

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 / 11<sup>3</sup>/<sub>4</sub> x 9<sup>3</sup>/<sub>8</sub> INCHES**

32.

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

Course.....

Used from AUG 18 1975, to JAN 31 1978.

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

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

Aug 29, 1975 } 4:20pm EYE PATTERNS 5 MIN DURATION  
 Jan 14, 76 (D) 4 pm strong " 20 "  
 June ? ? In England.  
 Aug 6 1976 9am . (O)  
 Aug 7 1976 12 noon (D)  
 Aug 7 76 night in DREAM?  
 Aug 9 76 RI 10am Small bird wild.  
 Aug 27 76 10 am strong (E) strong.  
 Oct 25 76 7:15 am comb. (D) strong.  
 Nov 15 76 4:30 am " (D) strong.  
 Nov 29 76 6 pm " (D) "  
 DEC 76 12 noon Breakfast (D) "  
 Jan 12, 77 4 pm. — (D) strong.  
 Jan. 29 77 4:30 am (D) strong.  
 " 11 am "  
 " 12:15 "  
 May 25 Isreal. noon at sea. (D) strong  
 Sept 1 100 men 8:03 am (D) med.  
 Sept. RT LEG - 1 BLOCK - pain. - artery in knee blocked  
 Dec. 27, 1977 9:50 (D) gone  
 10:07 (C) 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, 1975  
 H.E.

222 285 286 322 332 638

08927-04937 inc

Early E.G.H. records are stored  
 at Dexter Inc  
 49 Clinton Walk in Mass  
 (at Anderson) 321.5900  
 Dr. 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 Kod 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 outflow.

Tom Gilbert 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 scraped 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 + .003700 Meg. before the goal is to get a 2 minute <sup>interval</sup> interval.

Camera. Flight Research Ser. No 929 model III B. Stroke - 500 volt. 1800 B.C.P.S. Regulated.

50 ft film x 40 frames/ft. = 2000 pictures.  
~~60/2000~~ at 2 min = 4000 minutes  
 60/4000 = 66 hours -  

$$\begin{array}{r} 2 \overline{) 66} \\ \underline{48} \\ 18 \end{array} = 2 \text{ days } + 18 \text{ hours.}$$

Adjustment of timing  
8:10:40

12.45 adj

12.55 slow  
speed

14.55

17.43

19.25 adj

21.17 adj

8:23:02 adj

8:24:25

8:25:50.5

8:27:20

8:28:55

8:29:40

adj. S. 8:30:25

Close 8:31:30

We plan to put the camera at the same spot at 9:30 daylight time today which should be slack for that area. Al. Barber and Geo. will be the divers working off S. Coli (Aquarium's boat).

The D.C. battery in the camera drops to 20 volts when the record 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. Some 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

2 Aug 21 1975

David Dwyer.

from Calif.

William Bascome called. He is bidding on a study of the sewage outflow. I referred him to Bob Ward R.G. & G. He wants side scaned penetration.

Aug 25 1975 The slipred line 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.

On Sat. 23 I went to Westport with a transit and set it up on Barber's beach near Ahab's stand. The telescope is great. I could see the Vinyard light tower very clearly.

Esther and Ellen Dixon went on this trip.

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

Behr to spindle 194° magnetic ) check chart for position.  
" " Island 133° 45' Dunbar )  
" " Water tower 278° 30' )

John Briggs came around Helios in Westport 1648 Staked at Anderson?

We plan to make a lot of sonar measurements off Westport 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 John Doler, last night about 5 pm.

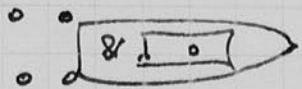
3 pm. Project for Westport again postponed for Tuesday. Will try for Wednesday.

Project for Sonar penetration.

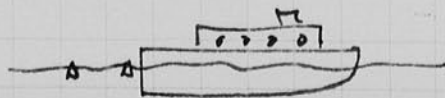
Use 4 massa transducers spaced on both sides of the survey skiffs.

Wave length of 5 kh. = 0.84 ft.

Diam = 6 ft



$$\frac{\text{Diam}}{\lambda} = \frac{6}{.84} \approx 8.$$



angle should be about 10°

Aug. 26, 1975.

3

Westport trip cancelled again.

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

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 unhappy about their arrangement of 4 transducers.

Aug. 29, 1975. I went to Westport on the 27 at 5am when John Dolan called.

A transit station was put at Baker's beads 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 Griggs (18) manned the transit. Palmer operated a 22 ft fiberglass boat with Claude LeDoux and me with the 259 Ed & Sid Scan.

On the 28 we got up early and made other runs. Tom Foley operated the 22 ft Boat with me. John Griggs and Fij 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. I 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 Technicon came in this morning. Chris Miller and I spent a lot of time with him testing the 700 series memory scope. It is my hope that his instrument will be useful for studying flash lamps.

Aug 30 1975 9:30 pm.

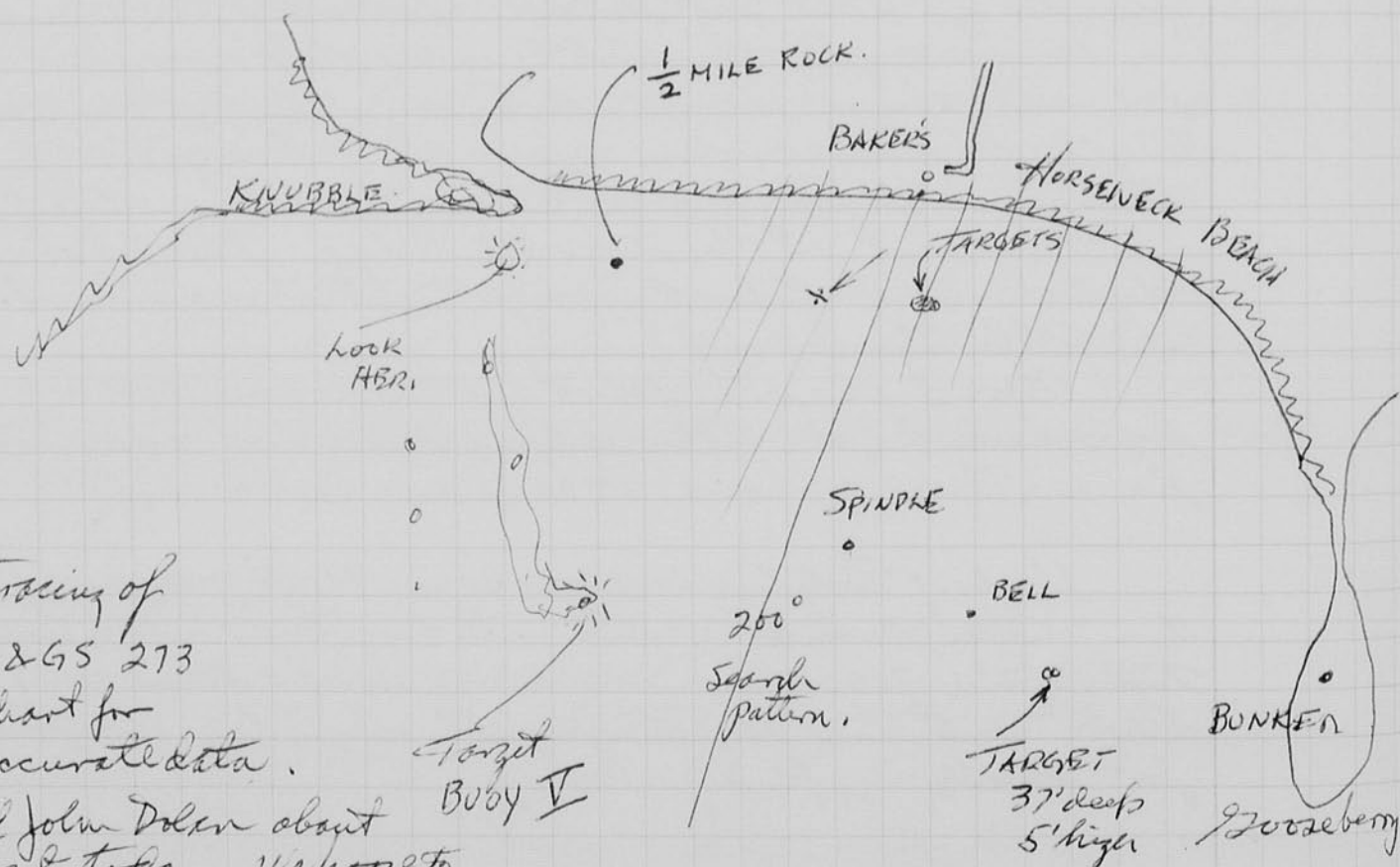
I spent the morning studying the sonar records of the 27, 28 Aug. then I made a map of the westport area off Horseneck beach with the several targets on it.

There are two areas that should be investigated. One is a target on the south east of the bell "WHI." 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 slight  $\frac{1}{2}$  away from the rest.

I did try a magnet on it at 37-40 feet deep. I did not feel a pull. maybe I missed the target. maybe it was covered with growth.

A second area just west of  $\frac{1}{2}$  mile rock seemed to show a target. I must get the sonar closer to a 16ft 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.

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

EASTMAN  
MONOCHROME FILM  
50410

410

M17

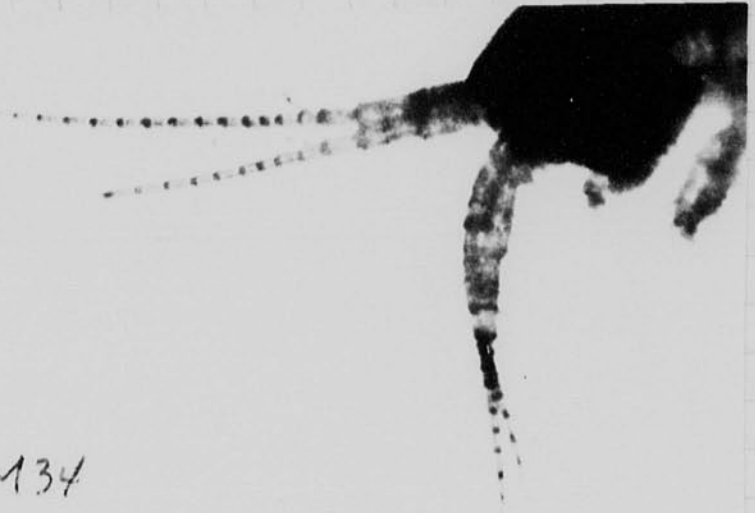


from the Charles River  
Squilla parvillina:

Silhouette photograph  
with 0.15 c.p.s. in 1.6 mm hole.  
 $10^{-6}$  sec exposure. 2 meters away  
Mag 17x with 25mm lens f5.6

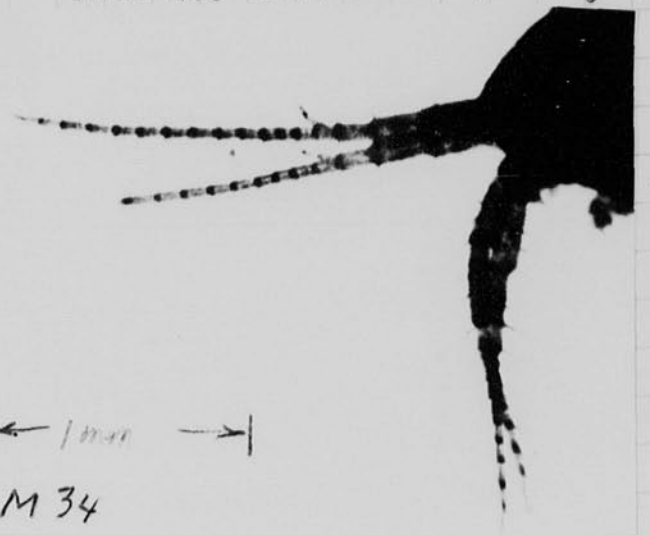
M = 34  
Unitron 5X microscope objective

M34



← 1mm →

M34



M = 34  
25mm lens  
Macro Zeiss

M = 68  
Unitron x10

M68

← 1mm →



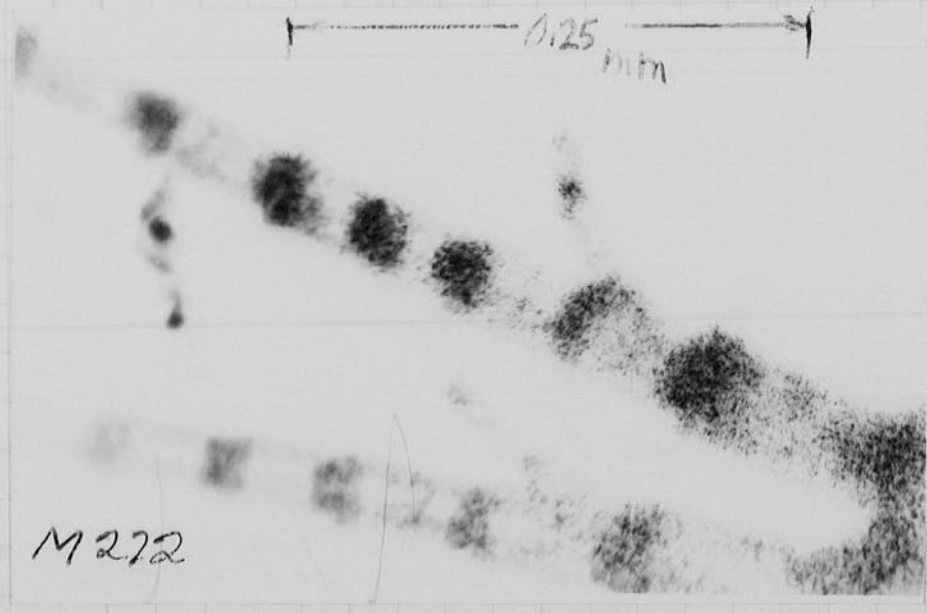
M = 272  
Unitron x40.

all from the same  
negative.

note grain in  
this print

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

M272



Eastman 410 full grain film.



6 Sept. 1, 1975.

Harold Edgerton

Jump on Prudential out. The capacitor 25 mfd 4000 v Sproague 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 man 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 soncoupe for exploration. A Tex a & m graduate (master) from Iowa, Parviz Boba, is to come to Cambridge to learn how to service and operate the 259 sonar.

I will get information from Boba 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 Holid. Lepanto, etc.

---

More experiments were made with a glass lat lantern slides which hold a very slow emulsion on them today.

1. Photo of ~~the~~ torn paper edge and fractured glass 2 meters from C.3 CP2 this was thin
2. Photo of water flea (Char River) in water drop. 1.6 meters.
3. Photo of water flea in water drop 1.3 meters. all above were thin. try fresh new developer next time.

J. Cousteau

Side looking Sonar info and bed price

at PARK LANE Hotel

Central Park South

New York City

Tel = 371-4000 -

Please, before Sept. 7 -

Equip. in Greece for October 20<sup>th</sup> -



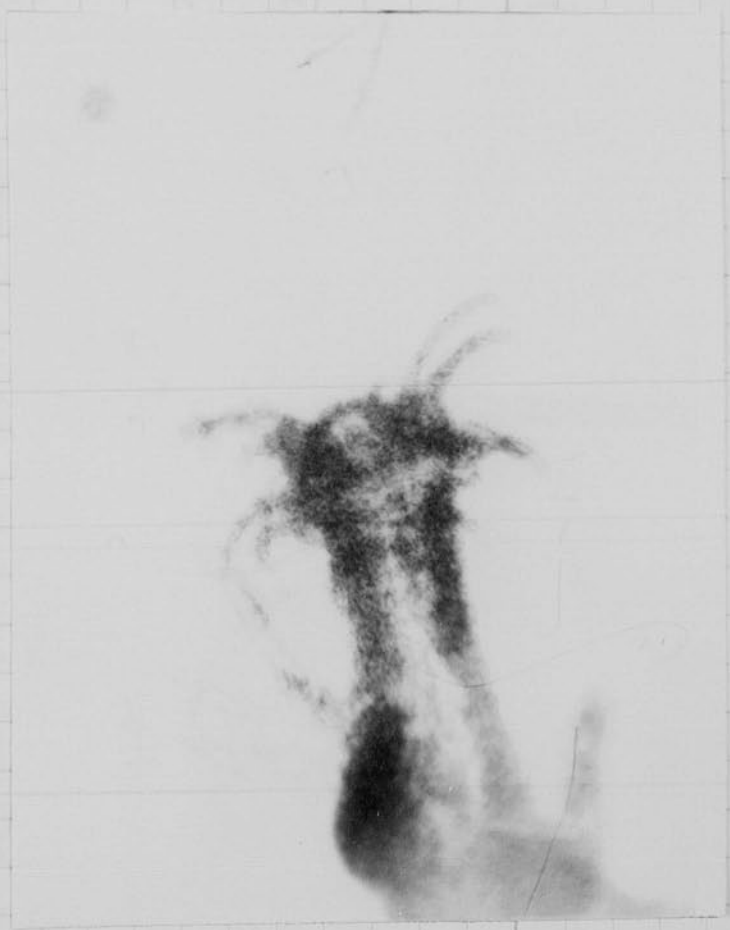
X 17 50mm



X 34 X5 MICROSCOPE  
OR 25mm. Zeiss



X 68 X 10  
microscope  
objective



X 272 X 40  
microscope  
objective

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

Sept 21 1975

David Egerton

Navigation methods to consider for  
Dover surveys.

It is important to keep the data current. Every effort should be made to produce a plot of the ship's 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 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 ~~to~~ 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, Hifit, Deca del Norte, Honeywell, Cubic, etc are all great but: 1. Require land based stations (or buoys) with power.

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 slope is a very effective method of holding a survey slip on a line with great accuracy. Cans or cans given with signals or radio to the helmsman guard the slip.

Vertical sighting wires to buoys or land stations to the side help to know where the slip 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 cannot 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 all be organized for reexamination at a later time. After 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~~ shore positions.

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

- ② Vertical depth. The depth of water is often a very important bit of information and should be recorded. Most ships have recording fathometers.
- ③ 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 slip where a sheet with the slip position is continuously kept up to date on an overlay.

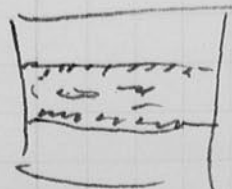
Shadow photos  
made on  
Glass Slides  
which are  
fine grain  
and blue  
Sensitive.

The grain is  
worse than  
7302 or  
50401.

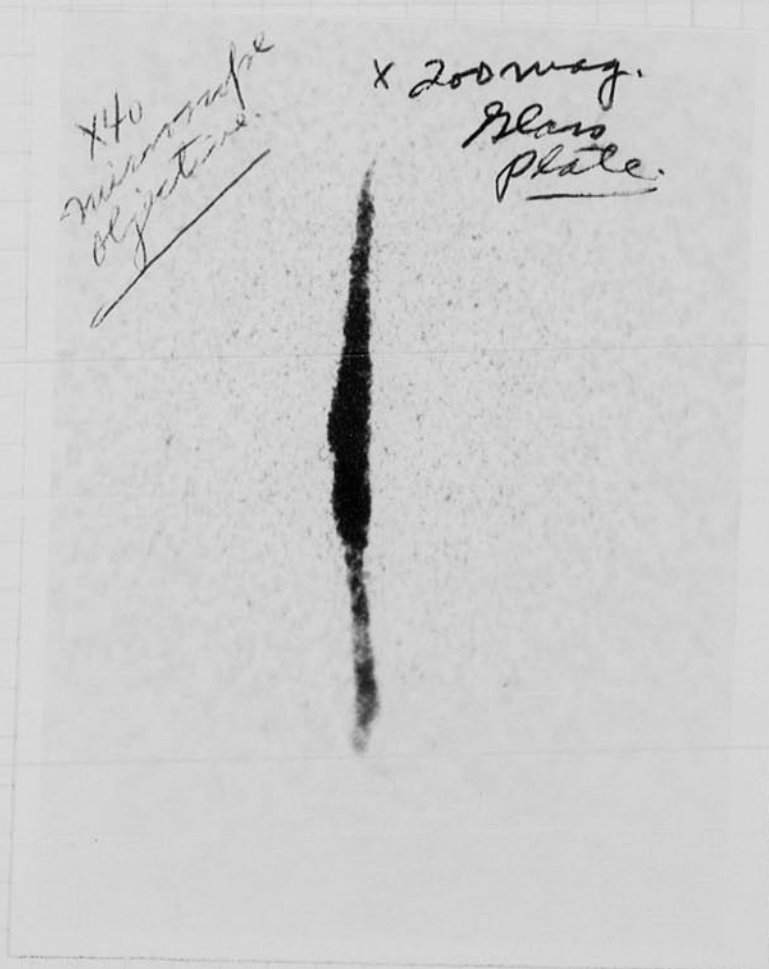
Sept. 5, 1975

I went to Chas.  
Wyckoff's lab. in  
New York 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 35mm  
slides from the 16mm  
frames.



Jean Murray  
was in  
Loch Ness  
last  
Summer.  
She saw  
the picts  
too on  
Sept 2.



Sept. 5, 1975

Harold Edgerton

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

We spotted a target found on Aug 28 at 1000' east and south. Divers were put out. Rods 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 Dogfish ledge and two mile ledge. Reports of oil have been given.

Sept 7 1975 Gilbert Grosvenor Nat. Geo. Socy. called on Sept 5 about the Rines photos which are mentioned on page 11 of Lock 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 meetings of the Bradford Society. There was a plan for image enhancement by the group at col tech. then if possible a very short story with a cover shot on the Nat. Geo. Socy. for Jan. Renewed activity with photography is contemplated.

I suggested an inertia switch on the camera or near the camera. This is because the camera is caused to swing about when the subject is near. Am 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 above the camera = ?

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

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 Brygton. Claude LeDoux and John Dolan & a crew member.

We spotted a target found on Aug 28 at 1000' East and south. Divers were put out. 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 Dogfish ledge and two mile ledge. Reports of oil have been given.

Sept 7 1975 Gilbert Grosvenor Nat. Geo. Socy. called on Sept 5 about the Rines photos which are mentioned on page 11 of Look News. 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 meetings of the Bradford Society. There was a plan for image enhancement by the group at cal tech. Then if possible a very short story with a cover shot on the Nat. Geo. Socy. for Jan. Renewed activity with photography is contemplated.

I suggested an inertia 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 above the camera = ?

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



Sept. 9, 1975

Harold Edgerton.

Doug Whitcomb is the new Teaching Asst. We went over the course today 6.163. We have two lectures a week plus a 2 hour lab.

Chris Miller is away, in ~~Yugo~~ Yugo 300' wire  
Slova for a few weeks, then he takes over for the rest of the term.

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.

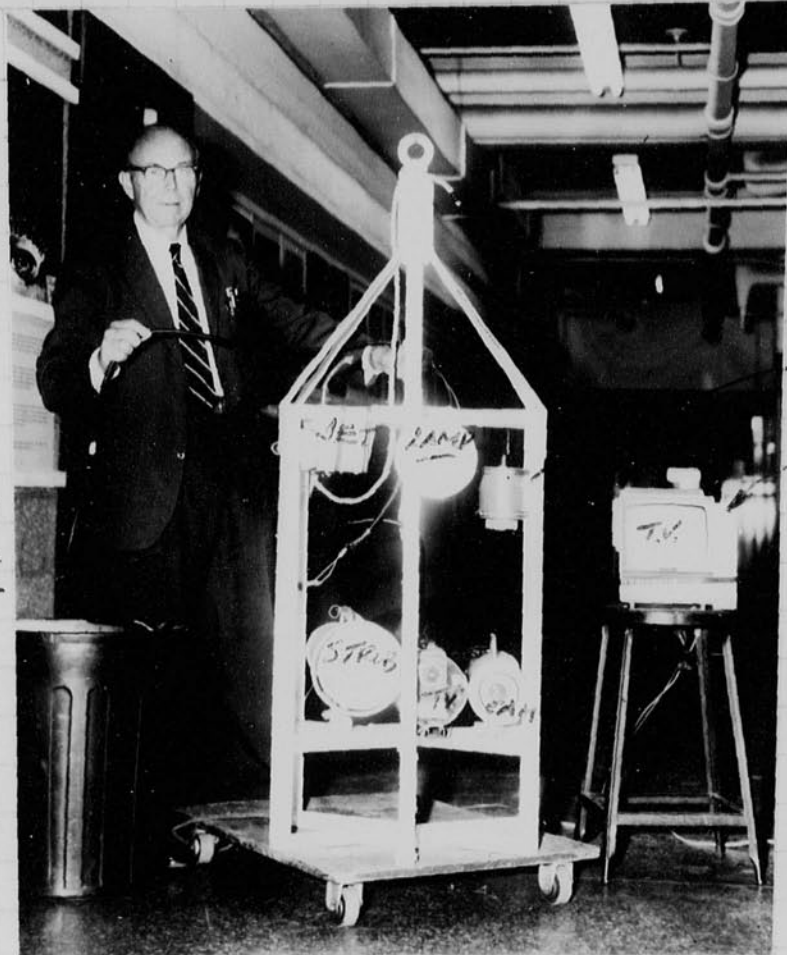
Bill MacRobert's helped to get our other T.V. into shape with a 100 ft cable for use at Westport.

Constance, 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 56, 86, 259 was sent to him on Sept 5 by Bill Reel.

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.

Paric Bablic arrived Sept 9 at 7:56 on flight 876 Delta from Miami. He is here to learn the 259 sonar for the Break Trip of the Calypso.



JET  
Control Box and T.V. to be on the ship.

Taken by Doug White  
Sept 9.

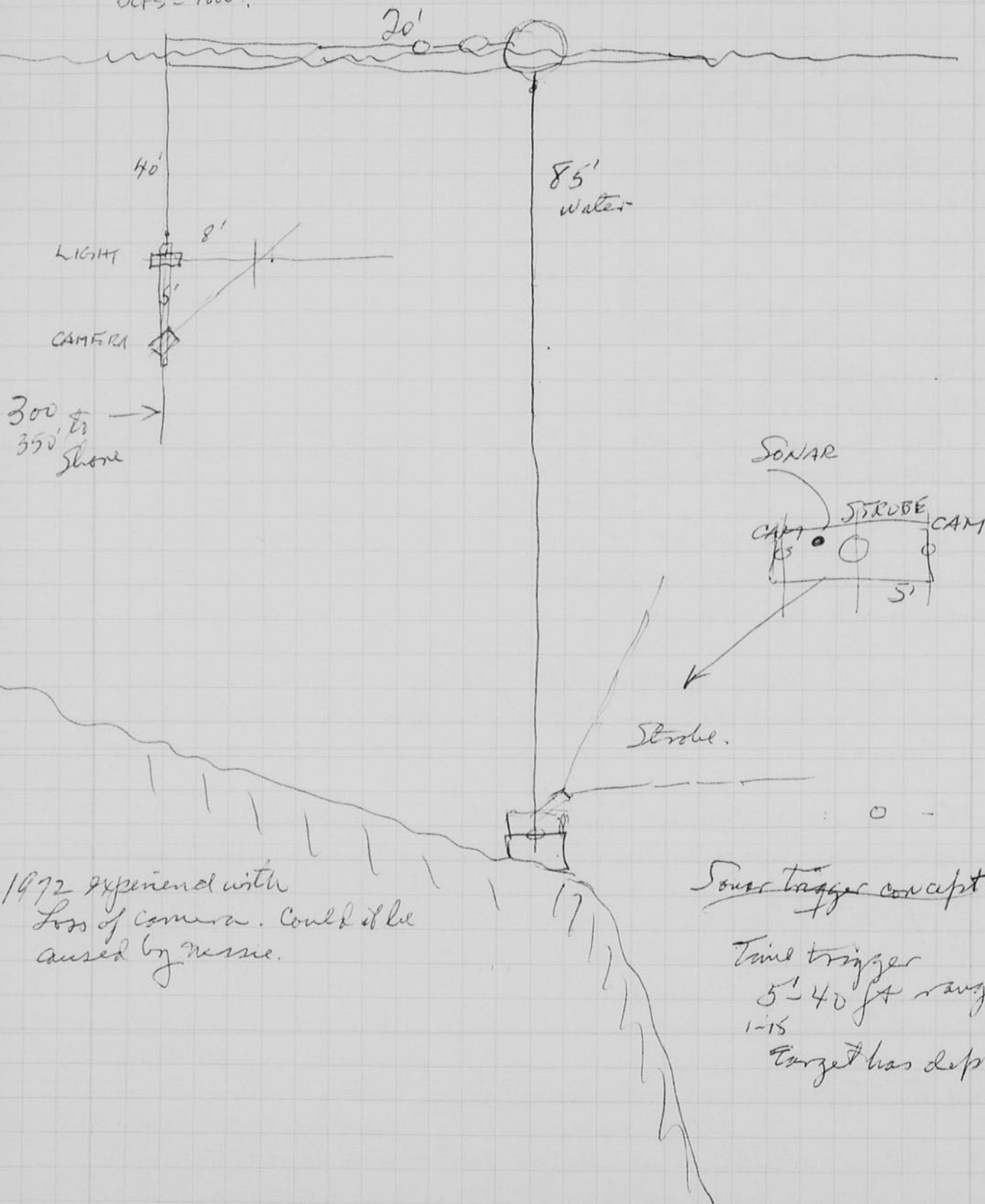
14 Sept 11 1975

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

Robt Rees  
Chas Wyckoff  
Lancel Edgerton

Parviz at dinner  
Carol  
Jean Murray  
Gather.

June  
Discussion of 7 photos made by Rees in 1975. These were out of  
2000 frames of 16mm High Speed Ektar film. 50 with sec DA = 8  
BCPS = 1000?



1972 experience with  
Loss of camera. Could it be  
caused by noise.

Sonar trigger concept.

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

Future Experiments.

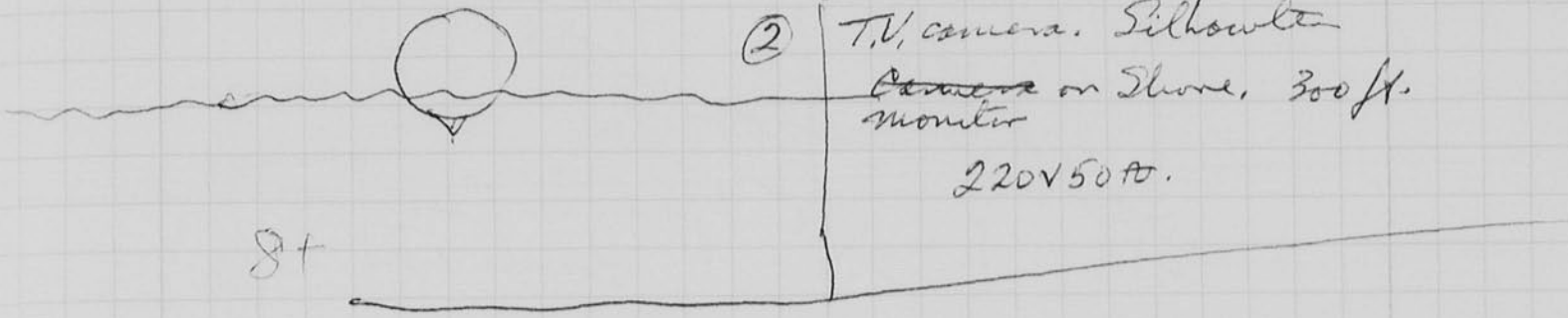
1. Daylight. Unfavorable angle (Wydsoff). Vertical camera  
Shadow.

Here needed.

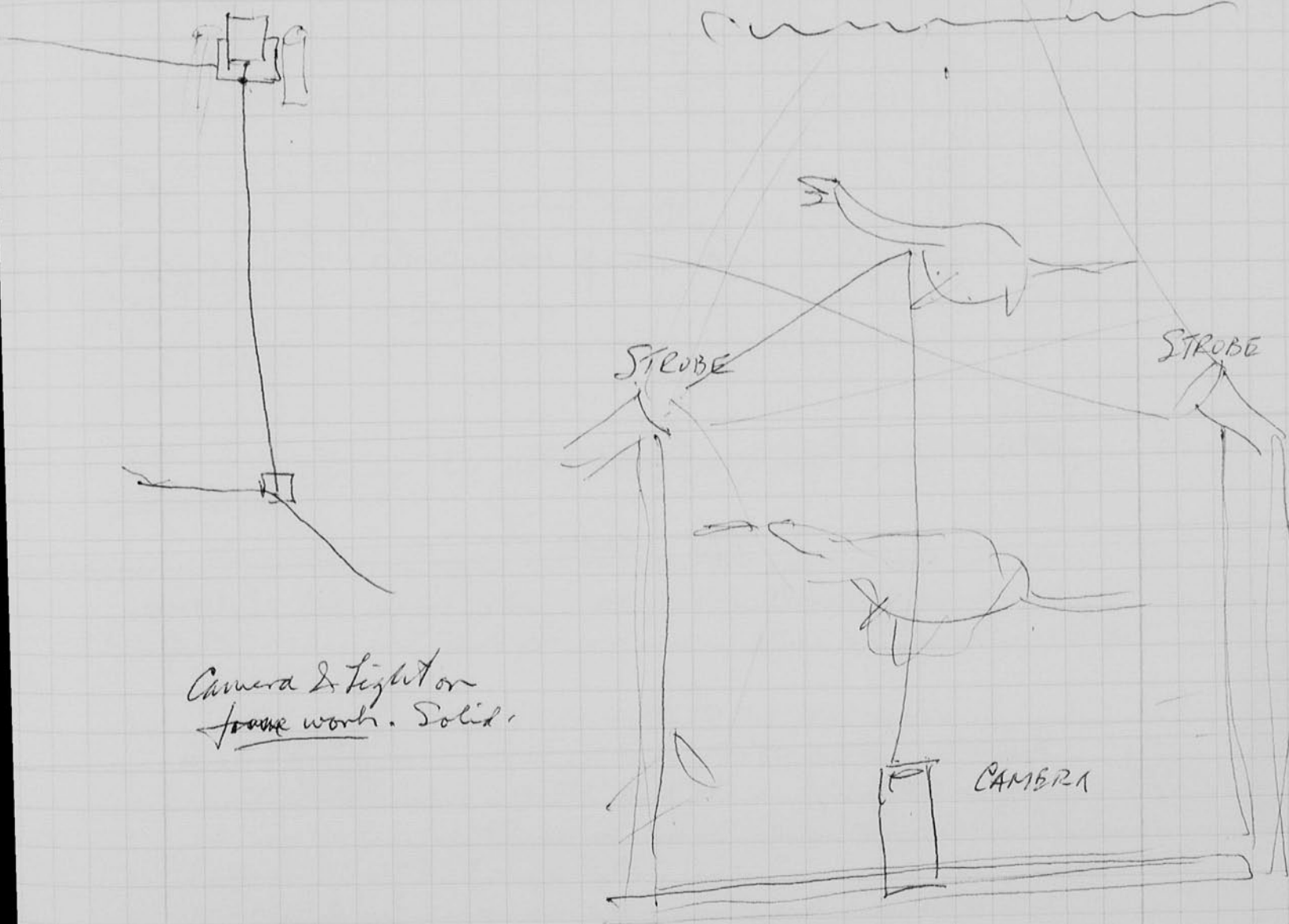
35 mm. (big format.)

16 oz movies.

2 per second 15 sec 30 photos.



② TV camera. Silhouette  
Camera on Shore, 300 ft.  
monitor  
220V 50 Hz.

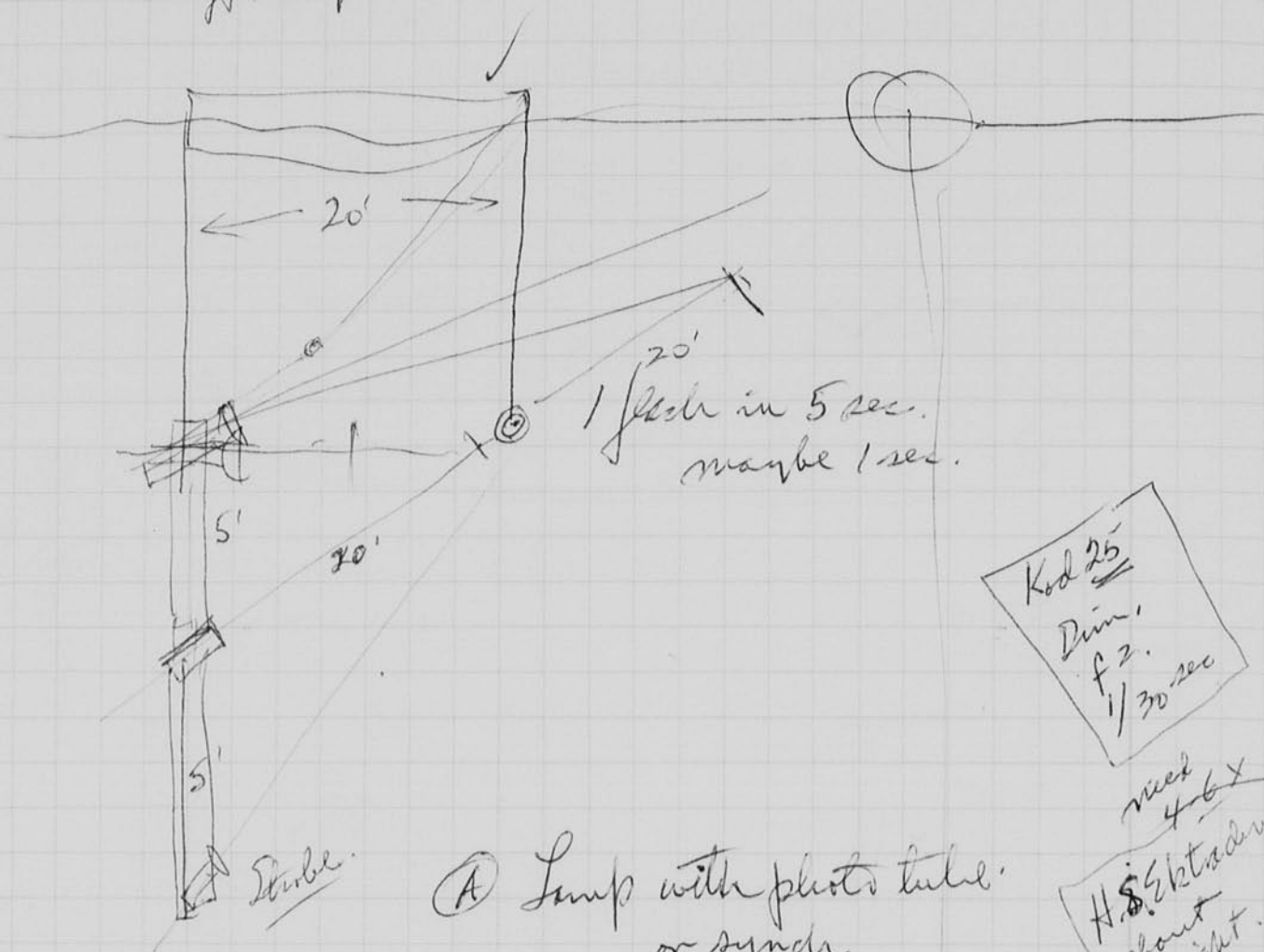


Camera & light on  
frame work. Solid.

