain. Total
1458	1000				
1458	100	50	3	3.	450 ?
358	100	60	3	3.	450
358	500				75

This last condition was used on June 4 1981 at sea. seems to be ok

I just returned from Martha's Vineyard Mass. Harbor View Hotel Edgartown where the MIT class of 1931 had their 50th reunion. Ken Germeshausen was elected Honorary President. The class has raised $3.1×10^6$ for the alumni fund. I gave a lecture.

NEW Schedule for Dr. Harold Edgerton, MIT, Cambridge, Ma.

From Boston to Columbus, Ohio and return May 13 and 14, 1981

US AIR #67 (on May 13)
lv. Bos 7:30a - ar. Pittsburgh 9:05a

US AIR #101
lv. Pittsburgh 9:35a - ar. Columbus 10:13a (to be met at airport by Harry Johnson) *
5:30p to be met by Jonathan Green at Morrison Tower, 196 W. 11th Ave. Columbus

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9797

Ohio State Univ
Fawcett Center
2400 Olentangy
River Road
desk # 614-421-2400

US AIR #233 (on May 14)
lv. Columbus 10:45a - ar. Pittsburgh 11:21a

US AIR #16
lv. Pittsburgh 1:15p - ar. Boston 2:37p

* MIT CLUB of Central Ohio luncheon (12:15p) at the
(Larry Milan) maybe attending) Jai Lai Restaurant
1421 Olentangy River Road
Columbus, Ohio

Jonathan Green at OSU 614-422-1766 or 422-1722
" " " Home 614-965-4938

June 4 1981 Ground breaking for new Bldg between 68 - 88 : to be called Bldg 49 Educational Center. Meeting today in 10-250 at 930 - then at ~~site~~ site.

I went to Roosevelt Anchorage (Roads) place in Boston Harbor at 6 pm to look for the aircraft Bomb! see dirt. Scott Grant.

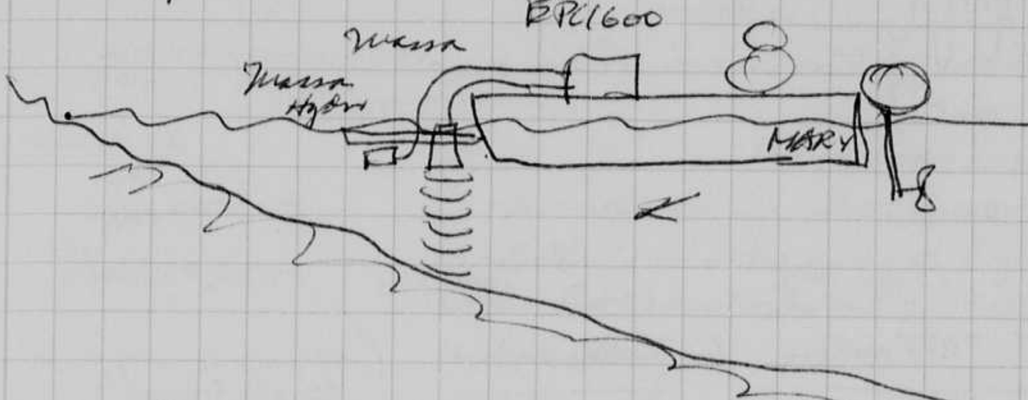
June 13, 1981

Seminar of High Speed Photography at MIT last week
C.E. Miller in charge. I gave lectures

June 8 Monday	8.30	45 min	Xenon lamps.
June 9 Tues	10	30 min.	Multiflash
June 10 Wed	11	30 min.	Bird, Bullet, Bug photography.

Ellen Dixon and Eric Edgerton were helpers
Eric ran the projectors. We had 21 paying customers.

Today I tested my new EPC recorder with the "Ram" front sub bottom penetrator. See [illegible]



Note: the [illegible] right up to the shore without damaging the propeller on the bottom.

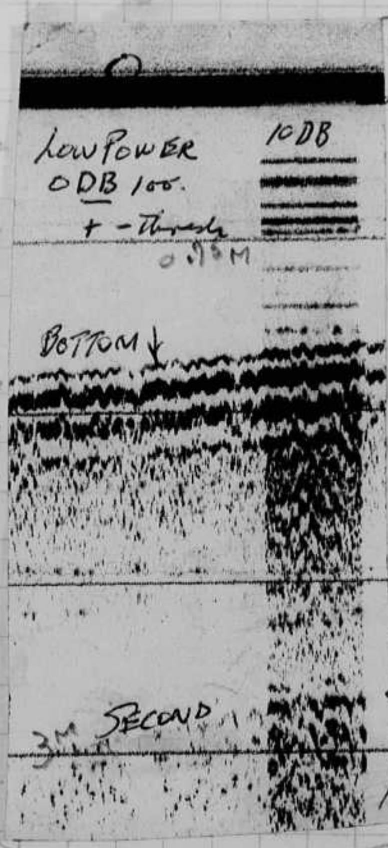
I used a .01 sec scale

$2D = vT \quad D = \frac{v}{2}T \quad v = 1500$ meters/sec

$D = 750 \times T$ = 7.5 meters (for full scal

~~or 0.75 meters per division~~

Should be .01 sec!



↓X .002 sec
.002 sec = 2.25 cm
1.5 M

The results look very encouraging! a multitrack - see examples. I must get a shorter pulse from the Massa transmitter. I think Massa can help me with this.

Those with me this morning were
Scot Flood
Eric Edgerton
Harold and Pat Moffitt
Peter Muir. We went in MARY a Boston Whaler with a 50 hp motor.

There has been a problem with the plastic belt. Earl Quinn suggested a weaker spring on the pullback reel, Seems to be 6k 8# to 2#!

$1.5 cm \times \frac{.002}{2.25}$ = 0.000444 sec

2.25 2.25 ½ cyc.
2
4504.50 cycles (8.5KC)

$1.1 \times \frac{.002}{2.25}$ = .000977 sec

$\frac{1}{.00097}$ = 1022
2044
≈ (2KC)

H.E. Bill mark S. Flow. amp. tests.
June 2, 1981 5+ pm. Sittings.

I.C.	R.	0	10	20	gain.	Total
1458	1000					
1458	100	50	3	3.		450 ?
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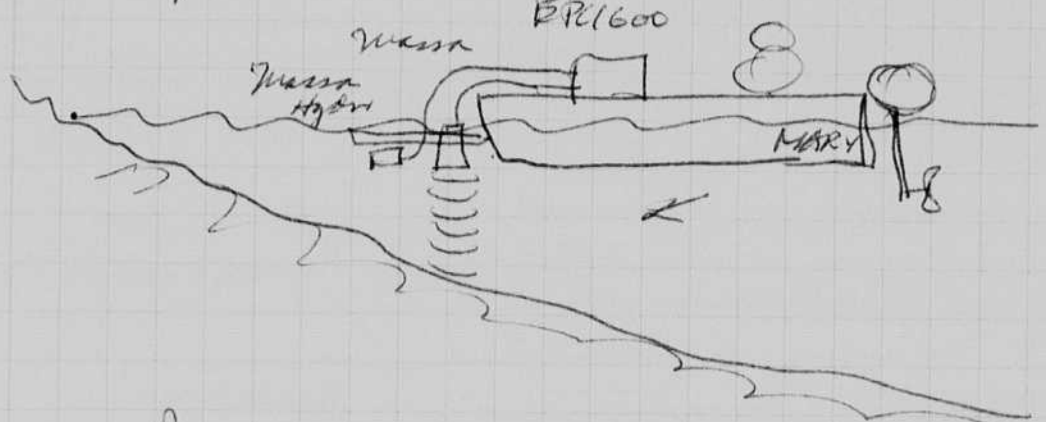


Note: the ship can go right up to the shore without damaging the propellers on the bottom.

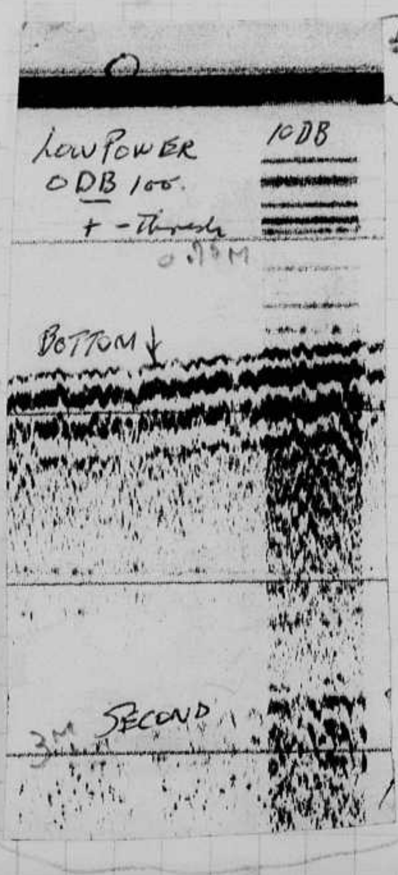
I used a .01 sec scale

$2D = VT \quad D = \frac{V}{2}T \quad V = 1500$ meters/sec

$D = 750 \times T =$ 7.5 meters (for full scale or 0.75 meters per division.

Should be .01 sec!

The results look very encouraging! ... multitrace - see examples. I must get a shorter pulse from the Massa transmitter. I think Massa can help me with this.



.02 sec
.002 sec
2.25 cm
1.5 M

$.15 \text{ cm} \times \frac{.002}{2.25} = 0.000444$ sec
2.25 2.25 1/2 cycle
2
4504.50 cycles
8.5 KC
$1.1 \times \frac{.002}{2.25} = .000977$ sec
$1/.00097 = 1022$
2044
4 KC

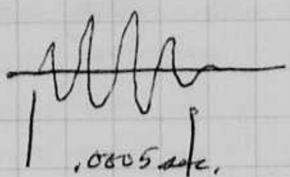
Those with me this morning were
Scot Flood
Eric Edgerton
Harold and Pat Moffitt
Peter Muir. We went in MARY, a Boston Whaler with a 50 hp motor.
There has been a problem with the plastic belt. Earl Quinn suggested a weaker spring on the pullback reel. Seems to be OK 8# to 2#!

14 June 1981 Sunday morning. Harold Edgerton

Esther, Eric Edgerton, Ellen Dixon Love were guests at Lyndon and Jane Keys home in Boston for a chicken dinner followed by home made strawberry ice cream.

The sonar reported of yesterday shows great promise, the output signal is 6000 cycles of about 4 pulses, see page 129. The EPC Recorder was set for 0.01 seconds for full scale of 9".

Therefore the pulse length is measured to be



$1.1\,cm \times \frac{.001\,sec}{2.2\,cm} = .0005\,sec$

$3\frac{1}{2}$ cycles

$= .0001428$

$f = \frac{1}{.0001428} = 7002.8$ cycles.

Resolution $= D = v \times T$

$= 1500 \times .0005$

$= 0.75$ meters. for total signal (seems too big) ok. single travel.

$D = \frac{v}{2} \times T = \frac{1500}{2} \times .01 = 7.50$ scale line in depth double travel.

Objective reduce the signal to one cycle

$T = 1/6000$ sec.

$D = vT = 1500 \times 1/6000\,sec = 0.25$ Meters $= 25.0\,cm = 10"$

Sunday - Ellen, Eric, Jane and Lyndon Key.
Nina Edgerton arrives 3:30 from Detroit.
Flood takes side scan out to the Duck Island area, Tests.

June 23 1981. Birthday Breakfast party for Nina Edgerton age 16
Angel's food cake with candles. Ellen Dixon was here.

The EPC Recorder seems to cut out once in a while. Scot Flood did not get records last week on two days out. It worked fine for me yesterday except the weather was windy. We only used it in the Charles River basin.

A telegram came in from Stephenson at Sanid yesterday. All is go for the search for the lost columns in the ancient harbor.

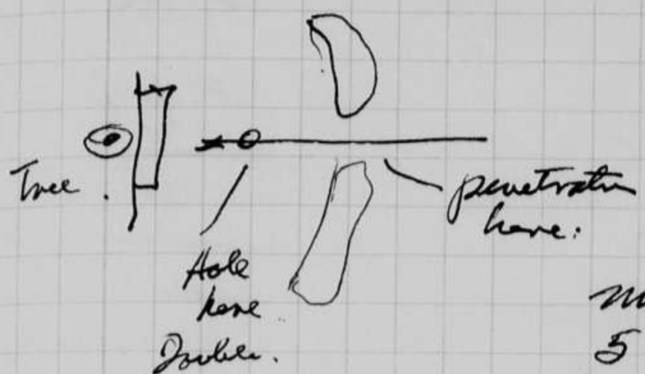
Esther, Sylvia and I are scheduled to leave on TWA July 2 at 2:30 pm for Athens to work with Jameson of Stanford for a week or two. We will be at Haliers in the east end of the Peloponnese. Shallow water penetration study

June 24 1981
Harold Edgerton

Today I tried the EPC recorder again on the .01 second range. It worked fine. The problems of delay and non-operation have all gone since Murphy at EPC disassembled and reorganized the unit.

Records were made in the Charles River this morning with Scott Flood. Some penetration was found near the Dutch Islands ~~places~~ where fill was used to make the islands.

There were a few records of interest in the Charles river. Some will be used in a paper that I am writing about the system.



There was an opening of a museum in Waltham today Jun 5 to 7. I was asked by Jack Naylor who has contributed to the photographic exhibit.

I met Arthur Krim (38) a son of Norman Krim (MIT 30?). who has written 3 books about the history of the Boston area. See p.132.

We discussed the granite pillars that were on the old North Station years ago. One of these has been re-erected at the Falmouth home of Sam Raymond.

Perhaps my penetration sonar can locate further pillars in the mud off of North Station. It is worth a try.

July 1, 1981. Harold Edgerton

Mike Murphy of E.P.C. Inc came in about noon with spare boards and parts to keep me going in Greece this summer July 8-20. Scott Flood went along with the 1600 unit and me. We looked at subbottom features off Dutch Islands and on Sullivans' flats. There were a few misfiring in the 1600. However by turning everything off and then on it began to run again. See the record for the run time before failure.

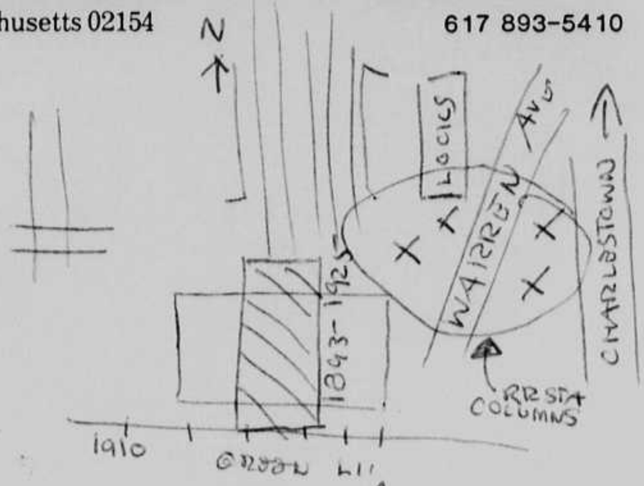
I took a photo of a cork coming out of a champagne bottle. The cork hit two wires to flash a microflash. 2 Exps 10^{-6} at f/12 1 1/2 ft away. Black background

1 photo of foaming into glass 45° back light f.8. <u>White</u> cardboard strips / the lamps
Blue Background.

June 30 1981 Harold Edgerton

CHARLES RIVER HISTORIC INDUSTRIES, INC.

190 Moody Street, Waltham, Massachusetts 02154 617 893-5410



Arthur Krim
617-547-9323
36 Highland Ave
Camb 02139

Thurman F. Naylor *President* Jack.

William H. Nichols *Treasurer*

Hon. William E. Hays *Secretary*

Michael B. Folsom *Executive Secretary*

Trustees:

Dr. Gregory Adamian
Herbert W. Ahrens
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Peter C. Hardy, Esq.
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Walter I. Keyes, AIA
Philip A. Lashway
Thomas W. Leavitt
Thomas J. Murphy
Joseph G. Riley, MD
Joan Sheridan
David F. Squire
Ronald G. Vokey
William F. Wiggin

We are pleased to
invite you to a preview of the new
Charles River Museum of Industry

Monday, June 29, 1981

5 to 7 p.m. Jack Naylor

Wigg.

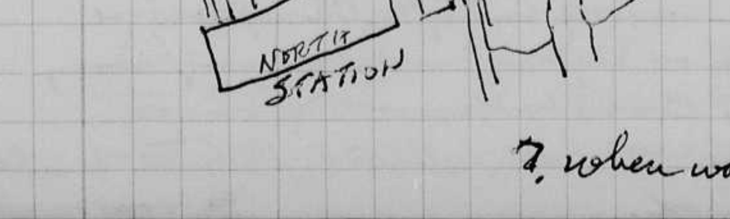
Arthur
KRIM
617
547-9323
36 Highland Ave
Camb. 02139

Son of Norman
Krim.

Map of
North
Station
area where
columns
were found,
and maybe
where others
exist.

Andrea Doria Wreck 40°30'N 69°54'W. from my note books.

1981 (four are shown on 258 chart 1963)



1. Make a de scan of old lock to Hoosac pier emphasizing the south side.

2. Reconstruction along shore to look for columns

3. when was Building destroyed year?

July 4, 1981 Harold Edgerton.

The expedition to Halcis Greece for Michael Jameson of Stanford Univ is off due to a request from the Underwater Arch. group in Athens. A phone call came there yesterday to Esther. First, I decided to go anyway. Then Esther said no and I agreed. We will go to Venice on July 10 Friday and skip the Greek part.

I will be with Antonio ~~Stefanon~~ who has a side scan Edo and a miniboomer. Our goal will be to find a third granite column that ~~fell~~ into the harbor according to rumors.

A photo of a cork blowing out of a champagne bottle was made several days ago with Scott Flood. I used a microflash at 1 1/2 feet with Vericolor negative color film. The exposure at f 11 was weak. There was no gas coming out of the bottle. The cork was up in the air to fit the flash contents.

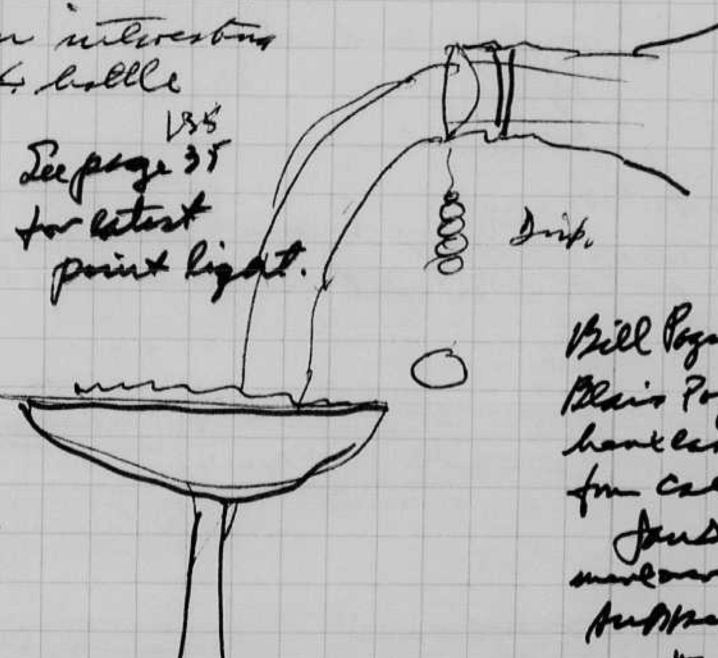
Today I made two silhouette photos. One was tripped by the foam which hit the wires before the cork. The other shadow photo was made of ~~bugs~~ liquid that went around the cork and triggered the flash. There was an interesting drip just below the ~~faucet~~ bottle

The drips were drawn away from the film. Diffraction effects could be seen.

I used a ~~[illegible]~~ U.M. Champagne by Taylor, Co 12% alcohol by volume.

1302 film 8x10 2 min in Dektol 1:1.

See page ~~35~~ 138 for latest point light.



Bill Pogue and Blair Pogue were here last night from Calif. Jane Tyler made one for [illegible].

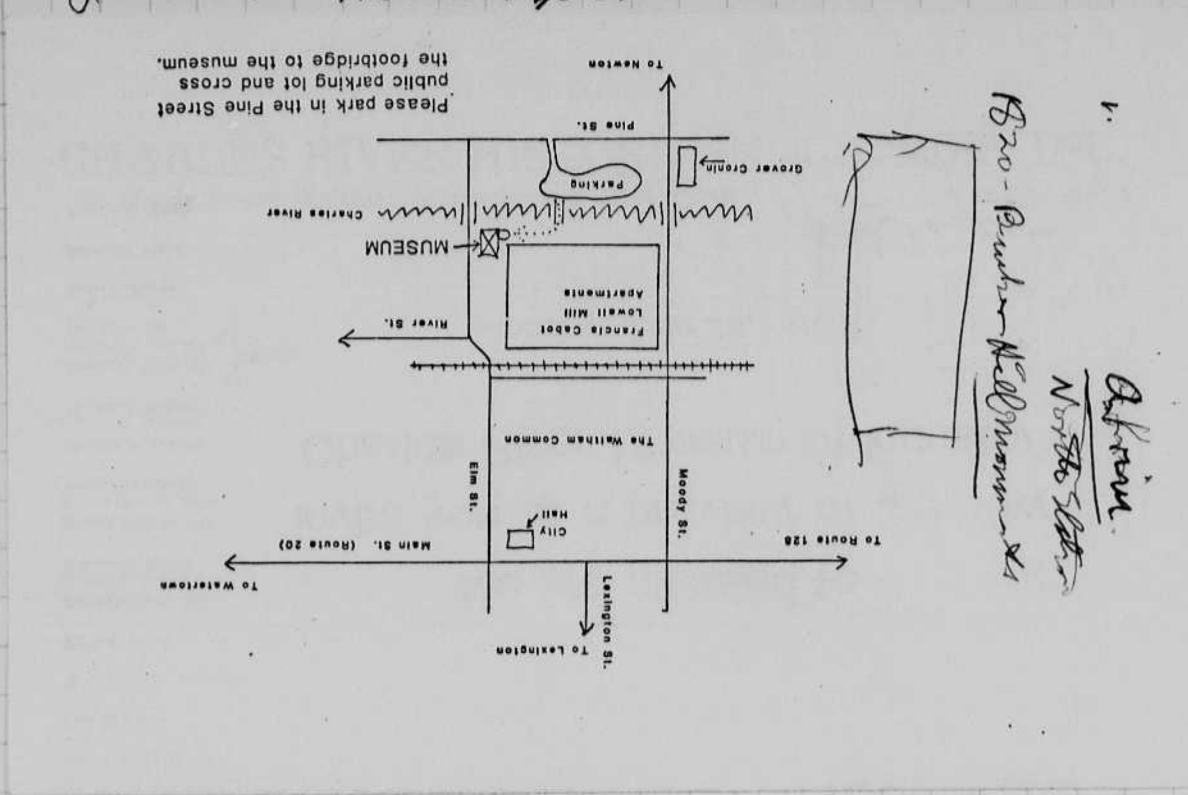
July 9, 1981 H.E.

