HAROLD E. EDGERTON

PAPERS

MC 25

Series III

Laboratory Notebooks

Number 32

Dated Aug 18, 1975 to Jan. 31, 1978

$2.95

COOP COMPUTATION BOOK

152 NUMBERED PAGES / 11¾ x 9⅜ INCHES

32.

NAME	NUMBER
HAROLD EDGERTON STROBE LAB. M.I.T. 4-405	32

Course .....

Used from AUG 18 19~~25~~, to JAN 31 1978

'RVARD COOPERATIVE SOCIETY
0 MASS. AVE., CAMBRIDGE, MASS. 02138

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

Aug 29 1975 · 3 4.20pm EYE PATTERNS 5 MIN DURATION
Jan 14, 76 ◯ 4 pm strong. ½ 20 "
June ? ? In England.
Aug 6 1976 9am ◯
Aug 7 1976 12 noon ◯
Aug 7 76 night ◯ DREAM?
Aug 9 76 10 am ◯ Small but vivid.
Aug 27 76 1 pm Chicago ◯ 2 strong.
Oct 25 76 7.15 am Camb. ◯ 3 strong.
Nov 15 76 4.30 am " ◯ strong.
NOV 29 76 6 pm " ◯ "
DEC 76 12 noon Beaufort ◯ "

Jan 12, 77 4pm. — ◯ strong.
Jan. 29 77 4.30 am ◯ 2 strong.
11 am "
12.15 "
May 25 Israel. noon at sea. ◯ strong
Sept 1 100 mm 8.03 am ? mod.
Sept. Rt LEG - 1 BLOCK - pain. - artery in lower blood
?

Dec. 27 1977 9.50 ◯ gone
1007 ◯ other side start.

Harold E. Edgerton
Aug 1975
M.I.T. H-405
Cambridge Mass
02139

253.4629 494.8783
area code 617

Phoned Dec 22 1977 AV

222 285 286 322 332 631

04927 – 04937 inc

Early EEG Records are stored
at Duster Inc
49 Clinton Natick Mass
(Ed Anderson) 321.5900
Ed Weiner
as per John Heffernan.
Feb. 1976.

Aug. 19, 1975

Harold Edgerton MIT 4-405 (617) 253 4629. Cambridge Mass. 730 am.

Yesterday I went to the New England Aquarium with Ellen Dixon (age 11 from Hickory N.C.) to screen the 50 ft 16mm Kodak II elapsed time motion picture of the Boston Harbor which was made with a 1 minute interval between photographs. The camera was placed at 40' deep south east of Buoy 10 Red which is East of the Deer Island out flow.

Tom Wilbert has an analysis of the film on a time basis. The pictures were fine at first at low tide with no current. There were particles an hour or two + later probably due to the sewage outflow of sludge. Then kelp came which draped itself over the lens and obscured the photographs, some of the time. Also the water was cloudy with small particles at later times.

I have just increased the timing resistor by .68 megohms. It was about .5 + .0037 = Meg. before the goal is to get a 2 minute time interval.

Camera. Flight Research Ser. No 929 Model 111B.

Strobe - 500 volt. 1800 B.C.P.S. Regulated.

50 ft film x 40 frames/ft. = 2000 pictures.
60/2000 at 2 min = 4000 minutes
24/66 = 66 hours.
= 2 days + 18 hours.

We plan to put the camera at the same spot at 930 daylight time today which should be slack for that area. Al Barber and Geo. will be the divers working off E. Coli (Aquarium's boat).

The D.C. battery in the camera drops to 20 volts when the rewind motor operates. The voltage is 24 volts between shots.

Some sort of a target with an object that is influenced by the current is to be placed in the field of view. Also a white object should be in the field so water light transmission can be estimated.

8.33:30
35.32
37.33
39.29.
41 29

adj. watch at times
8:10:40
12.45 adj
14 55 slow Spun
14.55
17.43
19.25 adj
21.17 adj
8:23:02 adj
8:24:25
8:25 50 S
8:27 20
8:28:55
8 29 40
adj. 8 30 25
close. 8 33 30

Aug 21 1975

Harold Edgerton.

Willard Bascom from Calif. called. He is bidding on a study of the sewage outflow. I referred him to Bob Ward E.G.&G. He wants side scanned penetration.

Aug 25, 1975 The elapsed time camera came out of the sea after 2 days on the bottom. It operated at a 2-minute cycle. Out on Thursday about noon?

There were 10 ft of film unexposed – I ran this in the lab and took to the coop for processing.

Esther and Ellen Dixon went on this trip.

Sat. 23 I went to Westport on the a transit and set it up on Barbers Beach Baker's near Chab's stand. The telescope is great. I could see the Vineyard light tower very clearly.

There were people on the spindle, and the weather was so clear.

Roberts Spindle 194° magnetic
" " Island 133° 45' Bunker
" " Water-tower 288° 30'

check chart for position.

John Briggs came around. He lives in West port 16 yr Student at Andover ?

We plan to make a lot of sonar measurements off West port to find the Atlantic Sword. This fishing ship went down in the winter with 3 men. We have looked for it many times, without success.

The trip for today Monday was cancelled due to weather by Solon Dolan, last night about 5 pm.

3 pm. Project for Westport again postponed for tuesday. Will try for Wednesday.

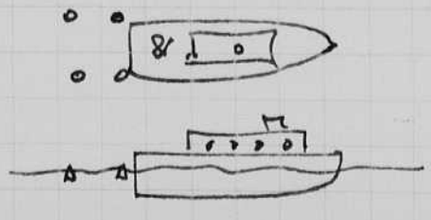
Project for Sonar penetration.

Use 4 massa transducers spaced on both sides of the survey ships.

Wave length of 5 kh. = 0.84 ft.

Diam = 6 ft

$$\frac{\text{Diam}}{L} = \frac{6}{.84} \cong 8.$$



angle should be about 10°

Aug. 26. 1975.

Westport trip cancelled again.

Roll 4 transducer system on previous page. Hydrophones cannot be used at exact center because of the propeller turbulance.

First try the self generated voltage in the transducers.

Second. Put two hydrophones at the mid points between the transducers. connect in parallel.

I am very illy [illegible] about the arrangement of 4 transducers.

Aug. 29. 1975. I went to Westport on the 27 at 7am when John Dolan called.

A transit station was put at Baker's beach near the east life guards stand. 900' intervals were made both East and west.

Course of 200° were held by the transit. Dolan and John Briggs (16) manned the transit. Palmer operated a 22 ft fiberglass boat with Claude LeDoux and me with the 259 EG & G Side Scan.

On the 27 we got up early and made other runs. Tom Foley operated the 22 ft Boat with me. John Briggs and Liz Dolan operated the transit.

We buoyed several targets. The magnet did not show iron. A buoy was left on one target due west of the spindle. Buoy V. this is shown as a 4' rock (mean low tide) on the chart at the 2 mile ledge. Told John D that I was relatively sure that it was not the Atlantic Sword.

Now I plan to plot up the areas that we have covered. The ship does not seem to be in these areas. Where can it be???

Krebs of Electronics came in this morning. Chas Miller and I spent a lot of time with him testing the 700 series memory scope. It is my hope that this instrument will be used for studying flash lamps.

Aug 30 1975 930pm.

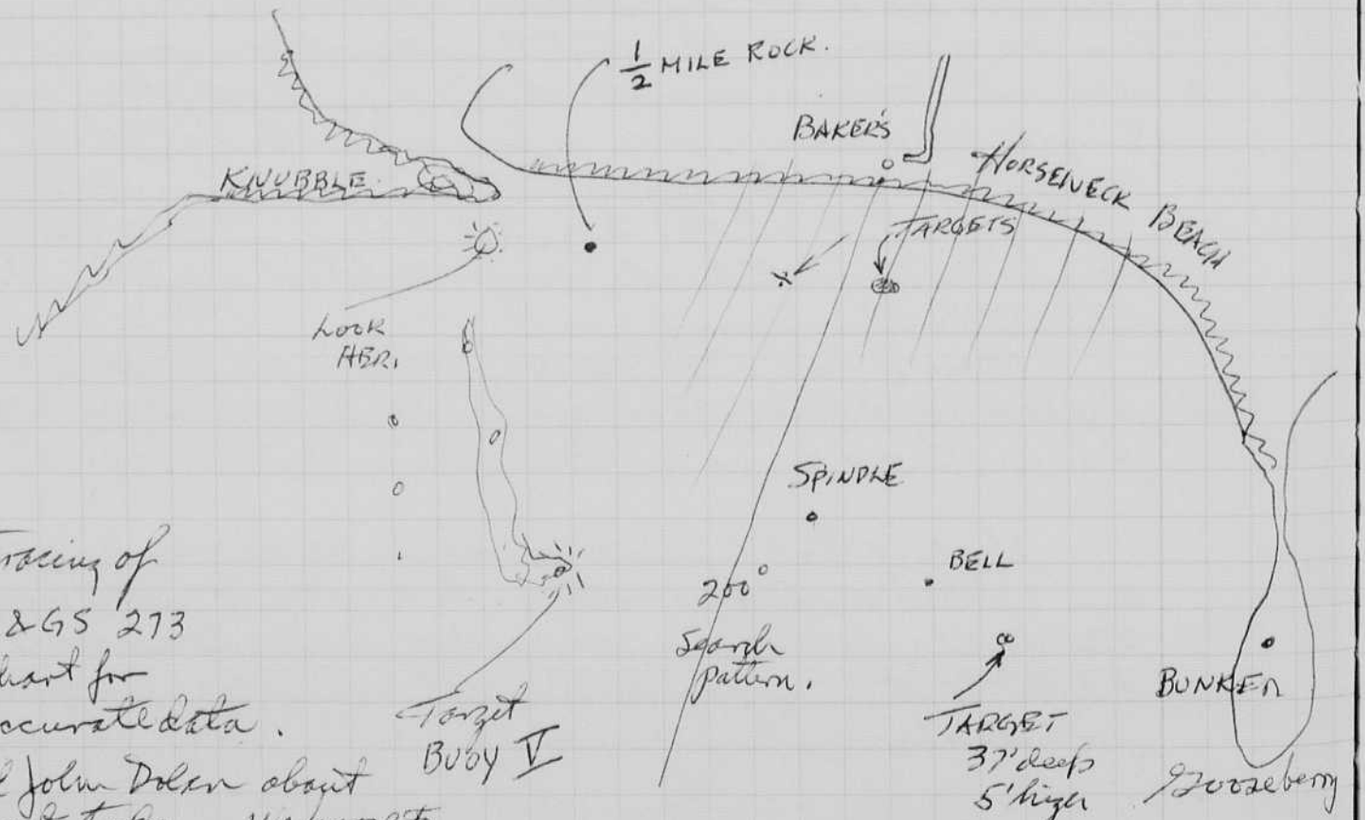
I spent the morning studying the sonar records of the 27, 28 Aug. Then I made a map of the Westport area off Horseneck beach with the several targets on it.

There are two areas that should be investigated. One is a target on the south east of the bell "WH." I can locate it easily with side scan sonar. This target shows a double patch of highly reflective material. One part seems to be circular and slightly away from the rest.

I did try a magnetometer at at 37-40 feet deep. I did not get a pull. Maybe I missed the target. Maybe it was covered with growth.

A second area just west of 1/2 mile rock seemed to show a target. I must get the sonar closer to a 16 ft hole just west of .

I propose that we reinstall the transit on the shore and run two more lines to the west. This will close in on the Knubble.



See Tracing of C&GS 273 chart for accurate data.

I called John Dolan about the targets today. We hope to get action next week.

EASTMAN MONOCHROME FILM 5041/0

410

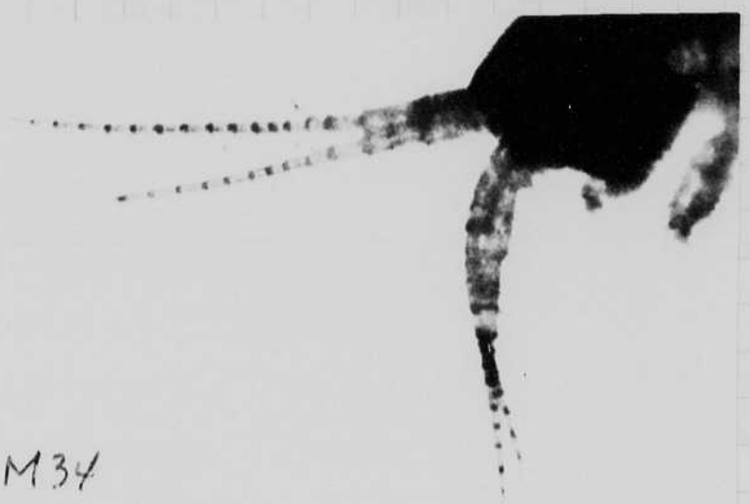
M17

1mm

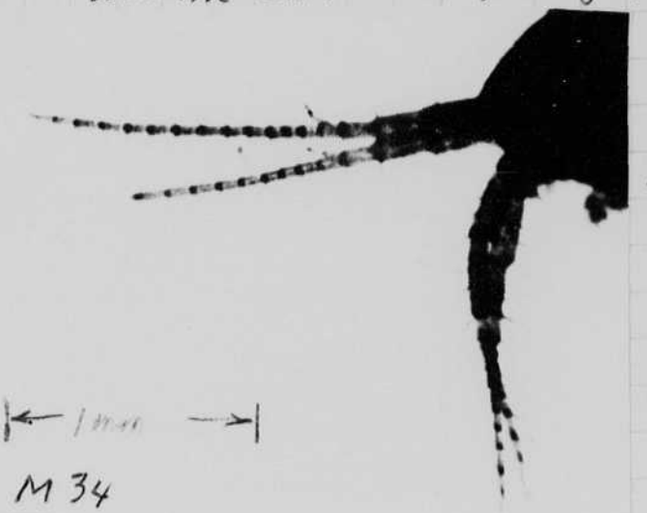
from the Charles River
Sailing pavillion.

Silhouette photograph with 0.5 c.p.s. in 1.6 mm hole. 10^{-6} sec exposure. 2 meters away mag 17x with 50mm lens f 5.6

M = 34
Unitron 5x microscope objective



M34



1mm

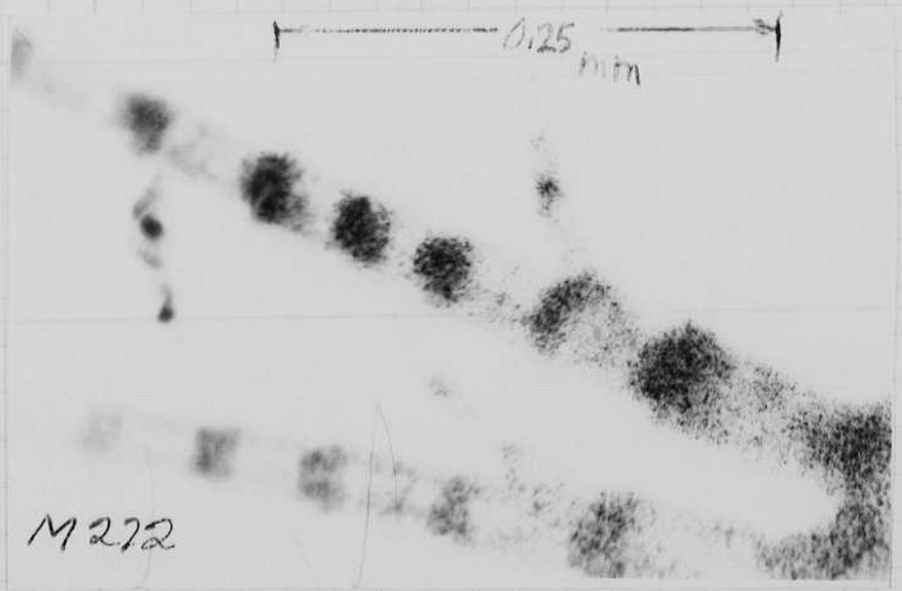
M 34

M = 34
25mm lens
micro Zeiss

M = 68
Unitron x10

M68

1mm



0.25 mm

M272

M = 272
Unitron x40.

all from the same negative.

note grain in this print

This photomethod seems to be very powerful for living material. I must get thinner emulsions with no grain.

Eastman 410 fine grain film.

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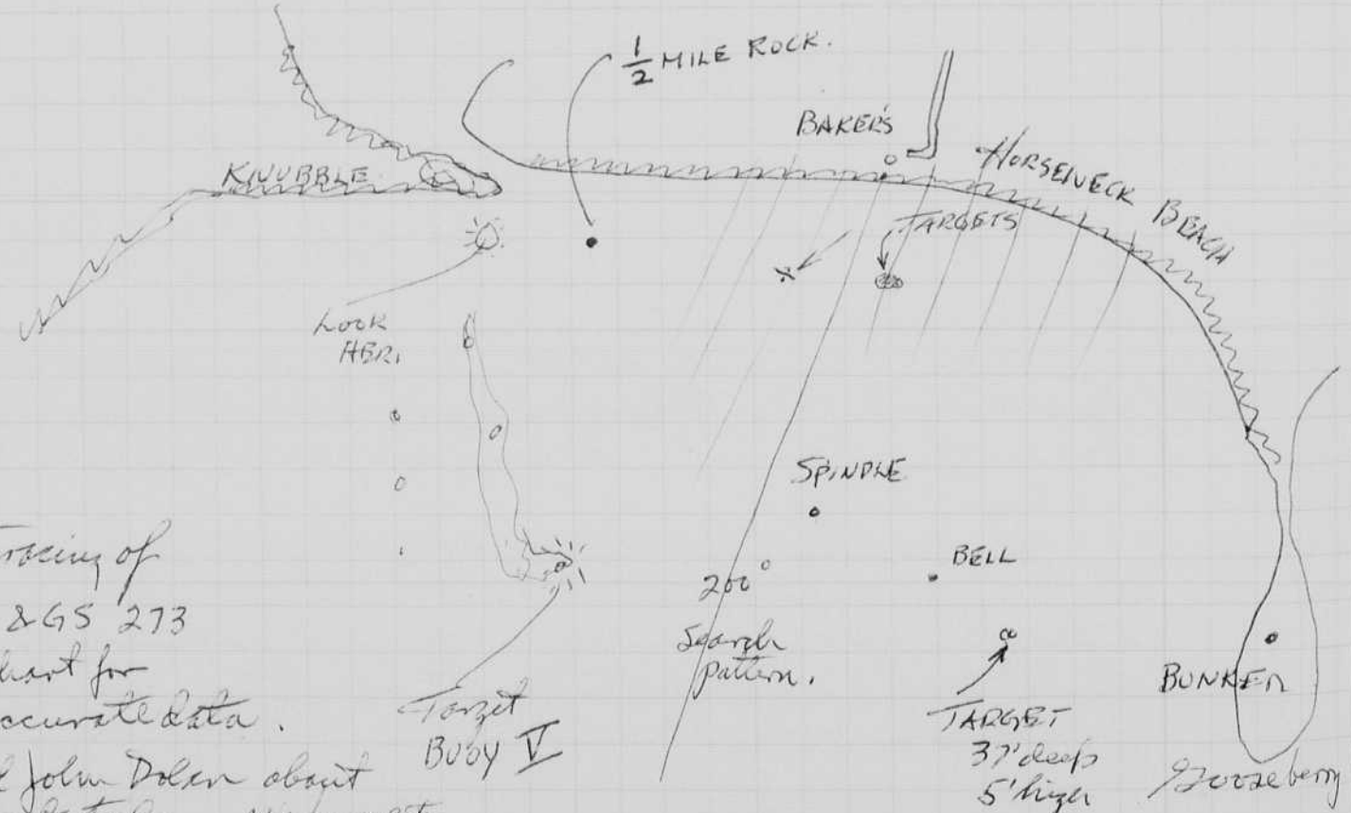

See Tracing of C&GS 273 chart for accurate data.

I called John Dolan about the targets today. We hope to get out in next 2 weeks.

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410

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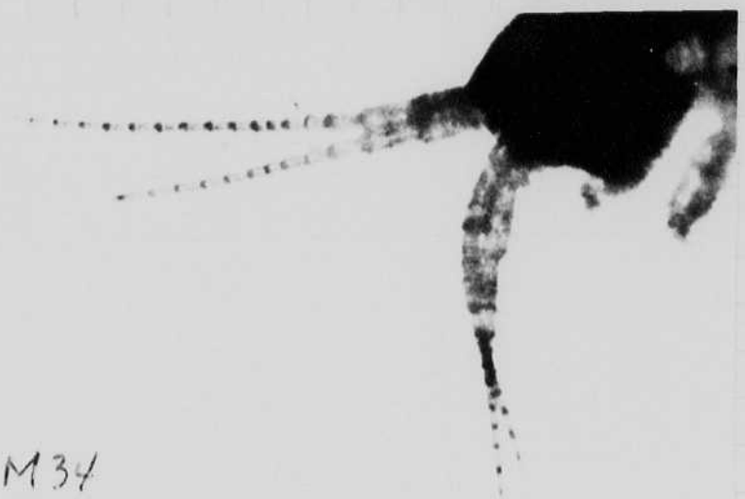
from the Charles River
Stichopus parillion.

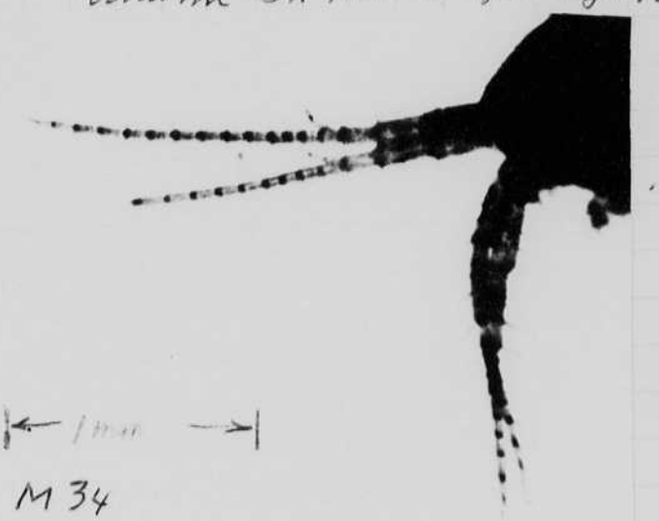
Silhouette photographs with 0,5 c.p.s. in 1.6 mm hole. 10^{-6} sec exposure. 2 meters away

← Mag 17x with 50mm lens f 5,6

M = 34
Leitron 5x microscope objective



M 34

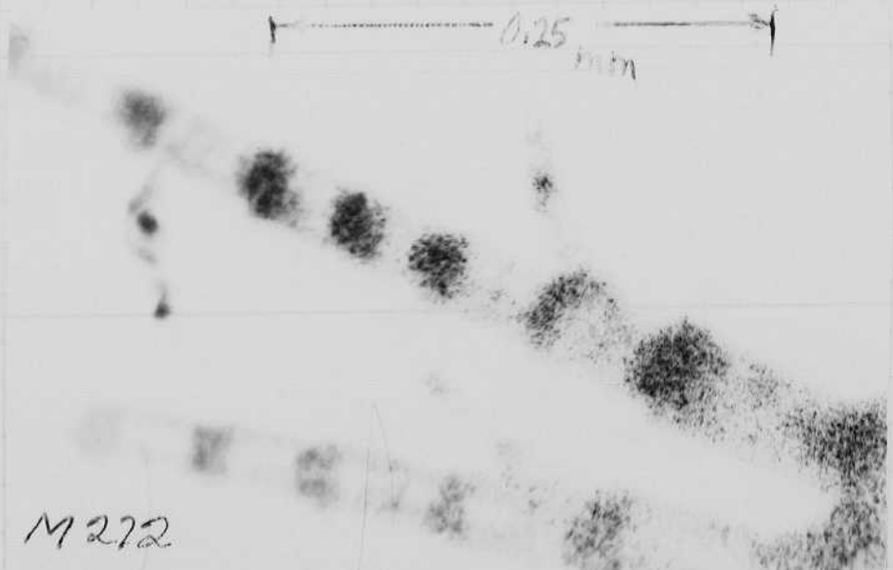


M 34

↑ M = 34
25mm lens
Macro Zeiss

M = 68
Leitron x10 →

M68



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Eastman 410 fine grain film.

6 Sept. 1, 1975.
Harold Edgerton

Jump on Prudential out. The capacitor 28 mfd 7000 v Sprague had blown out. There was a 16 in parallel. I returned to M.I.T. to find another capacitor.

J.Y. Cousteau arrived on the 12 noon plane from N.Y. city. I took him to 100 memorial Dr. where Esther had a very nice lunch.

Cousteau is going to make two 1 hour movies in Greece with the backing of the Greek government.

He wants to use a side scan sonar for search and his sonic pipe for exploration. A Texas M graduate (master) from Iran, Parviz Baba, is to come to Cambridge to learn how to service and operate the 259 sonar.

I will get information from EG&G to Cousteau in N.Y. next week (this week!). He wants delivery by Oct 1975. in Athens. Cousteau plans to survey much of the coast line for interesting wrecks etc. He has asked me to come if I can, since he knows of my interest in Nelid. Lepanto, etc.

More experiments were made with a glass ~~bd~~ lantern slides which have a very slow emulsion on them today.

1. Photo of ~~torn~~ torn paper edge and fractured glass 2 meters from 0.3 cps This was thin
2. Photo of Water flea (Chas River) in water drops. 1.6 meters.
3. Photo of Water flea in water drops 1.3 meters. All above were thin. Try fresh new developer next time.

J.Y. Cousteau
Side Looking Sonar info and best price
at PARK LANE Hotel
Central Park South

New York City
Tel = 371-4000 —
Phone, before Sept. 7 —
Equip. in Greece for October 20th —

Worm from Mt Auburn pond. Fine Grain Positive 7302

X 17 50 mm

X 34 X5 MICROSCOPE or 25 mm. Zeiss

X 68 x10 microscope objective

X 272 x40 microscope objective.

This fine grain positive 7302 is just a little better than 50 4/10. Exp 5

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Mr Cousteau
Side Looking Sonar info and bedspring
at PARK LANE Hotel
Central Park South

New York City
Tel = 371-4000 —
Plane before Sept. 7 —
Equip. in Greece for October 20th —

Worm from Mt auburn pond. Fine Grain Positive 7302 7

X 17 50 mm

X 34 X5 MICROSCOPE or 25 mm. Zeiss

X 68 x10 microscope objective

X 272 x40 microscope objective.

This fine grain positive 7302 is just a little better than SO 410. Step 5

8 Sept 21975

Harold Edgerton

1 Navigation methods to consider for Sonar surveys.

It is important to keep the data current. Every effort should be made to produce a plot of the ships position as a function of time as the data is being gathered.

Precision with side scan can be much less than with penetration sonar. also penetration sonar requires a ship to go much slower.

(A) Apparently ~~Loran~~ Loran A and B are not accurate enough for most surveys. In any case the loran readings should be recorded since they will be an aid.

(B) Next comes Radar as a navigation system. Distance ~~&~~ and angle can be read directly to ~~shore~~ shore points or to Buoys. This system is usually aboard survey ships and should be used.

(C) Sextant position measuring is a common system for ships. The readings take time to accomplish on a small boat. Likewise the entering on the chart requires a special 3 arm protractor. I have found that seldom there are facilities on the ship to plot the information on a chart. Sextant operation requires too much time. Maybe there are ways to speed this up.

(D) Pulse radio systems, Hifix Decca del Norte, Honeywell. Cubic, etc are all great but. 1. Require land based stations (or buoys) with powers

2. There is considerable expense involved.
3. Maintenance of the stations is required.

(E) Transit station. I have found that a transit station on the shore is a very effective method of keeping a survey ship on a line with great accuracy. Commands given with signals or radio to the helmsman guide the ship.

Visual sights to buoys or land stations to the side help to know where the ship is along the line. In any case, the line can be run again and again with great accuracy, if a target is to be relocated.

Transit lines should have 50% overlap so that double coverage will be accomplished. Why? Well sometimes the target may be shielded by the geology and can not be seen from both directions. The sonar may not be as sensitive at all distances due to the settings of the instrument. A double look may be helpful.

The records should be organized for re-examination at a later time. Often the targets are not recognized as the data is flowing into the recorder.

(F) Compass Bearings.

As a last method which is fast, simple, but not very accurate is the measurement of magnetic bearings to buoys or shore positions.

Care must be used to keep the compass away from iron on the ship since the readings may be affected.

(G) Vertical depth. The depth of water is often a very important bit of information and should be recorded. Most ships have recording fathometers

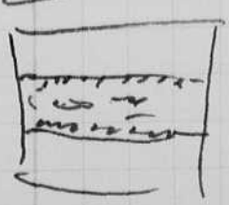
(H). Time should be the factor to interconnect all the data. a log sheet is one way to record every bit of information that come in.

If at all possible, there should be a facility on the ship where a chart with the ship position is continuously kept up to date on an overlay.

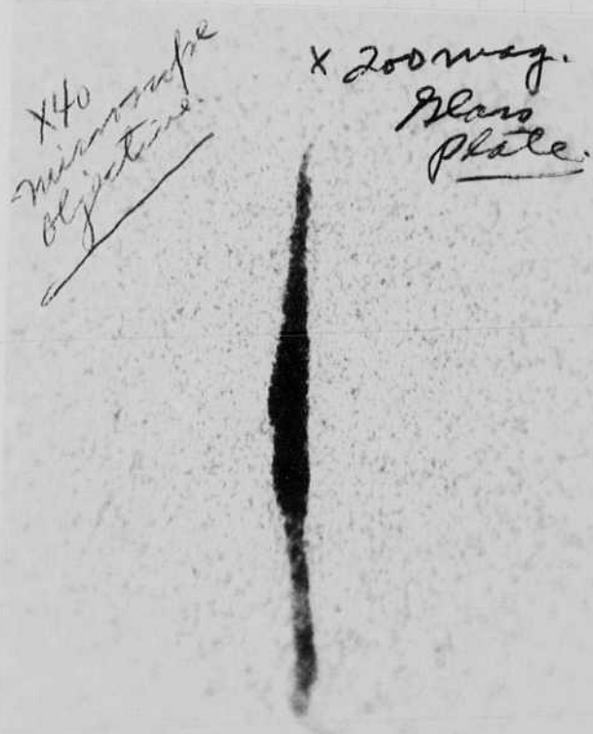
Shadow photos made on Glass Slides which are fine grain and blue Sensitive.

The grain is worse than 7302 or 50401.

Sept. 5, 1975
I went to Chas. Wyckoff's lab in ~~Sept~~ Newton to see the color photos from the 16 mm elapsed time strobe camera which Bob Rines took to Loch Ness last summer.
There were 3 excellent pictures! Chas made 35 mm slides from the 16 mm frames.



Jean Mooney was in Loch Ness last Summer. She saw the pictures on Sept 2.



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X40 microscope objective.

X 200 mag.
Glass Plate.

Sept. 5, 1975

Harold Edgerton

I went to Westport again on Sept. 3 arrived about 7:30 am. We went on Bearded Lady. operated by Paul Brayton. Claude LeDoux and John Dolan & a crew member.

We spotted a target found on Aug 28 at 1000' East and south. Divers went just outside. Rocks again. I now have a map with many rocks! We do not know where that wreck Atlantic Sword is located!

More records will be made in the area to the west near Dog fish ledge and two mile ledge. Reports of oil have been given.

Sept 7 1975 Gilbert Grosvenor Nat. Geo. Soc. called on ~~Sept~~ 5th about the Rines photos which are mentioned on page 11 of Loch Ness. Grosvenor and Barnett ~~planned to~~ did come to see Bob Rines on Sept 6. Sat. Rines told me about the meeting yesterday when I returned from the Plymouth meeting of the Bradford Society. There was a plan for image enhancement by this group at caltech. Then if possible a very short story with a cover shot for the Nat. Geo. Soc. for Jan.

Renewed acoustic with pictography is contemplated.

I suggested an electric switch on the camera or near the camera. This is because the camera is caused to swing about when the subject is near. Run time will be developed.

Could it be possible that the animal subject is curious about the camera?

The photo of the boat was excellent Distance about the camera = ?

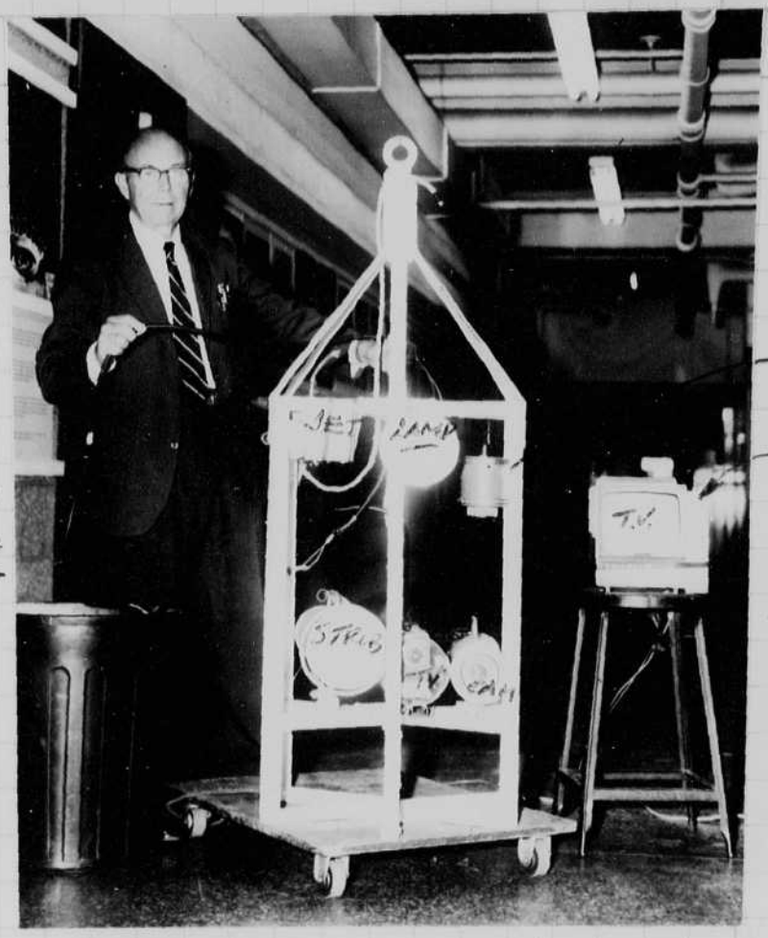
I propose that the camera be aimed ~~up~~ all of the time. The taking rate slowed be close to normal = 30 per second? for three shots

Sept. 9, 1975

Harold Edgerton.

Doug White is the new teaching asst. We went over the course today 6.163. We have two lectures a week plus a 2 hour lab.

Chas Miller is away, in Yugo Slavia for a few weeks, then he takes over for the rest of the term.



300' wire →

JET

control Box and T.V. to be on the ship.

Here is a photo of the Strobe and T.V. that is planned for the Monitor expedition of 1976.

We need to test it in the M.I.T. pool and the ocean before then.

Tobemby Doug White
Sept 9.

Bill MacRoberts helped to get our other T.V. units shake with a 100 ft cable for use at West Port.

Courtade, who was in Cambridge on Labor Day Sept 1. proposes to use side scan sonar in Greece in November to look for deep wrecks which can then be photographed by the diving saucer.

Information about the EG, & G 259 was sent to him on Sept 5 by Bill Reed.

I will need to cancel my trip to England in Nov 10, 11, 12, to go to Greece, maybe I can go after words. I plan to take the rotary job and a penetrator.

Pavic Babic arrived Sept 9 at 7:56 on flight 876 Delta from Miami. He is here to learn the 259 sonar for the Greek trip of the Calypso.

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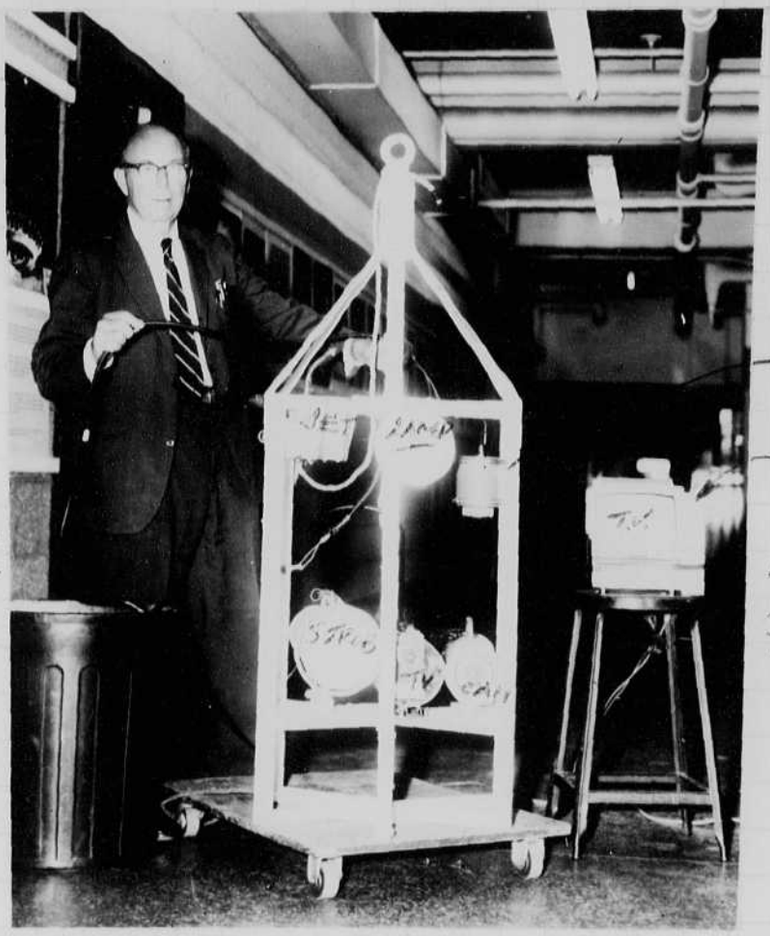

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14 Sept 11 1975

9 pm Loch Ness Inv. Committee. Acad of Applied Science

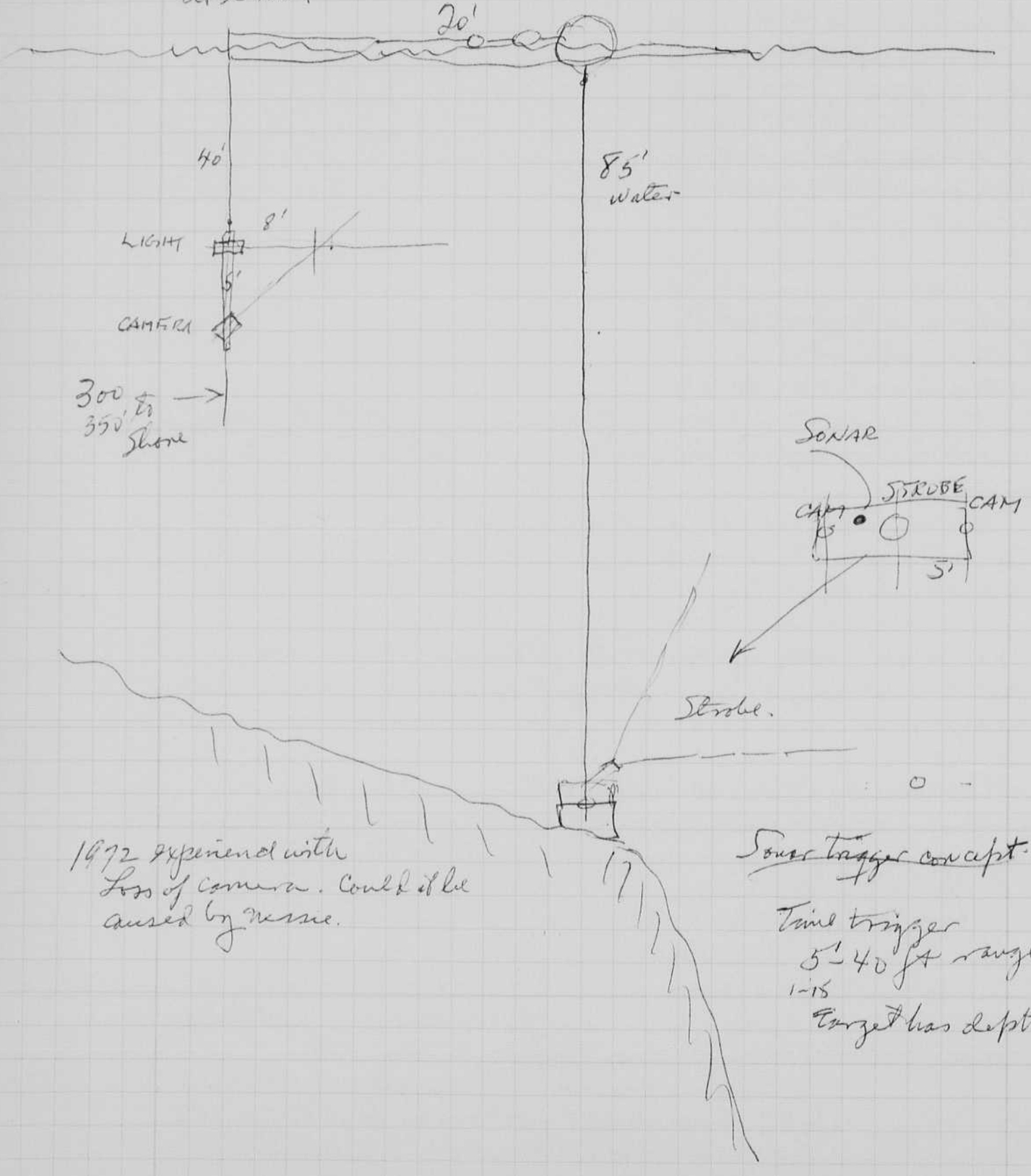
Robt Reines
Chas Wyckoff
Harold Edgerton.

Parvin at dinner.

Carol.
Jean Mowry.
Father.

June

Discussion of 7 photos made by Reines in 1975. These were out of 2000 frames of 16 mm High Speed Ektachrome. 50 watt sec DA = 8 BCPS = 1000 ?



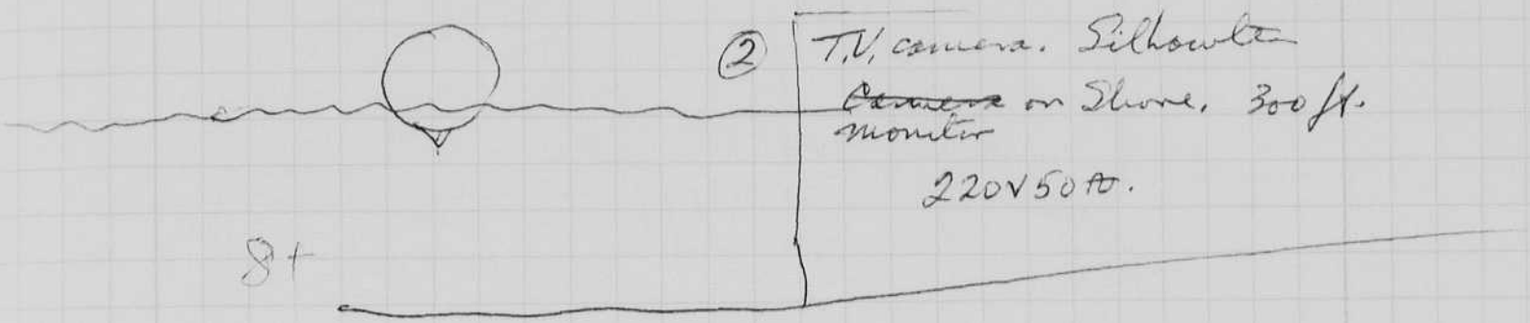
1972 experienced with loss of camera. Could of be caused by rescue.

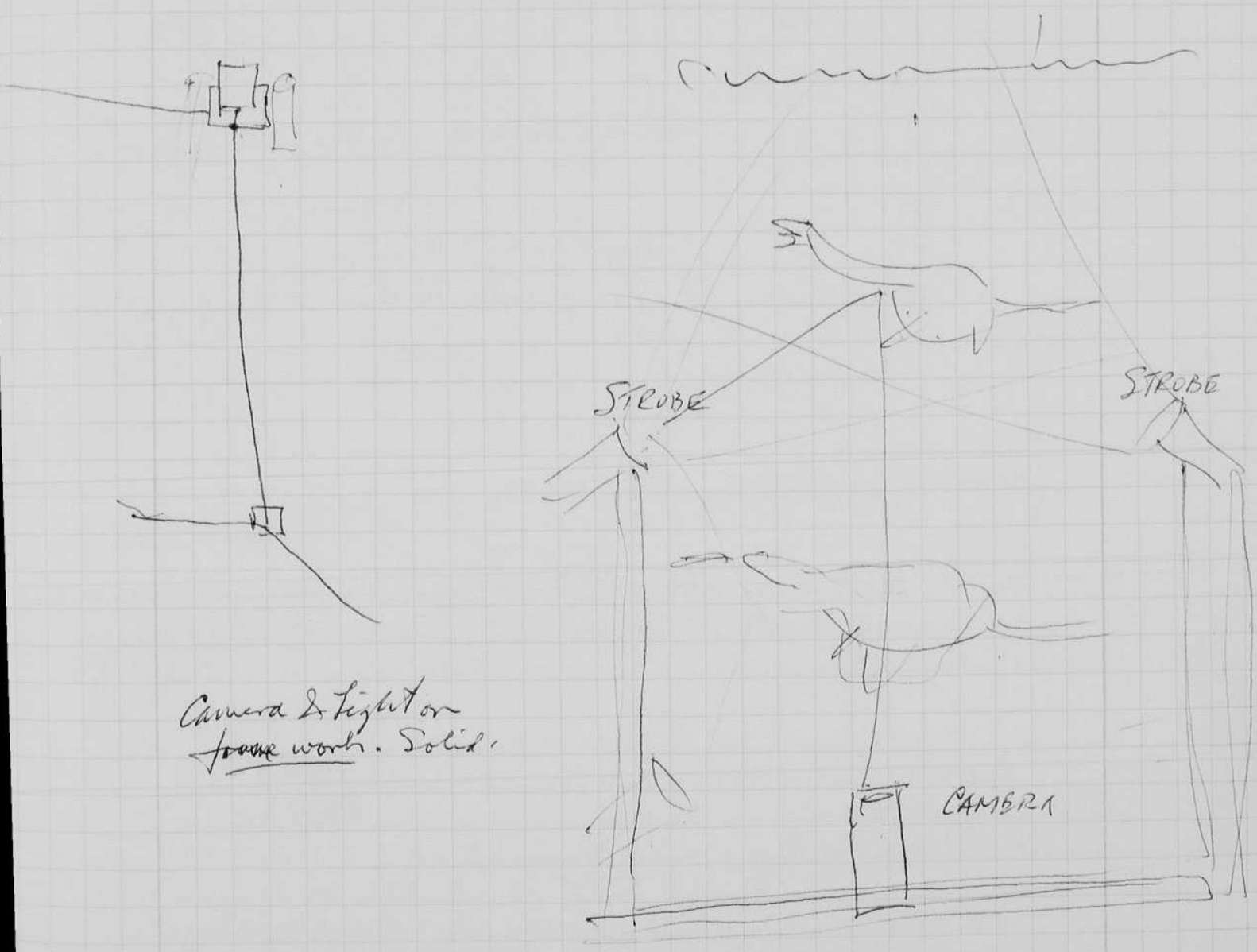
Sonar trigger concept.

Time trigger
5'-40 ft range
1-15
Target has depth

Future Experiments.

1. Daylight. Unfavorable angle (Wyckoff). Vertical camera
Shadow.
~~Stereo~~ needed.
~~35 mm. (big format).~~
16 oh2 movies.
2 per second 15 sec 30 photos.

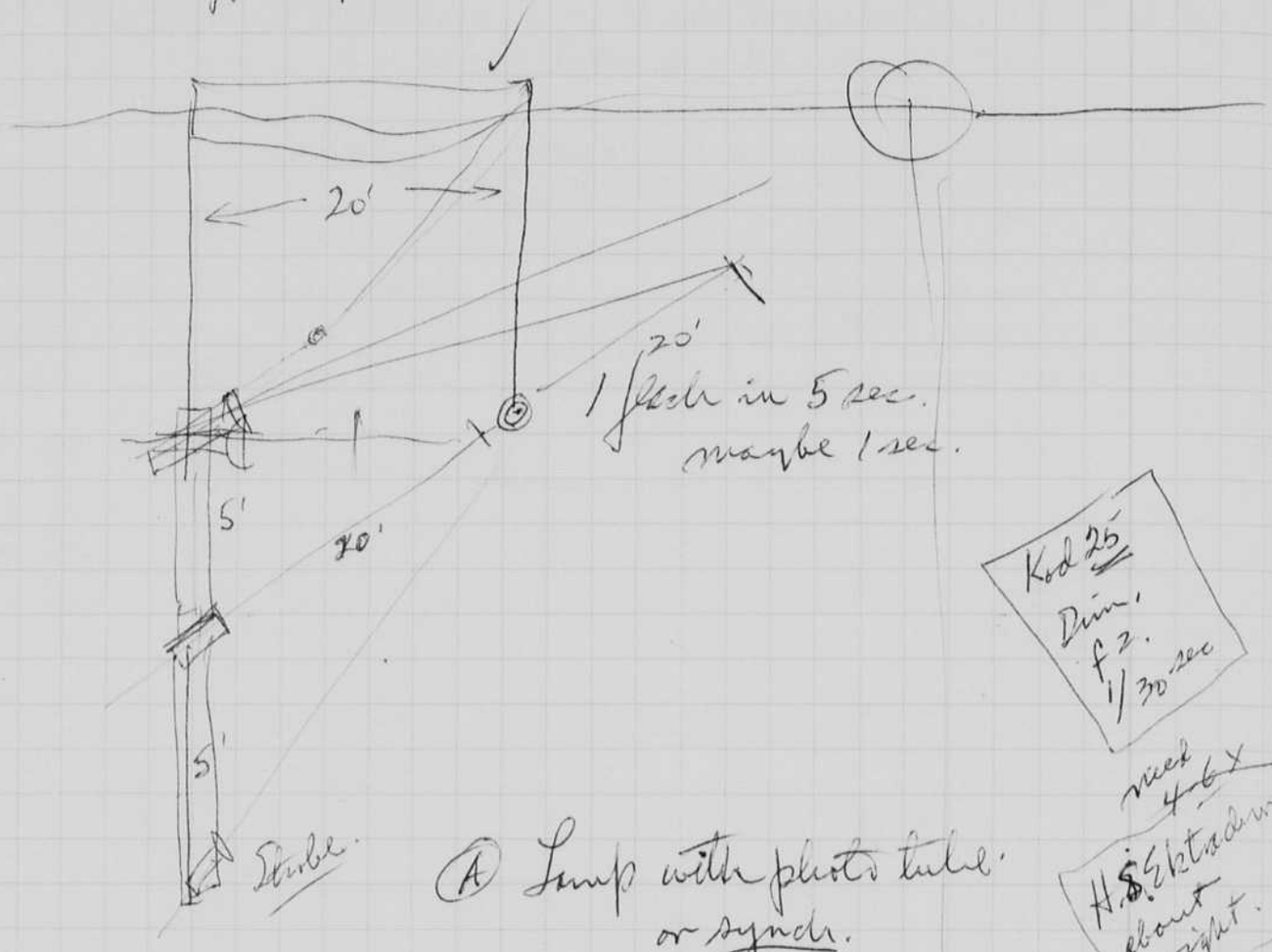




Camera & light on
~~frame~~ work. Solid.

Attractant to Animal
Strobe
Continuous light.
on off Lamp.

9-4
8 hours
60
480 minutes x 60 = 29000 sec
2000 photos
Rate 14 sec. 8 hours
14 sec



Kod 25
Dim.
f 2.
1/30 sec

used 4-6X
H.S. Extradon
about right.

(A) Lamp with photo tube.
or synch.

FREE
~~free run~~ 15 sec 8 hours.

(B) flash Lure.

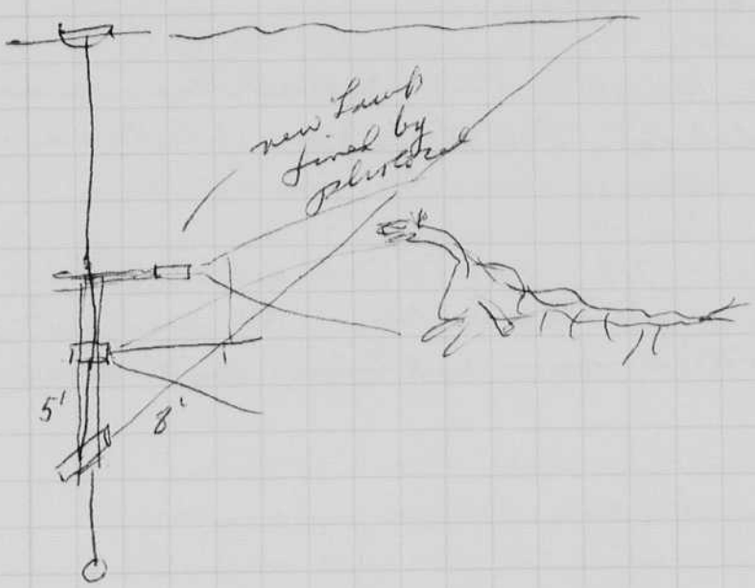
Batteries.
Electradyne H.S.

Oct. 12. 1975 Rings.
Oct 20.

(C) Television. 300' to Building
Take

Sept 16 1975 Tues.
Planet Explorer-

I called Wyckoff suggesting a lamp above if the camera is rigged up as before. The lamp could be also closer to the subject.



Inertia switch to start camera

Mercury switch -
Operates when tipped.

Question? Does the strobe lamp attract the monster?

Sept 20, 1975 Phone calls to Pines about Oct trip and N.G. mine made yesterday.
Nancy Smith (N.G.) called. Plan - He & Bob K drive to Washington with enhanced Photos for consideration as possible cover for Nat. Geo. Mag.
Oct. trip has nothing to do with the N.G. publication.
Discuss the participation of N.G. Photographer at Wash meeting. Pines report that the enhancement photo shows the complete mesh and something below the head. Working to S.P.L. I avail this eagerly.
However I am anxious to get on with the research. The question above is still foremost in my mind.

Sept. 19, 1975

Harold Edgerton

Yesterday in Washington D.C. to attend awards of Nat. Sci. awards to 13 people. Presentation by Pres Ford and Stever. . talk by Rockefeller at the State Dept at noon.

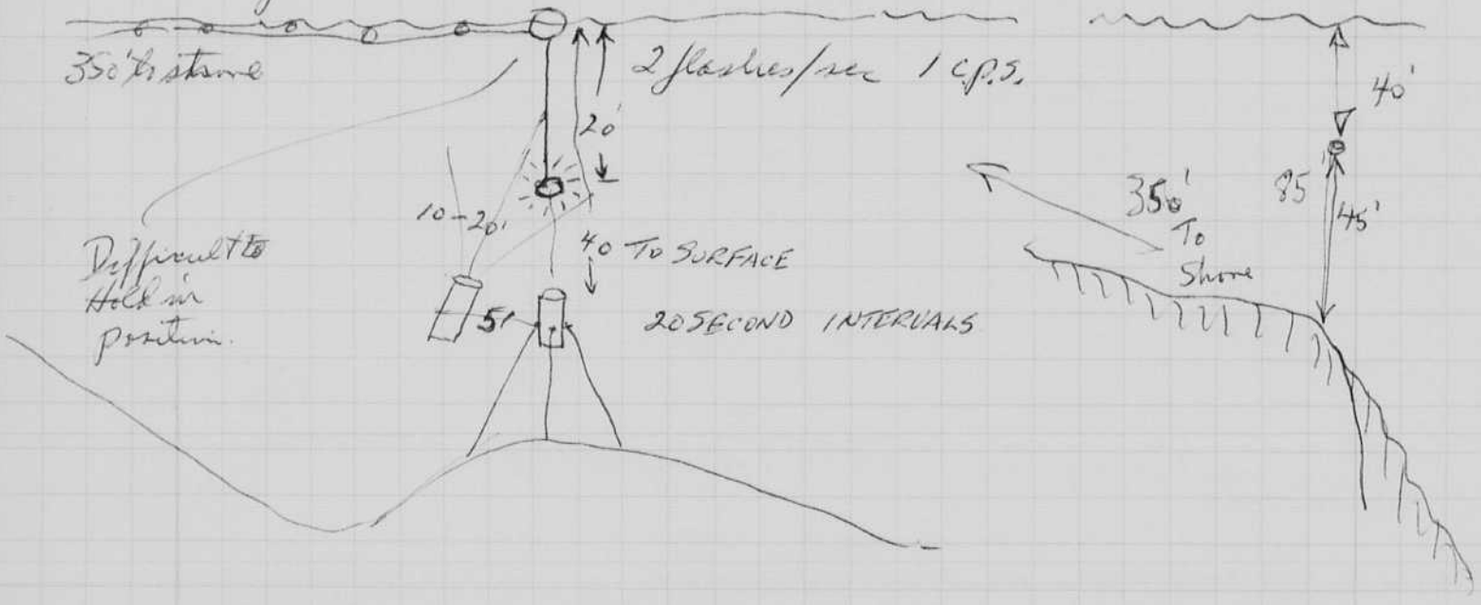
I saw Mal Payne, Mary Sumter, Hilbert Grosvenor Peter Purpura (Exhibits). The Loch Ness photos are to be discussed.

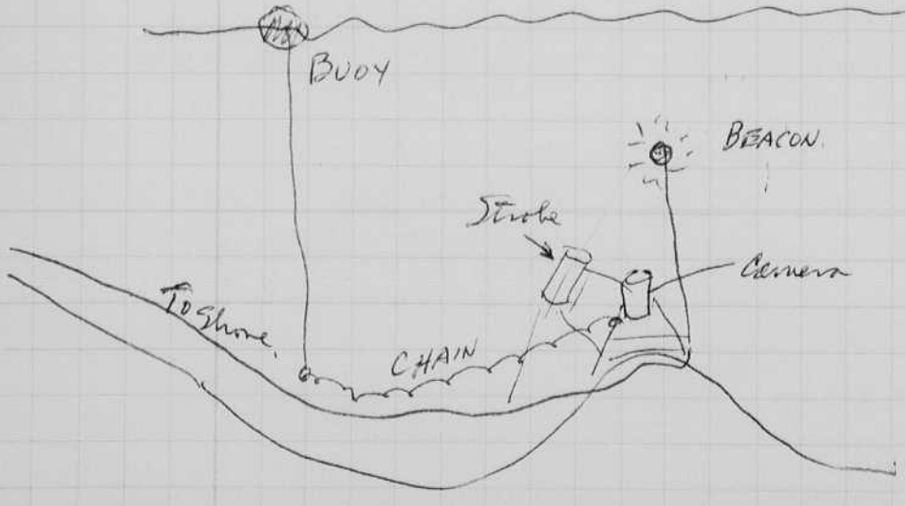
Sheldon Phillips 716-724-4524 called today to discuss the shadow photography. He suggested S.O. 343 and says that some had been sent before.

See Sept 20 on previous page.

Mac Roberts and I have been designing a small strobe, 2 flashes/sec, about 1 c.p.s. for use as a lure.

System to consider.





Plan for 35 mm camera setup for Tech News.

1. Assume the xenon flash will be a good lure.

2. Design for shore power with an isolation transformer

3. Put a Television camera near the camera so the operator can look.

4. Put several inertia switches in the area to alert the personell when there is action.

Design. Lure to float from the camera as in page 18.

Install 1 or 2 cameras with 35 mm color film in long rolls. High Speed Ektachrome.