Attractant to animal  
 Stroke  
 Continuous light.  
 on off lamp.

9-4

8 hours  
 $\frac{60}{480 \text{ minutes}} \times 60 = 29000 \text{ sec}$   
 2000 photos  
 Rate 14 sec. 8 hours



Kod 25  
 Dim.  
 f 2.  
 1/30 sec

need  
 4-6 X  
 H.S. Etadum  
 about  
 right.

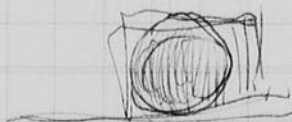
(A) Lamp with photo tube  
 or synchr.

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

(B) flash Tube.

Batteries.  
 Etadum H.S.

Runs  
 Oct. 12. 1954 → Oct 30.



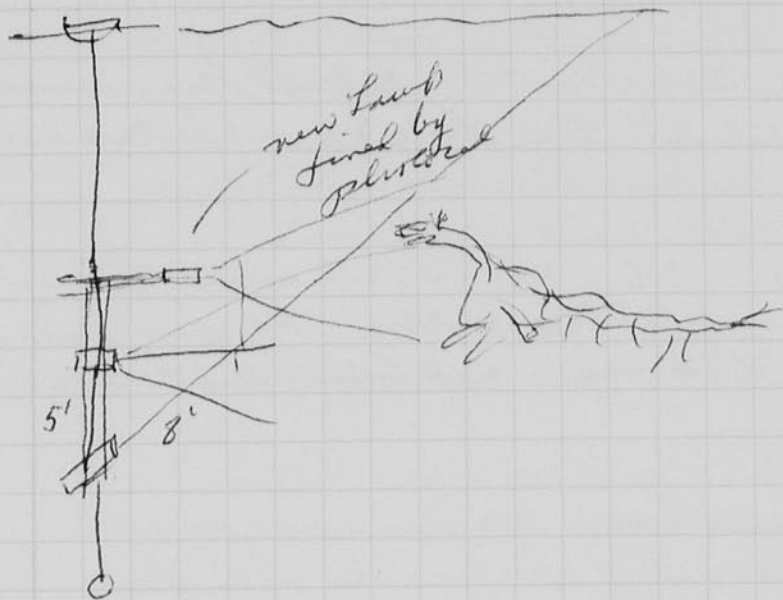
(C) Television. 300' to Building  
 Tape

Sept 16 1975 Tues.

17

David Dwyer

I called Wychroff suggesting a lamp above if the camera is aimed 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 call to Rines about Oct trip and N.G. news made yesterday. Mary Switzer (N.G.) called. Plan - He & Bob R. to come to Washington with enhanced photo 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. Rines reports that the enhanced photo shows the complete mesh and something below the head, according to J.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

Hank Edgerton

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

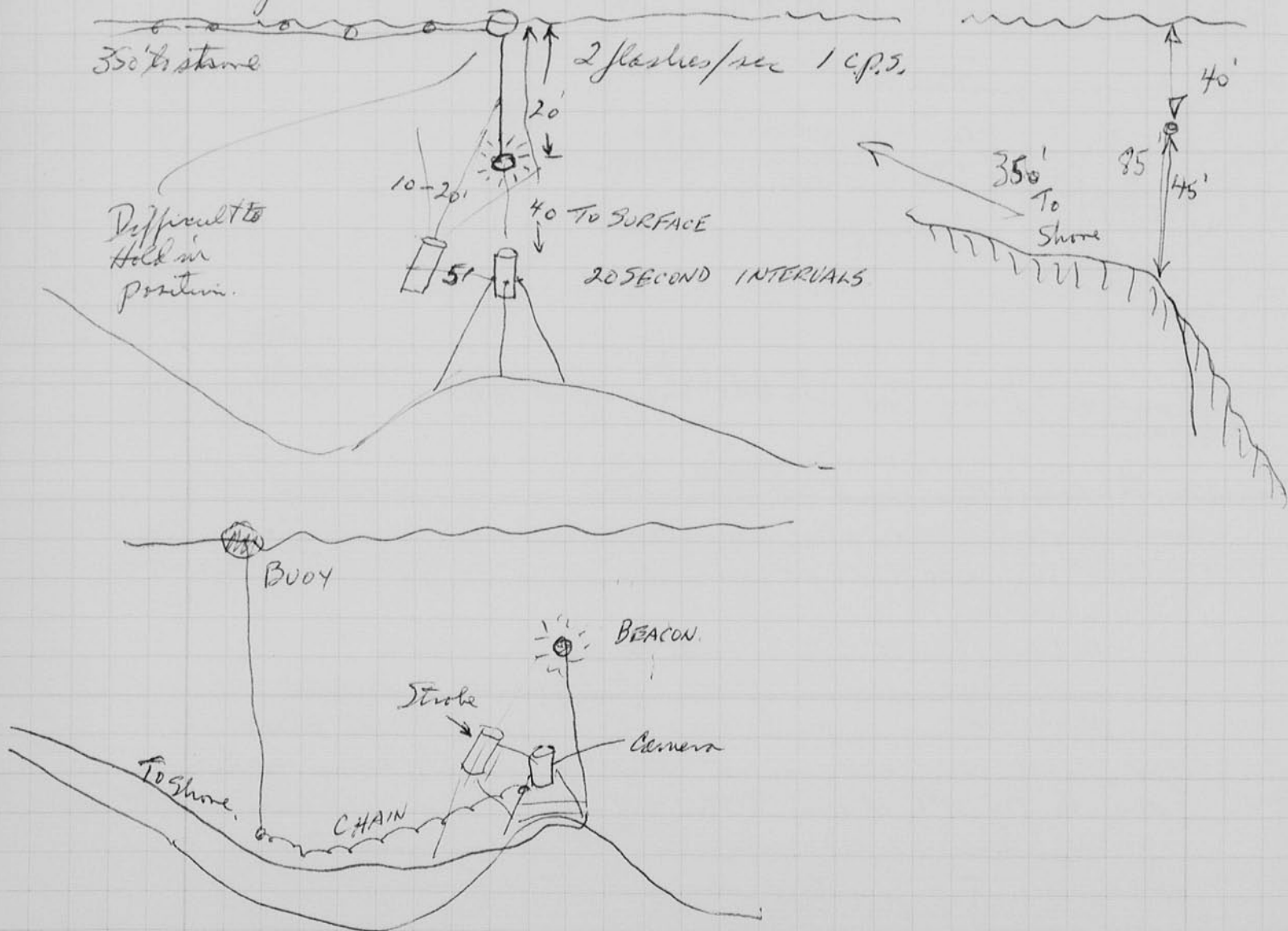
Lawrence Payne, Mary Sumner, Albert Grossman, Peter Purpura (Exhibits). The Loch Ness photos are to be discussed.

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 cps. for use as a lure.

System to consider.



Plan for 35mm camera setup for Look 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 personnel when there is action.

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

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

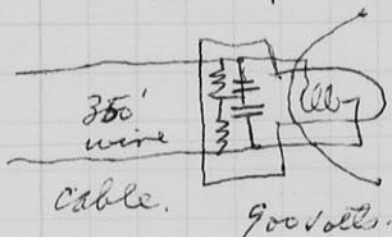
Operate at 2 pictures/second for 20 exposures, 50 watt sec.

~~Try~~ Try 2 lamps at 50 watt seconds  
 then power into lamp = 100 watts.  
 FX 109? 4 turn quartz spiral.

10 sec relay on

100 watts x 10 seconds = 1000 watt seconds.

2 - 250 m film in series.

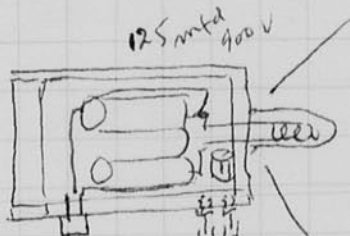
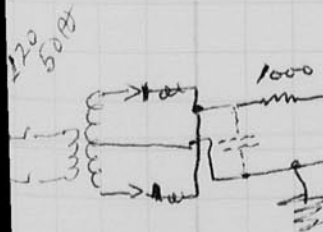


$$.81 \times 10^6 \times \frac{C}{2} = 50 \text{ watt sec}$$

$$C = \frac{100}{.81 \times 10^6} = 1.3 \times 10^{-4} = 1.30 \times 10^{-6} \text{ farads}$$

$$RC = 0.2 \text{ sec}$$

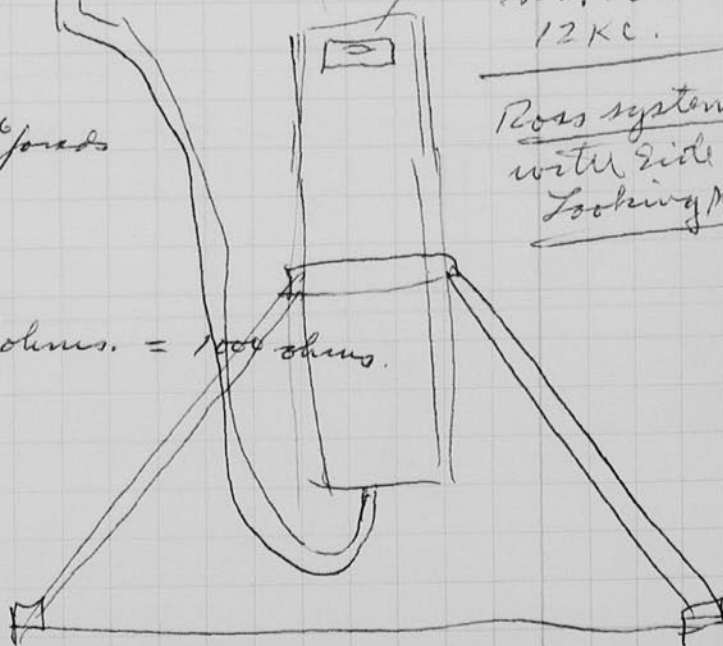
$$R = \frac{.2}{1.30 \times 10^{-6}} = 1.5 \times 10^3 \text{ ohms} = 1500 \text{ ohms}$$



Four in shore station.

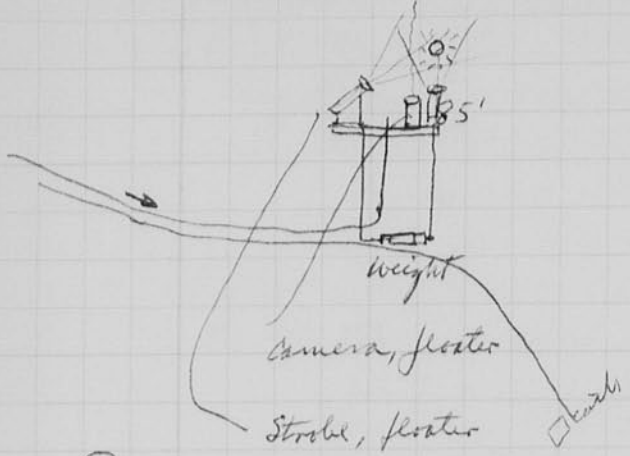
narrow beam?  
 no! 20° beam.  
 12 KC.

Ross system with side looking system



Inertia switches with mercury to give signal from shore lamp.  
 Relay and Bell in Shore Station.

Sept 20 75  
 David Johnston



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

35mm camera high speed electronic

How to fire the sequence??

Castle

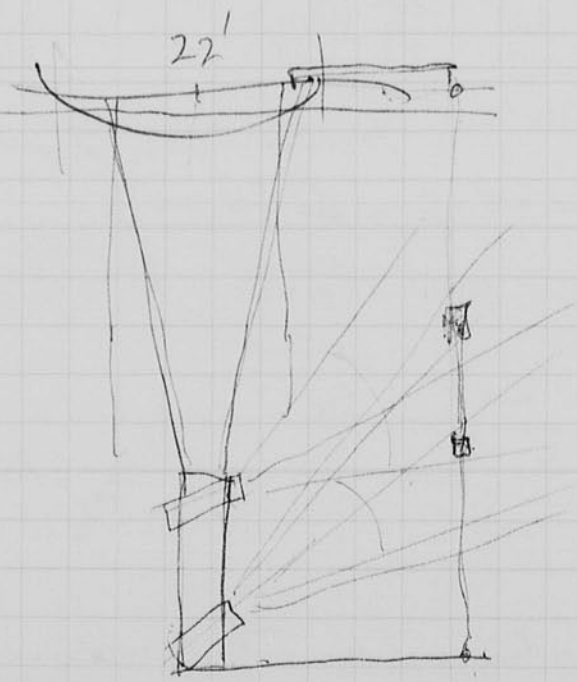
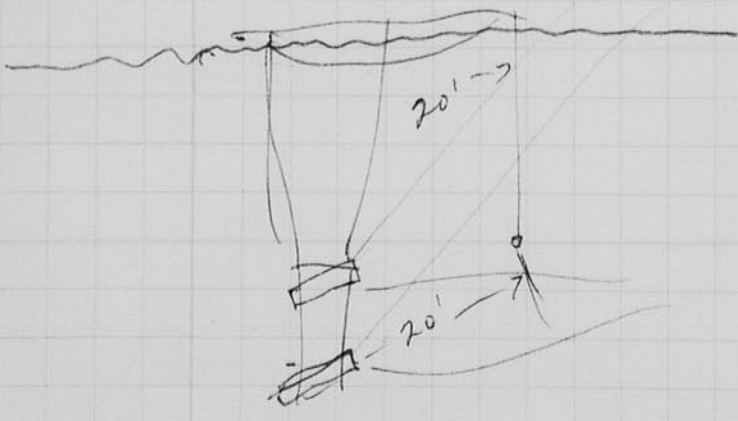
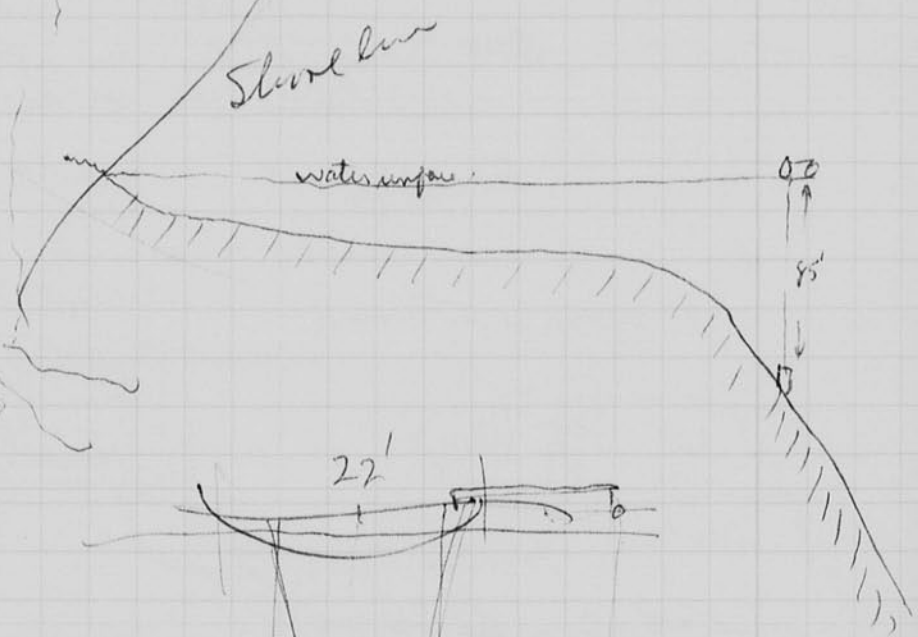
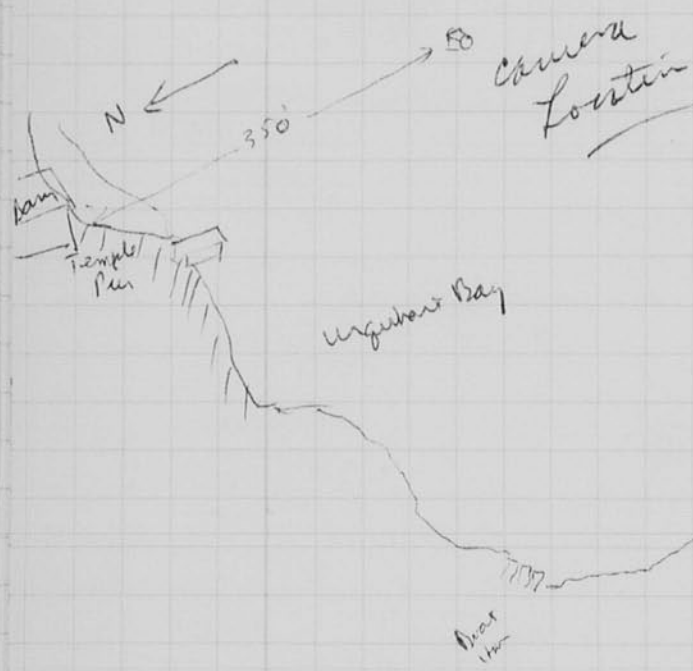
Mark Roberts

Hypno

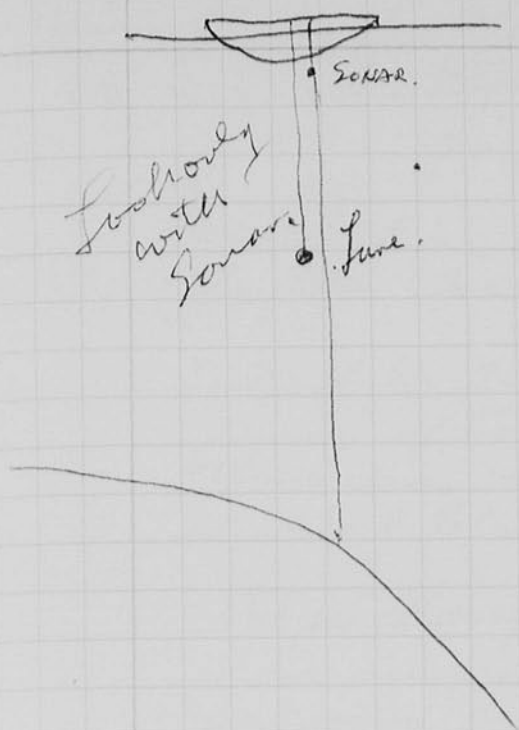
Sept. 21 1975. Bob Rines & Chris Wychoff.  
 Crompton  
 Prof. Leem Head of MRZ  
 Fishes.

Jim photo -

no fish no Reptile (known).  
 please wr. Elasm.







Oct. 1. Lure light Rines to Europe.

2. Redesign light

3. Auxiliary light.

or Redesignment.

1 week  $3 \times 5 = 15$  bats <sup>30 bats</sup> <sup>45°</sup> 20 seconds.

Lamps.

film 107 films.

4000 3 180 10 hours

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

② The lamp will be aimed up at 20°

③. no lamp is available.

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

Test of 7302 film

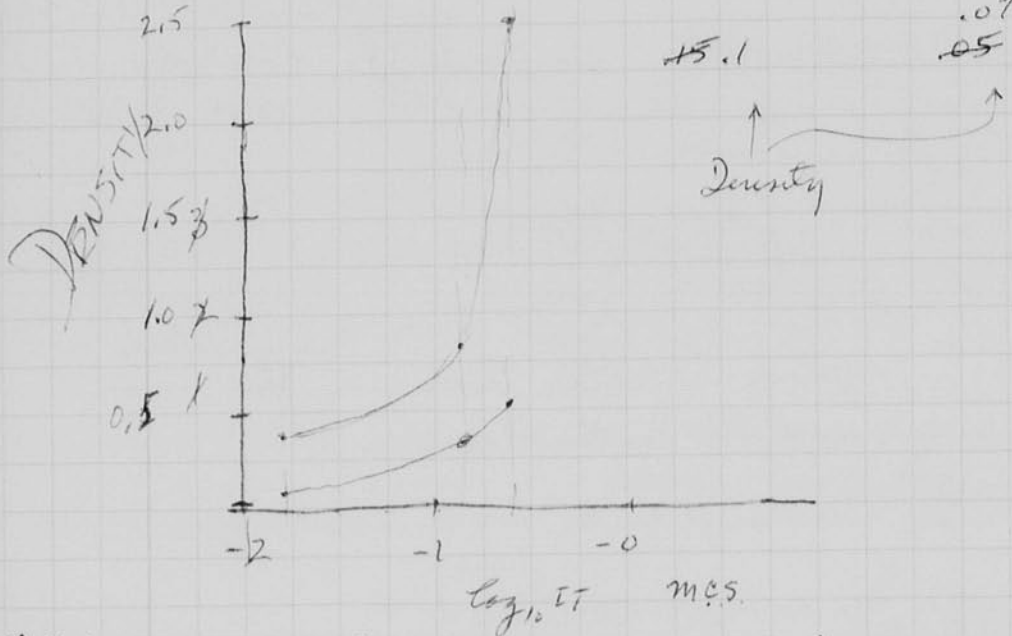
Point source.

4-1

Digital  
White.

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

|        | cm    | 95  | 98.6  | 2.5 | IT    | 9.359  | 0.41  |
|--------|-------|-----|-------|-----|-------|--------|-------|
| height | 95 cm | 95  |       |     |       |        |       |
| char   | 95+90 | 185 | .32   | .59 | .146  | .14    | .86   |
| Floor  | +67   | 252 | .17   | .37 | .0346 | .222   | 1.778 |
|        | 2.5   |     | .15.1 | .07 |       | -1.798 |       |



Sept. 24, 1975 tests made last night in pool of the new camera for the monitor tests.

f8 2 meters. T.V. monitor plus 2 cm. I.

Note Bentons Oquiter is la  
Lille Model 3D-12 NDVR cat no  
Pump. This pump is  
Oklahoma city.

Underwater exposure  
for the closeups of



Bob Rines called about  
JPL enhancement  
of Lockners photos.

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

then these come Bob  
and I got the Nat. Des.  
to see about a quick  
publicity. also plans  
for new equipment and  
expenses.

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

Aerial 1414 ultraviolet.  
 Aerial 3414 thin base.  
 Same emulsion as  
 50427

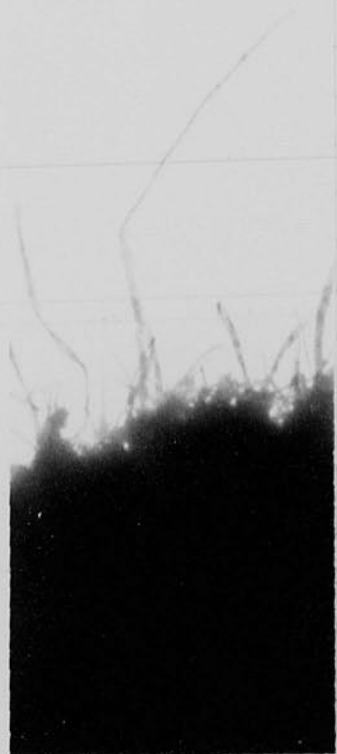
Developed in Dektol 1:1 for 3 minutes.  
 The film clears quickly in Hypo.

Subject for 2nd photo .93 m was a  
 piece of torn 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           |
| x 10 microscope "        | 55           |
| x 40 " "                 | 202          |

x 33  
 enlargement  
 25mm



33 times enlargement  
 ← 25mm

Shows diffraction due to  
 spacing above the  
 film

50427

transposed

24 Oct 1, 1975 Harold Edgerton.

Resizing <sup>19+</sup> X-ray meter Probona -  
AFS = 8  
AET = 2.5

Exposure 1/10 sec at f11 Developed 8 min in Dektol 1:1.

Density of sky 2.1.

Exposure from No - 500  
~~16 - 6000 Guess.~~  
~~17 - 11,000~~

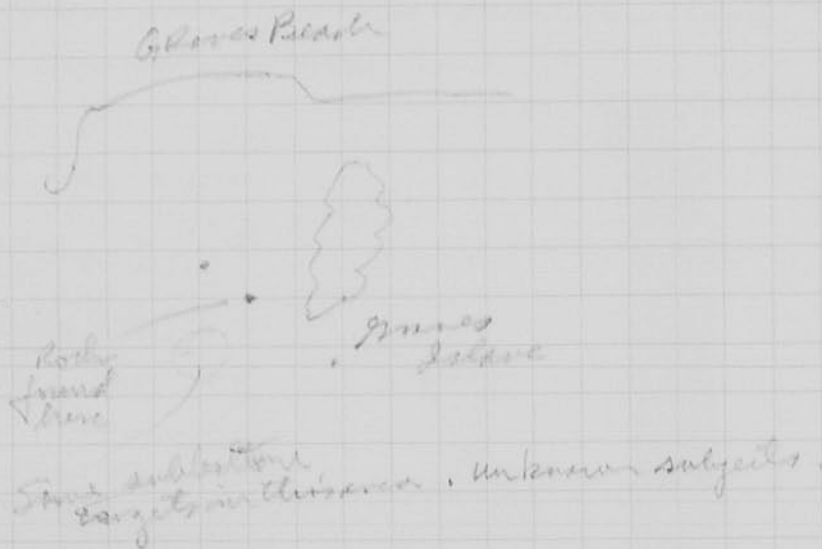
19+ f11 - 1/15 sec.

Used 1/10 sec. Density 2.1 of sky.

Try again with 1/100 at f 5.6

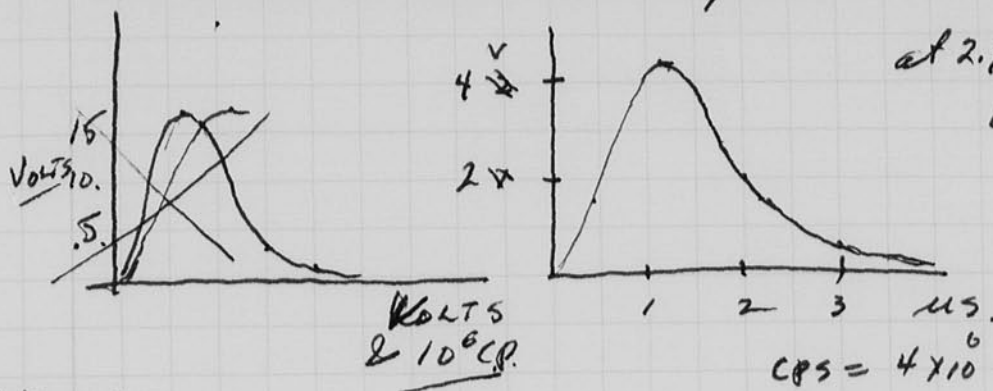
Oct 6, 75 Mary Ann left for Hickory N.C. at 1045 on Delta.  
She was in Boston to attend the PEO Convention  
of last week.

Oct 8, 75 Yesterday with Glen Reem at Magnolia & search  
for the Shore Map at Magnolia on the North Shore



Oct 11, 1975 Sat.  
 Harold Edgerton

Tektronix Scope 7623k. (new). Small sig.  
 #1542 Strobosc at slowest speed.



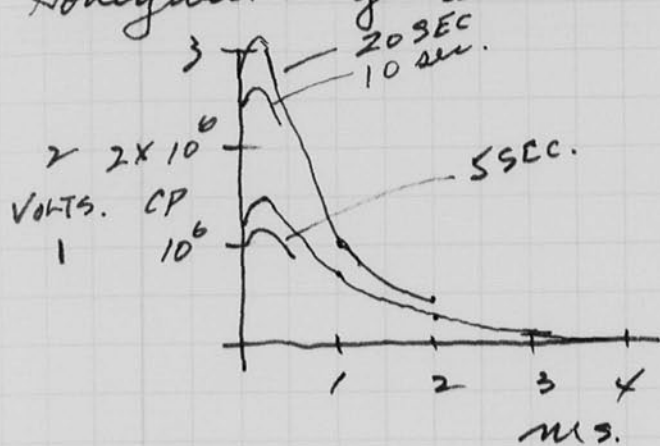
at 2.41 meters 100  $\Omega$   
 $1V = 10^6$  c.p.

J.R. Strobosc at  
 slowest speed.

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

Oct 13 75

Honeywell 25 year anniv unit.



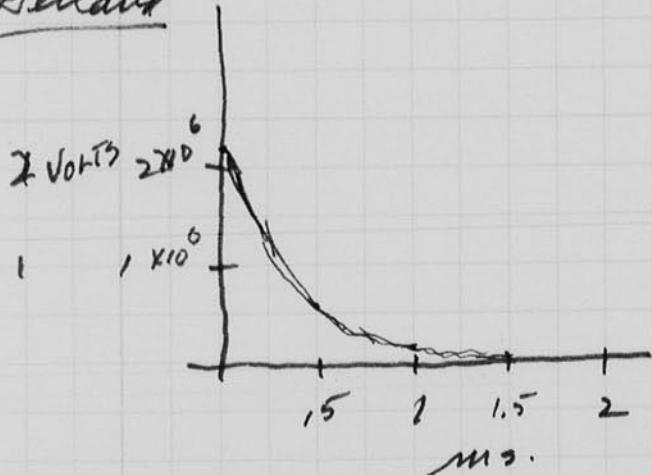
SF 3-4  
 phototube  
 #5 DENISE.

100  $\Omega$ .

2.41 meters 100  $\Omega$ .

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

Heiland



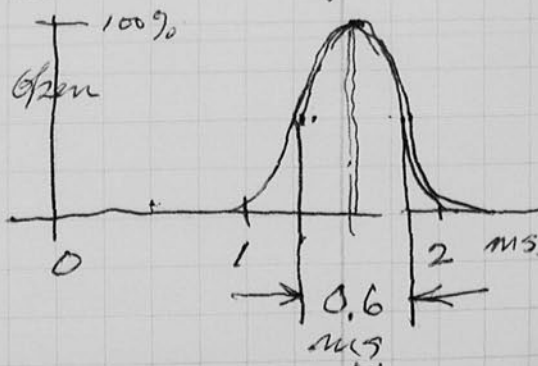
$$CPS = \frac{2.1 \times 10^6}{2} \times .5 \times 10^{-6} = 1.05 \times 10^3 = \underline{1050} \text{ BCPS}$$

Oct. 15, 1975 Conversation with Andy Vincent 1225 Union Ave Rochester, N.Y.  
 on the phone. 11 am  $\pm$ .

The shutter opens in 1.6  $\mu$ s.

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

The shutter can operate at  
 60 times a second.



864 4790 001 J

Harold & Esther Edgerton. AA 11.2.6700

1985  
 Fri Oct 16 <sup>Detroit</sup> Boston - ~~Greenboro~~ AA 91 315 - 5.04 pm  
 Robert Edgerton  
 221 Ottawa Dr. Pontiac Mich 48053  
 phone 313 332-5675

Tues Oct 21 Detroit - Omaha AA 553 5.27 - 5.30 cli  
 Hertz U 299 6.25 7.47 oma  
 Omaha motel at airport

Wed Oct 22 Woodline Iowa in morning with Jessie Decon  
 and Orville Cole. 712 647-2015.

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

Fri. Oct. 24. Omaha - New Orleans Braniff 141 1055-1120  
 155 230. 335 new orleans

Sa. Oct 25 auto. Hertz <sup>New Orleans trip</sup>  
~~cancelled.~~ Sat Sun - 431-335 N.O. 50  
 BK

Su. Oct 26 Frank Bennett 1042 Glenmore Ave Baton Rouge La 70806  
 504-DI-4-9195

M Bill & Joan 7815 Willow St New Orleans  
 504-681-1856

University Center at the  
 University of Houston

Tues Oct 28 Evening Houston M.I.T. Club Texas <sup>home 495-0063</sup> (Warwick Hotel)  
 Jack Forbes Uni of Houston 713-749-1344  
 Joe Moore 713-228-0871 (home 713-468-7521) Oct. 28 +  
 29

6:30 reception  
 7:30 dinner  
 8:30 lecture

Wed. Oct. 29 10am. Shell Dev Co 3737 Bellair Blvd po Box 481  
 Lecture. Houston Texas 77025 713-667-5661.

afternoon - Discussions. (Emanuel Baskin) ← Bruce MIT

Thurs Oct 30 Dallas evening lecture Dallas Mus of fine arts. (Fairmont Hotel 214-748-5454)  
 John Davis PO Box 807 Harst Tex  
 Bell Helldopfer 817 280-2886  
 Home 817 267-4844  
 Bill Booziotis (bus. 214-521-2461) October 30 night

dinner 6:30  
 lecture 7:30  
 reception 8:30

Fri Oct 31 Dallas - Chapel Hill N.C. (Raleigh-Durham) E 598-1138 226 atlanta  
 564 306 4.11

Sat Nov 2 Greensboro N.C. - Boston Piedmont #2 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. to Love " Hobby Airport)

Nov. 5, 1975.  
David Edgerton

27

I go tomorrow to Athens on AA to Kennedy N.Y.  
Oly 418 to Athens arrive 10:35. Some 620 pounds of  
equipment left tonight on the same flight in  
12 packages.

The Calypso is in Athens and will make  
two T.V. presentations for the Greek Govt. Coastguard  
will do the directing.

I have a list of things to do. We will see  
what happens.

1. Search for Helios (ENIKE) in the bay of Corinth.
2. Search for Lepanto wreck in the bay of Patras.
3. Ulysses wreck in Cephalonia Island  
near Ithaca.
4. Greek wreck in "Chalcis" bay north  
of Athens.
5. Marathon where statues were  
found.
6. Britannia - large ship in 80 meter  
of water 170 Km from Athens.  
50,000 G TONS 110 M between main & Cas. <sup>50 ft</sup> Sunken
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

September 21, 1975 C. Ch. G. Hoff.

Bob Rines' watch  
45 min fast

Lessie June 1975 Loch Ness - R. W. Peale

| FRAME NO | RINES TIME (R.T.) | SCOTLAND (S.T.) | DESCRIPTION             | TIME                             | DATE                                    |
|----------|-------------------|-----------------|-------------------------|----------------------------------|---|
| 0        |                   |                 | LOADING LEADER          | 5:00                             |   |
| 87       |                   |                 | CAMERA TRIALS           | INSIDE HOUSE - SCOTLAND          |   |
| 96       |                   |                 | CAMERA & STROBE TRIALS  | PRIOR TO LOWERING INTO LOCH NESS |   |
| 115      | 4:30 PM           | 3:45 PM         | SUBMERGED               | 4:30 PM RINES TIME               | 19 JUNE 1975                            |
|          |                   |                 | SIGHT DAYLIGHT          | SINGLE FRAME #138                | 5:00 PM R.T. 4:15 PM S.T.               |
| 200      | 6:20 PM           | 5:35 PM         | SIGHT DAYLIGHT          | #236                             | (7:05 PM R.T. 6:20 PM S.T.)             |
| 300      | 8:25 PM           | 7:40 PM         | 1 <sup>st</sup> PICTURE | #398                             | (10:30 PM R.T. 9:45 PM S.T.)            |
| 400      | 10:30 PM          | 9:45 PM         | 2 <sup>nd</sup> 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         | 3 <sup>rd</sup> PICTURE | #726                             | BODY & NECK (5:17 AM R.T. 4:32 AM S.T.) |
|          |                   |                 | SURFACE LIGHT           | F782                             | (5:24 AM R.T. 4:39 AM S.T.)             |
|          |                   |                 | 1 <sup>st</sup> BOAT    | #741                             | (5:35 AM R.T. 4:50 AM S.T.)             |
| 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           | 12:20 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     | #1100                            | 2:00 PM RINES TIME                      |
|          |                   |                 | 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         | DAYLIGHT STOPS          | #1520                            | (9:50 PM R.T. 9:05 PM S.T.)             |
| 1600     | 11:30 PM          | 10:45 PM        |                         |                                  |   |
| 1700     | 1:35 AM           | 12:50 AM        |                         |                                  |   |
| 1900     | 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

DAYLIGHT

STOP

Dec 27 1975

David Gypton, now back from the expedition on the CALYPSO with J.Y. Cousteau.

Nov. 6 (Th) Oly 417 to Athens with Cousteau

Nov. 17 Antemission trickery. (~~Stop at Salamis Island and Helice~~) Storm

Nov. 24 " " Search in 42 meters for ship.

Nov. 27 Calypso at Piraeus Thanksgiving day.

Dec Pyllos search for wrecks of 1827 (Stop at Salamis and Helice 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 Oly to Kalamata in evening - then taxi to Pyllos to  
join the Calypso.

Dec. 20 Arrived in Piraeus. Packed gear & boxes 500# for shipment  
I made a dive in the Foucoupe on Dec. 19 in  
Helice 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 Aigion

Dec. 21. Left Athens 3 hours + late on Oly 411 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  
Gypton returned about 7 pm from Hickory N.C.

Audy Rechinizer 202 325-9275 (Nov 14 75)

please call - <sup>Dec 23</sup> - 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.