The sonar is all packed up in 4 bags including the Honda generator. The EPC 1600 is packed in cardboard. The transducer, buoys, etc are in a telescope case. Total weight.

	#
Transducer	70
Sig Box	40
Honda	40+
EPC	60

Sylvia Edgerton will arrive in Boston tomorrow at 3:20 pm. Esther & I will meet her. She goes to Venice with us. July 11 81

 June 30 1981 Harold Edgerton

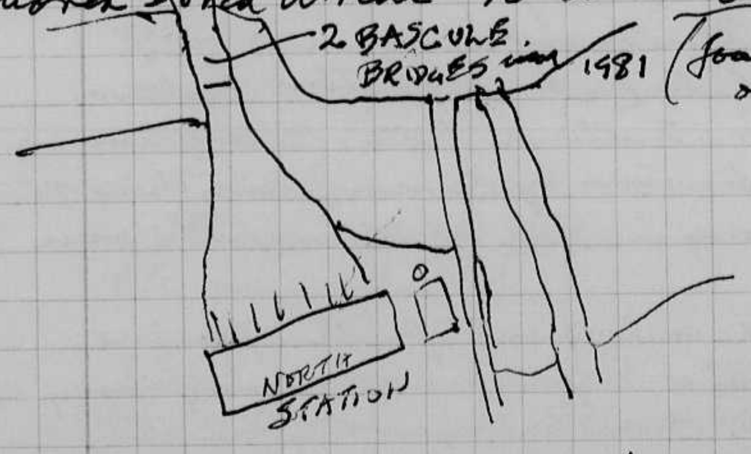


Arthur
KRIM
617
547-9323
36 Highland Ave
Camb. 02139

Son of Norman Krim.

Maps of North Station area where columns were found, and maybe where others exist.

Andrea Doria Wreck 40°30'N 69°54'W. from my note books.



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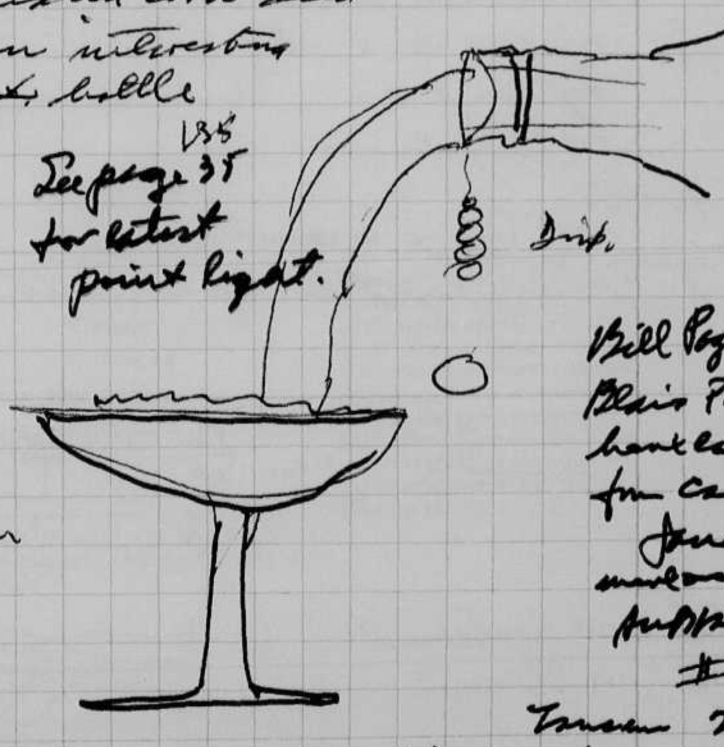


The drips were drawn away from the film. Diffraction effects could be seen.

I used a ~~crossed~~ U.M. Champagne by Taylor, Co 12% alcohol by volume.

1302 film 8x10 2 min in Dektol 1:1.

Bill Pogue and Blair Pogue were here last night from Calif. Janet Taylor was here for supper.

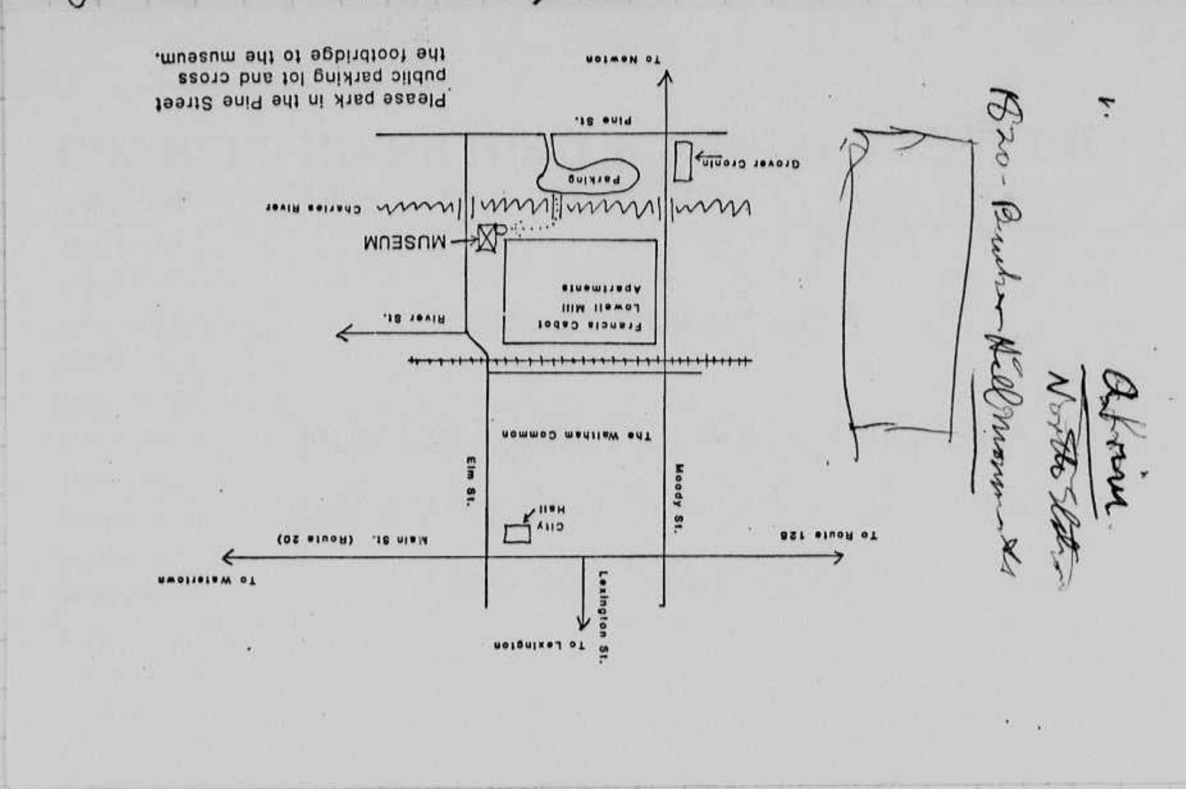
July 9, 1981 HE.

The sonar is all packed up in 4 bags including the Honda generator. The EPC 1600 is packed in cardboard. The transducer, buoys, etc are in a telescope case. Total weight.

	#
Transducer	70
Sg Box	40
Honda	40+
EPC	60

Sylvia Edgerton will arrive in Boston tomorrow at 3:20 pm. Esther & I will meet her. She goes to Venice with us. July 17 81

June 30 1981 Harold Edgerton



Arthur
KRIM
617
547-9323
36 Highland Ave
Camb. 02139

Son of Norman Krim.

Maps of North Station area where columns were found, and maybe where others exist.

Andrea Doria Wreck 40°30'N 69°54'W. from my note books.

(four are shown on 258 chart 1963)

1. Make a diagram of old lock to Hoosac pier emphasizing the south side.

2. Reconstruction along shore to look for columns

3. when was Building destroyed year?

July 4, 1981 Harold Edgerton.

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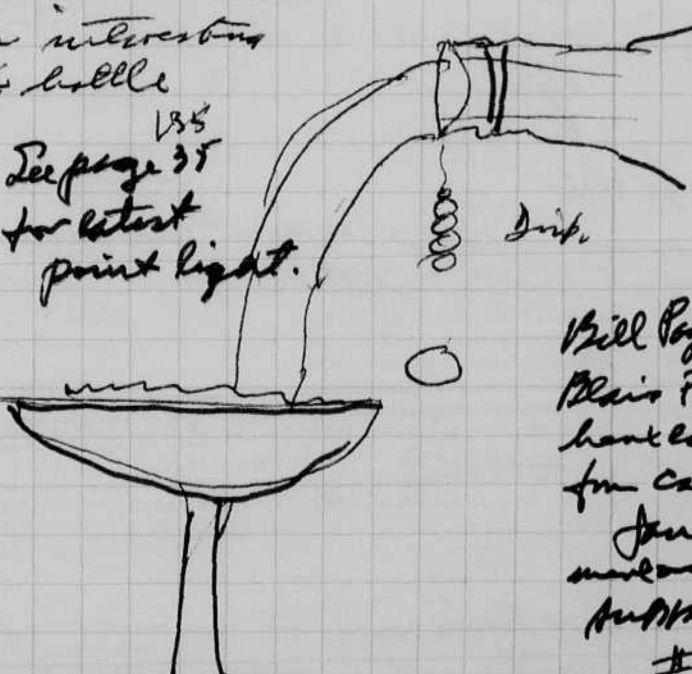
See page 35 135 for latest point light.



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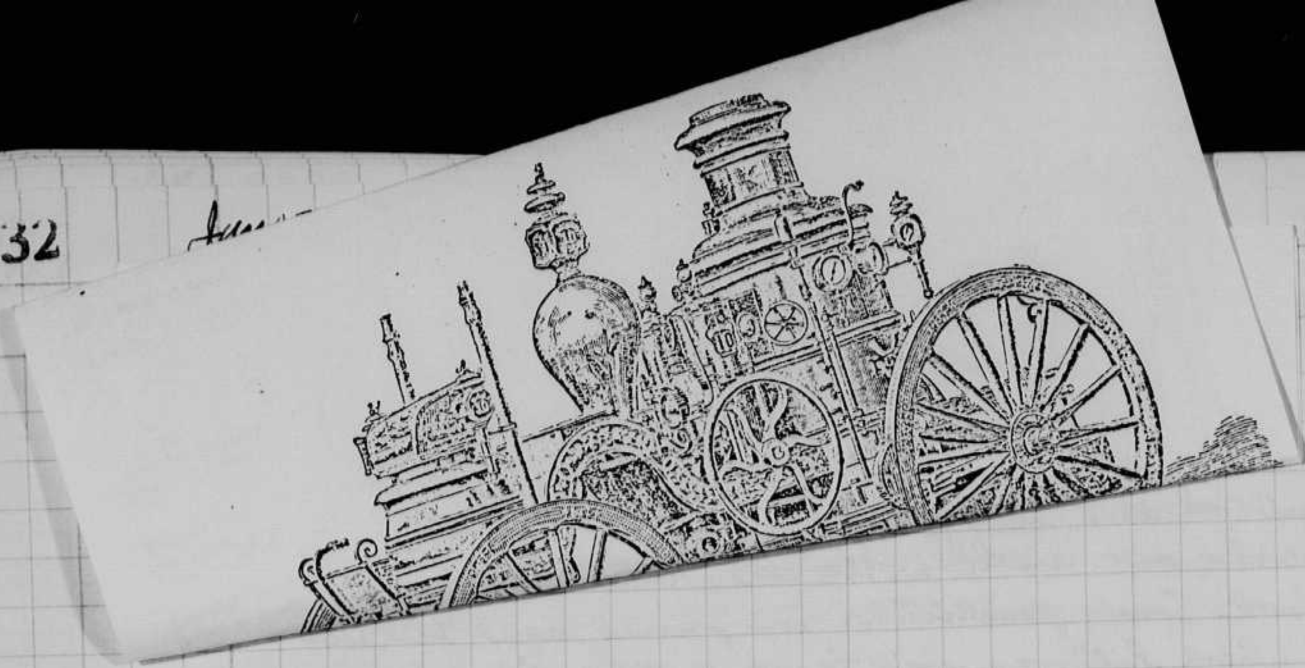
Jun...



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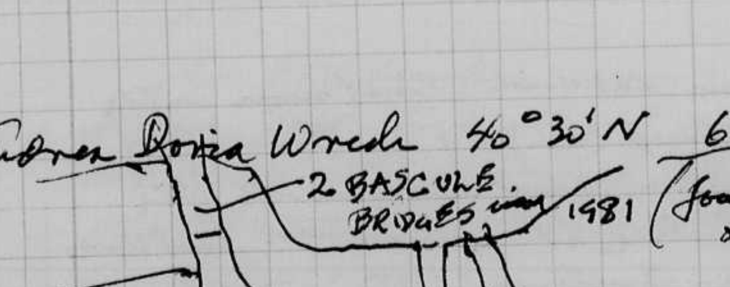

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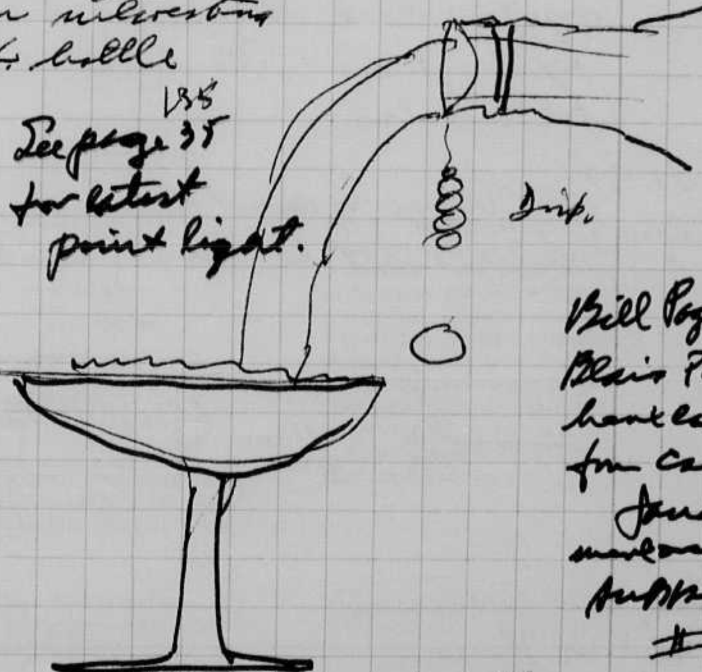

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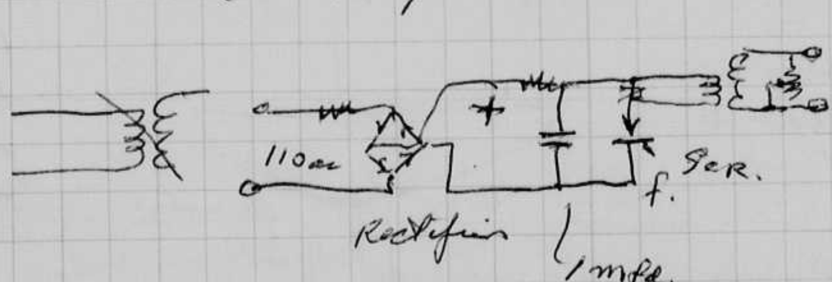
Aug 7, 1981
H. Edgerton

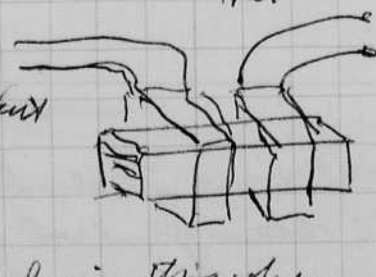
There is need for an electrical stimulator which could be easy to make.



Sensitivity control.

Parallel Resistor on secondary

This was designed while in Venice last month.



Laminations no electrical connections.

I was inspired to design this when Stefanno was shocked by the cable on my penetrator while in Venice.

Spark point light source

Harold E. Edgerton and Vernon E. MacRoberts

Massachusetts Institute of Technology, Strobe Lab, Cambridge, Massachusetts 02139

(Received 24 October 1980; accepted for publication 18 December 1980)

A mechanically-improved spark gap, in an open groove along a glass or quartz rod, is described in this paper. The output is about 0.5 cps with a flash duration of less than a microsecond. The effective source size is limited by a 1.6-mm diam. hole in an aperture plate. Ease of assembly and replacement of faulty components is the important improvement over earlier spark gaps. Mach[a] apparently was the first to study bullets and shock waves in air with illumination from an open spark gap. A bibliography of the history of spark discharges can be found in books by Edgerton[b] and Frungel.[c]

PACS numbers: 42.72. + h, 52.80.Mg

THE GROOVE CONSTRAINED POINT SOURCE

(1) *Old Models:* An epoxy-cemented air-spark gap, in a groove,[1] has been perfected as a point source of short duration flash illumination (see Fig. 5, page 240[1]). The arc occurs in a grooved Pyrex plate which prevents instability of the arc. A small aperture in an opaque plate limits the light output to a small area opposite the axis

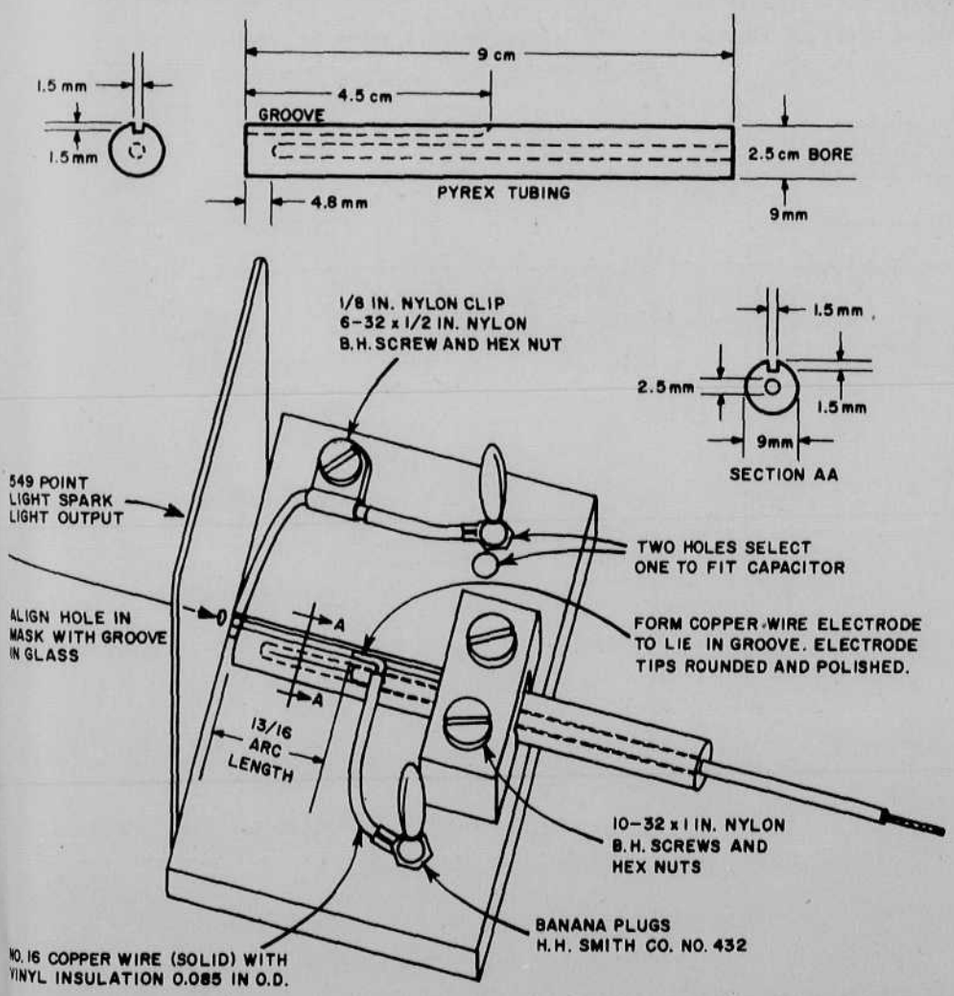


FIG. 1. Mechanical details of a point-light spark-gap source which is assembled with nylon screws so the starter rod can be changed easily. The electrodes consist of #16 solid copper wire, with vinyl insulation. Note, one electrode fits into the groove, the other is flush with the groove slot at the end of the rod, as shown in Fig. 2. Either quartz or Pyrex can be used for the starter rod.

 0034-6748/81/040624-02$00.60 © 1981 American Institute of Physics

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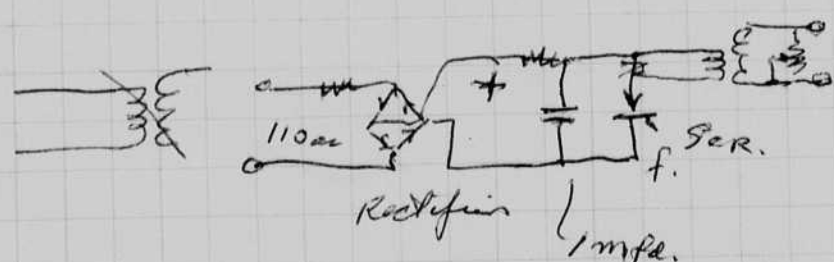

Intensity control.