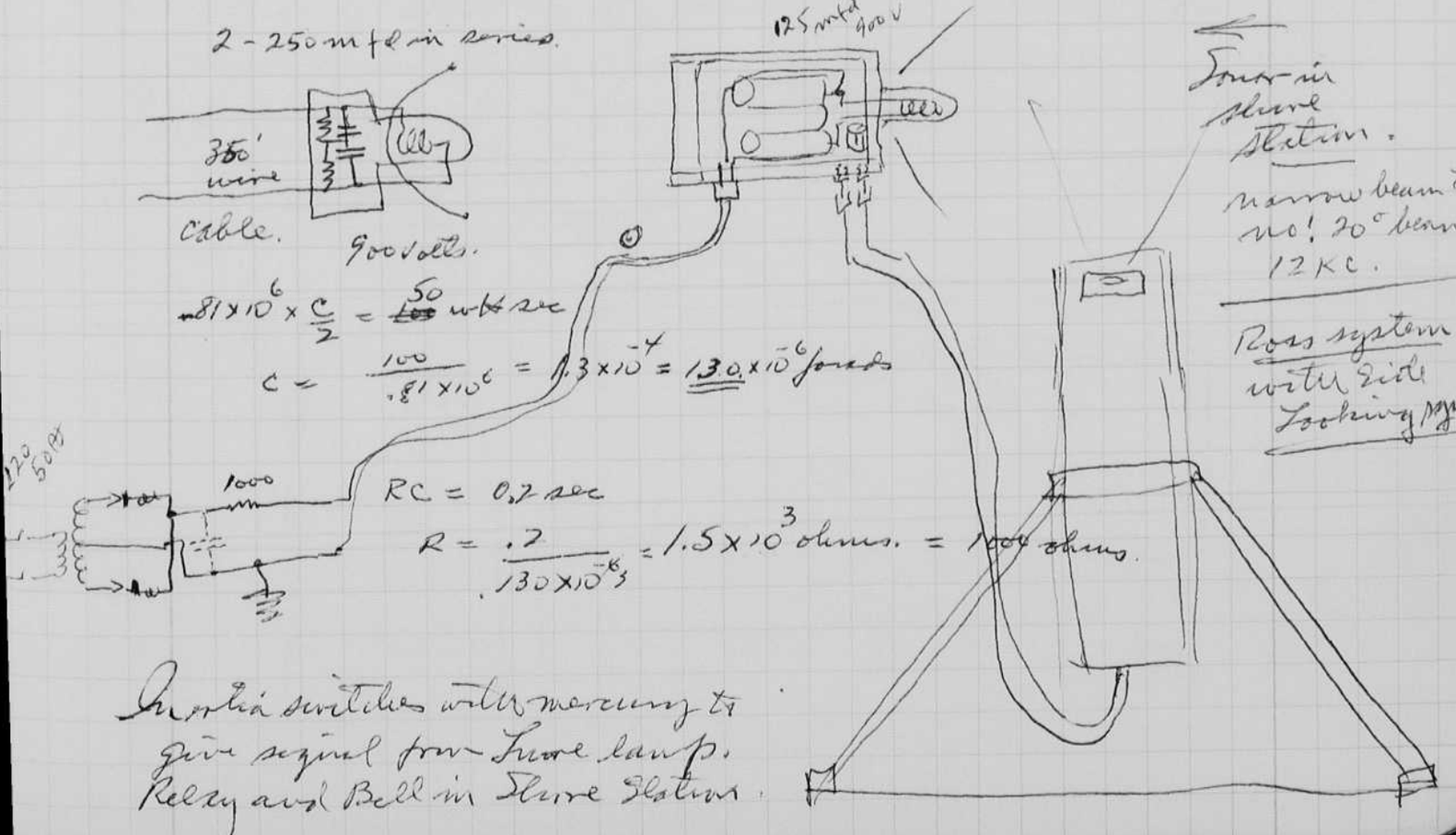
Operate at 2 pictures / second for 20 exposures. 50 watt sec.

~~200~~ Try 2 lamps at 50 watt seconds then power into lamp = 100 watts.

FX 109? 4 turn gently spiral.

10 sec relay

100 watts x 10 seconds = 1000 watt seconds.



$.81 \times 10^6 \times \frac{C}{2} = \frac{50}{2}$ watt sec

$C = \frac{100}{.81 \times 10^6} = 1.3 \times 10^{-4} = 130 \times 10^{-6}$ farads

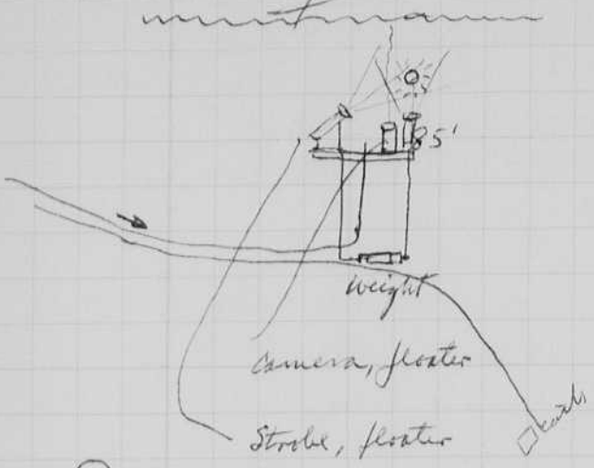
$RC = 0.2$ sec

$R = \frac{.2}{130 \times 10^{-6}} = 1.5 \times 10^3$ ohms. = 1500 ohms.

Mercoid switches with mercury to give signal from Lure lamp. Relay and Bell in Shore Station.

Sept 20 75

Hand Ejector



2 - 50 watt second strobes
1000 ohms chg. 2 per sensor
for 10 seconds.

35 mm camera - high speed ektachrome

How to fire the sequence.??

Castle

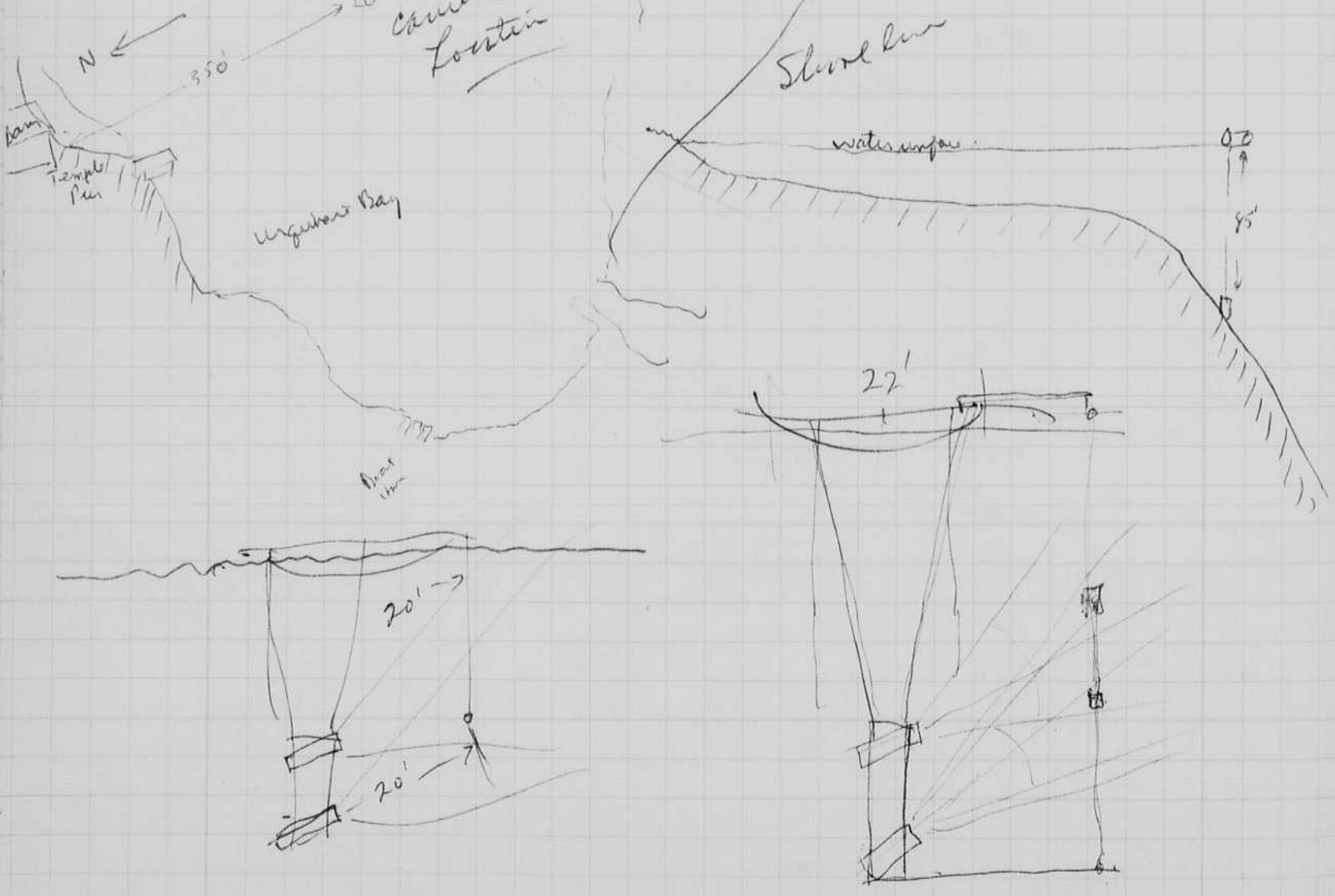
Roberts.

Hypo -

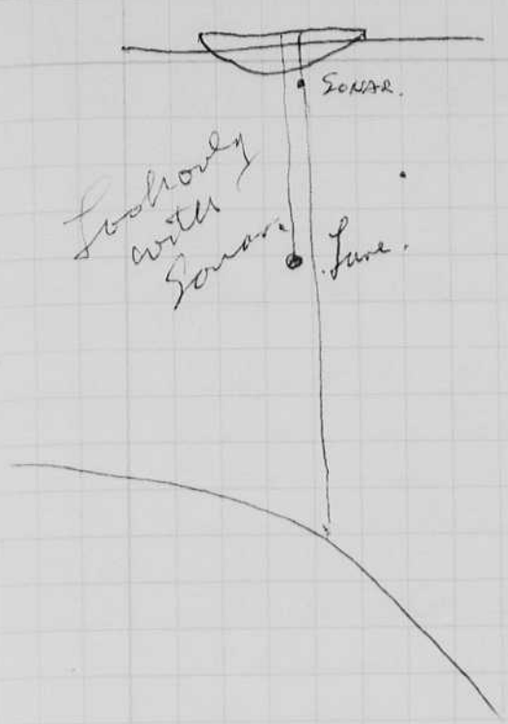
Sept. 22 1975. Bob Rines & Chas Wyckoff.
Crompton
Prof. Leem
Head of MEZ
Fishes.

Jim photo -

no fish no Reptile - (known).
photos w. Eleanor.



* 1st Conference with Chris Wyckoff Max Roberts.



Oct. 1. Line light Runs to Europe.

2 Realign light

3. Auxilliary light.

or Realignment.

1 week $3 \times 5 = 15$ ~~bat~~ 30 bats. 45° 20 seconds.

2000 3 180 10 hours

Lamps.

Film 10 X films.

① The line light will be a North head system with the battery on the boat and the circuit below:

② The lamp will be aimed at 20°

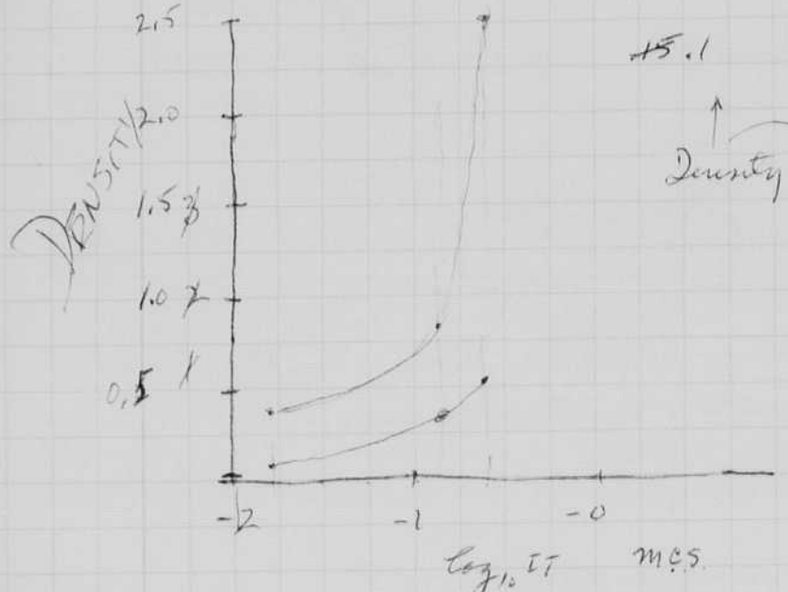
③. no lamps available.

The next phase is to design a system for a 35mm camera with a faster cycling rate - time of day - take it if possible, Sonar control of starting the whole. Method of observation from the shore. Ries and I will prepare proposal for Nat. Geo Research Lab.

Test of 7302 film. Point source.

Microflash = 0.5 cps. at $.3 \times 10^{-6} \times 10$

			Dk 50/3 min.	Dk dilution 1:2	IT		
		cm					
Bright White.	95 cm	95	.98 .6	2.5 3 min	.555	9.359	-.041
	64						
Clear	95+90	185	.3 .32	.59	.146	.14	-.86
				.37			
Floor	+67	252	.17 .2	.05	.0346	.222	1.778
						2	-1.798
				.07			
			.15.1	.05			



↑ Density

Sept. 24, 1975 Tests made last night in Pool of the new camera for the Mountain tests.
f8 2 meters. T.V. Monitor plus 2 spare.

Note Bertlwo Optiotron is located at Lotter Giant Pump. Oklahoma city. Model 3D-12 NDVR catalog. This pump is

Under water exposure for the closeups of

Bob Rines called about J.P.L. enhancement of Tochners photos.

Allan Gillespie says that he can now see a lot of detail not easily seen before.

When these come Bob and I go to the Nat. Geo. to see about a quick publication. Also plans for new equipment and experiments.

Tests of film type 50427 from Sheldon Phillips E.K.

microflash point source 0.5 cps at
1.85 meters Density = .13
.93 meters Density = 1

Aerial 1414 nitrate.
Aerial 3414 thin Base
Same emulsion as 50427

Developed in Dektol 1:1 for 3 minutes.
The film clears quickly in Hypo.

Subject for 2nd photo .93 m was a piece of toilet paper and two needles. There was an edge at .67 meters which showed blur.

The first negative showed paper also at an unknown distance. Diffraction was very evident compared to the 2nd exposure.

Prints made with	Enlargement
50 mm at max enlargement	15
25 mm "	33
x10 microscope "	55
x40 " "	202

x33 enlargement 25mm

33 times enlargement 25mm

Shows diffraction due to spacing above the film

50427

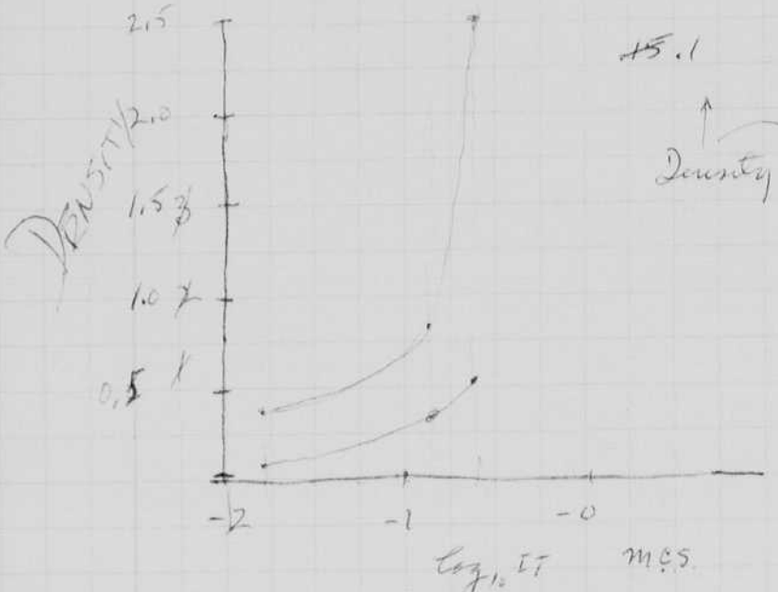
Sept 30 '75 Meeting at Theatre at P.R.O. committee. Concert minute taken and Francine Naff

Test of 7302 film. Point source.

Microflash = 0.5 cps. at $.3 \times 10^{-6}$ exp

Dyer for White.

		cm	DK 50/3 min	DK dilution 1:2 3 min	IT		
highlight	9.5 cm ~~64~~	95	1.98 .6	2.5	.555	9.359	.841
clear	95+90	185	.33	.57	.146	.14	.86
floor	+67	252	.17	.37 ~~.05~~ .07 ~~.05~~	.0346	$\frac{2}{.222}$	1.778 -1.798



+5.1

Density

Sept. 24, 1975 Tests made last night in Pool of the new camera for the Mountain tests.
f8 2 meters. T.V. Mountain plus 2 spare.

Note Bertiwa Optiflex is a Model 3D-1E NDVR cathode
Letter from Pump. this pump is
Oklahoma city.
Underwater exposure
for the close ups of

Bob Rines called about
J.P.L. enhancement
of Loch Ness photos.
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50 mm at max enlargement	15
25 mm "	33
x10 microscope "	55
x40 " "	202

x33 enlargement 25mm

33 times enlargement 25mm

Shows diffraction due to spacing above the film

50427

Sept 30'75 Meeting at Sheraton at PEC committee. Concord minute roads and freeway staff

24 Oct. 1, 1975 Harold Edgerton.

Reading 19+ on meter Probana -

AFS = 8

AET = 2.5

Exposure 1/10 sec at f 11 Developed 8 min in D-19 stock 1:1.

Density of stag 2.1.

Exposure ~~too~~ No - 500

16+ - 6000 Lumens.

17/11,000

19+ f 11 - 1/15 sec.

Insert 1/10 sec. Density 2.1 of stag.

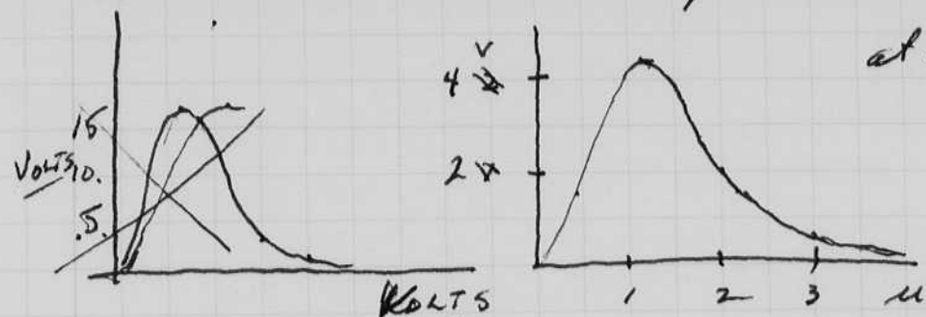
Try again with 1/100 at f 5.6

Oct 6. 75 Nancy Tam left for Hickory N.C. at 10:45 on Delta. She was in Boston to attend the PEO Convention of last week.

Oct 8, 75 Yesterday with Glen Reem at Magnolia to search for the ~~Thor Nautilus~~ at Magnolia on the north shore

Oct 11, 1975 Sat.
Harold Edgerton

Tektronic Scope 7623A. (new). making use of 1542 Strobotac at slowest speed.



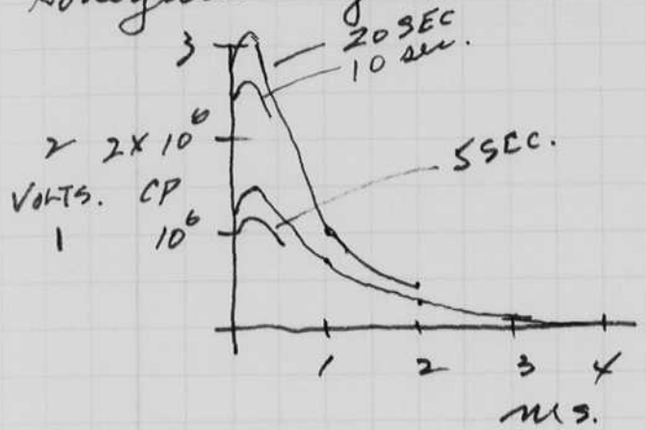
at 2.41 meters 100 Ω
1V = 10^6 c.p.

N.K. Strobotac at slowest speed.

CPS = $4 \times 10^6 \; 2 \times 10^{-6} = 8$

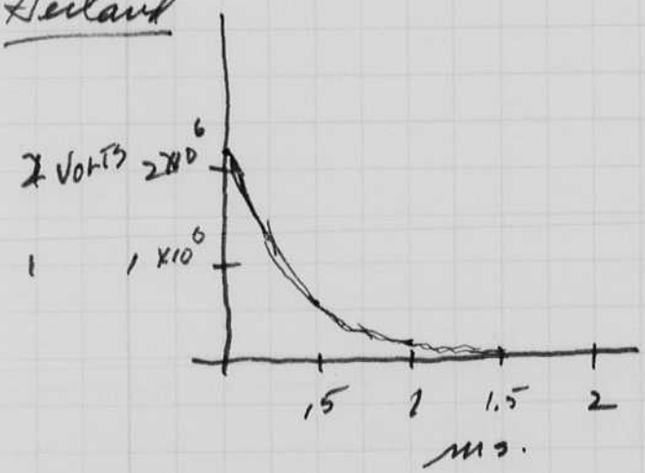
Oct 13 75
Honeymoon 25 year anniversary.

SL 3-4
Phototube #6 DENISE.
100 Ω.
2.41 meters 100 Ω.



CPS = $3 \times 10^6 \times 1 \times 10^{-3} = 3000$ BCPS

Heiland



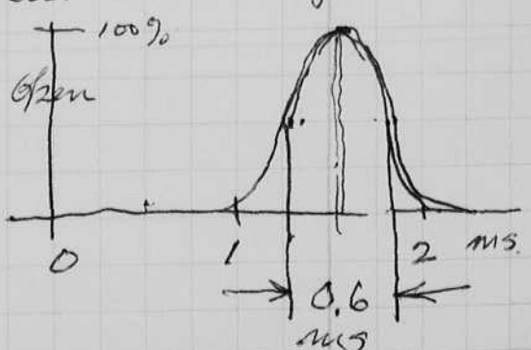
C.P.S. = $\frac{2.1}{2} \times 10^6 \times .5 \times 10^{-3} = 1.05 \times 10^3 = 1050$ BCPS

Oct. 15, 1975 Conversation with Andy Vincent 1225 Mt Ave Rochester N.Y. on the phone. 11 am.

The shutter opens in 1.6 m.s.

A 10 volt pulse will occur at the peak opening of the shutter.

The shutter can operate at 60 times a second.



Harold & Esther Edgerton. AA 1-2-6700

1975
Fri Oct 17 Boston - Detroit AA 91 3:15 - 5:04 pm
Robert Edgerton
221 Alland Dr. Pontiac Mich 48053
phone 313 332-5675

Tues Oct 21 Detroit - Omaha AA 553 5:27 - 5:30 chi
Hertz U 299 6:25 7:47 oma
Omaha Motel at airport

Wed Oct 22 Woodline Iowa in morning with Jessie Decou and Orline Coe. 712 647-2015.

Lincoln, nebr. Nat. Bank of Commerce.
Oscar Clarke 402 477-8911
Ted Frazier 402-432-6767
Howard Anderson 402-362-3701
Aurora Ken's Motel 402-694-3141

Fr. Oct. 24. Omaha - New Orleans Braniff 141 1055-1120
155 230. 335 new orleans
Sa. Oct 25 Auto. Hertz New orleans trip cancelled.
Su. Oct 26 Frank Bennett 1042 Blanmore Ave Baton Rouge La 70806
504-Di-4-9195
Bill & Joan 7815 Willow St New Orleans
504-861-1856

M
University Center at the University of Houston
Tues Oct 28 Evening Houston M.I.T. club Texas 495-0063 (warwick Hotel)
6:30 reception
7:30 dinner
8:30 lecture
Jack Larko Univ of Houston 713-749-1349
Joe Moore 713-228-0871 (home 713-468-7501) Oct. 28 + 29
Wed. Oct. 29 10 am. Shell Dev Co 3737 Bellaire Blvd po Box 481
Houston Texas 77025 713-667-5661.
Lecture.
afternoon - Discussions. (Emanuel Baskir) ← Bruce. MIT

Thurs Oct 30 Dallas evening lecture Dallas Mus of Fine arts. (Fairmont 214-748-
A ad. of the Hotel - 5454
John Davis PO Box 807 Harst Tex October 30 night
dinner 6:30 lecture 7:30 reception 8:30
Bell Helicopter 817 280-2886
817 267-4844
Home
Bill Boozioths (bus. 214-521-2461)

Fri Oct 31 Dallas - Chapel Hill N.C (Raleigh-Durham) E 698-11.38 2.26 Atlanta
564 3.06 4.11

Sun Nov 2 Greensboro N.C. - Boston Piedmont 42 2.45 - 4.11 Wash
AA 350 5.30 - 6.47 Bos

every hr → (45 mins)
(Possibility - Fly Houston to Dallas 10-30-75 via Southwest A.L. Hobby Airport to Love ")

Nov. 5, 1975.
Herrick Hyatt

Jean J.Y. Cousteau

I go tomorrow to Athens on AA to Kennedy N.Y.
ody 418 to Athens arrive 10:35. Some 620 pounds of
equipment left tonight on the same flight in
12 packages.
The Calypsoosis in Athens and will make
~~two~~ T.V. presentations for the Greek Govt. Cousteau
will do the directing.
I have a list of things to do. We will see
what happens.

1. Search for Helice (ENKE) in the bay of Corinth.

2. Search for Le Pantis wrecks in the bay of Patras.

3. Ulysses wreck in Cephalonica Island
near Ithaca.

4. Greek wreck in "Chalchis". bay north
of Athens.

5. Marathon where statues were
found.

6. ~~Brittanica~~ BRITANNIC – large ships in 80 meter
of water 170 Km from Athens.
50,000 GI TONS 110 M between Naxos & Kea. Sea for Simeon

7. Thera Santorini. Island.

8 Crete

9. etc.

I went to Polaroid today to see
Ed Land's experiments with noise etc.
He showed a pendulum that "seemed" to
go in a circle when one eye was
covered with a 1.0 density filter.

Notebook # 32

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 26 and 27.

Item(s) now housed in accompanying folder.

16 mm High Speed Ektachrome Magazine Load
(30' Rines' portion 45 min load)
Lessie June 1975 Loch Ness - R. W. Rines

September 21, 1975 C. Ch. Cyclops

FRAME No.

R.T. = RINES TIME
S.T. = SCOTLAND TIME

0 ↓ LOADING LEADER 2400
87 ↓ CAMERA TRIALS INSIDE HOUSE - SCOTLAND
96 ↓ CAMERA & STROBE TRIALS PRIOR TO LOWERING INTO LOCH NESS
114 ↓

FRAME	RINES TIME (R.T.)	SCOTLAND TIME (S.T.)	
115	4:30 PM	3:45 PM	SUBMERGED 4:30 PM RINES TIME 19 JUNE 1975 SLIGHT DAYLIGHT SINGLE FRAME #138 5:00PM R.T. 4:15 PM S.T.)
200	6:20 PM	5:35 PM	SLIGHT DAYLIGHT #236 (7:05 PM R.T. 6:20 PM S.T.) DAYLIGHT STOPS
300	8:25 PM	7:40 PM	
400	10:30 PM	9:45 PM	1st PICTURE #398 (10:30PM R.T. 9:45 PM S.T.) 2nd PICTURE #438 CYLINDER (11:15 PM R.T. 10:30PM S.T.)
500	12:35 AM	11:50 PM	
600	2:40 AM	1:55 AM	
700	4:45 AM	4:00 AM	3rd PICTURE #726 BODY & NECK (5:17AM S.T. 4:32 AM S.T.) SURFACE LIGHT #732 (5:22AM R.T. 4:37AM S.T.) 1st BOAT #741 (5:35AM R.T. 4:50AM S.T.) START DAYLIGHT
800	6:50 AM	6:05 AM	
900	8:55 AM	8:10 AM	
1000	11:00 AM	10:15 AM	
1100	1:05 PM	12:20PM	PICTURE HEAD #1071 (12:30 PM R.T. 11:45AM S.T.)
1200	3:10 PM	2:25 PM	PULLED OUT OF WATER #1144 2:00PM RINES TIME 20 JUNE 1975 SUBMERGED AGAIN #1163. 2:25PM RINES TIME RUBBER BOAT #1165
1300	5:15 PM	4:30 PM	
1400	7:20 PM	6:35 PM	SILHOUETTE #1316 (5:35PM R.T. 4:50 PM S.T.)
1500	9:25 PM	8:40 PM	
1600	11:30 PM	10:45PM	DAYLIGHT STOPS #1520 (9:50PM R.T. 9:05 PM S.T.) STOP
1700	1:35 AM	12:50 AM	
1900	3:40 AM	2:55 AM	
2000	5:45 AM	5:00 AM	
2050	7:50 AM	7:05AM	
2053	8:55 AM	8:10AM	END OF FILM

DAYLIGHT

16 mm High Speed Ektachrome Magazine Load — September 21, 1975 C. Ch. Ch. & G.

Bob Rines' watch 45 min fast

Lasie June 1975 Loch Ness — R. W. Rines

FRAME Nº

R.T. = RINES TIME
S.T. = SCOTLAND TIME

0
87 ↓ LOADING LEADER 2:00
96 ↓ CAMERA TRIALS INSIDE HOUSE — SCOTLAND
114 ↓ CAMERA & STROBE TRIALS PRIOR TO LOWERING INTO LOCH NESS

	RINES TIME (R.T.)	SCOTLAND TIME (S.T.)	
115	4:30 PM	3:45 PM	SUBMERGED 4:20 PM RINES TIME 19 JUNE 1975 SLIGHT DAYLIGHT SINGLE FRAME #138 5:00 PM R.T. 4:15 PM S.T.)
200	6:20 PM	5:35 PM	SLIGHT DAYLIGHT #236 (7:05 PM R.T. 6:20 PM S.T.)
300	8:25 PM	7:40 PM	1st PICTURE #398 (10:30 PM R.T. 9:45 PM S.T.)
400	10:30 PM	9:45 PM	2nd PICTURE #438 CYLINDER (11:15 PM R.T. 10:30 PM S.T.)
500	12:35 AM	11:50 PM	
600	2:40 AM	1:55 AM	
700	4:45 AM	4:00 AM	3rd PICTURE #726 BODY & NECK (5:17 AM S.T. 4:32 AM S.T.)
800	6:50 AM	6:05 AM	SURFACE HOOT #732 (5:22 AM R.T. 4:37 AM S.T.) 1st BOAT #741 (5:35 AM R.T. 4:50 AM S.T.)
900	8:55 AM	8:10 AM	
1000	11:00 AM	10:15 AM	
1100	1:05 PM	12:20 PM	PICTURE HEAD #1071 (12:30 PM R.T. 11:45 AM S.T.)
1200	3:10 PM	2:25 PM	PULLED OUT OF WATER #1164 2:00 PM RINES TIME 20 JUNE 1975 SUBMERGED AGAIN #1163 2:25 PM RINES TIME RUBBER BOAT #1165
1300	5:15 PM	4:30 PM	
1400	7:20 PM	6:35 PM	SILHOUETTE #1316 (5:35 PM R.T. 4:50 PM S.T.)
1500	9:25 PM	8:40 PM	
1600	11:30 PM	10:45 PM	DAYLIGHT STOPS #1520 (9:30 PM R.T. 9:05 PM S.T.)
1700	1:35 AM	12:50 AM	
1800	3:40 AM	2:55 AM	
1900	5:45 AM	5:00 AM	
2000	7:50 AM	7:05 AM	
2053	8:55 AM	8:10 AM	END OF FILM

DAYLIGHT STOPS

START DAYLIGHT

STOP

DAYLIGHT

Dec 27 1975

~~Harold Edgerton~~. Now back Dec 22nd from the expedition on the Calypso with J.Y. Cousteau.

Nov. 6 (Th) Oly #17 to athens with Cousteau
Nov. 17 Arte mission trickeri. ~~(Stop at Antimotoland and Halcei)~~ ~~Storm~~
Nov. 24 " " Search in 42 meters for ship.
Nov. 27 Calypso at Piraeus Thanksgiving day.

Dec Pylos search for wrecks of 1827 (Stop at Salamis and Nelice Storm)

Dec 8 #2 left for London at 10:10 am - President Hotel.
10 Evening meeting at the House of Commons
about Loch Ness. Sir Peter Scott. David Rines etc.
I gave a short talk about strobe photography.
Dec 11 Oly plane to athens at 12 noon (left 2:30)
arrived athens at 8:30 pm.
Dec 12 Off to Kalamata in evening - then taxi to Pylos to
join the Calypso.
Dec. 20 arrived in Piraeus. Packed gear 8 boxes 500# for shipment
I made a dive in the Fouconpse on Dec 19 in
Nelice with Albert Falco. The "bumps" consist of large
hand sized rocks down to gravel. The bumps can be
several meters high on the N.E. corner of the delta
off Argion
Dec. 21. Left athens 3 hours + late on Oly #11 for New York with J.Y. Cousteau
Snow storm in Boston - all N.Y. Boston planes
cancelled. - Rivera Hotel. - Amer plane at 1:10 pm
Father returned about 7 pm from Hickory N.C.

Andy Rohintzer 202 325-9275 (now 14 yrs)
please call - Dec 23rd - He wants to find the
Titanic - in 12,000 ft of water. Photos,
T.V. and dive by submarine. Good idea!
This subject comes up every so often.
It would be a difficult task.

Call John Fitch. Tape lectures. EE dept. Paul Penfield.

Jan. 5 1976
Harold Edgerton

a meeting was held last evening Jan 3 1976 at my home 100 mem Drive. Bob Rines, Chas Wyckoff, Chas Miller Bill MacRoberts, Harold Edgerton Jean Monnes-Davies. Suggestions. for photography in Loch Ness.

1. Daylight illuminated camera, vertical to the sunlight 35 mm Black & White.

2. old Elaphed twin camera. 16 mm color.

3. Big strobe 35 mm camera color. Fast operation. sometimes.?

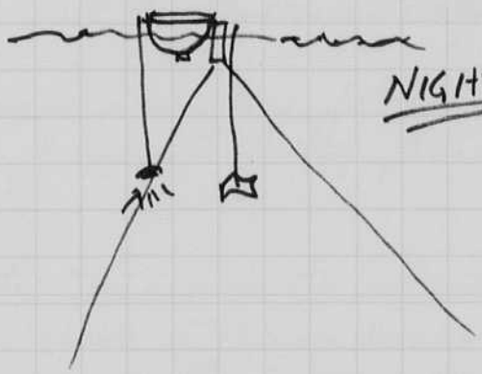
4. Television with "slow tape" and with "kick off" system for big strobe.

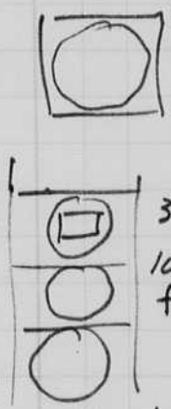
5. Sonar in various modes.

7. "Look down" strobe and camera. 100 ft.

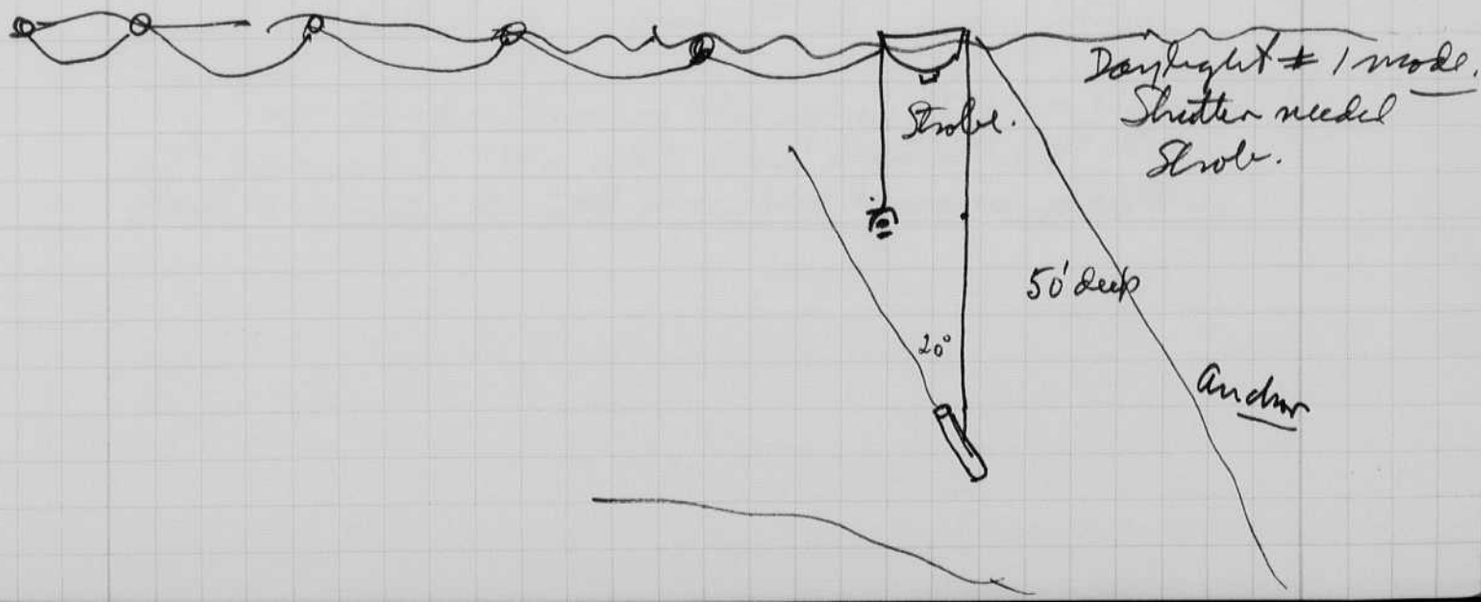
Run fast when subject is in the area.

Overlap Field down to floor.





800 pictures
16 ft.
1600 pics
12 hours.
60
720 minutes
1600
= .5 min.



30 Jan. 15, 1976

Harold Edgerton.

Marine Society meeting last night with Dan Horn – Exposition to France with Cousteau was discussed. Kennicott Copper co in Lexington (?).

Jan. 19, 1976. Lecture today on under-water photography in Room 4-402 at 12 pm I.A.P. program for M.I.T.

Bill, Chas Finkelstein, and I unpacked the 12 kc mud penetrator that was loaned to the 10 KSE oceanographic groups in athens. A good survey was made of the sewer-outlet area off Piraeus.

Elisha Linder has been here for a few days. Last night we had a small party. Martin and Diana Klein, Bob & Carol Rines, Joan Throckmorton, Jean Mooney. Linder went to N.Y. on the 9 pm plane Eastern.

I was in Philadelphia last week at the Int. Under-Water Archeological conventions where I gave a paper on the uses of sonar for under-water search.

Jan 22 1976 — Elapsed time Camera.

Ask Bill Wolcomm.

Continuous motion of film.

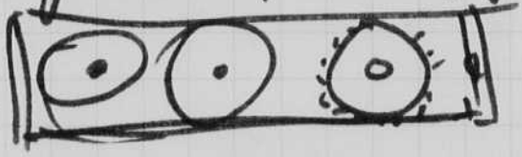
Fast Shutter - Vincent.
FAST.
Strobe.

1 sec - ~~1 sec. per frame~~

100 sec to move 1 frame.

15-20 sec to move frame.

Photo pistol up timing for squad.



4"

100 ft model.

Microswitch on teeth of sprocket for shutter.

Note:- a new camera has been announced by LW co of calif. It has 200' capacity with elapsed time capability.

A smaller camera by photo Sonic of calif is also a possibility for our tasks.

Jan 23 '76. I visited the Massa Co. about noon. Mark Massa gave me 5 transducers 12 KC which I plan to mount in case away.

Danny Massa explained his sound-filed equipment & monitor area.

— carpenter is the chief(?) engineer at Massa. We all had lunch at the Red Coach Grill with Massa Factory.

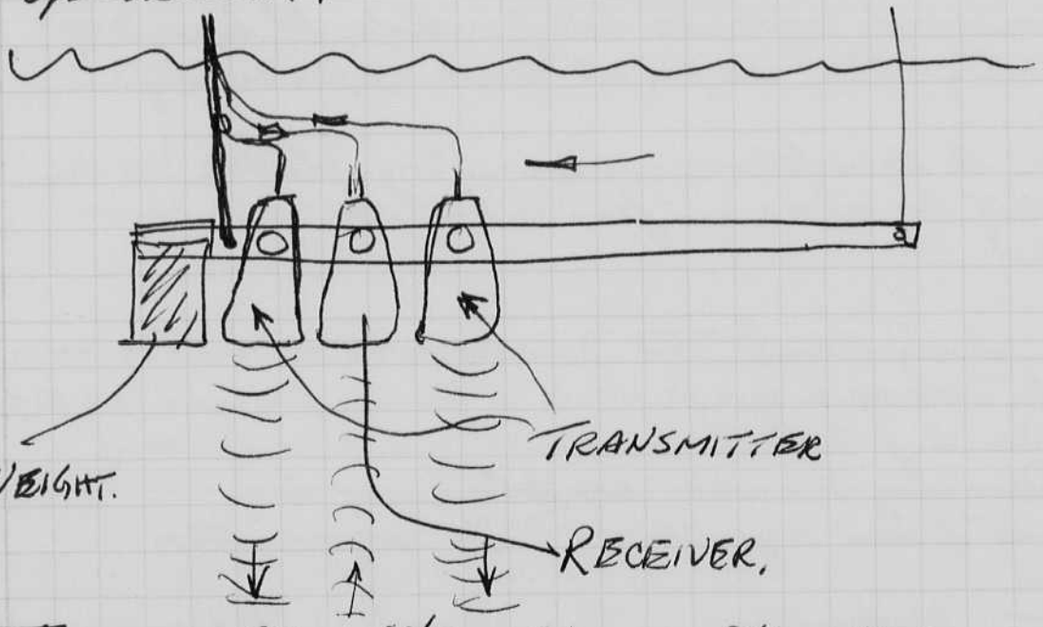
 Jan 27, 1976

Harold E. Edgerton visited the Massa lab in Hingham Mass on Mon, see previous page. Frank Massa gave me 6, 12 KH transducers.

These have been used for experimenting. at present, me, Bill MacRoberts and I, have decided to use three, closely spaced. The outer two are connected in parallel and driven through a twin cable #18 of 25 ft. from a capacitor discharge system.

The center element is used as a hydrophone. a 1000 ohm resistor is used across it to damp out the oscillations. We found that the signal is less than 0.2 MS. apparently the output is large compared to our old 12 KH Edo system.

The array will be mounted by metal clamps with a weight at the bow end. then a rope at the stern will be used to train the operation.



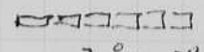
the use of 6 units - 4 trans mit with 2 recievers gives about 50% more output into the receiver.

Joe Boone called last night to advise about a visit of Mrs Polley of the Dynamation co in calif. This group are making a liquid filled camera - to withstand the pressure. The lens was made of high index glass and filled with pure water. The film must be wet before being installed.

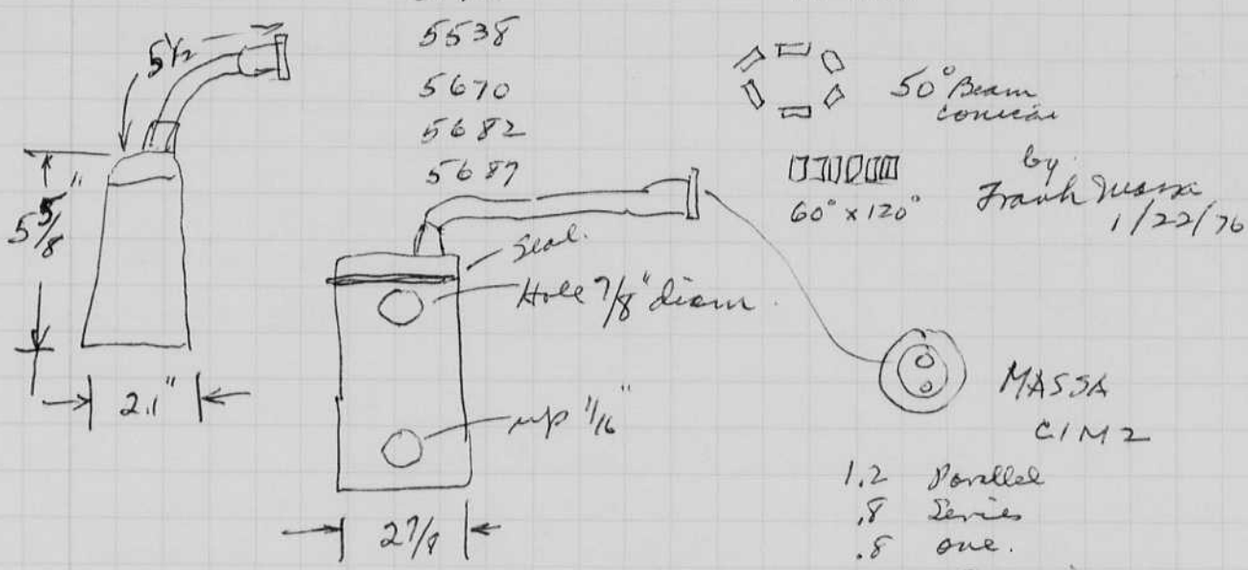
Jan 28. 1976
Howard Edgerton
Bill Mac Roberts.

12 Kc Massa Sonar

Massa 867509 4029
5192
5538
5670
5682
5687

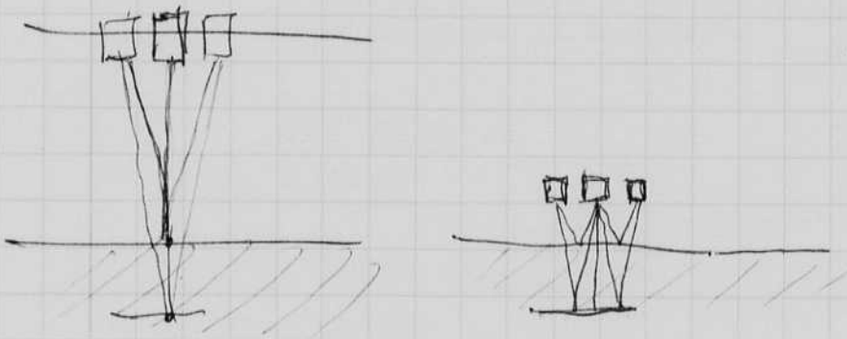


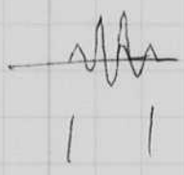
by
Frank Massa
1/22/76



1.2 Parallel
.8 Series
.8 one.
.8 center driver
2 outside in series as receiver.
1.4 peak to peak ~~Series~~ parallel - 25ft
Singer receiver

14 m.p. 10' to Plywood board.
~~2/5~~ ms duration.
3 cycles of 12 Kc.
1/4 ms duration.
0.25 ms





Trans W.T.C. A21 50 - 500 ohms.
at end of 25' #16 cable to recorder
@ 15.00

200 - 50,000

PC01 8.88

Jan 29 1976. Edgerton
Chas Finkelstein

Chas and I took the new 3 element 12 Kc Massa mud penetrator to the pool. It worked fine in the laboratory — but was u.g. in the pool. As soon as it hit the water the timing issues were too soon all by the same amount.

Jan 31 1976. Lecture last night in 10-250 (MIT on Photosynthesis Took Ness Chas. Wyckoff gave excellent lecture Then I showed an elapsed time movie Runs followed plus Chris Mc Dowell Blonder

Then we went to dinner

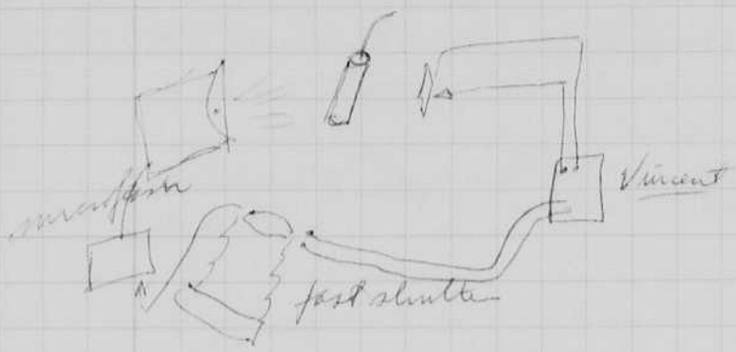
Martin Kleinfeld
Curtis & wife
Blanders wife an
2 children

 Jan 31, 1976
Harold Edgerton.

Test shutter (Vincent) with fire cracker.
contact about 1" away. microflash at 1 ft across
Plus x film developed 6 min.
Exposure Klein 2 photos of fire cracker.

Photos are late. is it
due to the delay in
the shutter.

Repeat - send results.
Explosion late. Paper in air.

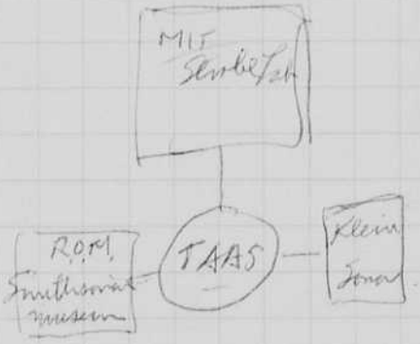


Conference on Tech Ness Photography.

10 am. Meeting in 4-402.

Bob Rines
Jerry Litvin
Chris Mc Govern
Bob. Needleman
Chas Wyckoff.
Bill Near Roberts
Harold Edgerton
Chas. Miller
Blonder.

Fissman, Cambridge England.
Martin, Brixham. London School.
Solomon, David. food chain.



Klein - High definition sonar
will be left there.

Sonargates.

Allen Gillespie
Peter Scott.

Co-quart Bay
Access to Shore
Rent Boat House facilities
Rines owns Boat House
(Power is to be installed
Menzies (land owner)
Rent or grind Barn for security.
2 Boats 22' outboard cabin 2 people
50' mooring on ledge.

Laurence T Bussey
Lt. Comd. USN
U.S. Dept of Commerce
National Ocean & Atm adm
Rockville Md 20852.
20 Jan 1976.
wrote to Rines - cooperation.

Chris. Mc Dowall.

Search for remains of animals, bones, etc.
Coring necessary for study of geology.
Bottom Sounding to show layers.
4 days to 3 weeks for birds in deer River.

Salmon Char. Lamprey? Hagfish. Poor a day for instruments.
Found, red spots in boy.

Film - 200 ft x 40 = 8000 frames of a roll.

24 hours. x 60 = 1440 minutes
60
86,400 seconds.

$\frac{86,400}{8,000}$ = 10.8 seconds between photos.

Observation by Mrs Nelson Bolton, 200 ft 400 ft max.
Suggested by Jerry Fetvin. Polaroid glasses.

Film now available in Scotland. John Cumming. Forum C.
Int. Nav.,
Bedford. (50 ft.)

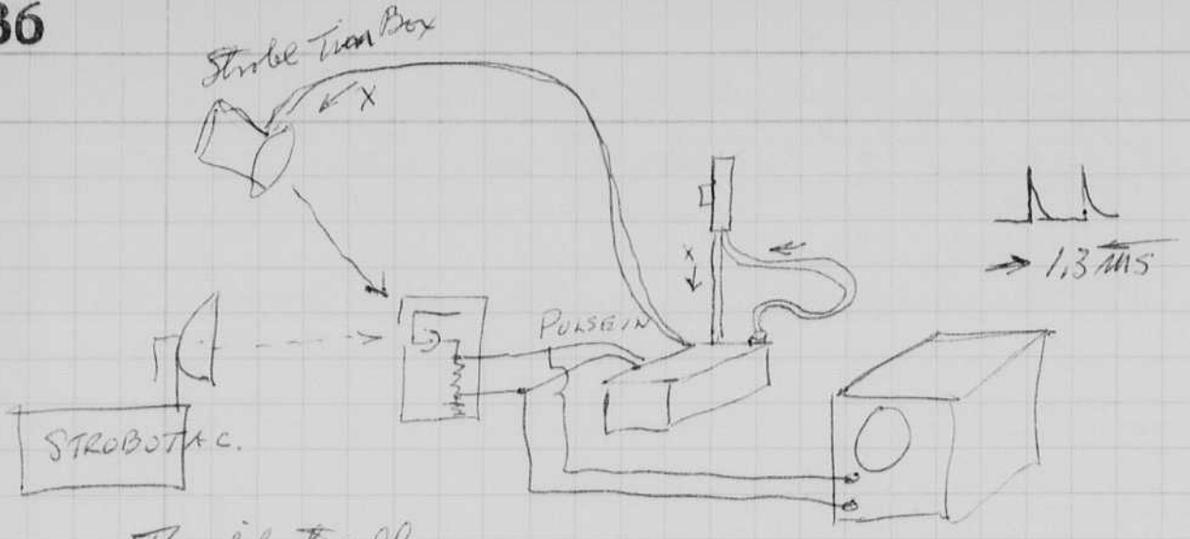
J.T.T. water stabilized Army. 5000.
mount rig.

Shadowing T.V. vs. Camera.

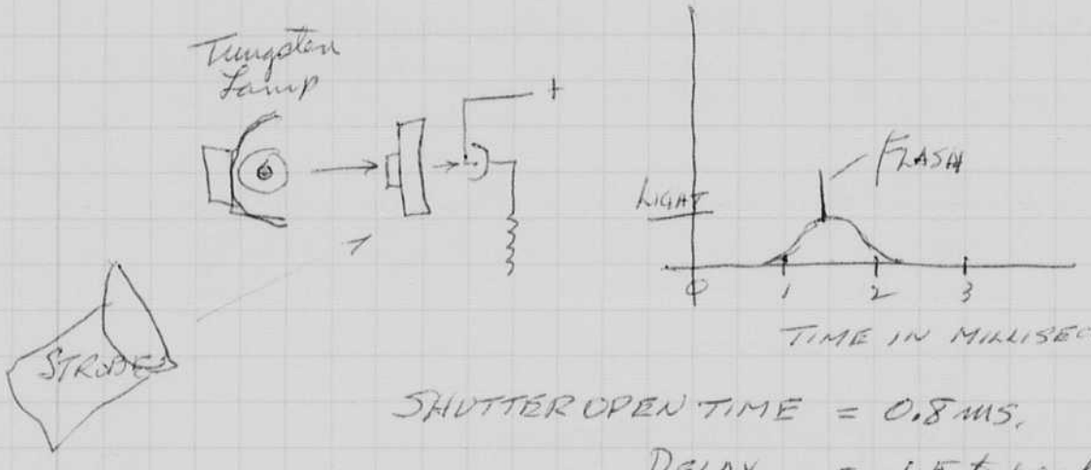
~~RCA T.V. System 1/2 hour. Disc. Playback.~~
Blonder. Says Tape home maintenance problems. T.V. problems.
T.V. available for survey with competent technician.
Fixed station. 80 ft water
Permanent light System on all the time.
Feeding ~~System~~ important in area. 50
Warm water center? 5
Noise Herding. 250
Big building on lake.
Permanent Hydroplanes in False.

Silhouette. Proposal 35 mm 10 mm Lens. 110V 50V
Shutter. power line.
Stroke 10 sec. To shore.

T.V. Chas Miller will give report.



The photocell accepts the light from the strobolar and the other flash device. The oscilloscope shows the delay in the system, which is 1.3 MS. from the light actuation until full open.



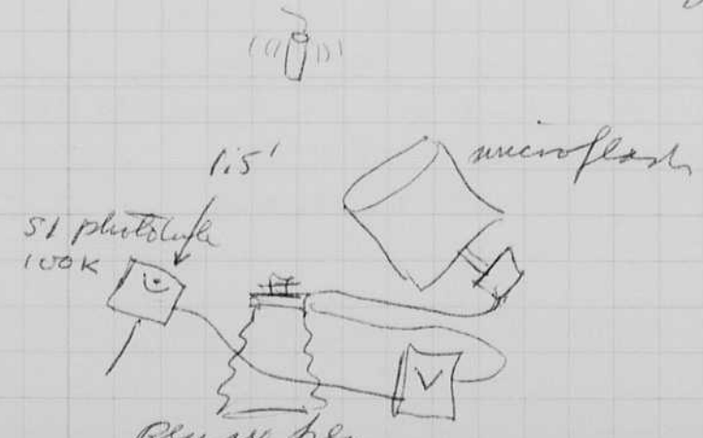
SHUTTER OPEN TIME = 0.8 MS.

DELAY = 1.5 to peak

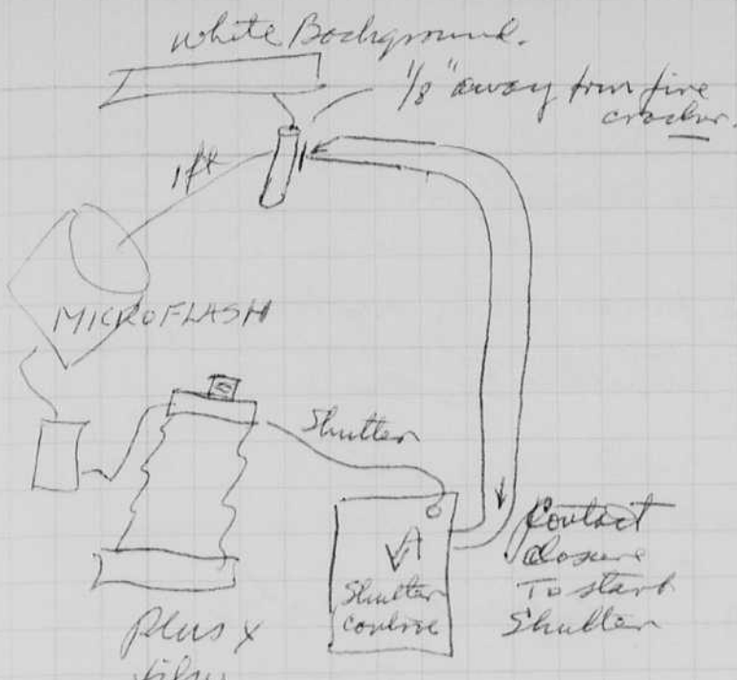
= 0.8 TO START

= 1.3 TO X SYNC

= 2.2 TO CLOSE.