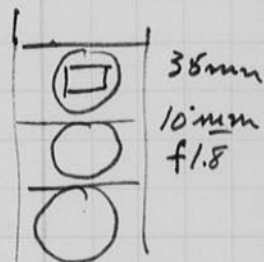
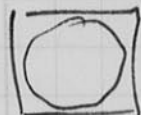
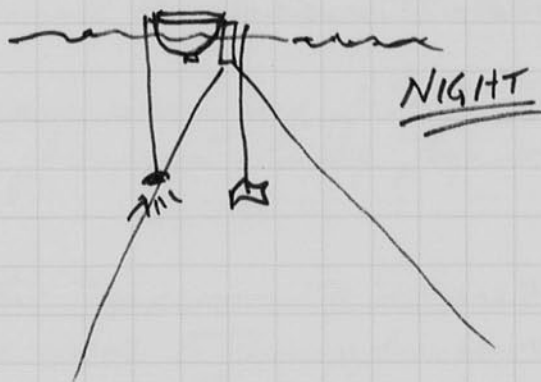
Call John Fitch. Tape lectures. SE dept. Paul Penfield.

Jan. 5 1976  
Harold Edgerton

a meeting was held sat evening Jan 3 1976 at my home  
100 new Drive. Bob Rios, Chas Wyckoff, Chas Miller  
Bill Mac Roberts, Harold Edgerton from Worcester, Mass.  
Suggestions. for photography in lock Ness.

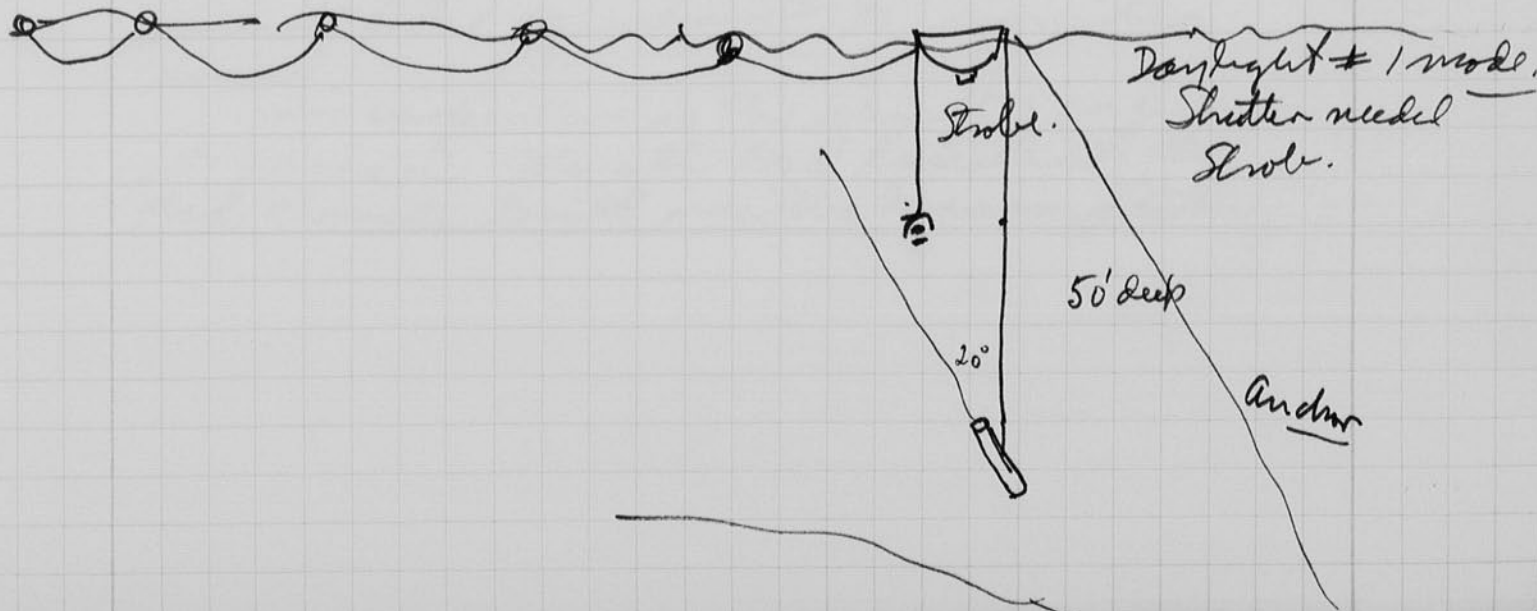
1. Daylight illuminated camera, vertical to the sun light  
35mm Black & White.
2. old Elapso timer camera. 16mm color.
3. Big strobe 35mm camera color.  
Fast operation. some times.?
4. Television with "slow tape"  
and with "kick off" system  
for big strobe.
5. Sover in various modes.
7. "Look down" strobe camera. 100ft.

Run fast  
when subject  
is in the  
area.  
Invert in front of  
strobe.



800 picts  
16/ft.  
1600 picts

$\frac{12 \text{ hours}}{60} = 120 \text{ minutes}$   
 $\frac{720 \text{ minutes}}{1600} = .45 \text{ min}$



Daylight = 1 mode.  
Shutter needed  
Strobe.

50' deep

Anchor

30 Jan. 15, 1976

Harold Dreyfus.

Marine Society meeting last night with Dean Horn - Expedition to Greece with Constantine was discussed. Kenneth appeared 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 Dunkelstein, and I unpacked the 12KC mud penetrator that was loaned to the 10KAE oceanographic group 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 Moorey. Linder went to N.Y. on the 9 pm plane Eastern.

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

Jan 22 1976

Elapsed time Camera.

31

AK  
Bill Nov 6 mm.

Continuous motion of film.

Fast Shutter - Vincent.

FAST.

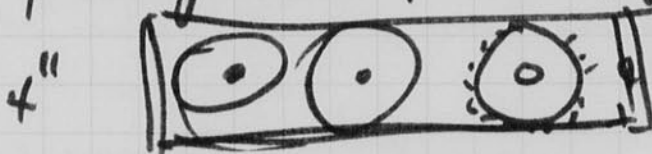
Stroke.

1 sec - ~~1/100 sec. / per frame.~~

100 sec to move 1 frame.

15-20 sec to move frame.

Photo pickup timing for sync.



100ft model.

Microswitch over 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. Frank Massa gave me 5 transducers 12 KC which I plan to mount in an array.

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

- Carpenter is the chief (?) engineer at Massa. We all had lunch at the Red Wash Drill near the Massa Factory.

32 Jan 27, 1976

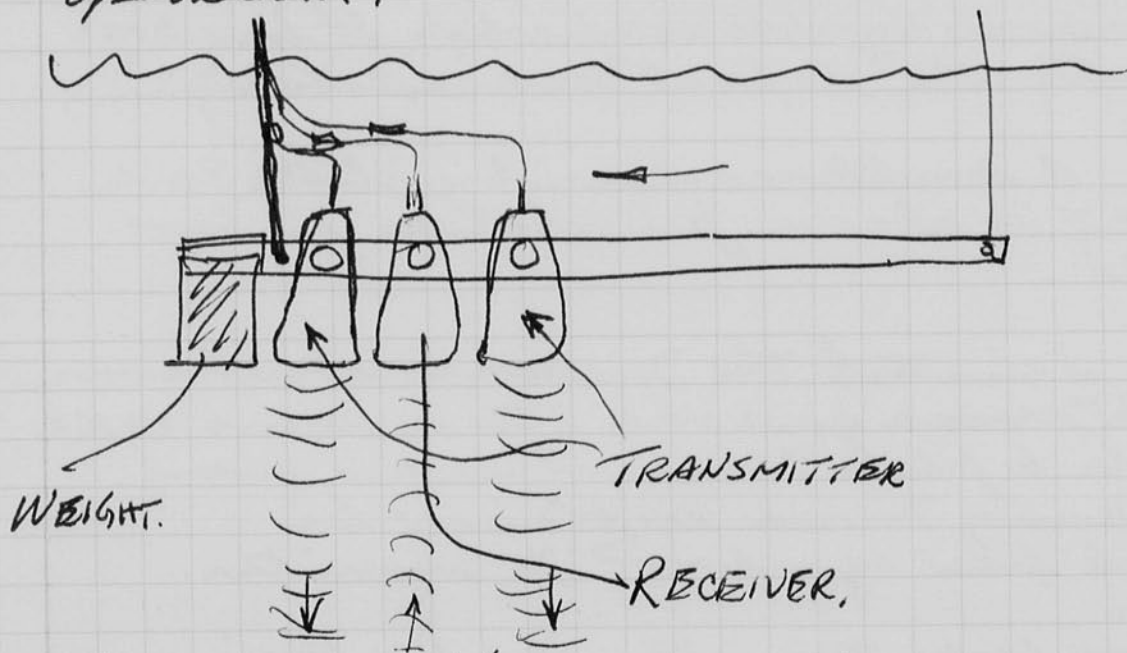
Harold S. Eyster I visited the Massa lab in Hingham

Mass on Mon, see previous page. Frank Massa gave me 6, 12 K $\Omega$  transducers.

These have been used for experimenting. At present, me, Bill MacRobert and I, have decided to use three, closely spaced. The outer two are connected in parallel and driven through a 4 wire 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 mV. Apparently the output is large compared to our old 12 K $\Omega$  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 trim the operation.



The use of 6 units - 4 transmitters with 2 receivers gives about 50% more output into the receiver.

Joe Boone called last night to advise about a visit of <sup>Mr</sup> Parley of the Dyna Metric 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 867504 4029

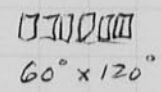
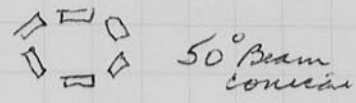
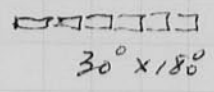
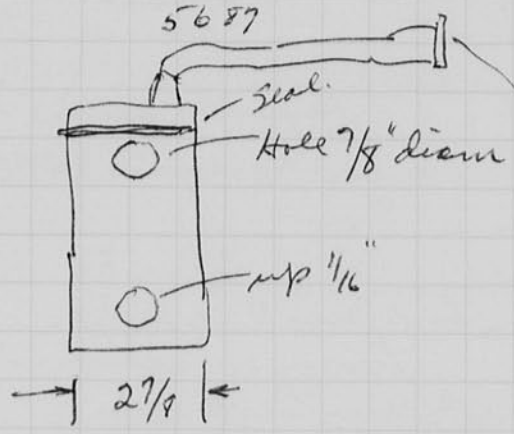
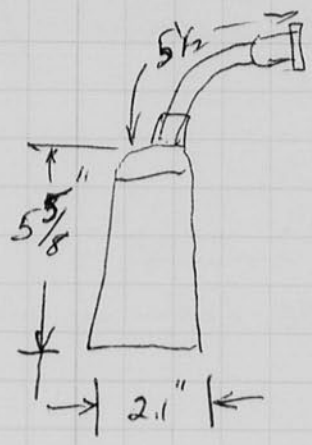
5192

5538

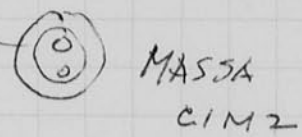
5670

5682

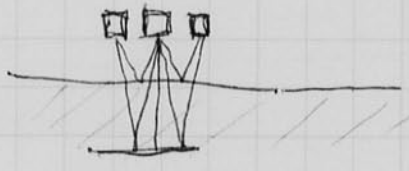
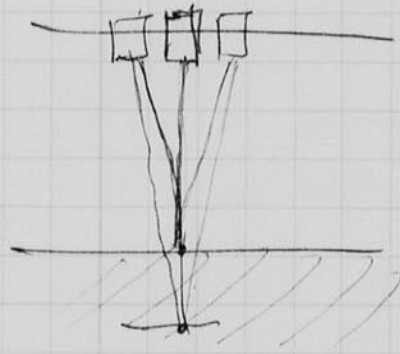
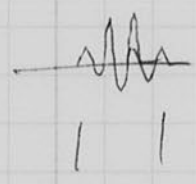
5687



by Frank Massa  
 1/22/76



- 1.2 Parallel
- .8 Series
- .8 one.
- .8 center driver  
 2 outside in series receiver.
- 1.4 peak to peak Series Parallel - 258  
 Single receiver
- 14 m.v. 10' to Plywood board.
- 2/5 ms duration.
- 3 cycles of 12 KC.
- 1/4 ms duration.
- 0.25 ms



Trans. VTC, A21 50-500 ohms.  
 at end of 25' #16 cable to recorder  
 \$11.00

200-50,000

PC01 8.88

Jan 29 1976, # Edgerton  
 Chris Finkelstein

Chris and I took the new 3 element 12 KC Massa and finished it to the pool. It worked fine in the laboratory - but was n.s. in the pool. As soon as it hit the water the timing was off too soon all by the same amount.

Jan 31 1976. Lecture last night in 10-250 (MIT on Photosynthesis Lock Ness

Chris Wychnoff gave excellent lecture  
 then I showed an elapsed time movie  
 Rines followed plus Chris Mc Dowson  
 Boulder

Barbara Klavins and  
 Curtis's wife  
 Blanders wife and  
 2 children

Then we went to all faculty club  
 for dinner.

Jan 31, 1976

Harold Edgerton.

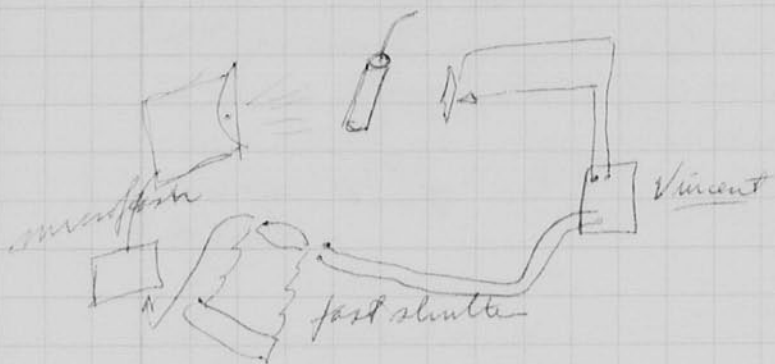
Fast shutter (Vincent) with firecracker,  
contact about 1" away. microflash at 1 ft away

Plus x film developed to min  
Exposure time 2 photos of firecracker

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

Repeat - same results.

Explosion late. Paper in air.



Conference on Loch Ness Photo equip.

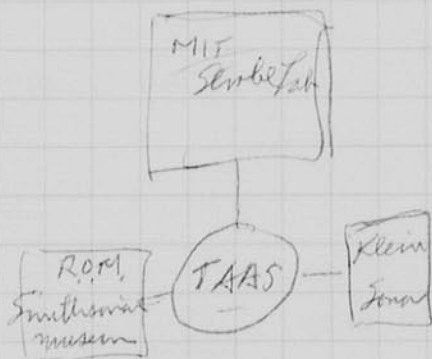
10 am. Meeting in 4-402.

Bob Rines  
Jerry Litvin  
Chris Mc Govern  
Bob Needleman  
Chris Wydrup.  
Bill Nease Roberts  
Harold Edgerton  
Chris Miller  
Blonder.

Lissman, Cambridge England.  
Martin, Graham. London School.  
Soloman, David. food chain.

Allan Gillespie  
Peter Scott.

Urquhart Bay,  
access to shore  
Rent Boat House facilities.  
Rink owns Boat House  
(Power is to be installed  
Menzies (land owner)  
Rent orginal Barn for security.  
2 Boats 22' outboard cabin 2 people  
80' mooring on ledge.



Klein - Hinge Refraction Sonar  
will be left there.

Sonargates,

Lawrence T Bussey  
Lt. Comd. USN  
U.S. Dept of Commerce  
Nat Ocean & atm adm  
Rockville Md 20852.  
30 Jan 1976.  
wrote to Rines - cooperation.



Search for remains of animals, bones, etc.

Coring necessary for study of geology.

Bottom sounding to show layers.

4 bags to 3 writers for bodies in det. Riv.

Sahnon Char. Thompson? Hoopfish.

2000 a day for submergence.

Found old rifles in bay.

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

$$24 \text{ hours} \times 60 = 1440 \text{ minutes}$$

$$\frac{1440}{60} = 24 \text{ seconds}$$

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

Observation by Tom Wolfier Balloon, 200 ft 400 ft Max.

Suggested by Jerry Tedvin. Polaroid glasses.

Frank now available in Scotland.

John Lunn. Frank C.

but now,

Bedford.

50 ft.

J.T.T. ultra stabilized Army. 5000.  
mounting.

Shadowing T.V. vs. Camera.

RCA T.V. System 1/2 hour. Dick. Play only.

Blonder. Says tape have 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.

Warm water center?

Noise Herding.

Big building on lake.

Permanent Hydrophones in lake.

50

5

250

Sithouille.

Proposal 35mm 10mm Lens.

110V 50N

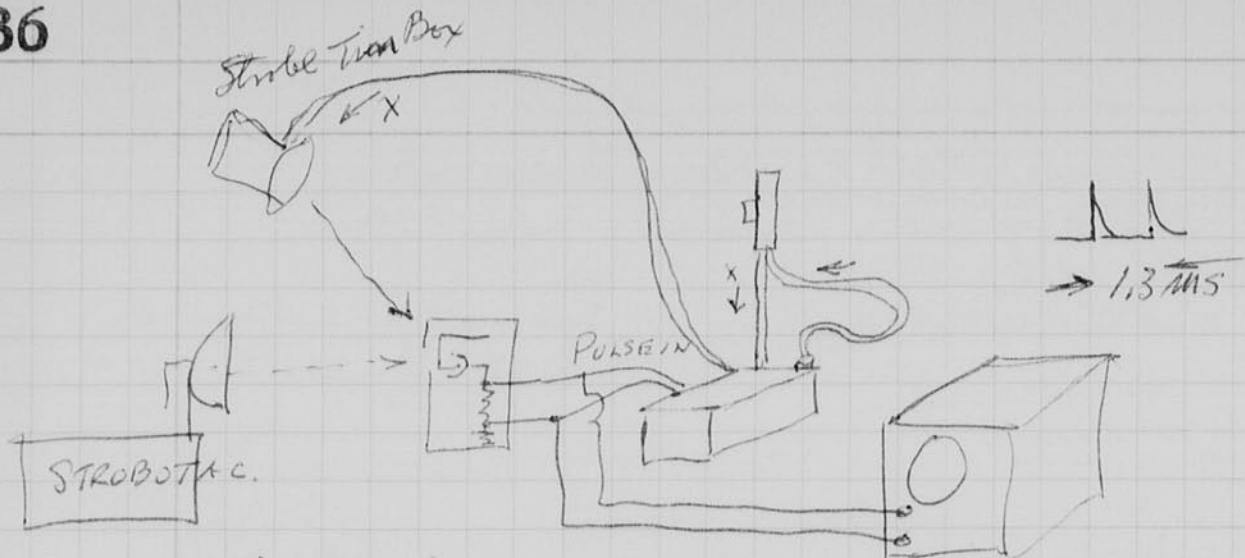
Shutter.

power line.

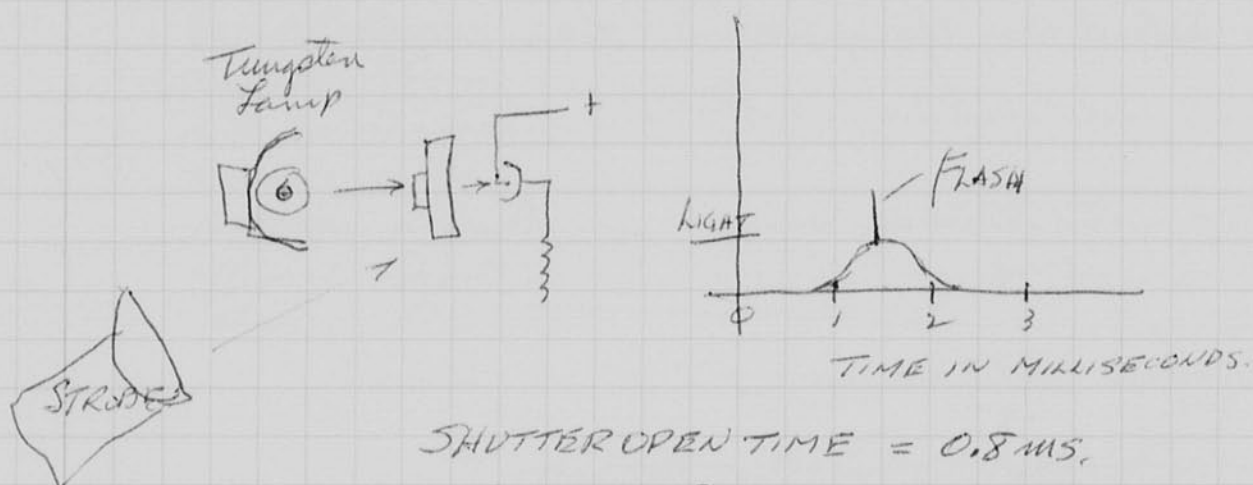
Stroke 10 sec.

To show.

T.V. Chris Miller will give report.



The photocell accepts the light from the strobotac and the other flash device. The oscilloscope shows the delay in the system, which is 1.3  $\mu$ s from the light actuation until full open.



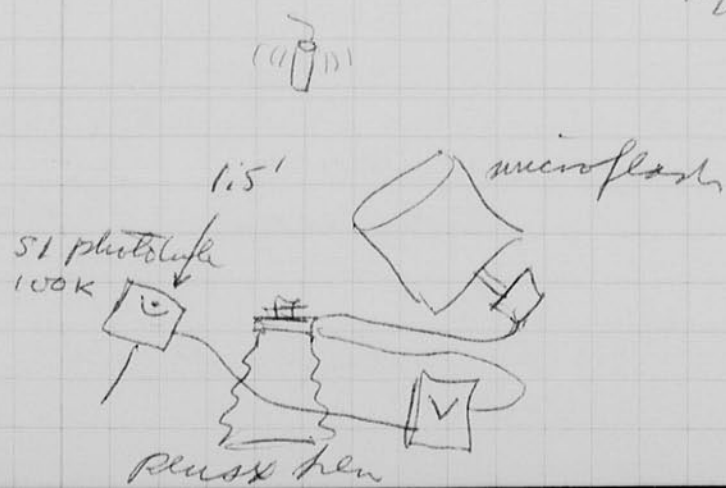
SHUTTER OPEN TIME = 0.8  $\mu$ s.

DELAY = 1.5 to peak

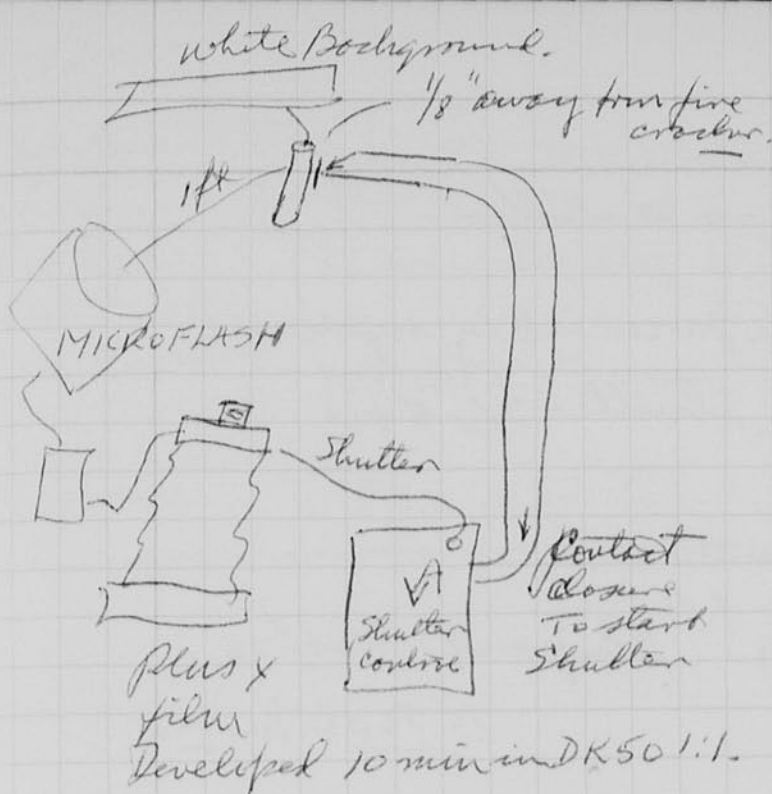
= 0.8 TO START

= 1.3 TO X SYNC

= 2.2 TO CLOSE.

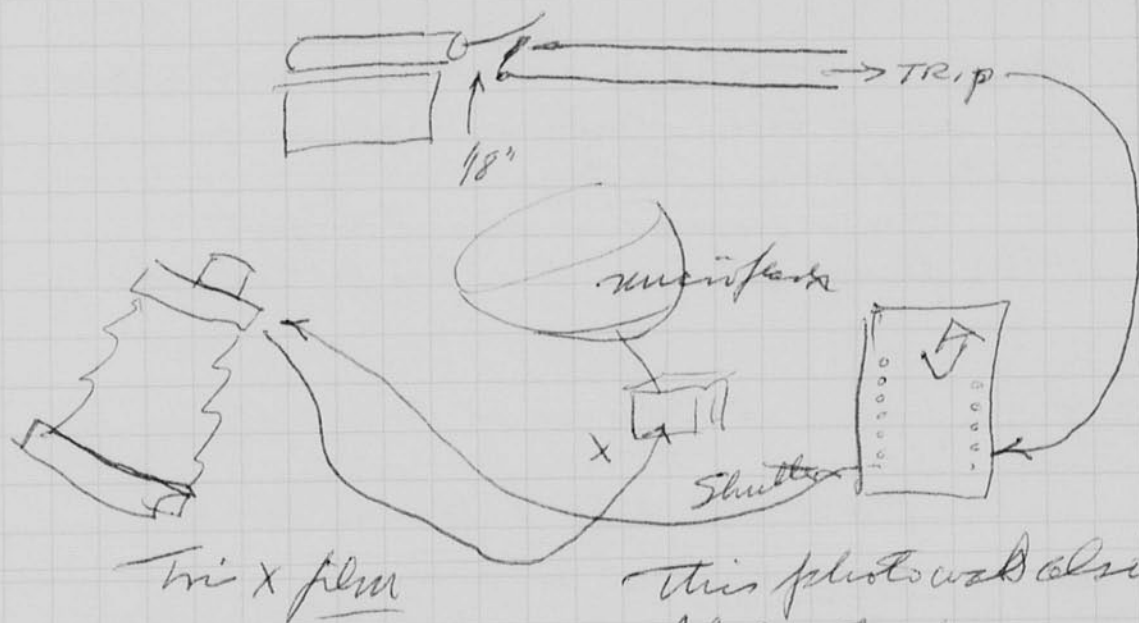


this did not flash the strobe so I assume the light was not sufficient to trigger the shutter. We will know when the negative is developed !!



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 fuse 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 fine cracker did  
 not jet very well.

Feb. 2, 1976

Patrick Barron (Dopler) wants to go into  
 insect photography. I gave him Balls and  
 Neelings's papers.

Feb 3. Tried again on fine cracker  
 Tri X film 12 mm DK50 1:1  
 Cleaned microflash lamp.  
 multiplicity shutter.  
 M.G. Contacts failed to close!

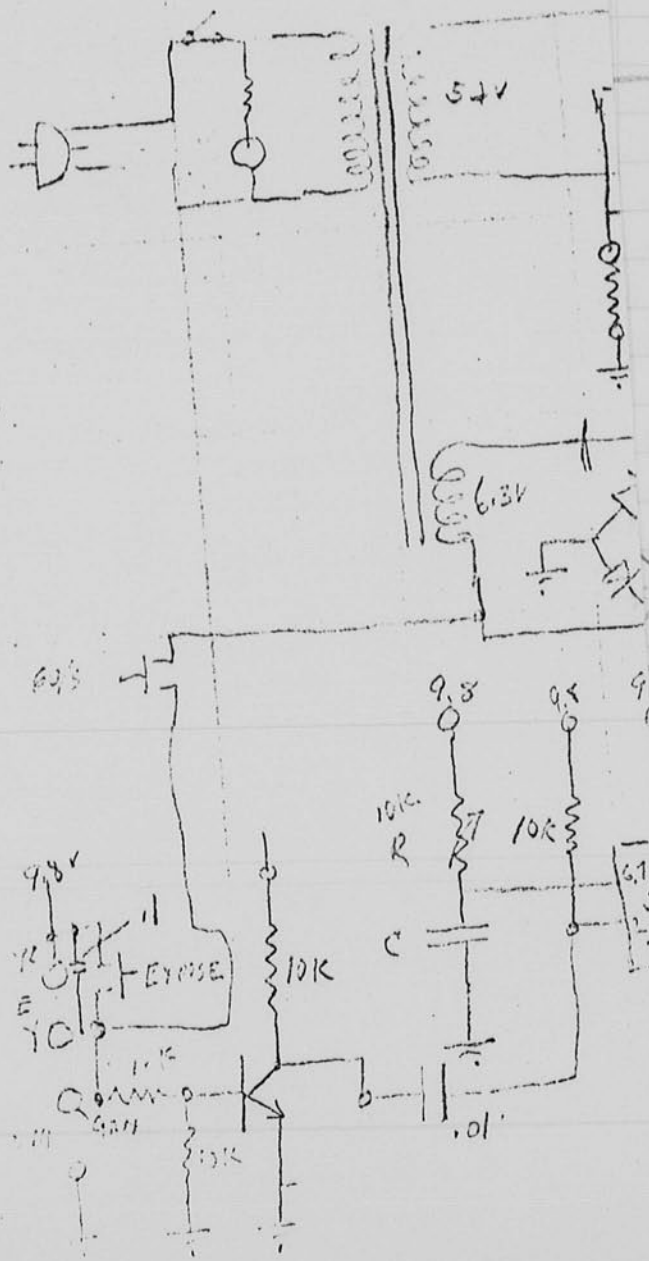


H. Dygdon  
 Bob Rios  
 Chris Wyder  
 Bill Nachbom  
 Tom Raymond  
 Sam Hayward  
 Chris Miller  
 Doug White

Present - 2000 photos  
 16mm  
 16mm 50 watt sec.  
 10mm f1.8 automatic

35mm Beutler 372 camera.  
 382 Strobel 100 watt sec  
 Lens of 3.5 28mm (16mm available,  
 Olympus lens.  
 3 sec min time, 1600 bulb prob

STROBE SUITRA  
 SSD



3 minutes

~~too small~~

Hose clamps?  
 Can't say

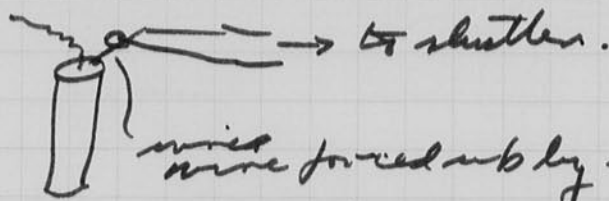
Data 1800

|        |      |
|--------|------|
| out 37 | 7125 |
| bc -   | 7345 |

7 amers  
 75

38 Feb. 3, 1976

Hamed Shutter



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.

Vincent associates

755306. Invoice

1285 University Ave

Rochester N.Y. 14609. 716 473-2232

Memo. All the firecracker photos are  
late since the shutter requires  
1 ms to open. See page 34.

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 prints.

f 22 Two 86 filters in series

Kodachrome II film

note Exposure seems to be ok.

Sun

Still exposures Jan 31 545 with 1/1000 sec exp

525

30

35

40

45

50

55

Sun set.

f 11 Plus X.

X 1 filter ?

H. Dyer  
Bob RiosPresent - 2000 photos  
16 mm16 mm 50 watt sec.  
10 mm f 1.8 aperture

Chris Wylde

Phil Washburn

Sam Raymond

Gary Hayward

Chris Miller

Doug White

35 mm Bantros 372 cameras.

382 Strobel 100 watt sec

Lens of 3.5 28 mm (16 mm available,  
Olympus lens.)

3 sec min time, 1600 photographs

New camera (proposed.)

Polaroid shutter

10 mm Duvetac lens, f. 1.6

(Chris Miller 4 mm)

Dome for windows.

Decide 35 mm film

3 months

Lens 10 mm or 16 mm or 4 mm

film - thin film plus X.

D.C. operation.

Depth - 750 ft. (1000)

Case

Aluminum case for~~P.V.C.~~ - too smallmount (not important) clamps, Hose clamps?Can't buy.Rate <sup>see</sup> 10 min. to 1 minute.

Total 1800.

Delivery - 3 months

Cement 37 4125

Stroke - 4345

Price - \$8500

conference notes made on Feb Feb 4.

Feb 6. Idea <sup>?</sup> suggest to Nat Geo that they put their cameras  
in the lock next summer.

Blonder says he has an S.W. to ready to go.

Feb. 7, 1976

David Edgerton.

Feb 5.

Photos were made of the sun with the 1.45 shutter  
Blitz Vincent associate.

The Sun was supposed to  
be in line with the main  
corridor of Bldg 7 on  
Feb 31 at

4:45

It was  
cloudy  
that  
day!

Plus X film

f/11 (maybe less due to shutter) Density 1 filter.

Photos at

4:35 4:30 4:25

40

45

50

55. The sun was practically below the  
horizon at 4:55

these were multiple exposure shots

Tests of exposure on Plus X film

with 55D 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 with 120 volt clear bulb tungsten lamp

Results. Density 0 Dark exposure of filament OK

1 " " " ... but less than before

3 no exposure.

(MS)



940ana Fine cracker. f/11 1/1000 sec.

Wire contacts close to side.

Magnification at 1 foot.

Plus X film

9 min DK50 developer.

Paper out from the fine cracker since

1 ms is the delay in the shutter.

Late. Cloud of fire shown on one side.



10.05. Photo with open shutter to show 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 ~~with~~ Scratch was  
also recorded on the open shutter.  
negatives ok. 10 min DK50 plus X.

Copy  
f16  $\frac{1}{4}$  sec  
Sovex photos.  
Plus X  
10 min Dev.

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

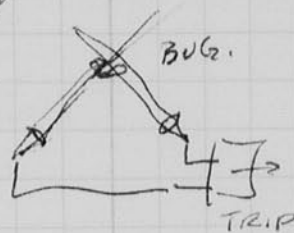
Insect photography.

Bird and  
Insect photos  
Audubon magazine  
Sept 1975

by Stephen Dalton.

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 contact.

Patrick Barron ↑  
brought this in



Then a strong light at night will attract  
many flying insects. As each pulse goes  
through the sensitive 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 are bats hunting insects  
around lamps. Perhaps they could be  
photographed in this way also.

13 min.  
28  
284  
364 days

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

all should be battery operated for  
full use with water proof covers etc.

Feb 18 1976 Hamed Edgerton.

I took the 259 Eddy Side Scan to Boston Light Ship Buoy on Feb 16 ~~Monday~~ <sup>Monday</sup> afternoon over 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 was broken up so that it 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 Polan. Some evidence has come in on the beach. See Westport search of August p 2 and 3 for background. I think John said the Gooseberry Island area is of interest to us for further search.

Feb 22 76. I was at Harvard Uni yesterday at 2-3 to talk to the Physics students. They wanted to know about EDS and how it was started.

Chris Finkelstein and Chris. took the 259 Eddy Side Scan to Boston Light Ship Buoy B yesterday to look for the Sea King. They think they found it in 105 ft of water at the spot shown on the chart. They were on the Blue Chip with Walley Handette.

Clyde Schokelle.

Mar 21 - May 16

May 26 - July 24

Aug 20 - Nov. ?

Tantouria-Thera,

Crete. ~~DIHA~~ DIHA.

6 miles north.

Le Pouto

Parviz Babai

39 Hubinger St.

New Haven, Conn. 06511

tel: (203) 387 7441

Susan Schultz Dapcott Am. S.W. Mass.

15 Halletts Ln.

Dorchester, MA 02540

617-548-6477

office 997-9321, X332

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

March 8, 1976 Monday.  
David Edgerton.

43

Returned last night on Delta from the south. Highway U.S. where  
Esther and I spent one day with our daughter Mary Lou.  
Chas. Bill, Jan, Lyndon, Maryanne, Ellen were all home.

Left Fri Feb 27 for Washington. Visited U.S. Society.  
John Fletcher was given info on the Vincent Shutter.  
Luis murder. Judge. etc. consulted. Poque was  
home sick.

Afternoon plane to Tampa. Weekend with  
Margaret and Bob Robinson ~~San~~ Fla  
Bar wale Key.

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

Wed Mar 4, I went to Boca Raton and worked  
with Max 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 Dan Smith and Fred Anderson at  
Hydro Furveys Ft Lauderdale on the 5th.  
Also E.G. & G. Tlo. Thacker phone operator.  
F was home sick. Yoder was in the  
new storage area. Richardson was at the  
messy can puter area.

On Fri Mar 6, I went to sea at 8 am  
with the JOHNSON to test the tide 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

Howard Edgerton Loch Ness Meeting.

Bob Kines, Chris Wydroff, Bill MacRobert,  
Chris Miller, Howard Edgerton.

English people want to help.

Scott has two people. Boat for experiments.

Menzies - owns property at temple Pies  
Barn.  
Locked up Barn at the Pies.  
Electricity 220V 50 cycles.  
25 ft from the water

2 Boats belong to Kines.  
Boat house.

Sony may donate ~~some~~ <sup>T.V.</sup> equipment.

Committee - museum - support.  
Watch group.

Chris Mc Fowan - Zoo program  
Flora Fauna, Bottom Sampling,  
with Dr. Jug. (? may not come).

Lower Survey Project.

Dr. Tucker Birmingham -

Tedford civil dept. ?  
~~at bridge~~ ? Univ. Fondon. ? (Mc Brown).

Buccannan Sterling Univ.

Dinsdale.

Wydroff - Dark Room

McKintosh, Gordon neighbor T.V. salesman

Money available in England thru Science. ~~Transit points~~

---

Jug - direction finder or camera  
current flow meter.  
Power triggered camera  
closed tv. system for daylight

Slits in 16 mm for meas.

Same control for both.