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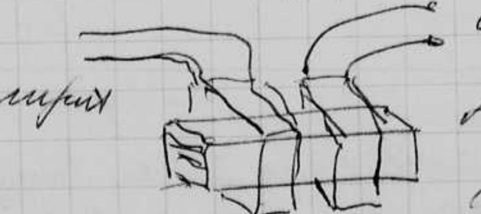

Commutator

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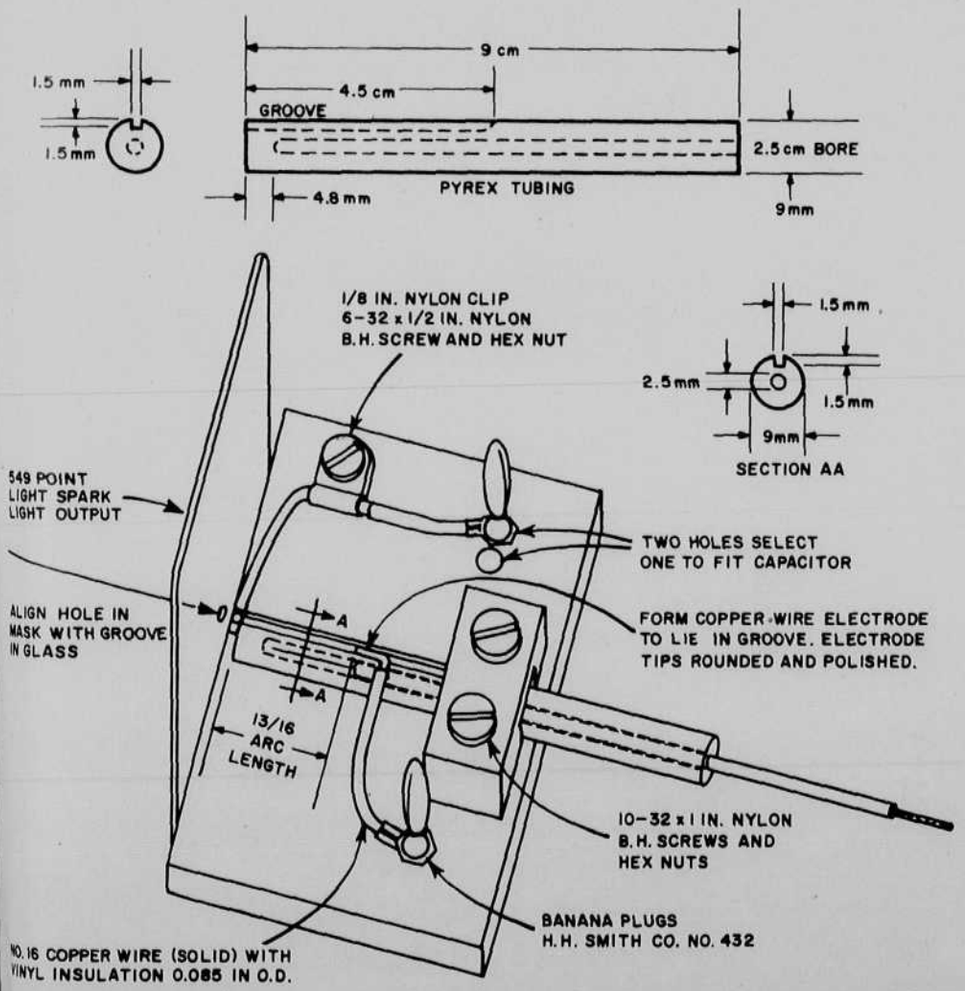

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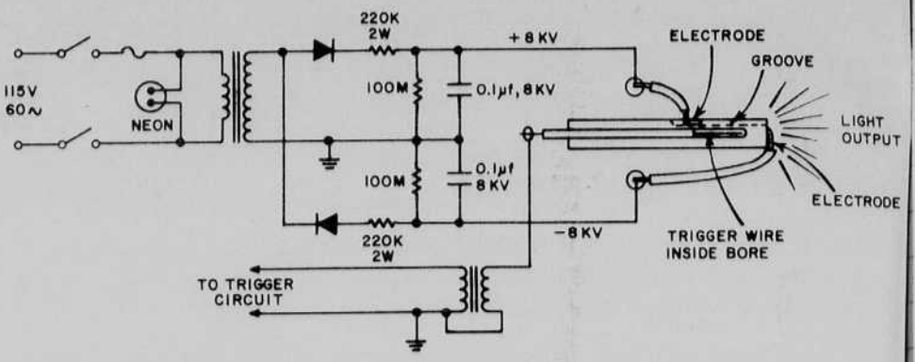

FIG. 2. Circuit of the arc-discharge path of the EG&G type 549 microflash unit, showing the placement of the wire electrodes.

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(2) *Improved Model:* The new air gap (Fig. 1) which is an improvement over epoxy assembly is assembled with insulating nylon screws. The new design permits easy replacement of a damaged arc-starter rod. The construction is designed to have long electrical leakage paths between the electrodes and the high voltage trigger lead. Figure 2 shows the circuit of the arc-in-a-groove spark lamp.

Two capacitors of 0.1-mfd each charged to 8000 V are connected in series to produce a combination of 0.05 mfd at 16 000 V connected across the spark gap. The discharge produces a peak output of 0.7×10^6 horizontal candela, with a flash duration of 0.7 μs. The spark gap assembly fits the EG&G Microflash unit, type 549. The normal gap, for reflected light use, has also been modified with a groove to stabilize the arc position.

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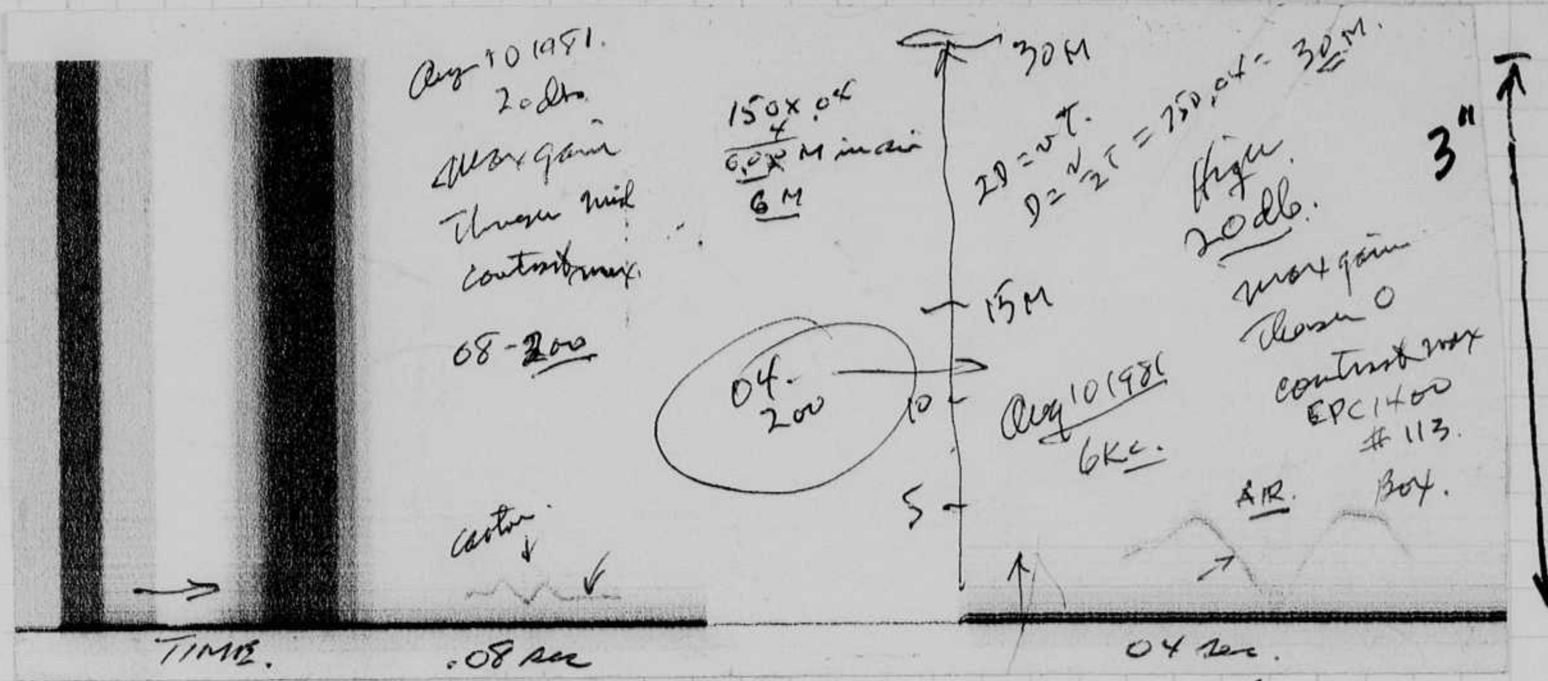
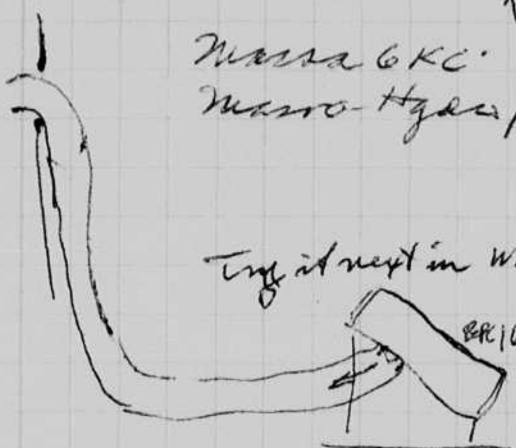
EPC ~~1400~~ #113. M.I.T. 4-405





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Try it next in water.

Show scale with delay generator.
Develope with a slide scan
Pilot tube go away from bearing.
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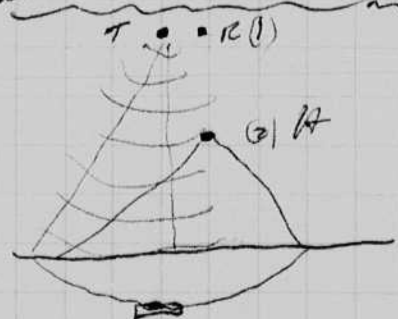
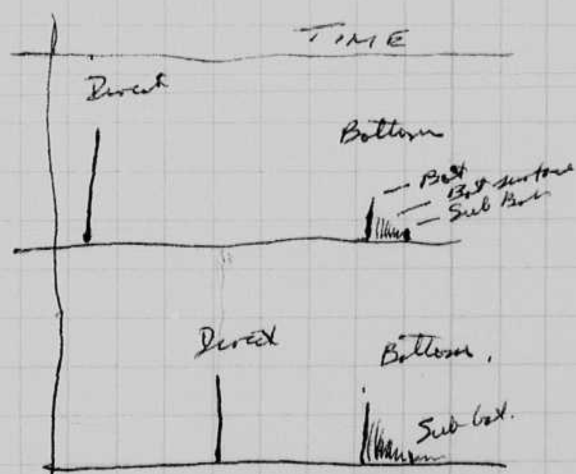
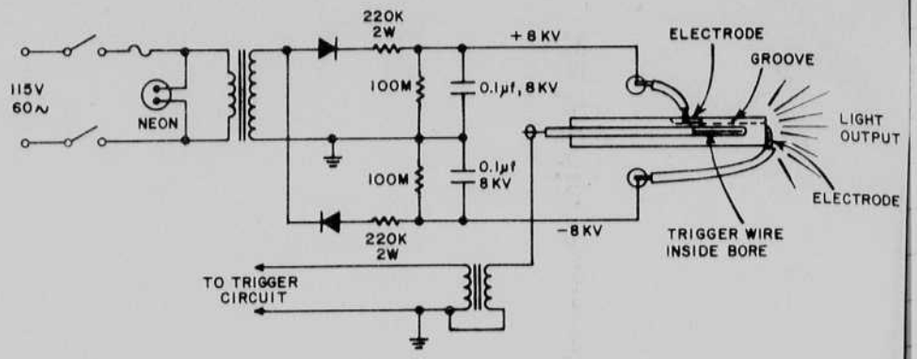




Theory: Put in delay into signals from the several hydrophones so subbottom signal is emphasized. The gain needs to be declined before the signals are added. There will be a tendency for the side echoes to cancel and the subbottom signals to add as the delays are adjusted for several sweeps.



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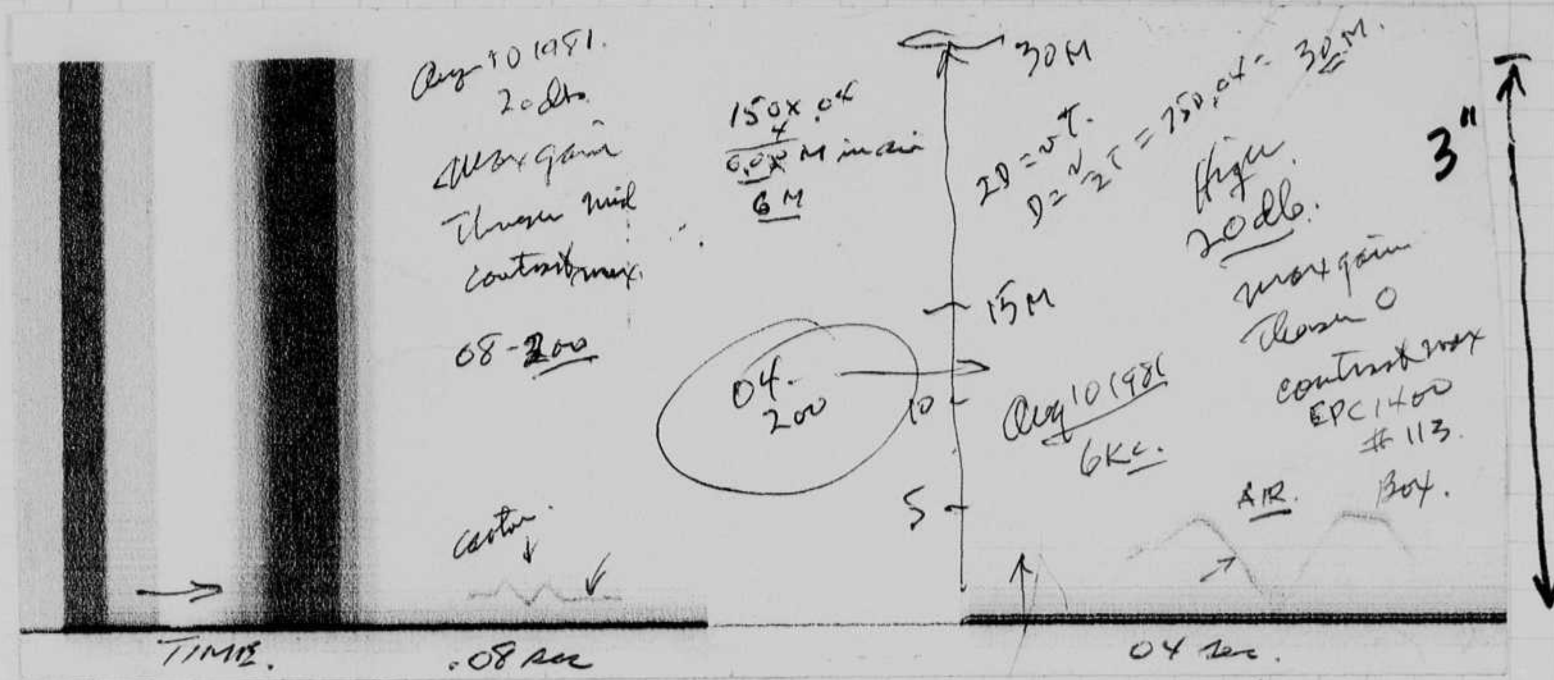

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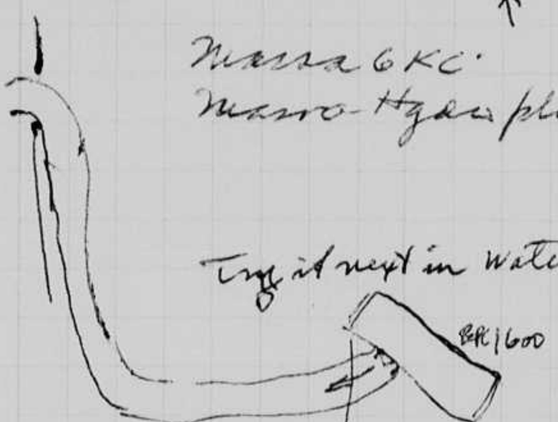
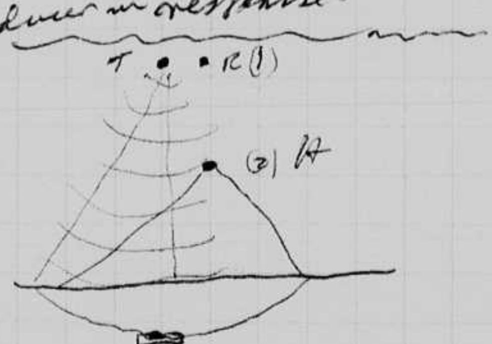
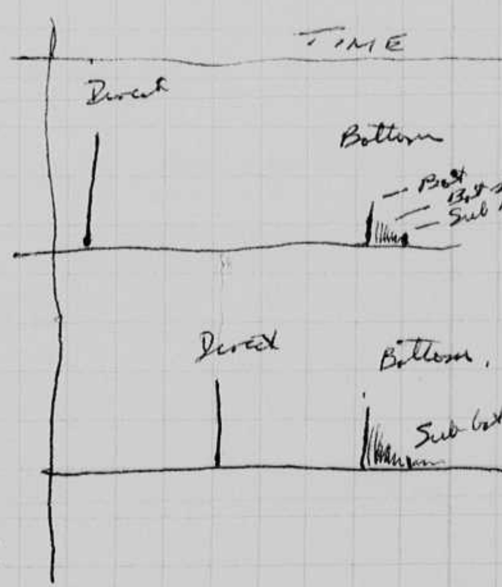


Show scale with delay generator.
Develope with a side scan
Pitch to be go away from bearing.
Narrow beam transmitter.

Angle reduces in response.





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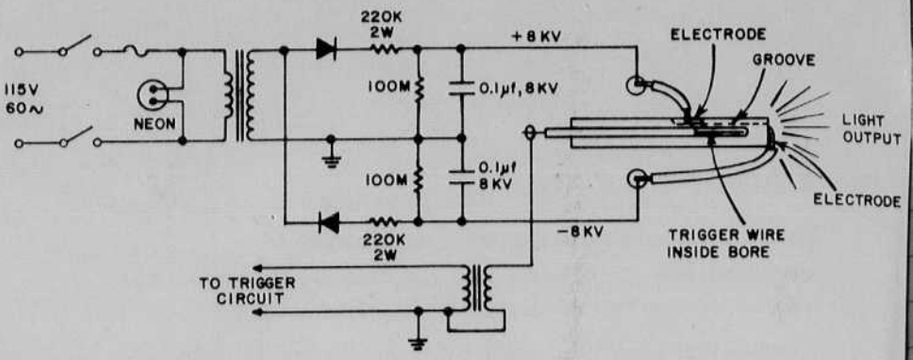

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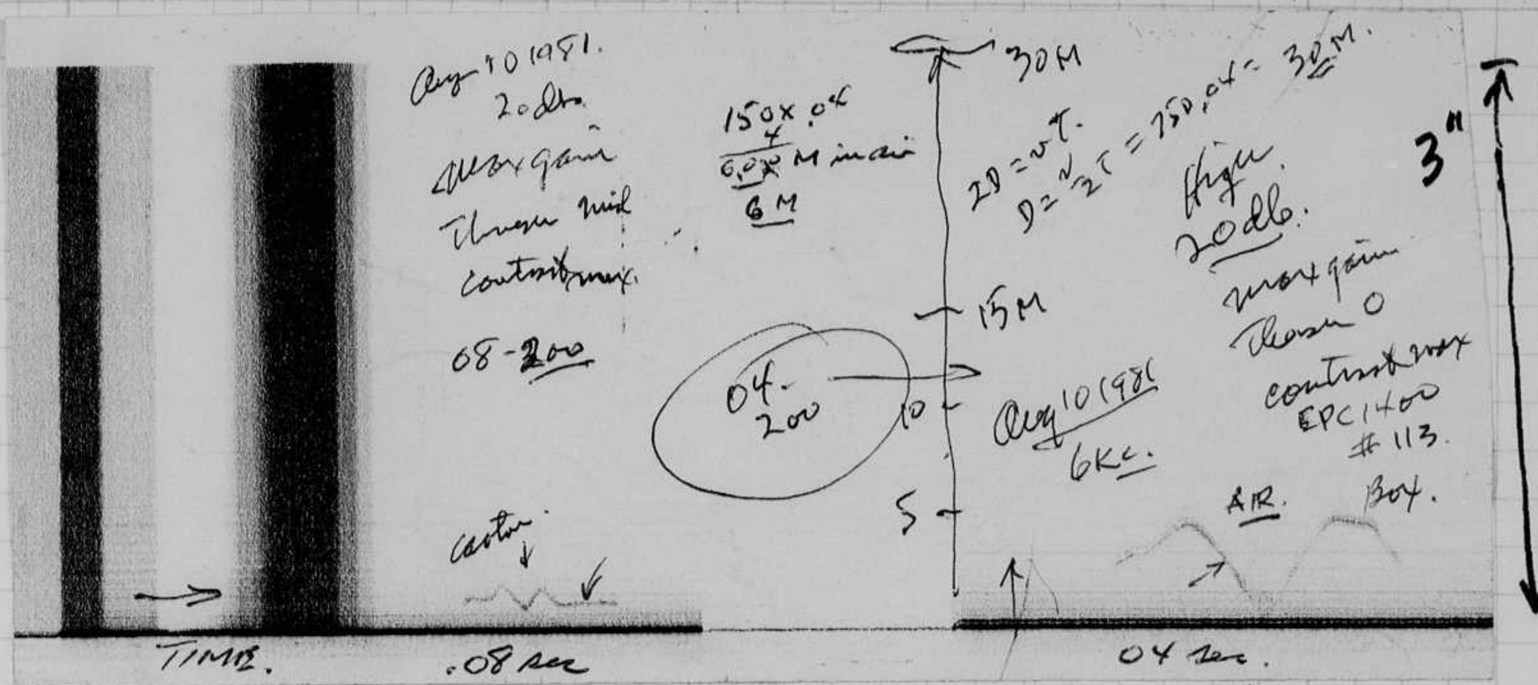

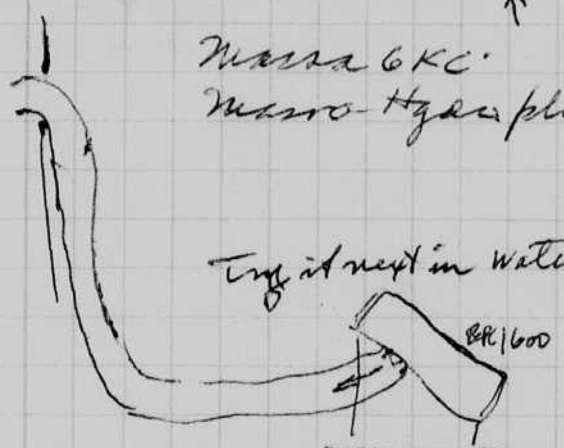

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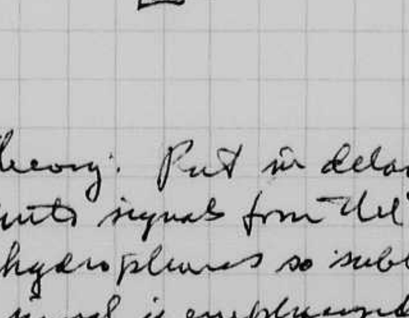

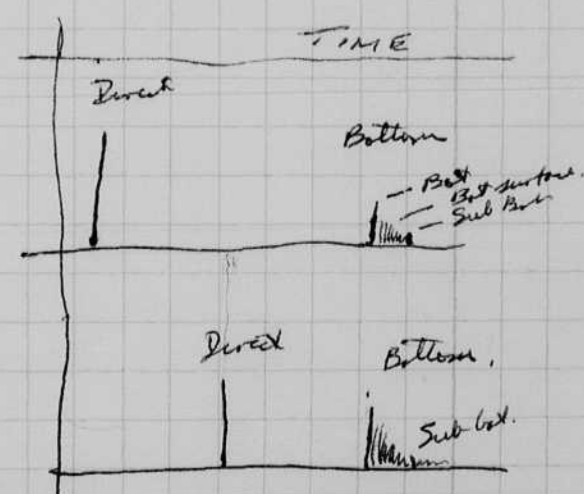

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FROM:

Room 4-405 DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE, Strobe Lab

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE, MASSACHUSETTS 02139

Note: The Greek portion of this shipment cancelled.

TO: Dr. Harold Edgerton/Dr. Michael Jameson
Athens Airport (HOLD FOR PICK UP)
Athens, Greece

SUBJECT: The following professional equipment will be used for a survey in Halieis (Porto Cheli), Greece, as requested by Dr. Michael Jameson. It will also be used in Venice, Italy. on a research project for Dr. Antonio Stefanon, Istituto di Biologia del Mare of the Italian national Research Council.