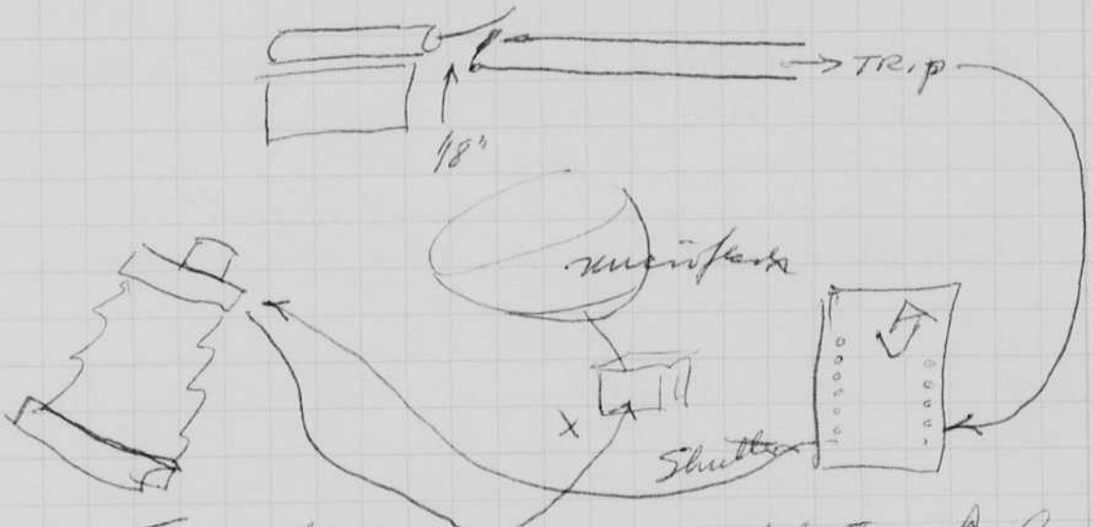


This did not flash the Strobe so I assume the light was not sufficient to trigger the shutter. We will know when the negative is developed!!



7:30 pm all the photos today have been late.

The trip has now been changed to be operated by the jet out of the sand where the fuze lies. I believe there is a strong jet here before the pressure builds up in the paper. Also the contact wires have been made weaker



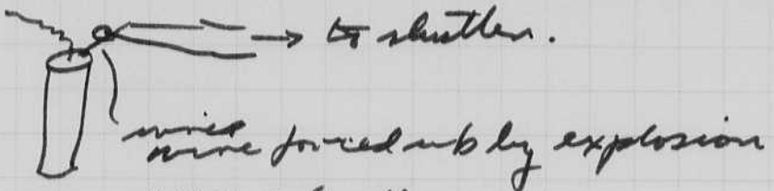
This photo was also late!
I believe this fire cracker did not jet very well.

Feb 2 1976

Patrick Barron (Sophs.) wants to go into insect photography. I gave him Balls and Hacking Balls papers.

Job 3. Tried again on fire cracker
Tri x film 12 mm DK 50 1:1
Cleaned microflash lamp.
Multiple shutter.
N.G. Contacts failed to close!

38 Feb. 3, 1976
Harold Edgerton.



26 L18A12X5 Uniblitz Shutter S/N 595
with synch contact.
Lense ROLYN R-122 mm to 132 mm
max OD 16.9 f 11
cable to power supply. Shipped 1-20-76.

75 5306. Invoice

Vincent associates
1285 University ave
Rochester N.y. 14607. 716 473-2232

Memo. All the firecracker photos are late since the shutter requires 1 ms to open. See page 36.
The exposure is about right for the flame at 1 ms for this firecracker.

Movie of Sun from 1st Balcony of Bldg 7 MIT
Feb 3 3 second intervals for pics.
f 22 Two 86 filters in series
Kodachrome II film
note Exposure seems 1 be oh.

Sun Still exposures Jan 31 5:45 with 1/1000 sec at
f 11 Plus X.
X1 filter ?

525
30
35
40
45
50
55 Sun set.

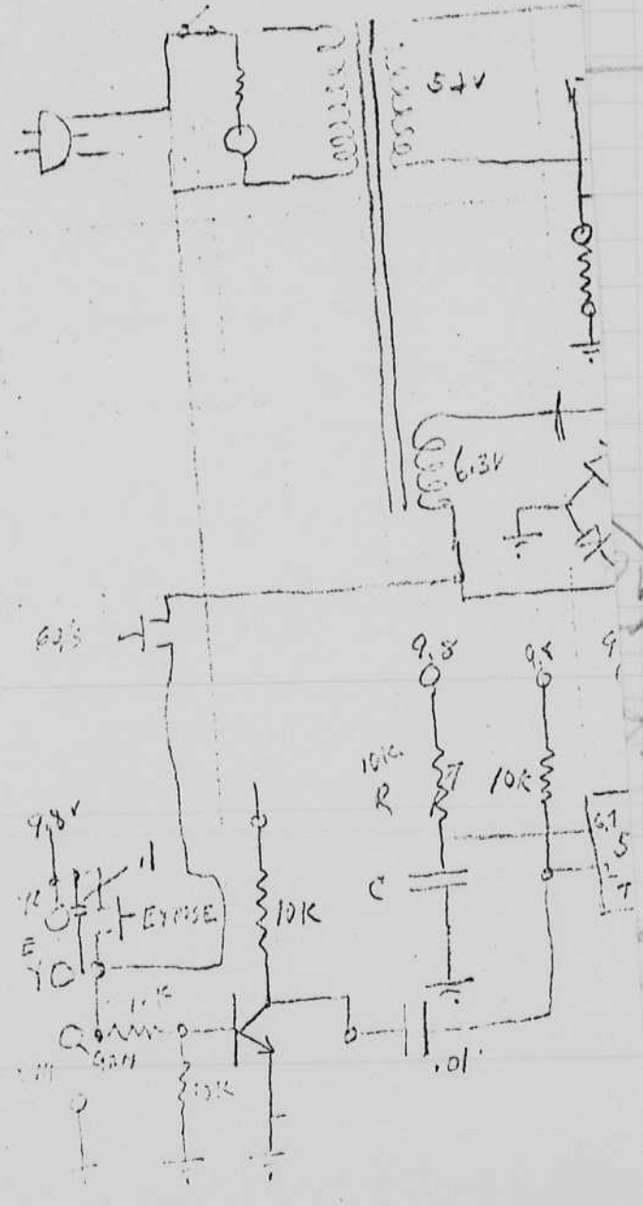
Feb 4 1976 4-402 10:30 Conference

H. Edgerton
Bob Rines
Chas Wyckoff
Phil MacRobert
Jim Raymond
Chas Haggerty
Chas Miller
Doug White

Present - 2000 photos 16 mm — 16 mm 50 watt sec.
10 mm f 1.8 augmentary

35 mm Bentzin 372 camera.
282 Strobe 100 watt sec
Lens f 3.5 28 mm (16 mm available.
Olympus lens.
3 sec min time. 1600 photos per

STROBE SHUTTER
SSD



3 months.

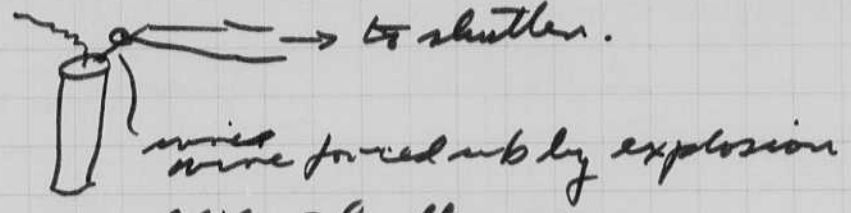
too small

Hose Clamps?

Data 1800.
and 37 7125
ae — 4345

Frames
75

38 Feb. 3, 1976
Harold Edgerton.



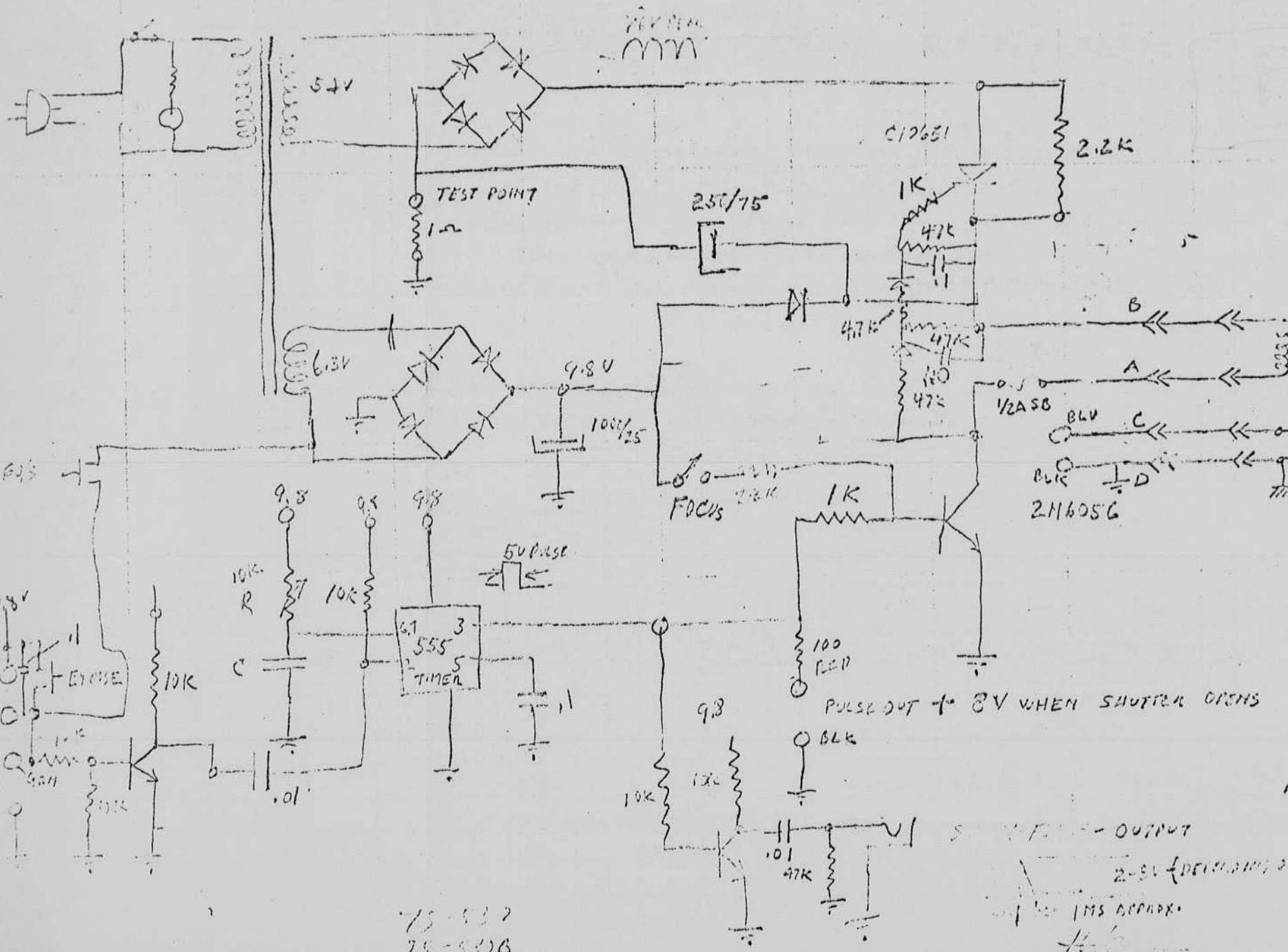
26 L18 A12x5 Uniblitz Shutter S/N 595
with synch contact.
Lense ROLYN R-122 mm to 132 mm

STROBE SHUTTER DRIVE UNIT
SSD-360

12/30 -

Vincent Uniblitz

DELAYED REQUEST SYNC CONTACT



1/12/76

Feb 4 1976 4-402 10:30 Conference

H. Edgerton
Bob Rines
Chas Wyckoff
Phil MacRobert
Sam Raymond
Gary Haywood
Chas Miller
Doug White

Present - 2000 photos
16 mm
16 mm 50 watt sec
10 mm f 1.8 Angenieux

35 mm Beaulieu 372 camera.
382 Strobe 100 watt sec
Lens f 3.5 28 mm (16 mm available. Olympus lens.
3 sec min time. 1600 photographs

New camera (proposed.)
Polaroid Shutter
10 mm Switar lens. f 1.6 (Chas Miller 4 mm)
Dome for window.

5 minutes.

Design 35 mm film
Lens 10 mm or 16 mm or 4 mm
film - thin film pins x.
D.C. operation.
Depth. - 750 ft. (1000)
Case Aluminum case for ~~P.V.C.~~ - too small
mount. (not important) clamps. ~~Hose clamps.~~ Cantilever.
Rate 10 sec min. to 1 minute.
Delivery - 3 months
Price. - $ 8500

Data 1800.
Camera 37 7125
Strobe - 1345

Conference notes made on Sat Feb 4.
Feb 6. Idea: suggest to Nat Geo that they put their cameras in all lock nets next summer.
Blonder says he has an S.W.T.A. ready to go.

Feb. 7. 1936

Harold Edgerton.

~~Feb 5.~~

The Sun was supposed to be in line with the main corridor of Bldg 7 on Feb 3 at 4.45 P.M. It was cloudy that day!

Photos were made of the sun with the 1 ms shutter Bldg 7 Vincent Associate.

Plus x film
f 11 (maybe less due to shutter) Density 1 filter.
Photos at
4.35 4.30 4.25
4.40
4.45
4.50
4.55. The sun was practically below the horizon at 4.55

These were multi~~flash~~ exposure shots

Circuit p 38

Tests of exposure on Plus x film
with 5"D 360 Shutter and f 11 lens
Three exposures.
Density 0
Density 1.
Density 3.
Direct Image of the filament on the film.
Exposure about 0.8 ms.
Subject 100 watt 120 volt clear bulb tungsten lamp

Results. Density 0 Dark exposure of filament OK
1 " " " " but less than before
3 no exposure. (M.S.)

Goans, Fire cracker. f 11 1/100 sec.
Wire contacts close to side.
Mazda at 1 foot.
Plus x film
7 mm DK 50 developer.

Paper cut from the fire cracker since 1 ms is the delay in the shutter.
Tail. Cloud of fire shown on one side.

10.05. Photo with open shutter & slow flame.
This firecracker was a fizzer. It did not bang.

10.07 Open shutter photo of firecracker.
a pre exposure was put on
the film with the microflash.
The match ~~sank~~ Scratch was
also recorded on the open shutter.
negatives ok. 10 min DK50 Plus X.

Copy
f16 1/4 sec
Some photos.
Plus X
10 min Dev.

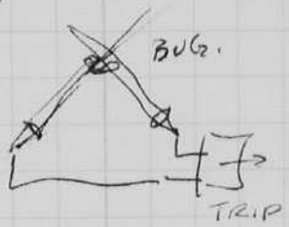
Feb 8, 1976. 100 Memorial Drive Cambridge Mass. Sunday aft.
Harold E. Edgerton.

Insect photography.

Bird and Insect Photos
Audubon magazine
Sept 1975
by Stephen Dalton.

Patrick Barron ↑
brought this in

Idea. Use crossed beams and photo trips to define an area in focus with the camera. any subject in this area causing a coincidence will fire a high speed shutter and a strobe with the x contact.



Then a ~~strong~~ light at night will attract many flying insects. As each one goes through the sensitive ~~area~~ volume, he will fire the shutter and light.

I have often noticed the tremendous population of insects that orbit an exposed lamp at night. This should be a good method of obtaining photographs of the insects.

Also there a bats hunting insects around lamps. Perhaps they could be photographed in this way also.

13 mo.
28
104
28
364 days

The camera should have an automatic rewind and a film counter.

all should be ballon operated for field use with water proof covers etc.

42 Feb 18 1976 Harold Edgerton

I took the 259 EG&G Side Scan to Boston Light Ship Buoy on Feb 16 ~~Monday~~ afternoon on the BLUE CHIP. We were trying to find the SEAKING which was lost several years ago. It is my opinion that we did not find it. There were some rocks but not big enough. Perhaps the ship has broken up so that is cannot be seen.

However, I believe that the ship is somewhere else. We must look further.

I had a phone call from Westport Mass yesterday from John Dolan. Some evidence has come in on the beach See West port search of august p 2 and 3 for bookmound. I think John said the Dooseberry Island area is of interest to us for further search.

Feb 22 76. I was at Yarmouth yesterday at 2-3 to teach to the Physics students. They wanted to know about EG&G and how it was started.

Chas Finkelstein and Chas. took the 259 EG&G Side scan to Boston Light Ship Buoy B yesterday to look for the Sea Kite. They think they found it in 105 ft of water at the spot shown on the chart. They were on the Blue Clip with Wally Haudette.

Eclipse Schedule.
Mar 21 – May 16
May 26 – July 24
Aug 20 – Nov. ?

Santorini - Thera, Crete. ~~PISWA~~ PIHA.
6 mile width.
Le Pouto

Parviz Babai
39 Hubinger St.
New Haven, Conn. 06511
Tel: (203) 387 7441

Susan Schultz Dapsott Univ. S.W. Mass.
15 Hallets Ln
Falmouth, MA 02540
617-548-6477
office 997-9321, X332

Lecture to students at Univ S.W. Mass
Demonstration of Sonar.

March 8, 1976 Monday.
Dared Egerton.

Returned last night on Delta from the south. Hickory N.C. where Esther and I spent one day with our daughter Marylou. Chas. Bill, Jon, Tyndon, Maryanne, Ellen were all home.

Left Fri Feb 27 for Washington. Visited N.G. Society. Jack Fletcher was given info on the Vincent Shuttler. Luis Marden. Judge. etc consulted. Prague was home sick.

Afternoon plane to Tampa. Weekend with Margaret and Bob Robinson ~~Sarasota~~ to Ft Lauderdale Keg.

Sunday aft to Vero Beach - Driftwood inn. for 3 days while working with Fish on the Sea Diver. We went out on Tuesday Mar 2 to look for a chain and anchor. The chain gave a good signal 100 meters away. The anchor was either buried or had been ~~pulled~~ pulled up. I could not find it.

Wed Mar 4, I went to Boca Raton and worked with Mac Allister on a study of the reefs. We had 4 ft waves but still worked in a small boat. Results were ok but could have been better.

Visited Jim Smith and Fred Anderson at Hydro Surveys Ft Lauderdale on the 5th. Also E.G.&G. Flo. Thacker phone operator. F was home sick. Yoder was in the new storage area. Richardson was at the ~~navy~~ computer area.

On Fri Mar 6, I went to sea at Dania with JOHNSON to test the side scan with the submarine. It could be seen at 750 feet away. The weather was 4 or 5. I used about 20 meters of cable on the fish.

44 March 9 1976

Harold Edgerton Loch Ness meeting.

Bob Rines, Chas Wyckoff, Bill MacRobert
Chas Miller, Harold Edgerton.

English people want to help.

Scott has ten people. Boat for expenses.

Barn.
Menzies – owns property at temple Pier
Looked up Board at the pier.
Electricity 220 V 50 cycles.
25 ft from the water

2 Boats belong to Rines.
Boat house.

Sony may donate ~~sonar~~ T.V. equipment.

Committee – museum – support.
Watch group.

Chris McGowan – Jo program
Flora Fauna, Bottom Sampling.
With Deo Jug, (? may welcome).
Sonar Survey Project.
Dr. Tucker Birmingham –
Telford civil dept. ?
~~Strange~~ ? Univ. London. ? (McGowan).
Buccaneer Sterling Univ.
Dinsdale.
Wyckoff – Dark Room
Mackintosh, Border Neighbor T.V. salesman

Money available in England than Scotland. Francis Powers

101

Jug – direction finder on camera
current flow meter.
Sonar triggered camera
Closed T.V. system for daylight

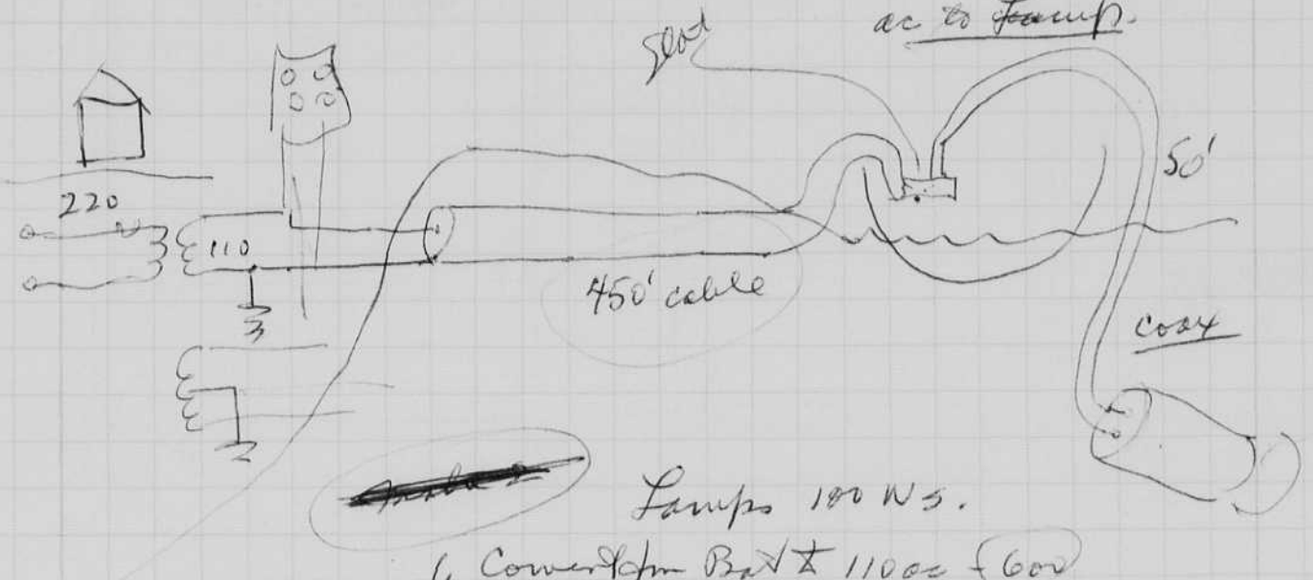
Stereo in 16 mm for movies.

Same control for both.

100 watt - 15 sec.

E.O. Plug

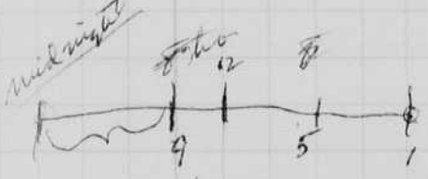
10 hours.
15 hours.
ac to lamps.



Lamps 100 W s.

1. Convert from Bat ☆ 110 ac (600 (Bat option)

2. Cable 110 volt grounded into the Right. Side Boat



Exposure counter.

20 sec 12 hours.

6 hour - 10 seconds.

(15) 9 hour. H.S. Ektar Plus X.

1100 - 600 volt supply. DC

Decision (1) Pines Reload camera make simple Tape Seal.

100 films.

(2) Cameras 10 mm. will synch be ok? for two.

(3) 450' cable Shielded Machintosh.

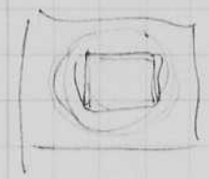
(4) Batteries.

Polight Silhouette.

Polaroid Shutters.

Motors.

100 ft, 16/ft 1600 3 hours. ~~180 min~~ 10 min. 180/1600

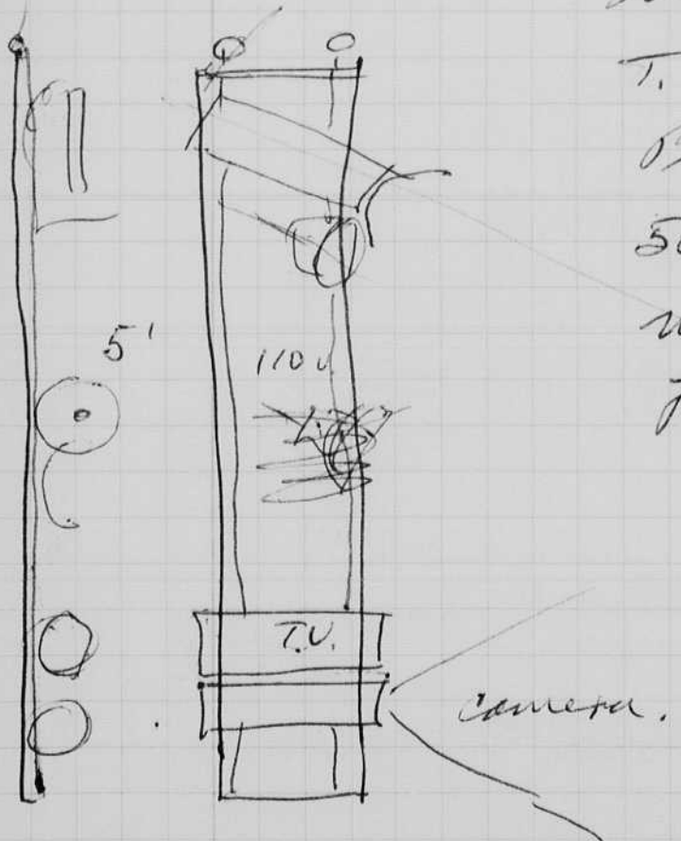


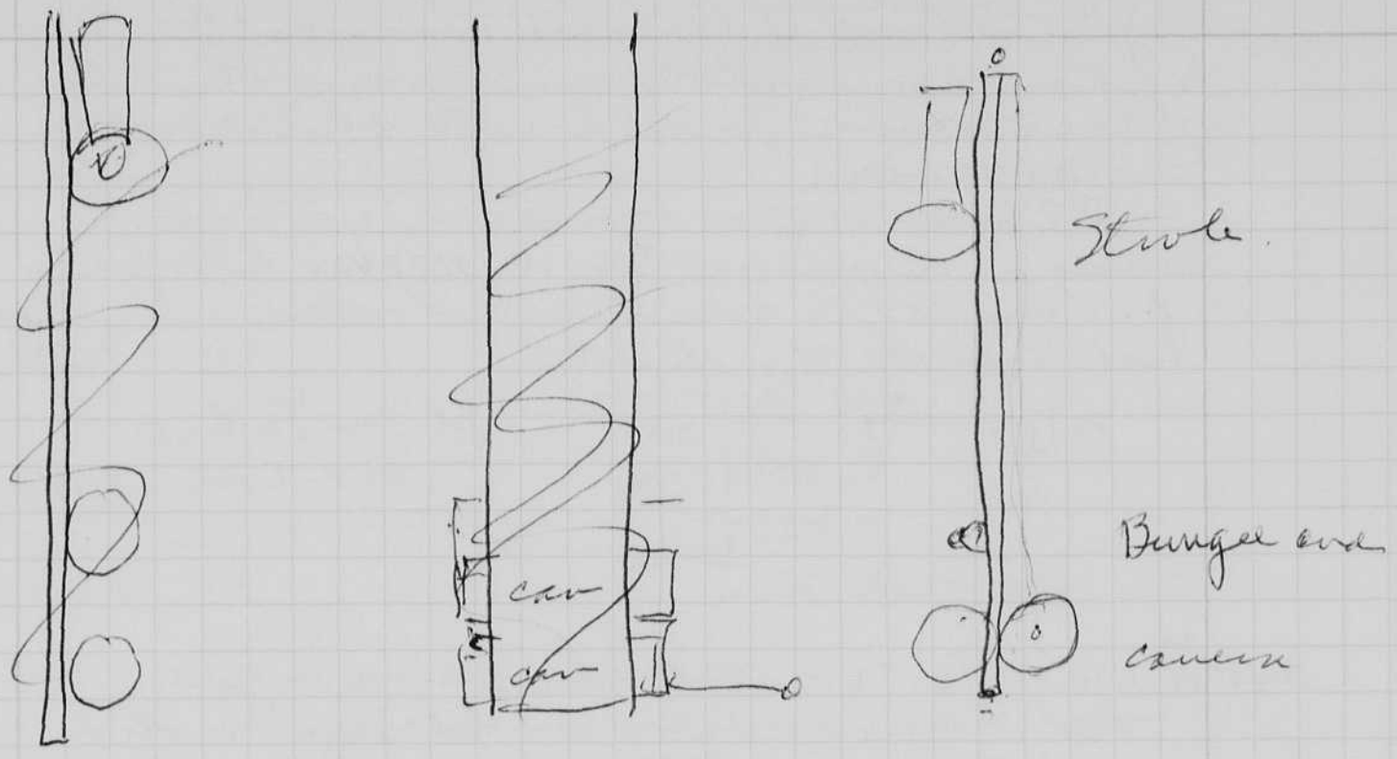
f 8 system.
Polaroid.

32 lbs

Benthos. Sea Raymond Purchase order # 9000.
Triggered model.

T.V. System. Benthos Camera
Strobe.
T.V. System — Recorder.
Push button.
500 ft cable.
motion Detector.
Frame Counter.





March 12, 1976 Harold Edgerton

Flott & Carter were here yesterday all morning to talk about tennis - Chas Miller showed some of his latest things about racquets.

Egr - Mili gave a slide and movie lecture on Mar 10 in 26-100 to 200 + students and others. It was well received.

Jeff Wyle took Egr - & Mili to Hingham with him.

Nov 19 1976 8 30 am Ready to take the T.V. - Strobe camera system to the ocean for lowering from the Sea Rock.

The leaks in the Brass case for the T.V. was caused by the clamps. We now seal it with a much lighter - symmetrical clamp.

A double push button system is now used to run the two jet motors. Extra contacts close the circuit to the relays in the T.V. which cause the camera to operate. Both switches have extra circuits. The camera operates when the two buttons are pressed simultaneously.

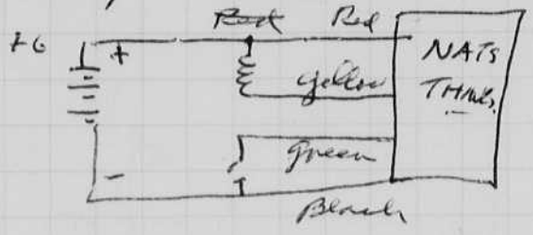
We lacks one wire in the control cable. This now is overcome.

The T.V. case has been tested for 150 #/sq inch 300 ft deep.

Mar 19'76 cont.
Harold Edgerton MIT 4-405 Strobe Lab

John Tatterob of Polaroid came in 2 days ago to fit a 5x70 shutter to our 35 mm continuous film camera for silhouette photography using the sun.

The assembly was brought in yesterday using a Angenieux lens # 1177464 Retrofocus R21 f 10 mm f 1.8. A circuit was put on the back to operate the shutter



John Tatterob
864-6000 3947

Mar 20 24, 1976. The T.V. - strobe U.W. camera system that is being developed for the Monitor study and others was tested at 45' off Buoy 2 and 10 outside of Boston Harbor Deer Island light yesterday.

See sheets of equipment for pictures

First we had leaks at 6 ft in the harbor off the aquarium. Our new leak detector worked well.

This leak detector consists of a paper towel between brass plates. When the towel soaks up water at the bottom of the container it produces a low impedance circuit which is put in parallel with the T.V. Video signal. If the video stops - pull up the camera because a leak has occured.

We removed the T.V. camera and some of the metal braces which we think caused a distortion of the case. A new paper was put in the leak detector and the next evening was successful.

Then we went to Buoy 10 and made several exposures with the camera horizontal. Then we took pictures at an angle at several heights above the bottom. All were made on H.S. Ektachrome at f 1 1.5 meters or scale. 20mm Nikonos lens

Carl Gilbert 899 2498 Home Weston
944 1738 office

Norman Leger
Chas miller
Harold Dzerlin) M.I.T.
Al Barker
Dave Bethel) Agassiz

Frame reading on counter
Start 1178

Ship —
Bill Buote 923-1322
50 Hunt St
Watertown
G J. Van Dissel
(of Potter & McCarthur)
visited the Shroeder,
Art Clifford M.I.T.

100 watt lamp

at Buoy 10 1190 Horizontal

91 10' deep. in water
92 Bottom can see bottom
93 1 ft above very dim
94 Bottom can see bottom

camera raised to surface and adjusted to 45°.

95 1200
96 1201
97 1202
98 1203 Bot min obs.
99. 04 2 ft Visim fair
05 4 ft Visim dim

end of experiment.

13.55
Mar 20nd
To harbor.

Note, high tide was 13:40 — about 11 feet.

We were South east of #10 Red when the experiment was finished. Wind weak tide also weak. the camera showed a slow drift.

Clearly a new T.V. case is needed of stronger construction. It should be designed and tested for 1000 feet.
5-3/8 or 5-5/16" is the minimum inside diameter.
5.375 or 5.313" Try — 6" O.D. 5/16" wall
nom I.D. = 5.375 19.01 #/foot.

Ryerson cat Edition 11-8 Stock 2-6962

PVC Schedule 80 Extrathick.
6.625 O.D.
5.761 I.D.
.432 wall
5.025 #/ft 210# working pressure (5 to 1 safety factor).
650#

Brass is now 13 3/8" long

Schedule 40
6" 6.625" O.D.
6.065" I.D
.280" wall
3.339 #/ft.

T.V. Camera. Mar 27 Sat. 1976
cable. 20

Wires to TV and Strobe.

1. Coax with ground. (or 2 wires). Video signal.

2 110 volt 60 cycle power common
3 " " " " " hot side

4. Pump Right
5 Pump Left.

6. camera start. 110 to relay (or direct to camera).
7 Lamp. 100 watt spot light.
8. Leak detector (in T.V) or ohm meter.
and/or Video signal

(9) conductors. Minimum.


9 wire


Video and 7 wires and wicking wire.

Wire resistance		Load Rubber.
#16	4.09 ohms/1000 ft.	6 amp.
#14	2.58	15
#12	1.62	20
10	1.02	25.

t/D ratio for Schedule 80 $\frac{.432}{6.625} = .065$

from Hoadley Data $p = 5000$ psi (10,000 feet).
for SS 304 Pipe. Stainless steel. pipe.
Schedule 80 pipe

maybe two wires are needed for the relay that fires the camera. The use of a common wire may cause problems. due to resistance drop.

The ground on the T.V. signal could be used as a return circuit.

Mar 23 1976
N. Elevator.

Ruis and Wyckoff were lectured about Bobs Dome.

#1 Starfish. Line - try to make a new liner.
220. 50 cycle
Delived camera and strobe to Bob Ruis with Lens for tests in dome tank.

#2 Silhouette - Ready for test in 2 days.
Bill working on unit.
Problem with circuit

#3 TV. monitor & Strobe.
Strobe OK
camera needs case.
(Second camera needed),

T.V.

Mar. 26, 1976.
Yesterday was Phipps 60+ ft steel ship
capt Bob Phipps and Pres. with Al. Barber
Tom Hilbert dives. Wyckoff.

called Sam Raymond this am.
1. Will return inside of Deep sea 30 exp camera for new case. (old one loaned to be used & repaired)

2. Requested another camera for Strobe Flares use

3. Requested another pump for jet.

4. Sam to make up T.V. System with lamp and camera control.
We will give specs.

Leonard Johnson Ed Linke

on "JOHNSON"

Rogers

April 4. 1976 Rines Wyckoff

Harold Edgerton.

Facts.

1. Initial loss of equip. Free Run 15-20 min
no sonar. Few fish. Dusk - 8 pm - ok at mid night
gone at 6 am - gone - burned and everything
Papered up the next day. 2 or 3 miles away
to the south
? What did survive the cameras.
All photos look behind. no clews on photos.

2. River mouth 30' deep. - Heavy mud.
no sonar 15-20 sec.
Equipment ~~lowered~~ ~~knocked~~ over.
this took a lot of time
Salmon photos excellent.
Something knocked it over

3. Aug. '72 15-20 seconds.
Raytheon Dept the finder.
On Bottom for Boat.
camera 135' above it.

Flipper pictures and Sonar Records.
½ hour - animals in area.
1 hour. 120-140 ft. Did not come
close to sonar. above and below
the camera.
Question: Is the flashing light
the attractant.?
Will a continuous light
bring the animals in?

4 Summer of 1975 1.2 min flash rate.
many contacts on film.
40 ft below. Sonar.
Rines believes the sonar has no
effect on the animal.
Something is bumping the camera.
Head picture comes near.

5 Oct 1975. Low light - some contacts in the
area. 8 or 10 frames of contact.
Low lamp 15 ft up the stern of Boat.

Stuart Johnson Ed Link

on "JOHNSON"

Rogers

April 4. 1976 Rines Hydrophone

Harold Edgerton.

Facts.

1. Initial loss of equip. Free Run 15-20 rolls no sonar. Few fish. Dusk - 8 pm - ok at mid night gone at 6 am - gone - burn and everything Loped up the next day. 2 or 3 miles away to the south.
? What did move the camera.
All photos look behind. no clews on photo.

2. River mouth 30' deep. - Heavy mud.
no sonar 15-20 sec.
Equipment ~~lost~~ ~~knocked~~ knocked over.
This took a lot of time
Salmon photos excellent.
Something knocked it over

3. Aug. '72 15-20 seconds.
Raytheon Dept the finder.
on Bottom from Boat.
camera 135' above it.

Flipper pictures and Sonar Records.
½ hour - animals in area.
1 hour. 120-140 ft. Did not come close to sonar. above and below the camera.
Question: Is the flashing light the attractant.?
Will a continuous light bring the animals in?

4 Summer of 1975 1.2 min flash rate.
many contacts on film.
40 ft below. Sonar.
Rines believes the sonar has no effect on the animal.
Something is banging the camera.
Head picture comes near.

5 Oct 1975. Low light - Some contacts in the area. 8 or 10 frames of contact.
Low lamp 15 ft up the stern of Boat.

54 Conclusions. April 4, 1976.

A. Flashing light is the lure.

1972 - Animals seem to go out of range.
Sea dr light. Sonar shows animal returning. This was done 3 times.
Then big noise caused end.?.

Equipment

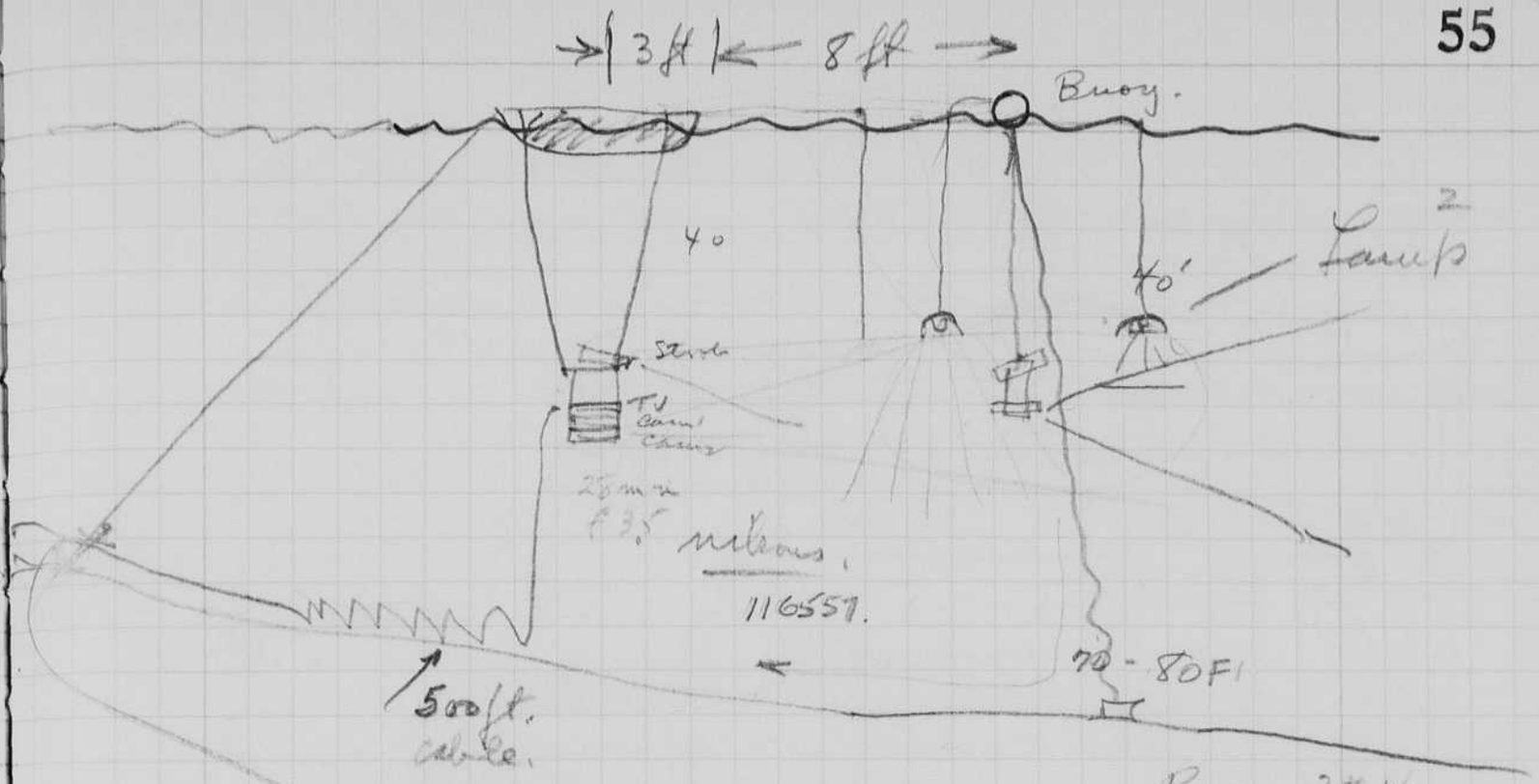
1. AE will get DC - AC conversion equip.
250 watts.

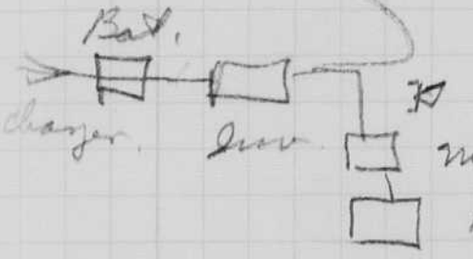
2. Elapsed time recorders.
Javelin JXL. 400
Sanne ETR 1200
Motion detector.
Tapes.
Rines & Bloomer will
Acquire one recorder. 60 to 110.
" Motion Det.
" Tapes
" Spare parts.

3. Camera
Edgerton & Miller.

4. Cable - Order 500 ft.

Look more 3 hours.





This program was written up on page 5. RR

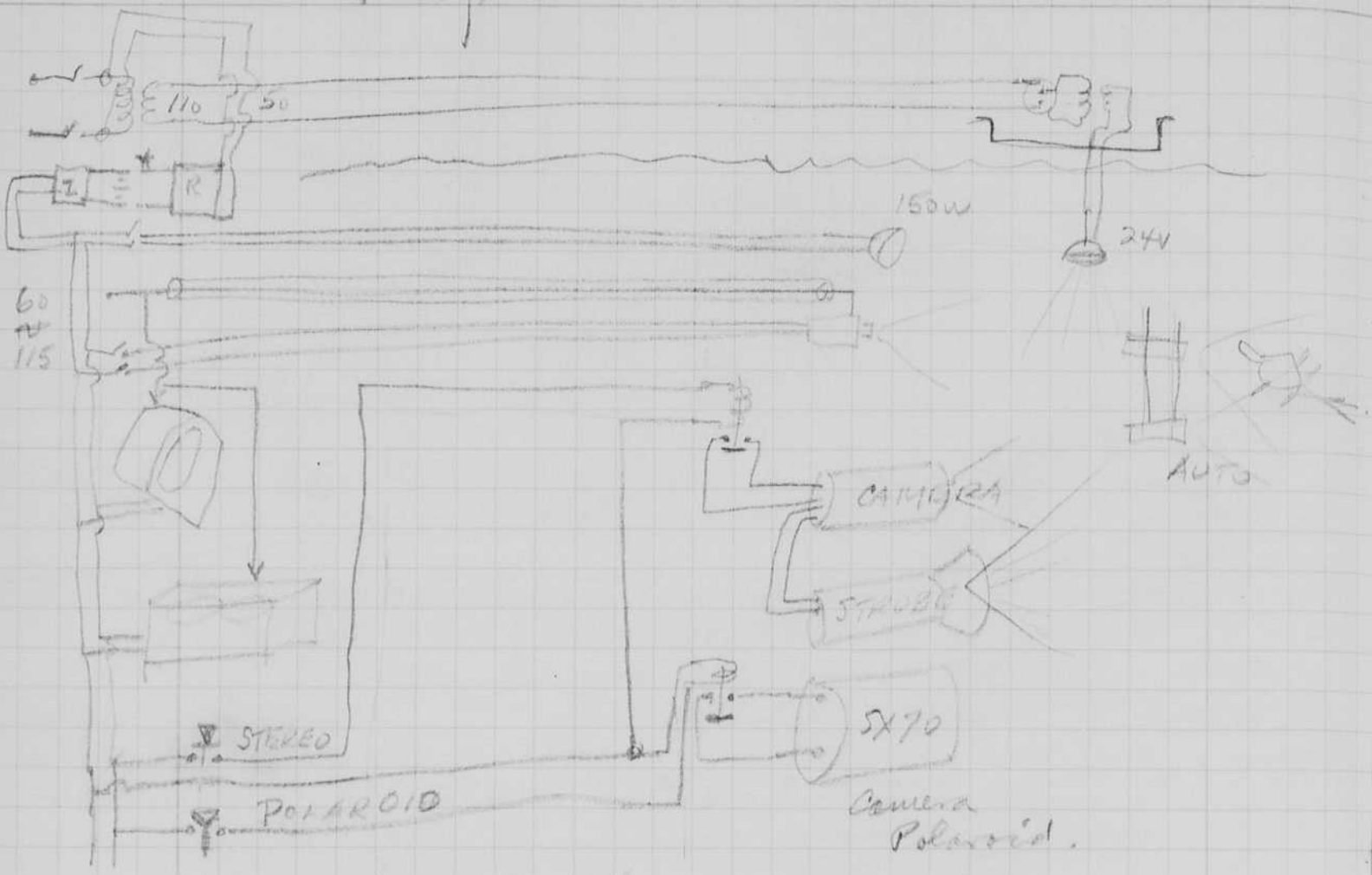
Steven

1. Strobe — HB — Tungsten lights
2. Cameras — HB & Bentleys
   A Steven
   B
3. cable 500 ft — HB & RR
   control box
   T.V. camera.
4. Monitor. — Rines Blanton
5. Recorder, motion Rines Blanton
   Tapes Lost.
6. 5x70 — Polaroid.
7. 110-600 V
   Power switching
   Dry Stuff — N. Eng.
   2 wire cable to S.T.
   Strobe.
8. Traces 110-240 V Lamps. — Rines & Clear W. W.

Cook, Bob
Meredith Dennis
Dinsdale
Johnatridge.
Chris McNamara. final 1-day
Eng.
Butterworth.
Klein - 2 week July 15
Date on Gary. 1/4 mile
Penetration -
Rines - 4 people June 1.
Broun - Prestwick.
Cousteau ?

April 8 1976

220 V 50 ~ H. Edgerton



Camera Polaroid.

Cable 7 plus coax

Batteries for Strobe

" " Camera

150 watt Lamp bulbs.

Reflector.

5000 ft/sec.

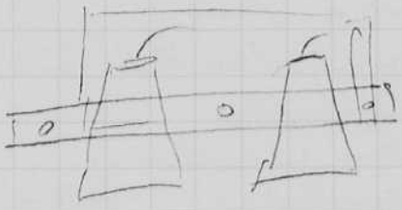
5 ft/ms.

1/5 ms pulse

April 10 1956 4-405 MIT Strobe Lab Dept.
Harold Edgerton

Bill MacRoberts helped me remount 2 Massa 5 KC transducers for use with the 257 EG&G Side Scan.

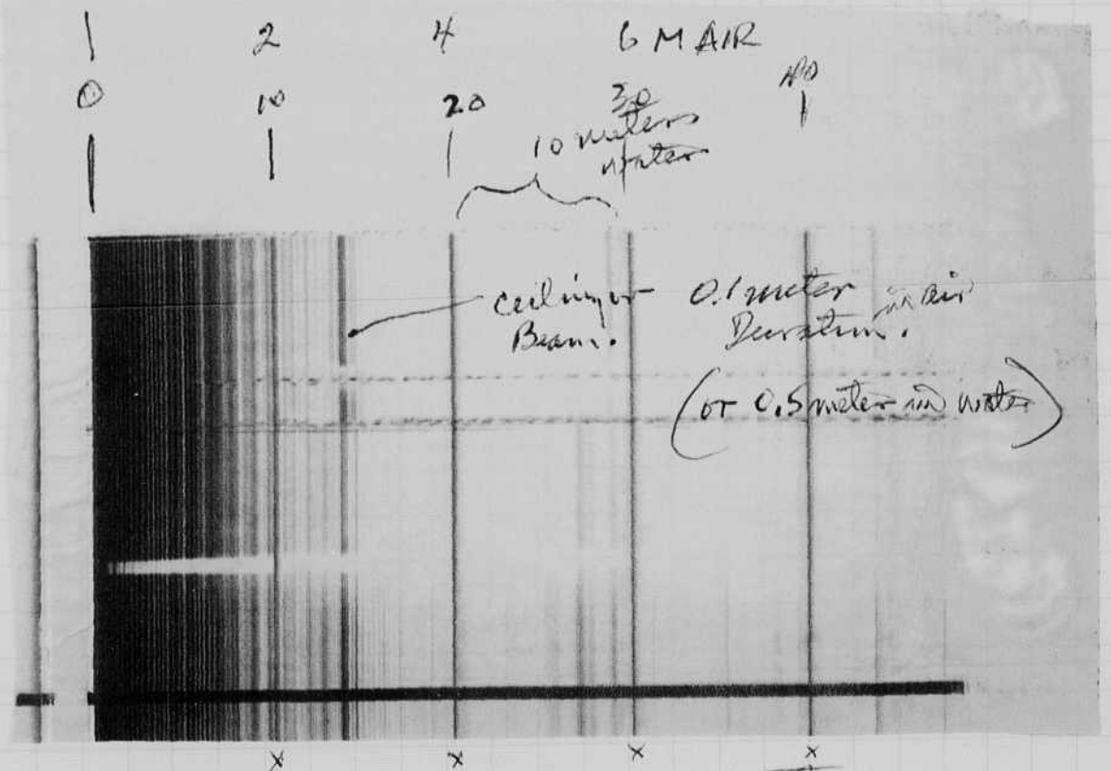
These were mounted in a wood frame by sawing them about mid way.



Massa
mnts
1029r
1066B

We coned the ceiling with beeswax to 30 with high imprint. A 5 ohm resistor was put across the receiver pickup massa to reduce the ringing.

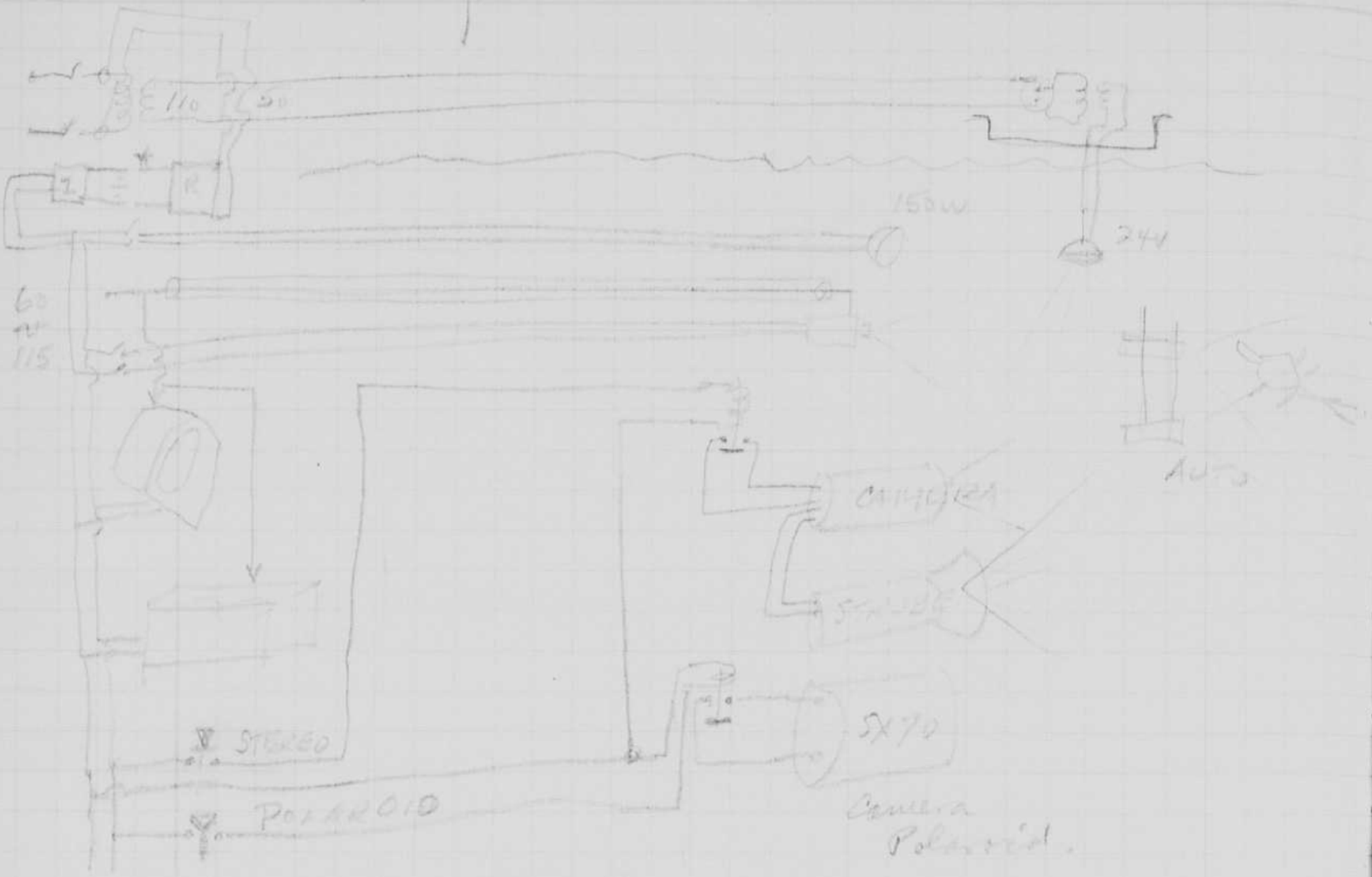
The ceiling echo looks short in time I estimate



The unit is now ready for the acceptance tests in the Boston Harbor.

April 8 1976

220 v 50 ~ ϕ. Schematic



Cable 7 plus ear

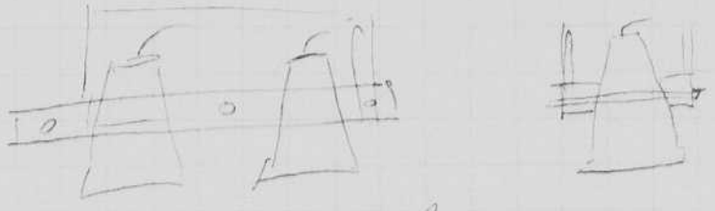
Batteries for Strobe.
" " Camera
150 watt Lamp bulbs.
Reflector.

1/500 sec.
5.6 f/ ms.
1/5 ms. pulse

April 10 1976 4-405 MIT Strobe Lab Dept.
Harold Edgerton

Bill Neal Roberts helped me remount 2 Massa 5 KHz transducers for use with the 259 EG&G Side Scan.

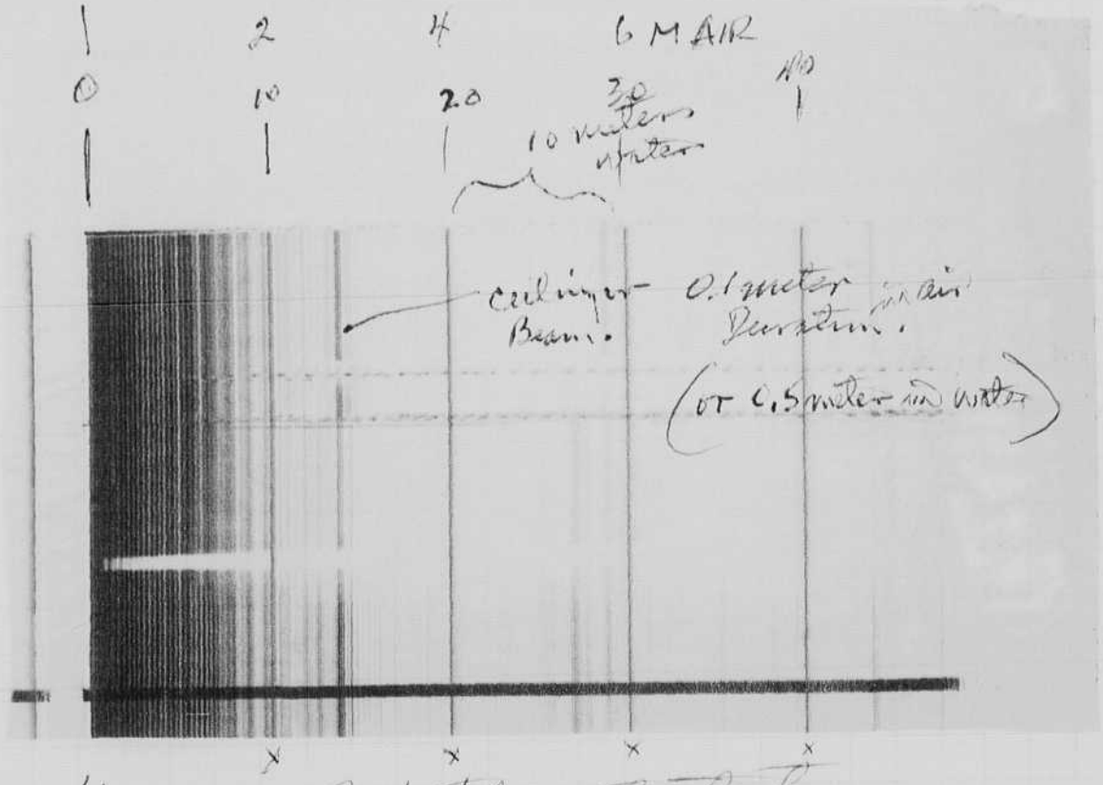
These were mounted in a wood frame by clamping them about mid way.



Massa units
10298
10668

We covered the ceiling with hoop pine ~ 30 with high infill. A 5 ohm resistor was put across the receiver pickup mass to reduce the ringing.

The ceiling echo looks short in time I estimate



The units now ready for the water tests in the Boston Harbor.

58 April 13 1976

Harold Edgerton

Yesterday in Washington.
Nat. Geo. Society. Fletcher
Scherschel
Payne Snyder.
Ed Brennan
Smith Bennett.
Jules Bellard (took an active)
called Hess on phone about Nature on 78.
Experiences in oceanography.
Loch Ness monsters and others.