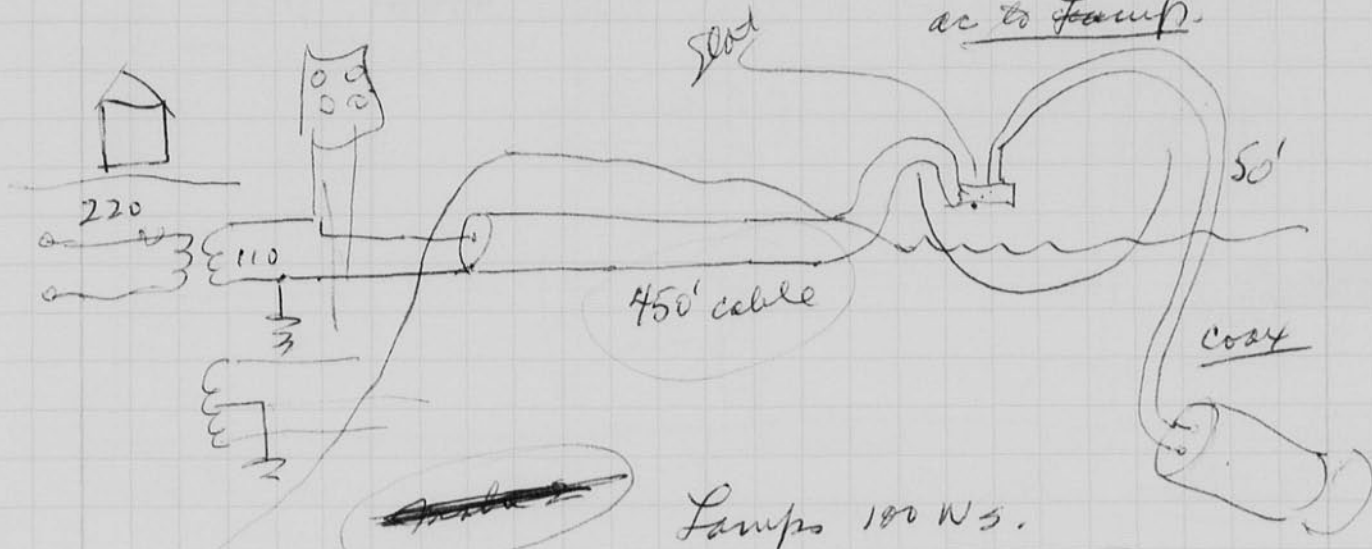
100 watt - 15 sec.

10 5 hrs.

15 9 hours.

ac to lamp.

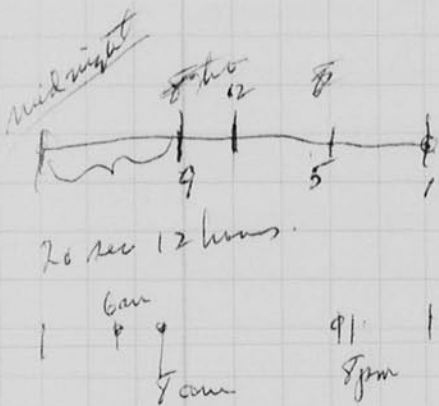
(E.P. Plug)



1. Converter from Boat to 110 ac (600 (Bat option))

2. Cable 110 volt grounded into the right. to the Boat

Exposure counter.



To see 12 hrs.

6 hrs - 10 seconds.

15 9 hour. H.S. Eltra Plus X.  
100-600 volt supply.  
DC

Desires: ① Rines Reload camera make simple Tape Seal.  
100 films.

② Cameras 10 mm. will synch back? for two.

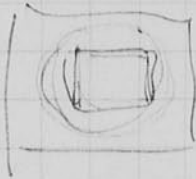
③ 450' cable Shielded Trenchintex.

④ Batteries.

Delight Silhouette.

Polaroid Shutter.

Motors.

100 ft, 16/ft 1600 3 hours. ~~180 min.~~ <sup>10 min</sup> 1600f 8 system.  
Polaroid.

32 lbs

Bentley. Sam Raymond Purchase order \$9000.  
Triggered model.

T.V. System.

Bentley Camera  
Studio.

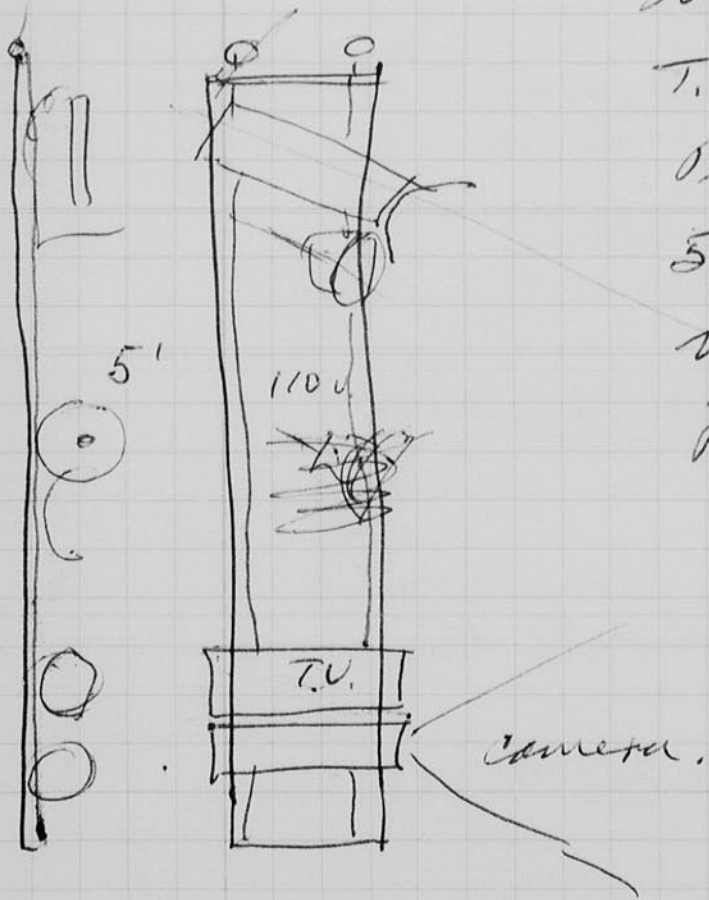
T.V. System - Recorder.

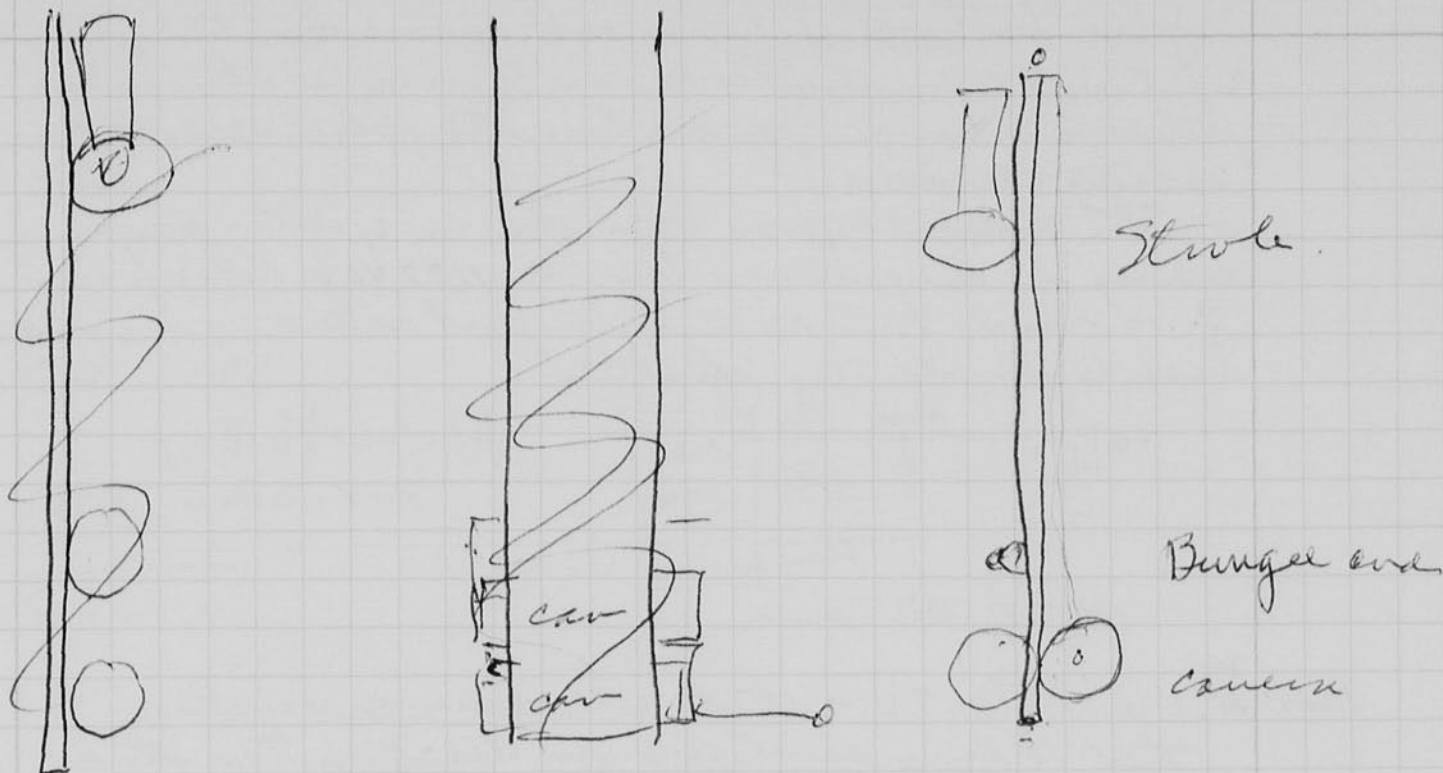
Push button.

500 ft cable.

motion detector.

Frame Counter.





March 12, 1976 *James Agerton*

Flores & Carter were here yesterday, all morning to talk about tennis - Ches Miller showed some of his latest things about requests.

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

Jeff Ugle took Agerton <sup>Miller</sup> to Hingham with him.

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

The leak in the Brass case for the T.V. was closed by the clamps. We now hold it with a much tighter - 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 lack one wire in the control cable. This now is over come.

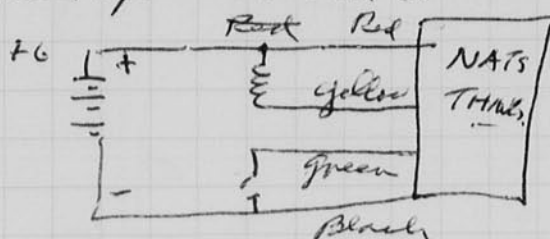
The T.V. case has been tested for 150 #/sq in 300 ft deep.

Mar 1976 cont.

Harvard Dept MIT 4-405 Strobe Lab

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

The assembly was done in yesterday using a Augenieux Lens # 1177464 Retrofocus R21 f 10mm f1.8. A circuit was put on the back to operate the shutter



John Lathrop

864-6000 3947

Mar 21, 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 Red 10 outside of Boston Harbor. Dead end light yesterday.

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 occurred.

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. 5ktrachrome at f1 1.5 meters or scale. 20mm Nikon lens

See photo of equipment on p 13



Carl Gilbert 899 2498 Home Weston  
944 1738 office

Ship -  
Bill Buote 9231322  
50 Hunt St  
Watertown  
G. J. Van Dessel  
(of Polter & McClintock)  
visited the Shrocks,  
Art Clifford M.I.T.

Norman Leger  
Chas Miller  
Harold Dyer ) M.I.T.  
Al Barker )  
Dave Bethel ) aquarist

Frame ready on counter  
Start 1148

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   | 2ft | vision fair |
|     | 05   | 4ft | vision dim  |

13.55

Mar 20th

To harbor.

end of experiment.

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 TV. case is needed of stronger construction. It should be designed and tested for 1000 feet.

5.378 or 5-5/16" is the minimum inside diameter.

5.375 or 5.313" Try - 6" OD 5/16" wall  
nom I.D. = 5.375 19.01 #/foot.

Pyrex cut  
Edition 118  
Std 2-6960

PVC Schedule 80 Extrusion.

6.625 OD.

5.761 I.D.

#32 wall

5.075 #/ft

210 # working pressure (5 to 1 safety factor).  
680 F

Brass is now  
13 3/8" long

Schedule 40  
6" 6.625" OD.  
6" 6.065" ID  
.280" wall  
3.339 #/ft.

T.V. camera. <sup>Sat.</sup> Mar 27 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  
anti-wicking wire.

| Wire resistance |                  | Load           |
|-----------------|------------------|----------------|
| # 16            | 4.09 ohms/100ft. | Rubber. 6 amp. |
| # 14            | 2.58             | 15             |
| # 12            | 1.62             | 20             |
| 10              | 1.02             | 25.            |

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

from Hoop Stress  $p = 5000 \text{ psi}$  (10,000 feet).

for 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. S. Gorton.

Ries and  
Wychroff were here to see  
also Bob's son.

51

#1 Refrad. time - try to make as linear.

220 .50 cycle

Delivered camera and  
strobe to Bob Ries with lens  
for tests in aquarium.

#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  
capt Bob Pluffs and son, with Al. Barber  
Tom and best class, Wychroff.

Called Sam Raymond this am.

1. Will return inside of Deep sea 30 exp camera  
for new case. (old one found to be sent to Japan.)

2. Requested another camera for  
strobe flash use

3. Requested another pump for jet.

4. Sam to make up T.V. System  
with lamp and camera  
control.

We will give specs.



Seward Johnson Ed Link  
on "JOHNSON"

Rogers

April 4, 1976

Rains  
by night

53

Harold Edgerton

### Facts.

1. Initial loss of equipment Free Run 15-20 rate  
no sonar. Few fish. Dark - 8 pm - ok at mid night  
gone at dawn - gone - bump and every thing  
popped up the next day. 2 or 3 miles away  
to the south.  
? What did rattle the camera.  
all photos look behind. no clues on photos.
2. River water 30' deep. - Heavy wind.  
no sonar 15-20 sec.  
Equipment heavy knocked over.  
this took a lot of force  
Salmon photos excellent.  
Something knocked it over
3. Aug: '72 15-20 seconds.  
Raytheon Depthfinder.  
on Port can from Boat.  
camera 135' above it.

### Flipper pictures and Sonar Records.

$\frac{1}{2}$  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.  
Rains believes the sonar has no  
effect on the animal.  
Something is banging the camera.  
Head picture comes over.
- 5 Oct 1975. Live light - some contacts in the  
area. 8 or 10 frames of contact.  
Live lamp 15 ft off the stern of Boat.

Conclusions. April 4, 1976.

A. Flashing light in the house.

1972 - animals seem to go out of range.  
Search light. Sound shows arrival  
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 recorder.

Javelin JXL 400

Samme ETR 1200

Motion detector.

Tapes.

Rines & Bladder will

acquire one recorder. 600 110.

" Motion Det.

" Tapes

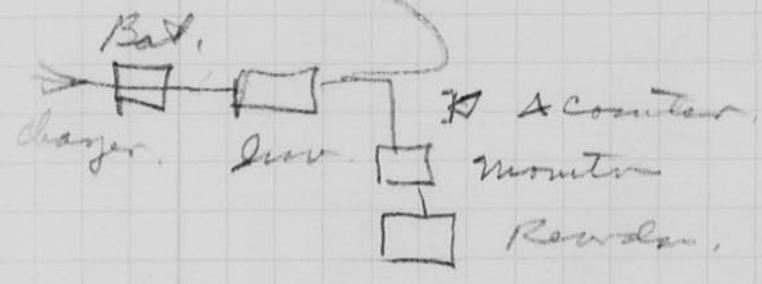
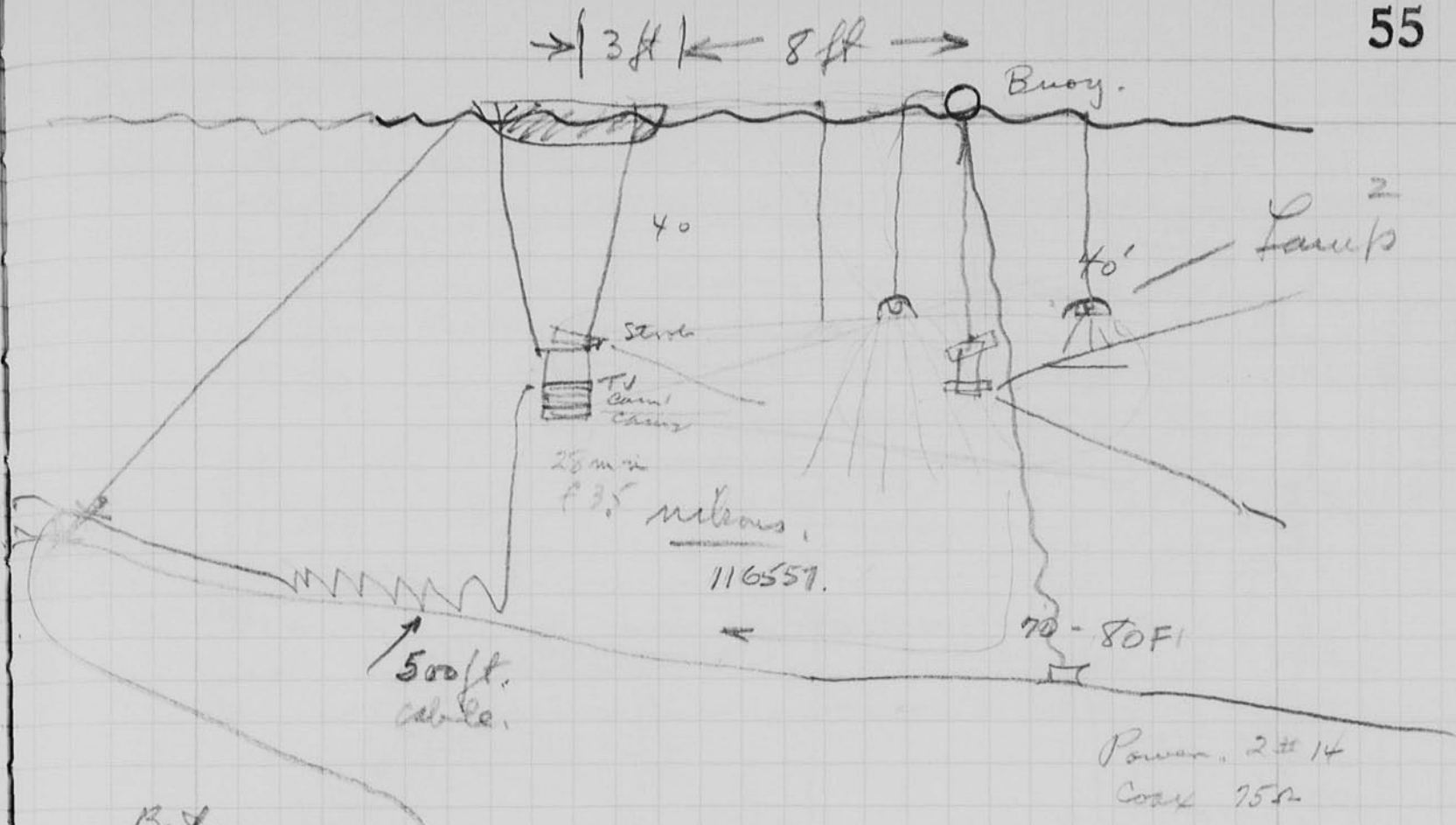
" Spare parts.

3. Camera

Edgerton & Miller.

4. Cable - order 500 ft.

Lock Room  
3 hours.



*thing program  
not written up  
on paper 5.  
AR*

Stencils

1. Strobe ✓ HB
2. cameras HB & A Stencils B Reuther
3. cable 500ft cable box TV camera. HB } HB }
4. Monitor. — Rines Blanker
5. Recorder motor Rines Blanker Tapes. Carb.
6. 5x70 Polaroid
7. 110-600V Power supply HB Dry Slip X. Edg. 2 wire cable to S.T. Strobe.
8. Transformers 110-24V Lamps. ✓ W. Rines & Clear W. W.

Targeted lights

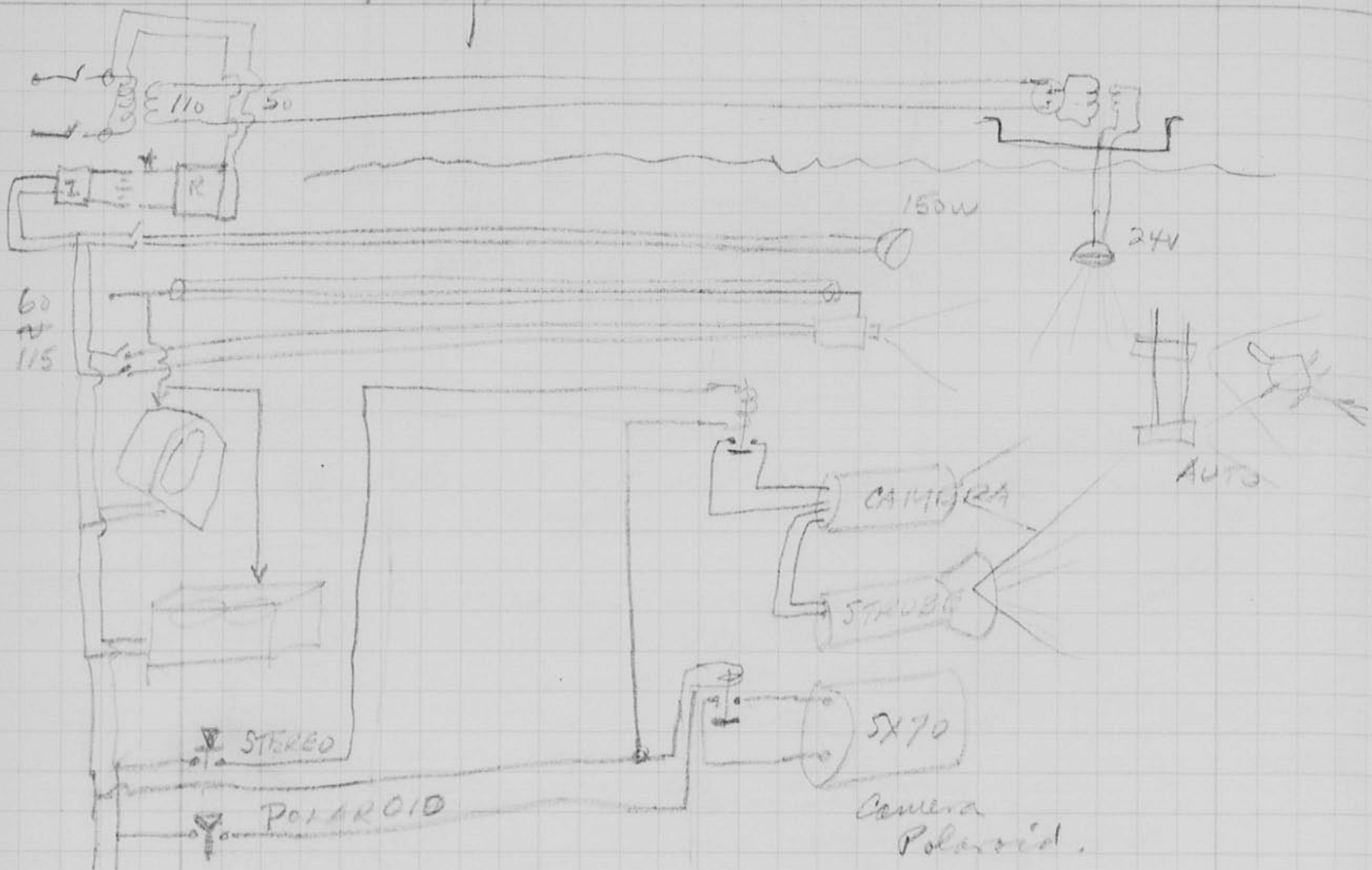
Rines.  
Voydroler

Cook, Bob  
Meredith Dennis  
Dinsdale  
Johnatridge.  
Chris MacPherson, full 1-day  
Zay.  
Dinsdale.  
Kline - 2 weeks July 15  
Sale on Bay. 1/4 mile  
Penetration -  
Rines - 4 people jump!  
Borden - Preswick.  
Cowstoker?

April 8 1976

H. Edgerton

220 V 50 Hz



Cable 7 plus coax

Batteries for Strobe.

" " Camera

150 watt Lamp bulbs.

Reflector.

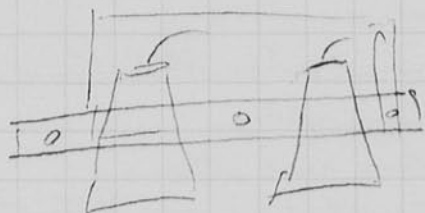
1/1000 f/stop  
 5.8 x / ms.  
 1/5 ms pulse



Stained Emitter

Bill Mac Roberts helped me remount 2 Massa  
5K transducers for use with the 259 Elde Side Scan

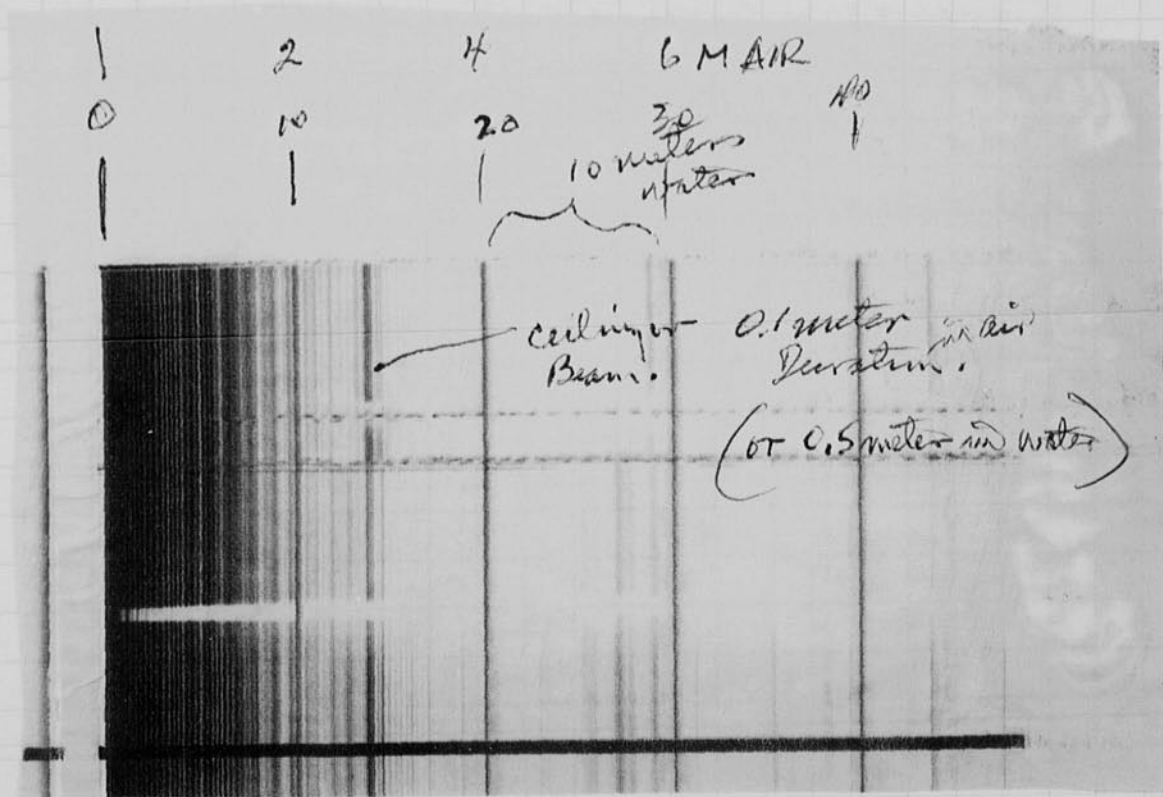
These were mounted in a wood frame by  
sawing them about mid way.



Massa  
units  
10292  
10668

We could "see" the ceiling with beam in 1030  
with high input. 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 units are now ready for the water tests  
in the Boston Harbor.

58 April 13 1976

Harold Segerton

Yesterday in Washington.  
Nat. Soc. Society. Fletcher

Scherzhel

Joyce Snyder

Bill Grossman

Smith Barrett

Julia Billard (book on stock)

Called them in phone about lecture in 78.

Experiences in oceanography.

Look New monsters and others.

Grossman said David Boublier & Cristal were in Iceland to check on the Lohren photography.

Photographers

Dr. Lott. Jean Des

Australia

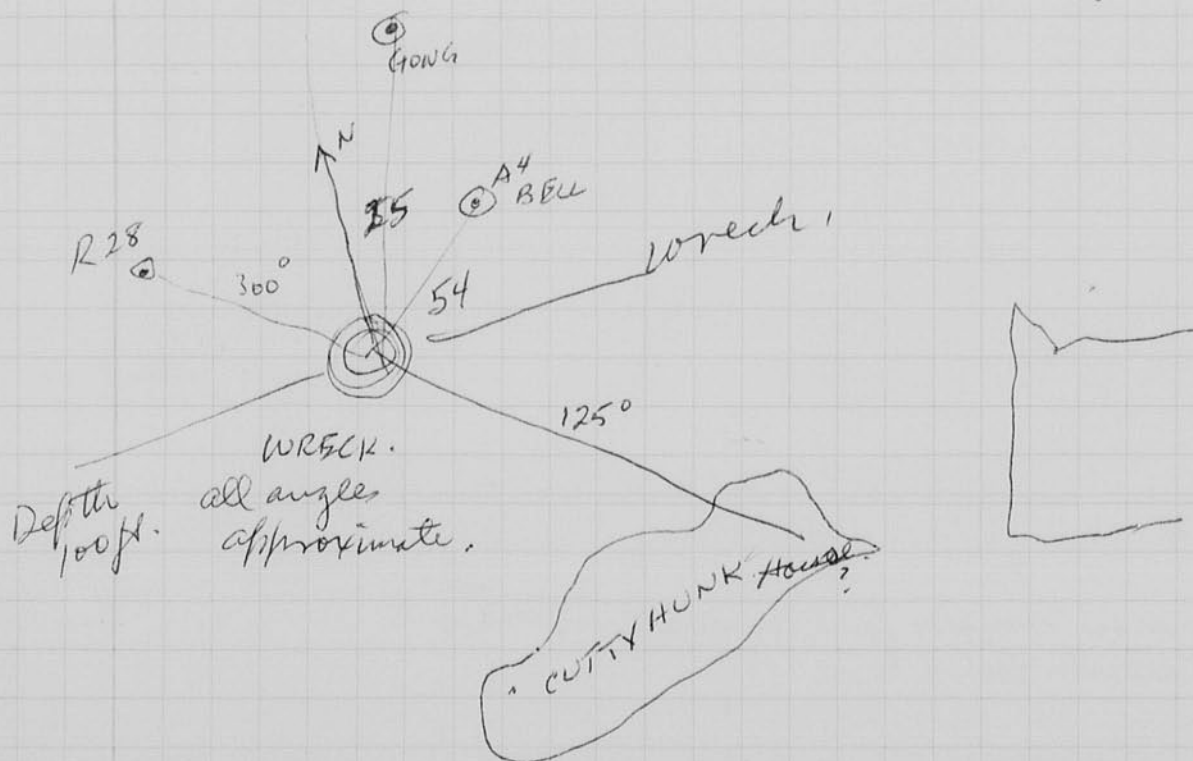
7 report to 10/2.

Bahamas.

April 14, 1976 I left at 7.30 for Fairhaven to work the  
EG & G 259 meter on the CORSAIR Capt Leonard  
Hathaway 617 996 8221 office home 617 992 9764  
Hathaway Briley wharf Fairhaven Mass.

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

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



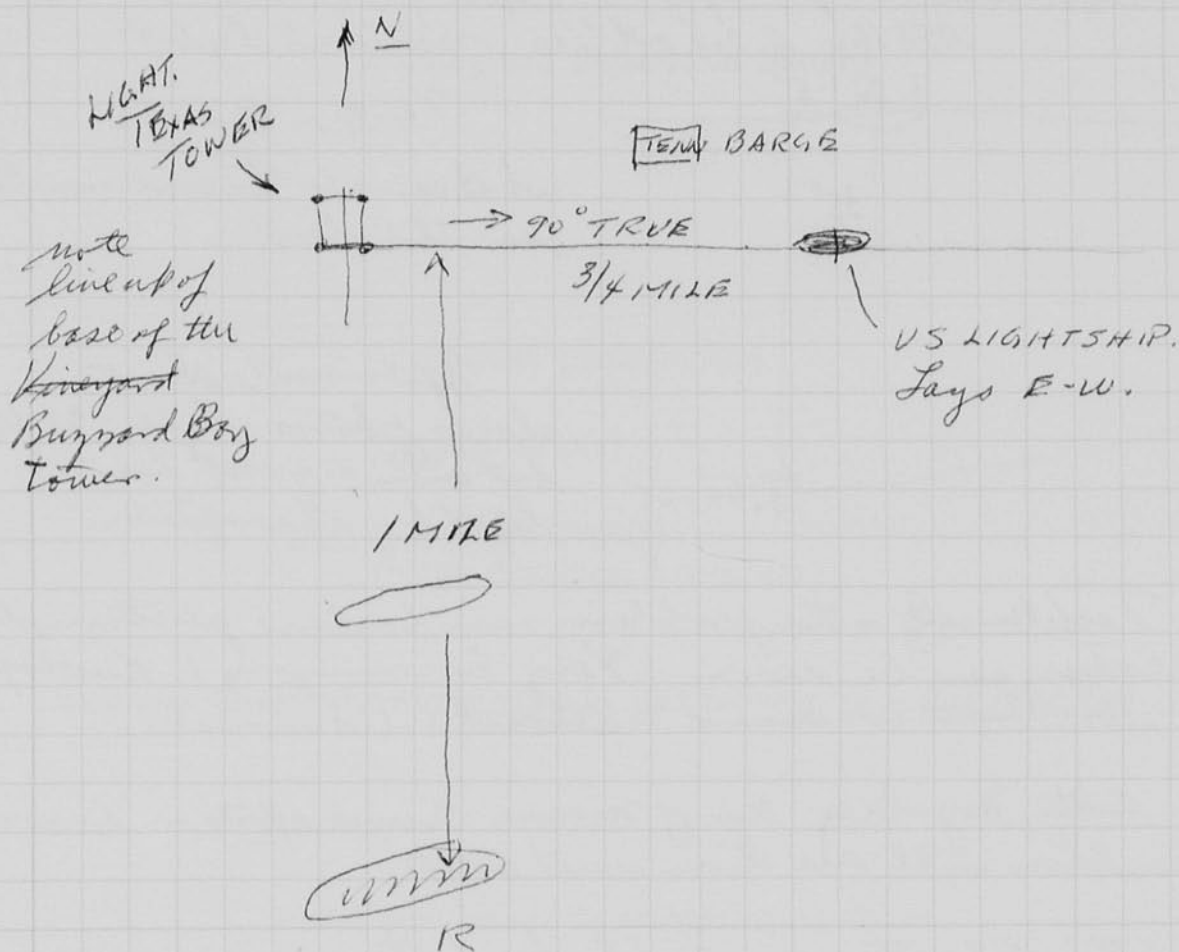
Vineyard Light Ship

and other information from Brad Luther. Apr 16 1976

PO Box 225

Faithanew

992.4030



Notebook # 32

Filming and Separation Record

\_\_\_ unmounted photograph(s)

\_\_\_ negative strip(s)

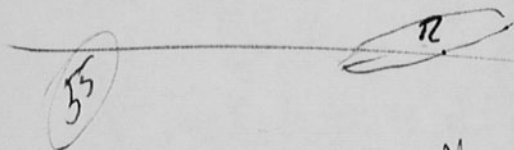
1 unmounted page(s)  
(notes, drawings, letters, etc.)

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

1 M  
S



TENN.  
BARGE



B. W. LUTHER  
PO BOX 225

N

F. H. 992-4030

Notebook # 32

### Filming and Separation Record

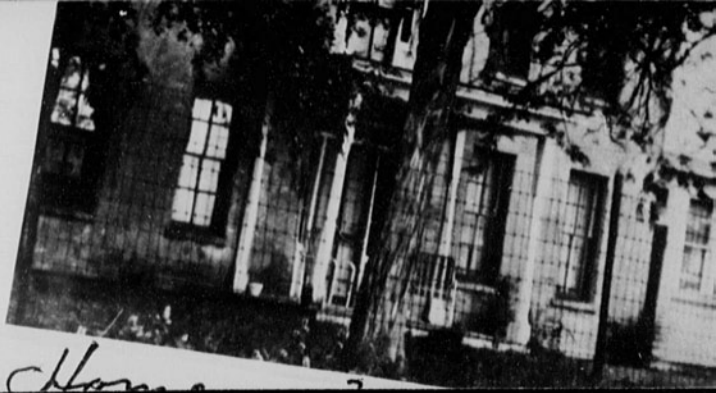
1 unmounted photograph(s)

     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?

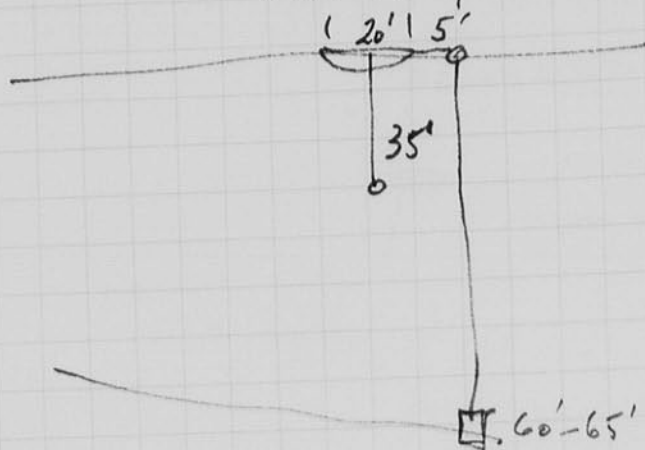
Coe Farm House  
Woodbine House



Kristoff & Doublier  
Rivers - 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 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 photo graphically.  
25' away can be seen. Very Encouraging! Kristoff.  
Use light or sound to attract the animals.