DESCRIPTION OF EQUIPMENT	DIMENSIONS	POUNDS
1. White metal box - Honda generator	13"x11"x15" = 39	62
1. Black metal box - EPC 1600 sonar recorder	20"x25"x 8" = 53	60
1. Black suitcase - transducer, buoys and rolled paper	29"x17"x12" = 58	51
1. Suitcase - supplies, can, rolled paper and miscellaneous items	$13\frac{1}{2}$"x$13\frac{1}{2}$"x16 = 43	25
		198 Approx.

NO COMMERCIAL VALUE: Depreciated Value is less than $500.00

The above scientific laboratory equipment is from the Massachusetts Institute of Technology, Room 4-405, Strobe Lab, Cambridge, Massachusetts, USA and will be returned to the same address at the conclusion of the surveys.

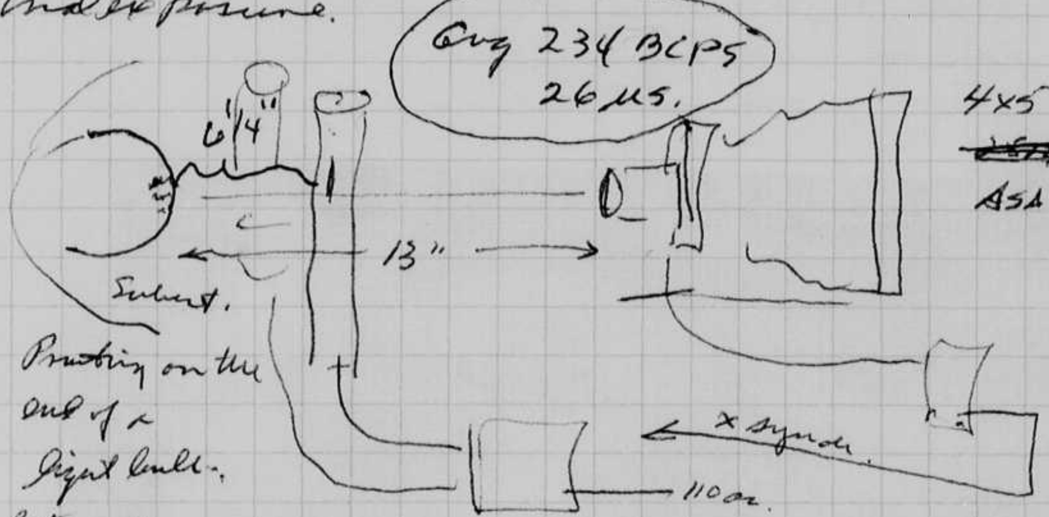
(GENERAL LICENSE NO. D5-4-9 has been granted by the U. S. Department of Commerce, Washington, D.C. for the export and import of this scientific equipment.)

Aug 15 1981

Yesterday - Janice Dixon Kay's 27 birthday.
Esther and I took her to the Mus of Sci for lunch.

The EPC 1600 had a motor on the belt disk partly separated. This caused the belt to be out of the groove. Some noise was caused by this. Mike Mar plug of EPS, found the trouble. We fixed the motor ~~start~~.
The Honda seems to be out of running (1100 60W) due to the turn off valve. a second Honda operates the EPC 1600 and purger but does not give enough power to drive the Edge Side scan. (according to Scott Flood). only the 125 meter scale. as I recall this range requires more power than others. why, I do not know.

I took a photo with the 2 light unit for trial exposure.



4x5 ~~[illegible]~~ film. (2475)
ASA.

Exposure on ~~[illegible]~~ white Bulb. ok.

Probing on the end of a light bulb.
White diffuse subject.

Toy 0.28
Bulb 2.--
Reflector 3.08.

10 min DK 50
Warm?

Strong light for focus. Try a lamp without a diffuser so the filament can be seen.

Try ASA 100 Daylight
C = 25

Both lamps together
468 BCps.

$DA = \sqrt{\frac{468}{4} \cdot \frac{100}{25}}$

$\sqrt{1872} \approx$ (42)

42
42
84
168
1764

f22 × D = 42

$D = \frac{42}{22} = $ 2 feet?

~~$(f/22)^2$~~

1:1 requires 4× light. $DA = \sqrt{\ } \quad \frac{1}{1+m} \times \frac{1}{2} \quad \frac{42}{2} = 21$
m = 1

D = [1 ft lamps]

FROM:

Room 4-405 DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE, Strobe Lab

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS 02139

Note: The speech part of this trip was cancelled.

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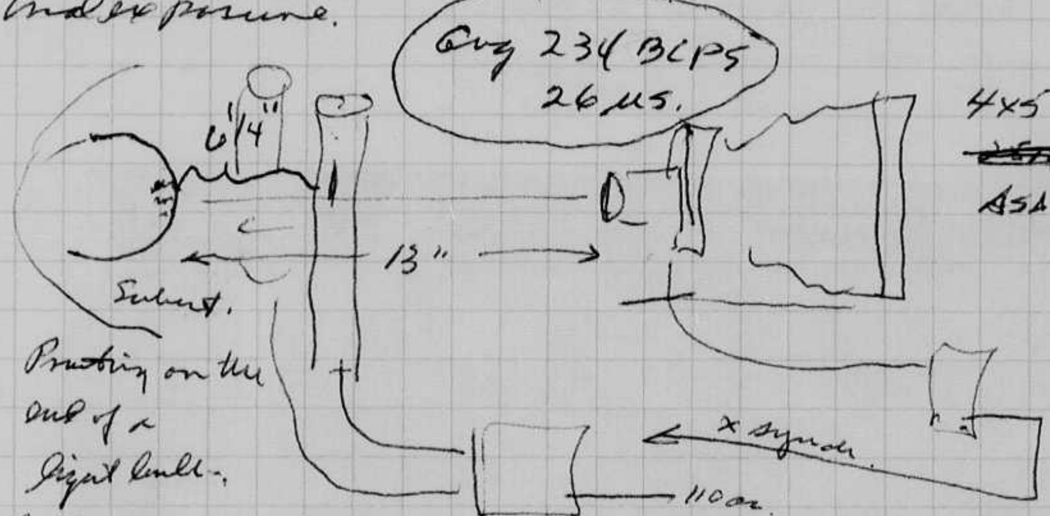

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White diffuse subject.

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Bulb 2,--
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$\sqrt{1872} \approx$ (42)

42
42
84
168
1764

$f22 \times D = 42$

$D = \frac{42}{22} = 2$ feet?

~~$(1+m)^2$~~

1:1 requires 4 x light. $DA = \sqrt{\ }$ $\frac{1}{1+m} \times \frac{1}{2}$ $\cdot \frac{42}{2} = 21$
m = 1

D = 1 ft lamps

Notebook # 33

Filming and Separation Record

____ unmounted photograph(s)

____ negative strip(s)

__1__ unmounted page(s)
(notes, drawings, letters, etc.)

was/were filmed where originally located between page 136 and 137.

Item(s) now housed in accompanying folder.

KODAK Technical Pan Film 2415 (ESTAR-AH Base)

- Black-and-white, panchromatic negative film having extended red sensitivity.
- Extremely fine grain and extremely high resolving power.
- Contrast can be varied with changes in development.
- Dimensionally stable, 0.004-inch (0.10 mm) ESTAR-AH Base with a 0.1 density dye that suppresses halation and light piping.
- Good latent image keeping.
- Useful in photomicrography and other scientific, medical, biological, and industrial applications where high-definition photographic records are required.
- High-quality pictorial results can be obtained with low-contrast development.

Applications

KODAK Technical Pan Film 2415 (ESTAR-AH Base) will be found useful in photomicrographic and photomacrographic situations in which conventional fine-grain films (such as KODAK PANATOMIC-X Film) have insufficient contrast. This film will provide several additional degrees of contrast for use with unstained specimens, phase contrast or other contrast-enhancing illumination, or at extreme magnifications. The film will also be useful in making black-and-white title slides, reduced copy negatives from black-and-white or color originals, and other applications where high resolution, high contrast, and maximum density are required. In photomicrography, a light-colored contrast filter such as KODAK WRATTEN Gelatin Filter No. 11 (yellowish-green) is suggested with most common histological stains in preference to the stronger filters often employed with other films (e.g., KODAK WRATTEN Gelatin Filter No. 58).

In solar flare photography, laser recording, LED recording, and other applications in which exposures are accomplished with monochromatic light, the spectral sensitivity of this film, which extends beyond 660 nm, will be appreciated. This film is also appropriate for lunar and planetary photography.

HANDLING

Load and unload the camera in subdued light.

Rewind the film *completely* into the magazine before unloading.

Darkroom Handling

Total darkness required. A KODAK Safelight Filter No. 3 (dark green) in a suitable lamp with a 15-watt bulb can be used for a few seconds only at 4 feet, after development is half completed.

EXPOSURE

Photomicrography

The following exposure index (EI) values are intended as starting points for trial exposures to give satisfactory results with meters or photomicrography equipment having through-the-lens meters of the ANSI type. Bracketing exposures by half-stop intervals is suggested for first tests.

Degree of Contrast Required	Contrast Index	KODAK Developer	Development Time at 68°F (20°C)	Exposure Index (Tungsten) ASA-ISO/ DIN
Maximum	2.9	D-19	4 minutes	100/21°
High	1.7	HC-110, Dilution D	8 minutes	100/21°
Moderate	1.4	HC-110, Dilution F*	8 minutes	50/18°

*HC-110 Developer, Dilution F, is prepared by diluting one part stock solution, mixed according to package instructions, with 19 parts water. Dilution F should be mixed fresh and discarded frequently, rather than replenished.

Copy Applications

It is recommended that a light source be used on either side of the copy material and arranged so that the light strikes the material to be copied at about a 45-degree angle. For originals larger than 11 x 14 inches, four lamps (two on each side) may be needed for added illumination.

For exposure meters marked for ASA speeds or exposure indexes and for the development conditions recommended above:

Tungsten—100 (for incident-light readings and for reflected-light readings from gray card—18-percent reflectance—at the copyboard).

Tungsten— 20 (for reflected-light readings from matte-white card—90-percent reflectance—at the copyboard).

These meter settings are intended as starting points. As an alternative to using an exposure meter to determine exposures, the following examples can be used as starting points to obtain correct expo-

© Eastman Kodak Company, 1979

sure: With two No. 2 photolamps in matte-surfaced reflectors at about 24 inches from the copyboard, give 1/10 second at *f*/22. With two No. 1 photolamps, exposures will be approximately twice that needed with No. 2 photolamps.

Pictorial Photography

Conventional developers used with this film generally produce contrast too high for normal pictorial photography. An experimental developer formulation, POTA, may produce acceptable contrast for some special applications. The suggested meter setting (for meters of the ANSI type) for trial exposures for film processed in this developer in a small tank for 15 minutes at 68°F (20°C) is: 25 (Daylight).

Filter Factors

When a filter is used, determine the normal exposure without the filter. Then multiply the normal exposure by the filter factor given below.

Kodak Wratten Gelatin Filter	Color of Filter	Filter Factor
No. 11	Yellowish-Green	5
No. 12	Deep Yellow	1.25
No. 13	Dark Yellowish-Green	6.4
No. 25	Red	2
No. 47	Blue	25
No. 58	Green	12.5

PROCESSING PROCEDURE

Procedure for processing in small tanks with spiral reels using agitation at 30-second intervals:

1. **Develop** to the desired contrast index as specified in the section on "Exposure."

2. **Rinse** at 65 to 70°F (18.5 to 21°C) in Kodak Stop Bath SB-1a for 15 to 30 seconds.

3. **Fix** at 65 to 70°F (18.5 to 21°C), with frequent agitation.
   Kodak Rapid Fixer —1½ to 3 minutes
   Kodak Fixer —2 to 4 minutes
   Kodak Fixing Bath F-5—2 to 4 minutes

4. **Wash** in clear, running water at 65 to 70°F (18.5 to 21°C) for 5 to 15 minutes.
   To save time and conserve water, use Kodak Hypo Clearing Agent. Rinse the fixed film in running water for 15 seconds. Next bathe the film in Kodak Hypo Clearing Agent for 30 seconds with agitation. Then wash the film for 1 minute in running water at 65 to 70°F (18.5 to 21°C), allowing at least one change of water during this time.

5. **Dry** in a dust-free place.

STORAGE

Store unexposed film at 70°F (21°C) or lower in the original sealed container. Aging effects are lessened by storing the film at lower temperatures. If film has been refrigerated or frozen, allow the package to reach room temperature for 2 to 3 hours before opening.
Store processed film in a cool, dry place.

ADDITIONAL INFORMATION

For technical assistance relating to the exposure or processing of this film for special applications, write to Scientific and Technical Photography, Professional and Finishing Markets Division, Eastman Kodak Company, Rochester, New York 14650.

The Kodak materials described in this publication for use with Kodak Technical Pan Film 2415 (Estar-AH Base) are available from those dealers normally supplying Kodak materials. Equivalent materials may be used if desired.

Notice: This film will be replaced if defective in manufacture, labeling, or packaging, even though caused by our negligence or other fault. Except for such replacement, the sale or any subsequent handling of this film is without other warranty or liability.

EASTMAN KODAK COMPANY, Rochester, N.Y. 14650

KP 75894 10-79 Printed in U.S.A.

Kodak, Estar, Estar-AH, Panatomic-X, D-19, HC-110, and Wratten are trademarks.

A LITTLE HISTORY ABOUT THE GREAT STONE DAM SITE

The Great Stone Dam Site, now part of the Lawrence Hydroelectric Project, initially consisted of the dam and the North Canal. It was built in 1845-48 by a small group of private New England individuals, who formed the Essex Company for the purpose. The dam and the North Canal, paralleling the river on the north side, were intended to supply water to industries which were expected to be attracted to the area. The abundance of water could be and was used for both process and power purposes. The founders' expectations were fulfilled and in 1866 they built the South Canal and its gate house to meet further industrial expansion requirements. The Essex Company was responsible also for the construction of navigation locks, bridges and fish passage facilities in that area of the river basin.

The dam, a phenomenon at that time and ever since called, "The Great Stone Dam" was constructed of huge granite blocks, laid in hydraulic cement, firmly embedded and bolted to the river's rock bed. The dam, today still in excellent condition, is 920 feet in length along its crest, which also serves as the spillway, is 35 feet thick at its base and 13 feet wide at its crest and averages 35 feet in height. Wooden flashboards supported by steel pins along the crest provide an extra 4-5 feet of storage and head above the dam.

As was envisioned by these farsighted men, the abundance of low cost water for process and power purposes made Lawrence into a major industrial city, by 1900 the world's leading textile center, also leading this nation in many other ways until the eventual demise of the textile industry in New England in the second quarter of this century.

To Our Guests:

August 16, 1981, is an occasion for celebration.

Today the Hydroelectric Plant here at the Great Stone Dam is formally dedicated. Located on the Merrimack River, the powerhouse will supply to communities the cleanest energy available.

Over one hundred years ago, this same Great Stone Dam harnessed the river's forces to provide the foundation for Lawrence's world-renowned textile industry. Modern technology has rediscovered a practical application for the ingenuity of another era.

The Lawrence Hydroelectric Project is the most advanced and efficient to be built with American-made equipment in the United States during the last decade. This project is also the largest of its kind in New England in 100 years.

The hydropower plant houses two bulb-type turbine/generator units, which will produce approximately 100,000,000 kilowatt hours of electricity yearly. The Lawrence Hydroelectric Project will meet the year-long needs of 17,000 homes and it will reduce New England's dependence on foreign oil by an estimated 7,000,000 gallons a year.

On behalf of EG&G, Inc. and Essex Company, partners in Lawrence Hydroelectric Associates, I thank you for participating in this historic occasion. We hope you have an enjoyable day.

Sincerely,

Bernard J. O'Keefe
Chairman of the Board and
Chief Executive Officer — EG&G, Inc.

Aug 23 1981

Harold Edgerton.

There were several phone calls about the use of Subbottom sonar for locating two turbine discs that flew off of a Tai jet plane while taking off at Hong Kong. I did not offer much hope. If there is gas in the sediments the chances of penetration are very small. I suggested that some trials might be helpful.

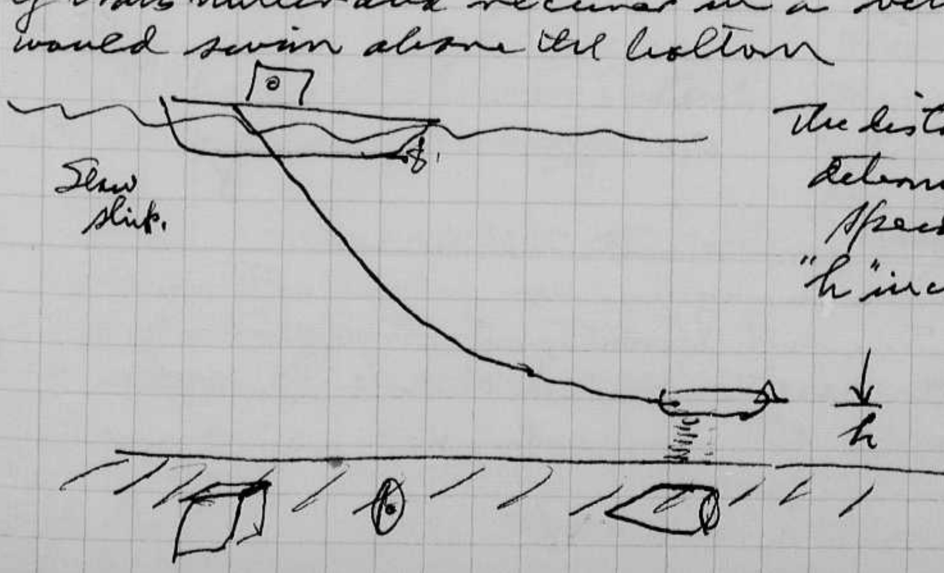
So Rich Hogan (Steadfast co Va) came by and we inspected my 6KC equipment with a EPC 1600 recorder. I was invited to go to Marblehead harbor to make a survey. The mud there is about 3 meters deep to rock (?). Two turbine wheels were obtained and planted some 6 feet down by jets by divers.

Then yesterday, John Moehring (G.E. co Cincinnati) Bob Kutzleb (Steadfast) and others assembled to make tests on the Isaac Fass (Capt Bob Reed) 35' boat. Our sonar experiments were not spectacular. Rich had a 10KC Edo double transducer system which gave results about the same as my 6 KC. Metal detectors Garrett Electronics 2814 National Drive Garland Texas were also tried with some success.

There is a need for a subbottom penetrator that can locate objects buried in the mud. What is the best frequency? What is the best pulse duration? How deep should the transmitter be? etc etc.

I think the frequency should be about 12KC.
The pulse length should be 1/2 cycle 1/24,000 sec.
The assembly should be about 1 or 2 meters above the bottom.

The ship underway could tow an assembly of transmitter and receiver in a vehicle that would swim above the bottom



The distance h is determined by the speed of the ship. "h" increases with speed. The sonar operator sees "h" and tells the Capt. to adjust the throttles accordingly.

 Aug 25 1981 Harold Edgerton.

Discussion with Massa yesterday about sub bottom detection.
Ideas - 1. Lower transmitter to bottom or close and keep it moving.

2. Use several transmitters to get a "side-looking" beam for under the bottom.

I tried my old 12KC 3 element unit on the EPC 1600 - High is too much so I used the "low" setting, this is 1/4 mfd at 700 volts. The ceiling showed up with 20 dbs and even with 10 dbs but was faint on 0 dbs. all at 1000 on gain control.

Actual gain 0 - 3.75 gain
10 20 gain
20 75 gain.

The signal duration on Low and 10 db seems to be about 1 or 2 milliseconds.
Will try this tomorrow at Portsmouth.

UTC A-21

500 ohm

500 50 Ω
200 ohm

I assume the Receiver is connected to the 50 ohm terminal ?
Then the 500 Ω secondary goes to the input to the EPC-1600 ?

On Low - 10 db 1000 the noise at the start is .009 ms.

EPC 1600 Trip out put 5 VOLTS + 0.1 ms.

I left Boston 745 am 915 at Harold Johnson

Retd 3 pm M.I.T at 4:30

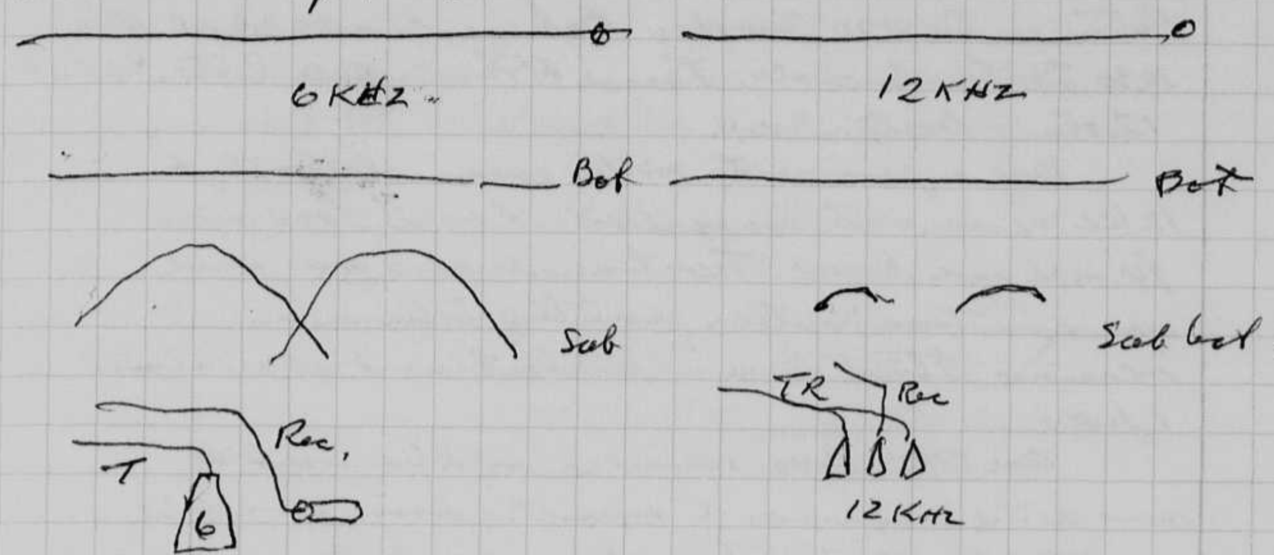
Aug 26 1981 I went to Portsmouth NH to meet David Switzer. Ed Curley and son John was there, also several others from the N.H. University at Plymouth N.H.
We used the 6KHZ Massa and EPC 1600 on a 25' Maka boat that belongs to Tom Bosquet
Quinton Blaine
Warren Pierce & wife

The records did not show much. I left transmitter Switzer.