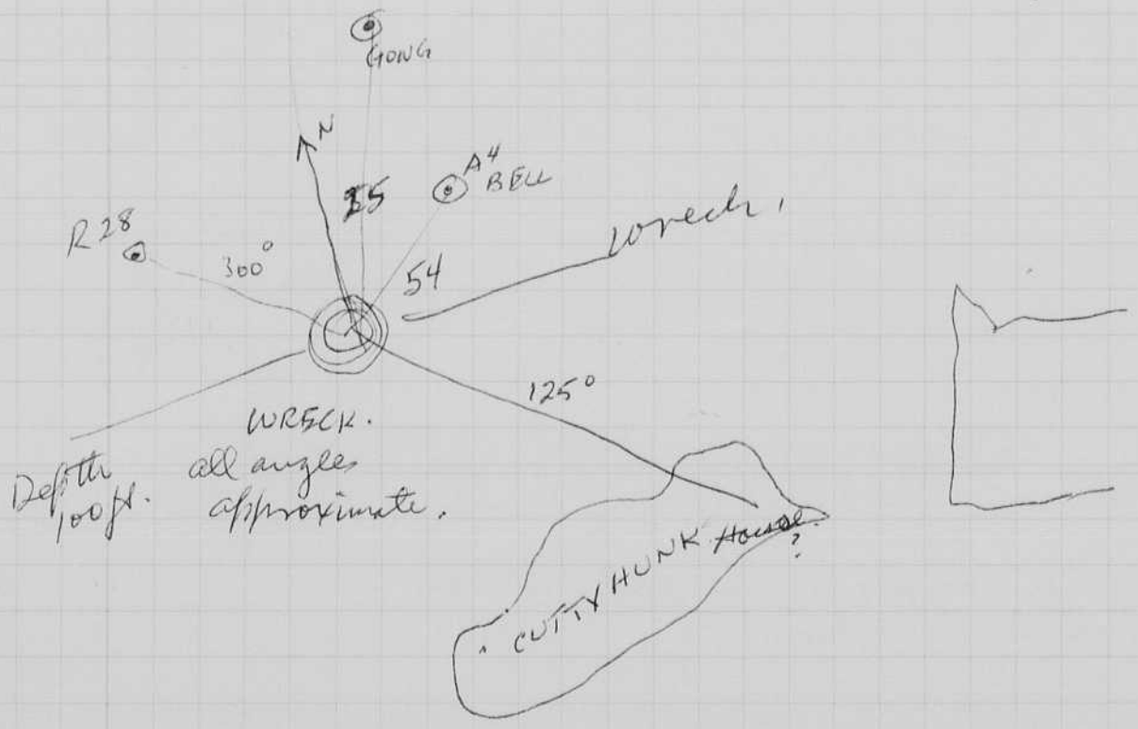
Photographers
Brit Brit. Jean Des
Australia
Freeport to 1972.
Bahamas.

Brennan said David Boublier & Cristal were in Scotland to check on the Loch Ness photography.

April 16, 1976 I left at 7.30 for Fairhaven to work the EG&G 259 sonar on the CORSAIR Capt Howard Hathaway 617 996 8221, office Home 617 992 9764 Hathaway & Bailey wharf Fairhaven mass.

Prof Susan Schultz Tapscott and her class of oceanographers were aboard. I explained the EG&G 259 and ~~gave~~ let each one of them operate it.

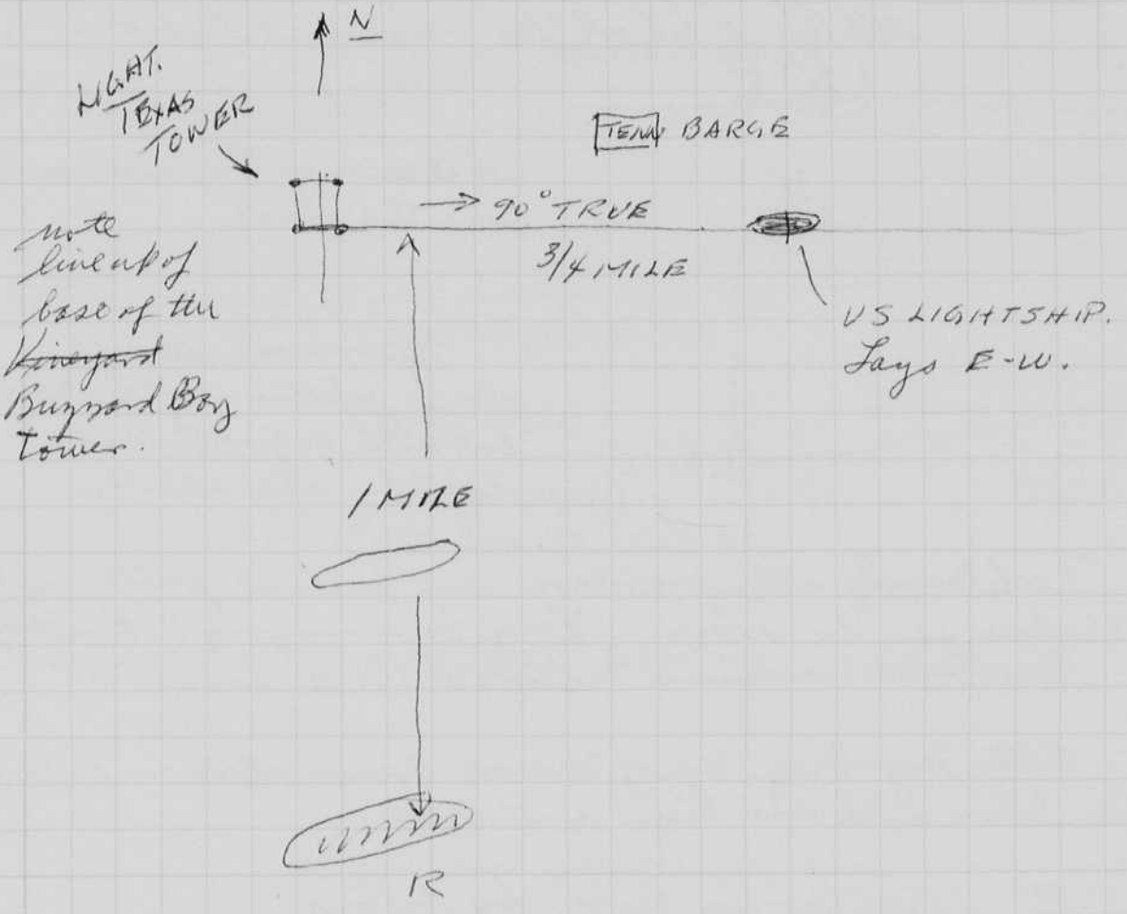
A wreck was noted on the return trip from the Texas Tower light in Buzzards bay.



Vineyard Light Ship

and other information from Brad Luther. Apr 16 1976

PO Box 225
Fairhaven
992.4030



Notebook # 32

Filming and Separation Record

____ unmounted photograph(s)

____ negative strip(s)

__1__ unmounted page(s)
(notes, drawings, letters, etc.)

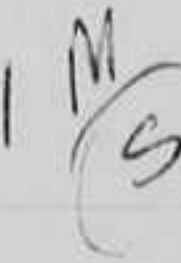
was/were filmed where originally located between page 58 and 59.

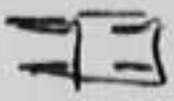
Item(s) now housed in accompanying folder.

VS LIGHTSHIP

3/4 m 090°T

VINYARD LIGHTSHIP





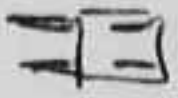
TENN.
BARGE

B.W. LUTHER
PO Box 225
F. H. 992-4030

VS LIGHTSHIP

3/4 M 090° T

VINYARD LIGHTSHIP 1 M S



TENN.
BARGE

N

B.W. LUTHER
PO Box 225
F H. 992-4030

Notebook # 32

Filming and Separation Record

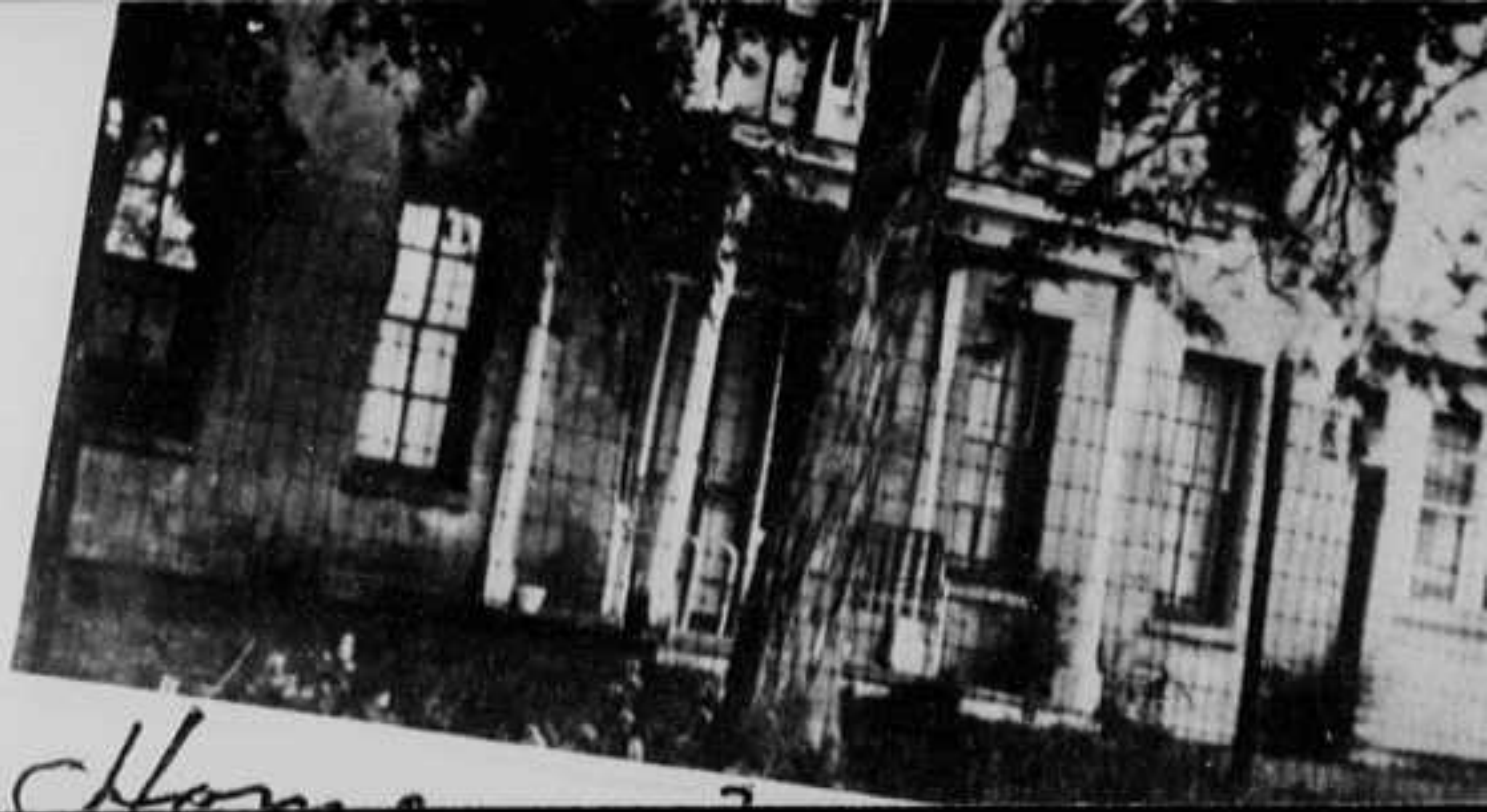
1 unmounted photograph(s)

____ negative strip(s)

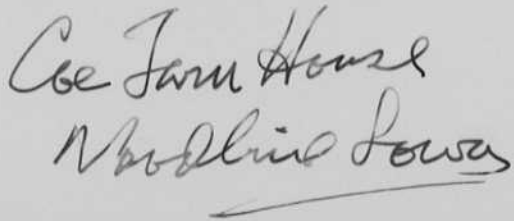
____ unmounted page(s)
(notes, drawings, letters, etc.)

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

Item(s) now housed in accompanying folder.

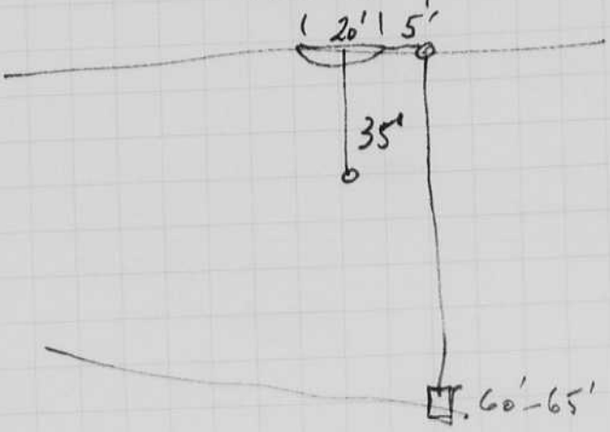


Home



Kristoff & Doublier
Rines - Edgerton
13:20 April 20, 1976

To report experiments of K & D in Scotland last week.
Can see 40 ft f 2.8 Light f 4 1/15 can see bar
ASA 160 f 2.8 at 1/60 natural light.



Water change what causes the camera to see the boat.

Experiments show clear photos at 20 - 30 ft but with a great loss light by absorption.

Technically - the problem can be done photographically. 25' away can be seen. . Very Encouraging! Kristoff.
Use light or sound to attract the animals.

Arthr. Myrberg Uni. of Miami Sound effects on animals.
Doublier will see him next week.

K. 1. Continuous light. by battery.
2. Strobe: firefly strobe.
3. Sound - Take recorder. subject ?
4. Food.

K & D will work in July & August. 557-7471 K.
Thelma Altemus. secy.

Canan trap 4 3 day - call back 22,000 ft.
Tuna instead of meat as ~~bait~~ bait
(August issue) ~~Trieste~~ locate platform
call back 3 days later.

① Bob Ballard - will make final detailed bottom study of Urquot bay. for Dr. Joe.

② David Doubler - food chain for the lake.
Mc Bowan asst. Curator Royal Mus Ottawa.

Klein July effort

?. McGowan - Marcos or bottom still seen looking for Bonzo.

2. Hall across V Bay.

3. Penetration of silt to find rocks. Kalham has details of slugs.

Salmon Bros (Greenland). 2 types. Let natural.

Rivers dry up still salmon and fish mill around the area.

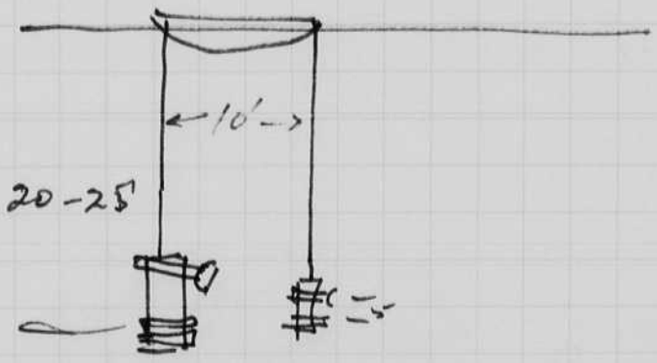
Salmon hatchery above in fish lake.

Diver. M. 18' boat trailer Tempest bay. 8 people

Gordon McKenzie electrical contractor Diver.

Allan Hunter

M.G. 16mm 3.5 Olympus set up for Benthos.



1/10 sec f3.5
16mm.

Conclusions. 20 ft deep.
for M.I.T. Consider 16mm f3.5 (2 lenses).
el chandler lenses and adapter.
for stereo pair.
Film - Stereo (~~2475?~~) ~~BW~~ Daylight Color
Kodachrome bk. (has more contrast).

For N. G. Society - Tab units to sonar
(Brit. aqua club Electricians. J. Gordon)
from Ruis
Groups
Eels - salmon pictures.

Apr 27 1976
Harold Edgerton. Put boat, MARY, in water last Friday. Put into action today with 6KH and 12 KH Pingers into the 25 Ft Ch Runabout. I am preparing for a club to Key West on the 29 Thursday - then on the 4 or 5 of May I go to Las Vegas to help Herb celebrate his retirement from Bldg 6.
I have made him a desk lamp from a FT-17 flash lamp of the type we used in the World War for Photo Recco. Around the base is inscribed a quote from a Japanese officer made in North Burma in 1944. 3 1943

Oh! what can we do now! with his bright blinking eyes streaking across the dark canopy of night, the devil himself has compromised our last and now unfaithful mistress of security.

from a Japanese officer in N. Burma. 1944.

LAMP FOR HERB GRIER MADE FROM FT-17 LAMP.

April 28, 1976 8:20 pm

Harold Edgerton 100 Mem. Dr. Cambridge Mass.

Sept 11-71.

We are still mighty busy with the design, manufacture and testing of equipment to be used in Loch Ness this ~~next~~ summer. See page 55 for details of the camera and T.V. systems. The plan calls for a June 1 arrival in London and Scotland.

Tomorrow at 9:15 I leave for Miami to work with Roy McAllister and Duncan Mathewson at the wreck of. NUESTA SENORA DE ATOCHA 82°20' W 24°38' north. Low past and first sighting. Then a hurrican blew it N.W. for several miles.

May 11, 1976 ~~Harold Edgerton~~.

Left for Miami Apr 29. met by McAllister and Mathewson, drove to Key West. the wind was too strong. cancelled our attempt to survey the Atocha. Then I went back to Boston on the Delta 1015 pm plane.

Esther joined me and we went to Detroit. Bob and family met us at the airport. We ~~then~~ drove to Canada to see the Park at St Pelie. This a bird sanctuary and is the finest part of Canada.

Then we went to ~~Las Vegas~~ Omaha to visit the Nat. Bank of commerce Oscar Clarke Jr. Carlson, etc. Next to Carvara at 2 pm to visit the James with Howard Anderson.

On the 4 of May I gave a talk to the Physics class at the Aurora high School. Carter was the principal. Mark Kramer and Mathew Williams were there in the class.

We took the 730? plane to Denver and Las Vegas from Lincoln. Caesar's Hotel. Party for Herb Grier at the Country Club in Las Vegas. The mayor and the Governor gave speeches. me too!

I left Las Vegas on the 6 for Miami. Mel Fisher met me at the air port. We left the next day at 4 in PETTICOAT (Capt Norman Wood & Wife Shirley) for the Marquessa Keys and the Atocha site, 10 miles west,

For N. G. Society - Tab units to sonar
(Bill. aqua club Electronics.
J. Gordon)
from Ruis
Group: Sets - salmon pictures.

Apr 27 1976
Harold Edgerton. Put boat, MARY, in water last Friday. Put units active today with 6KH and 12 KH pingers into the 25g EG&G Recorder. I am preparing for a trip to Key West on the 29 Thursday - then on the 4 or 5 of May I go to Las Vegas to help Herb celebrate his retirement from EG&G.
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Harold Edgerton 100 Mem. Dr. Cambridge Mass.

opt 11-78.

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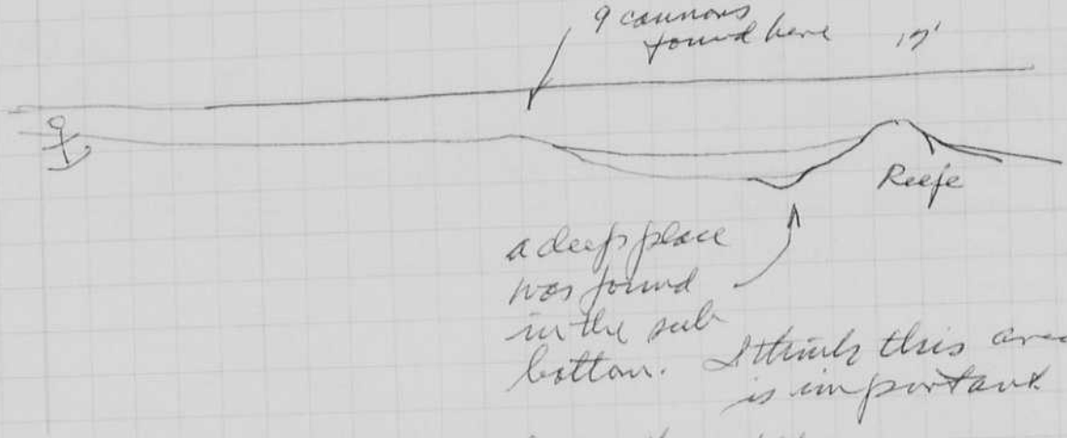
I left Key West at 730 on May 9 Sunday for Boston on Delta at 10 15 pm.

Our efforts at the Atocha ~~site~~ site seemed important. a 6 kH Massa pair of transducers were used. Many (10) targets were charged for investigation



May. 14, 1976 Chas Finkelstein and McGowan were in this morning to look at the camera equipment for Fish News.

May 15, 1976 4-402

Harold Edgerton M.I.T. - 4-405

Bleach Board outline by Bob Rines 930 meeting.

Bob Rines
Chas Finkelstein
Dennis Meredith
John Totterop.
Chris Mc Gowan
Chas Wydroft.

Support. Prescott U.S. Aquarium
Gillespie JPL (Cal Inst Tech).

Surface Water.
T. Dinsdale Water borne
Geo Newton.

Wat Tech

Geo Newton Sonar Special Studies
Roy Newton Klein Klein & Assoc
Harold Curtis Finkelstein,
Jean Mooney. Raymond (Benthos)
— Blonder Totterop (Polaroid)
Mrs Blonder

Under water Fort plots T.V.
Edgerton
Miller
MacRoberts.
Mooney

Zoology Invs.
Mc Gowan (R.O.M.)
Thomason (Can. Uni)
J. Buchanan Stirling Uni. micro biology
J. Attridge. and London Zoo
Jain Smithsonian Zoo.
(Brit Mus) Greenwood Fluvig.
(Harvard uni. Mus Comp Zool) Coronapteon crompton

John Wilford.
—
Martin Klein.
Paul Horsfrost

Academy,
Wydroff photographs
Blonder
pub. Rines

David James MP
Loch Ness
Loch Rayner
Highland council.
Hugh & Barbara Information.
Sir Peter Scott? Billy Arnold Roy Mackal
Geo. Newton Dr Tom Rines
Duncan. Barron.
Birmingham Uni

N.Y. Times Wilford (Mitchel)
Press Meredith (M.I.T. Tech. Rev).
officer.

Watch committee will be working at Loch Ness.
(Part of Highland Council).
Dr. James Mc Kay.
Gordon Macintosh.

Judge [illegible] Nat. Geo. Letter from someone in Europe. He was miss quoted badly. The Nat. Geo. want a low profile.

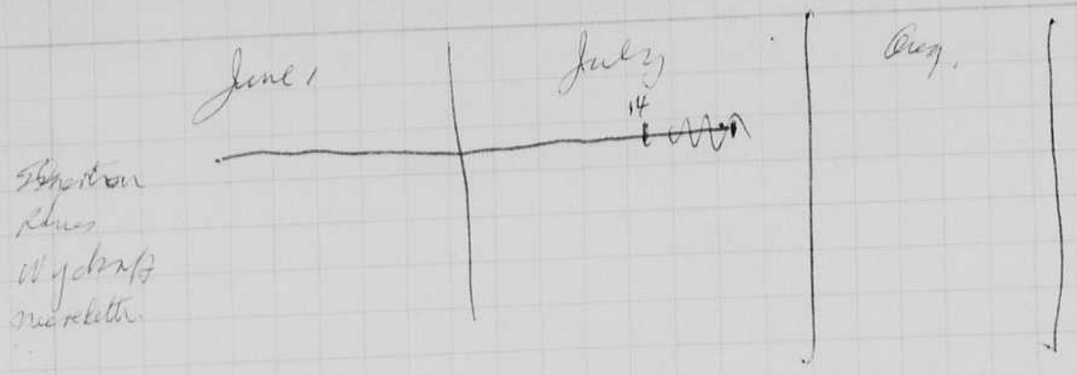
Discussion of N.Y. times program of cooperation.

Technical journal all free for sci. papers.

$20,000 stance. + Volume mag contribution from N.Y. Times.

Foynes. location for the new location sponsored

Exclusive ~~and~~ rights. 24 hour lead time.
Security: Chgerie Wydroff to keep films.
T.V. — Movies. 50/50 basis 10% expense
National fishing - Scotch - English etc.



Boats,

~~Hunter~~ 21' 75 hp. Moon cow II

~~Blue Hen~~ 18'

MALARAN
~~Malaran~~ - (Bucanna) Sleeps ~~5~~ 6. 2 Rented boat.

Facility

Temple Fiers (dly Menzies)

Mackay Rives Boat house.

Menzies Power & Water Base.

Adelaide Hot. (Dorthy Frazier)

Wyckoff. talks about summer effort.

May-15,1976.

ac power on Elapsed time camera. 13 seconds.
Set for 15 seconds. Load twice a day.

Aquarium - Fish. Ready to Pack H.S. Ektrachrome,
28 rolls.

Silhouette camera. focus changed.
changed by Tattrop. Calibration photos. 60-65
Wires scratch film. 75-80

Plus X and H.S. Ektrachrome in 35mm cameras.
2475 film,

Chris Mc Govan plans for summer.
~~Klein - Sonar.~~ Aquarium at 10 am. Harbor Island 723.9591 Rm.

Bottom Survey.
Sedimentation.
Coring to find out the bottom.
Bottom Survey ~~of F~~ with Sonar
Chas. Tinkelklein. experiment
18 bones. Mammoth. float.-
75 meter 35 meter range. on Sonar. Island Pond N.H.

Martin Klein. - Sonar finds things under sea.
300ft of water to find boats in Lake ontario.
Airplanes - Florida.

Bones show as structure.
Flood area of cameras to show cameras.
new small recorder to show
Leave lights off.

DC - AC

mid June for Chas J.
Long Ranger records can be made in Jack Nes
Chance for finding a small object is nearly zero.

Heavy weight of cables for deep Side Scan.
Sub bottom recorder.

Geo. Newton - talks about summer plans.
Infra Red.

Lines plotter of surface horns
Infred has improved greatly.
detect small differentials in temper 0.1 cel.
Hot air coming out of nostrils.
Low Emissivity.
Surface condition when all animals are on the surface.
Data processing equipment.
First trials to be made this year.

May 17, 1976

We cut the cable at 500 ft today for the Loch Ness effort. This should be adequate for the job. 230 ft was left in the cut off end.

The T.V. camera and control wires were all tested and wired up today.

Hydroff and I loaded the cameras at 6 pm for a night test of the Benthos system. The Polaroid camera was also tested. I noted that the counters operated satisfactorily.

Tomorrow we plan to check the T.V. system with 12 volt battery power via a Toredo (?) system that gives 60 cycles.

Then we plan a run in the Aquarium to check out the gear for the summer effort.

The lenses for the stereo pair are 16mm lenses with appropriate stops and shutter.

Both shutters must be "open" when the true owner of a house is observing a Monster. This will be revealed when the shutter finally ~~natural~~ camera

May 19, 1976 cc from

250 watts ±

Toredo 50:191
50-193 CMOS Oscillator
1068 Raymond Ave
~~Minneapolis~~ Minn
St. Paul
55106

612 - 646 - 2868

Sealed 230

Working on T.V. and Stereo all day for tests in Aquarium

Left Lens 100287 Olympus auto fisheye f3.5 16mm focal len.
Right Lens 10 1830 " " " "

2 Bulbs at f 3.5

Alex Wyckoff 4 mills off added ten.
Focus is O.K.
6 should have been added.

May 20, 1976
The big T.V. camera.

Tape.

0 Lab.
12 #1
21 aquar
49 camera over water.
66 audio test
85 Auto Water
131
178. Twilight. 1/15 ~~1/8~~ 32
~~1/60~~ f11 Polaroid.
127 mm Special mod Smith for T.V. Monitor.
CVB camera.
213 Photo of fish Dim. 1/15 - f32 300
251 Shark.

261 photo
276 photo
280 photo
285 photo
290 end

from T.V. in Aquarium.

Rec. Newton. talks about summer plans.
Infra Red.

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detect small differentials in temper 0.1 cal.
Hot air coming out of vents.
Low Emissivity.
Surface conditions when the animals are on the surface.
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May 19, 1976 ac from 250 watts ±

Toredo 50-191
50-193 CMOS Oscillator
1068 Raymond Ave
~~Minneapolis~~ Minn
St Paul
55106

612-646-2865

Seated
230

Working on T.V. and Stereo all day for tests in Aquarium

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1/15 f32
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127 mm special mod Smith for T.V. Monitor.

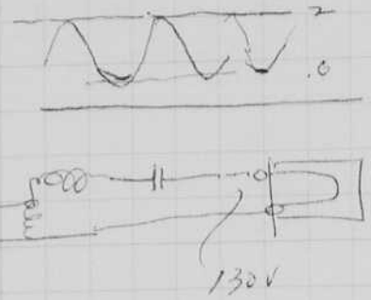
CVB camera.
213 photo of fish Dim. 1/15 - f32 300
251 Shark.

261 photo
276 photo
280 photo
285 photo
290 end

from T.V. in Aquarium.

May 21 1976
Harold Edgerton

Test of 250 watt lamp mitab Halide for Aquarium.
Output $100 \times 6^2 = 3600$ candle power. 250 watt 208 volts.



Ripple on 120# from lamps.

M 250 BD
Base Down.

May 23. 1976

283 end.

May 23 1976

Walter Kronkite	NBC	News	
Niac O'Gorman	NBC	News	
Nick Mogalian	NBC	News	
[illegible]	NBC	News	
[illegible]	NBC	News	
AL PERLMUTTER	NBC	NEWS	30 ROCKEFELLER PLAZA NY NY 10020 (212) CI-7-8300, EXT. 2914)
ALVIN COOPERMAN	NBC	30 Rockefeller Pl. NY, 212 CI 78300 X 4936	
	Home	212 8735329	

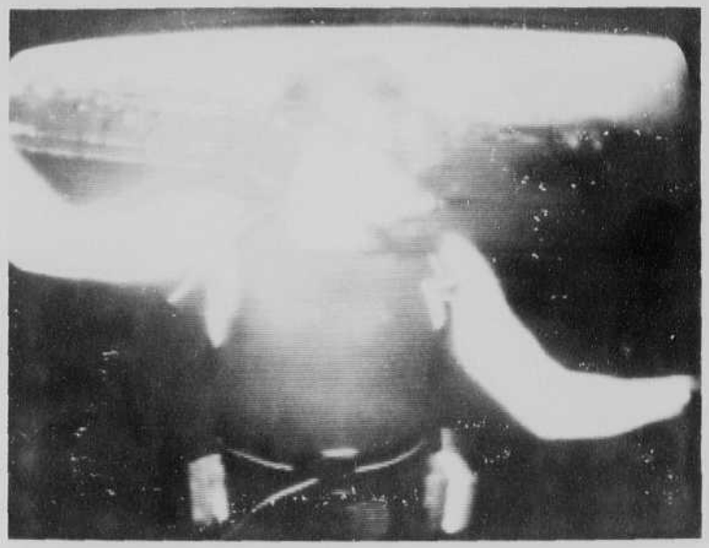
Tod Miller & Jean Dennis Meredith

Left Plus X f 3.5 6-10
Right H.S. Ektachrome f 3.5 6-∞

Polaroid 75 speed Color 5X70 5 3/4 feet between Lamp and Polaroid camera.
5 photos with 2 bulbs,
5 photos with 1 bulb

Strobe 8 ft to camera.

Test all "ok" in N.E. Quonset.
Some photos of Leo (Dancer)
More information in Class
Miller's note book.



Dec. Diver in U.S. Aquarius

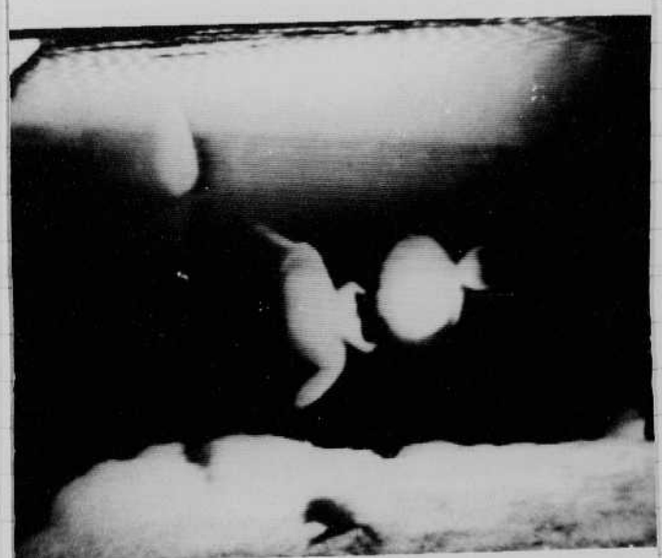
Polaroid photo from the tape taken with the 200 watt sec (2 strobes).

on our RCA T.V. camera unto our Javelin tape Recorder.

Dennis Andrejko
3964799 3.4418.
on robot who activated the sun position for line up with the main hallway thru MIT from Bldg 7.

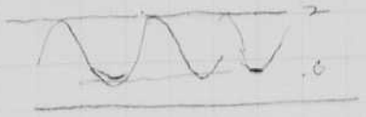
DENNIS A. ANDREJKO
7.421 3.4418.

971 FELLSWAY #10
MEDFORD, 396.4799.



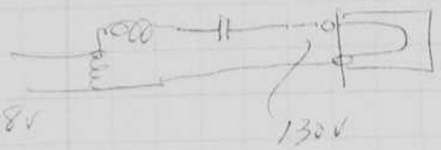
May 21 1976
Harold Edgerton

Test of 250 watt lamps, metal Halide for Aquarium.
Output $100 \times 6^2 = 3600$ candle power. 250 watt 208 volts.



Ripple on 120 ~ from lamps.

M250 BD
Base Down.



May 23. 1976

283 end c

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Walter Kravet NBC News
Nick O'Gorman NBC News
Dick Magalian NBC News
Fred Fehsenfeld NBC News
AL PERLMOTTER NBC NEWS 30 ROCKEFELLER PLAZA NY NY 10020 (212) CI-7-8300, EXT. 2914)

ALVIN COOPERMAN NBC 30 Rockefeller Pl. NY.
212 CI 78300 x 4936
Home 212 873 5329

Tod Miller & Jean Lennis Meredith

Left Plus X f3.5 6-10
Right H.S. Ektachrome f3.5 6-∞

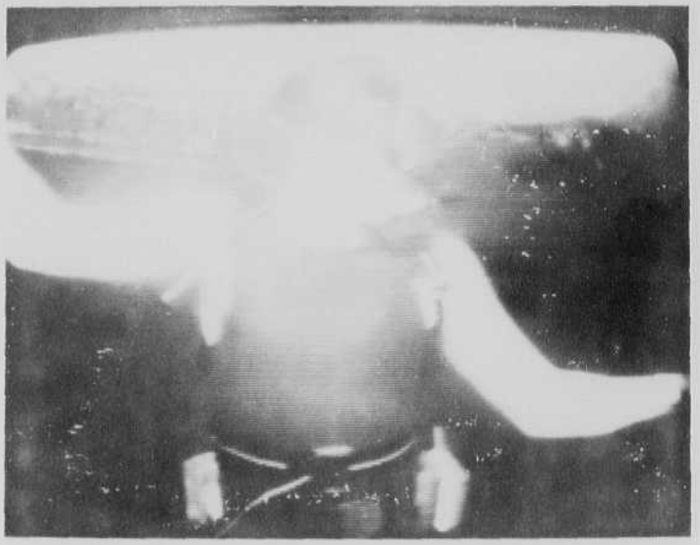
Polaroid 75 speed color 5 photos with 2 bulbs, 5 photos with 1 bulb

5x10

5 3/4 feet between lamp and photoboard.

Strobe 8 ft to camera.

Test all "ok" in N.E. Aquarium. Some photos of Rec (Diver) More information in Elias Millers note book.



Dec. Diver in U.S. Aquarium

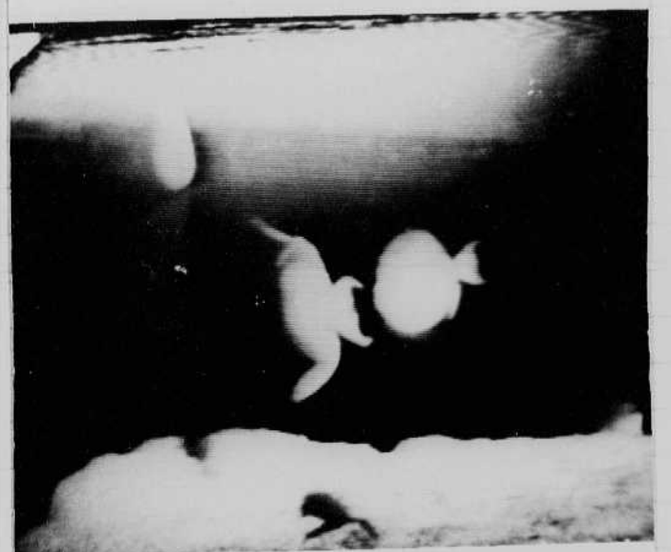
Polaroid photo from the tube taken with the 200 watt sec (2 strobes).

on our RCA T.V. camera onto a Javelin tape Recorder.

Dennis Andreasko
396 4799 3.4418
on the bottom added the sun position for final up with the main hallway. Thru MIT from Bldg 7.

DENNIS A. ANDREYKO
7.421 3.4418.

971 FELLOWAY #10
MEDFORD, 396.4799.



72 May 24 1976
Harold E. Edgerton
4-405. MBC.

Olympic Om System Zuiko auto Zuikoyl.
1:3.5 f16. Left # 100287
Right # 101830.

these are two lenses that were put on the Benthos camera by the National Geographic Society by ? from Washington.

May 26, 1976.

Yesterday - no sunday - at 10 am I took some flash photos of miss Lindsey Hastings in Building ? where she has been taking motion pictures of the tongue action of chamaeleo jacksoni and the Bitentaculus. She uses a G.R. Strobe at 400 flashes/second to show the tongue action up to 30 cm. A series of photographs are made on a film in a General Radio Camera. The flash time is about 1/20 of a second.

The equipment for the next Jack Ness effort was tested on Sunday night May 23 in the giant tank of the N.E. Aquarium. All seemed to work fine except the Polaroid 5"X7" camera and flash system. The M.B.C. crew were there to film the sequence on 16mm for background material.

A 250 watt metalicarc lamps was tested at the giant tank this morning. The assembly was hung close to the surface with a 10" aluminum reflector on the lamp. The first experiments were at 6 inches above the water surface. A bright image cast by the reflector was present. Then the lamp was raised about 3 ft. I prefer this arrangement with the reflector used.

I gave Bob Bonazolli's Salem phone no & John Prescott. Lamps are also made in 400 and 1000 watt sizes. The underwater experiments have not been tried.

May 29 1976
Harold Edgerton

Yesterday packed and shipped 48# on Brit Airways and 130# plate to Penstwick Scotland. Then Pines added some to make 1975 pounds total.

May 30, 1976 Silhouette photography of Pond water from Mt. Auburn Cemetery. About 1 pint of water was taken from the edge of the pond - west side. There were many copepods, Hydra worms etc.

A D.R. strobotac was used on "low" speed scale (max output). I switched it by turning the knob at lowest speed - 1 for just one flash.

Distance about 2½ ft & end on view a 4×5 film 7302 Eastman "fine grain positive" was used developed 5 min in 1:1 D-76 tol.

A final exposure was made on an 8×10" film 7302 in a developing tray, when 1 cm of liquid - the entire pint was dumped in. There were a few dead leaves etc in the bot. I did spot some copepods in the photo.

July 15, 1976.

The above photographs were made by pouring the water with the subjects directly onto the negative film in a tray (Eastman 7302). There may be some biological problems since the water is absorbed by the film and there may be a change of pH.

Now I propose the use of a thin glass or celophane layer between the water and the film. In this way the film will be kept dry and the liquid will not be changed by the emulsion.

74 July 15 1976

Harold E. Edgerton 180 mem Dr. Cambridge mass apt 11-74, 11-6A,

I returned yesterday with Esther from Scotland where we have been since June 1. Our task was to help Bob Rines in his effort to photograph the Loch Ness monster. All of our group were based at Drumnadrochit which is about 1/3 of the way from the north, and on the west side.

Rines has a cottage where he, Carol and Justice (2) live. We stayed with Gordon Mackintosh in TYCHAT, the house to the west of the Rines cottage.

Our operations were based at Temple Pier a stone pier just down the hill from TYCHAT. A chalet (portable house) was available to us there. Later a Command Post trailer (formerly a restaurant) was made available to us. This was installed on the pier (£12 a week)

The main effort was to get good photos of the animals. In this we failed. I believe it was due to the failure of the animals to come to the camera view. The basic camera-lamp was the 16 mm Elapsed Time unit that Rines has used since 1970. During this summer at least 60,000 exposures were made. Till in the summer, Wyzbroff noted 2 salmon and an eel(?). on the films.

152

A pair of Benthos deep sea cameras and strobe, a Polaroid with flashbulbs, and a T.V. monitor were mounted on a frame (unistrut) to photograph the Elapsed Time camera mentioned above. All of this was located 15 feet away from the Elapsed Time camera (ETC) with a cable back to the closet. A ~~four~~ two ~~foot~~ push buttons had control of the strobe and Polaroid cameras.

After a month (more or less) of no action, I arranged a sonar side scan beam to intersect the camera. The total range was 200 meters with the camera at 40 to 60. In this way a watch can be made of any object going into the beam. Coverage was made from the surface to the bottom with about a 2° width. Also the other side of the EG&G fish was removed and placed in a position to create a horizontal 2° beam. Then double information was obtained. Attached to this note book is a

Summary of the results as measured from the EG&G type 259 recorder using side scan sonar beamed at the camera setup. The HUNTER was used first – then the Barge some 110 metres from shore. (50 metres)

LOCH NESS

HAROLD EDGERTON
TEMPLE PIER
LOCH NESS 1976

SIGNAL WIDTH	DURATION VERT.	HOR.	COMMENTS
'ERS	MINUTES		
			NO TARGETS
2	0.3	—	DOUBLE
3	0.5	—	
2	0.3	—	
2	0.3	—	
3	0.5	—	
0.5	9	—	
4	0.5	—	
4	0.3	—	
1	0.1	—	DOUBLE
2	2	—	
2	0.7	—	
3	1	7	Strong signal ✓
2	1	1	
1	1.3	1.3	
1	0.3	0.5	
2	0.25	2.5	
10	0.5	3.0	7 filaments. ✓
2	0.3	2.0	
2	0.5	3.3	
			NO TARGETS
1	0.1	0.5	
1	.2	3.	
1	—	.5	
2	.4	1.5	
0.4	—	0.7	Several fish?

BARGE INSTALLED 110M OFFSHORE

6
7
8
9
10

BARGE MOORING MOVED

74 July 15 1976

Harold E. Edgerton 100 mem Dr. Cambridge Mass apt 11-74, 11-6A,

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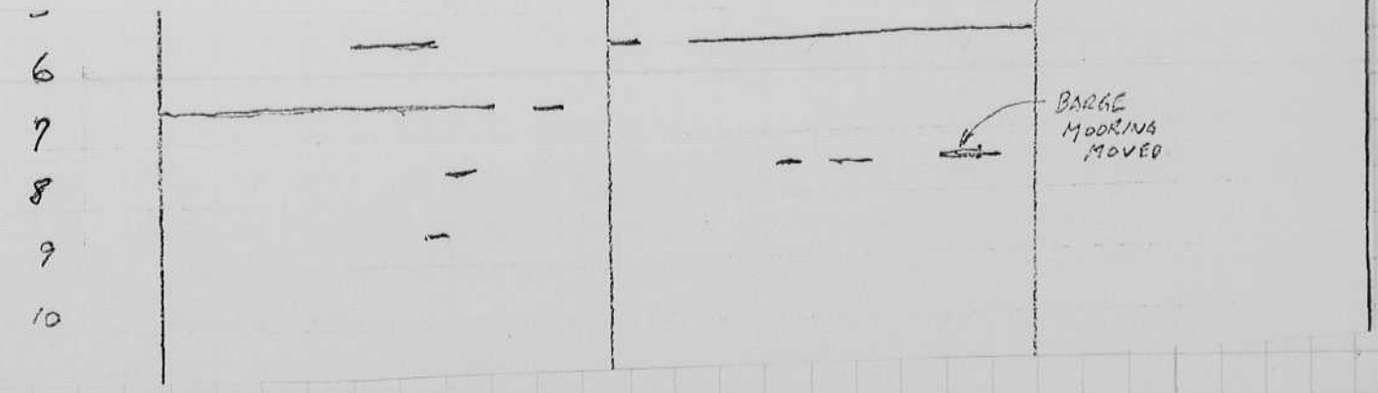
LOCH NESS

HAROLD EDGERTON
TEMPLE PIER
LOCH NESS 1976

SIGNAL WIDTH	DURATION VERT.	DURATION HOR.	COMMENTS
'ERS	MINUTES		
			NO TARGETS
2	0.3	—	DOUBLE
3	0.5	—	
2	0.3	—	
2	0.3	—	
3	0.5	—	
0.5	.9	—	
4	0.5	—	
4	0.3	—	
1	0.1	—	DOUBLE
2	2	—	
2	0.7	—	
3	1	7	Strong signal ✓
2	1	1	
1	1.3	1.3	
1	0.3	0.5	
2	0.25	2.5	
10	0.5	3.0	7 filaments. ✓
2	0.3	2.0	
2	0.5	3.3	
			NO TARGETS
1	0.1	0.5	
1	.2	3.	
1	—	.5	
2	.4	1.5	
0.4	—	0.7	Several fish?

BARGE INSTALLED 110M OFFSHORE



74 July 15 1976

Harold E. Edgerton 100 mem Dr. Cambridge Mass apt 11-74, 11-6A,

I returned yesterday with Esther for we have been since June 1. Our task Bob Rines in his effort to photograph monster. All of our group work base Drumna drochit which is about 1½ from the north, and on the west

Rines has a cottage where he, Cor live. We stayed with Gordon Mack TANGAT, the house to the west of the

Our operations were based at a stone pier just down the hill a chalet (portable house) was a there. Later a Command Post trailer restaurant) was made available & installed on the pier (£12 a week)

The main effort was to get go of the animals. In this we fa it was due to the failure of the cam to the camera view. The basic lamp was the 16 mm Elapsed Time Rines has used since 1970. During th at least 60,000 exposures were made. summer, Wyckoff noted 2 salmon and an films.

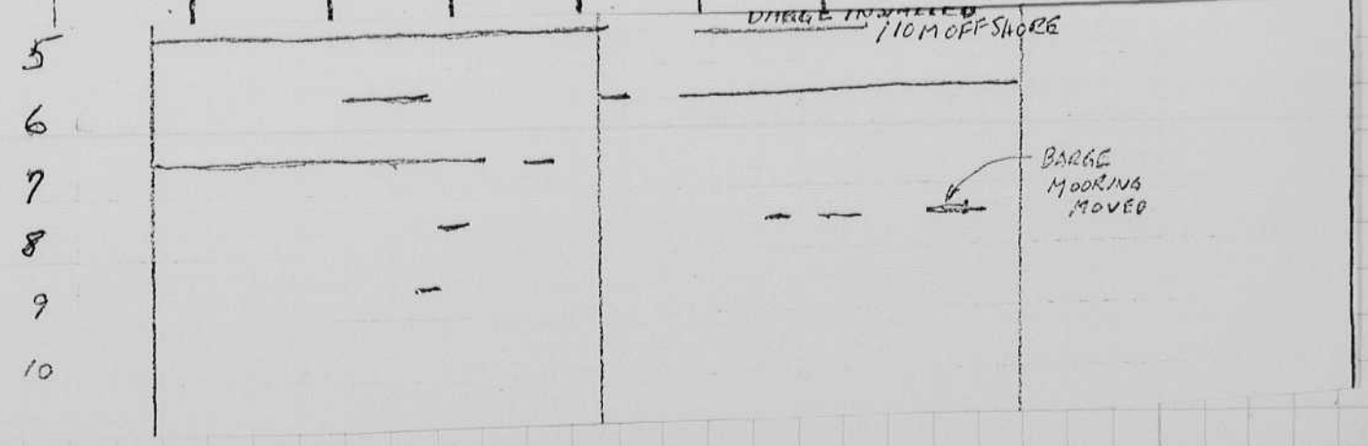
A pair of Benthos deep sea camera, a Polaroid with flash bulbs, and a T.V. mounted on a frame (unistrut) to g Elapsed Time camera mentioned abo was located 15 feet away from the Elapsed with a cable back to the chalet. ~~A pair~~ two buttons had control of the strobe and

After a month (more or less) of o arranged a sonar side scan s intersect the camera. The total range was 200 meters with the camera at 40 & 60. In this way a watch can be made of any object going into the beam. Coverage was made from the surface to the bottom with about a 2° width. Also the other side of the E66 & 59 fish was removed and placed in a position to create a horizontal 2° beam. Then double information was obtained. Attached to this rolle book is a

Summary of the results as measured from the EG&G type 259 recorder using side scan sonar beamed at the camera setup. The HUNTER was used first – then the Barge some 110 metres from shore. (50 metres)

HAROLD EDGERTON
TEMPLE PIER
LOCH NESS 1976

DATE 1976		TIME	CAMERA DIST METERS	SIGNAL WIDTH METERS	DURATION VERT. MINUTES	DURATION HOR. MINUTES	COMMENTS
JUNE	23						NO TARGETS
	24	07.18	65	2	0.3	—	DOUBLE
	24	08:52	120	3	0.5	—	
	24	08:56	125	2	0.3	—	
	25	05:08	75	2	0.3	—	
	25	05:21	130	3	0.5	—	
	25	16.02	145				
	25	1608	120				
	26	08.01	70	0.5	.9	—	
	27						
	28	07.51	135	4	0.5	—	
	28	07.57	75	4	0.3	—	
	28	09.32	52	1	0.1	—	DOUBLE
	29	05.07	35	2	2	—	
	29	09:11	175	2	0.7	—	
	30	22.44	80	3	1	7	Strong signal ✓
JULY	1	0.14	15	2	1	1	
		01.16	40	1	1.3	1.3	
		02.56	32.5	1	0.3	0.5	
		04.45	72	2	0.25	2.5	
		05.15	110	10	0.5	3.0	✓ 7 filaments.
		05:48	58	2	0.3	2.0	
		06:50	90	2	0.5	3.3	
JULY	2						NO TARGETS
	3	03.27	50	1	0.1	0.5	
		06.00	120	1	.2	3.	
		6.56	10	1	—	.5	
	4	23.13	75	2	.4	1.5	
	5	07.25	20	0.4	—	0.7	Second fish?



74 July 15 1976

Harold E. Edgerton 180 mem Dr. Cambridge mass apt 11-74, 11-64,

I returned yesterday with Esther fr. we have been since June 1. Our task Bob Rines in his effort to photograp monster. All of our group were bas Drumnadrochit which is about 1/2 from the north, and on the west

Rines has a cottage where he, Cor live. We stayed with Gordon Mack TYCOAT, the house to the west of the

Our operations were based at a stone pier just down the hill a chalet (portable house) was a there. Later a Command Post trailer restaurant) was made available to u installed on the pier (£12 a week)

The main effort was to get go of the animals. In this we fa It was due to the failure of the cam to the camera view. The basic lamp was the 16 mm Elapsed Time Rines has used since 1970. During th at least 60,000 exposures were made summer, Wyckoff noted 2 salmon and an films.

152

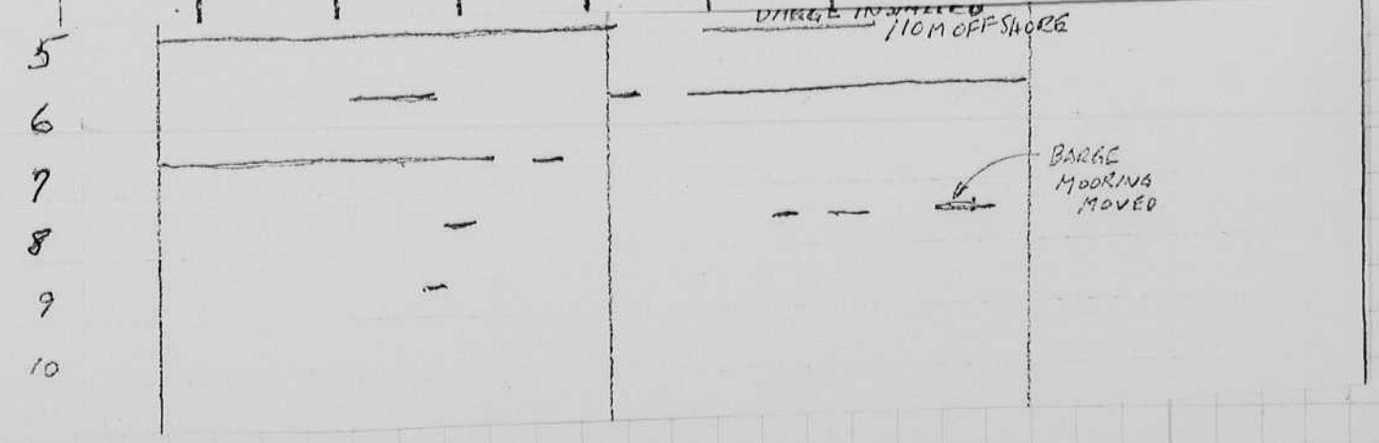
A pair of Benthos deep sea camera , a Polaroid with flash bulbs, and a T.V. mounted on a frame (unistrut) to g Elapsed Time camera mentioned abo was located 15 feet away from the Elapsed with a cable back to the closet. ~~A pair~~ Two buttons had control of the strobe and

After a month (more or less) of a arranged a sonar side scan to intersect the camera. The total range was 200 meters with the camera at 40 & 60. In this way a watch can be made of any object going into the beam. Coverage was made from the surface to the bottom with about a 2° width. Also the other side of the B&G 59 fish was removed and placed in a position to create a horizontal 2° beam. Then double information was obtained. Attached to this wall book is a

Summary of the results as measured from the EG&G type 259 recorder using side scan sonar beamed at the camera setup. The HUNTER was used first – then the Barge some 110 metres from shore. (50 metres)

HAROLD EDGERTON
TEMPLE PIER
LOCH NESS 1996

DATE 1996		TIME	CAMERA DIST METERS	SIGNAL WIDTH METERS	DURATION VERT. MINUTES	DURATION HOR. MINUTES	COMMENTS
JUNE	23						NO TARGETS
	24	07.18	65	2	0.3	–	DOUBLE
	24	08:52	120	3	0.5	–	
	24	08:56	125	2	0.3	–	
	25	05:08	75	2	0.3	–	
	25	05:21	130	3	0.5	–	
	25	16.02	145				
	25	1608	120				
	26	08.01	70	0.5	9	–	
	27						
	28	07.51	135	4	0.5	–	
	28	07.57	75	4	0.3	–	
	28	09.32	52	1	0.1	–	DOUBLE
	29	05.07	35	2	2	–	
	29	09:11	175	2	0.7	–	
	30	22.44	80	3	1	7	Strong signal ✓
JULY	1	0.14	15	2	1	1	
		01.16	40	1	1.3	1.3	
		02.56	32.5	1	0.3	0.5	
		04.45	72	2	0.25	2.5	
		05.15	110	10	0.5	3.0	7 flames. ✓
		05:48	58	2	0.3	2.0	
		06:50	90	2	0.5	3.3	
JULY	2						NO TARGETS
	3	03.27	50	1	0.1	0.5	
		06.00	120	1	.2	3.	
		6.56	10	1	–	.5	
	4	23.13	75	2	.4	1.5	
	5	07.28	20	0.4	–	0.7	Second finish?



 July 15 1976

Harold E. Edgerton 120 mem Dr. Cambridge mass apt 11-74, 11-64,

I returned yesterday with Esther from Portland where we have been since June 1. Our task was to help Bob Rines in his effort to photograph the Loch Ness monster. All of our group was based at Drumnadrochit which is about 1/3 of the way from the north, and on the west side.

Rines has a cottage where he, carol and Justice (2) live. We stayed with Gordon MacIntosh in TYCHAT, the house to the west of the Rines cottage.

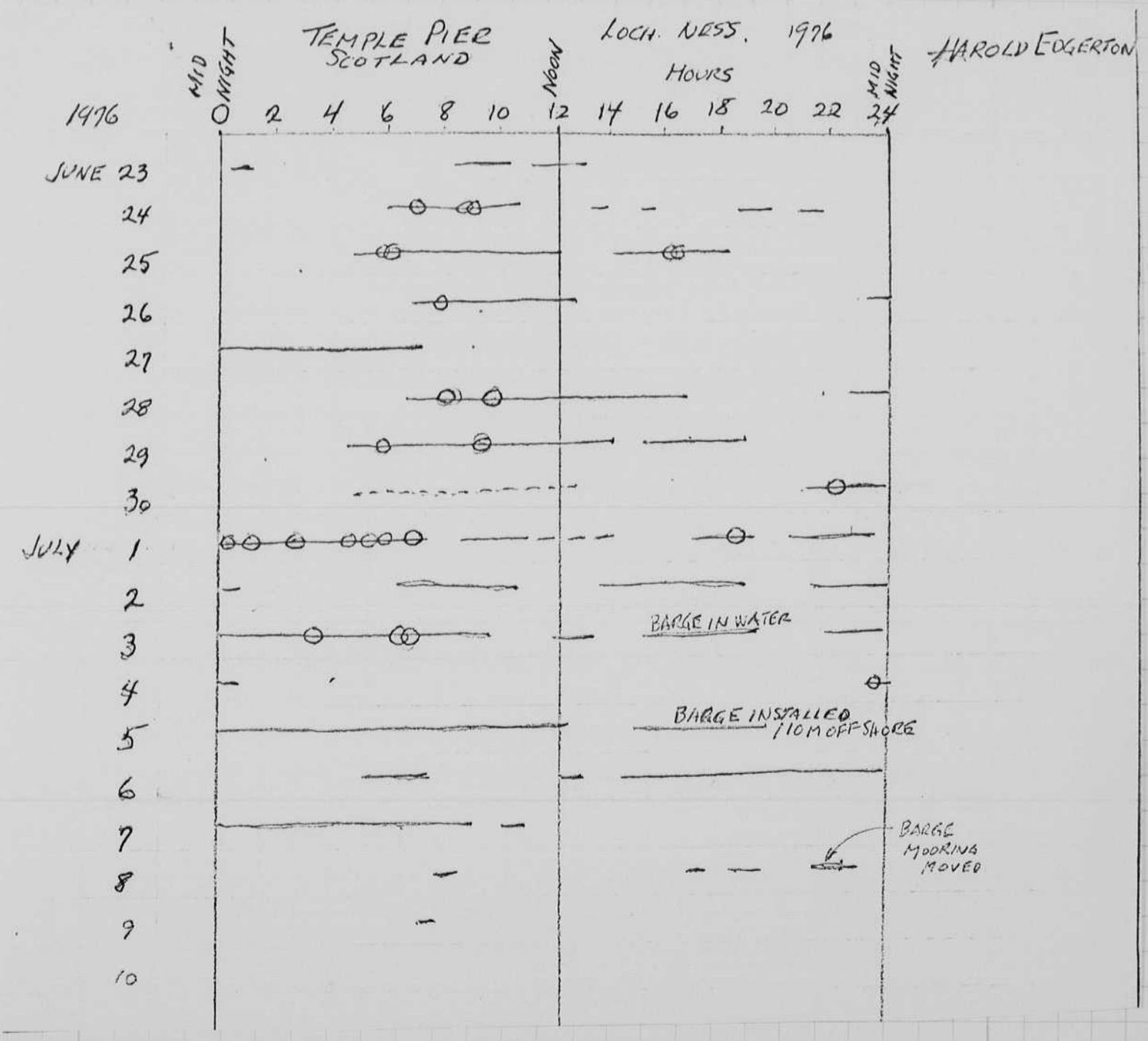
Our operations were based at Temple pier a stone pier just down the hill from TYCHAT. a chalet (portable house) was available to us there. Later a Command Post trailer (formerly a restaurant) was made available to us. This was installed on the pier (£12 a week)

The main effort was to get good photos of the animals. In this we failed. I believe it was due to the failure of the animals to come to the camera's view. The basic camera-lamp was the 16 mm Elapsed time unit that Rines has used since 1970. During this summer at least 60,000 exposures were made. Late in the summer, Wyckoff noted 2 salmon and an eel(?). on the films.

A pair of Benthos deep sea cameras and strobe, a Polaroid with flash bulbs, and a T.V. monitor were mounted on a frame (unistrut) to photograph the Elapsed time camera mentioned above. All of this was located 15 feet away from the Elapsed Time camera (ETC) with a cable back to the chalet. ~~a push button~~ push buttons had control of the strobe and Polaroid cameras.