Arth. Myrberg Univ. of Miami Sound effects on animals.  
Doublier will see him next week.

- K.
1. Continuous light. by battery.
  2. Globe. fire fly stove.
  3. Sound - Tape recorder. subject?
  4. Food.

K & D will work in July & August.

857-7471 K.  
Theora alternus. secy.

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

- ① Bob Ballard - will make <sup>staircase</sup> fully bottom study of  
Argnot bay. for De. M.
- ② David Doublier - food chain for the lake.  
McLowan asst. curator Royal Mus Ottawa.

Klein July effort

1. McGowan - Mares on bottom side scan  
looking for Bones.

2. Gull across V Bay.

3. Penetration of silt to find rocks.  
Kolham has detail of slugs.

Salmon Grass (Greenland). 2 types.  
Let mature.

Rivers dry up so that salmon and fish  
mill around the area.

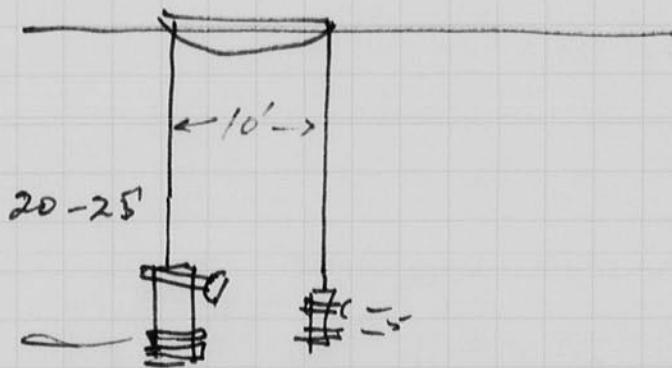
Salmon hatching above in fish lake.

Diver. M. 18' boat trailer Tempe Bay. 8 people

Gordon McKenzie electrical contractor  
Diver.

Alan Hunter

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



$\frac{1}{10}$  sec f3.5  
16mm

Conclusions.  
for MIT.

20ft deep.

Consider 16mm f3.5 (2 lenses).

al chandler lenses and adapter.

for stereo pair.

Film - Stereos (~~2475?~~) 100 W Daylight Color  
Kodachrome 64. (has more contrast).

For U. G. Society - Tab units to sonar  
 (Brit. aqua club Electronic. e. Gordon.)  
 Jim Ruis  
 Group. Sels - salmon pictures.

Apr 27 1976  
 Harold Edgerton. Out boat, MARY, in water last Friday. Put  
 into action today with 6KH and 12 KH fingers  
 into the 259 ELOK Recorder. I am preparing  
 for a talk to Key West on the 29. This day - they  
 on the 4 or 5 of May I go to Las Vegas to help  
 Herb celebrate his retirement from ELOK.  
 I have made him a desk lamp  
 for a FT-17 flash lamp of the type we  
 used in the World War for Photo Recon.  
 Around the base is inscribed a grate for  
 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

63

Harold Edgerton 100 New Dr. Cambridge Mass. apt 11-7A.

We are still mightily 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 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 NUESTRA SEÑORA DE ATOCHA 82°20' W 24°30' north. In past and first sightings, there a hurricane 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 Atocia, then I went back to Boston on the Delta 10:15 pm plane.

Esther joined me and we went to Detroit. Bob and Family met us at the airport. We ~~drove~~ drove to Canada to see the park at pt Pelee. This is a bird sanctuary and is the largest part of Canada.

Then we went to Las Vegas, Nevada to visit the Nat. Bank of Commerce Oscar Clarke Jr. Carlson, etc. Next to Aurora at 2 pm to inspect the James estate Howard Anderson.

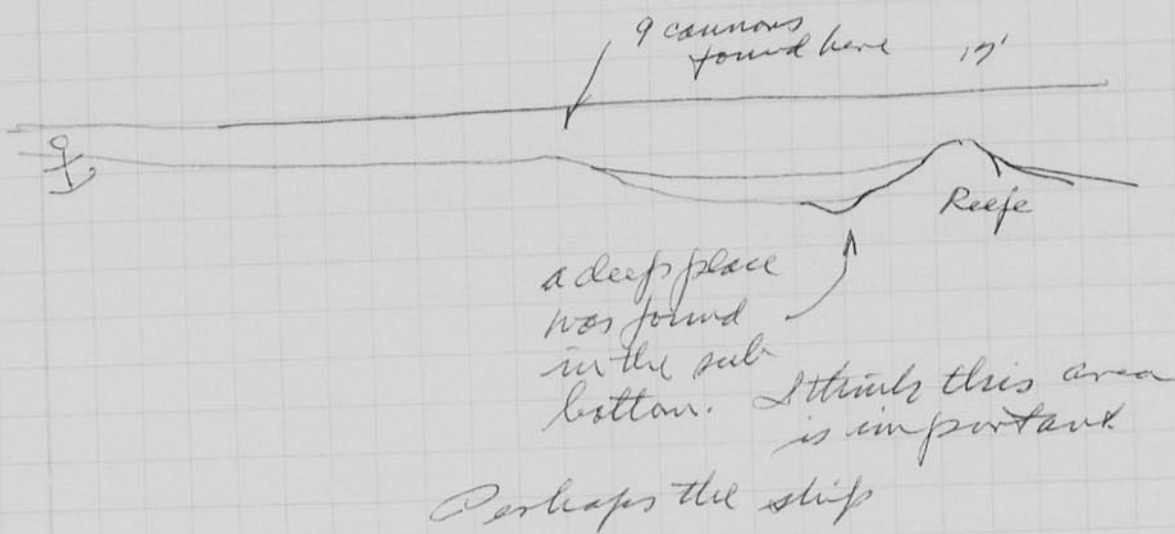
On the 4 of May I gave a talk to the Physics class at the Aurora High School. Carter was the principal. Mark Komer and Matthew Williams were there in the class.

We took the 8:30? plane to Denver and Las Vegas from Lincoln. Caesars 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 Marquesa Keys and the Atocia site, 10 miles west,

I left Key West at 7:30 on ~~May~~<sup>9</sup> Sunday for  
Boston on Delta at 10:15 pm.

Our efforts at the Atadna ~~site~~ <sup>site</sup> seemed  
important. A 6 kHz Massa pair of transducers  
were used. Many (10) targets were buoyed for  
investigation.



May 14, 1976 Chris Finkelstein and McGowan  
were in this morning to look at the  
sonar equipment for fish nets.

May 15, 1976

4-402

M.I.T. - 4-405

End, report

Harold Edgerton

Black Board outline by Bob Rines. 9:30 meeting.

Surface water.  
T. Dunsdale  
Water horse  
Geo Newton.

Bob Rines  
Chas Finkelstein  
Dennis Meredith  
John Tetterop.

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

Chris Mc Gowan  
Chas Wyckoff.

met 11:40

Geo Newton Jones Special Studies  
Kay Newton Klein Klein Essays  
Harold Curtis Finkelstein,  
Jean Money Raymond (Butters)  
Blonder  
Mrs Blonder Tetterop (Polaroid)

Underwater Foot  
Photo T.V.  
Edgerton  
Muller  
Mackelberts.  
Money

Zoology Assoc.  
McGowan (R.O.M.)  
Thomson (Cam. Uni)  
J. Buchanan Stirling Univ.  
micro biology  
S. Attridge. mid London Zoo  
Laurie Smithson Zool.  
(Brit Mus) Greenwood  
Shirley.

John Wilford.

Martin Klein.

Paul Hoseprop

Academy.  
Wyckoff photopaper.  
Blonder  
pub. Rines

(Harvard Univ.)  
Mus. Comp Zool  
Crompton  
Crompton

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

David James MSP  
Dick Rayner  
Highland Council  
Tech News  
Prof. & Ben  
Information.  
Sir Peter Scott?  
Roy Macdonald  
Geo. Newton Infor Red  
Birmingham Uni

Judge ~~Walter~~ Nat. Geo. letter from someone in Europe.  
He was misquoted badly. The Nat. Geo. want  
a low profile.

Watch committee  
will be working  
at Loch Ness.  
(Part of  
Highland  
Council).

Discussion of N.Y. Times program of cooperation.

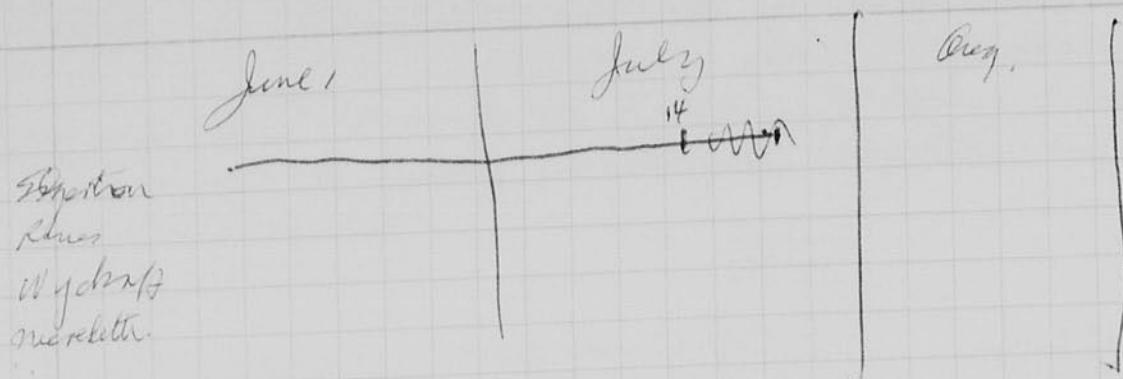
Technical journal all free for sci. papers.

Sir James McKay.  
Gordon Macintosh.

\$20,000 etone. + Nature mag contribution  
for N.Y. Times.

Foyers. location  
for the new  
location sponsored

Exclusive ~~and~~ rights. 24 hour lead time.  
Security: Cherie Wyckoff to keep films.  
T.V. - movies. 50/50 basis 10% expense  
National feebags - Scotch - English etc.



## Boats,

Hunter 21' 75 hp. Moos low II

Blue Horn 18'

MALAPAN  
 Meloran - (Buccanna) Sleeps ~~5~~<sup>2</sup> 6. Rented boat.

Facility

Temple Pier (aly menzies)

MaKey Rines Boat house.

Menzies Power & Water Bar.

ach uahamit. (Dorothy Frazier)

Wegbreff. talks about summer effort.

67

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. Ektadene,  
28 ~~rolls~~ rolls.

Silhouette camera. focus changed.

changed by Fottrop. Calibration photos.

Wires reset film.

60-65

75-80

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

Chris Mc Laman plans for summer.

~~Klein - Duss.~~ @ aquarium at 10 am. Harbor lower 723.9591 Rines.

Bottom Survey.

Sedimentation.

Coming to find out the bottom.

Bottom Survey off with Sonar

Chas. Tinkelblain. experiment

18 bones. Mammoth. float.

75 meter 35 meter range. on Sonar. Island Pond N.H.

Martin Klein. - Sonar find things under sea.

300ft of water to find boats in Lake Ontario.

Airplane - 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 class I.

Long Range records can be made in Lake Ness

Chance for finding a small object is nearly zero.

Heavy weight of cables for deep Side Scan.

Sub-bottom work.



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

Rines photos of surface horns

Infra red has improved greatly.

detect small differentials in temper 0.1 cel.

Hot air coming out of nostrils,

Low emissivity.

Surface conditions when the 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.

Wydroff and I loaded the cameras at 6 pm  
 for a quick 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 Toledo (?) system  
 that gives 60 cycles.

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

The lenses on the stereo pair are ~~16mm~~ lenses  
 with ~~aperture~~ 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 ~~materializes~~ announces

May 19, 1976

ac from

250 watts ±

Toledo 50:191

50-193 CMOS Oscillator

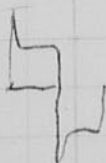
612-646-2868

1068 Raymond Ave

Minneapolis Minn

St Paul 55105

Scotch  
 230



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

Left Lens 100287

Olympus auto fish eye f3.5 16mm focal length.

Right Lens 101830

Both at f 3.5.

Miss Wydruff

4 mms of added ten.

Focus is O.K.

6 should have been added.

May 20, 1976

The big T.V. camera.

Tape.

0 Lab.

19 #1

21 aquar

49 camera over water.

66 audiotest

85 into water

131

178. Towell.

1/15 ~~f11~~ f32

f11 Polaroid.

127 mm special mod Smitte  
for T.V. Monitor.

CVF camera.

213 Photo of fish Dim. 1/15 - f32 300

251 Shrub.

261 photo

276 photo

280 photo

285 photo

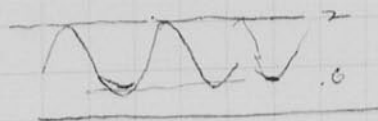
290 end



from T.V. in  
Aquarium.

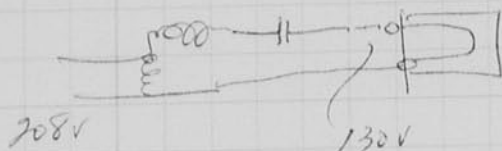
May 21 1976  
Harold S. Gorton

Test of 250 watt lamp metal halide for aquarium.  
Output  $100 \times 6^2 = 3600$  candle power. 250 watt 208 volts.



Ripple on 120 Hz from lamps.

M 250 BD  
Base Down.



May 23 1976

283 gnd

May 23 1976

|                 |     |                        |  |
|-----------------|-----|------------------------|--|
| Walter Kravetz  | NBC | News                   |  |
| NOIC O'GORMAN   | NBC | NEWS                   |  |
| Nick Magallon   | NBC | NEWS                   |  |
| Frank J. Zwick  | NBC | NEWS                   |  |
| Frank Ferns     | NBC | NEWS                   |  |
| AL PERLMUTTER   | NBC | NEWS                   | 30 ROCKEFELLER PLAZO NY NY 10020<br>(212) C1-7-8300, EXT. 2914 |
| ALVIN COOPERMAN | NBC | 30 ROCKEFELLER PL. NY. | 212 C1 78300 X 4936<br>Home 212 8735329                        |

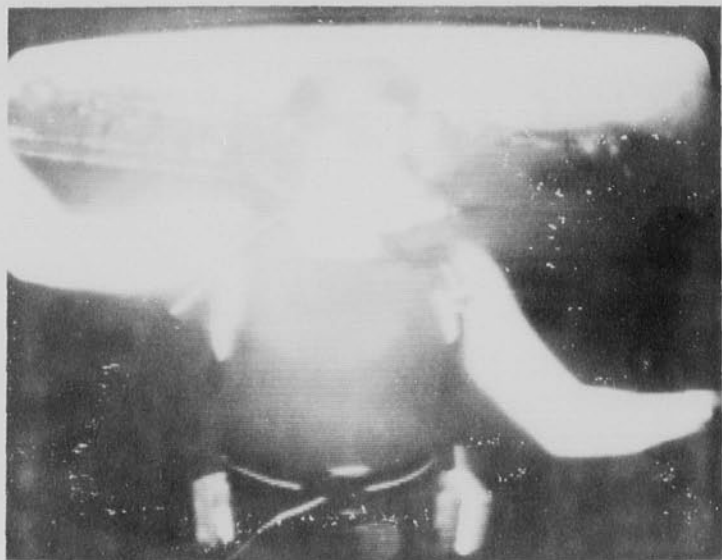
Tom Miller & Jean  
Lynn Meredith

Left Plusx Right H.S. EK Trachurus  
f3.5 f3.5  
6-10 6-∞

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

Stroke 8ft to camera.

Test all ok in N.E. Aquarium.  
Some photos of Neo (Diver)  
More information in Chris  
Miller's note book.



Dec. Diver in U.S. Aquarium

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

on an RCA T.V. camera  
into a Javelin tape Recorder.

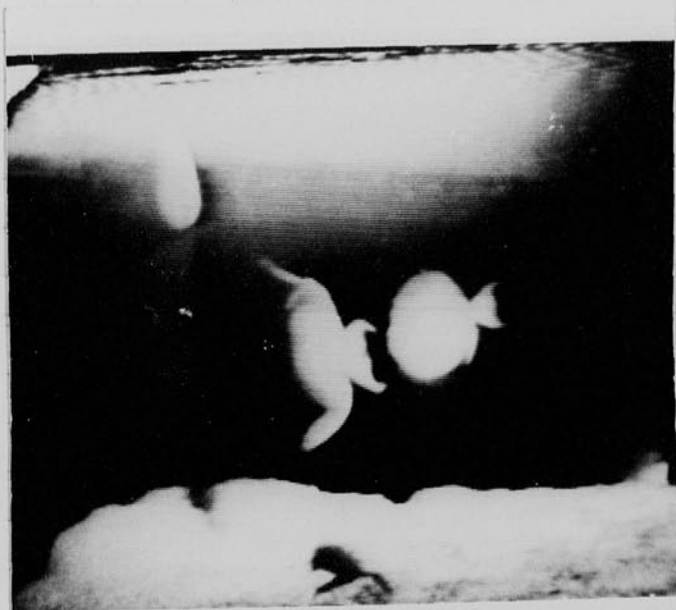
Dennis Andrejko

396 4799 3.4418

architect who calculated  
the sun position for  
line up with the  
main hallway thru  
MIT from Bldg 7.

DENNIS A. ANDREJKO  
7.921 3.4418

971 FELLSWAY #10  
MEDFORD, 396.4799.



May 24 1976  
 David S. Edgerton  
 4-405. NBC.

Olympic On System Suiko auto Fairbank,  
 1:3.5 f.16. Left # 100287  
 Right # 101830.

these are two lenses that were put on  
 the Benthos cameras by the  
 National Geographic Society by  
 Jim Washington.

May 26, 1976.

Yesterday - no Sunday - at 10 am I took  
 some flash photos of miss Lindsey Harkness  
 in Building ? where she has been taking  
 motion pictures of the tongue action of  
*Chamaeleo jacksoni* and *B. biternatus*.  
 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  
 stroke time is about  $1/20$  of a second.

The equipment for the next Lock 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 5X70  
 camera and flash system. The N.B.C. crew  
 were there to film the sequence on 16mm  
 for background material.

A 250 watt metallic arc lamp 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.

A game Bob Bonayolli's Salem phone no  
 to John Prescott. Lamps are also made in 400  
 and 1000 watt sizes. The underwater experiments  
 have not been tried.

May 29 1976

David Ogden

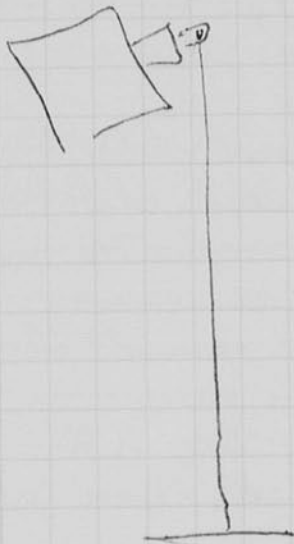
# 3000  
Yesterday packed and shipped 48¢ on Brit Airways  
and 130¢ photo to Pererivich Scotland. Then Pines  
added some to make 1975 pounds total.

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 copods, Hydra  
worms etc. copropods

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

Distance about 2 1/2 ft to end on view  
a 4x5 film 7302 Eastman  
"fine grain positive" was used  
developed 5 min in 1:1 Dektol.



A final exposure was made on  
an 8x10" film 7302 in a  
developing tray, when 1 cm of  
liquid - the entire pint was  
dumped in. There were a few  
oak leaves etc in the lot. I  
did spot some copropods on  
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.

July 15 1976

David E. Ogston 100 mem Dr. Cambridge Mass apt 11-7A, 11-6A,

I returned yesterday with Esther from Iceland 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 Drumna drochuit which is about  $\frac{1}{3}$  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 TVCHAT, the house to the west of the Rines cottage.

Our operations were based at Temple pier on stone pier just down the hill from TVCHAT. A chateau (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. 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 (unit) 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 chateau. A ~~push~~ 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  $2^\circ$  width. Also the other side of the B66 25A fish was removed and placed in a position to create a horizontal  $2^\circ$  beam. Then double information was obtained. Attached to this note book is a

Summary of the results as measured from the E664 type 259 recorder using side scan sonar beamed at the camera setup. The HUNTER (50 meters) was used first - then the Barge some 110 meters from shore.

LOCH NESS

HAROLD EDGERTON  
TEMPLE PIER  
LOCH NESS 1996

| SIGNAL<br>WIDTH | DURATION |      | COMMENTS        |
|-----------------|----------|------|-----------------|
|                 | VERT.    | HOR. |                 |
| 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?   |

DIRECT IN SIGHT  
110M OFFSHORE

6  
7  
8  
9  
10

BARGE  
MOORING  
MOVED



Summary of the results as measured from the E664 type 259 recorder using side scan sonar, beamed at the camera setup. The HUNTER (Sombrero) was used first - then the Barge some 110 meters from shore.

HAROLD EXERTON  
TEMPLE PIER  
LOCH NESS 1976

COMMENTS

| DATE | TIME | CAMERA | SIGNAL | DURATION |      | COMMENTS          |
|------|------|--------|--------|----------|------|-------------------|
|      |      | DIST   | WIDTH  | VERT.    | HOR. |                   |
| 1976 |      | METERS |        | MINUTES  |      |                   |
| 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   | 16:08  | 120    |          |      |                   |
|      | 26   | 08:01  | 70     | 0.5      | 9    |                   |
|      | 27   |        |        |          |      |                   |
|      | 28   | 07:51  | 135    | 4        | 0.5  |                   |
|      | 28   | 07:57  | 75     | 4        | 0.3  |                   |
|      | 28   | 07:32  | 52     | 1        | 0.1  | DOUBLE            |
|      | 29   | 05:09  | 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               |
|      |      | 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               |

JULY

JULY

DURGE IN SPEED 110M OFFSHORE

5  
6  
7  
8  
9  
10

BARGE  
MOORING  
MOVED

TEMPLE PIER  
SCOTLAND

LOCH. NESS, 1976

HAROLD EDGERTON

1976

MID NIGHT 0 2 4 6 8 10 12 Noon 14 16 18 20 22 24 MID NIGHT

HOURS

JUNE 23

24

25

26

27

28

29

30

JULY

1

2

3

4

5

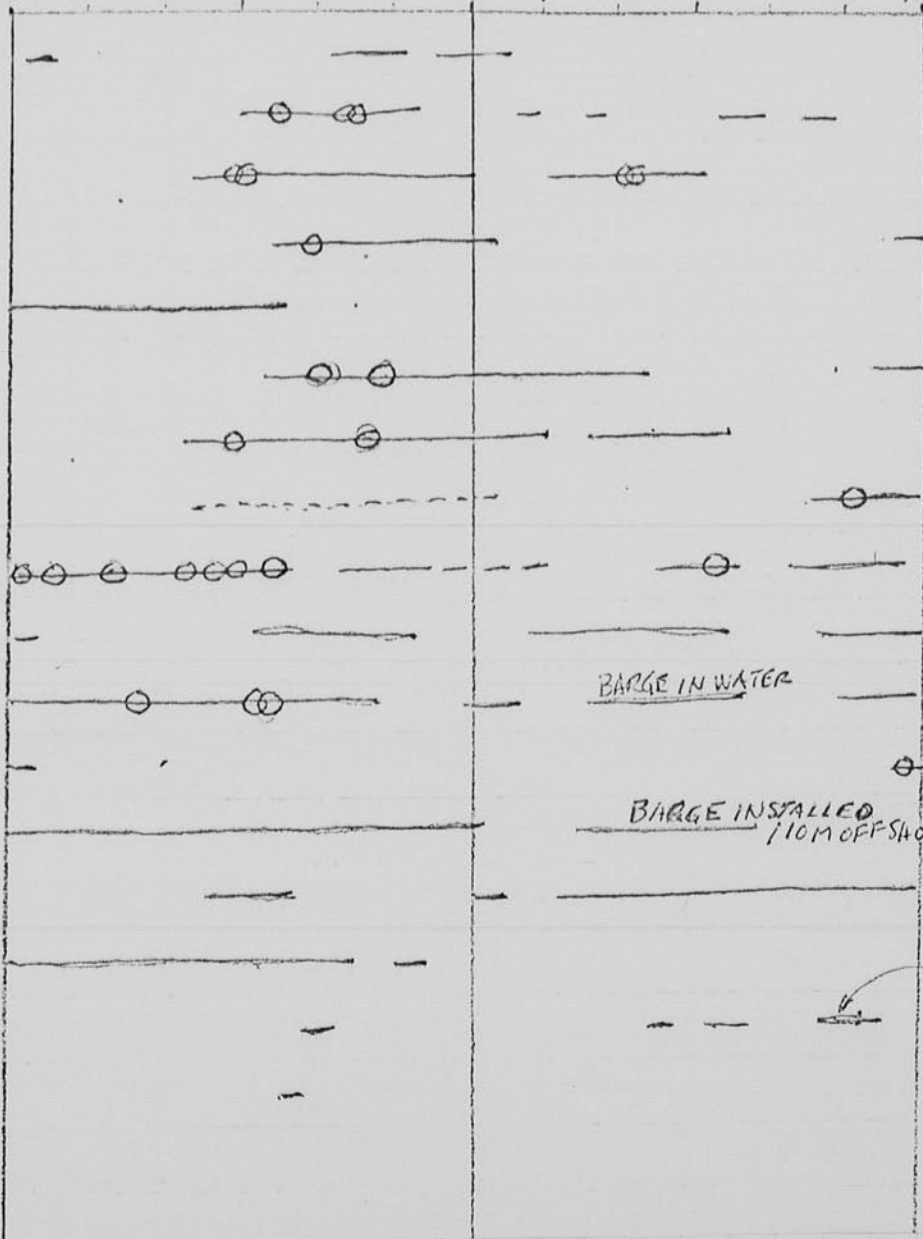
6

7

8

9

10



Edward & I left Lyell at Drummond Island Island on July 14 1976. We drove our rented Avis car, a Volkswagen, to Inverness to catch the 730 plane (British Airways) to London, then we took a 747 for American to Boston. Doublier of the fuel tank 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.

Note on the 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 was 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 beam records from ~~the~~ shore echoes. I did not see any signals that I could identify as animals. This experiment needs to be repeated.

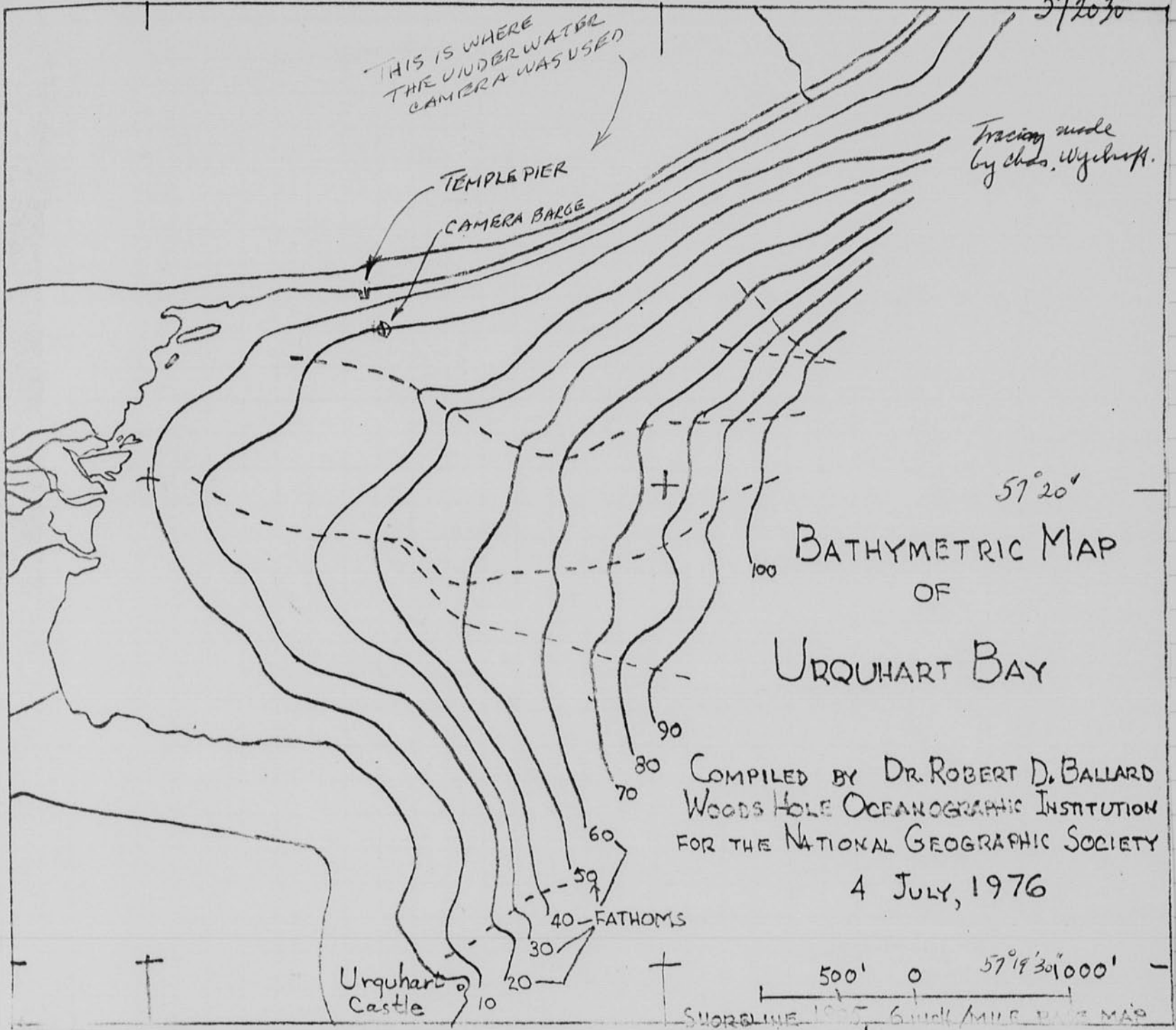
A few runs were made at the Lockend where Finkelshein found the rings. Two runs were made so that an approximate location of the many circles could be made.

59°20'30"

THIS IS WHERE  
THE UNDERWATER  
CAMERA WAS USED

Tracing made  
by chas. Wyckoff.

TEMPLE PIER  
CAMERA BARGE



BATHYMETRIC MAP  
OF  
URQUHART BAY

COMPILED BY DR. ROBERT D. BALLARD  
WOODS HOLE OCEANOGRAPHIC INSTITUTION  
FOR THE NATIONAL GEOGRAPHIC SOCIETY  
4 JULY, 1976

500' 0 59°19'30" 1000'  
SHORELINE 1975, 6 INCH MILE SCALE MAP

78 Harold Edgerton  
 Light output Gen Rad. 1539A High Scale with Reflector  
 July 17 '76 Peak light  $2 \times 10^6$   $2.2 \times 10^6$  CP.  $0.110$  CP  
 Duration  $2.5 \times 10^{-6}$  X.  $\frac{25}{25}$   
 $\frac{110}{44}$   $\frac{25}{.275}$

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

Strobotac 1531  $1.9 \times 10^6$   
 A.B. 24543.  $2.5 \times 10^{-6}$

Beacon for Aurora  $0.05 \times 8 = .04 \times 10^6$  volts. peak light.  
 Dur =  $30 \times 10^{-6}$

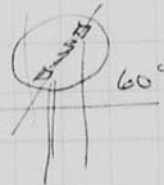
$30 \times .04 = 1.2$  C.P.S.

1539A on High at 200/min

$2.2 \times .05 = 0.110 \times 10^6$   
 $2.5$   $\frac{2.5 \times 10^{-6}}{0.275}$  B.C.P.S.

$\frac{25}{25}$   
 $275$

July 24. WHOI Constan.  
 July 21-1030-11 J.A. Wolfe.  
 30 } cosine  
 31 } wave  
 Aug 1 }  
 Aug 1-7. Toronto.



28. Tom Yerrama  
 Aug 21. WHOI. In Johnson.  
 Aug 15-20 N.C.

Photos made with P.K. Lamp  $30^\circ$   $0.275 \times \frac{1}{2} \approx .02$  C.P.S.  
 onto 7203 film 6 min PK 72 1:2 ±.

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

July 18, 1976

$110 \text{ cm} = 3.6'$

1. Water from Charles River 30 cc out 4" x 5" film over Saran wraps.  
 Lamp at 110 cm from film 0.2 C.P.S. many 00000 - chains

\* 2. Water from 100 mm Dr. 20 cc + many 0-0-0-0- CHAINS  
 \* 3. " " " " " 20 cc + → some?

Saran for 100 mm Dr.

Double film out

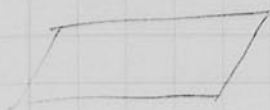
\* 0.2 c.p.s.

110 cm

#4



4x5" film holder



Saran wrap less than .001" thickness



50cc of tap water.

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

#5

400 cc Chlorine Water in 5x7" Pan  
with 4x5 film at bottom.

Lamp 0.2 at 110 cm.

7302 film Dodecyl 1:2 at 6 min.

July 21, 1976 ~~to~~ The D.K. Stroboscane adapted for silhouette photography was sent yesterday to Jeff Wilson PO Box 30113 Cleveland Ohio. He will present the paper in Toronto ~~page~~ 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?  $30 \times 30 = 900$  ???

Loran C Internav 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.

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. 100 36

Borrowed from the Univ of Cincinnati Library.

Foreword by Stanley Tuttle Lord son of Capt. Stanley Lord  
of the CalifornianIntroduction = 11 pages by Padfield stating that  
the evidence against Capt. Lord was not  
just and the conclusions by the court  
erroneous.

Book "The Amazing Seaway Line" Wharton, 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.   |
|-----------------------------|------------------------|--------------|
| WA Baker                    | 41° 16' North.         | 41° 46' N    |
| Hart Museum.                | 50° 14' west           | 50° 14' West |
| Wreckage and<br>boats found | 44° 32' N<br>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~~ <sup>Scotland</sup> 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 U.S. Aquarium. Tom Helbert, Chas. Mrazel will help me.

Bill is making two more silhouette lamps at 110 cm above the film using the FX-6A lamp with "high" on the GenRad Slave light. The output is about 0.25 cps. with the bare lamps.

Trialexposure made at 110 cm on 1302 fine grain portrait film of a torn sheet of paper to show fibers. Dev. 6 minutes.

July 25 1976

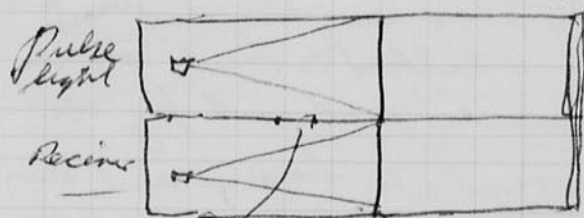
Harold Edgerton

Distance measurement.

Use of light pulses  $0.1 \mu s = 100 \text{ ft}$   $0.1 \mu s = 10 \text{ ft}$   $0.01 \mu s = 1 \text{ ft}$ .

Compromise for  $0.1 \mu s$  10 feet for crude instrument.

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



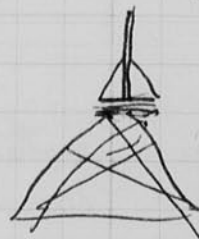
Controlled leak of light to pick up outgoing pulse

pick up outgoing pulse

filter to exclude the wind light.

best angle.

Telescope for adjustment of MIRROR.



Measure time between sent and received pulses.  
velocity of light  $\approx 3 \times 10^{10} \text{ cm/sec}$ .



82 Aug 4 1976 Harold Edgerton

catch up on activities.  
on Wed July 26 Tom T. Uyemura and wife Myoto + 3 others  
arrived and stayed at the Grand House. We had them for  
guests at our home, also Jean Murray.

I went (took Constance, Solomon Phil Constance  
and Thayer to W401 for a meeting of the Constance  
Society. Then dinner at the W401 with their trustees.  
Fri July 30 I took the 4 Japanese men & Selma -  
EPC Lat and Eb, G, 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 Diller, Patrick Barron and  
the capt. We took pics at 2 stations at 90 meters  
deep off Boston. The T.V. both showed holes  
in the bottom.

~~Fri~~ Today <sup>Aug 4</sup> I went to Nahant beach with Esther  
and our grand daughters Nina and Sylvan  
Edgerton from Pontiac. Andrew Kay and  
Duke from Dallas came to see me today about  
strobe photographs. The girls came July 30  
and leave on Aug 5 at 3:52<sup>PM</sup>. We had a grand tour with them.

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

Experimental photos Strobolent.

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

Photo record.

made at sea on

Slip. #44. 424 Aug 376  
Counter.

2 MIT

3, 4 on Slip.

1324 in water.

1147 50' deep.

1151 1325 String 50' deep.

1210 1335 outside. Ok.

1410 Station 13 Surface net 1336

1424 up. 1347

In lab. Aug 4 1350

Fast photo 13.51

Film removed for  
sending to Rochester.

H.S. Ektachrome.

f8 1.5m.

Suggestions for 424 M.I.T.  
Bench and seat for sonar.

Lamp over chart. Sonar.

Small Bomber & Drive.

Holes for tie-down ropes.

T.V. Tungsten light

T.V. system samples

Dark - Windows for T.V.

Increase power in  
12 KH pingar for  
more penetration.

Derek Goodwin 6212 Verne St

Bethesda Maryland 20034

~~number~~ 301. 840. 9293.

Bon Homme Richard

Program of Dr

Sydney Wignell.

Decca will operate the survey for  
the ship. (8000 day cost.)

1 week 24 hrs/day operation.

Goodwin plans to make a movie.

Nina and Sylvia Edgerton of Pontiac  
were guests for weeks of Aug 5.

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

84 Aug 6 1976 Harold Edgerton

Silhouette Photography.  
Strobolane at 110 ~~cm~~ cm.

1st enlargement 50mm lens 1mm = 11mm x11.

2nd enlargement 50mm lens 1cm = 5.9cm x5.9

3rd enlargement 4" lens.