Aug 29 1981 Harold Edgerton MIT 4-405

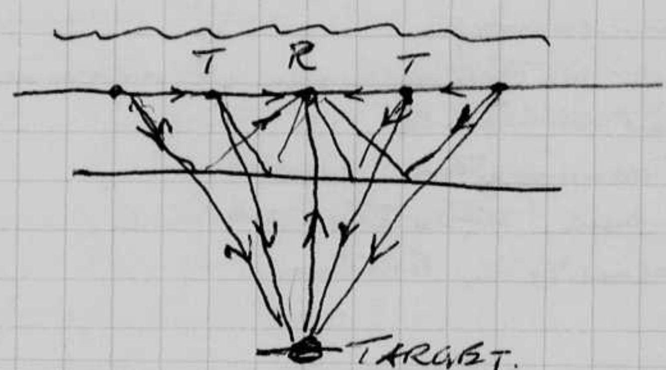
I spent yesterday on the Charles ~~—~~ in MARY with the EPC 1600 and with 6 KHZ and 12 KHZ. (massa 3)

The 12 khz seems to be the best to me except for penetration? I have examples of the tunnels. The 6 KC show large side bands



Why not make a linear array with ~~4~~. 12 KHZ with a receiver at the center

$d = vT = v\frac{1}{f}$



Measure signal arriving at Receiver from 4 senders.

Note phase and time differences,

Add all 4 signals from the target.

Measure signal from the target and see if it can be seen above the noise of other signals and reflections.

Kathy Giangrande N.J. who has been at Peter's Island in Greece cave in about 4. She has also been in England. Knows Morrison and Fleming.

Aug 30 1981 I just converted
5 12 KHZ massa transducers to a single flash. The records in air look good. Now in water.

	T	T	Receiver	T	T
Numbers of 12 KHZ massa trans.	5670	5687	4829	5538	568

 Sept. 4, 1981
Harold E. Edgerton.

Bob Marx has asked me to go to Bimini on Monday Sept. 7. I leave on Eastern 745 at 735 am to Ft Lauderdale 11:44 arrival. Then on Walker Bay 105 1 pm arr BC 1.30a.

Marx & Neal Watson 809.347-2292 Bimini.

Return on Sept 10 Thursday Bahamas Car 202A at 10a 10.30 Ft Lauderdale. Leave Ft Lauderdale Delta 358 at 12.15a - Boston 3:04. (changed schedule)

My experiments with sonar show that 12 kc Massa units are excellent. I used 100 v and 1/4 mfd as a driver. Two transducers were used one as a transmitter and the other as a receiver. I tried them in contact and also about 1 foot±.

An EPC-~~1600~~ 1400 recorder will be used to record the records. A separate driver will be used to operate the transducer and to amplify the output of the receiver.

The same circuits as used in the EPC-1600 will be incorporated. I discussed these with Bill MacRoberts. He will begin the assembly while I am away.

Erik ~~Vaaler~~ came in this afternoon to discuss his thesis on controlled vehicles.

I told Erik that navigation was a very important problem. Also the vehickle vehicle should be placed close to the bottom.

Sept. 10 1981 I returned last night about 8 pm from Ft Lauderdale Florida on Delta.

Neal Watson brought me from Bimini in his private plane after Bob Marx got several radio news productions about the Harrison, Martin.

We had been out in , a 20 meter boat with Bob Marx crew looking for the El Dorado Spanish ship, lost in 1533. The shoal is now called "El Dorado" after the lost ship.

Bob found 3 anchors in the sand. They have wooden stocks that are still intact! Also each had a coil of rope - badly disintegrating!

I used 6 KHz Massa equipment with the EPC 1600 to look for the target with out success

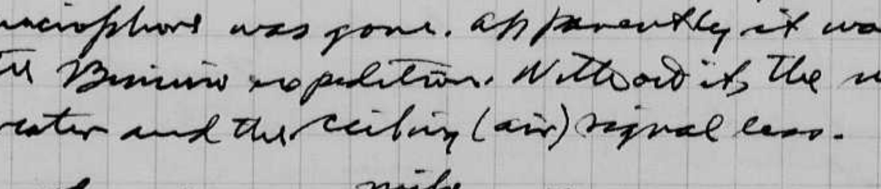
the sonar could see the Handfan at
25 & + meters below the bottom. Beyond 4 meters
there was not enough signal.
I used full power .75 mfd at 700 volts
into the transducer. the amplifier was set at
10 db. and the marking amp at 200 +. otherwise
noise wiped out my record.
I should have moved the transducer
farther forward to reduce the noise from the
diesel engine!
There is still a question that
the hard pan surface with ship debris
would have enough of a signal to distinguish!
On Sept 9 at noon it looked like the
hurricane was due on the 10th, so Bob got me
into Bimini and on real Watson plane to
Ft Lauderdale.

Welch Pogue arrived at 12.20 from
Washington D.C.

Sept. 14, 1981
Mary Ellen Pogue. Jan and Lyndon Key
several friends of Mary Ellens Esther, etc all
went to Plymouth for the Bradford Society
meetings. Breakfast. — meeting annual,
song fest. Visit to Bradford Grave on Burial Hill.
Tea at Phil. Barnes house.
New President Arthur Bradford. sons Jefferson and Joe?
The boys did some singing at the musicale. Dick Pogue
sang two songs with tape accompaniment by his
son David. It was a happy weekend, Welch left
Sunday for Washington. Mary Ellen left Sunday aft by
bus for Plymouth to attend the Mayflower society
meetings.

Pat and Dick Pogue
(Cleveland).

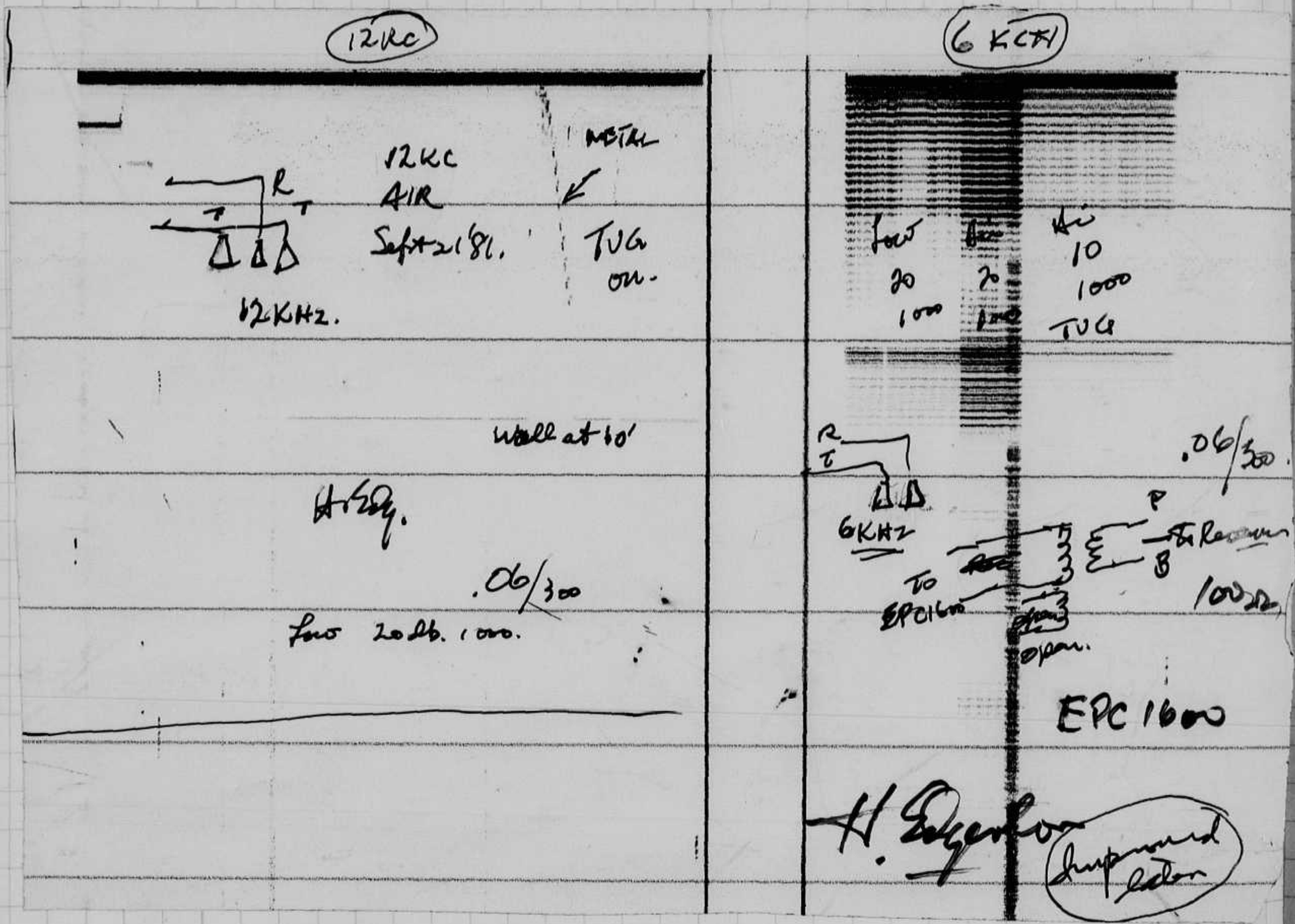
Sept 15 1981. I unpacked the EPC 1600 and the
transducer. The wood support for the
microphone was gone. apparently it was lost on
the Bimini expedition. Without it, the noise was
greater and the ceiling (air) signal less.



Sept. 16 1981
H. Edgerton

Work with Mr. Roberts on EPC 1600 amplifier. It works again after being checked for components and a new Integrated Op amp. ~~93~~ UA 9 3586. Could the old one be ~~bad~~ ??

The charging resistors were cooked when the SCR held over. The board was heated. The resistors should be spaced above the board.



Tests of EPC 1600 with 12KC and 6 KC systems.
Long cable.
A 100 ohm resistor has been put across the pickup transducer to cut down the ringing.

Transformer Special Series for 6KC.
2.
B - B connected to input 100 ohms.
G - E to EPC input.
G - F - open not used.

Sept 24 1981
Harold Edgerton

Dr. Hertz from Lund college Lund Sweden was here yesterday to give a lecture about jet ink printing, Applicon Burlington mass make a printer which demonstrated. 32 Second ave Burlington 01803
617 272 7070 253
Telex 949385

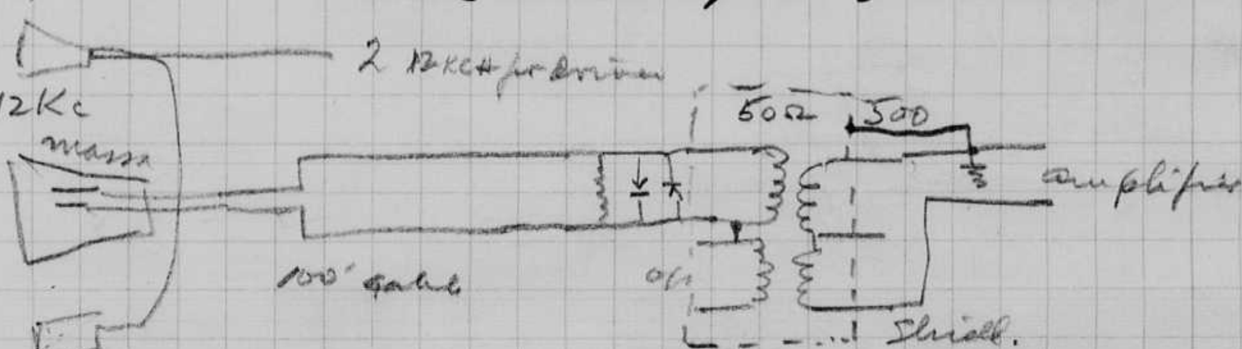
Michael A Andreottola Prin. chemist.
Dieter. Jokonen(?)

Walter J. Cairns V.P. A.D. Little Acorn Park Cambridge mass 02140 617 864.5770 · 921436 Telex.
(Handles inventors) friend of Dr. Hertz. Marblehead.

Hal Feightner Galileo Optics corp. Galileo Park. (Fiber optics?)
Sturbridge mass 01518 617 347 9191. at Hertz Lecture.

113 Sept 26 1981 Sat. The Sky art conference people (Otto Piene)
have been invited to visit my lab at 11:45-12:45 - 1:45?
Exhibits
10 - elevators to 4th floor
4-409. Spark coil and xenon lamps.
12KHz sonar with

"Bee" Kobadomae. Eastman. 3 stops
almost max enlargement
2415 film in 4x5 holder.
5 sec with tungsten. 8 min DK50. ok but dark!



Recorder is dark at 1000 gain with no input.
ok at 300

4-409
Sept. 29 1981.

Rick Evvasko Nat. Sci Bd. 3248. } undercooling of metal alloy.
Mat Impson " " " 3276. } Ni-Sn.

Measure time-temp curve (Blue Radiation!)

Start S-1 Surface photo tube - measure and print.

Sept. 16 1981

H. Edgerton

Worked with Mike Roberts on EPC 1600 amplifier. It works again after being checked for components and a new Integrated op amp. CA 3576. Could the old one be bad ??.

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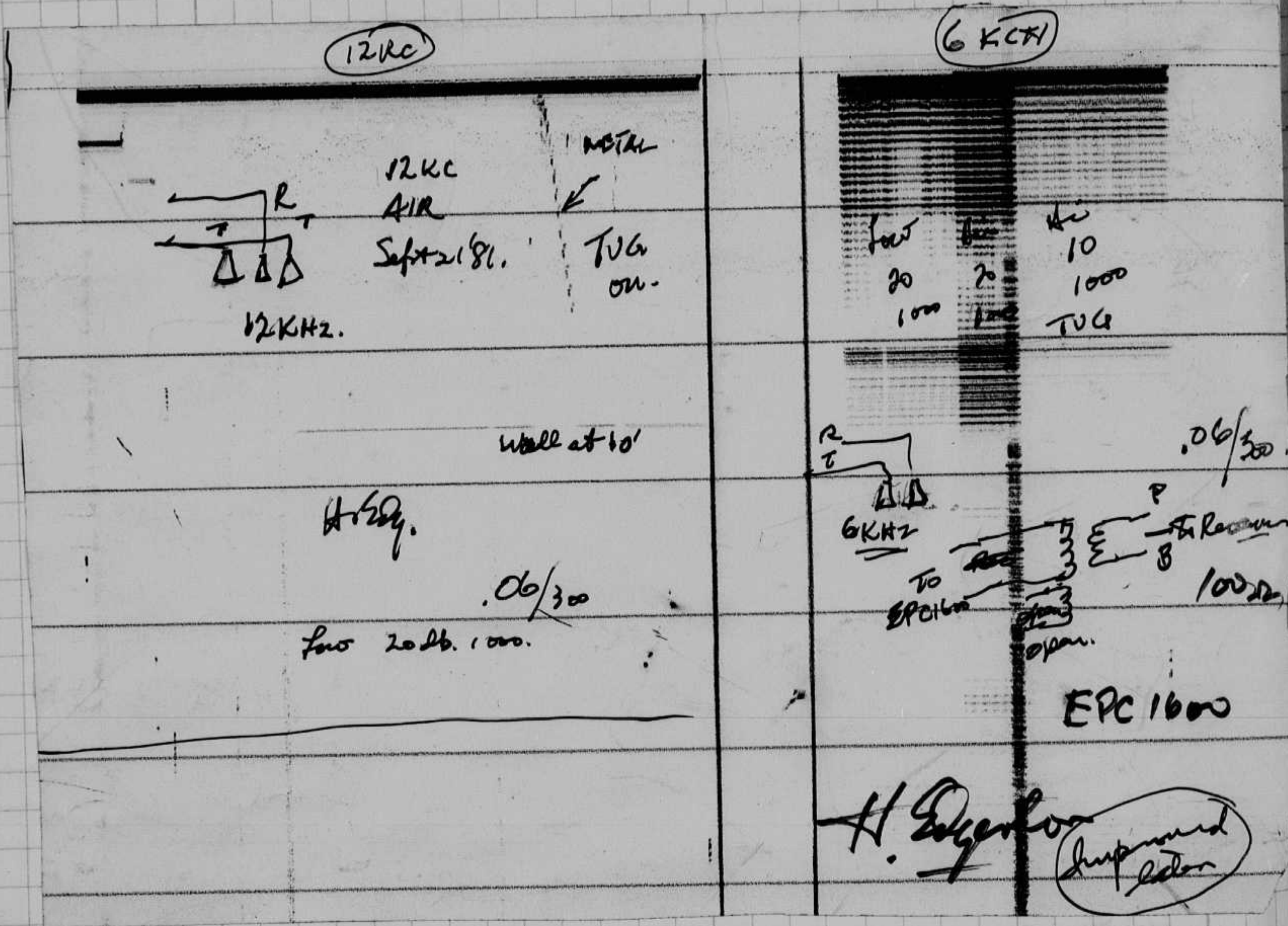

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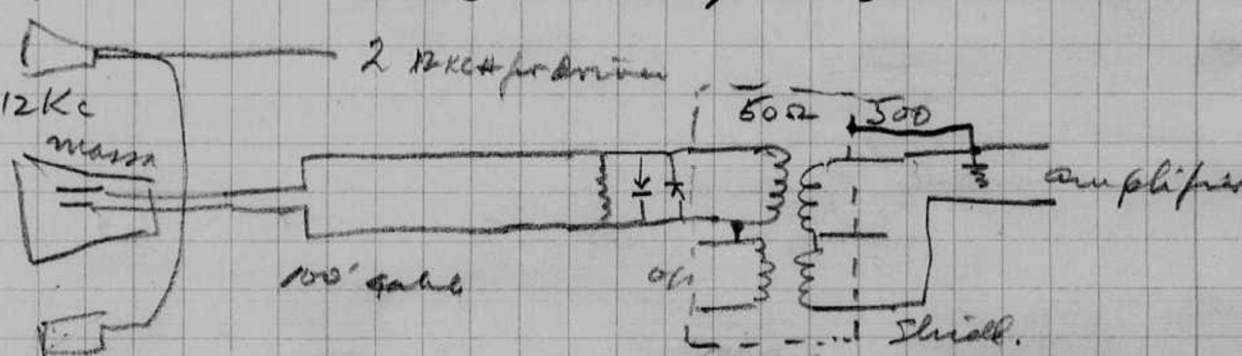
Sturbridge mass 01518 617 347 9191. at Hertz Lecture.

Sept 26 1981 Sat. The Sky art conference people (Otto Piene)
have been invited to visit my lab at 11:45-12:45 - 1:45?
Exhibits
10 - elevators to 4th floor
4-409. Spark coil and xenon lamps.
12KHz sonar with

"Bee" Kodachrome. Eastman. 3 stops
almost max enlargement
2415 film in 4×5 holder.
5 sec with tungsten. 8 min DK50. ok but dark!



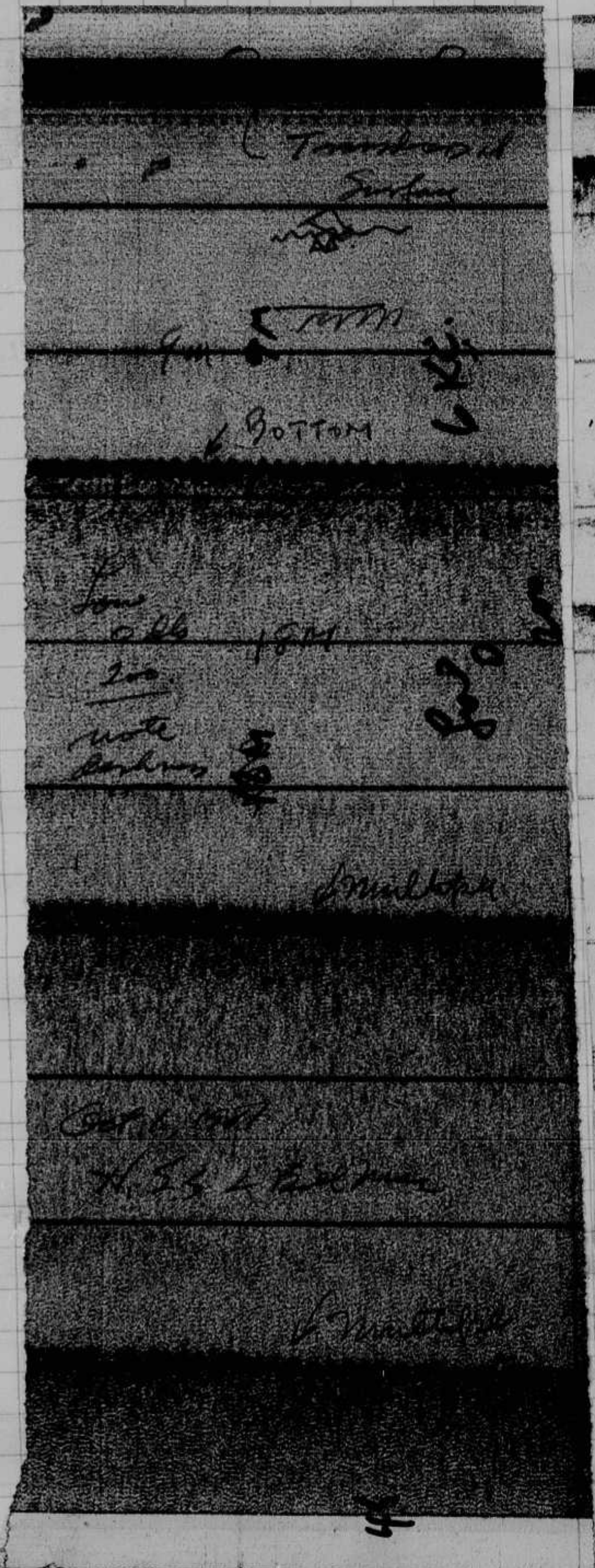
Recorder is dark at 1000 gain with no input.
ok at 300

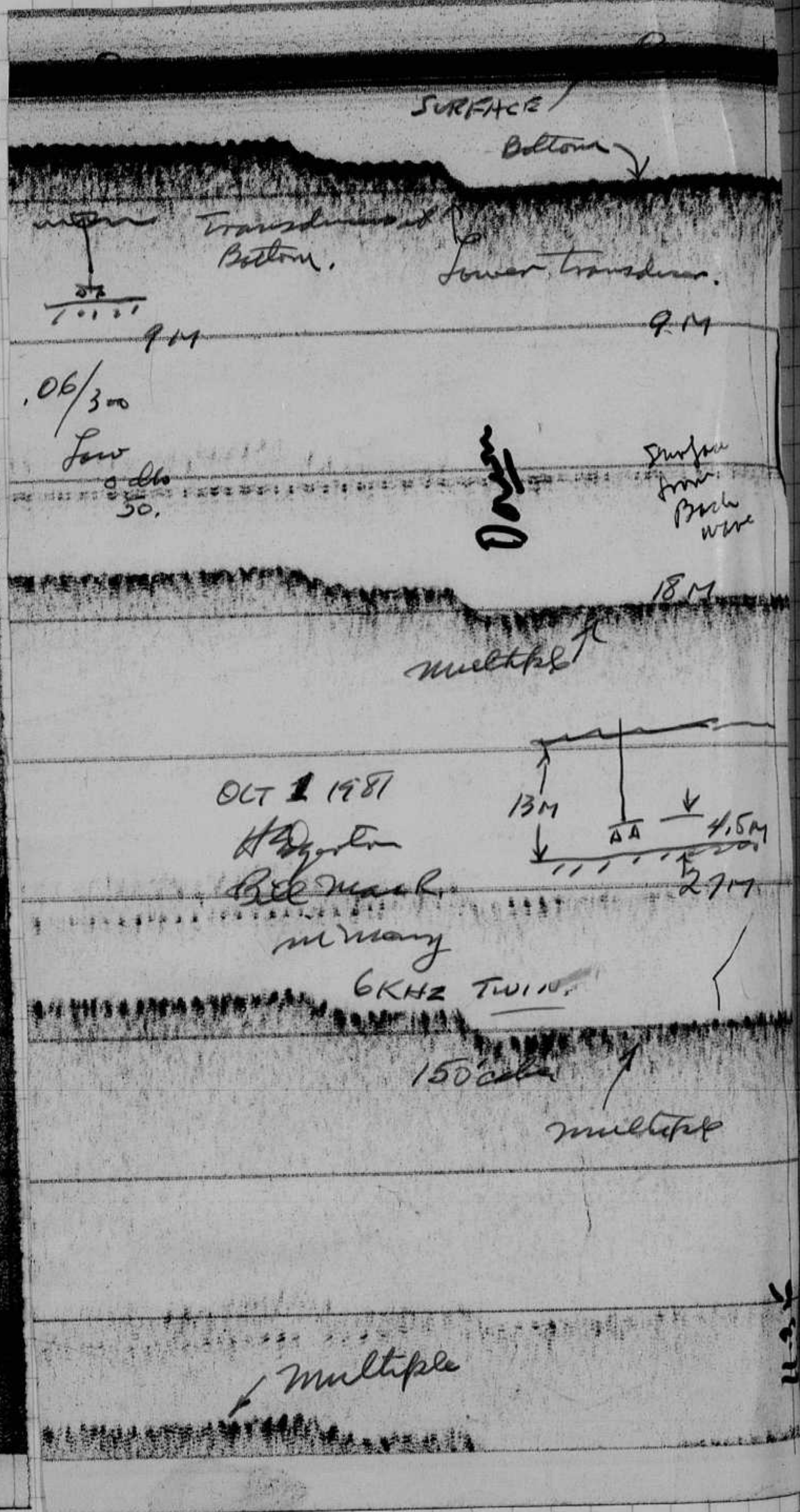
4-409
Sept. 29 1981.