After a month (more or less) of no action, I arranged a sonar side scan beam to intersect the camera's. The total range was 200 meters with the camera's at 40 & 60. In this way a watch can be made if any object going into the beam. Coverage was made from the surface to the bottom with about a 2° width. Also the other side of the E&G 259 fish was removed and placed in a position to create a horizontal 2° beam. Then double information was obtained. Attached to this note book is a

152


TEMPLE PIER
SCOTLAND
LOCH. NESS. 1976
HAROLD EDGERTON
MID NIGHT
NOON
MID NIGHT
HOURS
1976
0 2 4 6 8 10 12 14 16 18 20 22 24
JUNE 23
24
25
26
27
28
29
30
JULY 1
2
3
4
5
6
7
8
9
10
BARGE IN WATER
BARGE INSTALLED
110 M OFF SHORE
BARGE MOORING MOVED

74 July 15 1976

Harold E. Edgerton 160 Mem Dr. Cambridge Mass apt 11-74, 11-64,

I returned yesterday with Esther from Portland where we have been since June 1. Our task was to help Bob Rines in his effort to photograph the Loch Ness monster. All of our group was based at Drumnadrochit which is about 1/3 of the way from the north, and on the west side.

Rines has a cottage where he, Carol and Justine (2) live. We stayed with Gordon Mackintosh in TYCHAT, the house to the west of the Rines cottage.

Our operations were based at Temple Pier a stone pier just down the hill from TYCHAT. A chalet (portable house) was available to us there. Later a Command Post trailer (formerly a restaurant) was made available to us. This was installed on the pier (£12 a week)

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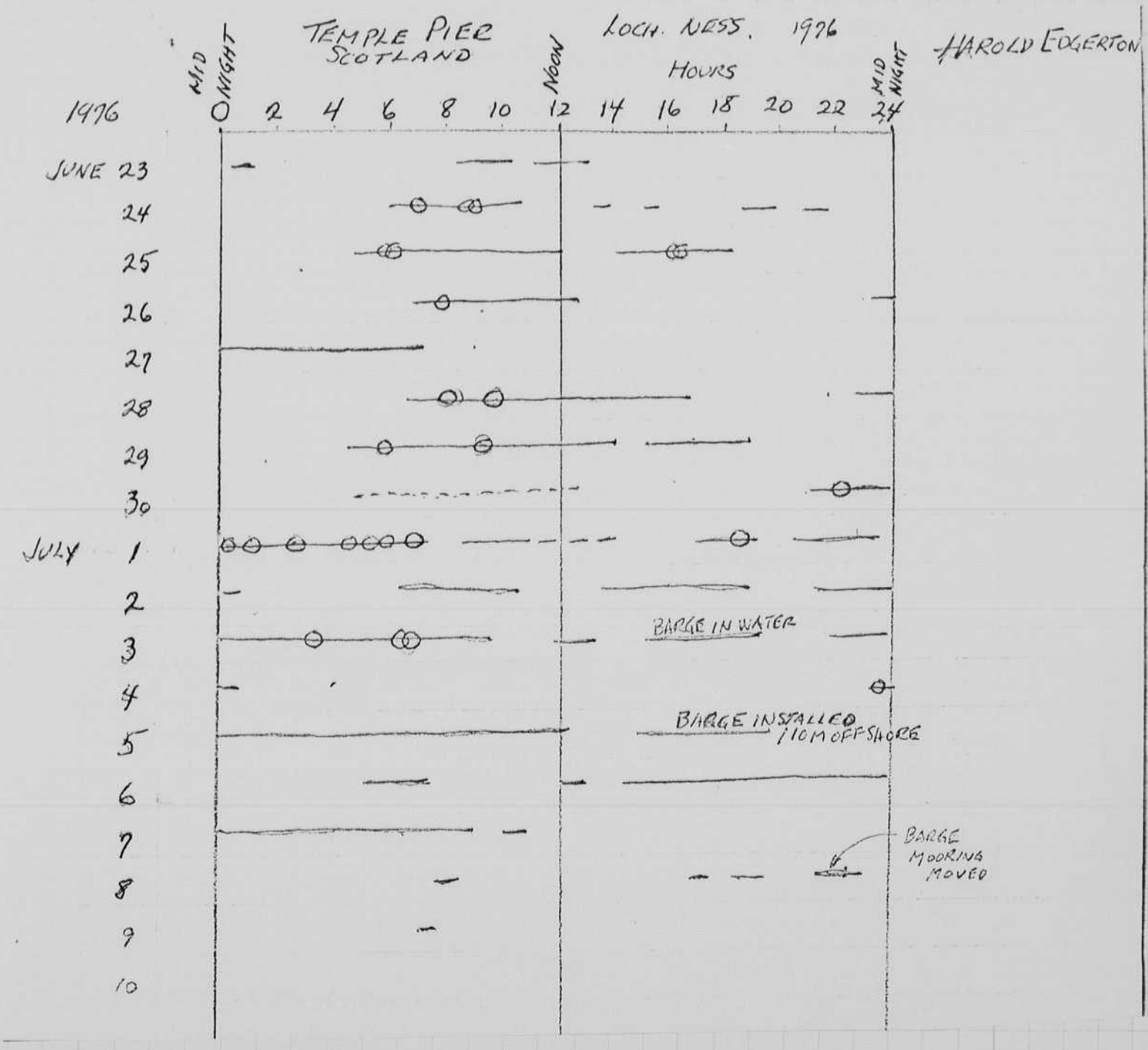
A pair of Benthos deep sea cameras and strobe, a Polaroid with flashbulbs, and a T.V. monitor were mounted on a frame (miniature) to photograph the Elapsed Time camera mentioned above. All of this was located 15 feet away from the Elapsed Time camera (ETC) with a cable back to the chalet. ~~A push button~~ Push buttons had control of the strobe and Polaroid camera.

After a month (more or less) of no action, I arranged a sonar side scan beam to intersect the camera. The total range was 200 meters with the camera at 40 & 60. In this way a watch can be made of any object going into the beam. Coverage was made from the surface to the bottom with about a 2° width. Also the other side of the EG&G 59A fish was removed and placed in a position to create a horizontal 2° beam. Then double information was obtained. Attached to this note book is a

152


TEMPLE PIER
SCOTLAND
LOCH. NESS. 1976
HAROLD EDGERTON
HOURS
MID NIGHT
NOON
MID NIGHT
0 2 4 6 8 10 12 14 16 18 20 22 24
1976
JUNE 23
24
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JULY 1
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10
BARGE IN WATER
BARGE INSTALLED 710M OFFSHORE
BARGE MOORING MOVED

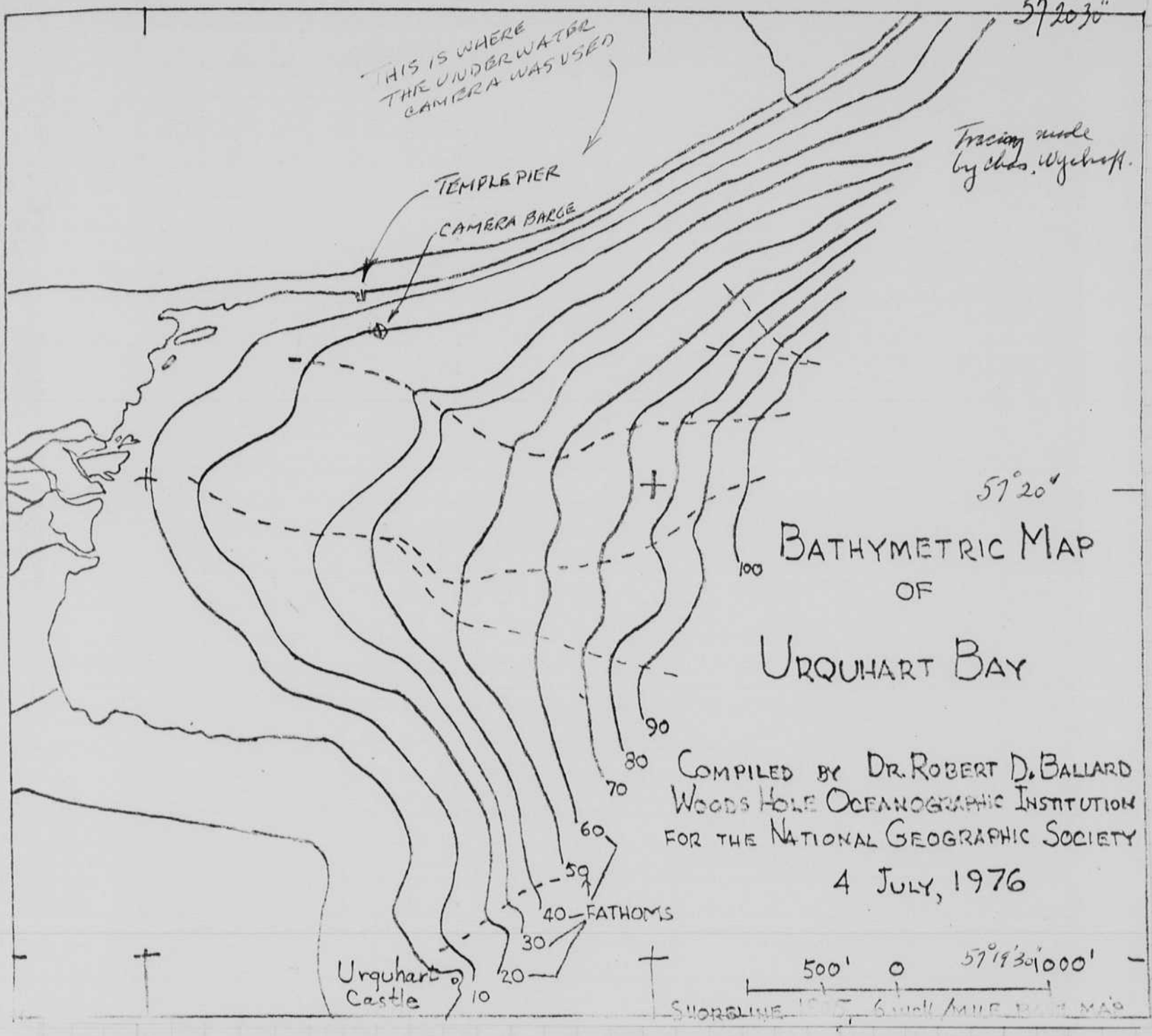
Estberard L left Tydal Drumnadrochit Scotland on July 14 1976
We drove our rented Avis car, a Vauxhall, to Inverness to
catch the 730 plane (Brit Airways) to London. Then we took
a 747 Pan American to Boston. Doubler of the Nat. Geo was
on the Inverness to London flight. Also Emory Kristofer who
was to pick up some new electronics for the auto
matic sonar triggered camera that was to be
installed to the NE of our camera Barge see p 77
for the Barge location.

Like with previous page that activity seemed
to stop for sonar sightings after the barge was put
into the water. I wonder if the preservative paint
on the wood may have polluted the water? The
total observation time also decreased also which
may not have coincided with action.

My sonar was pulled out of the permanent
position on and installed on the Hunter
which was now freed from its anchorage after
the camera gear had been transferred to the Barge.

One experiment was made in mid lake with
side scan set for 200 meters. The ship was
stationary. Strong intermittent signals were
received which probably were multiple from
echoes from ~~not~~ shore echoes. I did not see
any signals that I could identify as
animals. This experiment needs to be
repeated.

A few runs were made at the Lockend where
Funkelstein found the rings. Two runs were
made so that an approximate location of
the many circles could be made.


57°20'30"
THIS IS WHERE THE UNDERWATER CAMERA WAS USED
TEMPLE PIER
CAMERA BARGE
Tracing made by Chas. Wyckoff.
57°20'
BATHYMETRIC MAP
OF
URQUHART BAY
COMPILED BY DR. ROBERT D. BALLARD
WOODS HOLE OCEANOGRAPHIC INSTITUTION
FOR THE NATIONAL GEOGRAPHIC SOCIETY
4 JULY, 1976
100
90
80
70
60
50
40 FATHOMS
30
20
10
Urquhart Castle
500' 0 1000'
57°19'30"

Fellercard & left Tyndrum Drummadrochit Scotland on July 14 1976
We drove our rented Avis car, a Vauxhall, to Inverness to
catch the 730 plane (Britainways) to London. Then we took
a 747 Pan American to Boston. Doubler of the Nat. Geo was
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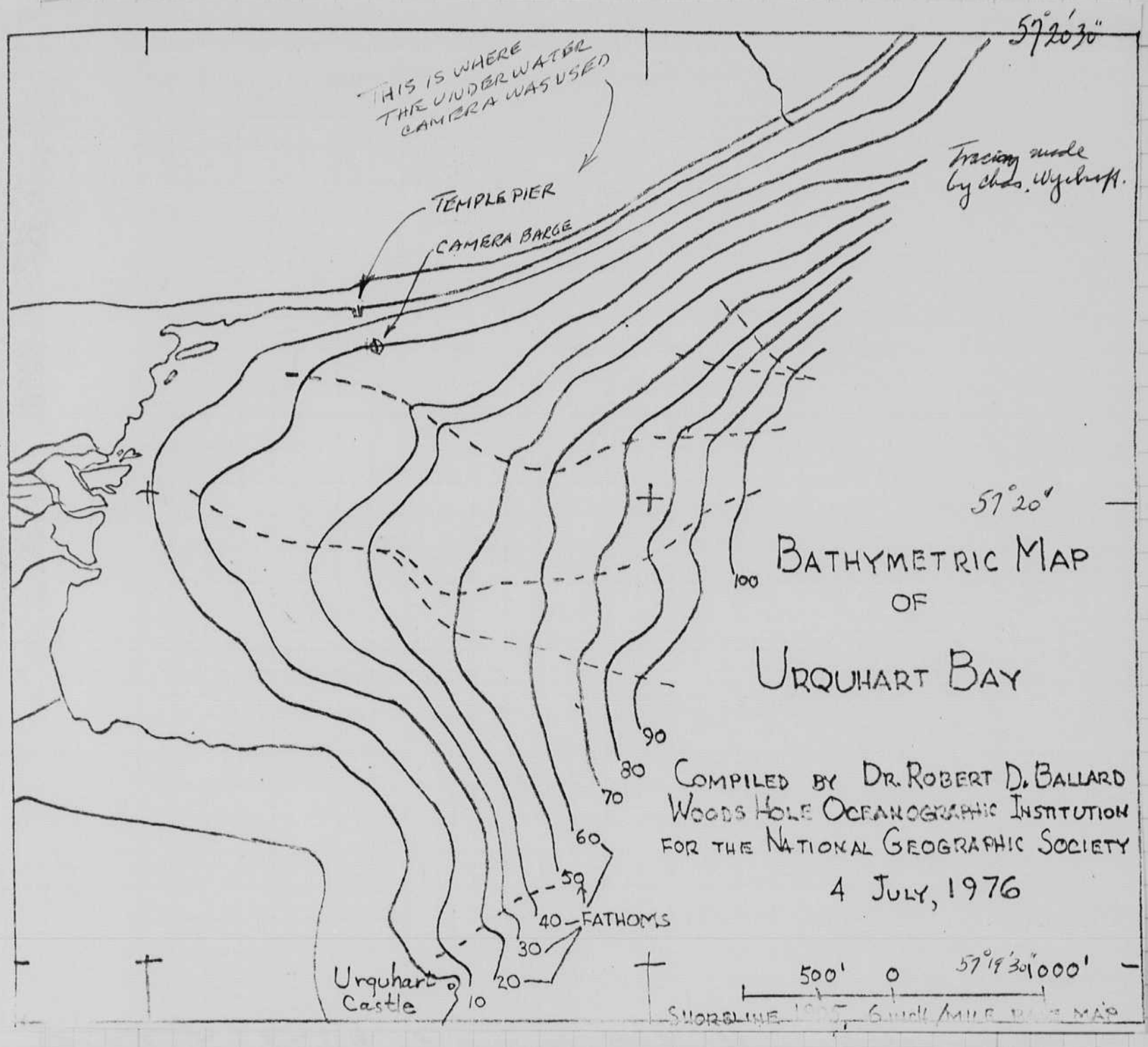

57°20'30"
THIS IS WHERE THE UNDERWATER CAMERA WAS USED
TEMPLE PIER
CAMERA BARGE
Tracing made by Chas. Wyckoff.
57°20'
BATHYMETRIC MAP
OF
URQUHART BAY
100
90
80
70
60
50
40
30
20
10
FATHOMS
COMPILED BY DR. ROBERT D. BALLARD
WOODS HOLE OCEANOGRAPHIC INSTITUTION
FOR THE NATIONAL GEOGRAPHIC SOCIETY
4 JULY, 1976
Urquhart Castle
500' 0 57°19'30" 1000'
SHORELINE

78 Harold Edgerton

Light output Xenon Rod. 1539A HIGH Speed with Reflector

July 17 '76 Peak light 2×10^6 2.2×10^6 C.P. $\times .05 = .11$ C.P.

Duration $\frac{2.5 \times 10^6 \times .11}{.275}$

110
44

0.275 B.C.P.S. @ 200/min.

Strobotac 1531 1.9×10^{-6}

AB 24543. 2.5×10^{-6}

Beacon for Aurora $0.05 \times 8 = .04 \times 10^6$ volts. peak light.

Dur = 30×10^{-6}

$30 \times .04 = 1.2$ c.p.s.

1539A on Hyll @ 200/min

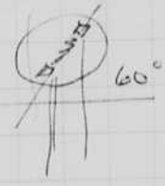
$2.2 \times .05 = .11 \times 10^{+6}$

$2.5 \quad \frac{2.5 \times 10^{-6}}{0.275}$ B.C.P.S.

25
25
275

July 29. WHOI Boothbay. Output about 1/3 when arc is viewed sideways.
July 21 - 10.30-11 J.A. Wylie.

30
31
Aug 1 } coastline marine



Aug 1 - 7. Toronto.

28. Tom Ufersma

Aug 21. WHOI Jim Johnson.

Aug 15-20 N.C.

Photos made with 2 K. Tam f/ 30° $0.275 \times \frac{1}{2} = .02$ C.P.S.
onto 7203 film 6 min DK 72 1:2 ±.

Water from faucet (shows small dots)
Urine (shows bubbles)

July 18, 1976

110 cm = 3.6'

1. Water from Charles River 30 cc onto 4"×5" film over Saran wrap. Lamp at 110 cm from film 0.2 C.P.S. many 0000s - chains

* 2. Water from 100 mem Dr. 20 cc + many 0-0-00s- CHAINS

* 3. " " " " " 20 cc + → some?

Double size 6×9

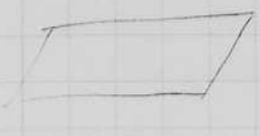
Saran from 100 mem Dr.

0.2 c.p.s.

110 cm

4x5" film holder

#4



Saran wrap less than .001" thickness

50 cc of tap water.

The saran leaked? any way the film was wet, partially, after the experiment was finished.

#5

400 cc Chamberlain Water in 5x7" Pan
with 4x5 film at bottom.
Lamp 0,2 at 110 cm.
7302 film Declibel 1:2 at 6 min.

July 21, 1976 KE. The 9.K. Stroboscope adapted for silhouette photography was sent yesterday to Jeff Wilson PO Box 30113 Cleveland Ohio. He will present the paper in Toronto Aug 6 on the silhouette system.

I have had difficulty in obtaining prints at magnifications greater than 30. Why not do it in stages by making a negative at 30 and then magnify (enlarge) it? 30x30 = 900 ???

Loran C Interavia 101. Bedford Mass Loran C chart.
Friends of Bob Rines. Loran A "
Improved Loran.

Hull College
Stone Circles of the British Isles.
Yale Univ. 1976 Sept.
Press.

80 July 19 1976. 18:23

Harold Edgerton 100 Memorial Dr

The Titanic and the Californian
by Peter Padfield
The John Day Co N.Y.
1966 Edition
62 West 45 St N.Y. 10036
Borrowed from the lui of Cincinnati Library.

Foreword by Stanley Tuttor Lord son of Capt. Stanley Lord of the Californian

Introduction = 11 pages by Padfield stating that the evidence against Capt. Lord was not just and the conclusions by the court erroneous.

Book "the ~~Iway~~ Isway Line" Newton Jo Oldham

"of Ships and men" alan Villiers

The Loss of the Titanic Sir James Bisset

The Marconi Scandal Francis Donaldson

April Capt Smith
Titanic 46 325 Gross Tons

From	orig	Corrected.
W.A. Baker	41° 16' North.	41° 46' N
Hart Museum.	50° 14' west	50° 14' West
Wreckage and boats found	41° 32' N 50° 01 W	

Titanic Enthusiasts of America
Joseph A Carvalho
11 Canal St
Winchester Mass. 01890 1968.

from M.I.T. Nautical Museum.

July 22 1976
Harold Edgerton

Unpacked Sonar from ~~England~~ Scotland and prepared for a photo expedition with sonar for Tuesday. We will use the Army T Boat (new MIT research ship) and work with the N.E. Aquarium. Tom Gilbert. Chas. Mazel will help me.

Bill is making two more silhouette composites 110 cm above the film using the FX-6A lamps in the "high" on the Benked Slave light. The output is about 0.25 e.p.s. with the bare lamps.

Trial exposure made at 110 cm on Ilford fine grain positive film of a room sheet of paper to show fibers. Dev. 6 minutes.

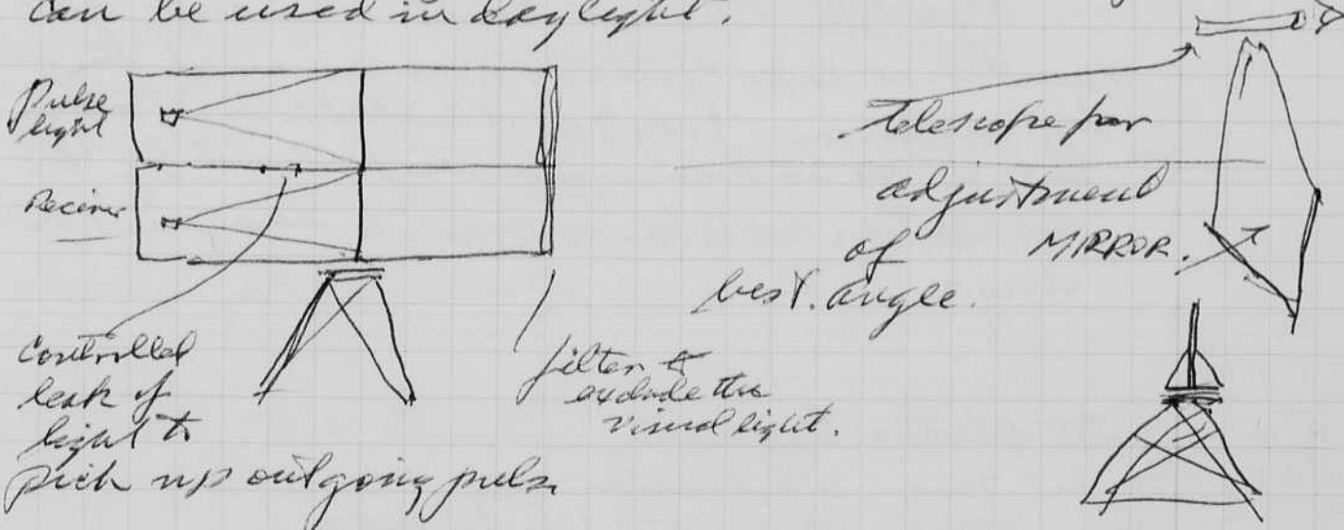
July 25 1976
Harold Edgerton

Distance measurement.

Use of light pulses .01 μs = 100 ft .001 μs = 10 ft .0001 μs = 1 ft.

Compromise for .01 μs 10 feet for crude instrument.

Use two optical systems with lenses so system can be used in daylight.



Measure time between sent and recieved pulses.
velocity of light = 3×10^{10} cm/sec.

82 Aug 4 & 1976 Harold Edgerton

Catch up on activities.

On Wed July 26 Tom T. Uyemura and wife Myoko + 3 others arrived and stayed at the Head House. We had them for guests at our home, also Jean Mooney.

I went (took Cousteau, Solomon Phil Cousteau and Thayer to WHOI for a meeting of the Cousteau Society. Then dinner at the WHOI with their trustees.

Fri July 30 I took the 4 Japanese men & Salem-EPC Lab and Eg & Gg at Waltham. I took them to the air port on Sunday Aug 1 to catch a 730 plane. They all plan to attend the conference in Toronto.

Tues Aug 3. I went to sea on the 424 boat with McLeod, Tom Gilbert, Patrick Barron and the capt. We took pict at 2 stations at 90 miles deep off Boston. The T.V. both showed holes in the bottom.

~~Fri~~ Today Aug 4 I went to Nahant beach with Esther and our grand daughters Nina and Sylvania Edgerton from Pontiac. Andrew Kay and Burke from Dallas came & see me today about strobe photographs. The girls came July 30 and leave on Aug 5 at 3 PM 52. We had a grand time with them.

MONITOR. The combined Link sub with Newton at Cape Hatteras was cancelled by plane by Newton on July 30. I talked to Link on Sat. 31. He was very much put out by the cancellation and he was ready to have sail on Aug 2.

Experimental photos Strobosland.

#1	110 cm	7302	old developer.
2	110	7302	new Dektol 1:2 from Bottle.
3	70 cm	7302	" "
4	110 cm	50427	5 min 1:2 Dektol.

Pluto record.
made at sea on
Ship. ~~454~~. 424 Avg 376
Counter.
2 M I T
3,4 on Ship.
1324 in water.
1147 50' deep.
1151 1325 String 50' deep.
. . .
1210 1335 on deck. ok.

1410 Station 13 Surface lost 1336
1424 up. 1347

In lab. Avg 4 1350
Fast photo 13.51
Film removed for
sending to Rochester.
H.S. Ektrachrome.
f 8 1.5 m.

Suggestions for 424 M.I.T.
Bench and seat for sonar.
Lamp over chart. Sonar.
Small Boomer & Driver.
Holes for tiedown ropes.
T.V. Tungsten light
T.V. system sampled
Dark-Windows for T.V.

Increase power in
12 KH pinger for
more penetration.

Derek Goodwin 6212 Verne St
Bethesda Maryland 20034
~~Mary~~ 301. 840. 9293.

Bon Homme Richard
Program of ~~Dr~~
Sydney Wignell.

Decca will operate the survey for
the ship. ($800 day cost.)
1 week 24 hrs/day operation.
Goodwin plans to make a movie.

Nina and Sylvia Edgerton of Pontoon
were guests for a week ~~of~~ to Aug 5.

Bill Dixon arrived Fri Aug 6 at 10 am on Eastern
from Hickory N.C. via Charlotte N.C.

84 Aug 6 1976 ~~Harold Edgerton~~

~~Silhouette~~ Photography.

~~Stroboflare~~ at 110 ~~mm~~ cm.

1st enlargement 50 mm lens 1 mm = 11 mm ×11.

2nd enlargement 50 mm lens 1 cm = 5.9 cm ×5.9

3rd enlargement 4" lens. ×2.

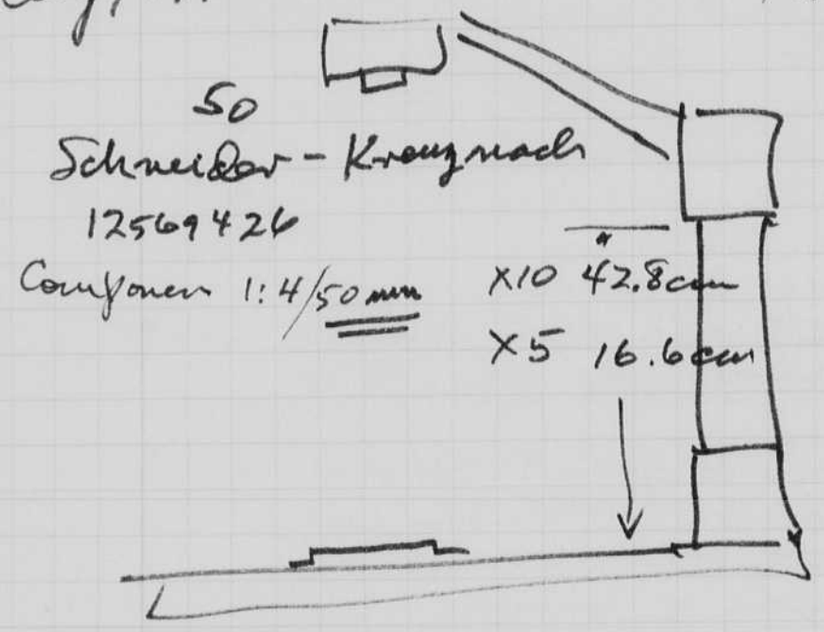
649.

enlargement. 1298

1 cm in enlargement = ~~.0.179 cm = 1.79 mm.~~

1298 = 1.079 mm

Aug 7 1976 H.E. & Bill Dixon



Eastman enlarger.

Aug 9, 1976 Clear River Water

H.E. & Bill Dixon

8×10 7302 Film Zinc Drain

Stroboflare at 1 meter (110 cm).

Depth 1-2 meter. 3 min Dur.

Shows many strings and dots.

Picture 8×10 Tray with 3-4 cm. H2O.

about 5 mm of water over the film.

Harvard Dr A Crompton 495 1724

Jane Mauge 495 1724 → Rudy Strickler - Yale

Dr. Ruth Turner 1779 Mallory Dept of Biology

Woolcott 1755 Osborne Building

Russel Isaacs 1-366.9181 Hynes book (new Brunswick). biology?

Warren Kimball Tyngsboro School Mass. Pollution
Westview
PO Box 545 Westboro 01581

Algae.-

Constance Son
Leslie Sheldon
777 3rd ave
212-826-2940
243-500-150W
Wants 5 Sockets,
Transformer
& Sam
Raymond.

S.O. 427 film is High Definition Slide Aerial 3414
mfgr from Sheldon Phillips. Aug. 9, 1976.

He suggested color 2483 Ektrachrome (E-4 processing)
High Contrast.

Note intensity light around the heads?

August 10, 1976 ~~Harold E. Edgerton~~

I visited Bldg 46 Salem this morning with Bill Dixon my grandson from Hickory N.C. We saw the tube dept etc

~~N.E. Water Pollution~~ San Ens. 437-2000. (17)
437-3202. Jefferson.

Gene Covert
Mort Finston } Aero Dept. shock waves. Dr.

Arthur Miller 617 262-2746
Chris Chrysofolos
Harcourt 17 Harcourt ST Boston ~~MA 02111~~
Ma 02116

86 Harold Edgerton Aug 10 1976 afternoon.
Bill Dixon.

FX6A – 1 METER. 7302 FILM.

Glass plate 1.2 mm THICK

✓ 1 8x10 500cc Tap water 3 min DEKTOL 1:2.

2. 4x5. Photoflow + specimens made larger area SHOW

motion → 3. 4x5 Dry Film + wet photo glass + specimens. (Bubbles) SHOWS MOTION IN INNATE

no motion { 4 4x5 wet film Photoflow + wet glass + specimens (3 FLASH)
5 " " " " " "

✓ 6 4x5 Dry film Dry Glass + specimens 3 flashes.

✓ 7. " " " " 2 "

✓ 8 " " " " 1 flash.

✓ ? " Dry film + Wet glass + specimens.

Dixon Theory for velocity marks in water. Dry neg. + Wet glass + specimens

Edy theory Photoflow + specimens show velocity marks.

Conclusion. Motion requires Glass Plate or thin liquid.
or just thin liquid.

H. Edgerton Bill Dixon

Prof. 87

Try to get a thinlayer of liquid.

1 Dry film 1.2 mg glass plate
Plus flow + Brine Shrimp.

2. 30 cc in 4×5 tray.

3. Soak film 1 minute before adding brine shrimp.

4 Wet film. Squeege before.
Brine Shrimp.

Res. & Dev.
Jeff Wilson
Union Carbide
Parma Ohio
1840 West 25
Cleveland, 30113
P.O.

S.O. 343 #8

High Resolution
2000 lines/mm.

type 7302 120 lines/mm #3.20

Aug. 17, 1976

To Lincoln Nebr with Esther and Bill Dixon on Aug 12 Thursday. Met Bob, Eric, Mary Jon, Chas. Ellen and Maryanne in Chicago. Then to Lincoln to the Holiday Inn.

On Friday 13 we all went to the Nat. Bank of commerce to see Judge Clarke, Kitty Carlson, Harold Bowman and Mingo. Then we went to Aurora to stay at the Kenschnitel. Dinner that night (13) with the Kremers Bob, Ken, and Maurice. Mark also came. Smith and wife. Arnett and wife. Howard Anderson, wife and daughter, Judge Clarke & wife.

— for Georgia friends of Ken Kremer.

On Sat. 14, all of us visited the James with Howard Anderson. It rained a bit. The corn looked great due to the irrigation.

Saw the Plainsman museum in the afternoon then went to Omaha to stay at the airport Inn.

Sunday Aug 15 we went to Woodbine Iowa. after a

drive around town we looked up Aunt Jessie
de Coe at the Rose Vista. We enjoyed a visit with
her. Then we went to Frankie Portegin's house
at 306 Weare St. This was the house once owned
by Josiah Coe for his children to stay in while
going to school. It was here that my mother
Mary Coe and Father Frank Edgerton were courting
as noted by Jessie who was a younger
sister of Mary. The dinner was great.

Aug 18 1976 I went to sea yesterday with the M.I.T. Aquarium
group on MIT's new ship #24. Tom Gilbert, Pete &
Caroline Karp, Chas Mazel operated the side scan.
I operated a Benthos camera and T.V. system. We
made photos at 4 locations all about 300 ft deep.

Mazel may go to N.Y. Stall on the weekend
to demonstrate the sonar to Rich Murphy
Albany N.Y. 518.785.3605 who called
from Sackets Harbor several days ago
Chas. Mazel lives in Cambridge 864-3259 I
gave Murphy his number last night and
hope they get together.

716.724.4524
called for
tomorrow.

Aug. 21, 1976. John Lemer arrived to discuss the Pacific Ocean experiment
that was described in a phone call from Fred Reines.
Neutrino flux from outer space. Large volume
of water to glow with Cherenkov radiation.

Aug. 22 1976 Sat. 3 pm. Loch Ness Meeting. Harold Edgerton.

Bob Rines. Geo. Newton.
Bob Needleman Norbert Klein
Chas Wyckoff Howard Curtis
Dennis Meredeth Sara Raymond.
Harold Edgerton. Vicky Briscoe 187-252

Geo. Newton 27,000 anx

Report from Bob Rines

Loch people serviced equip. Jordan Menzies.
Lake is low. No fish. Recorder is operating fine
Computer is gating fine 1 ft to 35 ft.

Nat. He moved into the Van on Temple Pier
many faulty trigger occurred. Diver as target
5 to 6 ft range of cameras.
50-500 cycles to attract sharks used
Baiting experiments (Kippers etc did not work)
Will stay until Sept 15. Writer & Kraftt.
Doubleat will be back.

Rines - our plans - to continue the run
charge - 220 out to Raft. 110 trans. on the raft.
Oct. 2nd week - Salmon may be there
Raytheon is excellent. 731 type.
Blonder - Fresh water tracking of fish.
5 volts/foot - Fresh water fish
go to the pos. electrode. Leave the negative.

Nasa - Helmrich to observe personal

Ross equipment works fine.
Hydrophone experiment. Subject was above the camera.
Hydro products equip. was lost in Belgium
John Mills - will try for October. 2nd week.
Study circles or other targets.
Mc Gowan - no word - Jeff Thomson
Univ. of Edinburgh - interested in Rings
Nikon - Motorized camera. offer.
N.B.C. Documenting in October.
Finance - Customs 500 Interpol.
Belfair Airways - have not paid for the air freight
Cabin - stillon dock. Chalet for a year. Living facility.
Wyckoff 9,000 pics - Dozen fish only.
Rosencrang - Physicists - Extra sensitory experts.
Rines will make a summary for the times.
Oct. Tech Review for Dec. Augusta "Jacobite" Boat.
Scotland.

Archeologist. Anna Ritchie Univ of Edinburgh. Scotland. about Rings.

Sharks with fish a. Kalmijn W.H.O.I.

90 Harold Edgerton Aug 24 1976 4-405 M.I.T.

Test of fast High Resolution film
Eastman 5.0.343 4x5.

FX6A at 1 meter. ~~DK7~~ Rebital 1:1 no mixing.
Stabilizer 0.5 lcps.

FX6A at 1 meter. HRP Developer 1:1. no mixing

1/3 " " " " Dmin. D 0.07 0.13

7302 at 1 meter HRP 1:1 2 min. D. 0,08 1.25

I used a ~~town~~ torn paper as a subject.

Hamilton Club.
Red Sea + 5
Angels 6
Earthquit, bad spot
Fader bought me home.

The paper split half way in one place. There were holes where the light came through without interference.

Aug 25. It appears that 5.0 343 film is mighty slow
0.1 above fog requires $\left(\frac{.5}{.3^2}\right)$

$S = \frac{.8}{(IT)} = \frac{.3 \times .3^2}{.5} = \frac{.027}{.5} = .05$ ASA speed for 5.0 343.

Speed of 7302 fine grain film is at least 10x this:
S = .5 or maybe 1. ASA.

Todo

I plan to expose Kodachrome type - 2483 by the silhouette system. The speed of 2483 film is 16.

Kodak Photomicrography color film 2483

$S = \frac{0.8}{(IT)}$ $IT = \frac{0.8}{16} = .05$ mcs.

$IT = \frac{cps}{D^2}$ Let D = 1 meter then
$cps = .05 \times 1^2 = .05$ c.p.s.

1. Make glass plate with edges.
2. Catch several Brine Shrimp.
3. Ex pose with 1/2 light and full light on Kodachrome film.
4. Look for color subjects such as green fibers
5. Look for diffraction colors around edges of fibers.
6. Angle a stream of air under the water.

Aug 26,76 Test of color film.

Photomicrography

Color film.

ASA 16

Shutter dark. 1 meter

2483

2483

1	Low	~~13 Sample High~~			26	Sample High 27 oh
2	High	14 High			27	Sample High 28 oh 29.
3	med ±	15 10 sec wiring			28	Cork on hole Light 30 or
4	Med ±	16 Sample Dark	?		29	3 High 31
5	Low ±	17	"	(oh)	30	3 High 32
6	Low ± Angle NG	18	"	"	31	3 High X 4. 33 over.
7					32	Rewind
8	High.	19	21 Med	Under		
9	Med.	20	22 "	"		
10	Med	21	23 "	"		
11	Low	22	24 Low	Dim		
12	Sample High	23	25 "	"		
13	"	24	26 "	"		

Exposure on So 343 HRP 4,15 min

1 meter Shutter + 10 sec no density 1.03

½ flashes D= .06

2 flashes D= 0.44

Photo of Cylinder of glass with Brine Shrimp. .02 .24 0.79

⅓ meter. Water leaked from glass

Plot on 7302 High Power at 1 meter. 0.11 3.68

over exposed, Reduce

Plot 7302 High (Anti-aliasing). 5 min 1/4 HRP 0.04 1.14 1.65

2½ min Dev

7302 5 min

Aug 30 1976. I went to W.H.O.I. on Friday Aug 27 to give a lecture for Mrs. Hollister – benefit for the Bradley House museum which had just been organized. The talk was in the School at Falmouth. Many of my friends were there. Esther went along. After the lecture we drove home through the rain.

On Sat am at 7 am I took the AA plane to Chicago – then to Milwaukee to attend the Conclave Society Involvement affair. Some 300 people attended. I took the ~~Coulter~~ Chopper strobe display. Plans were made for Houston, Boston and Seattle.

Eddie Taylor met me and took me to his home in Milwaukee. Had a fine visit and discussion about the Museum of Science and Industry.

92 Harold Edgerton

Sept. 2. 1976. MIT 4-405.

Exposures were made with 50 343 Eastman high resolution film yesterday with Chas Vogel and Ian Tindale.

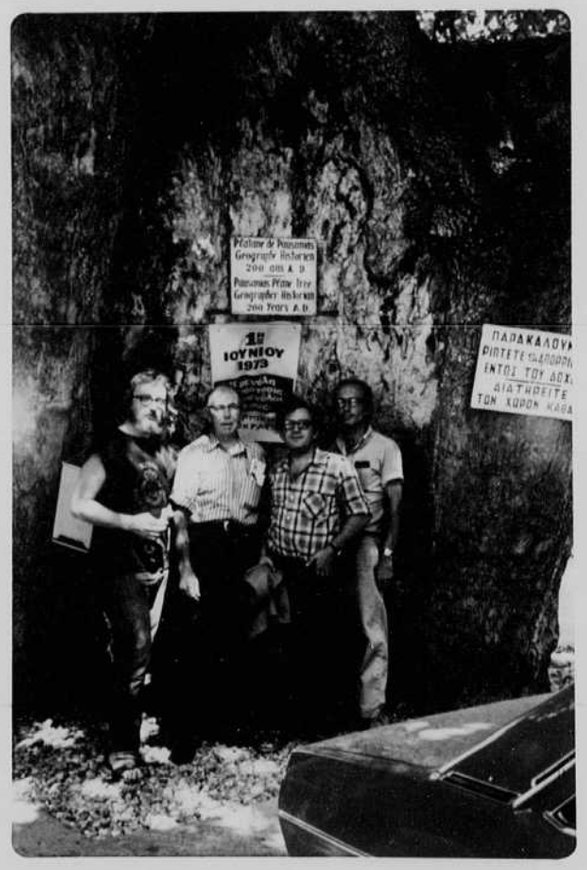
I used the microflash point source 549 without the stop and with the unit tipped 20° to expose the arc. The film was cm.

Previous trials were made at cm and cm.

Density measurements

	Distance	Density.	
(343) film 5mm sn 1:4 HRP dev	67.	0.4	
	85.	~~0.4~~ 0.74	
	39.5	1.25	1.20

Excellent. Bridge Stamps photo.



Pausanius's tree in Agion Greece Bay of Corinth.

Paul Caulfield Harold E. John Papadakis ?

Paper print of brine shrimp

15x 7302
5x 7302
To 120x
on paper.

7302 has
160 lines/mm.

$\frac{160}{120} = 1.3$
lines/mm

BRINE SHRIMP
120x
7302 7307 FILM
FX6A AT 1M
~~Iris Stroboscope~~. ~~Harold Edgerton~~. Bill Dixon

7302

So 343 has 2000 lines/mm. but I needed much more light.

Sept. 6, 1976 Harold Edgerton.

I was at the Nat. Geo. Society on Friday Sept. 3. 1976 first I saw Bob Sisson to show him the silhouette efforts. He wants a copy of our paper.

The negative on 343 film (page 92) made with an uncovered point source on the microflash unit at ~~69~~ 39.5 cm was used (Density of 1.2 - 1.25). of a Brine Shrimp, was left with Sisson for a trial print.

We showed the brine shrimp photos to Harrell. also we talked to Don Crump about the use of color photos of Spooky the owl who is 25 years old. My photos of 1965 were made of this owl. Great Horned owl.

Many Elder & Welch Pogue classmates had their 50th anniversary on Sat. 4 of Sept (actual Sept 5th). 40 were there, big time for all.

92 ~~Hawk Mountain~~

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Previous trials were made at cm and cm.

Density measurements

	Distance	Density.	
343 film 5mm in 1:4 HRP Raw	67.	0.4	
	85.	~~0.0~~ 0.14	
	39.5	1.25	1.20

Excellent. Bring Slump photo.

Pausanius's tree in Agion Greece Bay of Corinth.

Paul Crawford
Harold Edgerton
John Papastavridis ?

Paper print of brine shrimp

15X 7302
5X 2302

To 120X on paper.

7302 has 160 lines/mm.

$\frac{160}{120} = 1.3$ lines/mm

BRINE SHRIMP
120X
7302 7307 FILM
FX6A AT 1/M
~~Iris Stroboscope~~. ~~Harold Edgerton~~. Bill Dixon

So 343 has 2000 lines/mm. but I needed much more light.

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The Prehistoric Peoples of Scotland Books.
Edited by Stuart Piggott. Routledge & Kegan Paul London 1962

II The Megalith Builders G.E. Daniel p 29

Childe Prehistory of Scotland 1935
Piggott Neolithic Cultures of the British Isles 1954

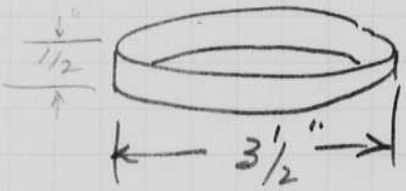
Audrey Shore Henshall The Chambered Tombs of Scotland
vol I Edinburgh at the University Press
1 George Square Edinburgh 8 1963
U.S. agent aldine Pub Co.
64 East Van Buren St Chicago 5 Ill.
Foreword by Stuart Piggott Univ of Edinburgh.

1539A

Sept 7 1976 Photos with Strobolume lamp Brine, Flatbed.

#1 D = 45 cm & film 1/4" aperture. 7302 3 min in 1:4 Hyp.
Brine Shrimp.

#2 D = 45 cm & film 1/8" aperture 7302 5 min 1:4 Hyp.



BRASS RING.
SARAN .01 mm on bottom with Rubber band.
Water 1 to 2 mm on the saran and then on the 7302 film.

#3. Same as #2. Exposure many fibers on the film. Where from??

Sept. 9, 1976 #2 Silhouette photos in Dark Room with microflash.
"open" spark gaps without the aperture. at 30°
Brine Shrimp - Several weeks old ±.

			Density		
2 x 2	SO 343	40 cm. to Saran holder.	.93	.56	.07
1 "	7302	120 cm. to " "	1.81	1.47	.03

Used HRP developer. for 2 min for 7302 1:2
and 3 min for 343.

I have been making 4x5" negative films from 35 mm negs of Lespanto and Helical sites. Some problems have been experienced with focus.
I tried to make a silhouette negative. It took 10 flashes at 120 cm from a microflash.

Dust Saran fog. and Water

Sept. 10 1976 Harold Edgerton.

Strobe Lamp in Wood Box with 1539A. arm Holes.

$C.P. = \frac{KVD^2}{R\Omega}$ $K = 36.4 \times 10^6$ D in feet. R ohms.

D = 1 ft. 5 3/4 to bottom 17 3/4" to bottom.

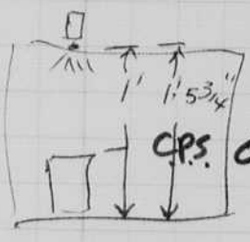
High output.

Peak voltage = 5.2 x .2 1.04 volts.

Duration 3 μs.

$CP = \frac{36.4 \times 10^6 \quad 1.04 \quad 1^2}{1000} = 36{,}400$ cp.

$\frac{36{,}400}{3 \times 10^{-6}} = 0.109200$ cps.



medium.

Peak voltage = 3.5 x .1 = 0.35 volts

Duration 1.5×10^{-6} sec.

Peak C.P. $= \frac{36.4 \times 10^6 \quad 0.35 \times 1^2}{1000} =$ 12,750.

cps = .0192 cps .019

low.

Peak voltage 3.5 x .02 = .07 volts.

Duration 1 μs = .0

Peak C.P. $= 36.4 \times 10^6 \times \frac{0.07 \times 1^2}{1000} =$ 2,540.

cps = .00254 cps. .00254

D = 45 cm.

High (IT) exposure $= \frac{CP}{D^2} = \frac{0.11}{0.45^2} = \frac{0.11}{0.202} = .545$ m.c.p.

$\frac{0.019}{.45^2} = \frac{.019}{.202} = .094$ mcs

$\frac{00254}{.452} = \frac{.00254}{.202} = .0121$ mcs.

Med - 2 min in HRP 4.1

Fractions	IT	$\log_{10}$ IT	D.
64	6.016 mcs	.779	3.38
32	3.008	.4783	3.01
16	1.504	.177	2.57
8	.752	-.1238	2.03
4	.376	-.4248	1.46
2	.188	-.7258	.94
1	.094	-1.027	.60
	0		.02

Low in 3 min HRP 4.1

(IT)	$\log_{10}$ (IT)		
.7744	-.111	2.08	2.10
.3872	-.412	1.48	1.45
.1936	-.713	.85	.86
.0968	-1.014	.71	.73
.0484	-1.315	.16	.17
.0242	-1.616	.05	.07
.0121	-1.917	.02	.04
0		.01	.03
		1995	000

Sept 11 1970

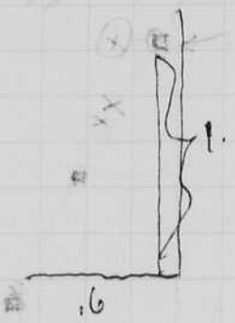
FINEGRAIN POSITIVE 7302 4"x5"

$\log_{10}$ IT	IT
-1.	.1
-0.7	.199
-.5	.316
-.3	.501
-.2	.631
-.1	.794
0	1.00
-.05	.89

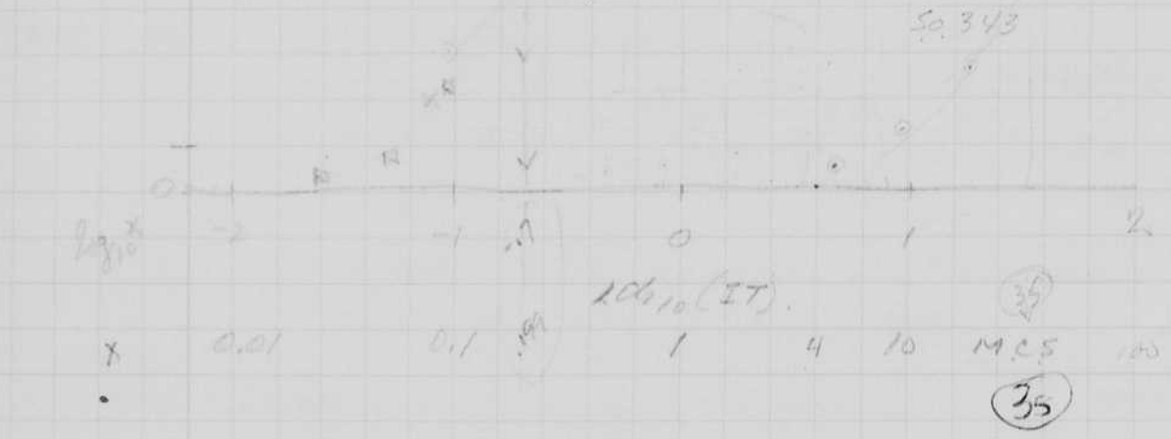
FOR D = 1

$$\frac{(IT)_{S05343}}{(IT)_{7302}} = 20$$

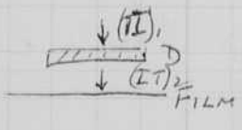
Inverse Value 100?



$$\text{GAMMA } \gamma = \frac{\Delta D}{\Delta \log_{10}(IT)} = \frac{1}{.6} = 1.67$$



35



$$(IT)_2 = (IT)_1 \times T_R$$

film exp. — exp. — transmission of filter

$$\text{Density} = \log_{10}\frac{1}{T} = -\log_{10} T$$

$$\log_{10}(IT)_2 = \log(IT)_1 + \log_{10} T_R$$
$$= \log(IT_1) - \log_{10}\frac{1}{T_R}$$

An Exposure was made with high power $(IT) = .545$ mcs

$\log_{10}(IT)_1 = -0.2636$

Density of filters in steps.

		$\log_{10}(IT)_2$	
none	0.00	-.2636	2.05
Jog	.03	-.2936	1.97
	.04	-.3036	1.96
	.07	-.3336	1.67
	.17	-.4336	1.43
	.43	-.6936	.91
	.86	-1.12	.39
	1.43	-1.71	.12
	2.10	-2.46	.05

Curve checks of 2 on card for "clear" point?

← These points are marked x

Sept 12 76.
Diffraction.

#1 Roger blade 1.2 mm at end.
High Strobe stand at 79 cm HIGH
HRP 1:2 one day interval 4 min.

#2. Same but with 4.5 mm on end of Roger blade. Slit axis of lamp changed 90° so parallel to edge of Roger

The diffraction is just barely noticeable on the second test at 4.5 mm. This experiment should be repeated with a larger distance.

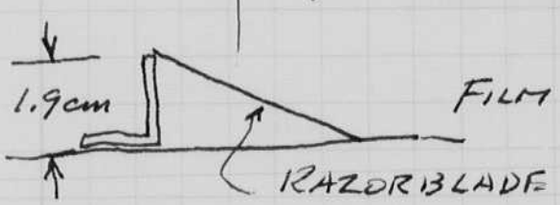
Diffraction to first max with blue light $I = \sqrt{2d\lambda}$

Let $d = 10.$ mm $\lambda = .4 \times 10^{-6}$ meters $= .4 \times 10^{-3}$ mm $= 4 \times 10^{-4}$ mm.

$$I = \sqrt{2 \times 10 \times .4 \times 10^{-3}} = \sqrt{2 \times 10 \times 4. \times 10^{-4}} = \sqrt{80 \times 10^{-4}} = 9 \times 10^{-2} \doteq .10 \text{ mm}.$$

Sept 14 First class - freshmen. Lisa Blatch is TA.
4-402 at 11-12 Tues. - Thurs. 10 students.

Sept 15 1976 Test for diffraction & blur.



- IN Box -
28 cm to Dotty.
$cps = 0.1075$ (High) $(2.8 \times 500$ mv. $= 2.5$ ms.
med $(2.4 \times 200$ mv. 1.2 ms.
low $(1.8 \times 50$ mv $.5$ ms.

Sept 21. 1976 Dark Box test of Film H&D. Developer 1:3 HRP 3 min development.
1. Paper, Slant D film. N.G.

44.5 cm to film from Lamp.
$K = 36.4 \times 10^6$
$CP = KVD^2/R_L$

	2. sec	64.	32	16	8	4	2	1	1	0	
High	D	0.88	0.52	0.26	0.10	.04	.03	.03	.03	.03	
cps = 0.1075	(IT)	6.88	3.44	1.72	0.86	.43	.215			0	mcs
	$\log_{10}$(IT)	+.8376	+.537	+.236	−.066	−.37	−.6670				

.54 Error. H 0.107 .54
.0959 M .019 .10
.00707 L .0014 .007

S034/3 IT 34.6 17.3 8.7 4.35 2.2 1.1
$\log_{10}$(IT) 1.5378 1.2380 .568 .638 .3054 .0043

9/22/72 Newer Equation.

note on page 96. Density = 1

7302 Fine Grain = 0.2 mcs.
5034/3 High Res. = 4. mcs

$\frac{H}{D} = 20$

The Elsko microflash has an output of 3.6 cps
guide #'s.

Elsko microflash Recorded 6 cps

End vane of ground area normal 1.6

End vane ground area 1.6 x 2 mm 0.11
1.6 m² Area .53

Side vane $D = \sqrt{\frac{cps}{4}} = \sqrt{\frac{6}{4}} = 1.22$ meters for Density of 1.

End Vane $D = \sqrt{\frac{1.6}{4}} = 0.63$ meters

Sept 25, 1972 Set. Morning on 4/24 class in Boston Harbor booking at the Docks with Side Scan Chan Nagel ran the gear. Kim Vandiver had a class with 18 students.

Light increase with 5034/3 over 7302

Light for .9 Density with 5034/3 = 35. = 175
" " " " 7302 = 0.2

HIGH NEEDED FOR 5034/3

Suppose exp made with 5034/3. with microflash

$\frac{\text{Guide angle min}}{D^2} = \frac{3 \text{ cps}}{(0.4)^2} = 18,750$ mcs.

3702 High Exp in Stroboscope (High range)

$\frac{.35 \text{ cps}}{(1.25)^2} = .224$

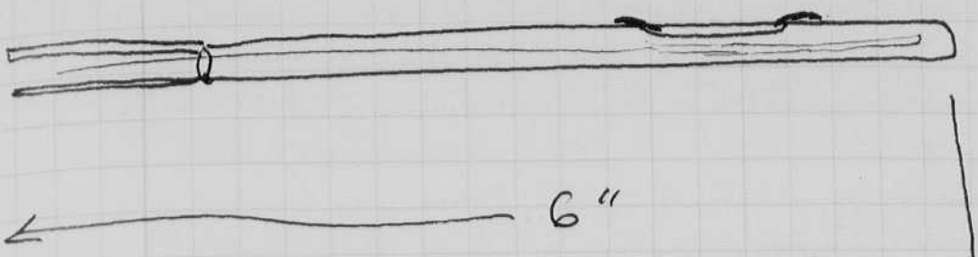
Difference in the power for 5034/3 and 7302

RATIO $\frac{18,750}{0.224} = 83.7$

Sept. 27, 1976
Harold Edgerton

Bonnie Brown, not ready to come in ab'mon today.
Jeni

Cut groove to operate spark.



6"

6" dia

Oct 3 Sunday - Miss Brown left at 1:30 on Jordan Air for N.Y., movies?

3 29,0532 negatives

at 5.76 O'Connor Dr. Josh. Dromtyger Lamp.
Big Scope 424.5250 office.

2 lamps 6x2x10⁶ cp 60 ms two lamps in parallel

2 lamps. 5x2x10⁶ cp. 80 ms. " " 640. cps

1 lamp. 1.4x5x10⁶ cp. 70 ms 80-90. 560. BCPS.

---

2 lamps 5x2x10⁶ cp. 50 ms. - 500 CPS.

1 lamp 4x2x10⁶ 120 ms. 960.

3x2x10⁶ 120 "

H Bird Bream Unit Bill MacRobert.

5x1x10⁶ 1/300 sec - 1500

Jones Bradon unit. 1 lamp.
with special lamps. (3).

3.5x10x10⁶ 70 ms.

Above tests were made of Bird units. Dr. O'Connor wants to do some bird photography.

Oct 6-16. Vancouver & Bri. Brit. Columbia James McTavish.
See trip report.

Oct 19 1976

Bill Pendley. Burbank, Calif. Visual Inst. Corp.

Hexa — 21 characters. 16mm camera
70 digital alphabetic frames

He gave a lecture at 11 am to the freshman seminar.

Oct. 22, 76 Bob Larsen gave a lecture at 1 pm yesterday in room 10-105 to about 50 people. The work of Fox-Talbot in England was described with slides and photos. The museum at Lacock abbey was shown.

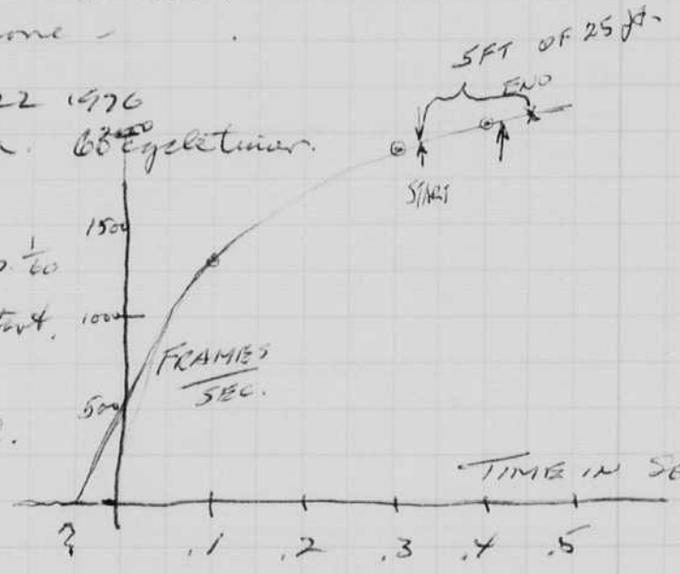
~~Bill~~ Peter Throckmorton was here thurs. Oct 21 at 5 pm to talk about his projects at the Falkland Islands. There involved old sailing ships now in the harbor. Peter lives at Newcastle Maine. ~~Box~~ Box 70 phone -

Fastax camera without prism Oct 22 1976

70 volts 25 ft of film. 68 ~~degrees~~ centigrade.