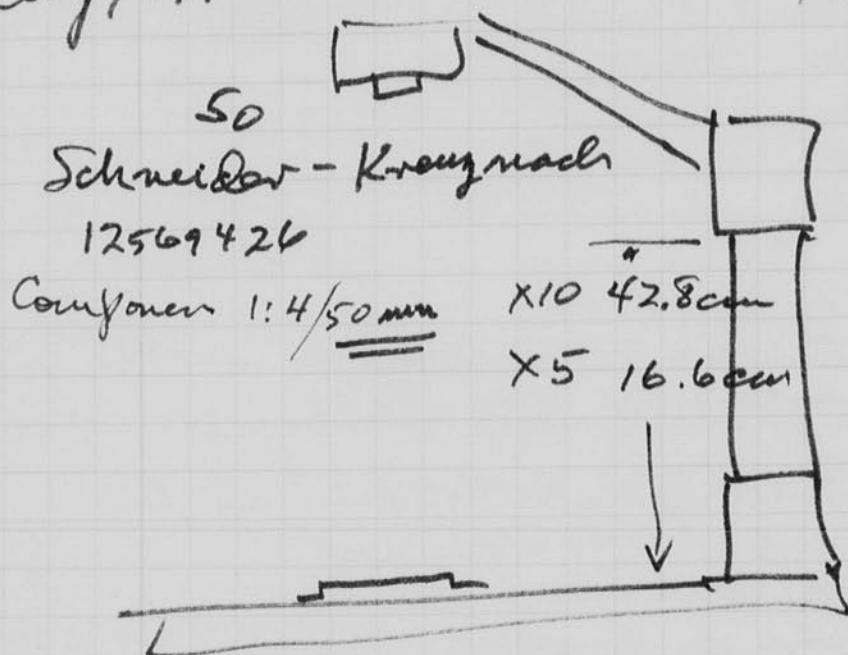
649.

enlargement. 1298

$\frac{1 \text{ cm in enlargement}}{129.8} = .017 \text{ cm} = 1.7 \text{ mm.}$   
 $= 1.079 \text{ mm}$

Aug 7 1976

H.S. & Bill Dixon



Getman  
enlarger.

Aug 9, 1976 Clear River Water

H.S. &  
Bill Dixon

8x10 9302 film Fine Grain  
Strobolane at 1 meter (110 lens).  
Debit 1-2 water. 3 min Dev.

Shows many strings and dots.  
Film in 8x10 tray with 3% of H<sub>2</sub>O.  
about 5mm of water over the film.

Harvard or A Crumpton 495 1724

Jane Munge 495 1724  
Dr. Ritt Turner 1779 molluscs  
Woolcott 1755

Rudy Strickler-Yale  
Dept of Biology  
Esbona B. Medicine

Russel Isaacs 1-366.9181

Hynes book (new manuscript),  
biology?

Warren Kimbell Lyman School Mass. Pollitun  
Westview  
PO Box 545 Westboro 01581

constant son  
Leslie Shedlin  
777 3rd ave  
212-826-2440  
243-500-150W  
wants 5  
Sochets,  
I referred her  
to Sam  
Raymond.

algae.-

SO. 427 film is High Definition Slide @ serial 3414  
info from Sheldon Phillips Aug. 9, 1976.

He suggested color 2483 Strachrome (E-4 processing)  
High contrast.

Note interesting light around the beads?

August 10, 1976 - Harold E. Edgerton

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

N.C. Water Quality Sam Ena. 437-2000.  
437-3202.

(17)  
Jefferson.

Gene Covert } aero dept. shock waves, etc.  
Mort Finston }

Arthur Milton 617 262-2746

Chris Chuslofeld

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 DIKTOL 1:2. SHOW
2. 4x5. Photoflow + specimens made larger area
- motion → 3. 4x5 <sup>wet photo</sup> Film + glass + specimens. (Bubbles) SHOWS MOTION INIMATE
- 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. Dry neg. + wet glass + specimens marks in water.

Edy theory Photoflow + specimens show velocity marks.

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

Aug 11, 1976

H. Edgerton Bill Dixon

Try to get a thin layer of liquid.



1. Blotter.
2. Diffuser.

Water + Brine Shrimp

1 Dry film 1.2 μm glass plate  
Photoflow + Brine Shrimp.

1.2 μm  
FILM

2. 70 cc in 4x5 tray.

3. Soak film 1 minute before adding  
brine shrimp.

4 Wet film. Squeeze before.  
Brine Shrimp.

Res. & Dev.  
Jeff Wilson  
Wilson Carbide  
Parma Ohio  
1840 West 28  
Cleveland, Ohio 44113  
P.O.

SO, 343 #8

High Resolution  
2000 lines/mm.

type 7302 120 lines/mm #3.20

Aug. 17, 1976

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

On Friday 13 we all went to the Nat. Bank of  
commerce to see Judge Cashe, Keith Carlson, Harold  
Bowman and Mingo. Then we went to Aurora  
to stay at the Ken's hotel. Dinner that night (13)  
with Kremens Bob, Ker, and Maurice. Mark also  
came. Snotts and wife. Amett and wife. Howard  
Anderson, wife and daughter, Judge Cashe's wife.  
— from George's 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 look up Aunt Jessie de Cou at the Rose Vista. We enjoyed a visit with her. Then we went to Francis Portegins' house at Job 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 <sup>Jessie</sup> 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 U.E. Aquarium group on MIT's new ship 724. Tom Gilbert, Pete & Caroline Karp, Chas Magel operated the side scan. I operated a Benthos camera and T.V. system. We made photos at 4 locations all about 300 ft deep.

Magel may go to N.Y. still on the weekend to demonstrate the sonar to Rich Murphy Albany N.Y. 518.785.3605 who called from Sachetts Harbor several days ago. Chas. Magel lives in Cambridge 864-3254 I gave Murphy his number last night and hope they get together.

?  
716.724.4524  
called for  
Tomward.

Aug. 21, 1976. Jim. Lerner arrived to discuss the Pacific Ocean experiment that was described in a phone call from Fred Keines. Neutrons flux from outer ~~space~~ space. Large volume of water to glow with ~~Cherenkov~~ Cherenkov radiation.

Aug. 22, 1976 Sat. 3 pm. Loch Ness meeting. Harold Edgerton.

|                  |                       |
|------------------|-----------------------|
| Bob Rines.       | Geo. Newton           |
| Bob Needleman    | Marvin Klein          |
| Chris Wycliff    | Howard Curtis         |
| Dennis Meredith  | Sara Raymond.         |
| Harold Edgerton. | Vicky Briscoe 198-252 |

Geo Newton. 27,000 amp

Report from Bob Rines

Local people service equip. Gordon Menzies. Lake is low. No fish. Recorder is operating fine. Computer is getting fine 1 ft to 35 ft.

Wat. Dec moved into the Van on Temple Pier many faults of triggers occurred. Divers as targets 5 or 6 ft range of cameras. 50-500 cycles to attract sharks used. Baiting experiments (Kippers etc did not work) Will stay until Sept 15. Winter & Kristoff. Doublet 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. 931 type. Boulder - Fresh water tracking of fish. 5 volts/foot - Fresh water fish go to the pos. electrode. Lose the negative.

Nasa - Helmreich to observe personal

Rines 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 Nowan - no word - left through son Univ. of Edinburgh - interested in Rines. Nikon - motorized camera. offer. N.B.C. Documenting in October. Finance - Customs 5000 Internat.

Archaeologist. Anna Ritchie. Univ of Edinburgh. Scotland. about Rines.

British Airways - have not paid for the air freight cabin - still on dock. Chidet for a year. Living facility.

Wycliff 98,000 picts - Dozer fish only.

Rosen cranz - Physicists - Extra sensory experts. Rines will work a summer in the trans.

Oct. Tech Review for Dec. Augusta "Jacobile" Boat. Scotland.

Shank's water field. A. Kalmijn. W.H.O.?





Aug 26, 76 Test of color films.

ASA 16 Photo microscopy 91  
 2483 Color  
 2483 Film.

Substrate, 1 meter

|                |                           |                 |              |
|----------------|---------------------------|-----------------|--------------|
| 1 High         | <del>13 Sample High</del> | 26 Sample High  | 27 ok        |
| 2 High         | 14 High                   | 27 Sample High  | 28 ok 29     |
| 3 med ±        | 15 10 sec motion          | 28 Cork on hole | 29 Lights on |
| 4 med ±        | 16 Sample High ?          | 29 3 High       | 31           |
| 5 Low ±        | 17 " (oh)                 | 30 3 High       | 32           |
| 6 Low ± orange | 18 " ✓                    | 31 3 High x 1/2 | 33 over.     |
| 7 8 High       | 19 21 med under           | 32              | Revised      |
| 9 med          | 20 22 " "                 | 33              |              |
| 10 med         | 21 23 " "                 | 34              |              |
| 11 Low         | 22 24 Low Dim             | 35              |              |
| 12 Sample High | 23 25 " "                 | 36              |              |
| 13 " "         | 24 26 " "                 |                 |              |

10 min  
 no HRP.

Exposure on So 343 HRP 4:15 min  
 1 meter Substrate + 10 up no density 1.03  
 4 flashes D= .06  
 2 flashes D= 0.44

Photo of cylinder of glass with Brine Slime, .02 .24  
 1/3 meter. Water leaked from glass. 0.79

Photo on 7302 High Power at 1 meter. 0.11 3.68  
 over exposed, Reducer C

Photo 7302 High (but no extra C). 5 min 1/4 HRP 0.04 1.14  
 2 1/2 min Dev 1.65  
 7302 5 min

Aug 30 1976. I went to W.H.D.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 Palmouth. 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 Coastline Society Involvement affair. Some 3000 people attended. I took the ~~bus~~ drop-off stroke display. Plans were made for Houston, Boston and Seattle.

Eddie Farber met me at the Milwaukee Air port & told him about the electron microscope work.

92 Hanky Martin

Sept. 2, 1976. MIT 4-405.

Exposures were made with 50343 Eastman high resolution film yesterday with Chris Magel and Jan Finkeddie.

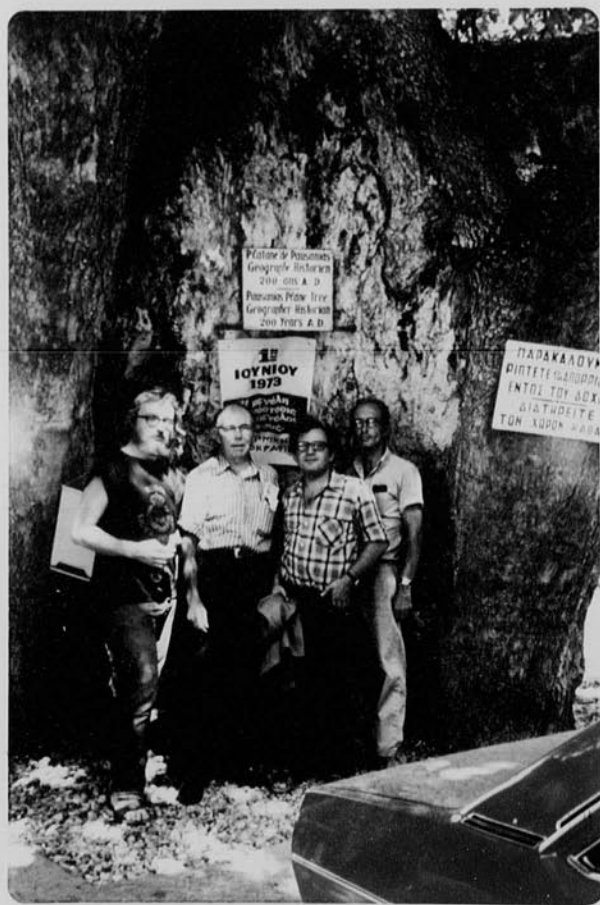
I used the new flash point source 549 with out the stop and with the unit tipped 20° to expose the arc. The film was \_\_\_\_\_ cm.

Previous trials were made at \_\_\_\_\_ cm and \_\_\_\_\_ cm.

Density measurements  
Distance Density.

|          |      |                      |
|----------|------|----------------------|
| 343 film | 67.  | 0.4                  |
| 5mm in   | 85.  | <del>0.74</del> 0.74 |
| 1:4      | 39.5 | 1.25 1.20            |
| HRP Rev  |      |                      |

Excellent. Brimble photo. Shinnip



Pausanias' tree in Agrion  
Greece  
Bay of Corinth.

Paul  
Kron  
Hanky  
John  
Pappas  
7

Paper print  
of brine shrimp

15x 7302

5x 7302

10120x  
on paper.

7302 has  
160 lines/mm.

$\frac{160}{120} \approx 1.3$   
lines/mm.



BRINE SHRIMP

120x

7302

7302 FILM

FX6A AT 11M

Jim Strickland.

Harold Edgerton. Bill Dixon

50343 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 effects.  
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 <sup>39.5</sup>~~67~~ cm  
was used (Denon's of 1.2 - 1.25). of a Brine Shrimp, was  
left with Sisson for a trial print.

We showed the brine shrimp photos to Garrett.  
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.

Manly & Walsh Poque Cherry Chas had their 50th anniversary  
on Sat. 4 of Sept (actual Sept 5). 40 were there, big time for all.

## II The Megalith Builders G.F. 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

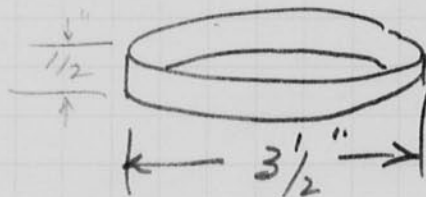
U.S. agent Aldine Pub Co.

64 East Van Buren St Chicago 5 Ill.

Foreword by Stuart Piggott Univ of Edinburgh.

1539A

Sept. 7, 1976 Photobox with Strobolamp lamp, Base, Flat end.

#1 D = 45 cm to film  $1/4$ " aperture. 7302 3 min in 1:4. High.  
Brine Shrimp.#2 D = 45 cm to film  $1/8$ " aperture 7302 5 min 1:4 High.

BRASS RING.

SARAN .01mm  
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" space gaps without the aperture. at  $30^\circ$   
Brine Shrimp - Several weeks old  $\pm$ .

| Exp   | Dist | Aperture | to     | holder           | Density       |
|-------|------|----------|--------|------------------|---------------|
| 2 exp | 50   | 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 Lepanto and Helice 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.Saran fog.  
water

Sept. 10 1976 Harold Edgerton.

Stroboscope in Wood Box with  
1529A. arm holes. 95

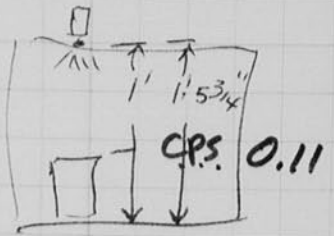
$$CP = \frac{KVD^2}{RA} \quad K = 36.4 \times 10^6 \quad D \text{ in feet. } R \text{ ohms.}$$

$$D = 1 \text{ ft.} \quad 5 \frac{3}{4} \text{ to bottom} \quad 17 \frac{3}{4} \text{ to bottom.}$$

High Output.

Peak voltage =  $5.2 \times .2 = 1.04$  volts.  
Duration =  $3 \mu s.$

$$CP = \frac{36.4 \times 10^6 \cdot 1.04^2}{1000} = \frac{36400 \text{ cp.}}{3 \times 10^{-6}} = 0.109200 \text{ cps.}$$



medium.

Peak voltage =  $3.5 \times .1 = 0.35$  volts  
Duration =  $1.5 \times 10^{-6}$  sec.

$$\text{Peak cp.} = \frac{36.4 \times 10^6 \cdot 0.35^2}{1000} = 12,750. \quad \text{cps} = .0192$$

**cps .019**

Low.

Peak voltage =  $3.5 \times .02 = .07$  volts.  
Duration =  $1 \mu s = .000001$

$$\text{Peak cp.} = \frac{36.4 \times 10^6 \cdot 0.07^2}{1000} = 2,540.$$

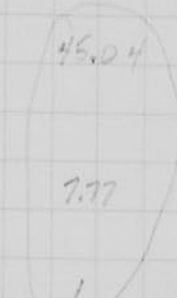
**cps = .00254 cps. .00254**

$$D = 45 \text{ cm.}$$

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

$$\frac{0.019}{.45^2} = \frac{.019}{.202} = .094 \text{ m.c.s.}$$

$$\frac{0.00254}{.45^2} = \frac{.00254}{.202} = .0121 \text{ m.c.s.}$$



MED - 2 min in HRP 4.1

Low in 3 min HRP 4.1

| FRAMES | IT          | Log <sub>10</sub> IT | D.   |
|--------|-------------|----------------------|------|
| 64     | 6.016 m.c.s | .779                 | 3.38 |
| 32     | 3.008       | .4793                | 3.01 |
| 16     | 1.504       | .1772                | 2.57 |
| 8      | .752        | -.1238               | 2.03 |
| 4      | .376        | -.4248               | 1.46 |
| 2      | .198        | -.7258               | .94  |
| 1      | .094        | -1.027.              | .60  |
| .      | 0           |                      | .02  |

| (IT)  | Log <sub>10</sub> IT |      |      |
|-------|----------------------|------|------|
| .7744 | -.111                | 2.08 | 2.10 |
| .3872 | -.412                | 1.48 | 1.45 |
| .1936 | -.713                | .85  | .86  |
| .0968 | -1.014               | .41  | .43  |
| .0484 | -1.315               | .10  | .17  |
| .0242 | -1.616               | .05  | .07  |
| .0121 | -1.917               | .02  | .04  |
| 0     |                      | .01  | .03  |
|       |                      | .995 | 0.00 |

Sept 11 1970

FINEGRAIN POSITIVE 7302 4x5"

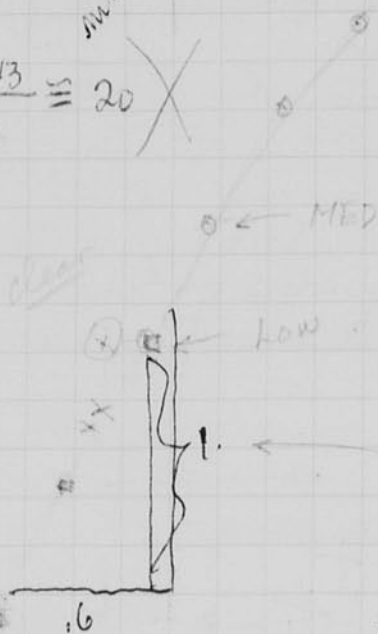
| log <sub>10</sub> IT | IT   |
|----------------------|------|
| -1.0                 | .1   |
| -0.7                 | .199 |
| -.5                  | .316 |
| -.3                  | .501 |
| -.2                  | .631 |
| -.1                  | .794 |
| 0                    | 1.00 |
| -.05                 | .84  |

FOR D=1

$$\frac{(IT)_{50.343}}{(IT)_{7302}} \approx 20$$

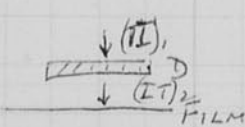
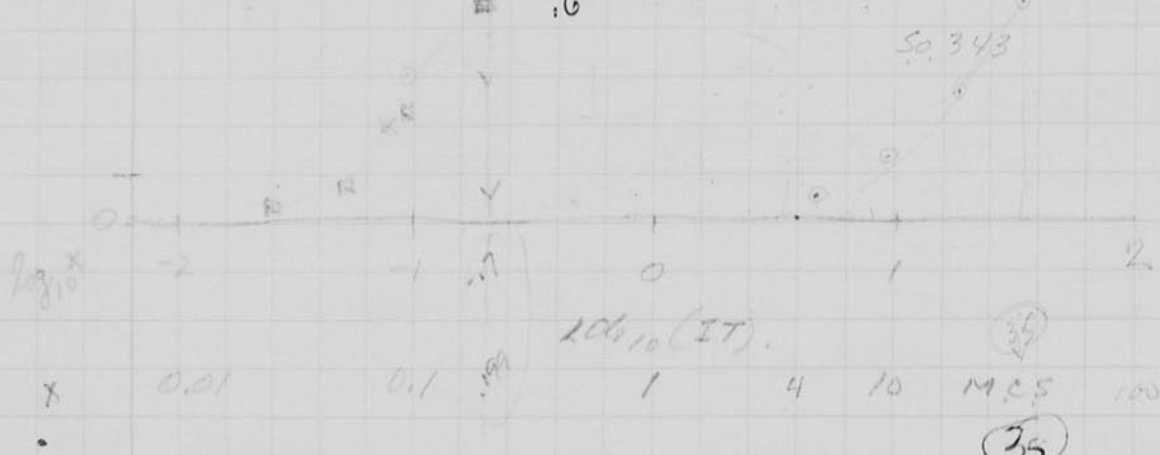
more like 100?

DENSITY



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

$$\frac{34}{2} = 17.0$$



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

film exp. transmission of filter

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

$$\log_{10} (IT)_2 = \log_{10} (IT)_1 + \log_{10} TR$$

$$= \log_{10} (IT)_1 - \log_{10} \frac{1}{T}$$

An Exposure was made with high power  $(IT) = .545 \text{ mcs}$   
 $\log_{10} (IT)_1 = -0.2636$

Density of filter in steps.

| Density | $\log_{10}(IT)_2$ | $IT_2$ |
|---------|-------------------|--------|
| none    | 0.00              | 2.05   |
| Fog     | .03               | 1.88   |
|         | .04               | 1.76   |
|         | .07               | 1.67   |
|         | .17               | 1.43   |
|         | .43               | .91    |
|         | .86               | .39    |
|         | 1.45              | .12    |
|         | 2.10              | .05    |

Curve checks ok except for "clear" point?  
 These points are marked x

34/2

Sept 12 76.  
Diffraction.

#1 Razor blade 1.2 mm at end.  
High Start plane at 79 cm HIGH  
RRP 1:1 overday intensity 4 min.

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

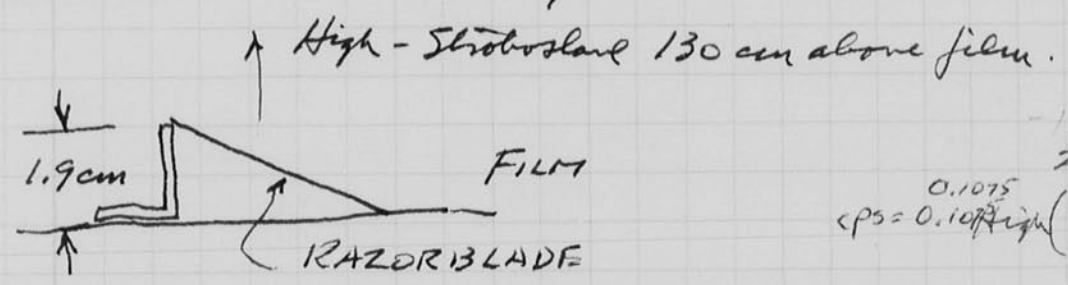
The diffraction is just barely noticeable on the  
second test at 4.5 mm. This experiment should be repeated  
with a larger distance.

Diffraction to first max with blue light  $I = \sqrt{2d\lambda}$   
Let  $d = 10.2 \text{ mm}$   $\lambda = .4 \times 10^{-6} \text{ meters} = .4 \times 10^{-3} \text{ mm} = 4 \times 10^{-4} \text{ mm}$ .

$$I = \sqrt{2 \times 10 \times .4 \times 10^{-3}} = \sqrt{8 \times 10 \times 4 \times 10^{-4}} = \sqrt{80 \times 10^{-4}} = 9 \times 10^{-2} = .10 \text{ mm.}$$

Sept 14 First class - Freshman Lisa Blitoch is TA.  
4:40 at 11-12 Tues. - Thurs. 10 students.

Sept 15 1976 Test for diffraction & blur.



- IN Box -  
28 cm to Dotty.  
 $0.1075$   
 $\text{cps} = 0.1075 \text{ High}$  (2.8 x 500 mv. = 2.5  $\mu\text{s}$ .  
med (2.4 x 200 mv. 1.2  $\mu\text{s}$ .  
low (1.8 x 50 mv. .5  $\mu\text{s}$ .

Sept 21. 1976 Dark Box test of Film #4D. Low (1.8 x 50 mv .5  $\mu\text{s}$ .  
Developer 1:3 HRP. 3 min development.  
1. Paper Sluck & film. N.G.

|                            |         |        |        |        |       |        |     |     |     |   |
|----------------------------|---------|--------|--------|--------|-------|--------|-----|-----|-----|---|
|                            | 64      | 32     | 16     | 8      | 4     | 2      | 1   | 1   | 0   |   |
| High D                     | 0.88    | 0.52   | 0.26   | 0.10   | .04   | .03    | .03 | .03 | .03 |   |
| $\text{cps} = 0.1075$ (IT) | 6.88    | 3.44   | 1.72   | 0.86   | .43   | .215   |     |     |     | 0 |
| $\log_{10}(IT)$            | +0.8376 | +0.537 | +0.236 | -0.066 | -0.37 | -0.680 |     |     |     |   |
| $\log_{10}(IT)$            | 3.858   | 1.926  |        |        |       |        |     |     |     |   |
| $\log_{10}(IT)$            | 5.399   | 2.358  |        |        |       |        |     |     |     |   |
| SD343 IT                   | 34.6    | 17.3   | 8.7    | 4.35   | 2.2   | 1.1    |     |     |     |   |
| $\log_{10}(IT)$            | 1.5278  | 1.2380 | .938   | .638   | .3054 | .0013  |     |     |     |   |

44.5 cm to film  
from Lamp.  
 $K = 36.4 \times 10^6$   
 $\text{CP} = KVD^2/R_L$   
mcs  
Err. H 0.107 .54  
M .019 .10  
L .0014 .001



Sept. 22, 1976 Harold Edgerton

Note on page 96, Density = 1

7302 Side View = 0.2 mcs.

50343 High Res. = 4. mcs

$\frac{4}{.2} = 20$  ~~times of speed.~~

The 50343 microflash has an output of 3.6 cps  
side views.

50343 microflash viewed area 6 cps

End view of ground area no mask 1.6

End view ground area  $1.6 \times 2$  mm 0.11

$1.6 \text{ m}^2$  view .55

Side view  $D = \sqrt{\frac{6 \text{ cps}}{4}} = \sqrt{\frac{6}{4}} = 1.22$  meters for density of 1.

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

Sept. 25, 1976 Sat. Morning on 424 ship in Boston Harbor looking  
at the Docks with Side View when Mayel ran the gear  
Kim VanLier had a class with 18 students.

Speed  
LIGHT  
NEEDED  
50343

Light increase with 50343 over 7302

Light for .9 Density with 50343 = 35  
" " " " " 7302 = 0.7 = 175

Assumptions made with

50343. with microflash

guess angle view = 3 cps. = 18,750 mcs.  
 $D = (0.4)^2 =$

7302 High FXGA in Stroboscope (High range)

$\frac{.35 \text{ cps}}{(1.25)^2} = 2.24$

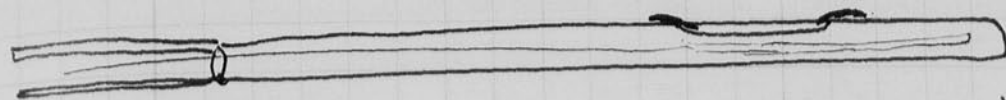
Little density  
Use name for  
both 777

RATIO  $\frac{18,750}{0.721} = 83.7$

Sept. 27, 1976  
Harold Edgerton

Lennie Cross not ready to  
come in at noon today.  
Lenni

cut groove to operate  
spark.



← 6"

Oct 3 Sunday - Miss Cross left at 130 on Friday Oct. 2 for NY, movies?  
329.0332 nights

|         |                   |                 |                       |
|---------|-------------------|-----------------|-----------------------|
| at 5.76 | O'Connor Dr. Jack | Donitzger Lamp. | 424.5200 office.      |
| 2 lamps | 6x2x10° cp        | 60 us           | two lamps in parallel |
| 2 lamps | 5x2x10° cp        | 80 us           | " " 600. - 2          |
| 1 lamp  | 1.4x5x10° cp      | 72 us           | 80-90. 560. BCPS.     |

2 lamps 5x2x10° cp. 80 us. - 500 cps.

1 lamp 4x2x10° 170 us. 960.  
3x2x10° 120

H Bird Green Unit

(Bill MacRobert)

5x1x10° 1.300 us - 1500

70 us Braden unit. 1 lamp.  
with special lamps. (3).

35x10x10° 70 us. 35/20 2450

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

Oct 6-16. Vancouver to Brit. Columbia James McTearan.  
See trip report.

Oct 19 1976

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

21 characters. 16mm camera

70 digit or alternate frames

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

Oct 22, 76 Bob Lassam gave a lecture at 7 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 Fecch alby was shown.

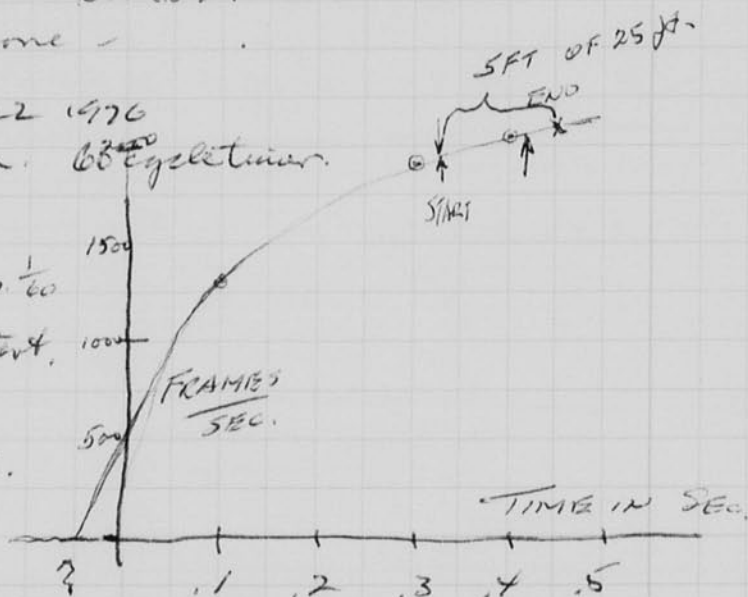
~~But~~ Peter Throckmorton was here Tues. Oct 2<sup>19</sup> at 5 pm to talk about his projects at the Falkland Islands. These involved old sailing ships now on the beach. Peter lives at Newcastle Maine. ~~Box 90~~ phone -

Instax camera without prism Oct 22 1976

70 volts 25 ft of film. 68 Eyeletimer.

3.5 ft. 4 ft. 1st timing mark.

|       |                  |                            |
|-------|------------------|----------------------------|
| 22.5  | 6 marks 0.1 sec. | 22.5 frames $\frac{1}{60}$ |
| 15.50 | 12               | 29.5 " start.              |
| 32    | 18               | 32.                        |
| 19.26 | 24               | 35.5                       |
| 35.5  | (27)             | end.                       |
| 21.30 |                  |                            |



Conclusion: - 25 ft at 70 volts is not enough film, suggest 50 ft.

2000 FPS.  $\frac{2000}{78} = 50 \text{ ft/sec.}$  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.

Voicer model 550-360 shutter  $\frac{1}{1000}$  sec. 4x5 film w/ Drape blue 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  
univ.)

Tom Eisner brought in his beetles yesterday. With Chris Miller and Bill MacRoberts, we took movies of the squirt phenomena. Tri x neg with lamp at 1 ft. 01 mfd 2000 f.p.s. on 16mm in Vestax with out a prism. The squirts came at seconds in 4 pulses.

Film 7278 12114

4 ft. fog.

5 ft. - Timing marks.

5/20 f.p.s.

X 1695

0.1 1470

0.2 1770

34 3.4 2040

37 5 2220

41 5 2460

44 6 2640

46 7 2760

49 8 2940

52 9 3120

53 10 3180

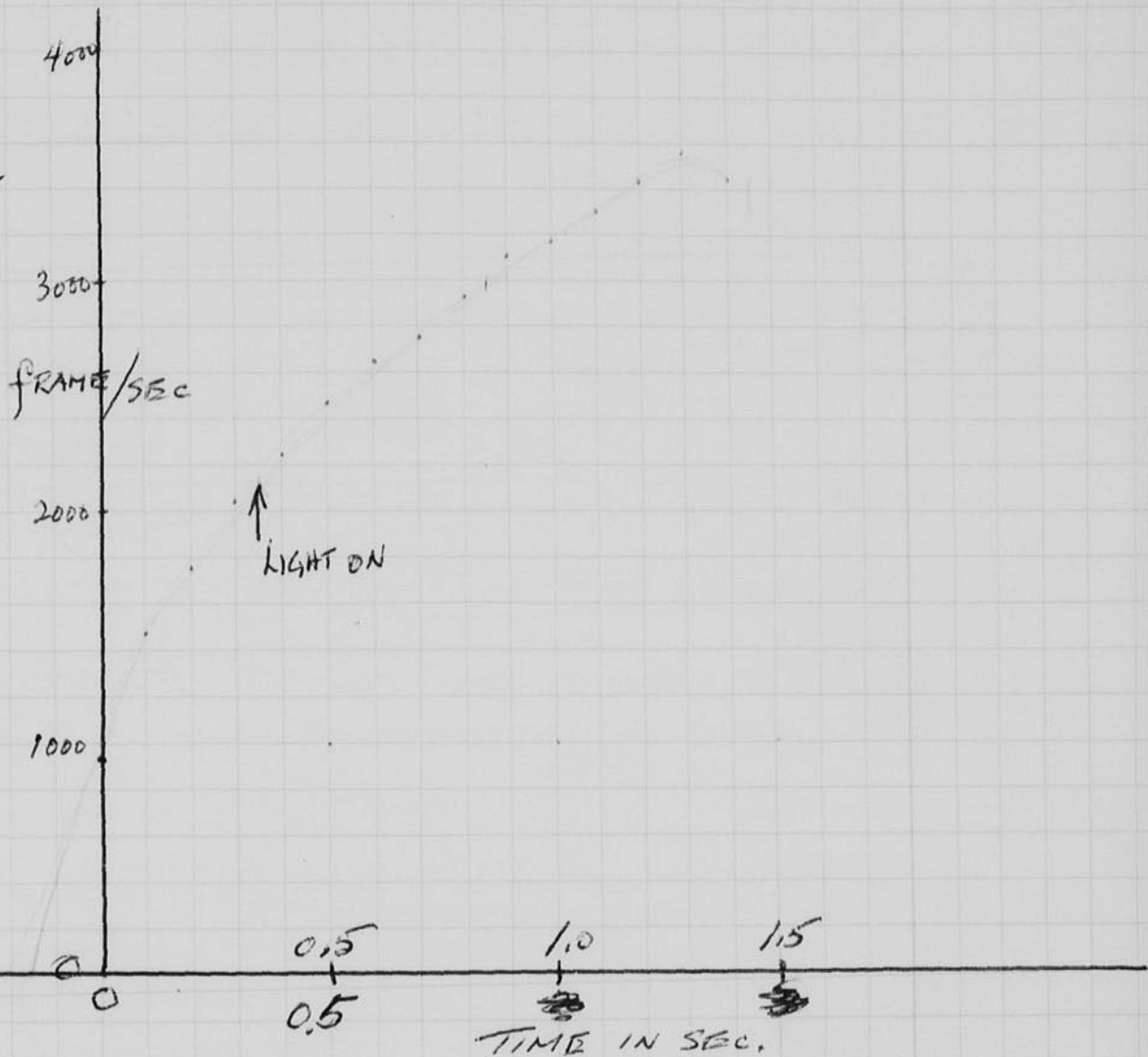
55 11 3300

57 12 3420

58 13 3480

57. 14 3420

14.5 fog.



Known f.p.s.

0.19 1140

1 26 1560

2 32 1920

3 37 2200

4 41 2460

5 45 2700

6 48 2880

7 50 3000

8 52 3120

9 55 3300

10 55 3300

11 57 3420

12 57 3420

1.3

1.4

1/60 sec. interval.

92324

92323

action. 48

Beetle fires here 4 times.

2680 f.p.s.

Bombardier beetle from Kenya (Nairobi)

(Pheropsohus) insignis

spelling will be confirmed T.E.

TOM EISNER  
Cornell

Oct 30 1976 David Elgerton 117 4-435

Yesterday gave a 3pm seminar at Uni. Delaware for Bob Sheridan. Chris Kraft was there and we discussed many geology and archaeology problems in Greece. Walmsley met me at Phil and returned me there.

Photos by shadow <sup>75</sup> PY6A at 25cm on full in 1539A Sun  
7302 film 1/4 HRP developer for 3 min.

- #1. Clear River water over a thin film of Saran plastic 0.1 mm.  
Shows particles. Shows mottled background from material in water.
2. Water from faucet over Saran - many lots and air bubble coming out of water?? Many round dots less than 1/5 mm. About 1.5 mm
3. Camb. Water in pan over film - no plastic.  
Shows round particles & air?? no round particle. ~~few two~~
4. Clear River water in Pan. Shows mottled background and large concentration of transparent material. ✓
5. Water in petri dish over in drops on glass.  
Double focus 40 sec. I loaded 3cc missing animals with a 5x microscope. I can't find the animals!
6. Clear River Water on small thin disc as 5  
I can't see the particles that are so plain in #1 and 4. The sample is much thinner?
7. Thin disc as in 6. Sample? many hairs - from hantavirus? for wiping??
8. Direct on film, no glass.

Nov. 1, 1976 11:30<sup>hr</sup> at UMass art with Das Kozafas. An exhibit is now at this school of Strobe shots. I showed the elapsed time movie and the bats in flight. In the with Das and ~~was~~ Roland?

Nov 3 '76  
#2

# Test of 50343 Eastman Film 2000 lines/mm.

Honeywell Strobe with <sup>3/8</sup> hole over lamp.

#1 Lamp at 1 meter 1:4 HRP Developer 3 min.  
4:2:1 24 poses all very dense.

Hole closed by tube to 10 mm (3/8") x 2.2 mm  
2.2 mm square

4:2:1 flashes.



Base output  
3600 B.C.P.S.  
+  
Strobosor  
8925

LIGHT

Density 3.36 3.06 .03

6x6 mm hole. (square)

1 flash is too thin  
2 " too dense  
Increase from 6 to 8  
mm.