Rick Ewasko Mat. Sci Grad. 3248. } undercooling of metal alloy.
Mat Simpson " " " 3276. } Ni-Sn.

Measure time-temp curve (Black Radiation!)
Start S-1 Surface photo tube - measure and print.

.06 scale



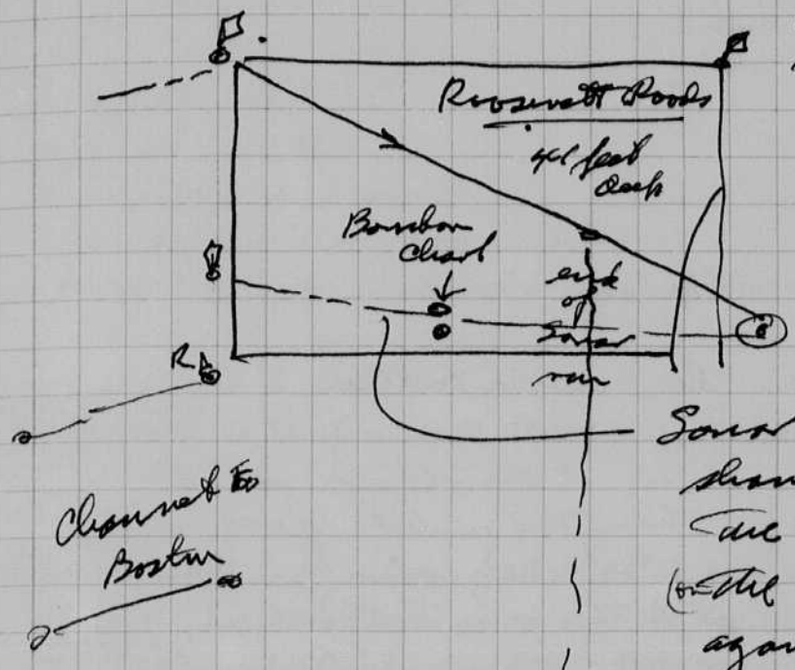


EPG. 1600 6KHz

(2 with transformers).

Oct 3 of 1951
Harold Edgerton.

Bill MacRoberts went with me to Presidents Rocks in the Boston Harbor on Oct 1 to look for the 500# aerial bomb lost in 1951.

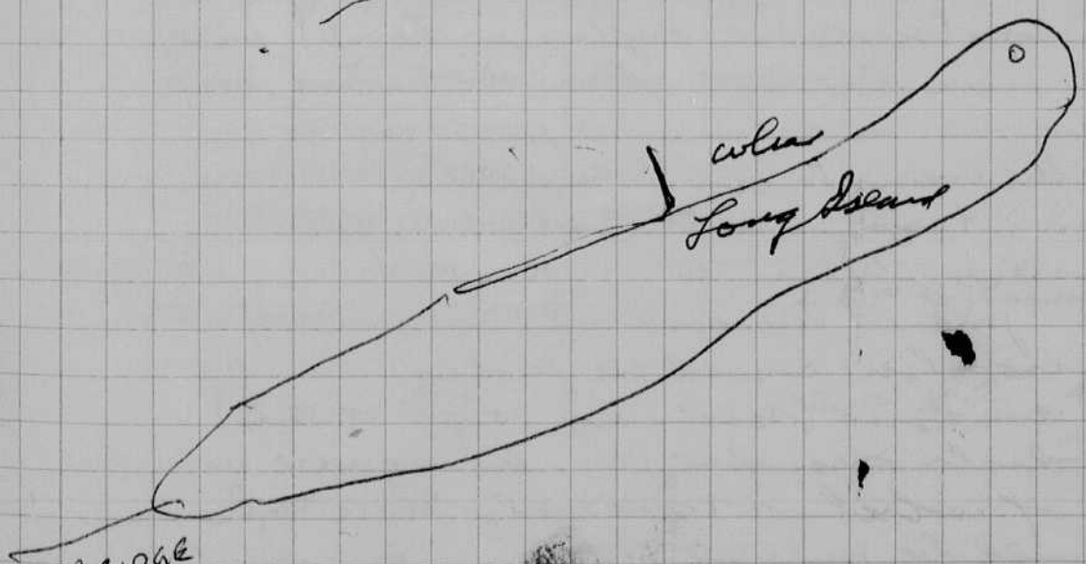


there were no targets seen in the sub bottom going from the Buoy "C" to the Deer Island light (½ way +).

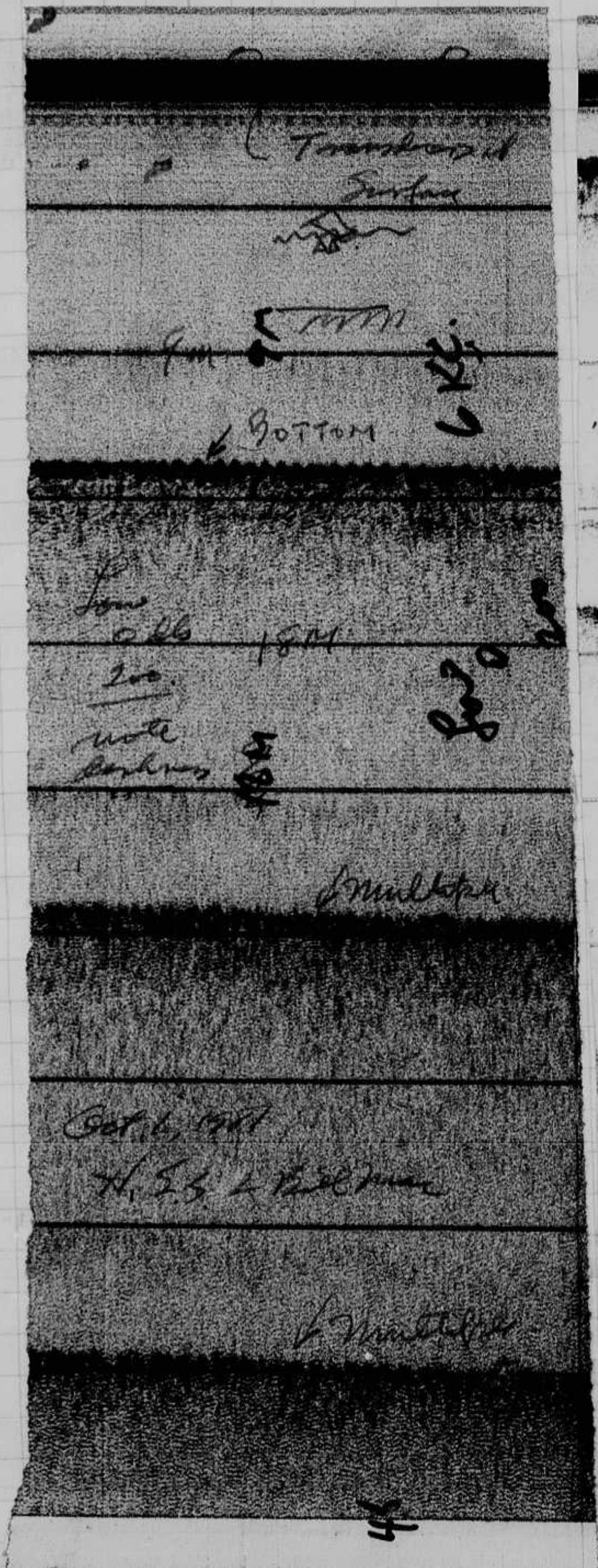
Deer Island light

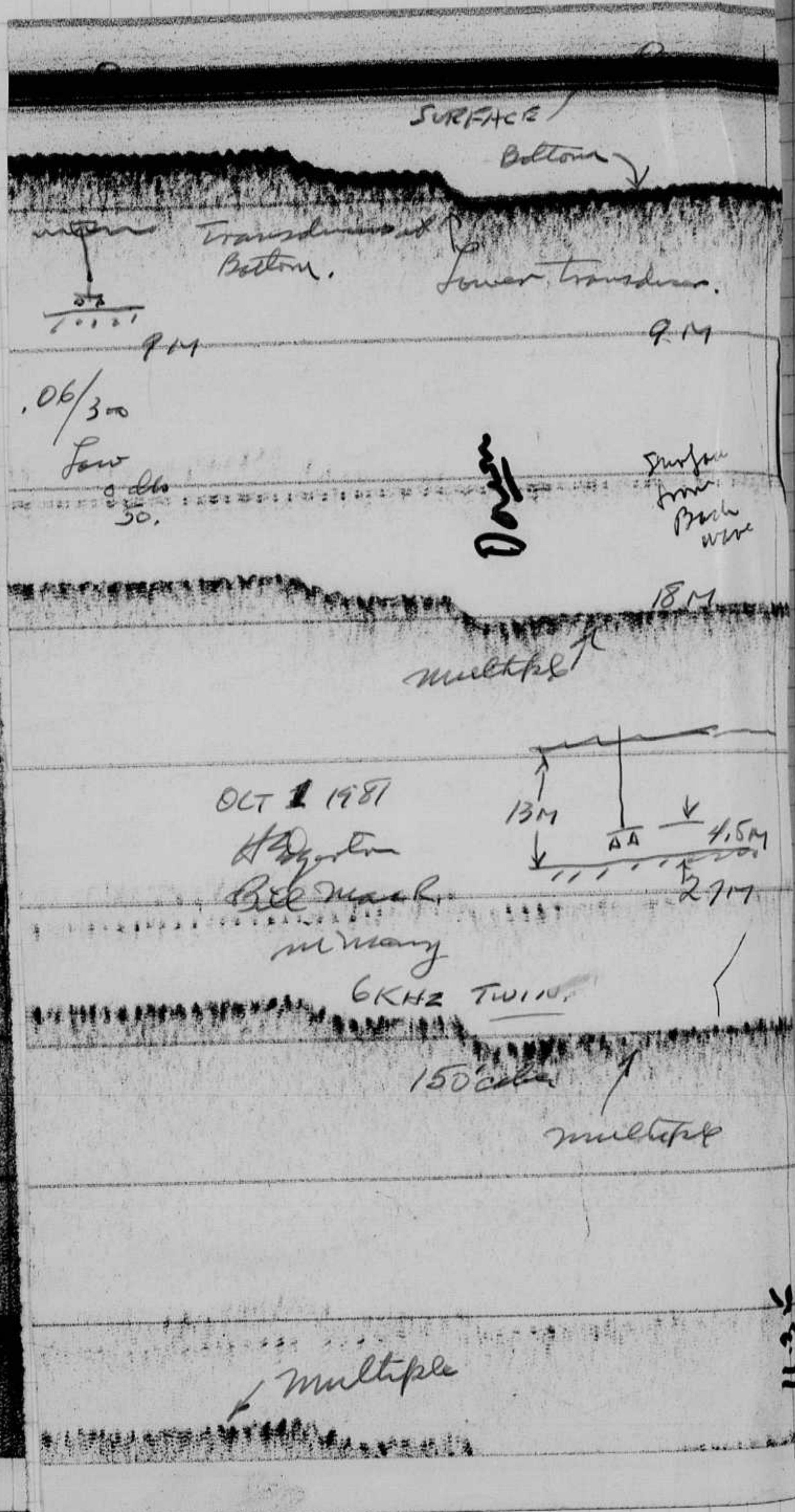
Sonar run of June 6 1951 shows surface target was marked shot on chart (at the surface.) Try here again.

Sediments found here. see Oct 1, records.



0.06 scale

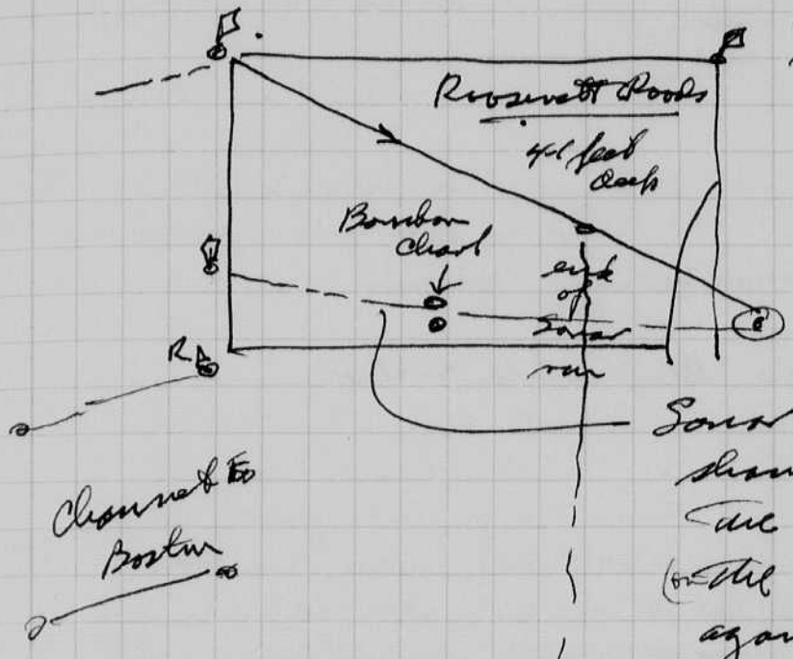




EPC. 1600 6 KHz Massa
(2 with transformers).

Oct 3 of 1981
Harold Edgerton.

Bill MacRoberts went with me to Presidents Roads in the Boston Harbor on Oct 1 to look for the 500# aerial bomb lost in 1951.

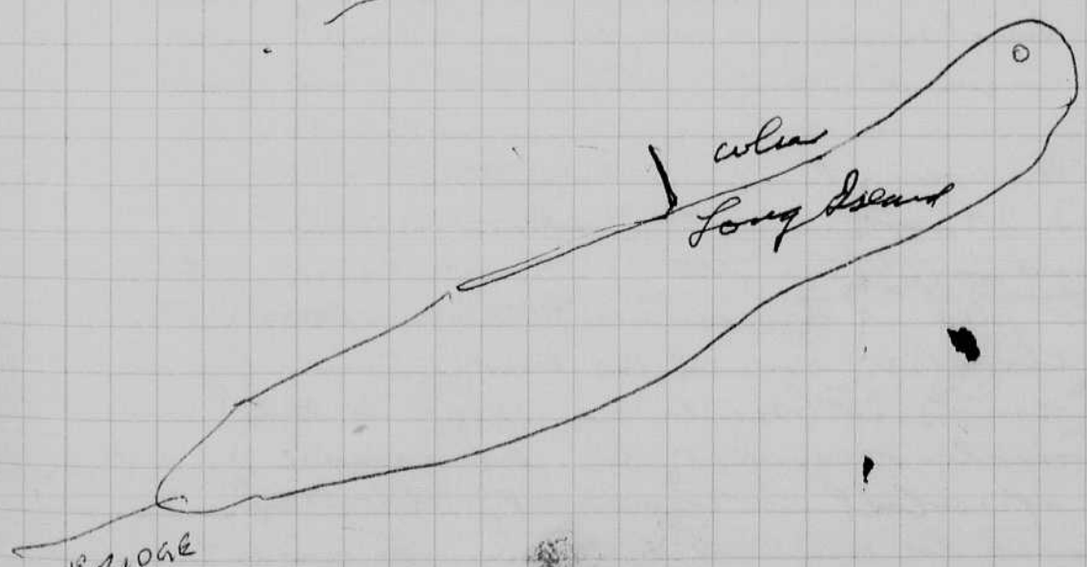


there were no targets seen in the sub bottom going from the Buoy "a" to the Deer Island light (1/2 way +).

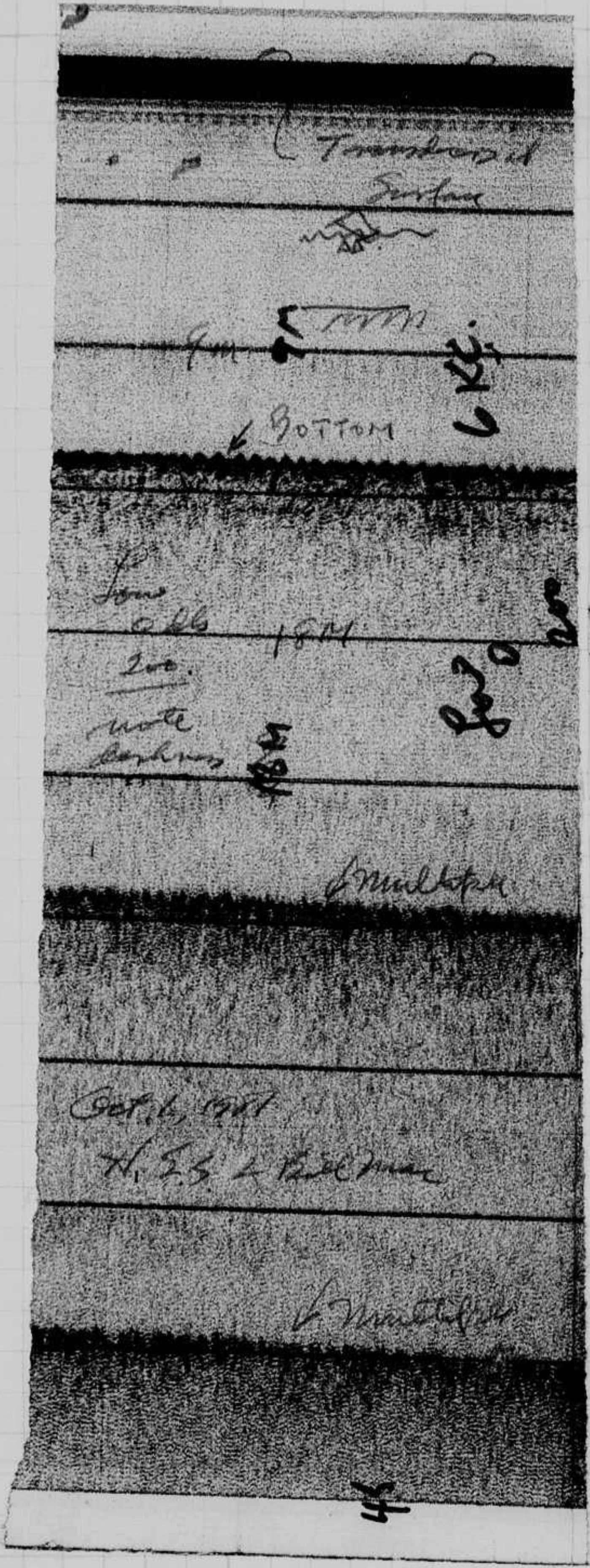
Deer Island light

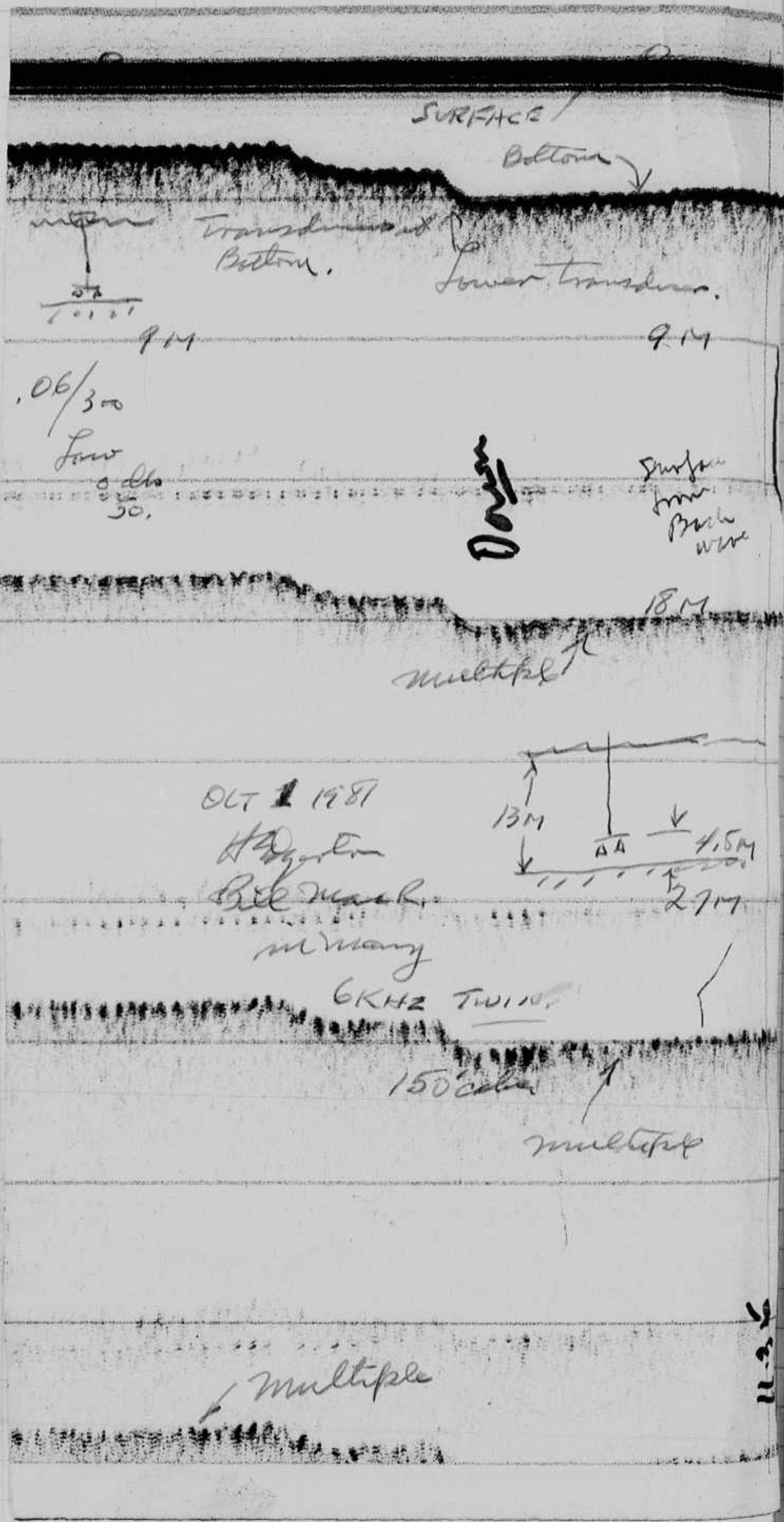
Sonar run of June 6 1981 shows surface target near the marked spot on chart (or the surface.) Try here again.