3,5 ft. 4 ft. 1st timing mark.

6 marks	0.1 sec.	22.5 frames	1/60
12	.2	29.5	"
18	.3	32.	
24	.4	35.5	
(27)			end.



Conclusion :— 25 ft at 70 volts is not enough film, Suggest 50 ft.
200 f.p.s. 200/10 = 50 ft/sec. or 5 ft in 0.1 sec. (about right).

Oct. 22 '76

Photo of Sun from Bldg 7 2nd floor on balcony.
EK 7302 film fine grain Positive 4x5.
Vivitar model 550 - 360 Shutter 1/1000 sec. 4x5 film w Graphlex camera.
Some clouds. Windows dirty - need cleaning.

4:32 pm Sun not in view.
~~4~~40 cloud just left
4:44 Cloud coming.
4:50 Clear
4:55. Clear

Oct. 27, 1976.
Harold Edgerton

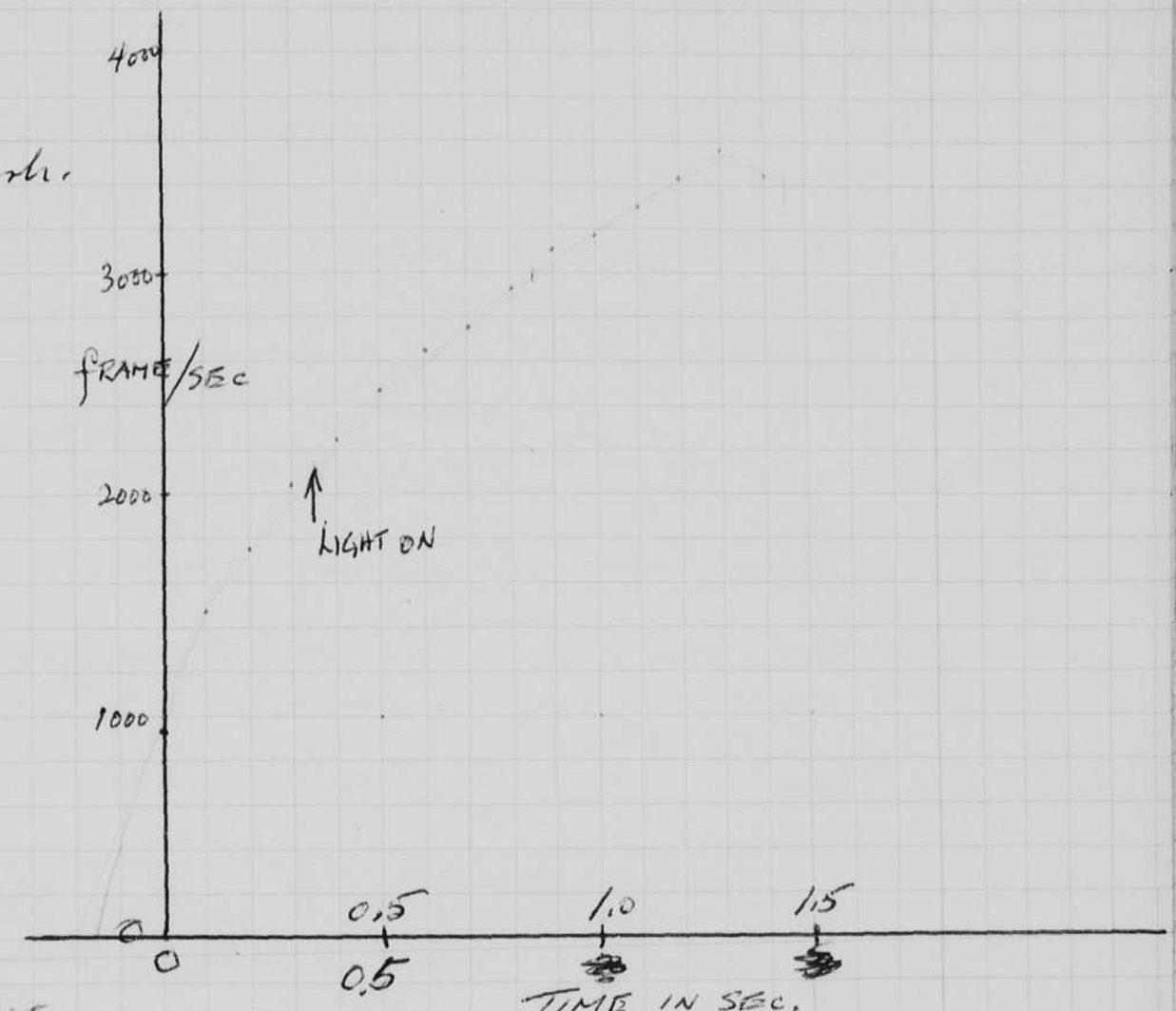
(Cornell visit)

Tom Eisner brought in his beetles yesterday. With Jues Miller and Bill MacRoberts, we took movies of the squirt phenomena. Tri-x neg with lens set at 1 ft .01 mfd 2000 f.p.s. on 16 mm in Pentax without a prism. The squirts came at seconds in 4 pulses.

Film 7278 12114
4 ft fog.
5 ft. - Timing marks.

SEC	FPS.
X	1695
0.1	1470
0.2	1770
3.3, 3.4	2040, 2220
.5	2460
6	2640
7	2760
.8	2440
.9	3220
1.0	3180
1.1	3300
1.2	3420
1.3	3480
1.4	3420

14.5 fog.



Frame	FPS
0.19	1140
.1 26	1560
.2 32	1920
.3 37	2200
.4 41	2460
.5 45	2700
.6 48	2680
.7 50	3000
.8 52	3120
.9 55	3300
1.0 55	3300
1.1 57	3420
1.2 57	3420
1.3	
1.4	

1/60 sec. interval.

92324 - action 48 - Beetle fires here 4 times.
92323

2680 f.p.s.

Bombardier beetle from Kenya (Nairobi)
(Pheropsophus) insignis
spelling will be confirmed T.E.

TOM EISNER Cornell

Oct 30 1976 Harold Edgerton MIT 4-435

Yesterday I gave a 3 pm seminar at Univ. Delaware for Bob Sheridan. Chris Kraft was there and we discussed many geology and archeology problems in Greece. Walmuller took me at Phil and returned me there.

Plus-X Pan shadows 1 x 6A at 75 cm on full in 1/39 A Shu
7302 film 1:4 HRP developer for 3 min.

#1. Cha River water over thin film of Saran plastic 0.1 mm
Shows particles

Shows mottled background from material in water.

2. Water from faucet over Saran - Many bits dust & air bubbles coming out of water??

many round dots less than 1/5 m m. about 0.15 m m

3 Comb. Water drop over film - no plastic.
Shows round particles & air??

no Round Particle.
~~Febr~~ Two

4. Cha River water in Pan. Shows mottled background and large concentration of transparent material!

5. Water kept Tyler water in drop on glass
Double glass Nonesuch. Loaded pan
moving animals within 5 x microscope

S. can't find the animals!

6. Cha. River Water on smud thin discs as 5
I can't see the particles but are so flaky as #1 and 4. The sample is much thinner?

7. Thin disc as in 6. Samples? many hairs - from handkerchief? for wiping??

8 Direct on film, no glass.

Nov. 1, 1976 1130 AM at Umass art with Gus Kazafas. An exhibition now at this school of Strobe shots. I showed the elapsed time movie and the bats in flight. Lunch with Gus and ~~Rosie~~ Noland?

Nov 3.76 #2 Lighter. Test of 50343 Eastman Film
2000 line/mm.

Honeywell Strobe with 3/8" hole over lamp.

#1 Tungsol 1 meter 1:4 HRP Developer 3 min.
4:2:1 Exposures all very dense.
Hole closed by tape ~~6 to 8 mm (3/8") x 2.2 mm~~
2.2 mm square

Bare output 3600 B.C.P.S. ±
Strobonar 8925

4:2:1 flashes.

LIGHT
Density. 3.36 3.06 .03

6x6 mm hole. (square) 1 flash is too plain 2 " too dense Increase from 6 to 8 mm.

4:2:1. —

Density 3.49 2.20 0.23 0.03 fog

#3 1x7 mm hole for next test. (square) High Contrast!
D = 2.31 Sample from Clam River about 1 week old! 343
Shows particles in water. no life.

Nov 5'76 Brine Shrimp. new 1 day old 343 film 1:4 Dev HPR 5 min.
#1 7x7 mm hole as before Density. = observer from side

#2 Ditto but centered. Exposure better.
New Brine Shrimp.

Nov 6 1976 Sat. Made prints from nov 5 #2 neg. excellent show diffraction effects. Many small circles on film due to unknown reason. Many new brine shrimp in water. 10x and 20x negative made on 7302 High Contrast Fine Grain film.

Yesterday my # 2333 lamp was returned from B.V. by M. She says that the photo system is going fine. of the outer eye layer

500 ms output 100 ms 100 cps
750 " 200 " 200 "
1200 " 300 " 320 "

from 1958 book Report B 1868 on 2333 microscope illuminator.

Nov. 9, 1976.
H. Edgerton & Bill MacRoberts.
1539A Stubbdave
output = 0.36 HCPS from end of lamp. FX-6A flat end.
HIGH. = 0.36 840V C = 1.2 mfd
med.
Low.

Nov 10, 1976 Wednesday Visit BBG Salem
Jack O'Brien Bruce Binney for Tim Tobin from Nice

Nov. 17, 1976. Wed. Visit by Paul Helmuth and dinner at our home, 100 Memorial Drive. He will join trustee-ship & Martin Kaplan.
Conf in morning with Harry Anderson and Bob Pines about finance for Franklin Pierce Law College in Concord N.H.

Nov 19, 76 all day meeting at Council of M.I.T. The affair ended with a banquet in Wiesner's President's house on Mass. Dr. David Rockefeller made a speech about education and Fellows.

Nov. 26, 1976. Mary Ellen and Welch Pogue were here on the 24, 25, 26 for a trip to Plymouth to dedicate the statue of Gov. Bradford. Then we had a Thanksgiving dinner at 100 Memorial Dr. apt 11-J.

I mailed, for the second time submission, a paper to the Scientific American entitled "Underwater Photography Revived by Strobe".

An article entitled Silhouette photography of small active subjects was submitted to the journal of microscopy several weeks ago.

Chas Wyckoff came back from Rockland on Wed. Nov 24. He will bring all the sonar records of last summer taken at Jock Ness.

We are scheduled (Pines, Klein, Wyckoff, and me) to go to N.Y. to the Alumni meeting on Dec 6 1976

Nov. 29. 1976 Monday Worked on draft of Sonar Results in Loch Ness '76
Wyckoff read draft of story we worked on last Sat Nov. 27. There are 30 contacts - some recorded on camera or T.V.

Dec 2 1976
Harold Edgerton
Bill MacRoberts.

Power Supply #1

C	fps	ms Dur	BCPS
1	32	20	300
2	32	25	600
7	32	52	1080
7	1	52	5824
7	15	52	4000

LOOK WHOOOOs HERE—The Barred Owl of Killian Court. According to the Massachusetts Audubon Society, there has been a barred owl sighted yearly in the downtown areas of Boston or Cambridge. This year MIT is the lucky host. The owl was first sighted in the court on Friday, Dec. 3, and has been posing for camera buffs, bird watchers, etc., ever since. The owl's natural habitat is a wooded swamp. But the creatures are not terribly shy and are often sighted at the edge of a wood. This bird is probably wandering in search of territory, according to the Audubon Society. Territorial by nature, the young owl must leave his parent's territory in search of his own. If he likes the Court well enough, and finds adequate food—small rodents and small birds—he could stay till spring or longer. Not likely, says the Audubon Society. So, catch him while you can.

—Photo by Calvin Campbell

Owl from Bldg #3 M.I.T.
Left in Dec 6 1976. HE

Dec. 10, 1976 Conf with Wyckoff

1. Sonar important since it shows what is going on.

Find out what is going on for Barge - strobe light, etc.

Wyckoff wants automatic system.

Nov. 9, 1976.
H. Edgerton & Bill Mac Roberts.
1539A Stubbdave
output = 0.36 HCPS from end of lamp. EX-6A
HIGH. = 0.36
med.
Low.

Nov 10, 1976 Wednesday Visit B.C.G. Salem
Jack O'Brien Bruce Binney for Rutgers in June

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Conf in morning with Harry Anderson and Bob Pines about finance for Franklin Pierce Law College in Concord N.H.

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Nov. 26, 1976 Mary Ellen and Malcolm Pogue were here on the 24, 25, 26 for a trip to Plymouth to celebrate the 356th of Gov. Bradford. That we had a Thanksgiving dinner at the memorial Dr. apt 11-7A.

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An article entitled Silhouette photography of small active subjects was submitted to the journal of marine biology several weeks ago.

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We are scheduled (Rines, Klein, Wyckoff, and me) to go to N.H. to the Alumni ~~on~~ meeting on Dec 6 1976

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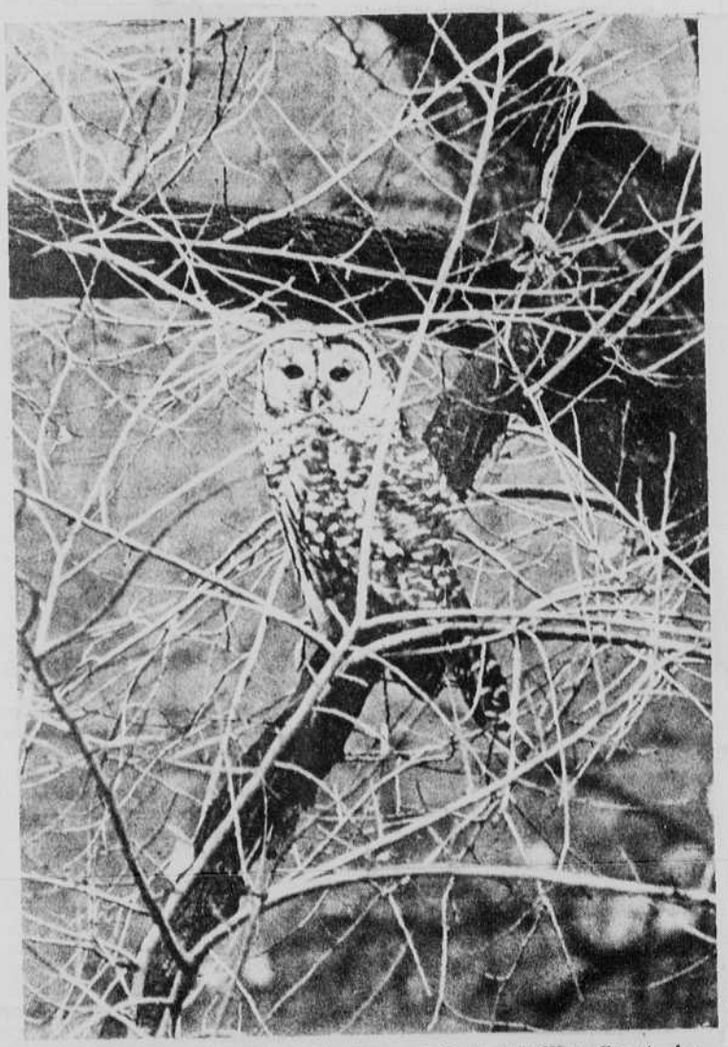
Bill MacRobarts.

Power Supply #1

C	fps	us Dur	BCPS
1	32	20	300
2	32	28	600
7	32	52	1080
7	1	52	5824
7	15	52	4000



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—Photo by Calvin Campbell

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Left on Dec 4 1976. HE

Dec. 10, 1976 Conf with Wyckoff

1. Sonar important since it shows what is going on.

Find out what is going on for Barge - Strobe light, etc.

Wyckoff wants automatic system.

Notebook # 32

Filming and Separation Record

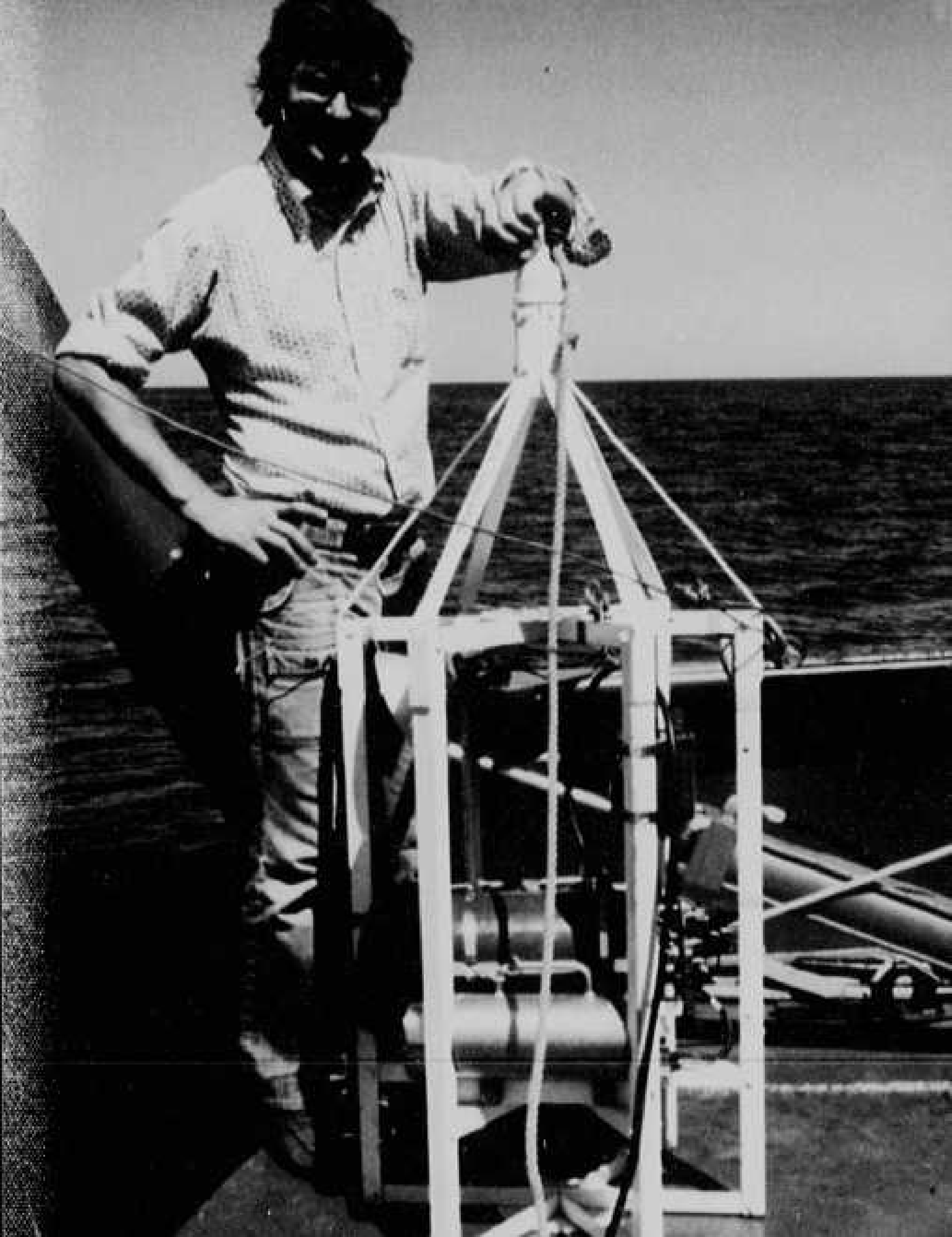
1 unmounted photograph(s)

____ negative strip(s)

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

was/were filmed where originally located between page 104 and 105.

Item(s) now housed in accompanying folder.



Dec. 21, 1976

Harold Edgerton

I went to Miami on Dec 12 at 9 am arrived 12,01 met by John Silverman, Duncan M. Claudia Finger. Flyup to Key West in Silvermans plane. Then to the GRIFON where we shortly left for the Marquessa Islands. Dec 13, 14, 15, and 16 were spent in surveying with the 25 kHz side scan of B&G.

Dec 17 ~~and 18~~ I went to Newbern N.C. leaving Key west at 7 am on Air Florida arriving at 3 pm ±. Then by car to Beaufort with Cathy and — Newton and Bob Sheridan.

Dec. 18, 19. conference at the Monitor Res. and Recovery Foundation Inc. 127 Front St Beaufort N.C.

July	29	(Tue.)	West Orange, N.J. to meet with Ted Edison, lv. 9:15am
July	30	(Wed.)	Boston Harbor in the afternoon (?)
"	31	(Thur)	Dentist - Dr. Herman DeWilde, 8am
Aug.	4	(Mon.)	John Mills arriving from England
Aug.	15	(Fri.)	Dr. Frank Frungel arriving from Germany
"	20	(Wed.)	New England Aquarium, Bd. of Gov. meeting, 12:30
Sep.	1	(Mon.)	LABOR DAY - Holiday
"	8	(Mon.)	Registration Day
"	10	(Wed.)	1st Class, 12 noon, room 4-402
"	15	(Mon.)	Class, 12 noon
"	17	(Wed.)	Class, 12 noon
"	17	"	New England Aquarium, Bd. of Gov. 12:30pm
"	22	(Mon.)	Class, 12 noon (last one)
Oct.	13	(Mon.)	COLUMBUS DAY - Holiday
"	15	(Wed.)	New England Aquarium, Bd. of Gov., 12:30pm
"	23	(Thur)	Council for the Arts, M.I.T. Student Center, 6pm buffet
			" " " Kresge, 7:30pm MIT Orchestra
"	24	(Fri.)	" " " Kresge Little Theatre, 9:30am
"	"	"	" " " " " 10 Fac. Presentation
"	"	"	" " " Student Center, lunch 12 noon
"	"	"	" " " Site Visits, 2pm
"	"	"	" " " President's House, 6pm Reception & Dinner
"	27	(Mon.)	VETERAN's DAY - Holiday
"	28	(Tue.)	Houston, Texas, MIT Club lecture (Joe Moore & Bill Lenoir)
"	29	(Wed.)	" " Shell - Bellaire Res. Center lecture (?)
"	30	(Thur)	Dallas, Texas MIT Club lecture (John Davis)
"	31	(Fri.)	California
Nov.	10	(Mon.)	London, England - Ben Franklin Society
"	11	(Tue.)	" " " "
"	12	(Wed.)	" " " "
"	13	(Thur)	Lacock Village - Fox Talbot Museum (Robert Lassom, Dir.)
"	19	(Wed.)	New England Aquarium, Bd. of Gov., 12:30pm
"	27	(Thur)	THANKSGIVING DAY

Dec 31, 1976. MIT Harold Edgerton

I gave a lecture Dec 30 at the Waldorf Astoria Hotel at the Am. Soc. of Arch convention on the use of sonar in arch. The affair had been set up by Julian Whittlesey. It was poorly advertised or only about 25 people showed up including Niki Starr Lahes her mother Dora
Fred Yolanris Bruce ~~Boban~~ Bevan (Whitehead Robot)
Poros (projectionest).
Then I had lunch with Yvon Miliaud
Celia Berlin - Reich 2220 Marlboro St 267-1302
and husband. She translates Lyn's english writing into French. She is a french writer and lecturer.

Jan. 6 1977 The lamp from the Mus of Science was removed by Parisitex(?) yesterday and I pick it up when attending the meeting in the evening. Barney O'Keefe gave a talk to the industrial associates of the museum. Stutorium & Posterities (?)

Mac Roberts estimates that 1/2 billion flashes have occurred. (1 one failure 1/3 Feb 77. KDV)

FT-118
FT-118.

Strobe
Time
3600
43,200
86,400 per day 24 hr.
31,536,000 per year.
4 years.
126,144,000 flashes

In stalled May 6, 1964
Failed July 1966
~~Oct 1966~~ Oct. 1966 ~~replaced~~ 65, $\times 10^6$ flashes
Stopped Feb. 1970 ~~Stopped~~ (going good) 160 $\times 10^6$ flashes total
Installed Feb 7 1970 ~~old lamp~~ & caps.
(6 years 8 months)
Failed. Oct. 1976 + Over 200,000,000 flashes
Removed Jan 8 1977.

There was a lot of white deposit over the circuit elements The lamps showed tracking between the electrodes. The ohmmeter showed infinity resistance.

The equipment operated fine when initially connected. Then it started to miss. We could hear the spark pulses on the Archer Telephone device.

Spark was weak.
Spark cap. increased ~~to~~ by sub- 0.1 for one lead ~~was~~ had a broken lead. The cap. was 0.25 + 0.1 at 300 volts ~~was~~ a model electric coil. We could not see the sparks so it was less than 0.1" gap.
A conducting layer on the spark coil and the adjacent capacitor seemed to be the problem. All was cleaned and more spacing was used. Output between 4 and 5 c.p.s.

Jan. 11, 1977

Harold Edgerton. We tried to get to Detroit on Dec Friday but the snow storm stopped us. Also the airport on Sat was closed so we cancelled out. Hope to go this weekend to see Bob and family at Pontiac, Mich. 185 Ottawa Drive (old dr. 221) 48052. They moved across the street into a larger house.

We hope to get my camera T.V. system into the water on the 12 or 13. The camera will be ~~bar~~ sloped down to get a horizontal view. Then I can try the two sets to see if they have enough power to rotate the system.

A Sonar sensing system designed by Deane Marshall was tried in the aquarium by Keir, Wyatt, etc on Sat night.

Jan 28, 1977. We went to Detroit on Jan. 22 Sat, Sunday helped to move Bob from 221 to 185 Ottawa St.
Monday I went to Lawrence Inst of Tech with Bob. I showed slides and movies (underwater ~~speak~~ kind of stroboscopic) 9, 10, 11, Classes then lunch with 5 or 6 from the school. Richard Marburger
Dean Joseph Mardosian
Maurice Zimmerman
Roy Crowl
Dan Mirdamerowski
Later I met with the Physics club.
Then Bob and I went to meet President Wayne Buell

Sitton & I returned to Boston on Tuesday at 2:15 on North Central.

Wed I gave a lecture on nature photography at noon Jan 26, 1977

John & Joanne Fitz with Johnathan & Cancelled Jan 28
John Mills, Fred Stanley (Joan) for dinner at the Hyatt Regency (England) on Jan 29.

Jan 29 1977.

Batteries from Sears & Roebuck for the "Green" flash units.
28 K 44344 N @ 11.99 each 6 VOLT 5,5 ah 4 lbs.
→ M.I.T. Exemption E-042-103-544

Feb 2, 1977 Aggiss Museum Dr. Paynter
to inspect the 5 volume set of prints
by Greenewalt. Nov. 1, 1976.

110 species above 300 species listed by Peters. James Lee
Classification 30 yrs old.

Flight, Amer Ornithologists Union Vol 85 part 4 1975

Archilochus Colubris 800 km across the Gulf of Mex.
1.5g of fat - 0.47 needed for 24.5 km/hr
crossing.

Breeds in Eastern North America and into southern
Canada winters from Florida south through
Mexico, Central America & Panama.

f22. II - 29 Eulampis Jugularis (Red throat.)
the lesser antilles from Saba to Grenada Martinique

f22 II - 30 Eupetomena Macroura Blue headtail. Long tail.
the Guianas, the greater part of Brazil, Paraguay.

III - 20 - 25 Todidigesia Viridis Birds of northern Peru.
(Flat bill has long tail
feathers with flaps on
them)

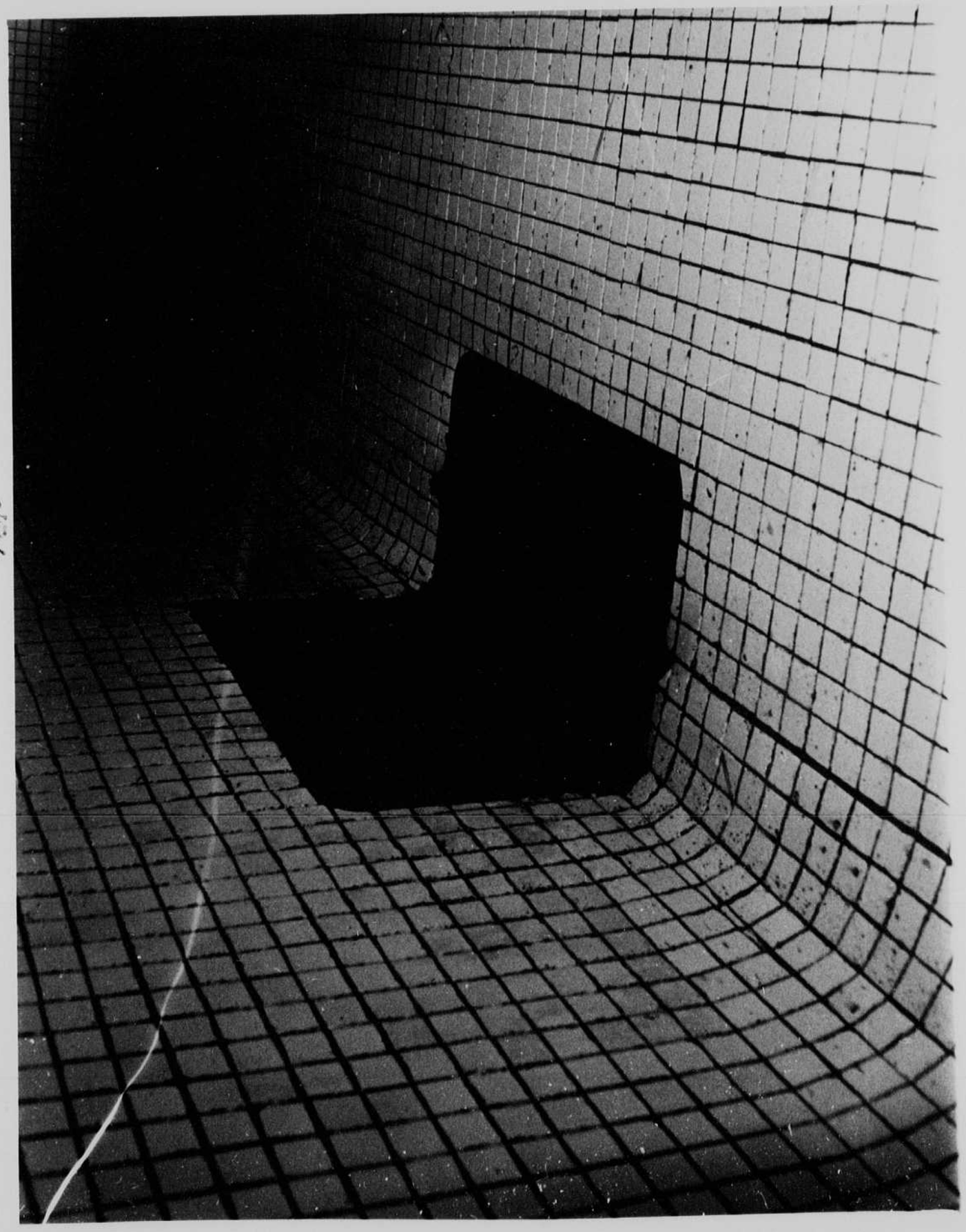
V - 22 Tofaza Pella
Brazil province of Amapá
Lives in the jungle

copy Feb 5 '77 HS
Slides sent to be ok
all made at f22
with lamps (1400 BCPS)
at 3 ft ±.

Negs from Villa Bandeira 64 46
Sawtooth & Elgerton 15192
Hope photo 25647
Bell 1000 09409
or 06909

Photo made Feb 3 in M.I.T. pool with Television controlled camera. Two jets Benthos Pumps for Turning.

Harold Edgerton.



Feb. 13, 1977
Harold Edgerton

I took the FX-6A flash lamp equipment that was provided by Mac Roberts last week to Woods Hole for a lecture & the noon meeting on the 10 thursday. Then I left the lamp plus my 2 hole dark room, developer, Hypo, pans, etc so. they could try the system for a project involving a magnetic animal.

My sonar is being packed for an effort to help Carl Clausen at Little Salt Spring Florida PO 7202 North Port Fla 33595 (813) 426 4100 for Feb 20 - 24

I am scheduled to show the Sarasota camera club some slides on Feb 22 in the evening at the request of my sister Margaret Mrs. Francine Robinson. 547 Riviera Lane 33577 (813) 388 4352

Feb. 14, 1977 monday.

The underwater camera will be tested at 2pm this afternoon at the aquarium where MIT has its ships.

I put in High Speed Ektar down and set the camera at 1.5 meters at f 4.

Angle of camera. 20° - 25°. next to bottom Hole.

Lots of back scatter in the photos

The jet is not strong enough! Try a bigger one. The film went through and was developed for processing.

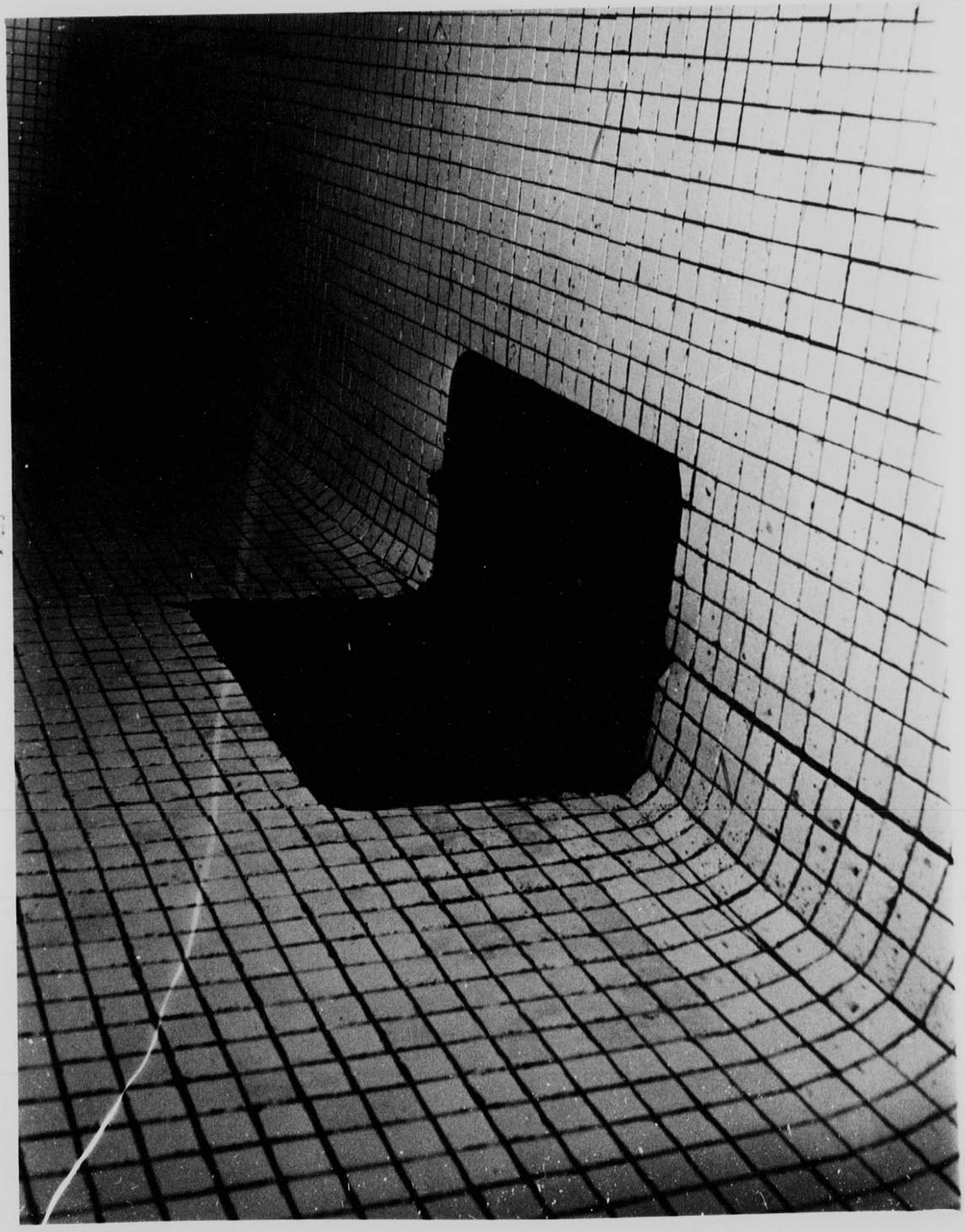
March 2 1977. Back on Feb. 27 Sat from the Florida trip. See following page for schedule of trip.

Bob Kines here for dinner last night to discuss the Lord Kelvin. We have automatic equipment on the a sonar trigger in the lake to operate the 16 mm elapsed time camera. Suggestions.

1. A 35 mm equipment motor operated should be used with more light to get better photos!
2. This should be set up here for experiment.
3. Kines needs to do more to get the cushions money cleared.

110 Photo made Feb 3 in M.I.T. pool with Television controlled camera. Two jets Boutlros Pumps for Turning.

Harold Edgerton.



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I put in High Speed Ektar down and set the camera at 1.5 meters at f 4.

Angle of camera 20° 25°. Next to bottom Hole. (Lots of black spots in the photos)

March 2 1977. Back on Feb. 27 Sat from the Florida trip. See following page for schedule of trip.

Bob Rines here for dinner last night to discuss the Loch Ness. We have automatic equipment with a sonar trigger in all fairness to operate the 16 mm elapsed time camera. Suggestions.

1. A 35 mm equipment motor operated shows the need with more speed to get better photos!
2. This should be set up here for experiment.
3. Rines needs to be sure to get the auditions money cleared.

Harold E. Edgerton
MARCH 1, 1977.

1977
m. 22 (Sat.) Pontiac, Mich. to visit the Robert Edgertons
" 24 (Mon.) " return about 9pm
" 26 (Wed.) Bob Cooke of the Bos Globe to interview HEE, 11am for newspaper article
" 28 (Fri.) John Mills to visit from England
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MAY 15 - JUNE 5 ISRAEL
MAY 19 - MAY 28. MARYLOU

* White's #662-7413

Sonar Trigger
Diana Hooked Megaphone 2.7 to 2010 Mar. 2, 1977 phoned to discuss project

Raytheon DE 725C used on fish farms & ships

March 3 1977 Hardcopy here.

Method of bottom and side views underwater photography.

The sound system will be used to trigger the camera which in turn will flash the strobe light when a subject comes in to the field, like at both ends.
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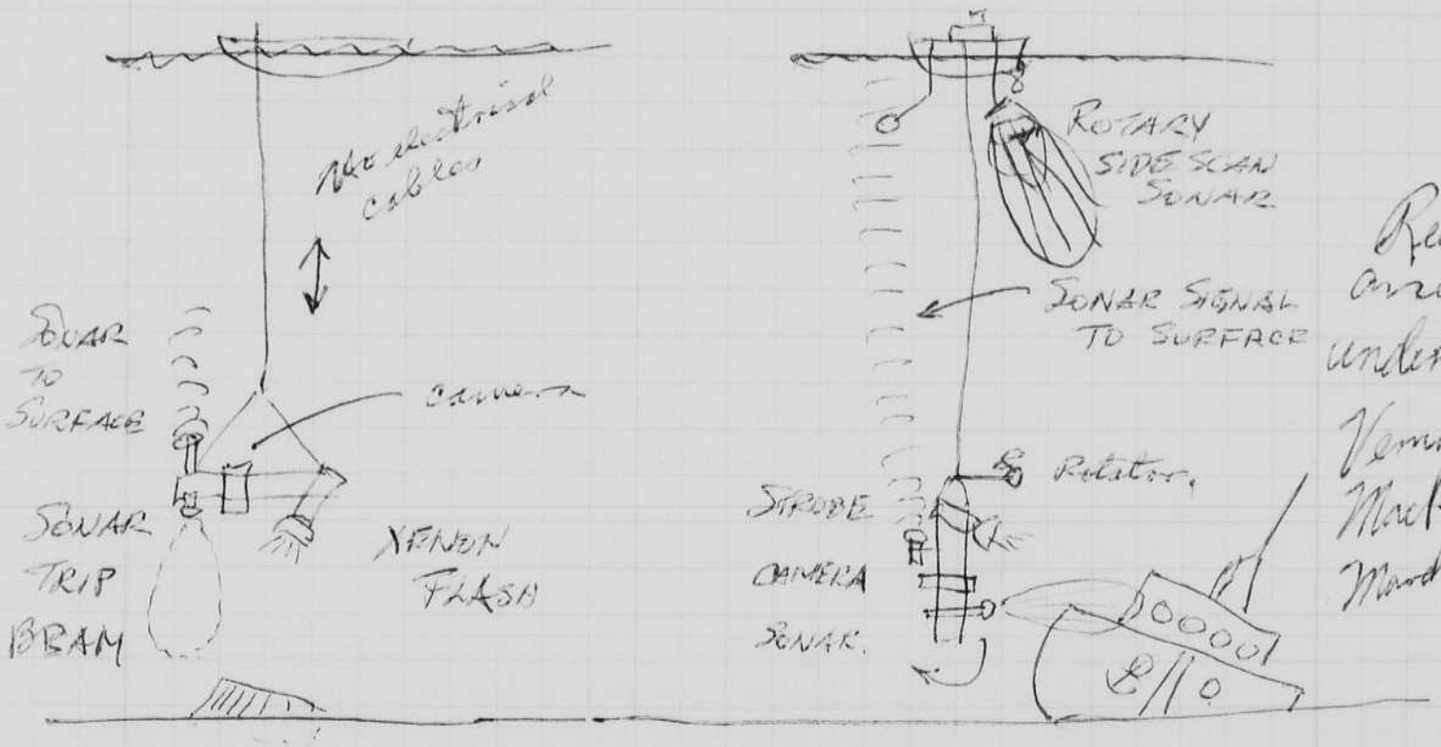

The sonar to surface gives the operator the slip at which the camera operates. Then he controls up and down motion.

Rotation gives a scan operation with a signal to the surface when an exposure is made.

A Rotary Side Scan shows the camera - subject distance.

Harold E. Edgerton
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March 3 1977 Herald Egyptian.

Raytheon DE 725C used on tow vehicle of unit

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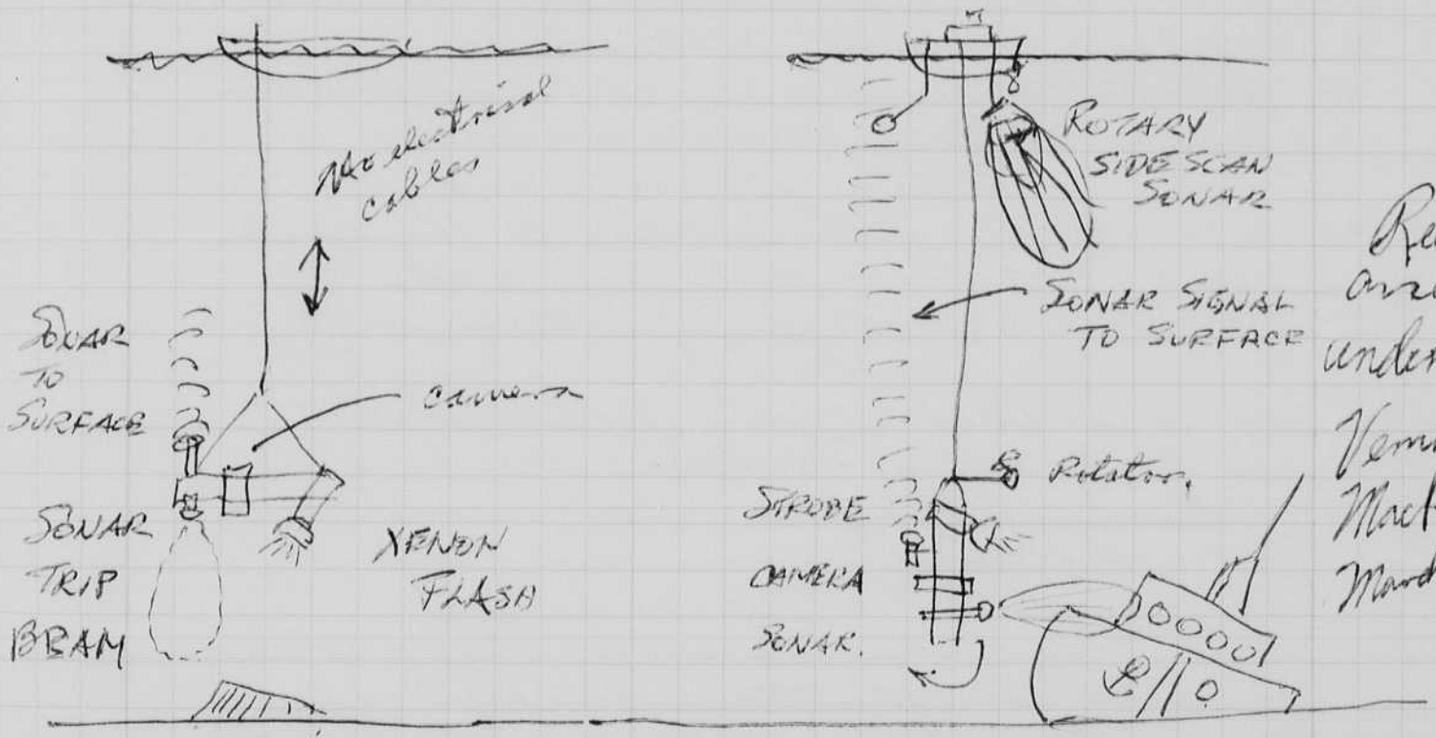

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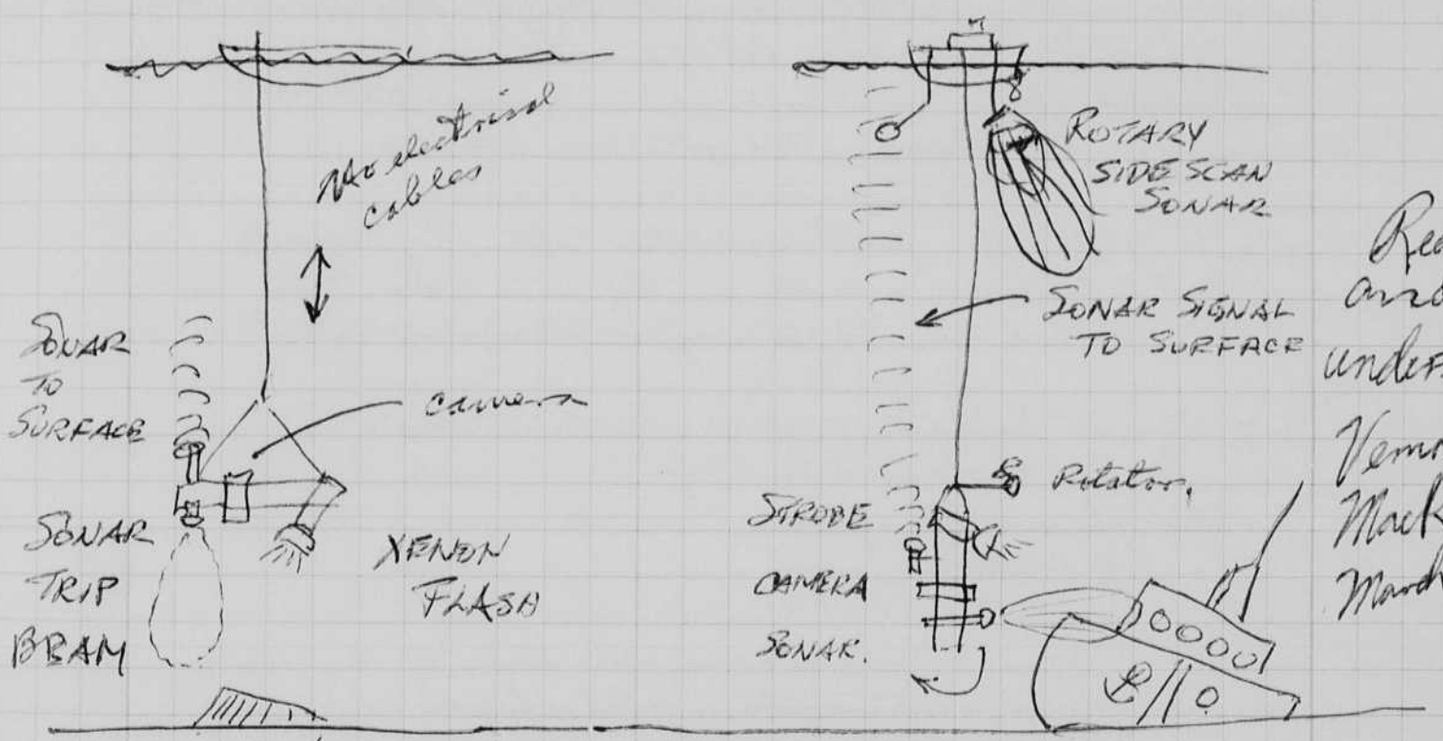

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Notebook # 32

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 112 and 113.

Item(s) now housed in accompanying folder.

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" 15-26 (Wed- Sun) Novosibirsk, Siberia, Russia for the U.S.I.A. lecture/seminar
" 20-24 (Mon. " Friday) C. E. Miller's High-Speed Congress
Aug. 13-21 (Sat. through Sun.) SUMMER VACATION - North Carolina

* White's #662-7413

Mar 31 1977
At E. mack Experiments made in the MIT pool yesterday with the 12 KC and Reflector 12 KC. The side echos and noise seem to be low with the Reflector. We are using re just Reflectors from Bldg 41 the Swedish rigid plastic

March 10 1977. Mac Roberts has been putting metalic shielding on the 6 KH transmitters ~~+ Head~~ and receivers. This system has long had a noise problem at the beginning of the cycle. I would say the noise has been reduced ~~by to~~ 1/4 of that experienced before. For example, the roof of the shorter cable was hidden in the noise for the initial pulse before. Now the signal comes in bold and clear with only a faint pulse at the beginning.

I was on the MARAMET out of the Army corps installation at Buzzards Bay. Ma. Side scan sonar 259-2 was used to explore the area near a large yellow buoy. Bil Chase is the US army corp rep.

March 16 1977 The pictures taken off Plymouth at f 8-1.5m were ok on the 30° tilt but under exposed on the 0° angle. All were sent to Bil Chase.

Mar 17. Sonar tested in T 42 X off Tunnels Boston Harbor. 9 to 1.30 p

Howard Effinger
Bob Magee
Jim Schor ---.

6 KC with ~~immersed~~ metal shield
12 KC in Gold reflectors.
5 KC in big disk with 6 KC receiver.

Very windy and cold.

Side scan of docks in harbor.

Aug 1947 N. Birds H.S. National Geo Magazine
Aug 1951 N. Birds N.G. H.S. N. Vam R. National Geo Magazine

April 21 1977

coop 32421-9

Harold Edgerton 016-24-1865 Passport D 1299300 May 25 78. Wisher MS42872

Just back from trip to S.F. via Nevada, Los Alamos Tucson - Denver - Boulder etc for lecture tour.

See page 112 for schedule!

April 10 1977 Sunday Easter. I returned yesterday from Lewes Del. where I was from the 4th of april on the CAPE HENLOPEN (160' Oceanographic Ship) of the Univ. of Delaware. Bob Sheridon was the chief Scientist of the trip to the monitor site. He and his students made 17 cores at the site, some 3/4 mile south. A del Norte system was furnished by Jack Siegel. This worked great.

The camera-strobe. TV was lowered once and a test was made. Also about 10 photos were made.

We had problems with the anchoring - a three way system, finally used a 2 moring system with wind and current. Then the wind quit!

April 16 1977. We tried the TV yesterday after the last to the MONITOR. There was a table spoon of sea water in the case and it did not work. I think this was from the damaged cable on the pull up. I had taped it and the TV ran ok at first but apparently there was salt water in the cable. The camera was not damaged!

Ford van. 557053 Mass license.

miles to Lewes & return 925 gasoline - 52.7 gal. 17.55 miles/gal

The first strobe picture was fine at f 5.6 1.2 meters

The second was dim - further away

Then two exposures were very under exposed.

A shot of all three beams looked ok but dim.

This was the last. I did not see any others as all exposures were on deck when the film was cleaned.

An edited tape was made and 1 dupe.

On April 15 two dupes were made on 1/2 hour tapes. One went to Magee with sound. The other was silent. The sound was of comments that I made when copying the tape the first time.

Norwich Conn Kate and Lynda Kate Edgerton 231 West town Norwich

Edgerton Handicrafts showed me the MASON monument marker in the first graveyard at Norwich at the end of Lane just east of Route 52 where it overpasses West town street.

Michael Scankowski 238 Summit St Norwich Conn 06360 was a great help!

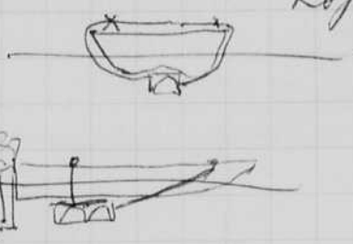
 ~~Fred Dyer~~ 4-405 M.I.T. Cambridge Mass

April 20 1977.

The cable as used at Cape Hatteras was removed yesterday by Bill MacRoberts. This cable was damaged on the Cape Henlopen when the cable was snarled against the stern anchor of a cable. Water seeped into the T.V. case but did not damage the T.V. camera.

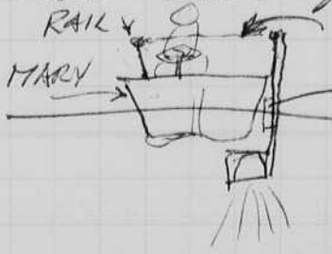
We are using now a 230 ft cable which has 7 wires. This cable is packed so water will not flow through the wires.

May 2, 1977 ~~Apr 25 1977~~ On Apr 29 ~~and~~ I went out with Steve Vaughn to the Boston Harbor with the 12KC Reflection unit that I plan to take to Israel. It seemed impossible to tow it until I tried the bottom system. Ropes with measured distances so the transducers can be spaced correctly. All went ok until the sled cable pulled back and was cut by the props. I was trying to go fast when this happened. I should have anchored the sled cable.

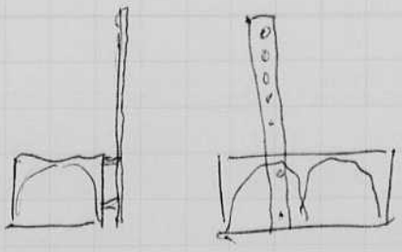


On May 2 I spliced the cable and then built a vertical indicator to the side. I was able to pull this around the Charles river and get records which are ok. If there are no records echoes it generally means that the transducers are not perpendicular!

Records were made on April 29 of the Tunnels. The southbound always came out stronger.



I plan to put this block here to hold the assembly away from the hull.



Also I plan to use the under-boat tailgunner. ~~As~~ Hardware for both will be taken on the trip.

May 6, 1977
Harold E. Edgerton.

Tests were made of the Pitney Bowles gear & Danger ous FT-114 and FT 151 last week. All are about the same effy. with 3 capacitor of 350 mfd at 400 and 450 volts. At any thing the Pitney Bowles was 10 % higher than the others.

May 9, 1977 Many sonar tests were made in the charles River with the 12KC Massa Reflector Double unit on Sunday yesterday. The equipment is being readied for an expedition to Israel, Acore, to help Elisha Linder. The still scan will go too.

May 11 1977. Ed Link, Seward Johnson, and — came today in a Grumman Jet from Florida. Mrs Link and Mrs Johnson also came. Lunched at M.I.T. then a seminar in the Ocean Eng. department Link lead a discussion on tethered and untethered submersibles.

The sonar link has limitations. A coax cable to the bottom was suggested with their sonar.

The limitations to sonar make T.V. with a reduced picture rate.

Bandwidth and delay time was discussed.

June 6 1977 Cambridge, Mass.
Harold Edgerton

See Field notebook for details also reports in file.

I left tel aviv June 3 for U.S.A. completing a trip to work with Elisha Linder. The trip started on TWA 810 at 3:45 for Paris Rome & Tel aviv on May 15 (Tel Aviv June 11, 77) for pounds of sonar gear was sent. # 370. Arrived 10 35 Boston land (13 hours)

Hotel for Ha Carmel Haifa or Mt Carmel.

May 17. Landing Day (Begin) Dennis on the David Rose 522.5 th and New York. Elisha Phina Paul Shepard Sebastian Rosa at Hotel Dan.

May 18. Wed. It took until noon to get the sonar out of customs. the Navy helped. Josi Tur Caspe & Yona Motskay (navy) made the contact with the customs. The equipment was taken to Haifa Naval Base to be put on a landing craft. ETZION GAUER PS1

Capt. Ronnie Shapiro (ZULU)

After a day and a night of search we moved the equipment to the MAOZ a much larger ship. Dr. Uzi Ben Avraham Dr Yehuda Melamed was the medical officer for diving.

ARIE HAR MARY, NEVE YAAKOV 43/5 Jerusalem Capt of MAOZ
YAACOV NIR Geo Service MOTSA ILLIT 02-539575 was in charge of the navigation by Mini ranger. Motorola.

After searching several areas completely without results, NIR went ashore and talked to an Arab who saw the splash. This put emphasis on a different area. Soon results came!

June 11, 1977 continued with account of the Israel trip.
The wreck was buoyed 1350 May 21 It was it.
Another large target was buoyed at 15.03 It turned out to be rocks

On May 22 the wreck was confirmed at 530
by 12.05 we were all packed up and ready to
go to Ashdod at 11.45 AM. ~~Left~~ left by Helicopter.
1237 left Ashdod
1.30 pm at Tel Aviv for conference at headquarters of defense
1.52 Left conference for Haifa
On May 24. tug boat 3 at Haifa Navy Yard.
Capt Yevgeny Peter. Tried sonar and navigation.
May 25 Plug full of water. fish not caught cable
there was a short in the cable between wire
orange and red which shorted out the signal to the
fish.
May 25-26 used relay side scan in
~~slalom~~ towing mode for survey. It works fine.
Try two transducers back to back on a pole
with strain ropes for survey. this will have
a minimum of strain due to water resistance.
May 26? phoned 2534629 (611) at 9 pm and asked to
25 meter yellow cable. It was sent at 8.30 that night
from Boston on TWA 015 6550 8354. and arrived
at 430 pm in Tel Aviv. Fri night. Nothing doing
on Sat so Elisha and I went to the Golan Heights
Jordan River etc on May 28 Zafat. Dinner at Sarah Aronson
May 29 Sunday. - new cable ready in less than 24 hours
Several buoys thrown - nothing of interest.
A USA nuclear sub is at anchor outside the harbor.
May 30 9.3 sq km of survey.
May 31 Many people came aboard.
Lecture at Technion Haifa Steve Tipson.
Dinner with Tannenhauser & family.
June 1. Last working day - Left in eft for MAOZ again
to look for tail and gear box of helicopter.
Problem with ~~sling~~ sub/water
ND 40 and compressed air blew hook away
Del Norte system sold by Deacon rad.
June 2. ~~Tracks~~ three targets were buoyed
during the night. #1 was gear part #2 nothing
#3 400 meters away was tail.
I left in Helicopter with Col Dagan at 1.30
for a 2 hour tour to Masada, Jerusalem,
Jericho. Dead sea etc and Tel Aviv
3.30 conf at Navy Head Quarters. Thanks from
airforce and navy.

Dagan
PO Box 3500
Federa
Israel

NETHANYA

Cont June 11 1977 Harold Edgerton.

Moshe Levy Commander of the Ashdod Naval base took me at 7 am to the plane on June 3. He was very appreciative of the work I did to build the Sikorsky helicopter.

The air force or the navy took my gear to the airport from Ashdod by helicopter. Then it was packed and shipped by TWA direct to Boston at their expense.