4:2:1

Density 3.49 2.20 0.23 0.03 fog

7x7 mm hole for next test. (square)

High Contrast!

#3 D = 2.31 Sample from Ches River about 1 week old! 343

Show particles in water. no life.

100 cps  
150 cps

Nov 5 '76 Brine Shrimp - new 1 day old 343 film 1:4 Dev HRP 5 min.

#1 7x7 mm hole as before Density = 0  
drawn from side

#2 Ditto but centered. Exposure taken  
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.O. by M. She says that the  
photo system is going fine of the outer eye layer

500 us output 100 us 100 cps ) from 1958 book Report B1868  
750 " " 200 " 200 " ) on 2333 micrograph  
1200 " " 300 " 320 " ) illuminator.

Nov. 9, 1976  
H. Elgerton & Bill Mac Roberts.

1539A Stroboscope

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 B.C.G. Tolson  
Jack O'Brien Bruce Binzer for this folder furniture

Nov. 17, 1976. Wed. Visit by Paul Helmuth and dinner at  
our home, 100 mem. Driv. He will pass trustee slip to  
Martin Kaplan.

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

Nov 19, 76 all day meeting at Council of MIT. The affair opened with  
a banquet in Wilson's President's house on mem. Dr.  
David Rockefeller made a speech about education and the arts.

Nov. 26, 1976. Mary Ellen and Helen Poque 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. April 11-78.

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

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

Chris Wyckoff came back from Stockholm on  
Wed. Nov 24. He will bring all the sonar  
records of last summer taken at Fock Ness.

We are scheduled (Ries, 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 Fock 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  
David G. Gorton  
Bill Nyce Roberts.

105

Power Supply #1

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

Copyrighted materials are not being displayed.

MIT will only display materials for which MIT is the copyright holder or for which there are permissions for public distribution.

If you would like access to the full page image for educational or research purposes, please contact the MIT Libraries' Institute Archives and Special Collections.

<http://libraries.mit.edu/archives/>

LOOK WHOOOO'S 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 5 1976. HZ

Dec. 10, 1976 Conf with Wyckoff

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

Find out what is going on for Bunge - Strohbehnert, etc.

Wyckoff wants automatic system.



Notebook # 32

### Filming and Separation Record

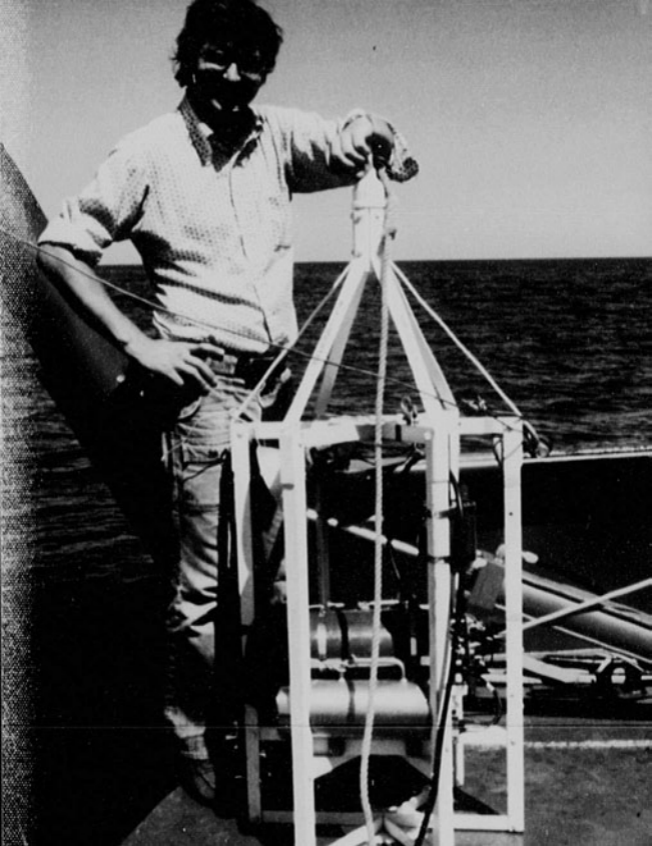
1 unmounted photograph(s)

\_\_\_ 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 9am arrived 12:01  
 met by John Silverman, Panama W. Claudia Linzee.  
 Equip to Key West in Silverman's plane. Then to the CRIFON  
 where we shortly left for the Marquesas Islands.  
 Dec 13, 14, 15, and 16 were spent in surveying with  
 the 254 side scan of B.L.B.

Dec 17 ~~and 18~~ I went to Newbern N.S. leaving  
 Key West at 7am on Air Florida arriving at 3pm ±.  
 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.S.

|      |    |        |  |
|------|----|--------|--|
| 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 Whitteley. It was poorly advertised so only about 25 people showed up including Niki Stavroulis her mother Dora

Fred Yalouris. Bruce ~~Baker~~ Bevan (talked about Radar) Poros (projectionist).

then I had lunch with Dion Milia and Colin Barton - Reiner 2220 Marlboro St 267-1302 and husband. She translates Dion's English writing into French. She is a french writer author.

Jan. 6 1977 The lamp from the Mus of Sicily was removed by Janister(?) 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. Plutonium & Postentics (?)

Mac Roberts estimates that 1/2 billion flashes have occurred.

FT-118  
FT-118  
113  
77  
KPI

Installed May 6, 1964

Failed July 1966

~~Oct 1966~~ Oct. 1966 original

Stopped Feb. 1970

Restarted Feb 7 1970

Failed. Oct. 1976

Removed Jan 8 1977.

There was a lot of white deposit over the circuit elements. The lamp 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 by sub 0.1 for one that had a broken lead. The cap. was 0.25 + 0.1 at 300 volts into a model electric coil. We could not see the spark at all 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. Out put between 4 and 5 C.P.S.

3600  
7200  
3600  
43.20  
86.400 per day 24 hr.  
31,530,000 per year.  
187,800,000 flashes  
6 years

Jan. 11, 1977

David Edgerton. We tried to go 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. 175 Ottawa Drive (old was 221) 48052. they moved across the street into a larger house.

We hope to get my camera TV system into the water on the 12 or 13. The camera will be ~~down~~ sloped down to get a horizontal view. Then I can try the two jets to see if they have enough power to rotate the system.

A Sonar sensing system designed by Duane Marshall was tried in the Aquarium by Reine, Wyckoff, etc on Sat night.

Jan 20, 1977. We went to Detroit Jan. 22 Sat, Sunday, helped to move Bob from 221 to 175 Ottawa St.

Monday I went to Lawrence Inst of Tech with Bob. I showed slides and movies (underwater exposed tank of starfish) 9, 10, 11, classes then lunch with 5 or 6 from the school.

Richard Marberger  
Dean Joren Mergosian  
Mondor Gimmersman  
Roy Coone  
Dan Mirdusmeroski

Later I met with the Physics club.

Then Bob and I went to meet President Wayne Buell

Gistler & 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 Johanna &

Laurels Jan 28

John Mills, Fred Crowley (Joan) for drinks at the Hyatt Regency on Jan 29.

Jan 29 1977.

Batteries from Sears & Roebuck for the "Green" flash units.

28K 44344N @ 11.99 each 6VOLT 5.5 ah 4lbs.

→ M.I.T. Exemption E-042-103-594

Feb 2, 1977 Aggins Museum Dr. Pasztor  
inspect the 5 volume set of prints  
by Greenwalt. Nov, 1, 1976

110 species shown 320 species listed by Peters. James Lee  
classification 30 years old.

Flight, Amer Phil Society Vol 65 part 4 1975

*Archilocus Colubris* 800 km across the Gulf of Mex.  
15g of fat - 0.47 needed for 26.5 km/hr  
crossing.

Breeds in Eastern North America and into Southern  
Canada; winters from Florida south through  
Mexico, Central America to Panama.

f22. II-29 *Eulampis jugularis* (Redthroat.)  
The lesser Antilles from Cuba to Grenada Martinique

f21 ✓ II-30 *Eupetomena macroura* Blue head tail, Long tail.  
The Guianas, the greater part of Brazil, Paraguay.

III-20-25 *Toddigeasia mirabilis* Andes of northern Peru.  
(This bird has long tail  
feathers with flaps in  
-breast)

V-22 *Tajana Pella*  
Brazil province of Ornapá  
Lives in the jungle

copy Feb 8 77 H2  
Slides sent to beek  
all made at f22  
with lamp (1400 BCPS)  
at 3 ft.

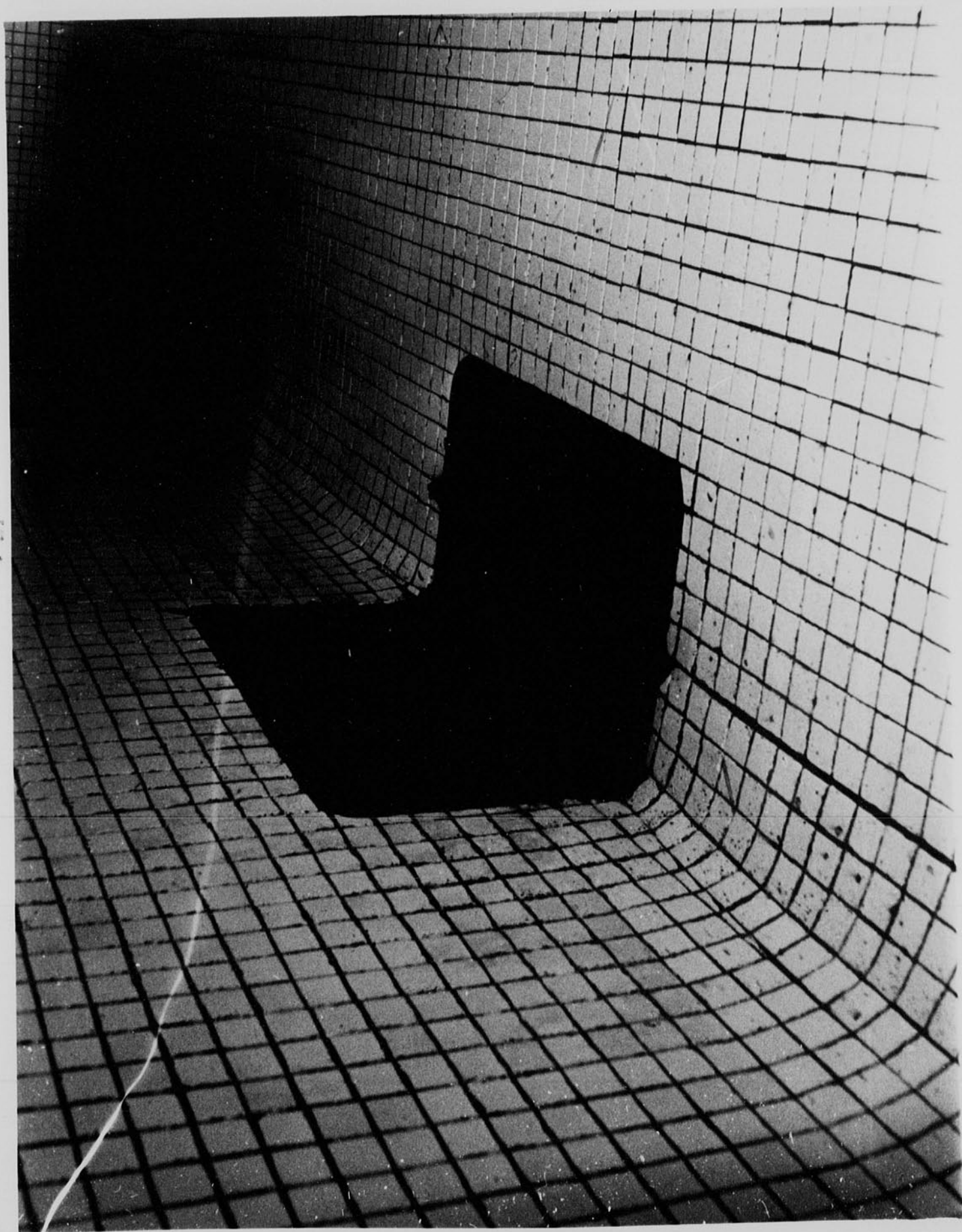
maps from V. B. Bunker 26 46  
Soucoupe & Aggins 18190  
Hope papers 28647  
Bolt 1000 09609  
m. 06909

Photo made Feb 3 in  
M.I.T. pool with television  
controlled camera. Test jets

Bentley's  
Pumps for Training.

Handwritten signature.

TOP



Feb. 13, 1977

Harold Edgerton

111

I took the FX-6A flash lamp equipment that was finished by Mac Roberts last week to Woods Hole for a lecture to 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  
Northport Fla 33595  
for Feb 20 - 24 (815) 426 4100

I am scheduled to show the Sonata camera club some slides on Feb 22 in the evening at the request of my sister Margaret Mrs. Trueman Robinson, 547 Dunwale Lane 33577 (813) 378 4352

Feb. 14, 1977 Monday.

The under water camera will be tested at 2 pm this afternoon at the aquarium where MIT has its slips.

I put in High Speed Elctra dome and set the camera at 1.5 meters at f4.

Angle of camera. 20° - 25°. next to bottom hole.

Lots of back scatter in the photos!

The jets are not strong enough! Try a longer arm. The film went thru and was sent for processing.

March 2 1977. Back on Feb. 27 Sat from the Florida trip. See following page for schedule of trip.

Bob Lines here for dinner last night to discuss the Lodi rex. We have automatic equipment with a sonar trigger in the lab to operate the 16 mm elapsed time camera. Suggestions.

1. A 35 mm equipment motor-operated should be used with more keys to get better photos!
2. This should be set up here for experience.
3. Rives needs to commit get the customs money cleared.



MARCH 1, 1977.

- 1977
- Jan. 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
  - Feb. 1 (Tues) Jim Champy and John Wynne, room 4-405, 3pm meeting
  - " 10 (Thur) V.H.O.I. lecture, 12 noon, Redfield Aud. (Craig Taylor, x 307) "Strobe & Sonar"
  - " 14 (Mon.) Ship sonar and photo gear to Orlando, Florida
  - " 16 (Wed.) Leave for Orlando, pick up sonar at air freight (Holiday Inn- Sunshine Parkway)
  - " 17 (Thur) Visit Ed Link at Harbor Branch Fnd., Ft. Pierce
  - " 18 (Fri.) Meet Charles Aquadro at 12:07pm (Eastern A.L.#597 - Melbourne airport) lecture, 4:30pm
  - " 19 (Sat.) MIT Alumni, 2nd Florida Festival, The Orlando Hyatt House, (Northeast Corner of routes F-192 and I-4--The Disney Exit, Tel. 305-846-4100), 4:30pm lecture
  - " 20 (Sun.) Visit with the Robinsons (548 Gunwale Lane, Sarasota, Tel. 813-388-4352)
  - " 21 (Mon.) Sonar expedition - Carl Claussen, Little Salt Spring Res. Facility, Northport, Fla. (Tel. 813-426-4100)
  - " (Nat'l. Air & Space Museum, Ind. Ave.)
  - " 25 (Fri.) Washington, D. C. MIT Club (Ken Gordon 301-469-9240 home, 8600 Burningtree Rd.) work: 202-724-3353, Lecture at 8pm, Smithsonian (Bethesda, Md. 20034)
  - " 26 (Sat.) Visit with the Pogues (5204 Kenwood Ave, Chevy Chase, Md, 301-654-7233)
  - " 27 (Sun.) Return to Boston
  - March 4 (Fri.) and March 5 (Sat.) Boston Sea Rovers
  - 8 (Tue.) and March 15 (Tue.) lectures for Otto Piene & E. Goldrungen, 7pm, rm. 3-133
  - 10 (Thur) lecture for Prof. S. Widnall, rm. 4-402, 3pm to 4:30pm
  - 12 (Sat.) EG&G, Inc. Winter Dance, Marriott Hotel, Newton, 7pm
  - 13 (Sun.) Niki Stavrolakes, Port Jefferson, New York (Christening)
  - 17 (Thur) Lecture for Mrs. Den Hartog, MIT Faculty Club, 6pm
  - 18 (Fri.) Leave for Woodbine, Lincoln and Aurora, Nebraska
  - 19 (Sat.) Lecture at the University of Nebraska, Lincoln, 4pm
  - 23 (Wed.) MIT Club of Denver, Colorado (Gordon Moore 303-757-8052, work 303-573-7616) evening lecture
  - 24 (Thur) Rocky Mountain Chapter of the Optical Society of America, Boulder, Colorado Edwin Vande Noord (303-441-4578 at Ball Brothers Res. Corp. Aerospace Div. P. O. BOX 1062, Boulder), evening lecture
  - 25 (Fri.) University of Arizona, Optical Science Center, Tucson (Richard Shoemaker, tel. 602-884-3030) evening lecture
  - 26 (Sat.) to 27th (Sun.) VACATION
  - 28 (Mon.) Check in to the Los Alamos Inn (reservation made by Ms. Lorraine Martin) 505-662-7211
  - 29 (Tues) Colloquium at the Los Alamos Scientific Lab, 8am, Dr. Eugene Stark (Geo. & Louise White)
  - 30 (Wed.) MIT Club of San Francisco (DuBoise Montgomery 415-854-2940, HOME: 327-4539) lecture Raphael Hotel 415-986-2000; 6pm at Engineers Club, 160 Sansome St. 16th floor
  - April 4 - 8 Possible trip to MONITOR site, off North Carolina (10-18) BOB?
  - Apr. 18-19 VACATION - PATRIOTS DAY - lecture at 100 Memorial Drive, Cambridge, 7:30pm
  - " 19 (Tues) EG&G Stockholders meeting, 9:30am, Dr. D. Menzel's Memorial service, 2:00pm HARV. CHAM.
  - " 20 (Wed.) Society for Information Display (SID) '77 International Symposium, Sheraton Boston Hotel, 12 noon lecture ("Those Blinking Lights") Dr. John Van Raalte, RCA Lab, Princeton, N.J. Tel. 609-452-2700, ext. 3127 SKY ROOM 730
  - " 21 (Thur) MIT Club of Toronto, lecture (Duncan Allen (Jim Maguire - 314-694-6924 Work)
  - " 26 (Tues) MIT Club of St. Louis, lecture " " 821-0093 home
  - MAY 3 (Tues) Lecture for Otto Piene, 7pm, rm. 3-133
  - " 4 - 31 Possible search for the SNARK -off England with Syd Wignall
  - " 12 (Thur) Lecture for Mrs. Bolt (Travel Club) at the Newmans in Lincoln, 8pm
  - " 14 (Sat.) JYC Involvement Day - BOSTON
  - " 18 (Wed.) Lecture for Bob Weatherall, Ipswich Historical Society, 8pm MAY 15 - JUNE 5 ISRAEL
  - " 20 (Fri.) to June 10 - Israel with Elisha Linder - expedition MAY 19 - MAY 28. MAY 20
  - June 6-9 (Mon. through Thurs.) on Cape Cod with Class of 1927
  - " 20-24 (Mon. " Friday) C. E. Miller's High-Speed Congress
  - " 22 (Wed.) Lecture for Bill Ryan x5346 at the Sheraton/Boston, 6pm cocktails, banquet
  - Aug. 13-21 (Sat. through Sun.) SUMMER VACATION - North Carolina
  - " 27-Sep. 3 (Sat. " Sat.) Congress - Thera, Greece

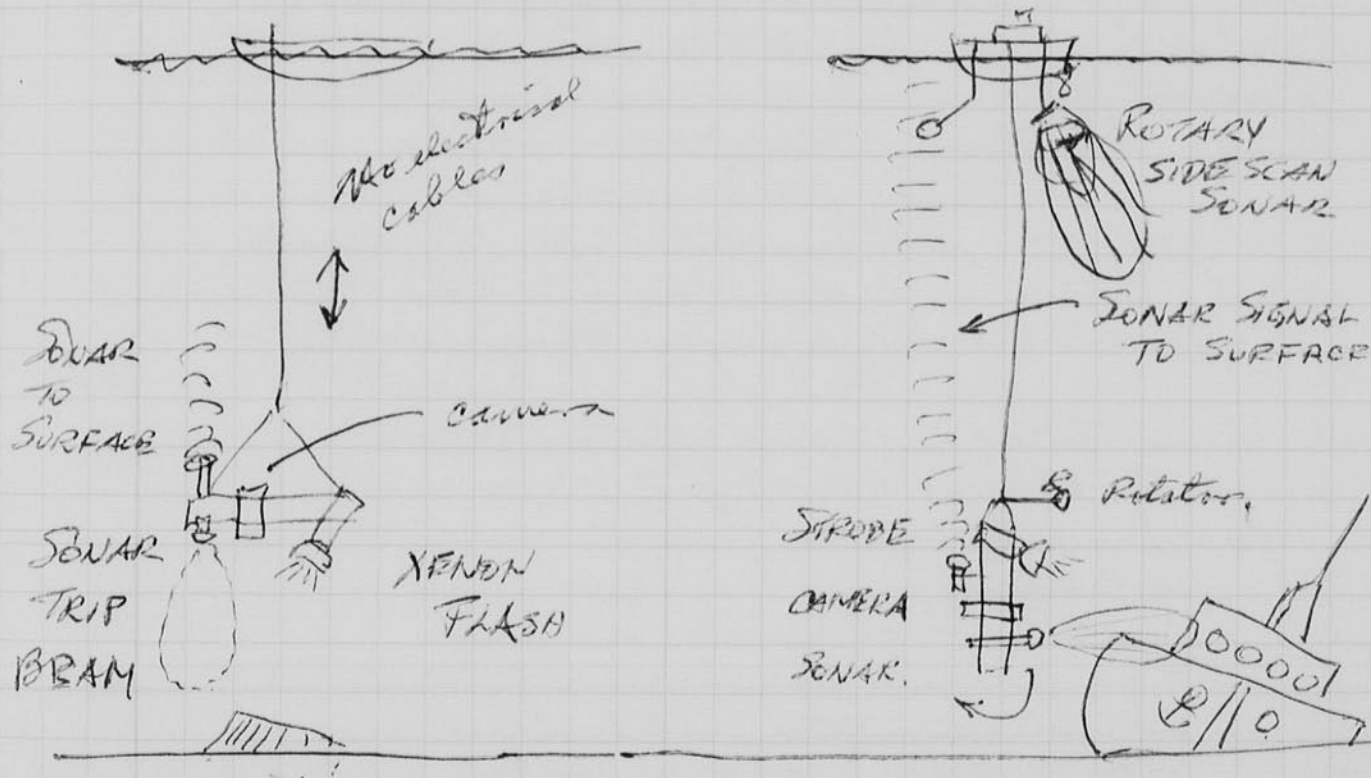
Inshore Marshall Megapulse 275-2010 Mar. 2, 1977 planned to discuss project

March 3 1977 Hand System.

Raytheon DE 725C lockness used on 29 units

Method of bottom and side view 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, held at lockness. The next use will be to move the camera until it comes up to a subject, then an acoustic signal is needed to inform the operator that an exposure has been made. If the sonar is surface operated then other things can be used to give a signal when the operation is accomplished.



Read and understood  
Vernon G. MacRoberts  
March 3, 1977.

The sonar to surface gives the operator on the ship a signal when the camera operates. Then he controls the 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.

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.

1977

Jan. 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, llam for newspaper article  
 " 28 (Fri.) John Mills to visit from England  
 Feb. 1 (Tues) Jim Champy and John Wynne, room 4-405, 3pm meeting  
 " 10 (Thur) W.H.O.I. lecture, 12 noon, Redfield Aud. (Craig Taylor, x 307) "Strobe & Sonar"  
 " 14 (Mon.) Ship sonar and photo gear to Orlando, Florida  
 " 16 (Wed.) Leave for Orlando, pick up sonar at air freight (Holiday Inn- Sunshine Parkway)  
 " 17 (Thur) Visit Ed Link at Harbor Branch Fnd., Ft. Pierce  
 " 18 (Fri.) Meet Charles Aquadro at 12:07pm (Eastern A.L.#597 - Melbourne airport) lecture, 4:30pm  
 " 19 (Sat.) MIT Alumni, 2nd Florida Festival, The Orlando Hyatt House, (Northeast Corner of routes F-192 and I-4--The Disney Exit, Tel. 305-846-4100), 4:30pm lecture  
 " 20 (Sun.) Visit with the Robinsons (548 Gunwale Lane, Sarasota, Tel. 813-388-4352)  
 " 21 (Mon.) Sonar expedition - Carl Claussen, Little Salt Spring Res. Facility, Northport, Fla. (Tel. 813-426-4100)  
 " (Nat'l. Air & Space Museum, Ind. Ave.)  
 " 25 (Fri.) Washington, D. C. MIT Club (Ken Gordon 301-469-9240 home, 8600 Burningtree Rd.) work: 202-724-3353, Lecture at 8pm, Smithsonian (Bethesda, Md. 20034)  
 " 26 (Sat.) Visit with the Pogues (5204 Kenwood Ave, Chevy Chase, Md. 301-654-7233)  
 " 27 (Sun.) Return to Boston  
 March 4 (Fri.) and March 5 (Sat.) Boston Sea Rovers  
 8 (Tue.) and March 15 (Tue.) lectures for Otto Piene & E. Goldrung, 7pm, rm. 3-133  
 10 (Thur) lecture for Prof. S. Widnall, rm. 4-402, 3pm to 4:30pm  
 12 (Sat.) EG&G, Inc. Winter Dance, Marriott Hotel, Newton, 7pm  
 13 (Sun.) Niki Stavrolakes, Port Jefferson, New York (Christening)  
 17 (Thur) Lecture for Mrs. Den Hartog, MIT Faculty Club, 6pm  
 18 (Fri.) Leave for Woodbine, Lincoln and Aurora, Nebraska  
Lecture at the University of Nebraska, Lincoln, 4pm  
 19 (Sat.) Aurora, Nebraska, Ken's Motel, Tel. 402-694-3141  
 23 (Wed.) MIT Club of Denver, Colorado (Gordon Moore 303-757-8052, work 303-573-7616) evening lecture  
 24 (Thur) Rocky Mountain Chapter of the Optical Society of America, Boulder, Colorado Edwin Vande Noord (303-441-4578 at Ball Brothers Res. Corp. Aerospace Div. P. O. BOX 1062, Boulder), evening lecture  
 25 (Fri.) University of Arizona, Optical Science Center, Tucson (Richard Shoemaker, tel. 602-884-3030) evening lecture  
 26 (Sat.) to 27th (Sun.) VACATION  
 28 (Mon.) Check in to the Los Alamos Inn (reservation made by Ms. Lorraine Martin) 505-662-7211  
 29 (Tues) Colloquium at the Los Alamos Scientific Lab, Sam, Dr. Eugene Stark (Geo. & Louise White)  
 30 (Wed.) MIT Club of San Francisco (DuBoise Montgomery 415-854-2940, HOME: 327-4539) lecture Raphael Hotel 415-986-2000; 6pm at Engineers Club, 160 Sansome St. 16th floor  
 April 4 - 8 Possible trip to MONITOR site, off North Carolina  
 Apr. 18-19 VACATION - PATRIOTS DAY - lecture at 100 Memorial Drive, Cambridge, 7:30pm  
 " 19 (Tues) EG&G Stockholders meeting, 9:30am, Dr. D. Menzel's Memorial service, 2:30pm  
 " 20 (Wed.) Society for Information Display (SID) '77 International Symposium, Sheraton Boston Hotel, 12 noon lecture ("Those Blinking Lights") Dr. John Van Raalte, RCA Lab, Princeton, N.J. Tel. 609-452-2700, ext. 3127  
 " 21 (Thur) MIT Club of Toronto, lecture (Duncan Allen)  
 26 (Tues) MIT Club of St. Louis, lecture (Jim Maguire - 314-694-6924 Work)  
 May 3 (Tues) Lecture for Otto Piene. 7pm, rm. 3-133 " " 821-0093 home  
 " 12 (Thur) Lecture for Mrs. Bolt (Travel Club) at the Newmans in Lincoln, 8pm  
 " 14 (Sat.) JYC Involvement Day - BOSTON  
 " 15 (Sun) to June 3 - Israel with Elisha Linder - expedition Ashdod, Acre  
 June 6-9 (Mon. through Thurs.) on Cape Cod with Class of 1927  
 " 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

Mar 3 1977

#2. Mack Experiments made in the MIT pool yesterday into the 12 Kc and Reflector 12 Kc. The side echos and noise seem to be less with the Reflector. We are using no just Reflectors from 666. The Sweden night photo

March 10 1977. Mac Roberts has been putting metallic shielding on the 6 KHz transmitters. These 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 stroke lake was hidden in the noise for the initial pulse before. Now the signal comes in loud and clear with only a faint pulse at the beginning.

I was on the MANAMET out of the Army corp installation at Buzzards Bay, Ma. Side scan sonar 259-2 was used to explore the area near a large yellow buoy. Gil 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 Gil Chase.

Mar 17. Sonar loaded in T 424 off Tunnels Boston Harbor. 9 to 1.30p

Howard Effinger

Bob Muzze

Jim Scho - ---.

6 Kc with ~~insulated~~ metal shield

12 Kc in Gold reflectors.

5 Kc in big dish with 6 Kc receiver.

Very windy and cold.

Side scan of docks in harbor.

Aug 1947 H. Birds H.S.

National Geo Magazine

Aug 1951 H. Birds U.S. H.S. N. Van R. National Geo Magazine

April 2, 1977

Howard Edgerton

016-24-1865

camp 32921-9

115

passport D 1299300 may 25<sup>th</sup> WA. holder M54287A

Just back from trips to S.F. via Milwaukee, Los Angeles  
Tucson - Denver - Boulder etc for lecture tour.

See page 112  
for schedule!

April 10, 1977 Sunday Exeter. I returned yesterday from Lewes Del. where  
I was from the 4th of April on the CAPE HENKOPEN (160' Oceanographic Ship)  
of the Uni. of Delaware. Bob Sheridon was the chief scientist of the  
trip to the monitor site. He and his students made a 17' core at the  
site, some 3/4 mile south. A del. work system was furnished  
by Jack Siegel. This worked great.

The camera - strobe. TV was lowered once and a tape  
was made. Also about 10 photos were made.

We had problems with the anchoring - a three way  
system. I finally used a 2 mooring system with  
wind and current. Then the wind quit!

April 16, 1977. We tried the TV yesterday after the hit 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 the three beams looked ok but dim.

This was the last. I did not see any others

as the exposures were on deck when the

film was cleared.

an edited tape was made and 1 dupe.

on April 15 two dupes were made on 1/2 hour tapes.

one went to Mager with sound. The other was silent.

The sound was of comments that I made when

copying - la take the first time.

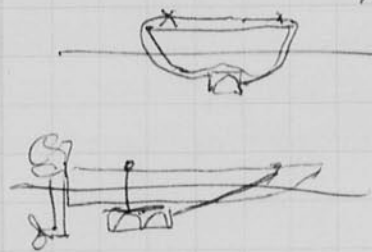
Norwich Conn Kate and Lynda Kate Edgerton 231 West town Norwich  
Edgerton Handicrafts showed me the MASON monument  
marker in the first graveyard at Norwich at the end of  
Lane just east of Route 52 where it over-passes  
West town street.

Michael Scankowski 238 Summit St Norwich Conn 06360 was a great  
keep!

The cable as used at Cape Hatteras was removed yesterday by Bill Mac Roberts. This cable was damaged on the Cape Hatteras when the cable was snarled against the stern anchor 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 wicker so water will not flow through the wires.

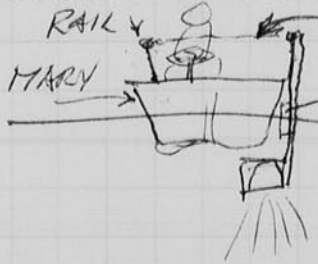
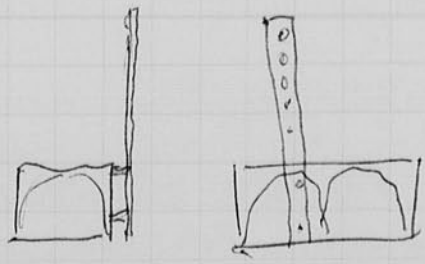
~~May 2, 1977~~ ~~Apr 25 1977~~ On Apr 24 I went out with Steve Vaughan to the Boston Harbor with the 12KC Reflector unit that I plan to take to Brazil. It seemed impossible to tow it until I tried the bottom system.



Ropes with measured distances so the transducers can be spaced correctly. All went ok until the elast cable pulled back and was cut by the prop. I was trying to go fast when this happened. I should have anchored the elast cable.

on way 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 record echoes it generally means that the transducers are not perpendicular!

Records were made on April 29 of the tunnels. The south one always came out stronger.



Rope.  
 I plan to put this block here to hold the assembly away from the hull.

also I plan to use the under-boat technique. Hardware for both will be taken on the trip.

May 6, 1977  
Harold G. Edgerton

117

Tests were made of the Pitney Bowles quartz lamps  
nos FT-118 and FT-151 last week. All are about the  
same effy. with 3 capacitors of 350 mfd at 400 and 450 volts.  
If anything 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, across, to help Elisha Linder.  
The side scan will go too.

May 11, 1977. Ed Lark, <sup>Second</sup> Johnson, and — came today in a Grumman  
jet from Florida. Mrs Lark and Mrs Johnson also came.  
Lundrat MIT then a seminar in the Ocean Eng. department  
Lark lead a discussion on tethered and  
un tethered submarines.

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 870 at 5:45 for Paris Rome & Tel Aviv on May 15  
June 11, 1977 400 pounds of sonar gear was sent. \$300. Arrived 10:35 Boston (13 hours)

Hotel Lev Ha Carmel Haifa or Mt Carmel.

May 17. Dinner with David Rose 522 5th Ave New York. Elisha Phina <sup>Paul Stewart  
Jonathan Rose</sup> at Hotel Dan.

May 18. Wed. It took until noon to get the sonar out of customs.

The Navy helped. Josi Tur Casper & Yona Motzkesy (navy)  
made the contact with the customs. The equipment was taken  
to Ashdod Naval Base to be put on a landing craft. ETZION  
GAUER P5  
Capt. Ronnie Shapiro (ZUR)

After a day and a night of search we moved the equipment  
to the MAOZ a much larger ship. Dr. V'zi Ben Avraham

Dr Yehuda Melamed was the medical officer for diving.

ARIE MAR MARY, NEVE YAAKOV 43/8 Jerusalem Capt of MAOZ  
YAACOV NIR Dec Service MOTSA ILLIT 02-539575 was  
in charge of the navigation by mini-ranger, Motorola.

After searching several areas completely without result, NIR

went ashore and talked to an Arab who saw the splash.

This put emphases 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 1803 It turned out to be rocks

On May 22 the wreck was confirmed at 530

by 10.05 we were all packed up and ready to go to Ashdod at 11.45. Left Ashd. 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 Bengaly Peter. Tried sonar also navigation.

May 25 Plug full of water. fish net caught cable

there was a short in the cable between wires

orange and red which shorted out the signal to the fish.

May 25-26 used rotary side scan in

stationing mode for survey. It works fine.

Try two transducers both to back on a pole with strain ropes for survey. This will have

a minimum of strain due to water resistance.

May 26 planned 253.4629 (611) 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 Elisha and I went to the Polasa Heights

Jordan River etc on May 28 Zafat. Dined at Sarah Arenson

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 9.3 12 Km of survey.

May 31 many people came aboard.

Lecture at Technion Haifa Steve Felson.

Dinner with Tannenhausen A family.

June 1. Last working day - Left in aft for MA02 again

to look for tail and gear box of Helicopter.

Problem with flying and salt water

WD 40 and compressed air blew trouble away

Del Norte system used by Deora used.

June 2. ~~Two~~ Three targets were buoyed during the night. #1 was gear part #2 nothing

#3 400 meters away was tail.

NEHEMIA

I left in Helicopter with Col Dagan at 1.30

for a 2 hour trip to Masada, Jerusalem,

Jenico, Dead sea etc and Tel Aviv

3.30 conf at Navy Head quarters. Thanks from air force and navy.



Dagan  
PO Box 3500  
GORDERA  
Israel

Cont June 11 1977 Harold Edgerton.

119

Wesley Tavy, Commandeer of the Ashcroft Naval base took me at 7 am to the plane on June 3. He was very appreciative of the work I did to find the Segorah helicopter.

The Air Force or the Navy took my gear to the airport from Ashcroft by helicopter. Then it was packed and shipped by FWA direct to Boston at their expense.

The 50th class reunion of 1927 M.I.T. was celebrated this weekend. About 110 went to Wisconsin Club on the Cape. Then there was a banquet at MIT yesterday, some 1500 attended. Our class put on skit with a dragon. Took news monster. 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 (Dike) and I carried a treasure chest with bags marked # with sterge for presentation. Our class gave around 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 MA02 in May

\* Head Ezra Stevens Strobe.

Joe Burley

Hank Steimbrenner

Bob Wallace

Joe Mahado

Jim? Hawkins Tail

Fisher Chairman of class of '27.

Harold Edgerton } chest with bags.  
Dike Arnold }

JUNE 28, 1977. Tuesday.  
Harold Edgerton.

Carl Edgerton and James Hatland 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 Metrojale hotel.

I saw A. Marshall 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 Usino was in charge of the exhibit. Paul Sumter kept track of us and kept the seminar on the track.

Harold Anderson of the Omaha World Herald was present at my talk at the Akademelegorodo. 3 other journalists were with him visiting Russia, Martin (Chicago), President Lou Quincy and Texas.

I returned to Boston about 5 pm on June 26 via N.Y. Kennedy on P.A.A. for Copenhagen - N.Y.

A sore throat developed on the P.A.A. plane so now I am home with a cough and running nose.

Bill MacRoberts has been working on 4 sets of Sover - camera - camera combinations for use in Lohr News. One has already gone with lines. 3 more are to go next week with John Lattorab.

July 3, 1977. Yesterday I tested the rebuilt 259-Y sonar with the new improved (?) circuit. I was not impressed.