Sediments found here. see Oct 1, records.



0.06/scale



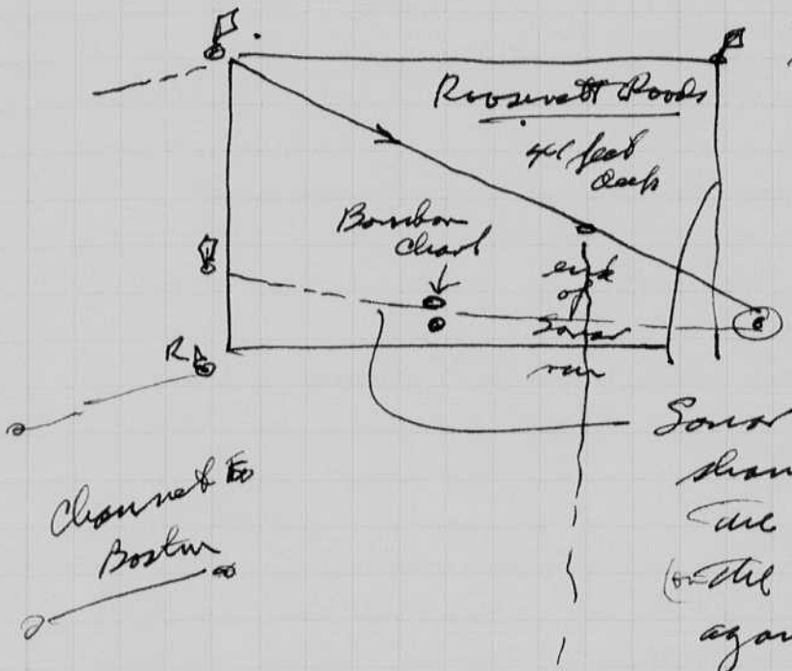


EPG.1600 6KHZ Massa
(2 with transformers).

Honfaell
Noville
Gotto

Oct 3 1981
Harold Edgerton.

Bill MacRoberts went with me to Presidents Roads in the Boston Harbor on Oct 1 to look for the 500# aerial bomb lost in 1951.

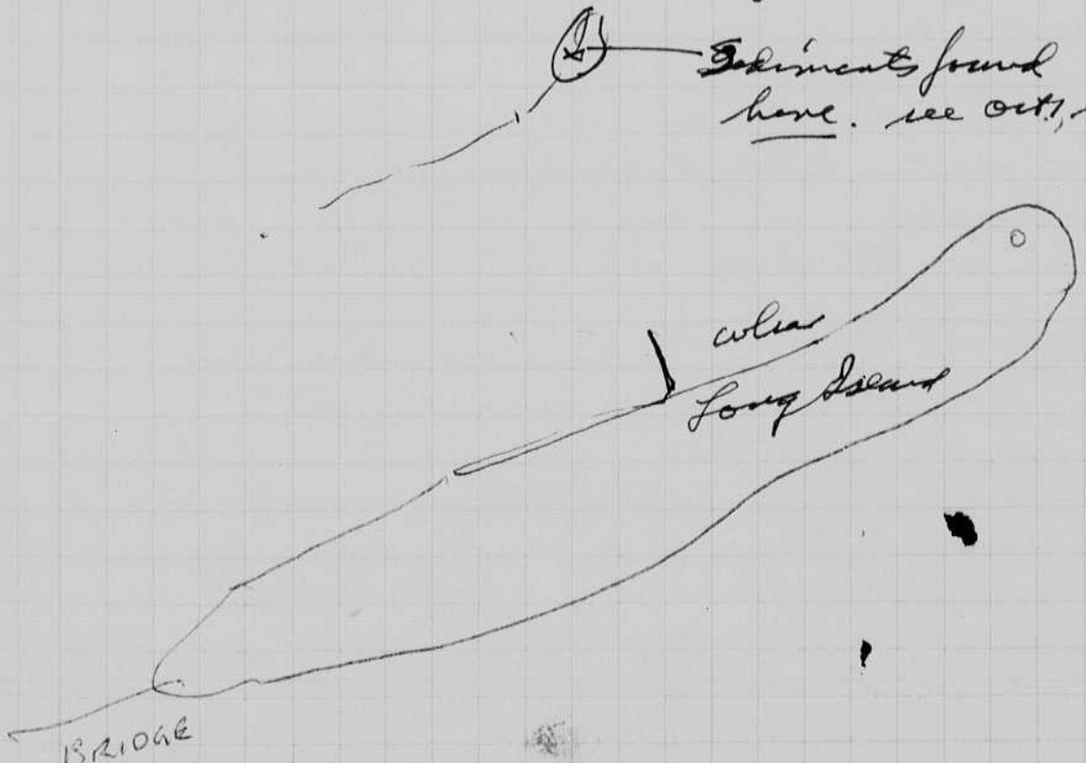


there were no targets seen in the sub bottom going from the Buoy "a" to the Dear Island light (1/2 way +).

Dear Island light

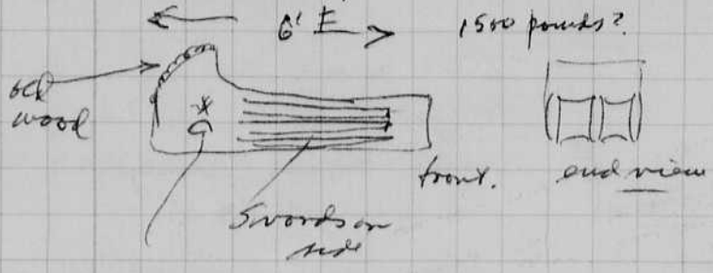
Sonar run of June 6 1981 shows surface target was the mounted shot on chart (or the surface.) Try here again.

Sediments found here. see Oct 1, records.



October 4 1981 Harold Edgerton

Elisha Linder, diver-Raban & wife "Dion"? were here yesterday afternoon and for supper. They are archeologists from Israel. Elisha showed me photographs of a large bronze ram from a Greek ship that was found at Atlit in 10' of water.

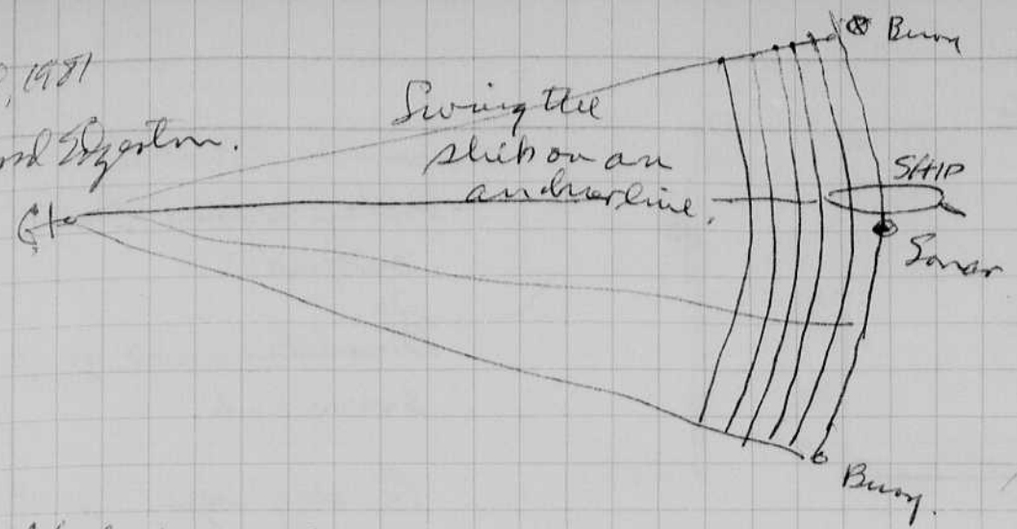


Survey System with penetration sonar

I propose to use a Dory cable to the sonar from a stationary boat. One system would be to anchor with 2 anchors so the boat will not swing. Then the cable goes into the water (40' deep) and a diver can move the transducer back and forth over the bottom. Some signaling system would be ~~dec~~ needed to inform the diver that a target was underneath. Then he could drop a marker.

A second method. A boat on a single anchor line (such as nylon or hemp) will swing through an arc when the wind and currents are in action. I propose to lower the transducer above the bottom and permit or force the ship to swing back and forth on the anchor line. Buoys could be put at the ends of the swing. Then the anchor line could be pulled in by a small amount (such as 20 ft or less) and the on-deck recorder would make a signal record of what is covered. Then the anchor line would be pulled in again to give the ship a new position. In this way complete coverage of an area could be made and buoys could be placed on target areas.

Oct 9, 1951
Harold Edgerton.



Swing the ship on an anchor line.

Reposition ship by pulling in (or out) on the anchor line

Make a record of the sonar on each swing, the rudder might be arranged control power could be used.

I hope to use this system in the Boston Harbor on the search for the 500 pound bomb that was lost by the navy in 1951.

I wrote to Bob Morgan about this hoping that he will be interested in using the system at el Dorado shoals near Bimini.

8:10 PM Oct 9, 1951. Lyndon, Jan, Esther and I went to the Fine Arts Museum at 10 am to see the Boston artists display then we had lunch at the restaurant in the new West wing.

Design of a short flash spark unit for silhouette photography. See pages 133 to 136 in Elect. Flash Stable.

Design with mica, glass, mylar etc.

Breakdown of a thin film.
Dielectric constant.

Stored energy = $c\frac{V^2}{2}$

$c = K\frac{\text{Area}}{d}$

Destruction $\cong CK_1 = KK_1\frac{A}{d}$.

See page 136.

$E = \frac{V_s \cdot 8}{d}$ field strength

Let E be breakdown $\frac{E_c}{\text{[illegible]}} \times .8$

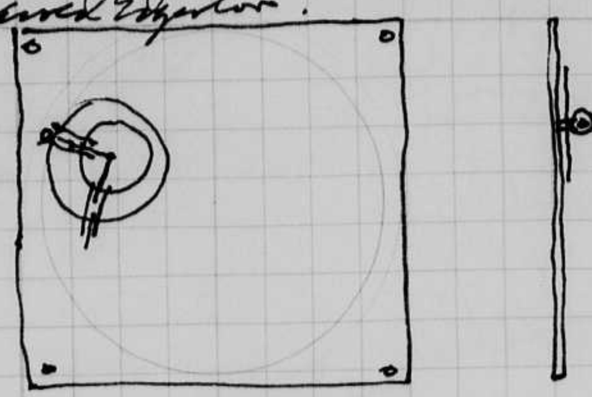
$C = K\frac{A^2}{d}$ A = area
d = thickness

Set up experiments with mica, glass, Plastics etc.

try 3 mm finest in glass tube 2 mm bore.

Oct 4 1981

Harold Edgerton.

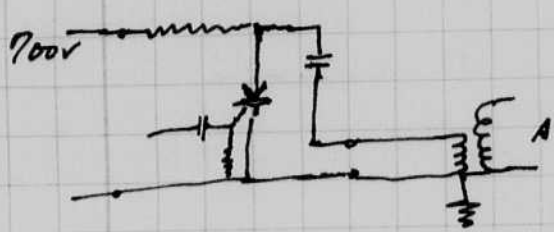


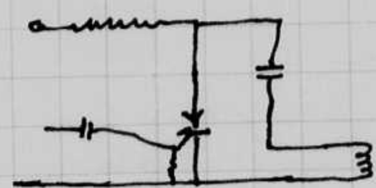
measure on the scope

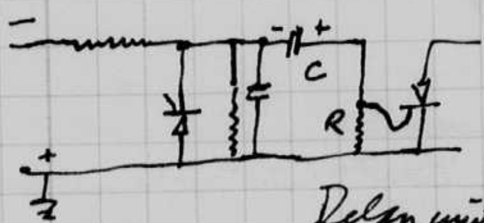
Voltage vs time of coil output.

Breakdown voltage of 3mm gap.

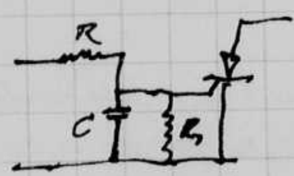
Pulses of light c.p. vs time







Delay unit.



$R_1 >> R.$

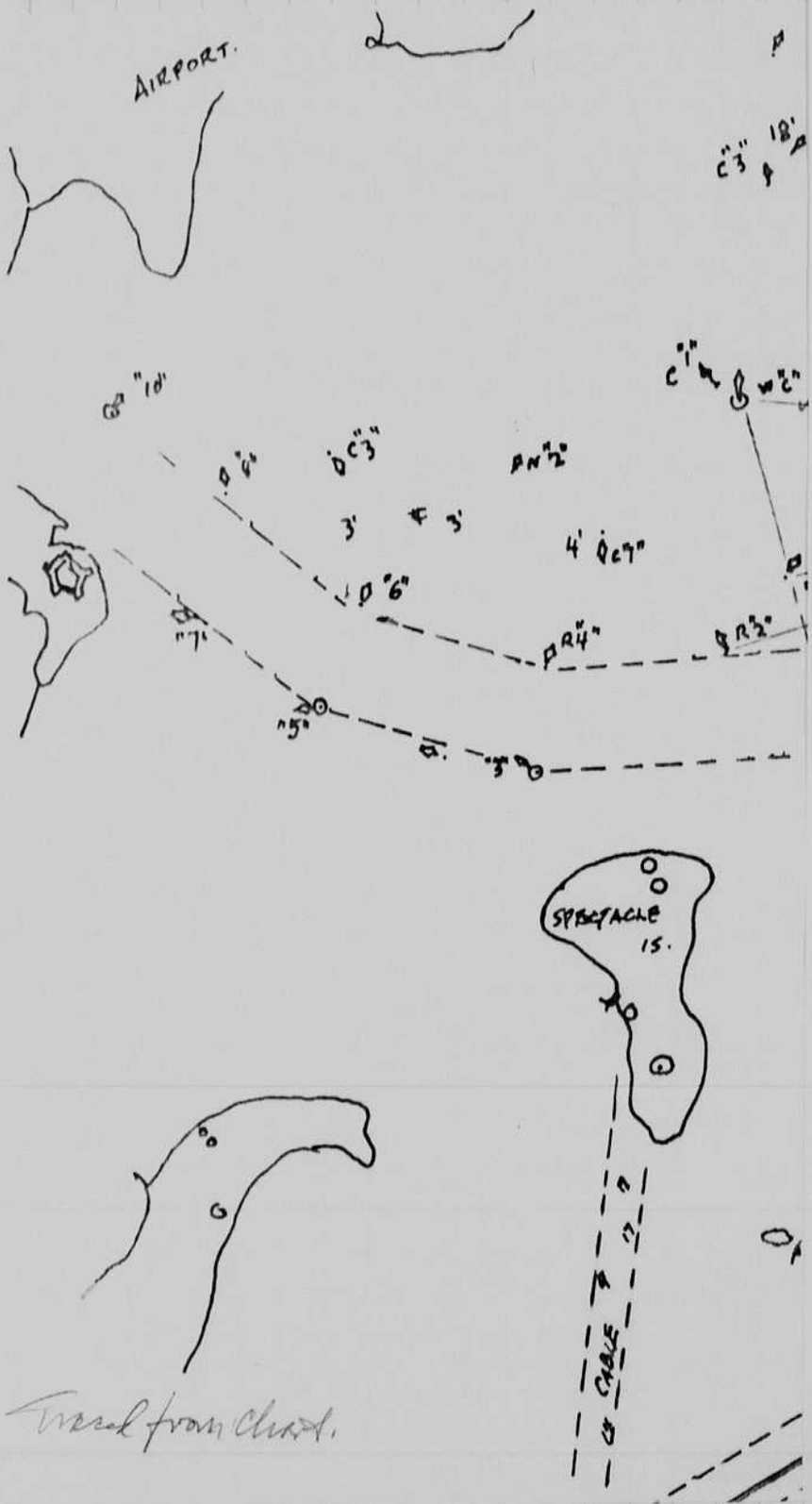
Delay in each unit adjustable.

students?

Well, there's the EG&G building which is going to get started this fall. [Connected to building 38], its facilities will include a large 325 student lecture hall with computerized rear-video display for use in teaching large core subjects, four classrooms of approximately 30 students each, an extension of the 5th floor lab for use in teaching 6.004 when it eventually becomes a core course, and a large furnished conference room similar to the Bush Room. The earliest we can expect to see the completion of this building would be fall 1982.

Comment by Joel Moses. Oct. 1981.

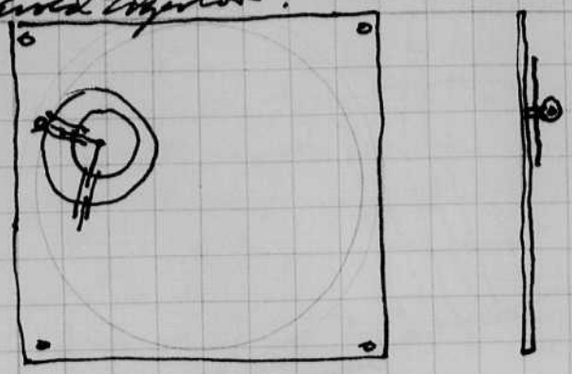
Oct 1981 Institute.



10th Anniversary of the
MIT Museum was held Oct 15 & 16 at 30
Howard Johnson, Richard Douglas, Warren Seamans.
Then a reception for 5 to 7.

Oct 4 1981

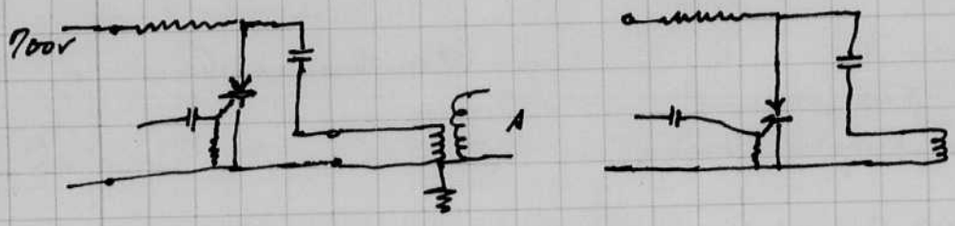
Harold Edgerton.

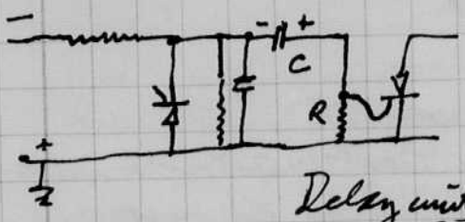


measure on the scope
Voltage vs time of coil output.

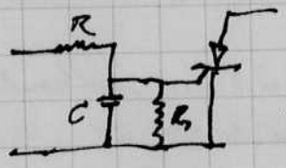
Breakdown voltage of 3 mm gap.

Pulses of light c.p. vs time.





Delay unit.



$R_1 >> R$.

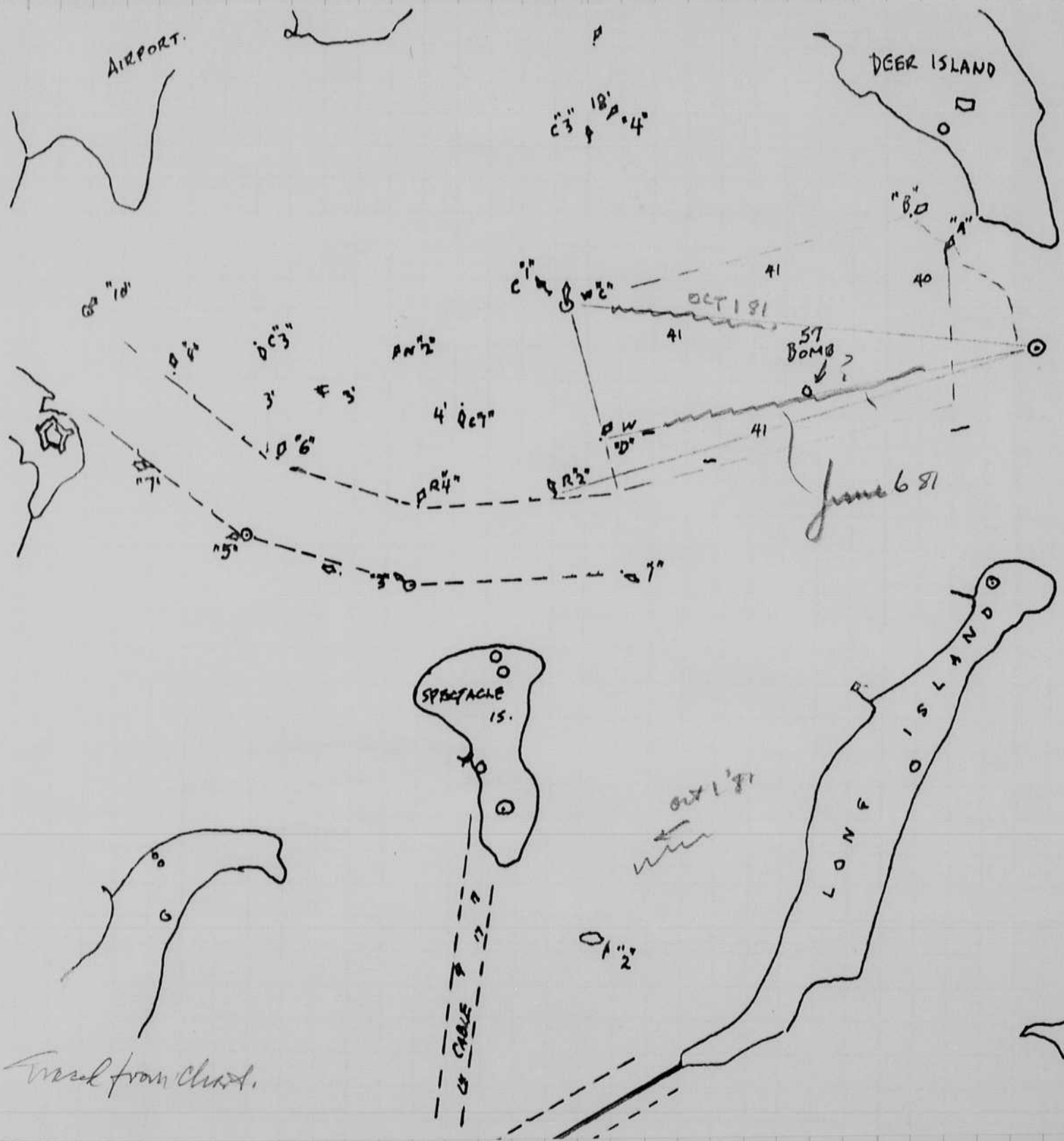
Delay in each unit adjustable.

students?