The 50th class reunion of 1927 M.I.T. was celebrated this weekend. About 110 went to Wianno club on the Cape. Then there was a banquet at M.I.T. yesterday, some 1500 attended. Our class put on skit with a dragon. Took two months. We had a chinese dragon head with a strobe light on the tongue and another on the tail. Six men* put their heads through a green cloth. Stevens was the head man. Arnold (Dibz) and I carried a treasure chest with bags marked $ to the stage for presentation. Our class gave over $ a million $.

Sikorsky Aircraft
North Main St
Stratford Conn 06602
203 378-6361

Paul Shurko Mil Prod. Support
Edmond R. Vianney Eng Manager.
mil Prod Programs.
I met these men on the MAOZ in May

* Head Egon Stevens Strobe.
Joe Burley
Hank Steinbrenner
Bob Wallace
Joe Mallado
Jim? Hawkins Tail

Fisher Chairman of class of '27.

Harold Edgerton } chest with bags.
Dibz Arnold }

118 June 11, 1977 continued with account of the Israel trip.
The wreck was barged 13.50 May 21 It was it.
Another large target was barged at 18.05 H Commodant to be reckon

on May 22 the wreck was confirmed at 8.30
by 10.05 we were all packed up and ready to
go to Ashdod at 11.45 H. ~~Left~~ left by Helicopter.
1.37 left Ashdod
1.30 pm at Tel Aviv for conference at headquarters of defence
1.53 Left conference for Haifa
On May 24. Tug boat 3 at Haifa Navy Yard.
Capt Yehezkel Peled. Tried sonar de navigator.
May 25 Sling full of water. Fish net caught cable
Had a short in the cable between wire
orange and red which shorted out the signal to the fish.
May 25-26 used relay side scan in
flatfish mode for survey. It works fine.
Try two transducers back to back on a pole
with strain ropes for survey. This will have
a minimum of strain due to water resistance.
May 26? phoned 2534629 (617) at 9 pm and asked for
25 meter yellow cable. It was sent at 8.30 that night
from Boston on TWA 015 6550 8354. and arrived
at 4.30 pm in Tel Aviv. Fri night. Nothing doing
on Sat so Sheldon and I went to the Golan Heights
Jordan River etc on May 28 Sat. Dinner Yoash Aronson
May 29 Sunday. - New cable ready in less than 24 hours
Several bumps thrown - nothing of interest.
A USA nuclear sub is at anchor out side the harbor.
May 30 9.5 sq Km of survey.
May 31 Navy people came aboard.
Lecture at Technion Haifa Steve Fisher.
Dinner with Tannenhauser & family.
June 1. Last working day - Left in eft for NATO again
to look for tail and gear box of helicopter.
Problem with sling and salt water
ND 40 and compressed air blow back away
Del Norte system sold by Dearnaud.
June 2. ~~Tracks~~ three targets were barged
during the night. #1 was gear post #2 nothing
#3 50 meters away was tail. NEHEMIA
I left in Helicopter with Col Dagan at 1.30
for a 2 hour tour to Masada, Jerusalem,
Jericho, Dead sea etc and Tel Aviv
3.30 conf at Navy Head Quarters. Thanks from
airforce and Navy.

Dagan
P.O. Box 3500
61200 TEL AVIV
Israel

Cont June 11 1977 Harold Edgerton.

Moshe Zavy Commander of the Israeli Naval base took me out to see the plane on June 3. He was very appreciative of the work I did to build the Sikorsky helicopter.

The Air force or the Navy took my gear to the airport from which I was flown by helicopter. Then it was packed and shipped by TWA direct to Boston at their expense.

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I met these men on the 9402 in May

* Head Egon Stevens Strobe. Fisher Chairman of class of '27.
Joe Burley
Hank Steinbrenner
Bob Wallace
Joe Mallado
Jim? Hawkins Tail

Harold Edgerton } chest with bags.
Dike Arnold }

118 June 11, 1971 continued with account of the Israel trip.
The wreck was barged 135° from 21 ft water.
Another barge target was barged at 300 ft and had to be recovered

Mon May 22 the wreck was confirmed at 330
by 1215 we were all packed up and ready to
go to Eilat at 1145 ft. ~~Left~~ left by Hale to plane.
1237 left Ashdod
1.30 pm at Eilat for conference at headquarters. Shapira
1.55 left conference for Yamit
Tue May 24, tug boat 3 at Haifa navy yard
Capt Shapiro pilot, tried sonar for navigation.
May 25 Ship full of water. Fish not caught cable
Have not yet shot in the cable between wire
orange and red cables shorted and the repeat to the
fish.
May 25 - 26 mid night work crew on
planning room for survey. 24 working hours.
Try two transducers work to Beer on a pole
with strain gages for survey. Thus will have
a minimum of strain due to water resistance.
May 26 phoned 2534625 (611) at 9 pm and asked for
25 meter yellow cable, it was not at 7.30 that night
for Haifa-on, NA 015 655 8334, and arranged
at 9.30 pm in Tel Aviv, for night. Following day
on Eilat for Passion and I went to the Eilat Hotel
Jordan River stone on May 28 Dept. Israel Tank Museum
May 29 Sunday. - Nuclear ready in Western Negev
Several bumps thereon - nothing of visible
At 1.30 nuclear ship is at anchor and sent the boat
May 30 9.3 ft Part of survey.
May 31 Navy people came aboard,
Lecture at Technion Haifa Steve Tipton.
Dinner with Tannenbaum Dynamics.
June 1, Test running day - Left in eft for MAEA again
to look for tail and gear boxes of helicopter.
Problems with ship and electronics
No 4 & 5 not compensated for blue thruster delay
Del Norte system used by Bendix navy.
June 2. Tracks three targets were buoyed
during the night. #1 was gear pod #2 rotating
at 3 fathoms away was tail. NETHERLANDS
Left on Helicopter with Col Dugan at 1.30
for 2 hours trip to the radar formation,
Jericho, Dead sea the west Tel Aviv
3.30 Conf at Navy office Gen Tsur. Thunder storm
Airport and Navy

Degan
P.O. Box 350
Herzlia

Cont June 1977 Harold Edgerton.

Mr the Navy Commander of the Submarine Squadron base took me out from the plant on June 3. He was very appreciative of the work I did beside the Sikorsky helicopter.

The Officers of the Navy took very good by the airport provided by helicopter, then it was packed and shuffled by F16 A escort to Boston at their expense.

The 50th Anniversary of 1927 MIT was celebrated this weekend. About 40 went to Miami Club on the Expo. Then there was a banquet at MIT yesterday, some 150 attended. Our class put on skit with a dragon. Fat Ken Smith. He had a Chinese dragon head with a flood light on the tongue and drummer on the tail. Six men* put their heads through a green cloth. Steven was the head man. Arnold (Dick) and I carried a trave with bags inscribed # 7 1/2 stage for presentation. Our class was second in attendance

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Paul Shurtz Mil Prod Support.
Edmund L Manning Eng Manager.
mil prod Programs
I met these men on the Navy mission

* Head Engr Steven Retired. Fisher Chairman of class of '27.
Joe Burley
Hank Flemtreemer
Bob Wallace
Joe Mallade
Jim Hawkins Tail

Harold Edgerton } chest with bags
Dick Arnold }

JUNE 28, 1977. Tuesday.
Harold Edgerton.

Carl Edgerton and James Nathland are here from San Diego. They came on the 25 while I was still in Russia.

I left for N.Y. and Moscow on June 16 with Fritz Goro, Martin Scott and Bob Smith. We were invited as a seminar group to go to Novosibirsk Siberia to be a part of the USA Photo exhibit as arranged by the U.S. Information Service. We were met in Moscow by Linda Berbers (from Lincoln Nebraska) and installed in the Metropole hotel.

I saw I. Marshak at a hospital where he was in preparation for an operation. I tried to reach his wife by phone on the return from Novosibirsk but without success.

We all stayed at the Novosibirsk Hotel. Several sessions were had with the group of young guides. Frank Usina was in charge of the exhibit. Paul Smith kept track of us and kept the seminar on the track.

Harold Andersen of the Omaha World Herald was present at my talk at the Akademelegorodo. 3 other journalists were with him visiting Russia, Martin (Chicago), Prescott Low Quincy and Texas.

I returned to Boston about 5 pm on June 26 via N.Y. Kennedy on P.A.A. from Copenhagen - N.Y.

A sore throat developed on the PAA plane so now I am home with a cough and running nose.

Bill MacRoberts has been working on 4 sets of Sonar - Camera - Camera combinations for use in Loch Ness. One has already gone with Rines. 3 more are to go next week with John Talbot.

July 3, 1977. Yesterday I tested the rebuilt 259-4 sonar with the new improved (?) circuit. I was not impressed.

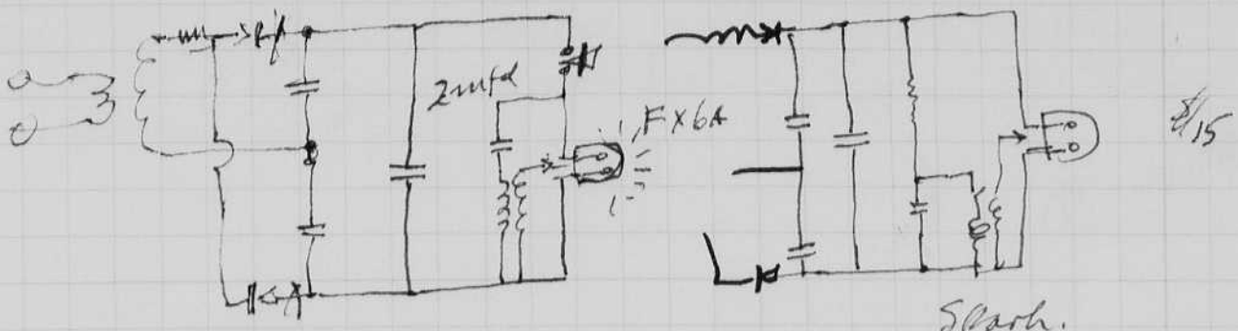
Today I changed the angle of transducers from 50° to 20°.

The Blade is sticking. It seems to be the motor. I hope to get a new motor.

The 12 KH and 5 KH seems to be about the same as before. I now must test them at greater depths than the 14 feet in the channel river.

July 6, 1977
Harold E. Edgerton.

Tests of light for microscope photography.



July 7, 1977.

Test 2 m.s. o 3 m.s. or

Peak light $\frac{.6V}{4} \times 10^6 = 0.15 \times 10^6$ cp. $1.5 \times 3 = .45$ cp.

Output = .3 c.p.s.

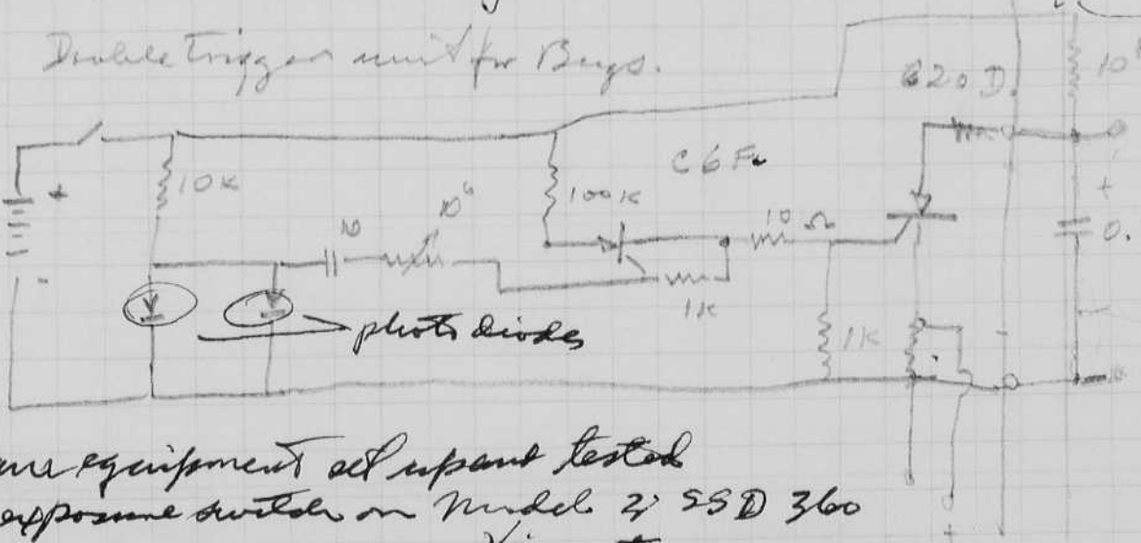
July 19 1977

I went to Barrington N.J. on July 8, 9, with Eric Edgerton to help Frank DiMinno try to find some bronze cannons left by the Hessians in 1777. We used 12 KH.

I have been working on the side scan. It now has the 259-4 modification as furnished by EG&G. A survey of the Charles River was begun planned over the past weekend.

circuit by Jack Fowler 2/8/66

July 20 1977 Double trigger unit for Bugs.



Double Beam equipment set up and tested with remote response switch on Model 2' SSD 360 Vincent.

"X" to Strobe H Bird unit.

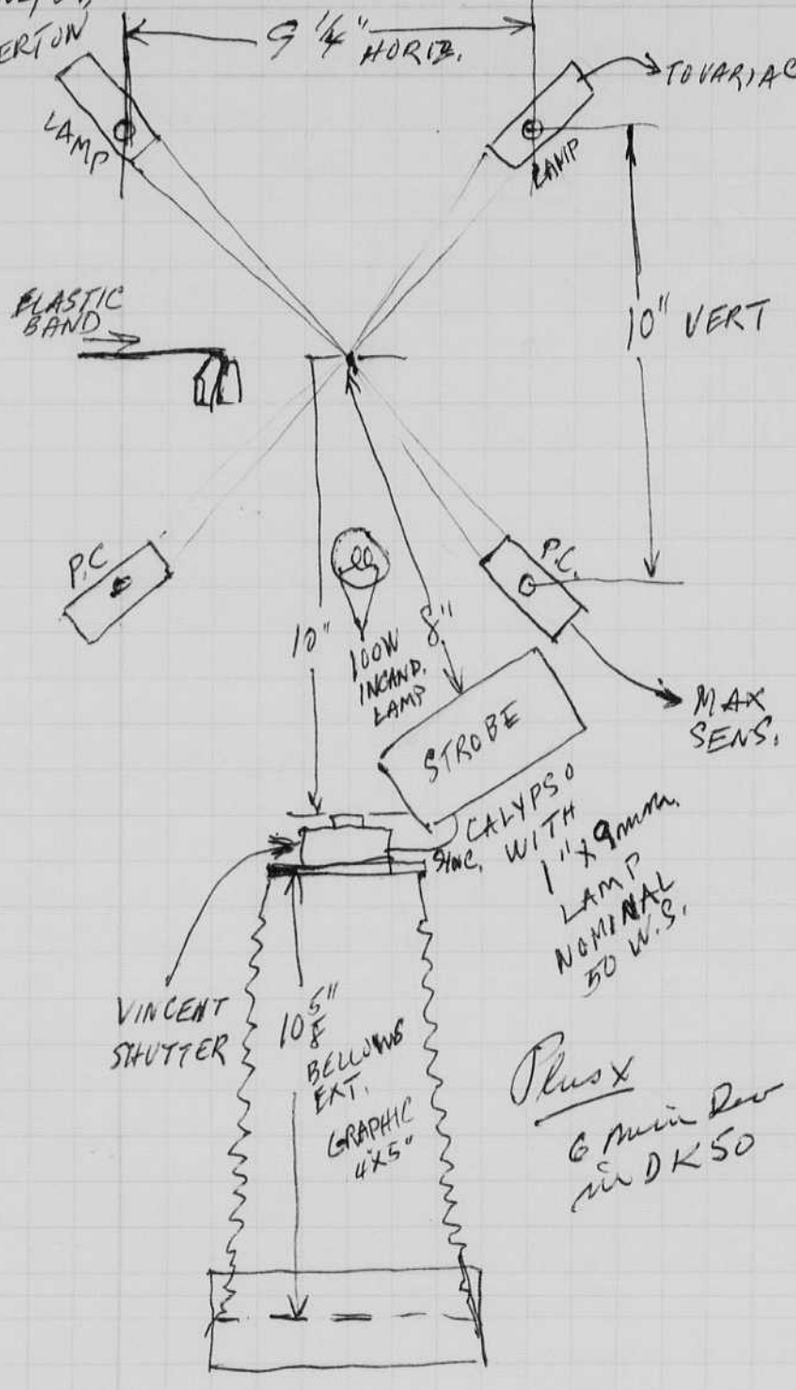
1st response on 7302 nothing

2 " on Panatomic X Plus X 125 ASA weak 3 min rest Subject Confused

3 " on Plus X Camp closed up 6 min closer " "

BUG PHOTOGRAPHIC SETUP

H.E. EDGERTON
V.E.M.



Color
#1 Polaroid 58

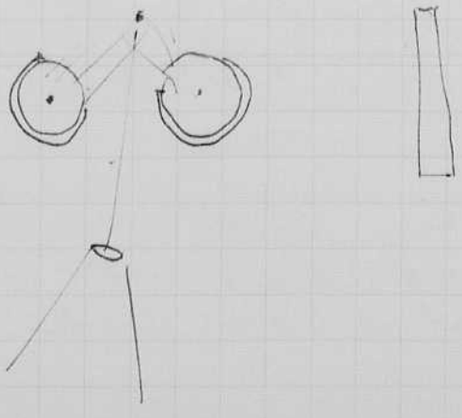
underexposed with two lamps
10,000 BCPS each
8" 7" front of Box

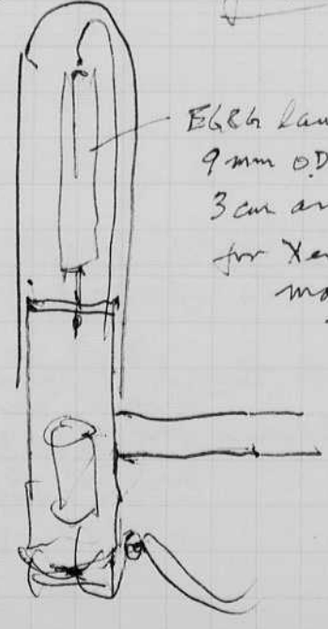
Rubberband Snaps,
ASA 75

#2 Moved lamps
to about 6" and
more in line.

Plus X
6 min Dev
in DK50

Exposure better
Rubber bands some
motion?
and is not in field.
need shorter flash !!!





August 4 1973
Harold Edgerton
Bill MacRoberts

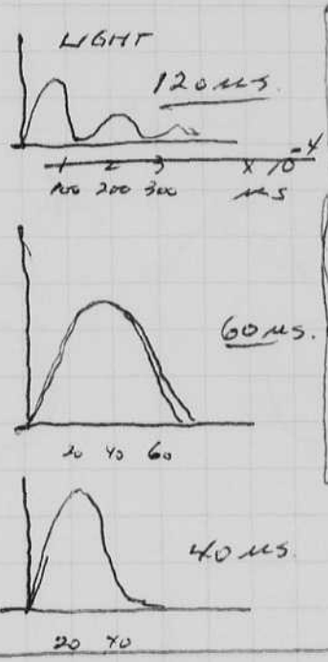
Just back Aug 3 from Cape Hatteras where I spent 9 days on the SEADIVER and the R/V JOHNSON with 2 submarines at the MONITOR WRECK site. The camera-strobe lost in 1973 was brought up. Also the 1/4" metal plate that was near it. A lantern was found which was on the turret at the accident. (in 1862)

Experiments with.

L. = 56 Q 2.6 R .0012
C = 57 measured
Sprague 282 P1

EGG QUARTZ LAMP.

L = 11 Q 1.7 R = .00031
C = 57 measured.

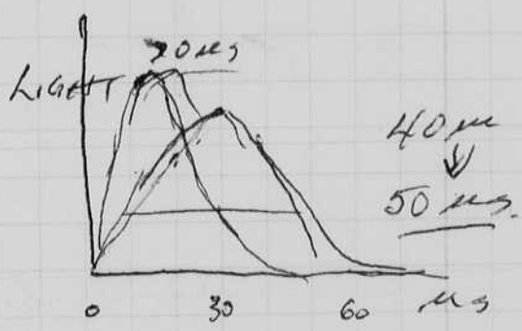


1958
Beckman FT-21B
DOLLY
Photocell
20 40 60 ms
output = 1 x 10^6
x 30 x 10^-6
30 BCPS
10 mfd?
1000 V.?

L = 0 Leads only.
C = 57.

Capacitor life 1500 v 2000 v 1000 hrs 250 hrs
condensance
Audio discharge
on.
Paschement = ?

L = 6 mh. C 60 mfd R = small. ?
#14 (or 15)
wire.



Short induction
Peak is up by 20% or less
20 ms to peak.

3.6 no Inductn	40 ms
3.2 with Ind.	50 ms
4.5 with Ind.	50 ms.
5.8 ±	
5. without Ind	50 ms.

we plan to use 50 mfd at 1500 volts and a 6 mh Inductor.

The trans power caused the voltage to go to 2300. There were noises in the capacitors. We cut the voltage back to 1000 V

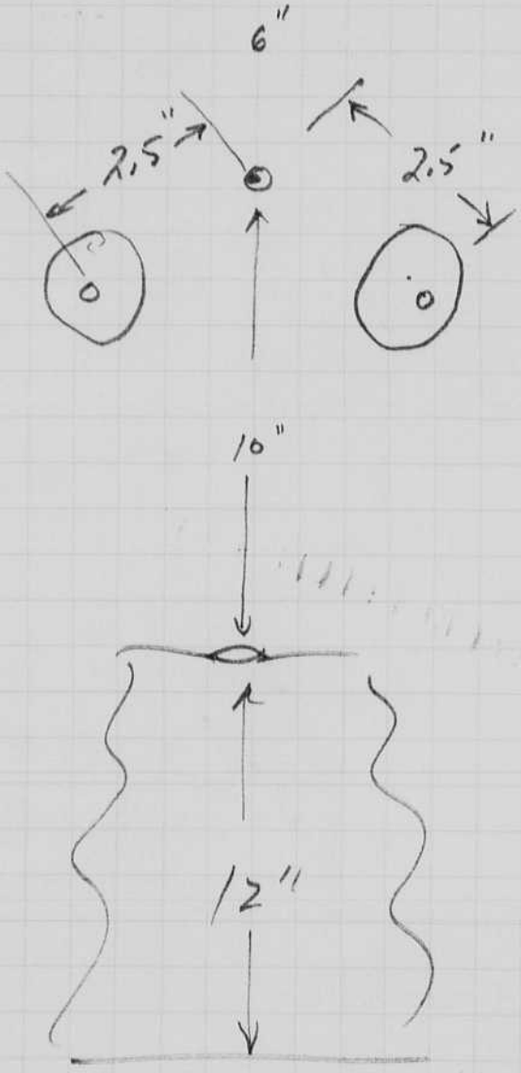
Kodacon by Sprague
242 capacitor used in Beckman 681 P

Aug 7 1977. The voltage was brought up to 1500 by Bill before he left on Friday. He plans to clean up the equipment on Monday. The flash duration will be about 50 ns with 6 uh series with Tunbs. Experiments will be made to get proper exposure on Kodachrome II film.

2pm. Beg plots unit see p 122.

Exposure on plus X film 5 min DK-50 ok.

——— Blue (light) Background cardboard.

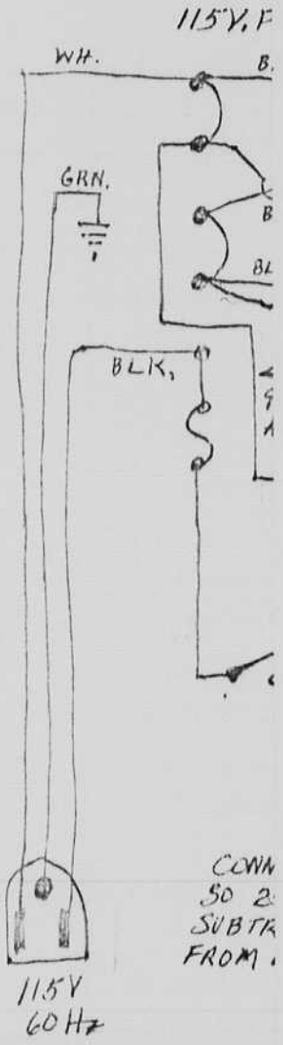


Aug 10, 1977
Harold Edgerton

MacRoberts finished Bug Unit on Monday. Test photos show ample light is available from the circuit - see attached.

John Lotherop from Polaroid came in yesterday. He is going to help set up an enlarger with Polaroid paper for about 15x enlargement.

[illegible] strobe viewer. called John.



[illegible] from Arlington where [illegible] two cottages [illegible] Tom Dixon, [illegible] Mary anne & Ellen [illegible] with sw. [illegible].

[illegible] me Small [illegible] ously and [illegible] camera

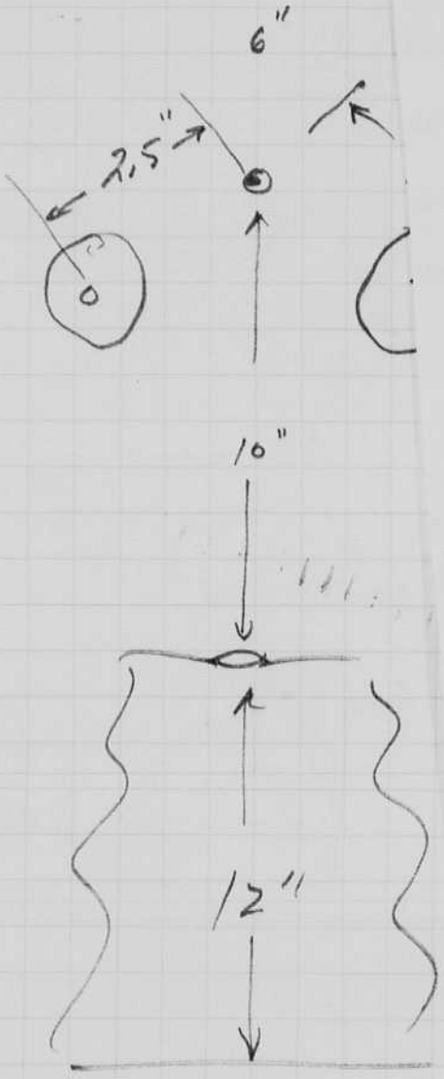
[illegible] the parts [illegible] bridge. [illegible] [illegible] bridge [illegible] the [illegible].

[illegible] cause one was a deep scar in one of the end plates. I am sure this is where the leak occured in the camera at the O Ring.

Aug 7 1977. The voltage was brought up to 1500 by Bill before he left on Friday. He plans to close up the equipment on Monday. The flash duration will be about 50 ns with 6 uh series with Tandys. Experiments will be made to get proper exposure on Kodachrome II film.

2pm. Bug plots unit see p 122.

Exposure on plus X film 5 min DK-50 ok.



Aug 10, 1977
Harold Edgerton

MacRoberts finished Beg Unit on monday. Test photos show ample light is available from the circuit - see attached.

John Lotherop from Polaroid came in yesterday. He is going to help set up an enlarger with Polaroid paper for about 15x enlargement.

The light will be produced with a strobe lamp. I gave him a Edmunds Sci 10x viewer. This was tested today. It has flare. I called John. He is trying a 1" movie lens.

Aug. 22. 1977. Harold Edgerton
Esther and I returned last night from Top Sail North Carolina near Wilmington where we spent from Fri Aug at two cottages on Boryhand Carolina Aves. Mary Tom Dixon, husband chas, Son Bill, Daughters Jan, Mary anne & Ellen were there. Robt and Liz Edgerton with son Eric, daughters Nina and Sylvia.

I have a ticket for Washington D.C. where I will visit Mary Smith at the Nat Geo Society and the navy Dept Res Lab. To inspect the camera and strobe.

Aug 31, 1977. The camera and strobe parts and pieces were brought to Cambridge. I had removed the film from the camera in Washington. It was processed that night in Cambridge the emulsion was soft after the long soaking in the sea water.

I wrote a report of the condition of the camera.

Dr. Uhlig inspected the corrosion. He pointed out the coarse corrosion in several places. One was a deep area in one of the end plates. I am sure this is where the leak occured in the camera at the O Ring.

Mac Roberts finished Bug unit on monday. Test photos show ample light is available from the circuit - see attached.

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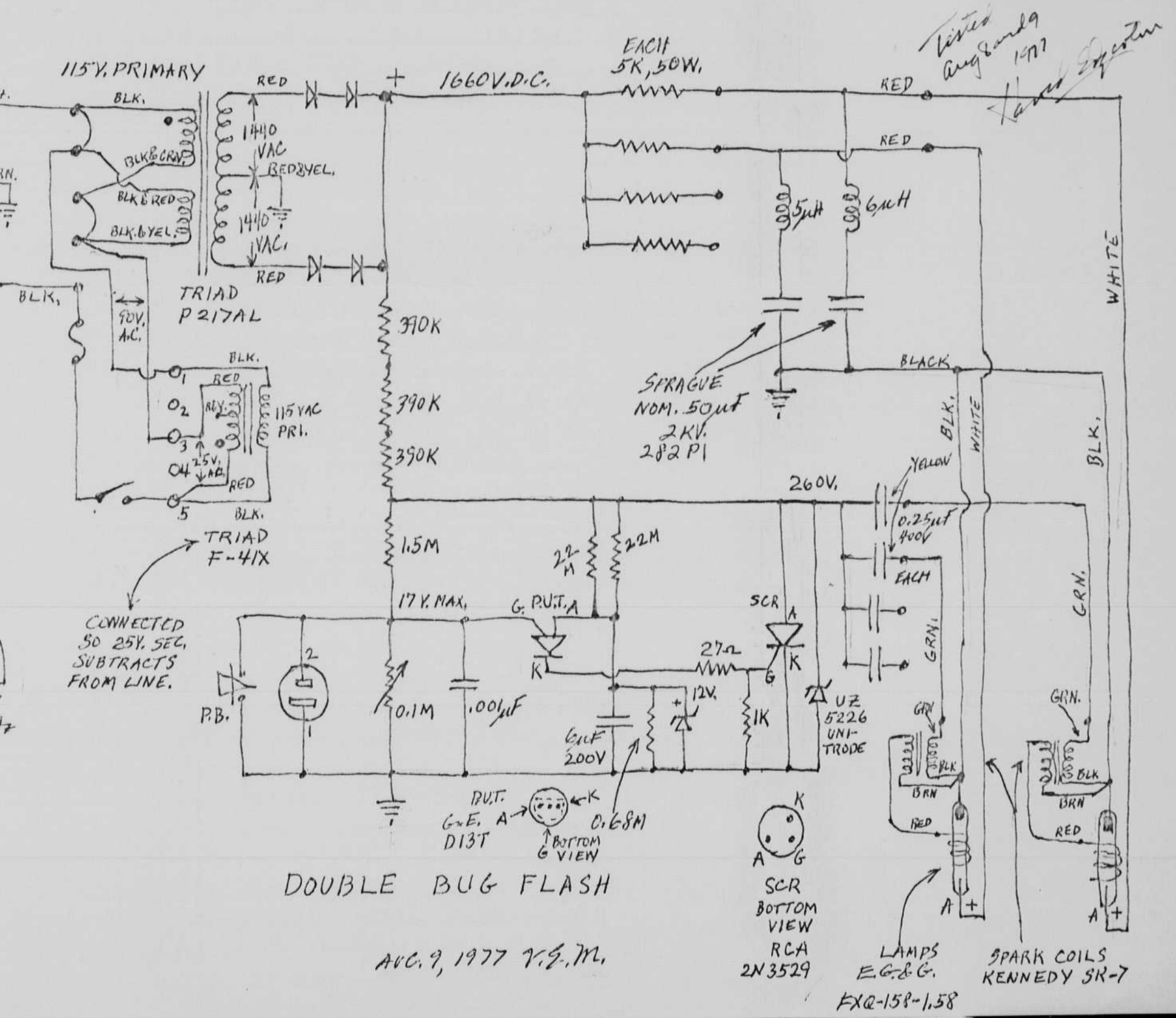

DOUBLE BUG FLASH

AUG. 9, 1977 H.E.M.

Visited Aug 9 1977 Harold Edgerton

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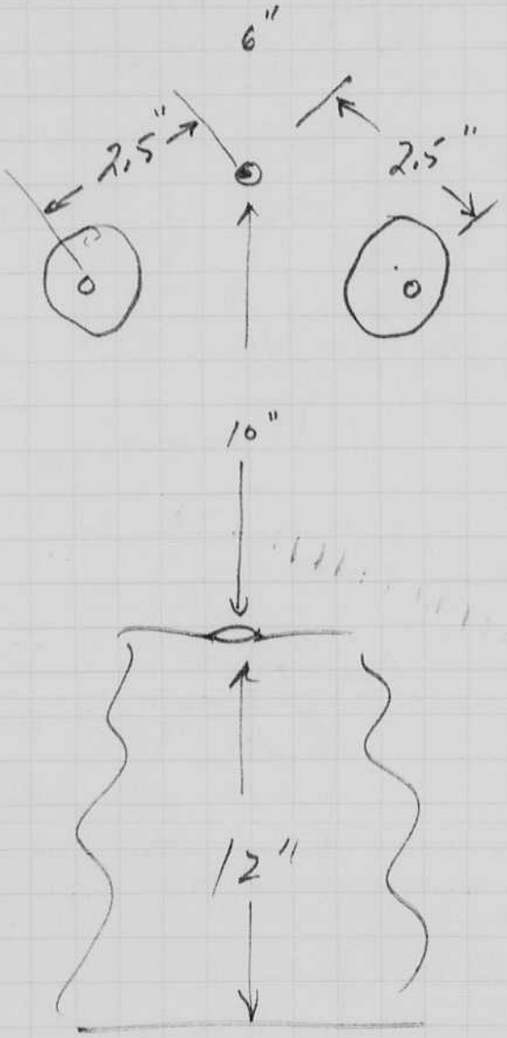
2pm. Bug photos until see p 122.

Exposure on plus X film 5 min DK-50 ok.

——————— Blue (light) Background cardboard.



.1977
ed Edgerton

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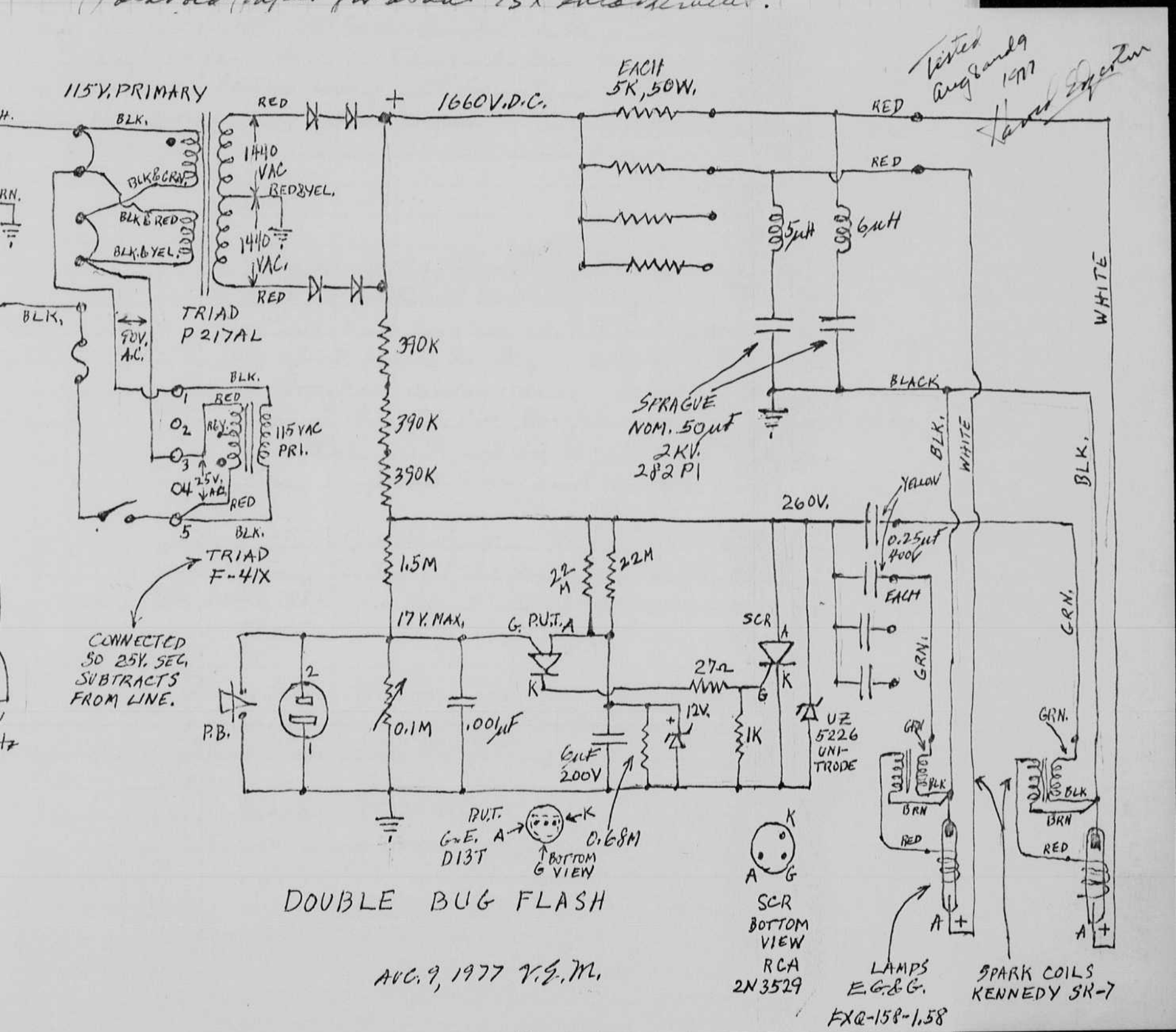

DOUBLE BUG FLASH

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Visited Aug 9 and 9 1977 Harold Edgerton

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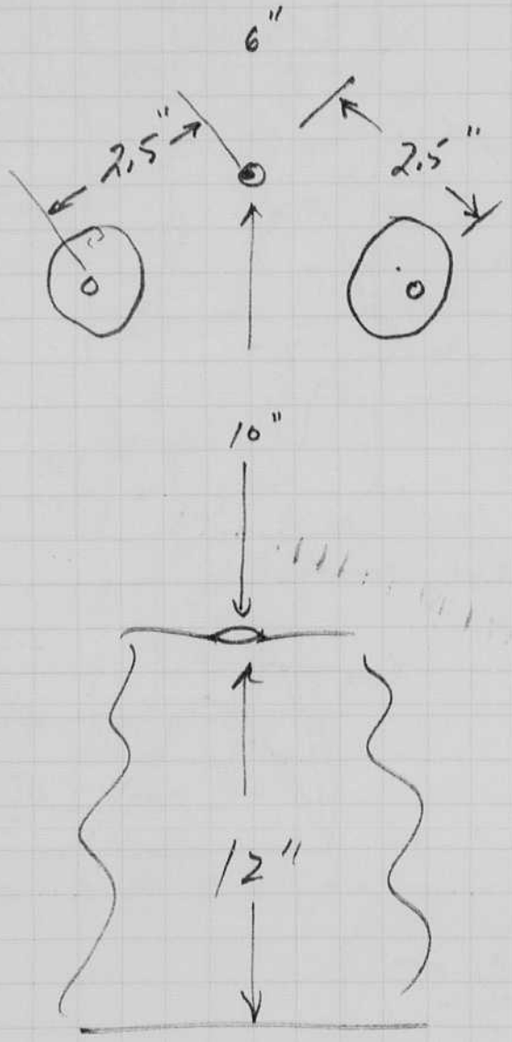
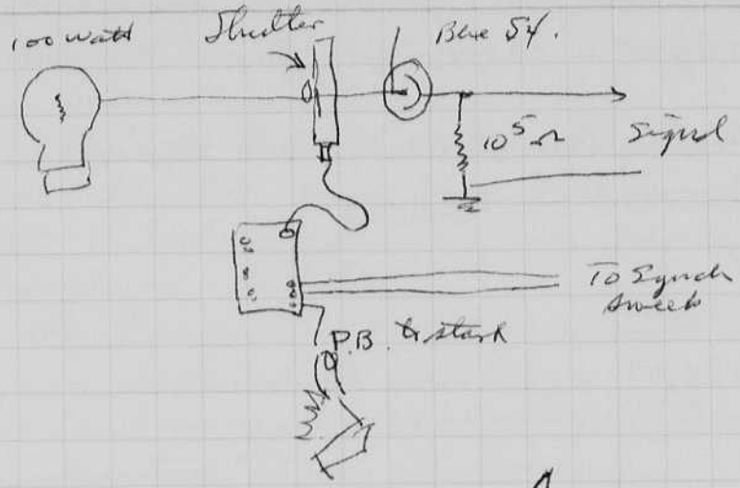
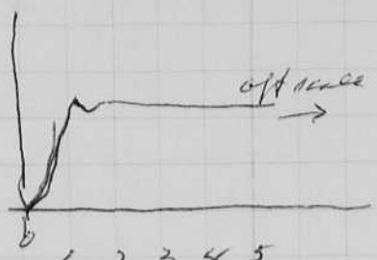
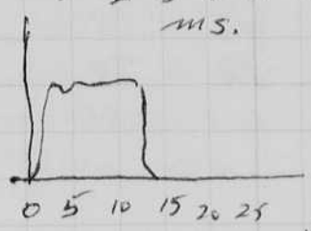


Sept 2 1977
Test of Shutter Uni Blitz Vincent.





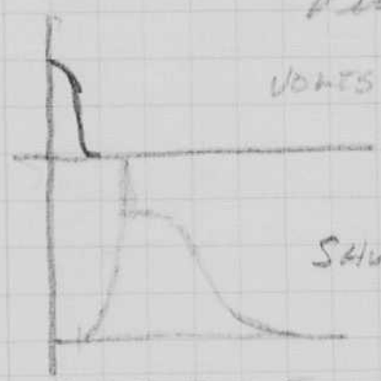


Pulse now Shutter!
when strobe is connected, why. Also double sometimes

1/5 ms

Sept 20, 1977 H. Edgerton
Chas Miller tried Bill Chat on adjustment on the unit controlled the time! now it goes. Oh see with transistor control Today Bill MacRobert made the pulse with operate from batteries.

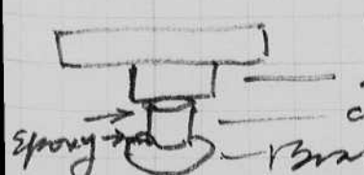
Sept 8 1977 Uniblitz Shutter Vincent.



with Mercury Switch.

There was a lot of Bounce of contacts with a Microswitch!!

Oceanal Ocean Systems San Diego Calif
Model
B1055C 1055213
Draw 0550000 12/70 disp 1/71
Time Zenith Swiss made. This Pinger came from the MONITOR Sat. off cape Hatteras.
It was a 12 KC cylinder with a brass cemented end



on last Thursday, ~~Aug~~ 26, the Army ship T44 was recommissioned EDGERTON. Esther broke a champagne bottle on the bow. Dean Horan arranged the entire affair at the Aquarium. The ship is 65 ft long of 90 tons. It will be an excellent way for work to be done along the coast line.

I put an inertia switch on the bottle which closed the circuit when the bottle hit the rail of the ship. Then this operated the Blitz shutter of the Vincent co Rochester N.Y. The x contacts then fired a strobe of 4000 volts and 25 mfd. 1000 BCPS to get a picture on Plus x film. The photo was made too soon! The liquid was going very fast. The M.I.T. photographer Campbell made a hand triggered shot that was better since it was later.

Several photographs of Sea lions and Dolphins were made at the Aquarium. Sarah Parker and Sue Miller were the trainers of the animals. I used plus x film with the Uni Blitz shutter. This lens is about f 22. It lacks definition. I need a better lens and an aperture. The strobe x contacts could help as an aperture by triggering the flash lamps at a partial opening of the blades.

While in Top Sail N.C. I took some silhouette pictures of water from the ocean and from the canal. The small FX6A and supply was put above the sink in the bathroom which could be darkened. The pan with the film was put in the sink. I noted that two images were produced. One was the direct shadow, the other was caused by light reflected by the bathroom mirror. The spacing of the two images should be proportional to the distance that the subject is above the bottom. This is then a useful technique to show spacing.

I could use two lamps as another way to accomplish the result.

Some time ago I had a lamp at a grazing angle when I was taking pictures of cactus needles. The gap between the point and the shadow showed the distance of the needle point from the film.

Sept. 20, 1977

Harold Edgerton

Classes started last week. I have a section of freshmen on a seminar 65.

I left for Calif on Thursday Sept 15 for San Diego. Carol Edgerton and Jim Nathland were married on Sept 17 Sat at 1 pm in the Star of the Sea catholic church in La Jolla.

On Friday Sept 16 I went with Carl Muller to the Navy Island in San Diego Harbor. We went to the Deep Submergence submarine facility where we inspected three submarines. One of them was apart for overhaul.

The camera system was discussed with Lt. Smith. I suggested the Utility cameras of Benthos. A relay needs to be installed in both units to keep the batteries "off" until the flashes are needed. Then a picture number should be recorded so that the film will not be run to the end.

Today I showed my class the method of measuring light and how exposures are made on 7302 film with my portable equipment. A silhouette of Cambridge water from 100 mem. Drive was made to show the students

See plot p125

Plug x DK50 6 min. D	D_{FILTER}	Another plot exp.
1.04	0	107
93	.03	107
79	.19	94
68	.42	52
43	.98	51
24	1.62	26
14	2.08	14
11	FOG.	11

128 Sept. 14, 1977.

— Harold Edgerton

Lamp FX6A in High or I.R. Equip.

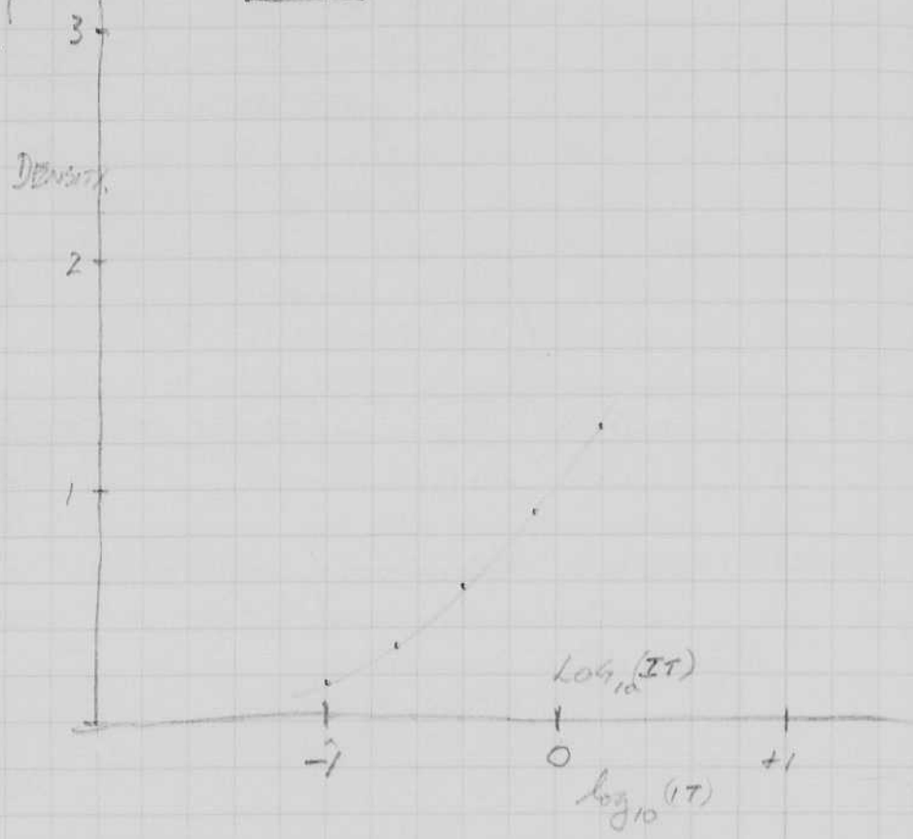
Peak light = 120,000 c.p. Dur = 2.5 mil/sec = 3 C.T.S.

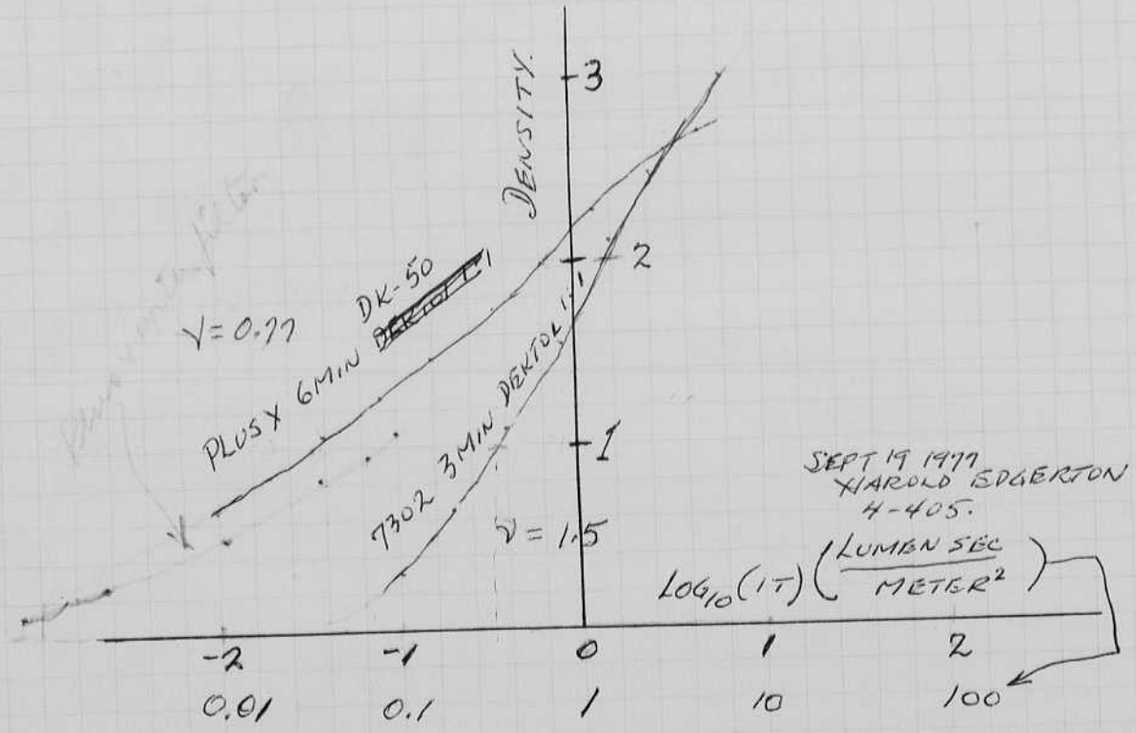
Distance to type 7302 Film = 173 cm.

1 min develop in DEKTOL

1:1.

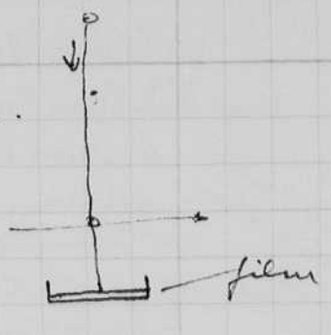
log I	I Lumens/sq meter cp/ft²		
		0	.03
-1.	.1	1	.18
-.7	.2	2	.34
-.4	.4	4	.58
-.1	.8	8	.89
0.2	1.6	16	1.26





Oct 1 1977 7.30pm Shadow Photography.

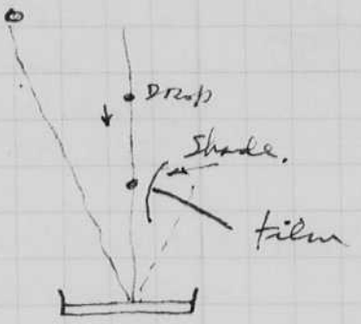
1. Splash of a water drop with water on a film. Catch the drop after impact & show waves and other disturbances in the water. Start with water about 2 or 3 mm deep and with a drop falling from 12 inches. Try to observe small drops that form on the rim.



Try shadow reflection from the water surface after the drop has made impact.

Try different heights of liquid fall. Vary the surface tension.

Try a cup of milk or water in a deep layer. by the reflection method.



Retirement on Oct 2'77
Reception at Taylor-Park Community Council
Awards for John Chapman and ~~Joan Jo~~
Deana Jo.

Oct. 3. 1977.

Output of 8½ gap - sealed electrode lamps with. mfd at 1500 volts in Big Trash unit. 2 Lamps.

(each lamp) - 9×10^{6} cp peak × 40×10^{-6} sec duration = 360 BCPS. (at 1 meter)
Bill found 480 BCPS with meter at 1 ft.

The lamps were in a cylindrical glass tube 3.8 cm O.D. with ~~a~~ aluminum reflector.

150 mm f4 Tests of Lens. 8" – 21" $M = \frac{E}{21} = .33$ $21\int\frac{.33}{8.0}\ \frac{.03}{.70}$
Set lens on correct ~~∞~~ on scale. then Max extension.

-YSARON.

A curve of the sharp focus points was made for use later. The lens seems to be better than the one supplied by the Vincent company.

Oct. 6 1977 thurs 1977.

400 BCPS. 40.00 $DA = \sqrt{400}\ \frac{125}{25}\ \frac{1}{(n+1)^2} = \frac{4.5}{4} = 10$ $D = \frac{10}{0.5}$ $A = 11/5 = f22$.
(20.0)

Photo seemed check, oh! Class demonstration.

Copy of flash sent to Bob Marshall 920 Jefferson 20021 with Pigeon photo following phone call.

Sept 30 1977

Harold Edgerton

Strobe beacon put on roof at 6 pm 40 mfd at 2000 v
Series trigger with two lamps in series. Output –
Lamp covered with glass and Reflector vertical. Some
missing at 10 pm.

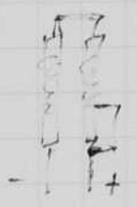
Oct, 1, 1977 Lamps firing all the time today!
The lamp was tipped to illuminate the Dome of Bldg 10.
Off at 11 am. Flash operated at night only since the
power supply makes a noise on the charging cycle.

Lamps #. FX 45. 6" gap. - ½ 12 mm o.d.

Size.

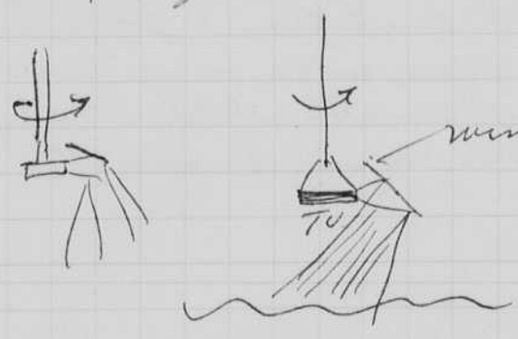
Output W.C.P.S. 2 KV. 40 mfd 2 1.1×10^6 peak light

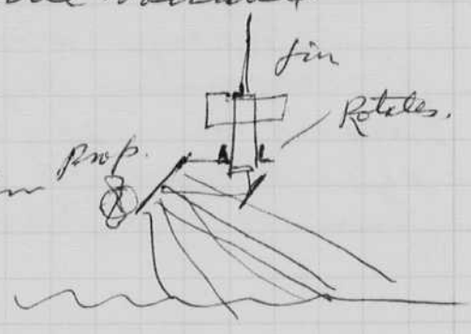
Flash Duration. Series trigger 260 μs Dur 286 c.p.s.
(225) with miter.



Underwater T.V. Why not use a multiple set of cameras
to get 360° coverage with multiple receivers and
recorders? Then there would be no need for
rotation.

How about a mirror to give variable
looking angle?





Tests of new lens in Multiblitz shutter as mounted by
John Lothrop. 150 mm focal length.

Diam of hole = 6 mm

$A = \frac{150}{6} = 25.$

Exposure of test for Lens

26 × focal length in = 26 × 15 = 3.9 M

$\frac{26 \times 15\text{ cm}}{130}$
$\frac{26}{390\text{ cm}} = 4\text{ M}.$

(Used 2.4 M for one test!). enormous part.
Had a 3600 RPM 1/60 sec. per rotation white pointer in photo.
The oak box Kodatron (pre) was used 8600 B.C.P.S. at 12 ft

$D_A = \sqrt{8600 \frac{125}{25}} = \sqrt{8600 \times 5} = \sqrt{43000} = 2\text{.}15.$ plus × John.

$D = 12 \frac{2.15}{12} = f20$ the lens is f 25. Exposure ok at DK 50 6 mm

Notebook # 32

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 130 and 131.

Item(s) now housed in accompanying folder.

150 m.m. Lens.

18,000 BLDS
STROBE.

BLUR OFF
BLADE. 2600 RPM
GX-1 1971 N. Edgerton.

150 m.m. Lens.

18,000 CPS

STROBE.

BLUR ON BLADE.

2600 RPM

OCT 1971 H. Edgerton

Oct 15 1977 - Harold Edgerton

We had a party last night at the MIT Strobe Fraternity dinner afterward. Some 40 were there to celebrate and honor Bill (Earl) Mac Roberts who reached 65 years last spring. He will continue to help us in the strobe lab.

Bob Rines told me of activities in Scotland at Loch Ness.

Esther and I went to Nebraska on the night of the 8th to Omaha. On the 9th we visited Jessie DeCou in Woodbine Iowa. (She is my mother's youngest sister).

Then we went to Aurora Nebraska to see our farms, etc. I attended a board meeting of the Int. Sensors co.

met at cemetary 3 miles south of Woodbine Bob Crawford Woodbine Stub Leonard Logan

Oct 19 1977 Th. The M.I.T. club of Cape Cod will visit the Strobe laboratory at 1:30 to 2:30 today. Just there will be a picnic at the Historical exhibit on museum.

I took multiflash photos of a dart yesterday as an example for the Seminar class. The pics showed how the bird changes direction when it is dropped horizontal. After a drop of about 1 meter, the point is down. The dart oscillates so that in another meter of drop it is again almost vertical.

Oct 23 77. Photos were made at the Aquarium ~~last night~~ yesterday at 10.30 Sue Parker & 4 Students helped Aaron Bobrick, Ewan Huang & Denise Denton, Chas Harnett.

Used 15,000 BCPS (2 spot reflectos)
Plus x at f 8.
3 Color Kodachrome II. 4x5.
3 B&W.

The class of freshmen seminar students came & 100 men dined for dinner. Diana Calalander (Wellesley) was with us.

Oct 24 Sunday. Photos of sun were made for Bldg 7. at 4 & 5 pm & got crossing.

Oct 26 1977
Harold Edgerton

My seminar class took 8×10 inch silhouette photos of Chas River Water yesterday to investigate "floaters"; There seems to be an all of our photos - regardless.

On film #3 the water was filtered. This seemed to reduce the # water particles but there were many more floaters! They must come in through the air.

FLOATERS!!!

Oct. 27, 1977 7307

Another film was exposed after a thin soap solution was used on the surface at the center. At, the thin film swept the "floaters" quickly to the sides of the tray.

I used a ~~pie~~ black tray to observe the floaters. I could see them easily when I observed the water surface with the reflected light from a lamp.

It now appears that "floaters" come from the air. They cause the patterns seen in the film caused by the distortion of the surface of the water. Some of the floaters could be in the tray initially. Others drop in from the air.