Well, there's the EG&G building which is going to get started this fall. [Connected to building 38], its facilities will include a large 325 student lecture hall with computerized rear-video display for use in teaching large core subjects, four classrooms of approximately 30 students each, an extension of the 5th floor lab for use in teaching 6.004 when it eventually becomes a core course, and a large furnished conference room similar to the Bush Room. The earliest we can expect to see the completion of this building would be fall 1982.

Comment by Joel Moses. Oct. 1981.

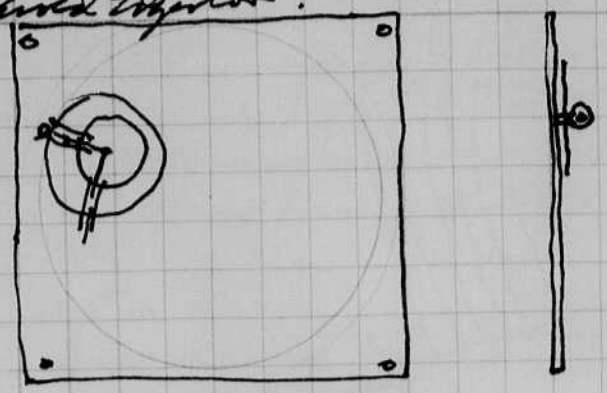
Oct 1981 Available.



10th Anniversary of the
MIT Museum was held Oct 5 1981 at 4:30
Howard Johnson, Richard Douglas, Warren Seamans.
Then a reception for 5 to 7.

Oct 4 1951

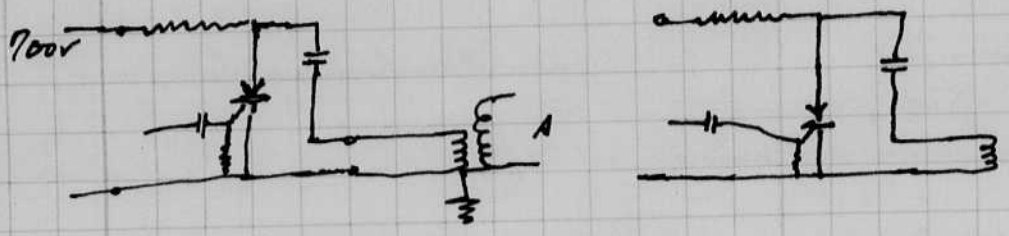
Harold Edgerton.

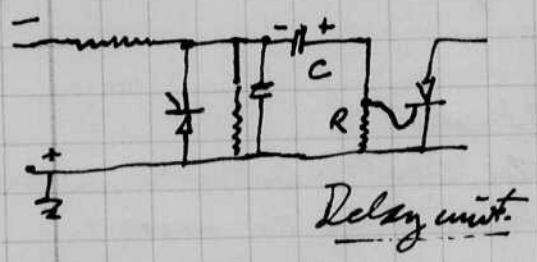


measure the pulse
Voltage vs time of coil output.

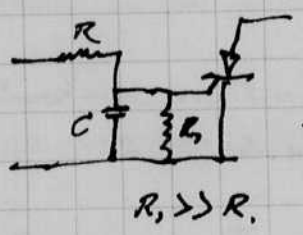
Breakdown voltage of 3 mm gap.

Pulses of light c.p. vs time





Delay unit.



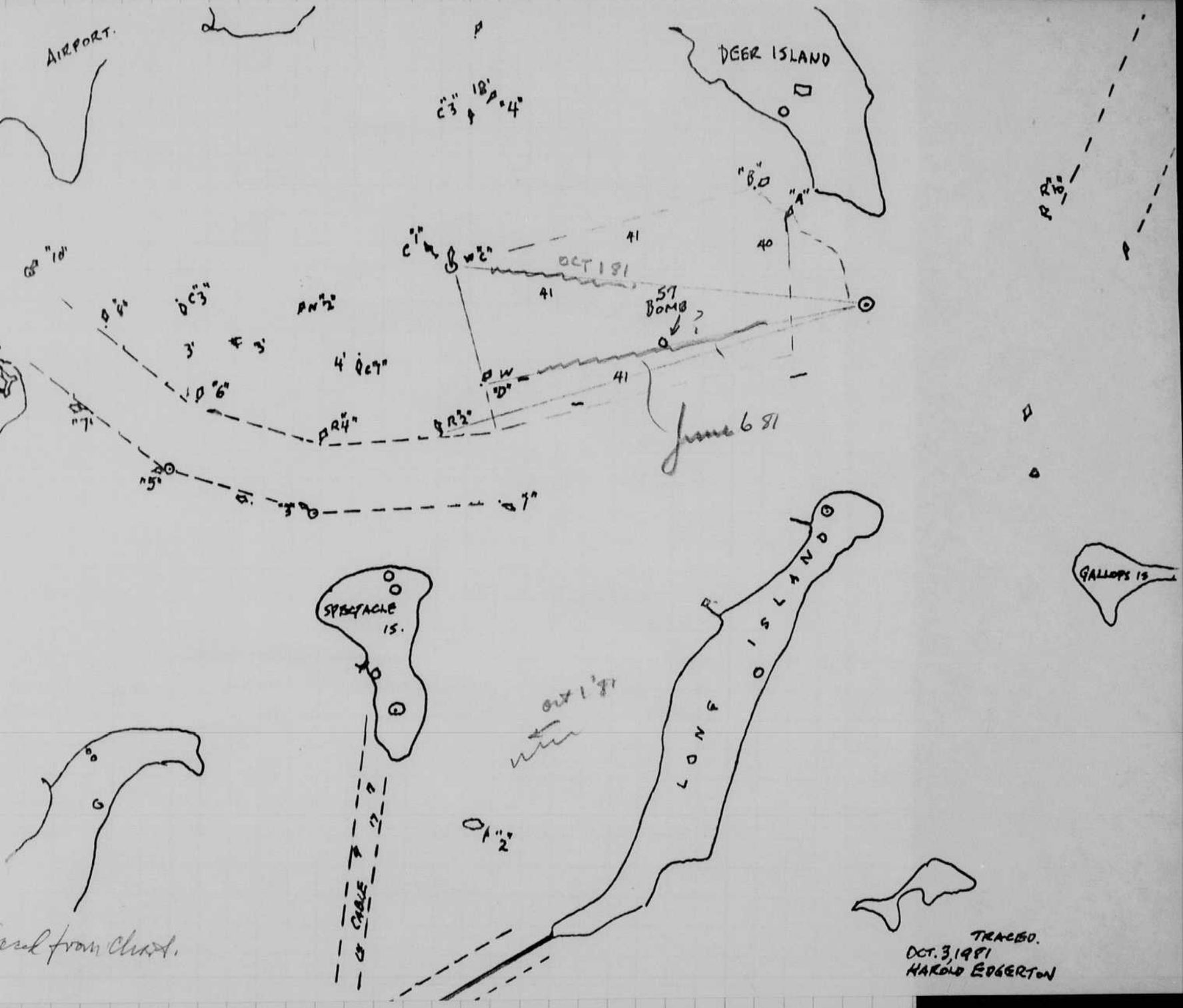
Delay in each unit adjustable.

students?

Well, there's the EG&G building which is going to get started this fall. [Connected to building 38], its facilities will include a large 325 student lecture hall with computerized rear-video display for use in teaching large core subjects, four classrooms of approximately 30 students each, an extension of the 5th floor lab for use in teaching 6.004 when it eventually becomes a core course, and a large furnished conference room similar to the Bush Room. The earliest we can expect to see the completion of this building would be fall 1982.

Oct 1951 Installed.

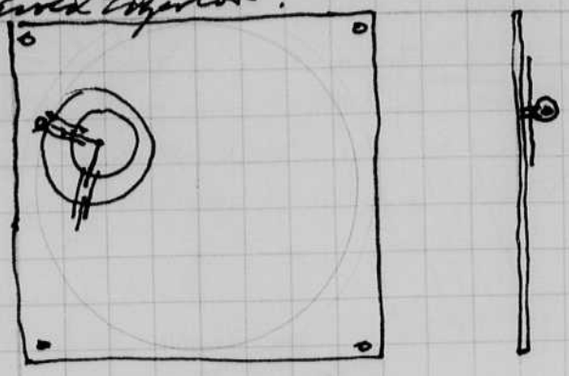
Comment by Joel Moses. Oct 1951.



...10th Anniversary of the
...IT Museum was held Oct 3 1981 at 4:30
...ard Johnson, Richard Douglas, Warren Seamans.
...en a reception for 5 to 7.

Oct 4 1981

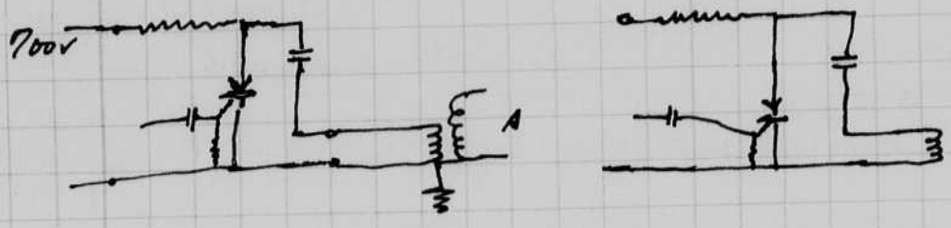
Harold Edgerton.

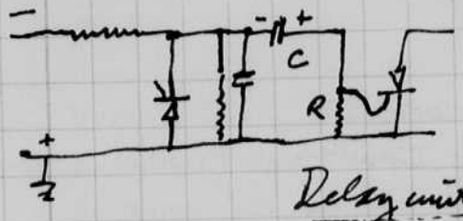


measure on the scope
Voltage vs time of coil output.

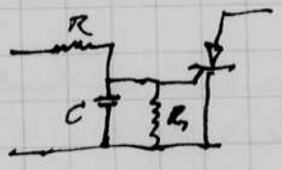
Breakdown voltage of 3 mm gap.

Pulses of light c.p. vs time





Delay unit.



$R_1 >> R$

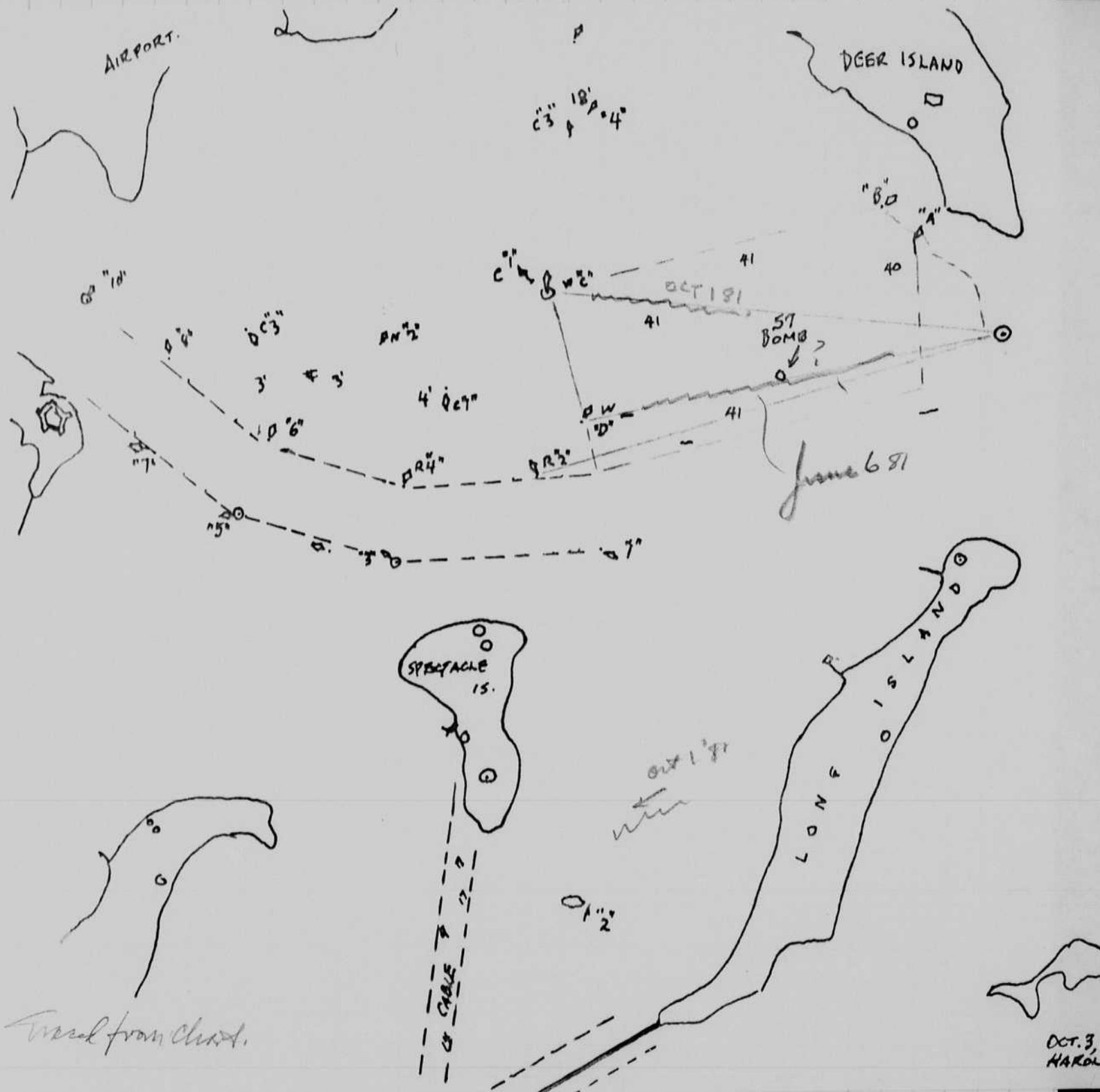
Delay in each unit adjustable.

students?

Well, there's the EG&G building which is going to get started this fall. [Connected to building 38], its facilities will include a large 325 student lecture hall with computerized rear-video display for use in teaching large core subjects, four classrooms of approximately 30 students each, an extension of the 5th floor lab for use in teaching 6.004 when it eventually becomes a core course, and a large furnished conference room similar to the Bush Room. The earliest we can expect to see the completion of this building would be fall 1982.

Comment by Joel Moses. Oct. 1981.

Oct 1981 Installed.



10th Anniversary of the
MIT Museum was held Oct 3 1981 at 4:30
Howard Johnson, Richard Douglass, Warren Seamans.
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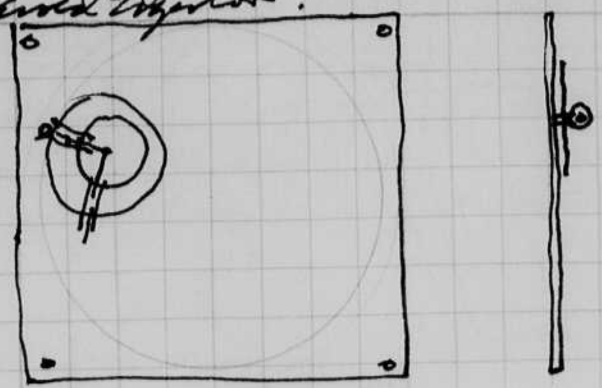
Oct 4 1981

Harold Edgerton.

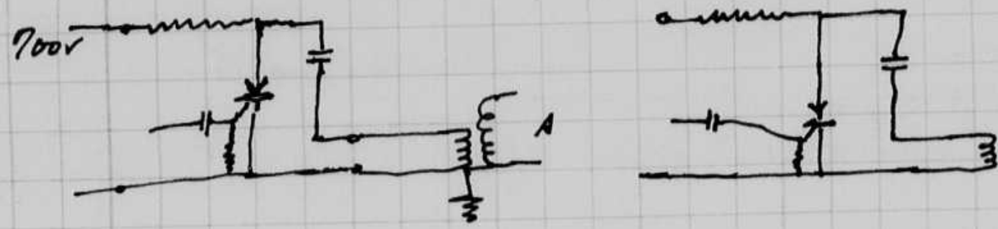


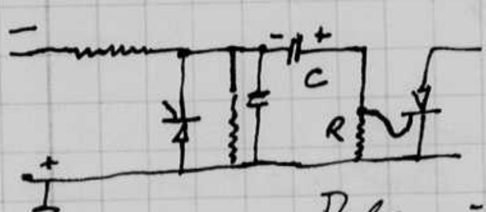
measure on the scope

Voltage vs time of coil output.

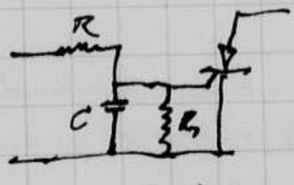
Breakdown voltage of 3 mm gap.

Pulses of light c.p. vs time





Delay unit.



R, >> R.

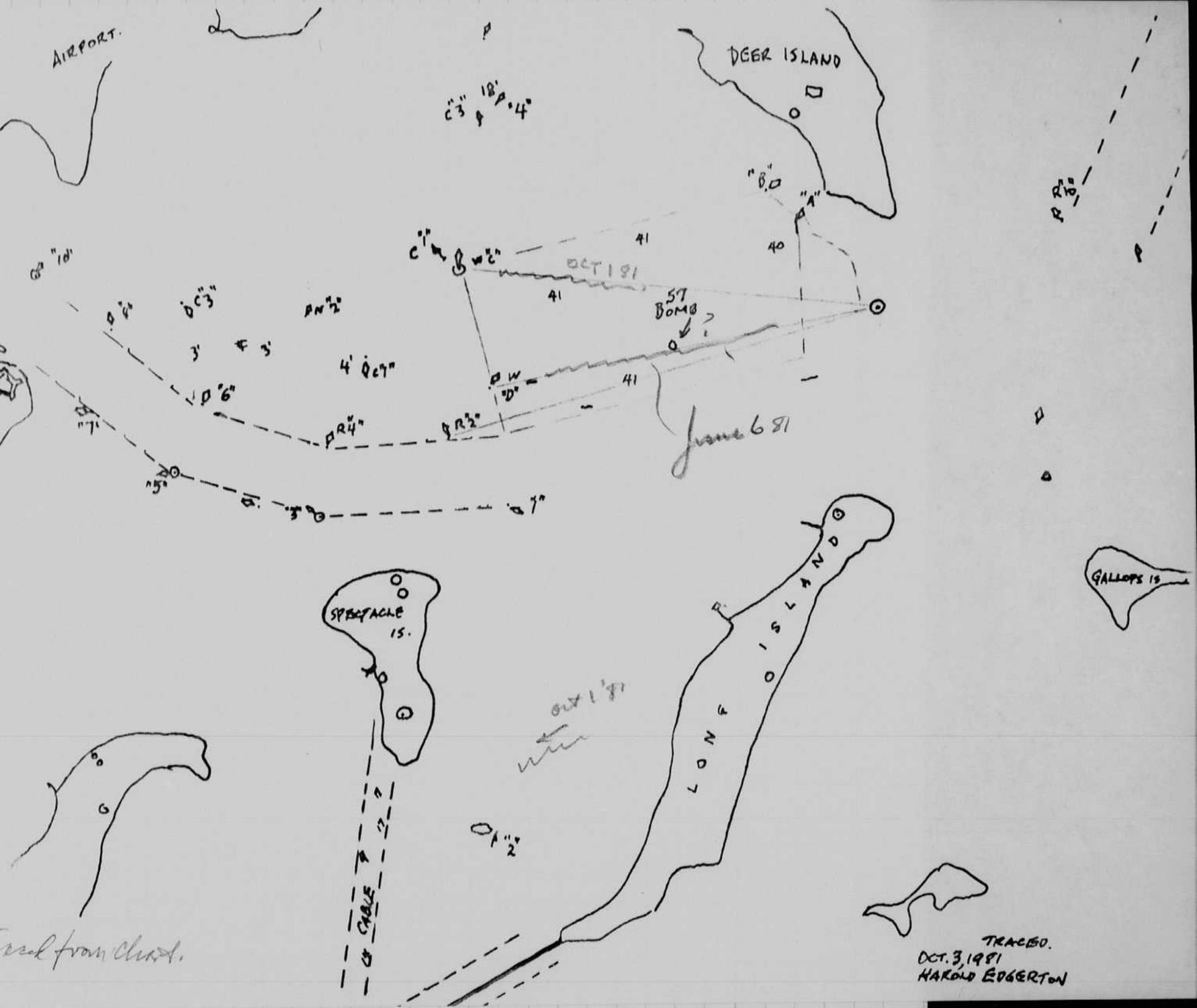
Delay in each unit adjustable.

students?

Well, there's the EG&G building which is going to get started this fall. [Connected to building 38], its facilities will include a large 325 student lecture hall with computerized rear-video display for use in teaching large core subjects, four classrooms of approximately 30 students each, an extension of the 5th floor lab for use in teaching 6.004 when it eventually becomes a core course, and a large furnished conference room similar to the Bush Room. The earliest we can expect to see the completion of this building would be fall 1982.

Comment by Joel Moses. Oct 1981.

Oct 1981 Curiosity.



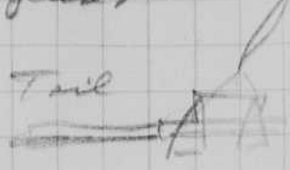
...ed from Chart.

...to the Anniversary of the
...IT Museum was held Oct 3 1981 at 4:30
...ard Johnson, Richard Douglas, Warren Seamans.
...en a reception for 5 to 7.

Oct. 6, 1981

Hank Bezaire

a Tail has been put on the twin 6KH2 transducers. This should make it track for slow speed.



Tried this in the MIT pool. It seems to track ok.

Donald Boston
364 Meredith St Staten Island N.Y. 10314
212 761-6129

Verrazano Bridge & Staten Island.

Took for boat propeller in the mud with 6 KH and 12 KH sonar. EPC 1600.

Comment Oct 12, 1981 HB.

The 6 KH with 150' cable and the EPC-1600 was marginal, I sailed out "good" but weak signal after returning to Boston. Erik Vaaler went with me. 2 meters deep

The 12 KH was ineffective in the mud at Staten Island.

I now plan to make a mini Bonner for this type of target.

Russo FT-24 1-356-5929 FT-24.
Mahaffey David. Multiflash 492-4108 25 Healy St. Mar. 1978.
VINCENT SHUTTER. 1.2 ms delay 1.8 ms open time. p 9. p9.
Hydrophones p.92.

Design of Flash Lamp Driving Circuits - $i = k v^{1/2}$ Gong.
J.P. Markiewicz and J.L. Emmett
Journal of Quantum Electronics vol. Q.E.2 no.11 Nov. 1966.
Write article with McLennan of E484. for 1982 Congress in San Diego.
wreck off Miami p 92.