I recall a method of using wax from ones ear to clear the surface of a liquid. Pepper (ground) when sprinkled on the surface of water is not disturbed when a finger is touched to the liquid. However, if the finger is first put into ones ear to pick up a small amount of ear wax, then the pepper particles are violently rejected to the sides away from the finger.

Flash III James Killian and I had a conference today about the revision of Flash II.

Killian agreed to contact Brenewal about color photos of birds for the book.

I have already written to Rose and to Mili about photos.

We (S.K. & I) went over the Flash II Book commenting about the photos. ~~and~~ Some will be rejected. Then new photos will be used.

Silhouette photography will be emphasized and illustrated. Also underwater photography will be discussed at great detail.

The new Strobotac of Ben Rod will be shown.

 Oct. 27, 1977 Harold E. Edgerton

I proposed a simple strobe projector of movies today to MacRoberts. The idea is to use a belt of 16 mm film with a light detector trip to fire the strobe in the sprocket holes.

The drive may be a motor or even a small crank to be operated by hand.

Since there will be no sliding parts I believe that a continuous belt of film can be used without wear. This should make an exhibit which will have a tremendous life compared to existing intermittent systems.

Of course there will be flicker at frequencies below 40 cycles, but these can be tolerated for a short look.

I propose to use a belt of color milk drop photographs to show a splash. It is our plan to make a device of this type for use in Strobe Alley and other places.

A projector of this type was used to show the very early 1/2 frame 35mm movies made of the milk drop splash. This was probably in 1936±. I recall seeing a similar device used with a neon lamp and spark coil in some old scientific journal.

Oct 30 1977 H. Edgerton.

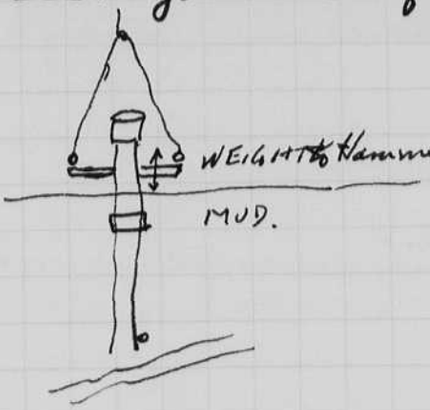
More photos were made at the Aquarium yesterday morning. Ann Coltz ran the sea lion part. I found the sea lions were difficult to photograph since they are so dark, especially MUGS the big male.

My lights were tripped by others with flash and this caused me to miss some exposures. I should have covered the photocell of the unit that was used for the shutter synch, and reduced the gain of the side light - or aimed its photocell towards the key light.

John Rosanowitz put on the dolphin performance. There was a lot of splash. Again problems with the synch due to other photographers.

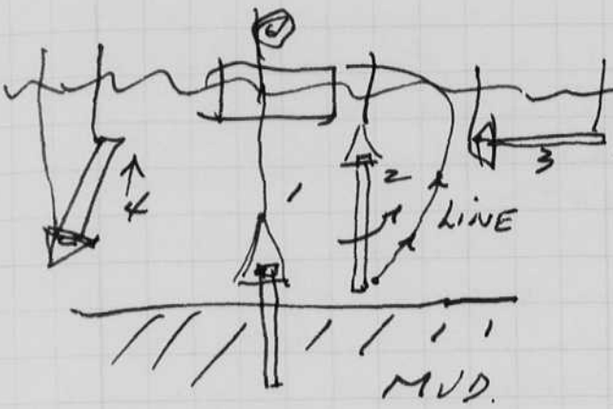
Oct 30 1977 + Harold Edgerton

Coring methods for objects in the mud.
See my letter to Syd Wignal of Aug 6 1975



One problem is how to pull the corer out of the water and still retain the material in the pipe.

method 1. Put a cap on the top of the pipe to prevent the pressure of the water when the pipe is withdrawn from the water.



method 2. attach a line to the end of the corer so the pipe can be put into a horizontal aspect before being pulled out of the water. It could be suspended + to keep the soft material in the pipe.

The mud sediment samples from 6 to 10 feet deep are most important to bring up from the bottom. There may be something at the bottom which should be sampled if at all possible. Old wood can be cast and brought up but gravel and rocks with will be very difficult.

Another method could be the use of a vacuum pump on the end of the pipe before it is pulled out of the water. This could help hold in the material of the bottom part.

 Sat. Nov. 5 1977 Harold Edgerton 4-405 MIT Strobe Lab.

The Jugglers in the area were having a giggle today in the Sala Puerto Rico in Stratton.

I brought some of them to the multiflash Studio about 10.30 for a few photos.

David Ledoux (Ashdown House)
Rod Holbrook.
Art Fawbell 3545152 camb.
Skip Kurz (Harvard) 3546486 Home 475 4567 (Grange) work
Holly Bradley. Amherst.
Louise Vermont.
Mike Mosher.
Dmit Walker BIS&N

The first photos (4) were made on Plus x at f 8 developed 6 minutes. the action was not good since the clubs had black tape on the handles which did not photograph.

I brought Skip and Alvin Haeberli #91 Holly Bradley back about 4 pm for another try I used Plus x at f 11 with the strobes at 60 - 0.3 sec on Skip & Holly with Indian clubs.

I made 4 balls on Skip at 60/0.3 sec and 30/sec for 1 sec 6 flashes(?).

I had some problems with the camera shutter release. This needs attention.

The photos look fine, I am sure that some great color photographs will be made with these subjects.

Nov. 9, 1977 I called Dave Raymond today after talking to Bil. Rowe (W+O.) about elapsed time camera. Bil wants an 8 mm in a glass sphere. I recommended 16 mm in a simple type with out a shutter. The trip could be photoelectric thru the sprocket holes.

Nov 11 1977 Shot test photos from 2nd floor Bldg 7
Plus x film / 35 mm lens f 25. Density filter.

315	first photo dark	400	out
320	Barely readable	405	sun out
325		410	
330		415	
335	Blurred Baker	420	good

Nov 12 1977
Harold Edgerton

Museum Science in am about 10 for photos of Archimedes, a great horned owl of 1½ years old. Students David Silverman ~, Allan Jim Snyder ~ Owen Hwang helped. We used a 3 lamp 6000 BCPS unit of 60 ms operated from 110 volts.

Photos were made of ff 7½ the owl on Polaroid 58 color 4×5 film at f 22 (dark) and f 16.

The background was a curtain. We used a blue paper screen!

Mit Stonehenge big eruption.

340 behind Sept f 4.5 Kodak red film color neg ASA 100 D4 filter
345
350
355 Clouds mostly thin
400
405
410
415
420

1/1000 sec exposed 5 min intervals.

Sun photos

Kodachrome 25 min FUJICA ST 705 # 80 8 1324
at 75" from north well on metal in floor of ff 7-201.

345 1/60 f 8
346 1/60 f 8
351 1/60 f 4
400 1/60 f 4 clone

410 ± 1/500 f 16 Several shots with sun at horizon.

16 mm movies 16/sec
ASA 400 film in Hall's show the walls lighted.
24/sec with lens stopped down to get the sun.

 Nov 15 1977 - Harold Edgerton 4-405 M.I.T.

Sales-Driver W710 came at 4 and we took photos of planetar on 8x10" TP302 film. The results were great. Prints were made and taken to W.A. Agnew Pete 2 flash lamps FX54.

Nov 25 77. Wyckoff brought in photos (16 mm from Jackmans). We discuss some strange dot patterns on 3 frames ?!?! The 35 mm films have not been processed.

Thanksgiving I was in Falmouth with Barbara Bowman and family. My sister was there too with her husband and daughter Betty.

A photo exhibit of my work was opened at the Visual Studies Gallery on Nov 23 from 6 to 8. Many of my friends showed up including Minor White and Fabian Bachrach with son Chip. The show was put together by Jim Karageorge.

Dec 3 77 Double Sprayer was finished for Agnew. Tyson and — came over to see it. They wanted something different with another pump to decrease the head needed for the operational pumps. We gave them full information on ordering pumps and other parts for an assembly to be made at the Agnew shop.

Ted gave us two stroboscopes for this job. We kept one at MIT and gave the other to Tyson.. Denise working now Ron one

Freshmen class dinner at 100 memorial drive cambridge mass.

Esther

Dec 3 1977 4-410

Tony Darlings. Report.

Under-water photo's 100 ws Elapsed.
16 mm opt mm Aug. 24
off 30 aug after problem.

Sonar Triggering
M.I. #1. on 16 Sept 1977 on Raft.
Have worked some time.
Was due to be checked at end
of August. Weather bad.
Display reading - counters.
212 counts 192 exposures.

at the aquarium for photos of Porpoises & sea lions.

18,000 p.c.p's.

#3 mid. of Sept 18 Sept 198 counts.
off tydal basin 190 exp.

19 Sept. ~~Sept~~ Sept. - 21 lost.
Castle Bay due to damage to
Buoy

#4 Oct. 2, 1977 443 counts
250 counts.
off castle.

~~Report~~ typed out and read.
Dick Gagner & — divers Bad
weather.
18 Dec Launch Row Boat.
Hunter broke lines and
was jumped out.

Algae formation on Glass and glass lens. cooled.

Heriot Watt Uni. - Edinburgh.
have submersible and other equipment.
Dark. rings artifacts.
need side scan sonar. July. (June ?) no date given
July proposed for the expedition.
John Mills Sonar & Recorder
Nilsen - Plane tables. Smith. Clyde Uni. head man
Heriot-Watt - platform etc.

Nov 15 '77 — Harold Edgerton 4-405 — M.I.T.

Solar-Orbiter W-10 came at 4 and we took photos of planetarium on 8x10" 4302 film. The results were great. Prints were made and taken to W.H. A good pile 2 flash lamps 4564.

Nov 25 77. Wyckoff brought in plates (16 mm for Talmers). We saw more strange dot patterns on 3 films ?!?! The 35 mm films have not been processed.

Thanksgiving I was in Talmadge with Barbara Brown and family. My sister was there too with her husband and daughter Betty.

A photo exhibit of my work was opened at the Vassar Studio Gallery on Nov 23 from 6 to 8. Many of my friends showed up including Gjon Mili and Fabian Bachrach with an Oscar. The show was put together by Thos Hoyaffas.

Dec 3 77 Double Sprayer was furnished for Agassiz. Tyson and — came over to see it, they wanted something different with another pump to decrease the head needed for the operational pumps. We gave them full information on ordering pumps and other parts for an assembly to be made at the Agassiz.

Red gave us two stroboscopes for this job. We kept one at MIT and gave the other to Tyson.. Daniel working now Ron one

Freshmen dessert dinner at Professor Edgerton's

Dec 3 1977 4-410

Tony Starlings. Report

Underwater photos 100 ws Elapsed.
16 mm opt mm Aug 24
off 30 aug after problem.

Sonar Triggering
M.T. #1 on 16 Sept 1977 on Raft.
Have worked some time.
Was due to be checked at end
of August. Weather bad.
Display reading - counters.
212 counts 192 exposures.

#3 unit. open 18 sept 198 counts.
off tydal slime 190 exp.

19 sept. ~~sept~~ 21 lost.
Castle Bay due to damage to
Buoy

at the aquarium
for photos of
Porpoises &
sea lions.

18,000 B.C.P.S.

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250 counts.
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Hunter broke lines and
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Algae formation on Glass and glass lens. cooled.

Heriot-Watt Uni. - Edinburgh.
have submersible and other equipment.
Dark. rings on objects.
need side scan sonar. July. (June ?) no date given
July proposed for the expedition.
John Mills Sampson Bearsh Ltd
Nilson - Rescue tables. Strath Clyde Uni. head man
Heriot-Watt - platform etc.

 Dec. 10, 1977

- Harold E. Edgerton. Jolly Boro was here on the 8 and 9. He gave the Science lecture on the 9th at 10 - 12:30 at MIT that he gave at the Mus. of Sci. on Dec 8.

Dec 20, 1977 Hi. Janice Kay came Dec 18 at 9:45 am from N.C. We attended Payson Park Church and then went to John Bullet's home in Watertown for a brunch party.

Monday. Dec. 19 Aquarium & noon - Prohibit

Tues. Dec 20 Mus. of Sci. at noon with Jan. Yolanda Hinton came in with ballistic problem. Plan to take photos tomorrow.

Dec 21 1977. Sun photos from apt. 11:56 A 100 memorial Dr. apt. 6

Step X 2.40 and 9.20 ? Photo X John 6 min Dev in DK 50

f 25. Paragon Lens 135 mm. with 1/1000 sec shutter at 5 minute intervals

Filter 1.35 Density.

Last night at Harold's parents home in Cambridge. Peter was just back from Greece. He goes to the Falkland Islands next month with 8 people to do work on the old ships that are on the beach.

Terry Voss 238 Newbury St 02116 536-6176 Picture gallery.

→ Exposure for above ok. The sun image was very dark. D= . The buildings on the Boston hill were under exposed.

a picture taken on Dec 26 when it was cloudy showed the buildings much better even if the sequence of time was much less

filter 1.35 7.05 to 10 am 1/1000 sec at 5 min

Dec 27, 1977 Rines, Bob, Kohl & Pat. Fall photos Aug Sept Oct. observations.

Sooner June, July 76. target.

(2) Only when lights & sound are on.

(3) Flash lamp close to camera. may dim best. [15 ft distance Boston Bruglee 12 ft.]

Was 7 or 8 ft with Dave. Best after 8 ft.

Traffic is worst in June, July. Little July or early August best.

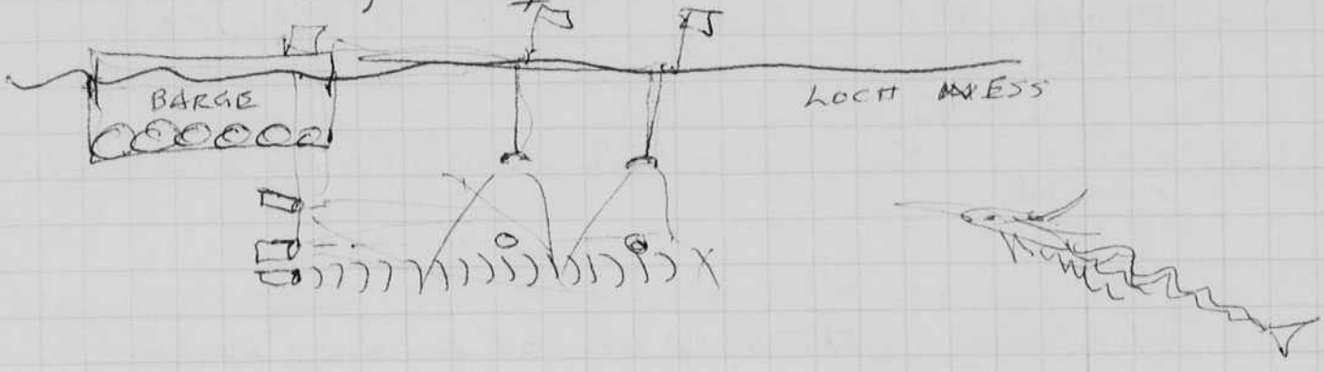
Tower seems to be ok. Trigger.
Should go back & color film.

Shiels photo. Shows mouth - small head. 2 fenders
neck smoother

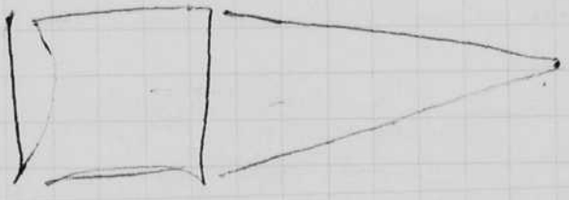
Smith photo 2 pictures. of Head & neck.
Similar to the Shiels photo.

Aug - Sept Humps ~~Photo~~ sightings. reversal.

Conclusion. Study the 16mm equipment
Acquiring.



Prey



Summer

Mike, Peter Mid-July diving, timing best
~~Harold Watt~~ submersible.
John Wills.

Kittens
1 16mm + 5th
1 35mm motorized
more lights.

June. = Klein
July = H.E. & others —
Baltimore shoots
Late July. Cameras etc
Aug.

Fines ordered me to go in July & Feds need water tower while I can equip.

Urquhart Bay
Better for long sightings.

Baiting experiment.

Dec. 27, 1977. Roger Allen 2122 will come tomorrow to discuss Lochness paper on sonar at 10 am. Bring in slides etc. The journal is called Spectrum.

David Machaffey will bring in bicycle tomorrow for multiflash photos. Healey St 492-4108 8x10 Polaroid color. on Tomorrow thurs.

Film tests.

~~Light D Film~~
~~0.3 hps. 89 cm 7302~~

3 min.	0.3 hps	17 cm	SO 343	Broaded strip. Exposure nil. N.G. no exp. Washed out?								
3 min	0.3 hps. +16 mfd.	17	SO 343	" "	0.	0.03	0.18	0.39 (T)	0.63	0.94	1.27	Density
					1.17	0.91	0.60	0.31	0.11	0.05	0.4	
											0.04	
1½ min.	0.3 hpc +16 mfd	17 cm	7302	Broaded strip.	2.84	2.97 (2.03, 2.84)	2.77	2.46	2.01	1.45	1.0	

John ~~Mitchell~~ FOSS 787 5721 wants to borrow a dropper & Slide

~~Job~~ MITCHELL 322-7777 wants to borrow a strobe with lots of red output for the destruction of cells and virus etc.

now → uniform lighting N.G. ~~off~~. 0.3 hps. + 48 mfd 17 cm SO 343. Broaded strip. Angles not good. too big a film per distance (1.30, 0.93)

50 mfd 50 SO 343 0 .03 .18 .27 0.58 .36 .27 .15 .07 .04

~~0.3 + 48 mfd~~ 50 mfd total. ~~50~~ 40 cm SO 343 Saliva with Water & show a 60 μ cells from the mouth.

one FX6A cracked a seal. Thin so distance changed to 40 cm

50 mfd as above. 40 SO 343 avg density = 0.65 3 min in Dektol 1:1 72°.

Note Dec 29 These clear particles in this film are about 60 μ in diameter. They are irregular shaped compared to previously photographed saliva samples.

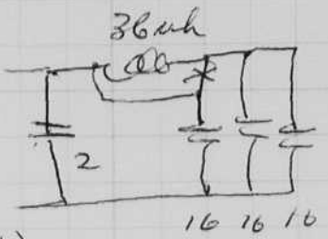
"SQUAME" cells see page 146

The layer of water was too thick for the 40 cm distance with the full FX6A strip. ~~1 cm~~

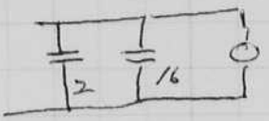
Dec. 29, 1977 Silva Silhouette

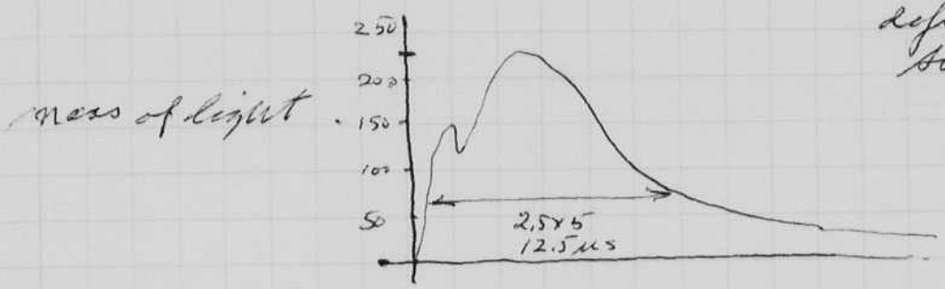
~~Harold Edgerton~~.

The FX6A lamp had a ~~crimped~~ lead seal N.G.
I put a 36 mh inductance in series with the 16 x 3 capacitors to cut down the peak current.



FX6A 40 cm th film. 1 oz ont to 50 343. (yesterday, I) used 4 oz.
~~this should get better~~
definition of all the subject.





Dec. 31. 1977

Donald Krause 5 old town Road # 236 ayer mass 01432 came in yesterday. He gave me a transparency of a brick wall photo with outside clouds. He was proud of the black to light ratios in the example.

He wanted me to finance further work, I said "no" since I was not interested in the field of effort that he is pursuing.

Krause is a friend of Chas. Wyckoff.

Gus Kayafas came in with pictures & he signed for the folios. also checks from Hasty for $120 and $60 for prints.
He discussed the program and gave me an according for the rest.

Corella Vulgaris diffugia Small discs 50 μ ± shells in water.

from Garrett.

STROBE PROJECT LAB
FALL 1976 MIT

Newcomb Promoted

John E. Newcomb, Jr., assistant director for administration at the MIT Center for Advanced Engineering Study (CAES) since Oct. 1975, has been named associate director of the center.

The appointment was announced by Dr. Myron Tribus, director of CAES.

Mr. Newcomb, a personnel officer at MIT for eight years before he joined CAES, will have wide responsibilities in each of the center's main operating areas—Advanced Study Program, Self-Study Program, Tutored Video Instruction, Cable and Video Services, Technical Curriculum Research and Development Project, in collaboration with the Department of Material Sciences and Engineering, Project Proceed, in collaboration with the Department of Chemical Engineering, and the Conference and Seminar Program.

In addition, he will seek ways to broaden the center's role in continuing education for practicing engineers.

A native of Lawrence, Mass., Mr. Newcomb joined MIT in 1962 as a technician at the Francis Bitter National Magnet Laboratory. As a personnel officer he was responsible for non-academic employment in the School of Engineering and was deeply involved in programs to encourage the employment of persons who had served prison terms. He remains a member of the Governor's Advisory Committee on Corrections.

Since 1968 he has been an honorary member of the MIT Quarter Century Club and is its executive director, a post he will continue to hold.

puter Science, has programs in [illegible]. The agreement was the [illegible] Management and Economics, first of its kind.

FROM OCEAN BOTTOM TO DOC'S WALL—An undersea camera and strobe, raised from the wreck of the Civil War ironclad *Monitor*, has been mounted on the wall of Strobe Alley whose leading citizen is Professor Harold E. (Doc) Edgerton. The camera/strobe unit was lowered in 1973 to take pictures of the *Monitor*, which sank in a gale off Cape Hatteras. It lodged in the central portion of the ship, but was recovered last summer during another expedition to the famed warship.

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STROBE PROJECT LAB
FALL 1976
MIT

Charlie Mellen
Mr Ibid

...16)
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... (12/7)

... Sci. (12/7)
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...dent Affairs
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... Graphic Arts
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... Biology (12/14)
...the Pres. (12/14)
...erv., Medical Dept.
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...ical Dept. (10/5)
... Food Sci. (10/19)
... Barker Eng. Lib.
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Design Lab. for Comp. Sci (12/7)
R77-214, Spons. Res. Staff, seismic event res., Earth & Planetary Sci (12/7)
R77-216, Oceanographic Res., Earth & Planetary Sci. (12/14)
R77-218, Aquatic-Life Chemist, Civil Eng. (12/14)
R77-220, Bio-Chemist, Ctr. for Cancer Res. (12/14)
R77-221, Neurochemist Res., Nutrition & Food Sci. (12/14)

EXEMPT:
E77-46, Admin. Asst., Comptroller's Acctg. Off. (10/19)
E77-47, Eng. Asst., Aero/Astro. Dept. (10/19)
E77-54, Eng. Asst., Ctr. for Mat. Sci. (12/14)
E77-56, Estimator/Scheduler, Physical Plant (11/9)
E77-59, Nurse Prac./Physician Asst., Medical (11/16)

HOURLY:
H77-89, HVAC Designer/Draftperson, Physical Plant (10/5)
H77-137, Tech., National Magnet Lab. (9/14)
H77-170, Waiter/Waitress, Endicott House (10/19)
H77-176, Mech. B, Energy Lab. (11/30)

The following positions have been FILLED since the last issue of *TECH TALK*.

B77-685	Sec. IV
B77-695	Sr. Clk. IV
B77-380	Sec. III
B77-687	Sec. IV
B77-689	Data Entry Oper. III
H77-190	Hourly
B77-599	Sec. III
B77-690	Sec. IV
H77-58	Tech. B
B77-659	Sr. Sec. V
B77-615	Console Oper. IV
B77-723	Sec. III
B77-682	Sec. VA
B77-670	Sr. Sec. V
E77-62	Acctg.
B77-595	Sec. IV
B77-701	Jr. Prog. V
B77-714	Sec. V
B77-544	Sec. IV
B77-722	Cashier
H77-192	Tech. C
B77-700	Sec. III
B77-709	Sec. IV
R77-233	Spons. Res. Staff
B77-649	Sr. Clk. III
B77-702	Sec. IV
B77-732	Sr. Clk. III
H77-174	Tech. A
H77-185	Draftsperson
B77-658	Clk.
R77-183	Spons. Res. Staff
E77-60	Exempt
B77-660*	Sec. IV
A77-67	Admin. Staff
R77-133	Spons. Res. Staff
B77-665	Typist/Past-Up Artist
B77-706	Sr. Comp. Oper. V
A77-56	Admin. Staff
D77-631	Sec. IV
B77-682	Sec. V-VA
D77-17	Spons. Res. Staff
R77-110	Spons. Res. Staff
B77-718	Sec. IV

The following positions are on HOLD pending final decision:

B77-715	Admin. Asst. V
B77-479	Clk. II
B77-591	Sec. IV
H77-174	Tech. A (EM)

DOE and who worry about a chemist's understanding of the problems of big science. MIT physicist Herman Feshbach says that, even though he does not think Deutch has a "gut feeling" for research projects of the size of a typical high energy experiment, he has gained some familiarity with the problems of the field while serving on the university's research structure panel. The physicists' apprehension could also be attributed to their unusually weak representation in policy circles in this Administration. With characteristic candor, Deutch says that "it's true that I'm not a high energy physicist, and that is not all bad."

The Massachusetts scientist has specific ideas about what he intends to do in the new energy department. (He commutes to the capitol each work week from Lexington, where his family lives and where he was a town selectman. Friends in other cities contributed small amounts to aid his election, and copies of his campaign poster are treasured as rare pieces of Deutch memorabilia.)

The now-defunct Energy Research and Development Administration (ERDA) was generally criticized for putting too much emphasis on big demonstration projects and Deutch argues that the inherited programs do not include as much fundamental work as would be healthy in some areas—such as the solar energy effort. He also thinks there is need for more basic research in the environmental and conservation programs, noting questions about the safety of liquefied natural gas transport and the atmospheric buildup of carbon dioxide. "My ambition is to see all of the mission-oriented programs do good basic work rather than have it all done in the basic research program," he says. Deutch will have a formal budgetary role in reviewing the goal-oriented programs, and will also head an R & D coordination council that will

The suggestion that someone is a chemist brings to mind a certain character type—the person who toils long hours at a laboratory to bring the public "Better Things for Better Living," or an ascetic professor more comfortable with molecules than social problems. It is not an image that fits Deutch. "To think of John as a chemist is something you just don't do," says his mentor from the Defense Department advisory board. Instead, Deutch's work in chemistry may have been an intentional interlude in a career plan that has never veered too far from matters of public policy. His interest in theoretical chemistry may have led him to that science as a place where he could make a mark and gain the credibility necessary to work in public policy. Enthoven, from the McNamara systems analysis group, thinks there are marked similarities between the requirements for Deutch's early defense work and his present job. Furthermore, it is almost essential to establish credibility in some disciplined field. "In public policy, everybody thinks he is an expert," says Enthoven, who is now a professor at the Stanford Business School.

Having returned to Washington, Deutch appears to be in his element. Old hands are already noting him as a figure to watch. Some associates are still slightly bewildered that he has gained such broad experience so young. But it is apparently not through happenstance that he has so many friends and colleagues in the defense establishment, the chemical industry, the universities, and elsewhere. The man who played a minor role in the civilian redirection of the Defense Department may have arrived at just the right time to play a major role in developing energy strategy.


STROBE LAB - MIT - FALL 1977
DAVID KROL
A. David Stuart
HAROLD EDGERTON
ANDY BAIRD

 Jan 1. 1978

c/ Harold Edgerton.

Forty last night to celebrate 1978 arrival at Ruth Appel's house in Belmont. Eight Meyers, Janice Kispert, Holden's guests.

I wrote MacWhorter 148 Hacienda Ct 939211 about the use of SO 343 film thru a 10× enlargement to 7302 film. Next a contact 7302 so the resulting print will be light field.

The two 7302 negs were put emulsion to emulsion to get an interesting optical effect when slightly displaced.

I find that focusing the enlarging lens is mighty difficult. I need excellent optics in the lens. What aperture gives the maximum resolution?

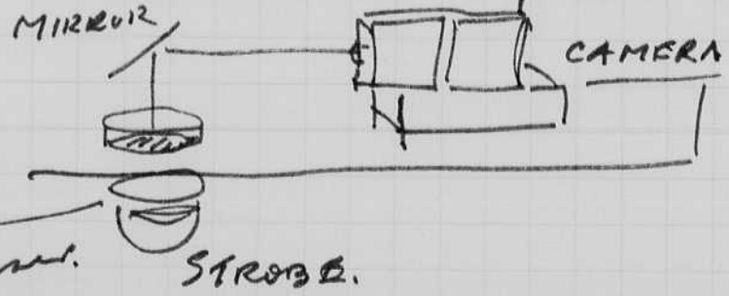
Jan 3 1978 I worked on the video tapes of the monitor for the Feb 13 demonstration.

Julia (with Prof Green) told me that the mouth cells were called "Squame" there are about 60 μ in diameter.

Jan 4 '78 Ed Papko and I discussed photography with strobe. He wants to do combination of daylight and strobe or strobeflash.

I recommended the use of color negative. (ASA 100) so that both B&W and color could be made for prints. I have used one roll of Vericolor II VPS - - 135 - 20 exposure with Nikon. see page 138 for a color print.

Jan. 5. 1978 Prof Green - discussed on the telephone yesterday Elapsed time study of growing cells with 2 minute interval of time between photos. JUDY



Arquitecto
TOMAS J. SANABRIA
Centro Comercial
Santa Monica
Of. 204
Caracas Venezuela
(104)

#45

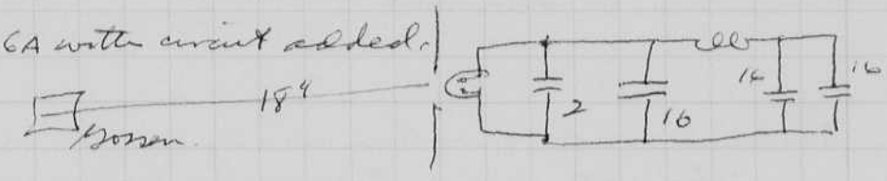
Married 1945

mr Rivers PHELPS are interested in lines

met Jan 7 1978 with KING at the Mus of Science. Sanabria is to make a Science Museum in Venezuela. Architect

3.5uh air core inductor
0.1 ohm

Jan 7 1978. Test of FX CA with circuit added.



Gossen meter
2,2 on scale 5=100 f 32 x 1 ft = DA = 32 = $\sqrt{BCPS \frac{100}{25}}$ =

$BCPS = \frac{32^2}{4} = 250$

32
32
64
96
$\sqrt{1024} = 250$

Tried two GE. light meters at 1 foot
~~8~~ 8. lumens/sq foot x 1 ft^2 = 8 BCPS
Perhaps this photocell cannot measure this short peak

~~Hoge~~ Honeywell flash unit on (M) 726 BCPS at 340 V. (on AC)

Gossen meter ASA ~~25~~ Reads 5 at 4 ft. Guide factor = D x A Reads 5 on meter scale with f 8- say 7.

7 x 4 = 28 28^2 = BCPS.

28
224
56
784 BCPS about right.

Lamp is 3 cm long. in Reflector 4.7 x 2 cm.
Make a nipple 1/2 cm long

Mark 8 mm. circle over the reflector Gossen 2,2 at 4 ft.
Read f 3 on scale at ASA 25

$(DA)^2$ = BCPS = $(3 \times 4) = 12^2 = 144$ B.C.P.S

$II = \frac{BCPS}{D^2} = \frac{144}{40^2} = \frac{144}{.16} = 900$ lumens per sq meter

Let assume the output is now 100 BCPS with the 0.8 cm hole at 40 cm away.

$I_4 = \frac{900}{.4^2} =$

25×4^2

25
16
150
25
400 BCPS
25 Read 25
4
100
16
76
92
23
308. BCPS

by GE meter

100
92

$96 \times 1^2 = 95$ BCPS.

Gossen shows 144

Jan 7 1978 H&D of So 343 film

Lamp ~~Herbert~~ Honeywell portable on (M)
with 0.8 cm disc in front of reflector
(on reflector). 100 BCPS measured see p 148.

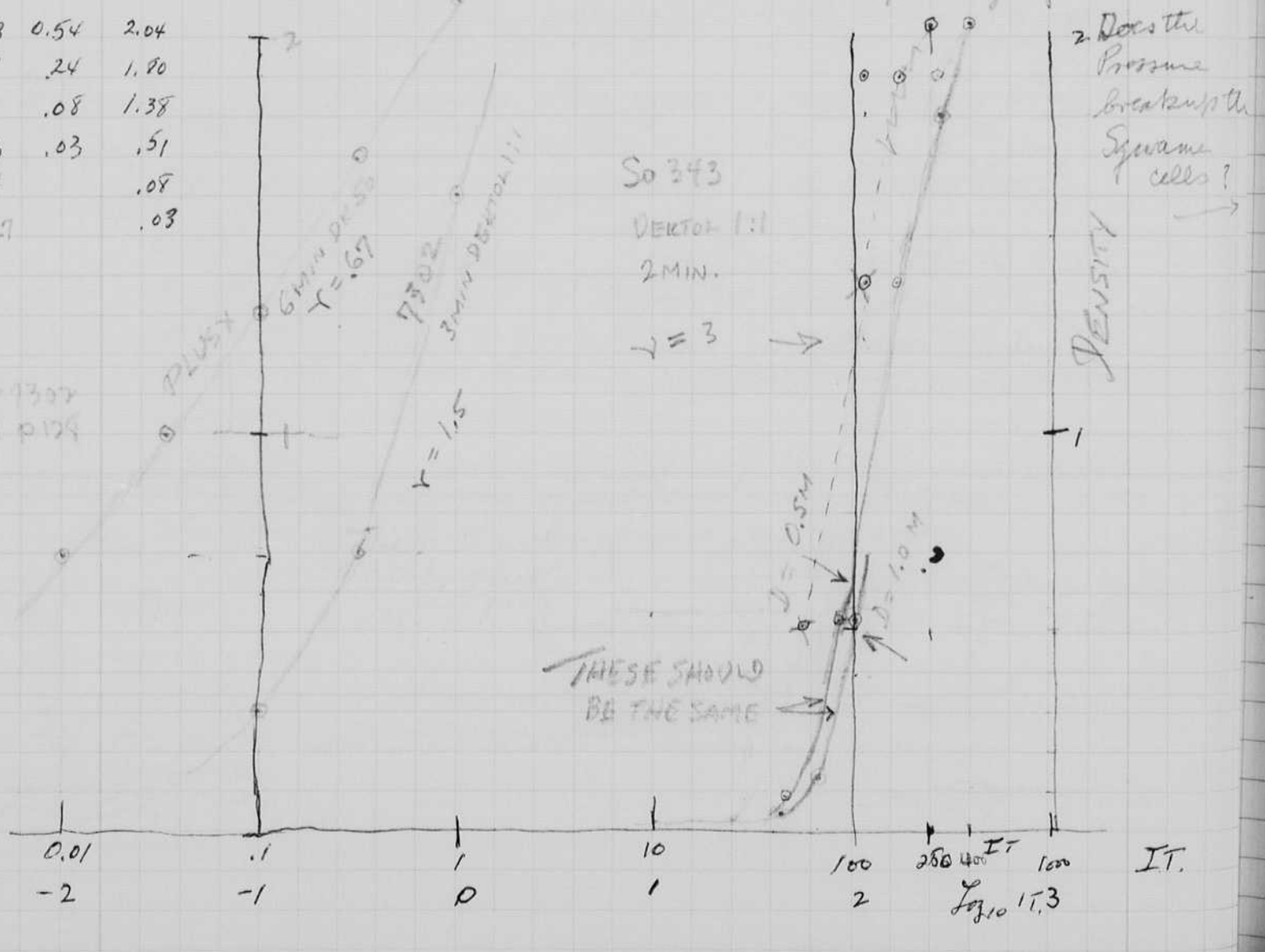
#1 Distance = 0.5 meters, $100/0.5^2$ = 400 lumens cords/sq meter.

#2 " = 1.0 meters $100/1^2$ = 100 lumens cords/sq meters.

Picture made of saliva in 1 oz on So-343 film 2 min Dektol 1:1
The water did not cover the entire sample, a drop
was shown in one corner.

Jan 8, 1978. A second picture was made of the water saliva
mixture. A 5×5 cm slide cover made of glass →
was put on top of the liquid. This showed
how the layer of water to be thinner and
the resolution to become better. See example! → Glass top changes picture?! →

D	1M	.5M
.03	0.54	2.04
.18	.24	1.80
.37	.08	1.38
.63	.03	.51
0.94		.08
1.27		.03

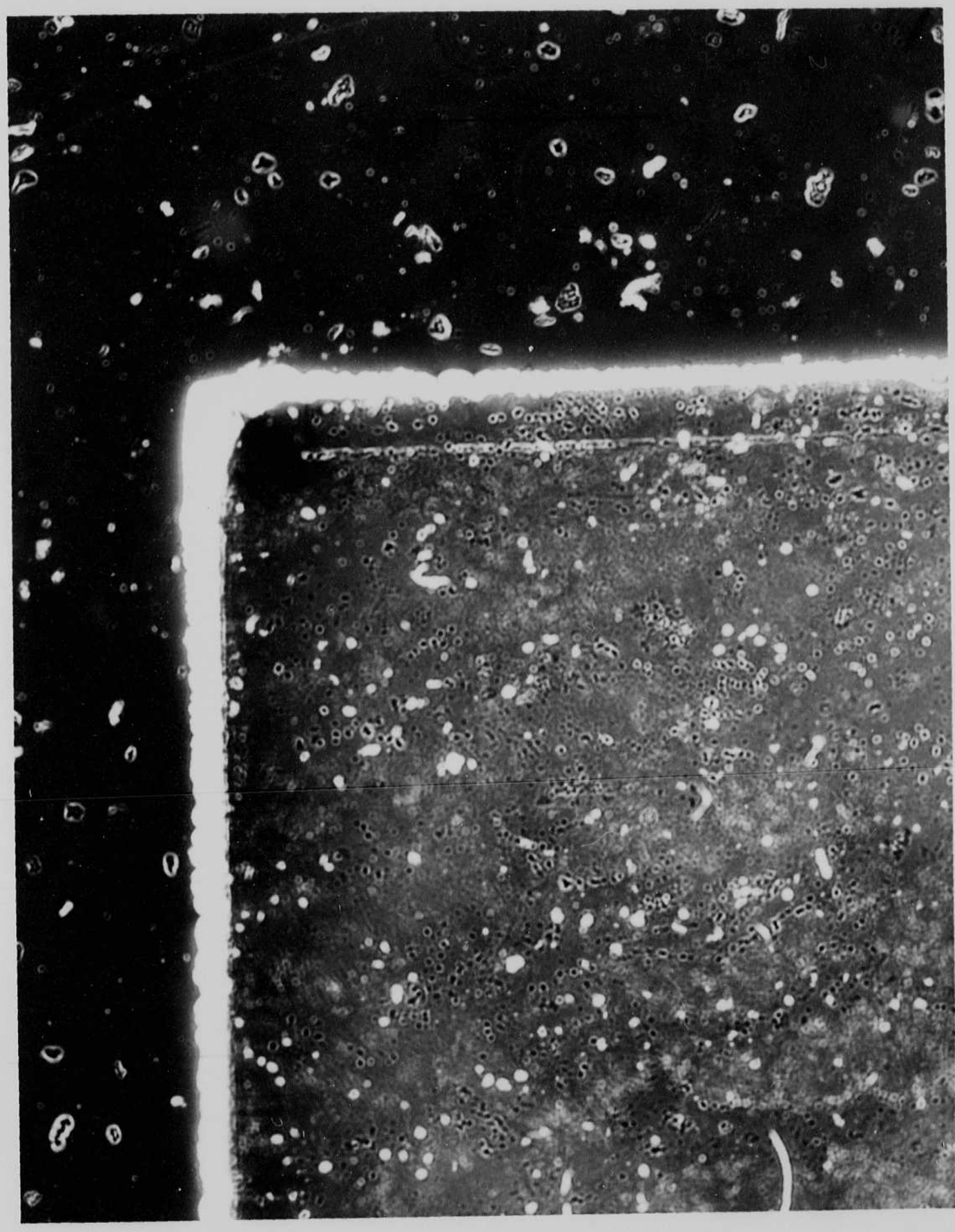


Enlarged 40X

Emulsion with Legend ↓ SQUAME ↓ cells

$\frac{5\,mm}{40} = 0.13\,mm = 130\,\mu$

$\frac{1.5}{40} = 0.04\,mm = 40\,\mu$



↑ —→ glass cover.

Jan 1 1978 H&D of So 343 film

Lamp ~~Herbert~~ Honeywell portable on (M1) with 0.8 cm disc in front of reflector (on reflector). 100 BCPS measured see p 148,

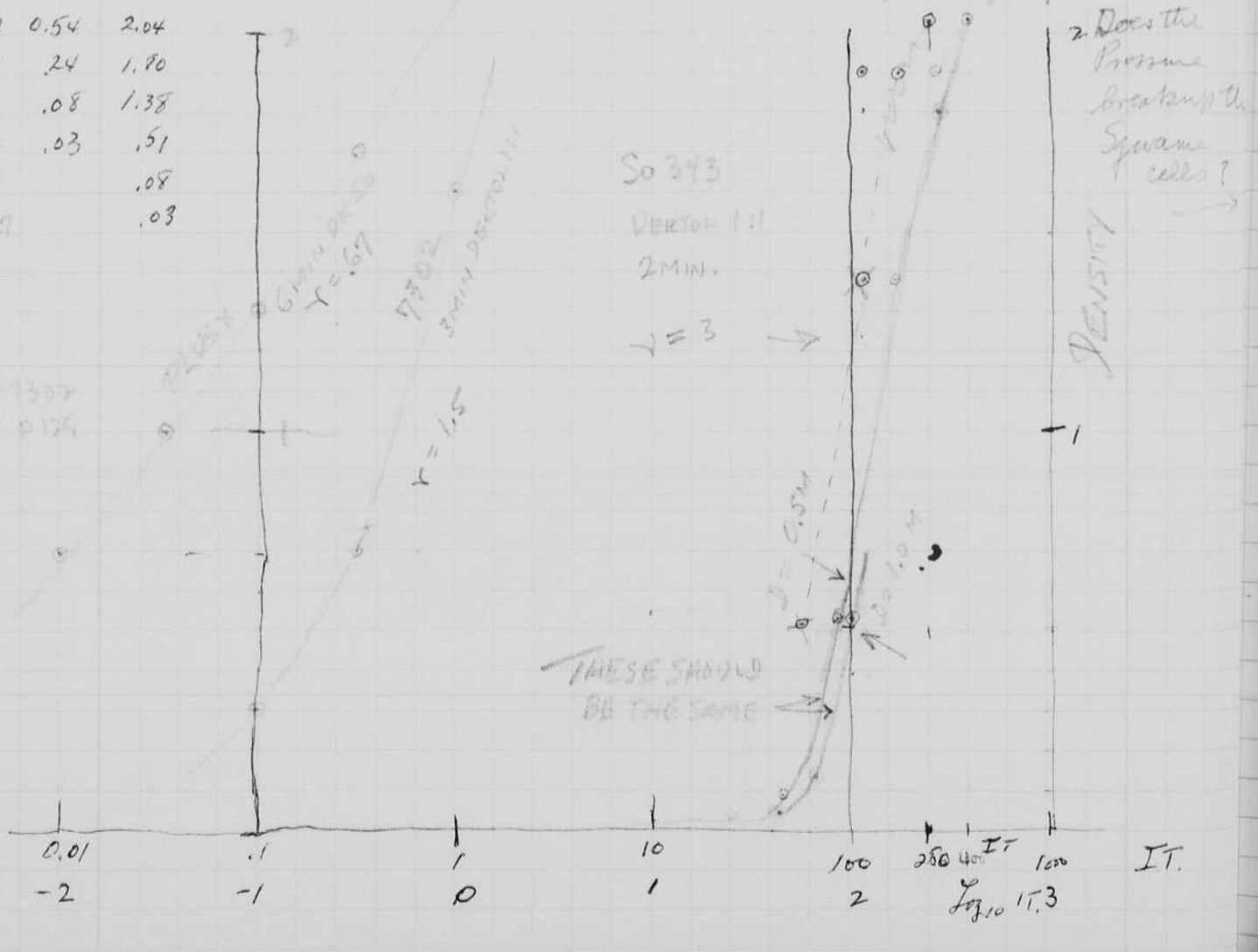
#1 Distance = 0.5 meters, $100/0.5^2$ = 400 lumens cords/sq meter.

#2 " = 1.0 meters $100/1^2$ = 100 lumens cords/sq meters.

Picture made of saliva in 1 oz on 30-343 film 2 min Dektol 1:1
The water did not cover the entire sample. a drop was shown in one corner.

Jan 8, 1978. A second picture was made of the water saliva mixture. A 5x5 cm slide cover made of glass was put on top of the liquid. This showed from the layer of water to be thinner and the resolution to become better. ⇒

D	1M	.5M
.03	0.54	2.04
.18	.24	1.80
.37	.08	1.38
.63	.03	.51
0.94		.08
1.29		.03

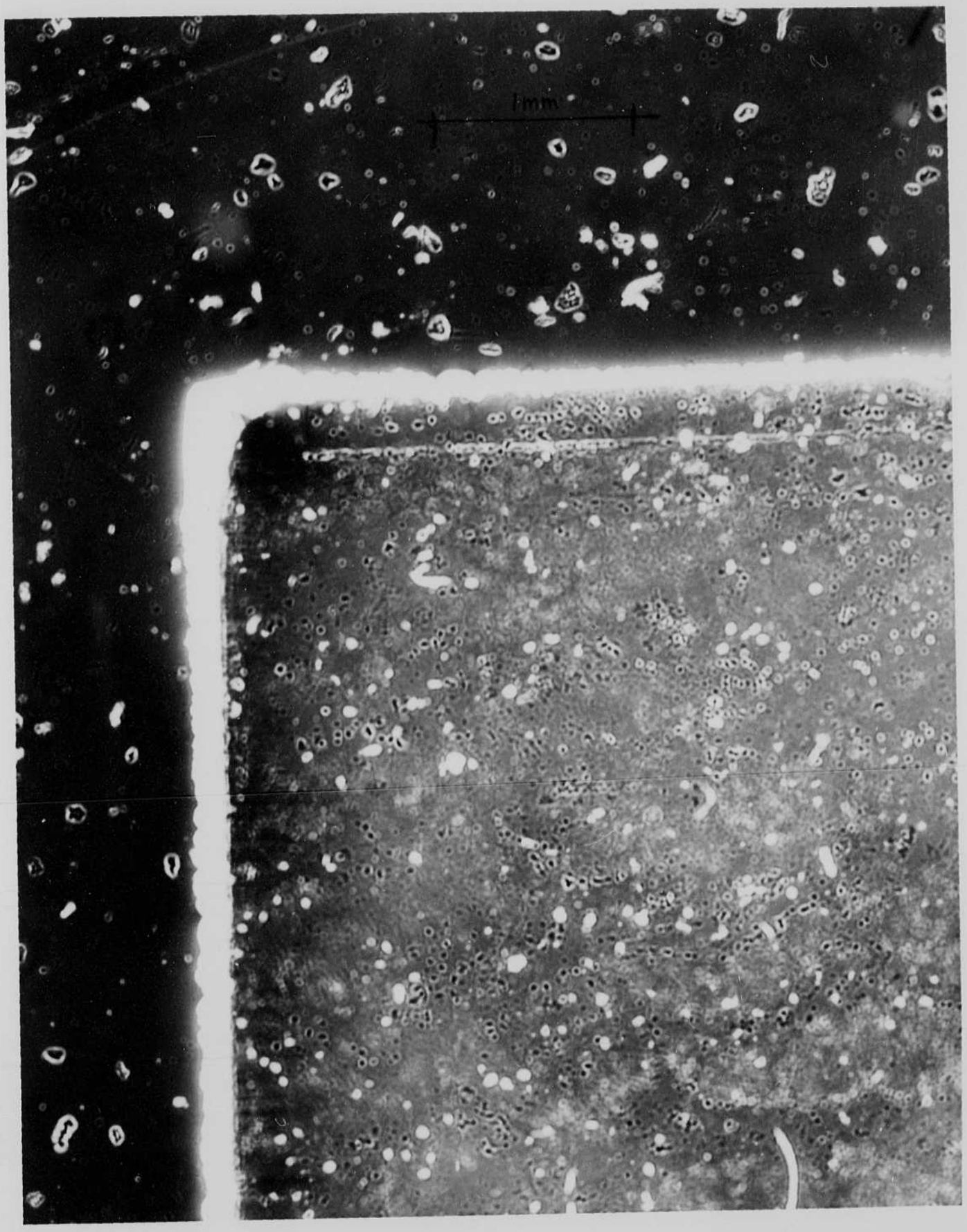


Enlarged 40x

Emulsion with Liquid ↓ SQUAME cells ↓

$\frac{5mm}{40} = 0,13mm = 130\mu$

$\frac{1.5}{40} = 0.04mm = 40\mu$



↑ ——→ glass cover.

Notebook # 32

Filming and Separation Record

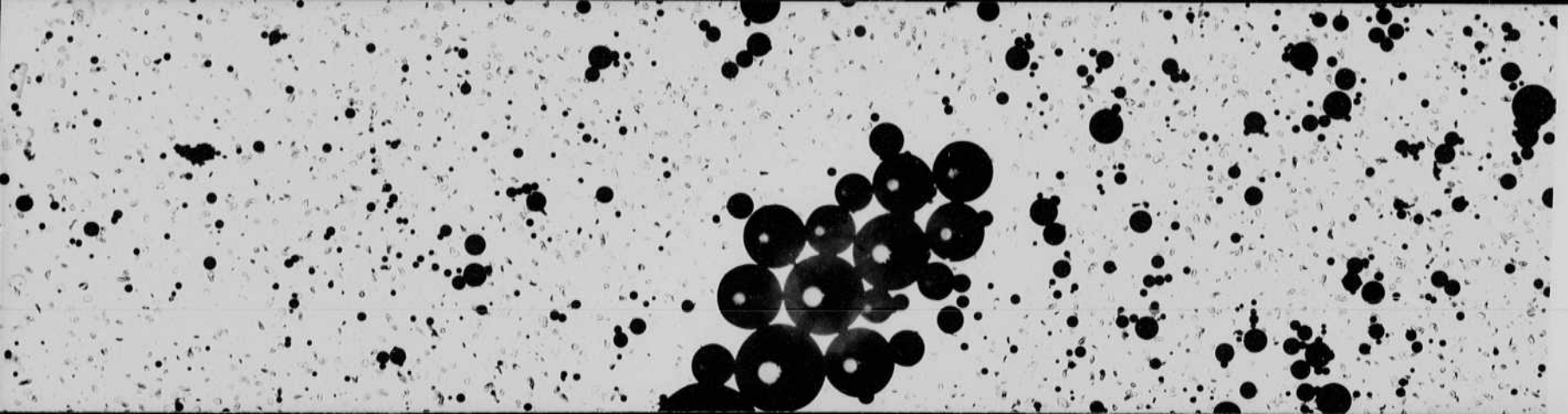
1 unmounted photograph(s)

1 negative strip(s)

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

was/were filmed where originally located between page 148 and 149.

Item(s) now housed in accompanying folder.



Notebook # 32

Filming and Separation Record

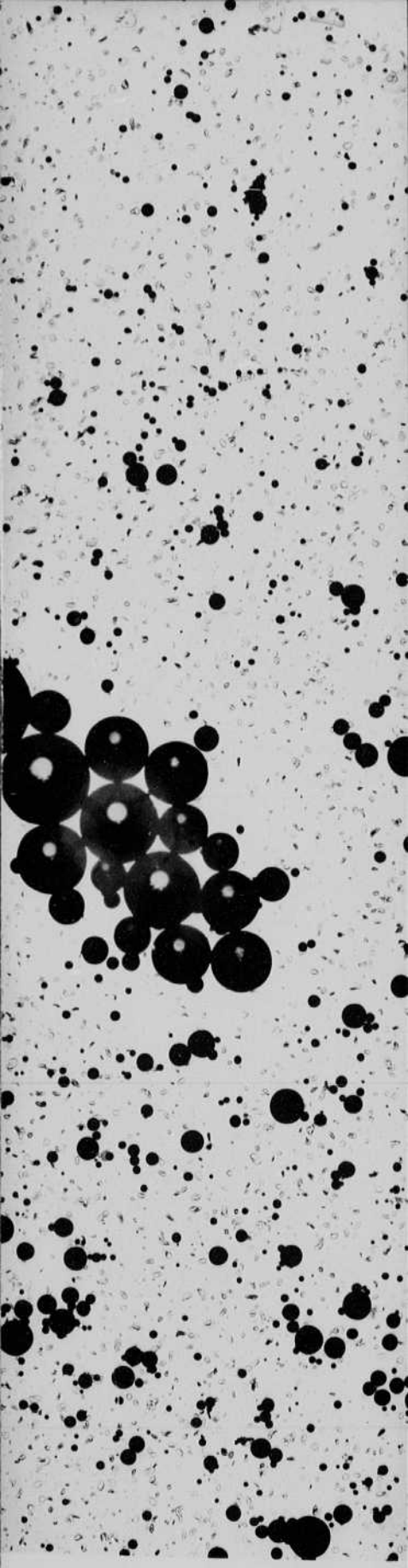
1 unmounted photograph(s)

1 negative strip(s)

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

was/were filmed where originally located between page 148 and 149.

Item(s) now housed in accompanying folder.



15X

Squamish
Calls

1977

0.31 0.63

Jan 9, 1978.

Harold Edgerton

I started a series of lectures today for this week of IAP (Independant Study Period). Our room 4-402 was packed for the slides and movies of high speed action with strobe light. Then Ron Buchino showed some of them how to photograph bullets.

Judy brought in some of Doc's experiments and we started a set up for elapsed time photography. After some discussion we finally selected a G.E. strobotron as a light source. It now has been coupled to our 16 mm elapsed time camera. There are 3 minute intervals. Our max on this equipment is about 1 minute for 50 ft of film.

40 exp per ft × 50 = 2000 exposures.

$1 \times \frac{2000}{60} = 33.3$ hours of time for 50 ft of film.

$\frac{4000}{24} = 166$ seconds of showing

= 2.4 minutes of projection. for 33.3 hours

Slow down ratio $\frac{2000 \text{ sec}}{166 \text{ sec}} = \frac{12 \times 60}{1} = 720$ speed up.

1" = 2.54 cm = 25 mm

½ = 12.5

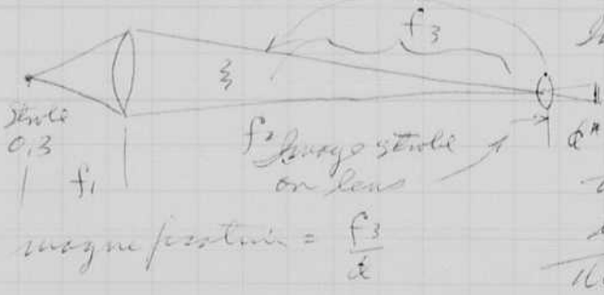
166) 2000 (12
166
340
332

Try a strobotron output = 0.3 B.C.P.S.

Kodachrome 25 requires what IT for density of 0.5?

$IT = \frac{0.3}{d^2} = \frac{0.3}{.015^2} = 1333$ lumen sec/square meter.

f of lens = 15 mm

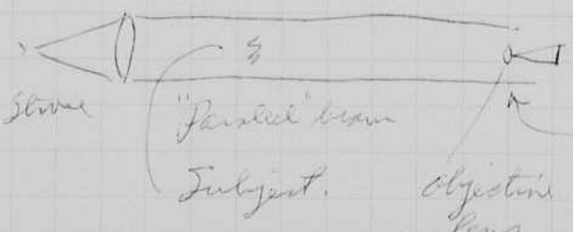


magnification = $\frac{f_3}{d}$

See Treatment in Electronic Flash-Strobe. Mc Graw Hill. page

If a parallel application the image of the lamp will be larger than the lens, then the above equation does not hold since only part of the light is effective.

The above calculation shows that the condenser system is a very powerful one for back illumination.



Another system, less efficient make a parallel beam. Now the aperture of the lens controls the light on the film in contrast to the previous scheme on this page.

Jan 21 1978 MIT 4-405 Sat.

Harold Edgerton.

I was to be in Ft Lauderdale yesterday to work with David Zink at ~~Bimini~~ Bimini with the side scan and penetrator. a snow storm started the night before and completely stopped the air port. my gear, 487 lbs, is at Eastern Airlines waiting for flight 881 to Ft Lauderdale at 10.15. I may get out on the 22nd or Sunday if the air port is cleared.

I talked to Tom Butler of the West Palm Beach Science museum yesterday through Jay Collins of the MIT Club down there. It seems that a meteor hit the water 200 yards off shore. There is some interest in finding it with the sonar or a mag. Mac Allister is in on this too. ~~Ed~~

ZINK 305 525-8284
marina motel (?)

Jan 31. 1978 I went to Bimini on Jan 22 with David Zink on the MAKO 60 IV a 42' Hatteras cruiser. We took side scan and penetration records of the west side of the main island. The penetration records were very poor. I used a 12KC Double mass in the bord reflection and a 6KC Double mass.

On Jan 30. I took a series of photos of the sun set and of building 7. Sun set was at 4.35 pm E.T. and one day before exact alignment Jan 31. today. I hope to try again if there are no clouds. There were two clouds yesterday.

5 min intervals

4:45

Plus X film f 25 1/1000 sec. Density filter D = 1.92. this was removed for the last photo when the sun was below the horizon and in the clouds.

Sun photos Jan 30 1978 notes made during photography

FILTER

Plus X

D2 4.25

D2 4:30 pm sun on lens? Edge. 6 min.
DK50 fresh
72°

D2 4:35 " " ok

D2 4:40 " " "

D0 4:45 " Sun behind cloud. on Horizon or below

Jan 31 1978 Sun photos. Plus X film
f 25
D = 2. full br.

3.45 South of window?
50
55
4.00
05
10 "
15 "
20 "
25 ~~Lost in way? Half~~
30 ~~ok~~ 1/2 photo of sun
35 ok
40 ok
45 ok
50 Last photo. dim and half sun
55

7 min DK 50

Sky clear.

Audrey Henshall Chambered tombs of Scotland
Mit Press 1965.

Lamps FX-24 Russo 6926 6829 1-356-5929. Ipswitch. Bird photos. Oct 20'71
Austin Juggler 492-2321. at M.I.T.

Notebook # 32

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 152 and end.

Item(s) now housed in accompanying folder.

Density 2 claim. Daniel Lee.
Plus 4.20

✓ .25	26 .	No sum on lens
✓ .30	30.5	No sum on lens?
✓ .35	. .	0
✓ .40	. .	0
✓ .45	. .	Clear.
50	.	
55	.	

Jan. 30. 1978.

Dennis Jr. chem. Daniel Lee.
killer.

Plus x 4/.20

✓.25 26. No summons

✓.30 30.5 No summons?

L .35 . . 0

+ .40 . . 0

✓.45 . . Clear.

50 .

55 .

Jan. 30, 1978.

CONTINUED
ON
NEXT REEL