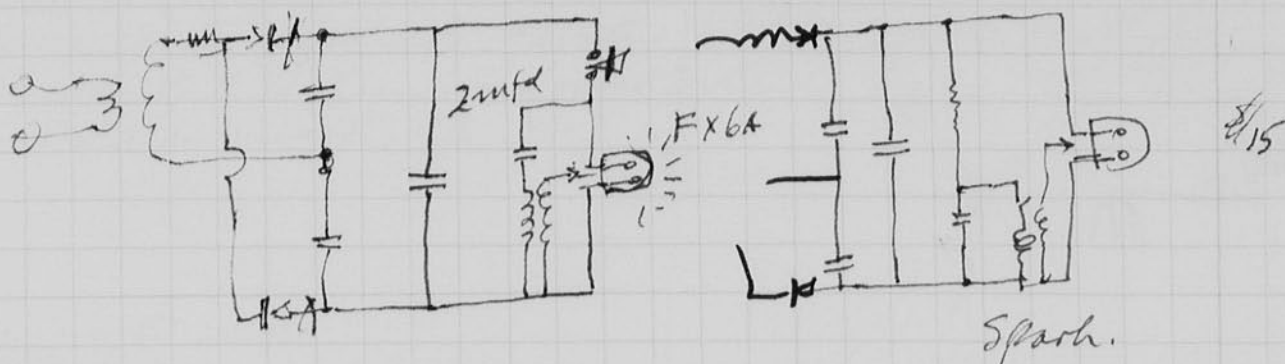
Today I changed the angle of transducer from  $50^\circ$  to  $20^\circ$ .

The Blade is sticking. It seems to be the motor. Shop 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. Then the 14 feet in the Charles river.

July 6, 1977  
 Harold S. Edgerton.

Tests of light for microscope photography.



July 7, 1977.

Test 2  $\mu$ s or 3  $\mu$ s.

Peak light  $\frac{.6V}{4} \times 10^6 = 0.15 \times 10^8 \text{ cps}$

$1.5 \times 3 = .45 \text{ cps}$

Output = .3 cps.

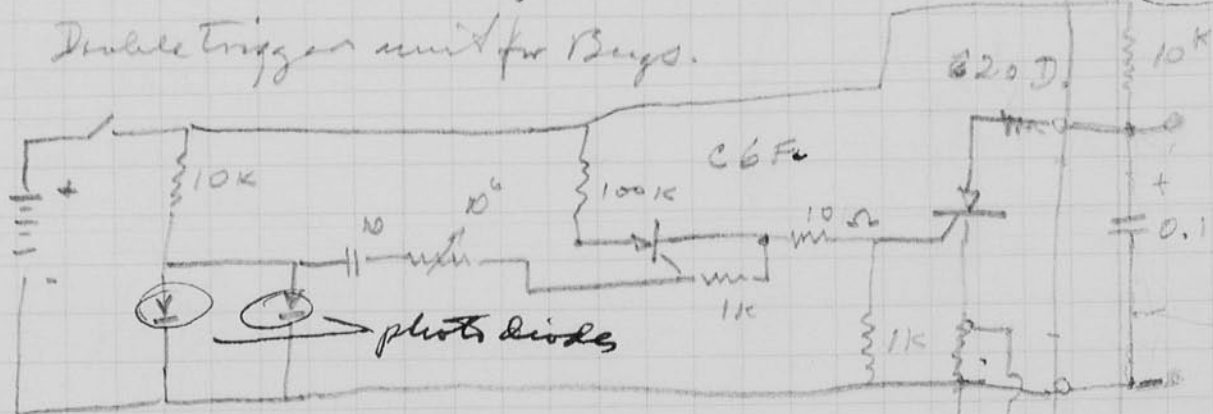
July 19 1977.

I went to Barnington N.J. on July 8, 9, with Eric Edgerton to help Frank DeMunno try to find some bronze cannon balls left by the Hessians in 1777. We used 12 KH.

I have been working on the side near. It now has the 259-4 modification as furnished by BU&G. A survey of the Charles river was planned over the past weekend.

designed by  
 Fred Funtke  
 2/8/66

July 20 1977 Double trigger unit for Buys.



Double Beam equipment all repair tested into remote exposure switch on Model 2 SSD 360 Vincent.

"X" to Stroke H Bird unit.

1st exposure on 7302 nothing

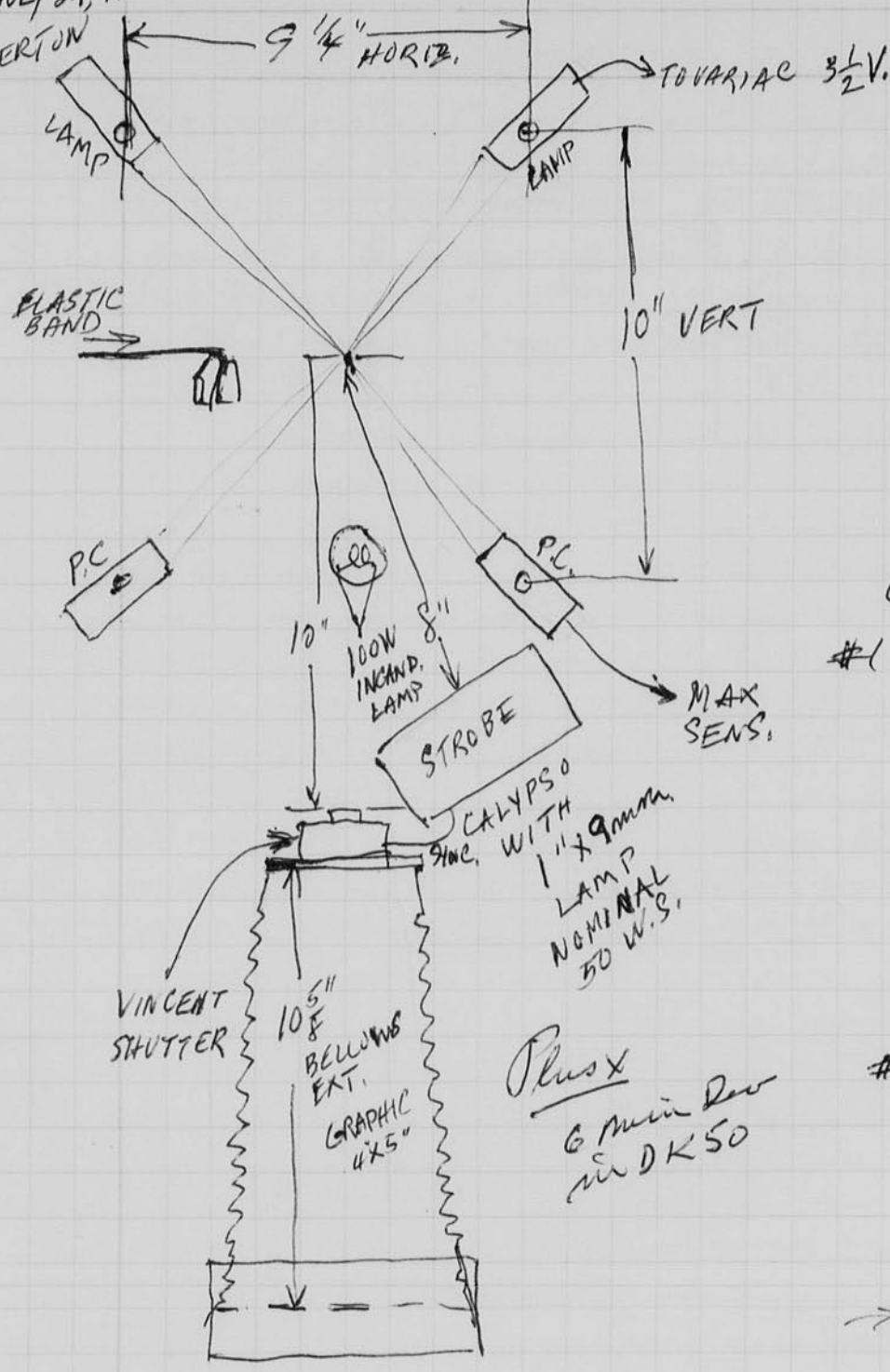
2 " on Pan film 125 ASA with 3 min nut Subject overexposed

3 " on Kodak Lamp used up 6 min clock

122 JULY 21, '77

# BUG PHOTOGRAPHIC SETUP

H.E. EDGERTON  
V.E.M.



Color

#1 Polarcolor 58

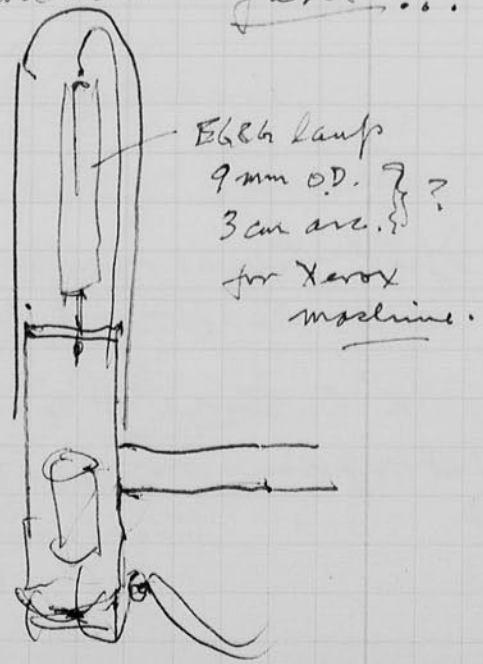
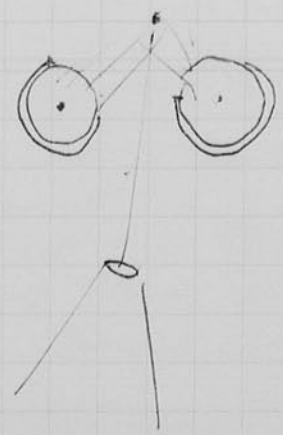
underexposed  
with two lamps  
10,000 BCPS each  
8" 7" in front of Box

Rubberband Snaps,  
ASA 75

#2 Moved lamps  
to about 6" and  
more in line.

Exposure Jitter  
Rubber slips some  
motion?  
and is not in field,  
make shorter flash !!!

Plus X  
6 min Dev  
in DK 50



August 4 1977  
 Harold Edgerton  
 Bill Mac Roberts

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 turner at the accident. (in 1862)

Experiments with

L = 56 Q 2.6 R .0012

C = 57 measured

Sprague ~~33~~ 282 P1



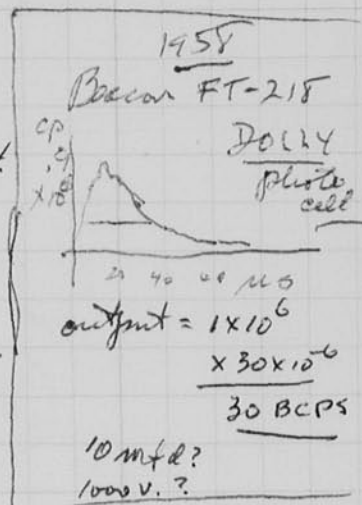
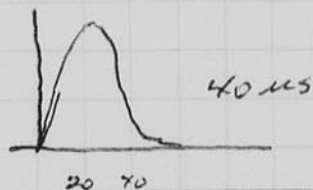
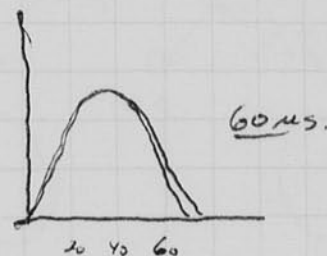
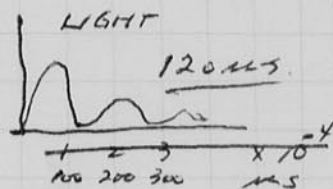
EGG4  
 QUARTZ  
 LAMP.

L = 11 Q 1.7 R = .00031

C = 57 measured.

L = 0 Leads only.

C = 57.

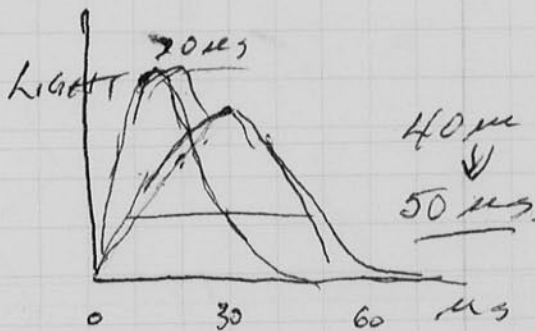


Capacitor  
 life 15000 1000 hrs.  
 2000V 250 hrs.  
 can handle  
 the discharge  
 ok.  
 Peak current = ?

L = 6 uH. C 60 ufd R = small. ?

# 14 (or 15)

wire.



Short induction

Peak is up by 20% or less.

20 us to peak.

3.6 no inductance 40 us

3.2 with inductance 50 us

4.5 with Ind. 80 us

5.3 ±

5. without Ind 50 us

we plan to use 50 ufd at 1500 volts and a 6 uH inductor.

Kelocore by Sprague  
 242 capacity used in Boscons  
 681 P

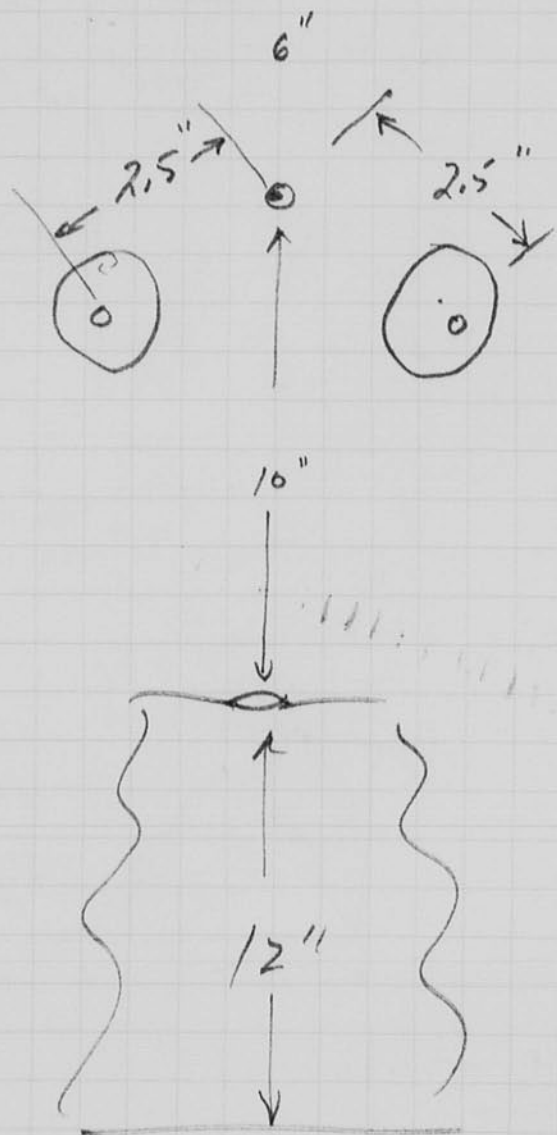
the transformer caused the voltage to go to 2700. there were noises in the capacitors. We cut the voltage back to 1000V

124 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  $\mu$ s with 6  $\mu$ h series with Jumbos. Experiments will be needed to get proper exposure on Kodachrome II film.

2pm. Bug photo unit see p 122.

Exposure on plus X film 5 min DK-50 ok.

————— Blue (light) Background cardboard.



Aug 10, 1977

Harold Edgerton

Mac Roberts furnished Bug Unit on Monday. Test photos show ample light is available from the circuit - see attached.

John Lottrop from Polaroid came in yesterday. He is going to help set up an enlarger with Polaroid paper for about 15X enlargement.

snob  
viewer.  
called John.

from  
Wilmington where  
two cottages  
my Tom Dixon,  
law, Mary Anne & Ellen  
with son.  
via.

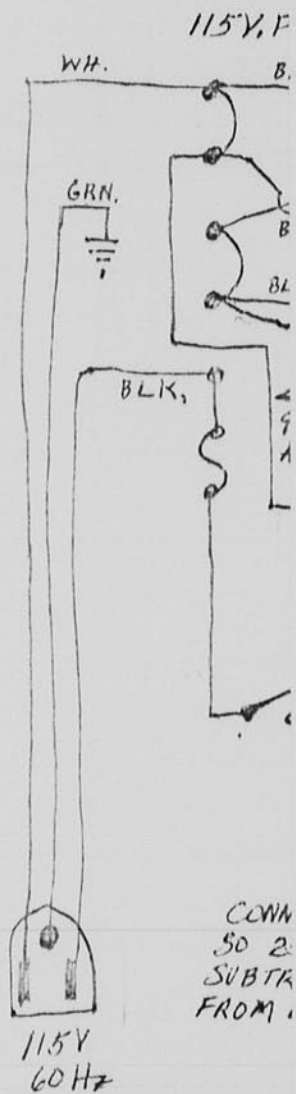
one small  
outlet and  
camera

the parts  
ridge.

l  
ridge  
tile

course  
one was

a deep area in one of the end plates. I am sure this is where the leak occurred in the camera at the O Ring.







Aug 10, 1977

125

Harold Edgerton

Mac Roberts furnished Bug Unit on Monday. Test photos show ample light is available from the circuit - see attached.

John Lottrop 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 an 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 east flight from Top Sail North Carolina near Wilmington where we spent from Fri Aug at two cottages on Borykard Cardiac Ave. Mary Lou Dixon, husband Ches, 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. Whig inspected the corrosion. He pointed out the crevice corrosion in several places. One was a deep area in one of the end plates. I am sure this is where the leak occurred in the camera at the O Ring.

on last Thursday, ~~Aug 26~~, the Army ship T-44 was rechristened EDVERTON. Esther broke a champagne bottle on the bow. Jean 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.

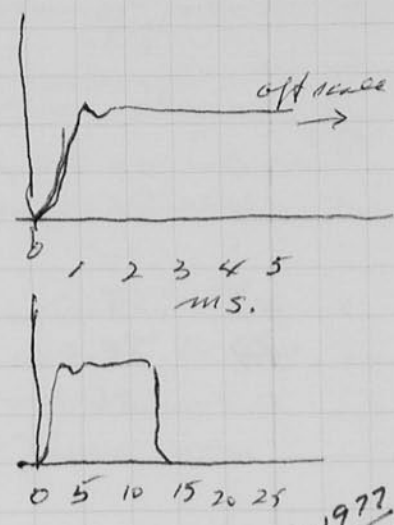
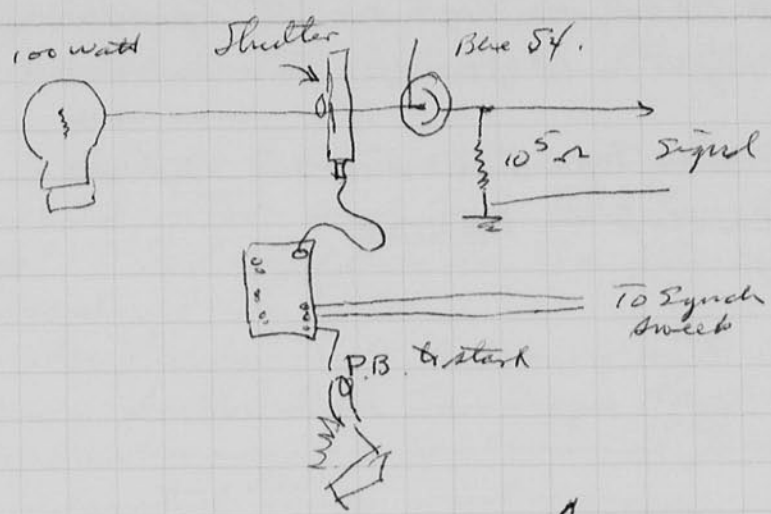
I put an inertia switch on the bottle which closed the circuit when the bottle hit the rail of the ship. Then this operated the <sup>Uni</sup> Blitz shutter of the Vincent co Rochester N.Y. The X contacts then fired a strobe of 4000 volts and 25 mfd, 15000 BCPS to get a picture on Plus X film. The picture 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.

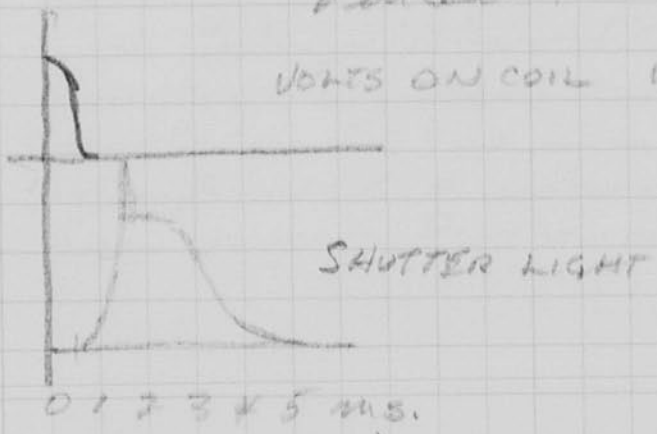


Pulse now  
 Shutter?  
 when strobe  
 is connected, why also double  
 sometimes

1.5 ms

Sep 20, 1977 H. Edgerton  
 Chris Miller told Bill  
 that an adjustment  
 on the unit controlled  
 the time! now it  
 gives .00 sec with  
 transistor control  
 Today Bill MacRobert  
 made the pulse  
 unit to operate  
 from batteries.

Sep 28 1977  
 Uni Blitz Shutter  
 Vincent

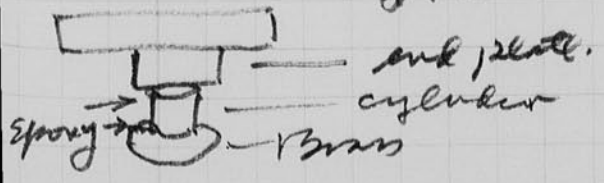


There was a lot of Bounce  
 of contacts with a  
 micro switch !!

Internal Ocean Systems San Diego Calif  
 Model B1055C 1055213

Draw 0554000 12/70 Insp 1/71

Timer Quartz Swiss made. This trigger came  
 from the MONITOR Site off Cape Hatteras.  
 It was a 12 KC cylinder with a brass conical end



128 Sept. 14, 1977.

Harold Edgerton

Lamp FX 6A in High or VR. Equip.

Peak light = 120,000 c.p. Dur = 2.5 out put = 300 f.s.

Distance to type 7302 FILM = 173 cm.

1 min develop in DEKOR

1:1. 3-

| log <sub>10</sub> I | CP  | lumens/m <sup>2</sup> /sq meter | Density |
|---------------------|-----|---------------------------------|---------|
| 0                   | .03 |                                 |         |
| -1                  | .1  | 1                               | .18     |
| -2                  | .2  | 2                               | .34     |
| -4                  | .4  | 4                               | .58     |
| -1                  | .8  | 8                               | .89     |
| 0.2                 | 1.6 | 16                              | 1.26    |

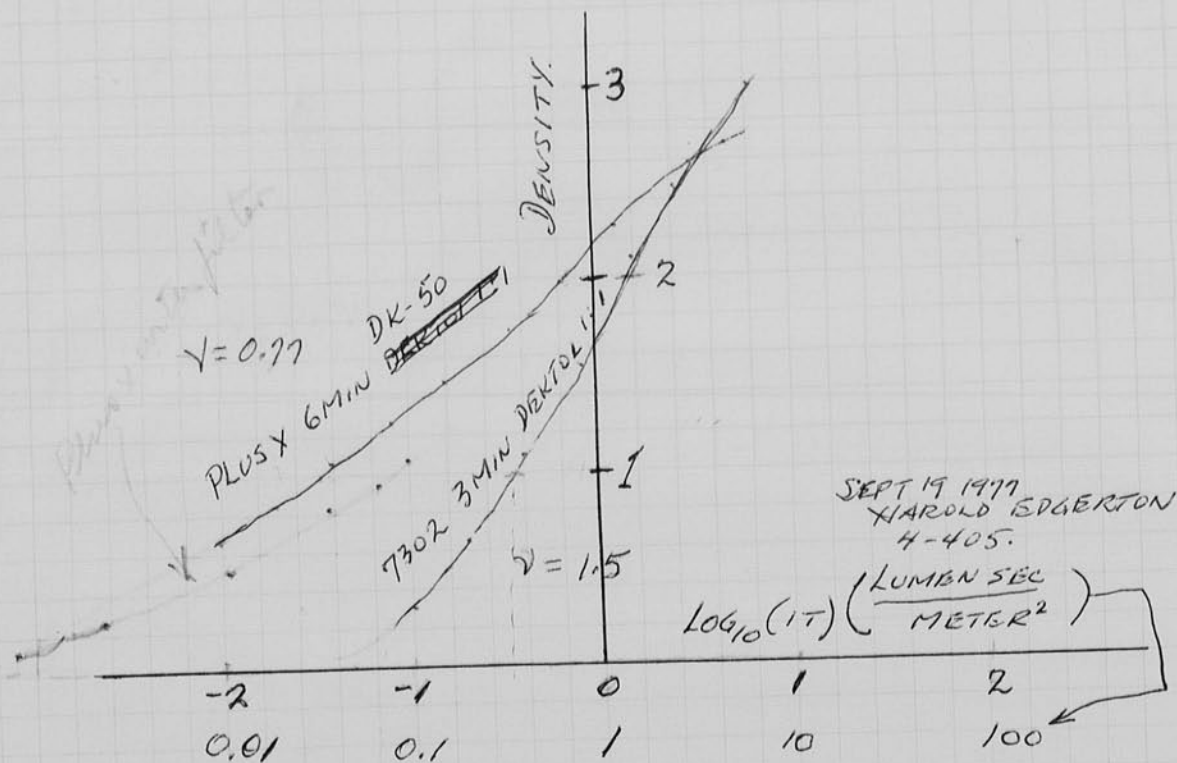
DENSITY

2

1

LOG<sub>10</sub>(IT)

log<sub>10</sub>(IT)



Sept. 20, 1997

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 Natland were married on Sept 17 Sat at 1pm in the Star of the Sea Catholic church in La Jolla.

On Friday Sept 16 I went with Carl Moller 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 photos 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 m. Dive was made to show the students

See plot p125

Plug  
DK50 6 min. $D_{f, \text{range}}$ Another  
plot  
area!

D

1.04

0

107

93

.03

107

79

.19

94

68

.42

82

43

.98

67

24

1.62

26

14

2.08

14

11

F06.

11

Sept 30 1977  
David Dyer

Strobe beam put on roof at 6 pm 40 mfd at 2000 V  
Series trigger into 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. Plants operate at night only since the  
power supply makes a noise on the changing cycles.

Lamps #. FX 45. 6" gap. - 12 mm o.d.

Size.

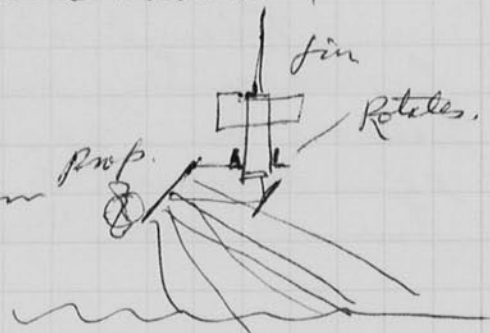
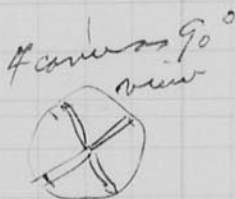
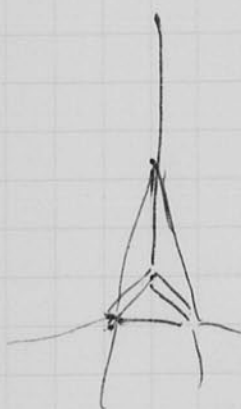
Output NCPS. 2KV. 40 mfd 2 1.1 x 10<sup>6</sup> peak light

Flash Duration. Series trigger 260 us Dur 286 cps.

(225) with meter.

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 Lottrop. 150 mm focal length,

Diam of hole = 6 mm

$$A = \frac{59}{100} \approx 25.$$

Exposure of test for lens

$$26 \times \text{focal length} = 26 \times 15 = 3.9 \text{ M}$$

$$\frac{26 \times 15}{100} = \frac{390}{100} = 3.9 \text{ M}$$

(Lenses 2.4 M for one test!), enormous part,

I had a 3600 RPM 1/60 sec. per rotation white powder in photo.  
The Oak box Kodak (pre) was used 8600 B.C.P.S. at 12 ft

$$D = \sqrt{8600 \frac{125}{25}} = \sqrt{8600 \times 5} = \sqrt{43000} = 205. \quad \text{Plus x film}$$

$$D = 12 \quad \frac{215}{12} \approx 18 \quad \text{the lens is } f \underline{25}. \quad \text{Exposure ok at } D \underline{50} \text{ 6 mm}$$

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 mm. lens

18,000 CPS  
STROBE.

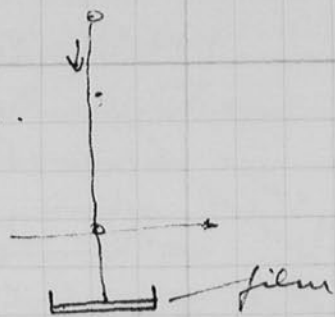
BLUR OFF

BLADE. 2600 RPM

BIT 1971 H. E. O. [unclear]



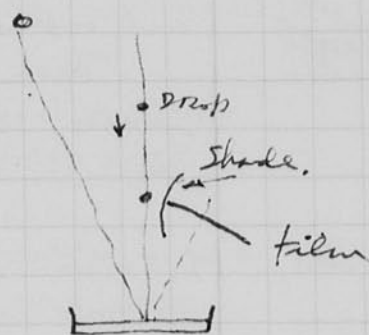
1. Splash of a water drop into water on a film.  
Catch the drop after its hit & show waves and other disturbances in the water. Start with water about 2 or 3 mm deep and with a drop falling from 12 inches. Try to observe small drops that form on the rim.



Try shadow reflection from the water surface after the drop has made its pact.

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 Fayon -  
Park County regional  
dinner for John Chapman  
and Jean Joe.  
Deana Jo.

Oct. 3. 1977.

Output of  $1\frac{1}{2}$  gap - sealed electrod lamp with.  
mfd at 1500 volts in Big Flash unit. 2 Lamps.

(each lamp) -  $9 \times 10^6$  cp peaks  $\times$   $40 \times 10^{-6}$  us 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 an aluminum reflector.

150mm  
f4

Tests of Lens. 8" - 21"  $M = \frac{8}{21} = .33$   
Set lens on correct  $\infty$  on scale. then Max extension.

133  
21/80  
63  
70

-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. 4000  $DA = \frac{400 \frac{125}{25}}{200} \frac{1}{(1+1)^2} = \frac{4.5}{4} = 10$   $D = \frac{10}{0.5} = 20$   $A = \frac{11}{5} = 2.2$

Photo seems to check, oh! Clear demonstration.

Copy of flash sent to Bob Menchell 720 Jefferson 20021 with Pigeon photo  
following phone call.

Oct 15 1977 Harold Edgerton

We had a party last night at the MIT Store followed by a dinner afterward. Some 40 were there to celebrate and honor Bill (Earl) Mose Roberts who reached 65 years last spring. He will continue to help us in the stroke lab.

Bobkins told of activities in Scotland at Foch Ness.

← Esther and I went to Nebraska on the night of the 8 to Omaha, on the 9th we visited Jesse DeLeon in Woodbine town. (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.

Oct 19 1977 H. The M.I.T. Club of Cape Cod will visit the Shell Laboratory at 130 to 230 today. First there will be a picnic at the Historical exhibit on Mass and.

I took multiple photos of a dart yesterday as an example for the Seminar class. The pic's 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 Alvin Bobrick, Ewan Huang B Denise Denton, Chas Harwell.

I used 18,000 BCPS (2 spot reflectors)

Plus x at f 8.

3 Color Technichrome II. #45.

3 B&W.

The class of freshmen seminar student came to 100 men drive for dinner. Diana Kohlender (Wellesley) was with us.

Oct 24 Sunday Photos of sun were made for Bldg. 7. at 4.15 pm to get crossing.

met at  
cemetery 3 miles  
south of Woodbine  
Burlington  
Woodbine  
Skip Leonard  
Logan.

Oct 26 1977  
Hawick Edgerton

133

My seminar class took 8x10 inch silhouette photos of Ches River Water yesterday to investigate "floaters"; These seem to be on all of our photos - very and less.

on film #3 the water was filtered. This seemed to reduce the in water particles, but there were wavy more floaters! They must come in through the air.

Oct. 27, 1977

9302

FLOATERS!!!

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 ~~pl~~ 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.

Flesh III James Killian and I had a conference today about the revision of Flesh II.

Killian agreed to contact Greenwalt 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 Flesh 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 Strobotics of Ken Rod will be shown.

I proposed a simple strobe projector of movies today to Mac Roberts. 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.

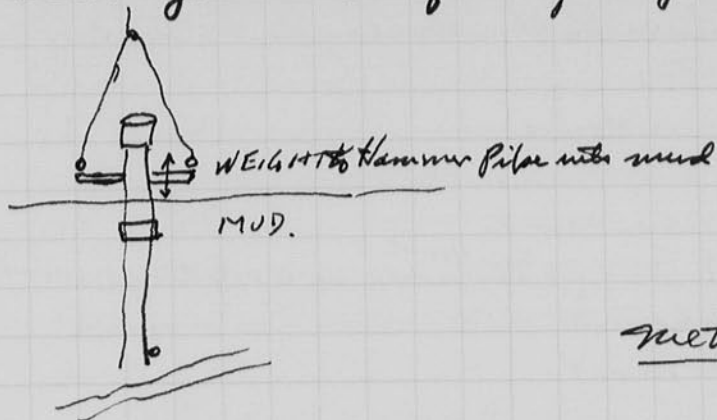
More photos were made at the Acquaviva yesterday morning. Ann Cotts ran the sea lion part. I found the sea lions were difficult to photo graph since they are so dark, especially 140665, the big male.

My lights were tripped by others into flash and this caused me to miss some exposures. I should have covered the photo cell of the unit that was used for the shutter sync, and reduced the gain of the tide light - or aimed its photo tube toward the key light.

John Rowanowicz put on the dolphin performance. There was a lot of splash. Again problems with the sync due to other photographers.

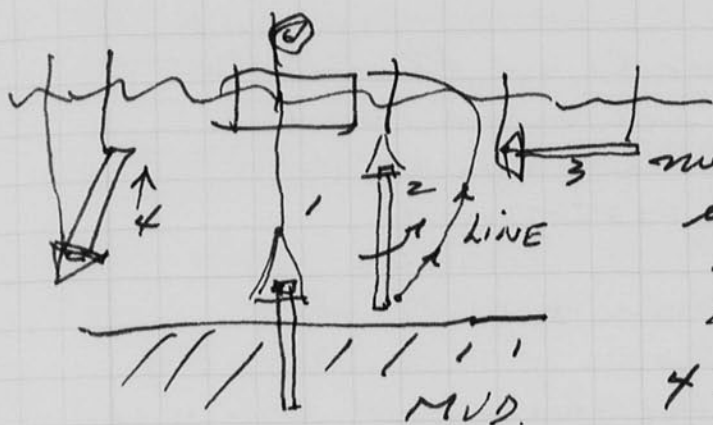
Coring methods for objects in the mud.

See my letter to Syd Nigral of Aug 6 1975



One problem is how to pull the cover 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 cover 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 cut and brought up but gravel and rocks will be very difficult.

Another method could be the use of a vacuum <sup>pump</sup> 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 4-4051117 Strobel Lab.

The jugglers in the area were having a juggle today in the Sala Puerto Rico in Stratton.

I brought some of them to the multi flash Studio about 10:30 for a few photos.

David Ledoux (Ashdown House)

Rod Holbrook.

Art Sewell 354 5152 camb.

Ship King (Harvard) 354 6486 <sup>Home</sup> 495 4567 (4 Ring) work

Holly Douley, Amherst.

Luis Vermont.

Mike Moschen.

David Walker B13&N

The first photos (4) were made on Plus X at f8 developed 6 minutes. The action was not

good since the clubs had black tape on the handles which did not photograph.



TAP

I brought Skip and Alvin Haeblerli #91 Holly Douley back about 4 pm for another try. I used Plus X at f11 with the strobes at 60 - 0.3 sec on Skip & Holly with Indian center.

I made 4 balls on Ship 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 Sam Raymond today after talking to Gil. Rowe (W101) about slapsheet time camera. Gil wants an 8mm in a glass sphere. I recommended 16mm in a simple type with out a shutter. The trip could be photo electric thru the sprocket holes.

Nov 11 1977 Dev set photos from 2nd floor - Bldg 7  
Plus X film 135 mm lens f25. Density 1 filter.

|                        |             |
|------------------------|-------------|
| 315 first photo cloudy | 400 out     |
| 320 partly cloudy      | 405 sun out |
| 325                    | 410         |
| 330                    | 415         |
| 335                    | 420 gone    |

Blind Peter

Nov 12 1997  
Haired Edgett.

Museum of Science in am about 10 for photos of  
Archimede, a great horned owl of 1 1/2 years old.  
Students David Silverman, Allan  
Jim Snyder - Kevin Hurray helped. We used a  
3 lamp 6000 BLISS unit of 60 us operated from  
110 volts.

Photos were made at 7 ft to the owl on  
Polaroid 58 color 4x5 film at f 22 (dark)  
and f 16.

The background was a curtain. We need a  
blue paper screen!

Mount Stonehenge big event today.

340 behind Post f 4x5 vertical film color neg ASA 100 D+ filter

345

350

355

Clouds most of the time

410

415

410

415

420

1/1000 sec exp at 5 min intervals.

Some photos

Kodachrome 25 in FUJICA ST 205 # 8081324  
at 35" from north well on metal in floor off 7-201.

345 1/60 f8

346 1/60 f8

351 1/60 f4

410 1/60 f4 close

410 ± 1/1500 f16

Several shots with  
sun at horizon.

16mm movies 16/sec  
ASA 400 film in Hall to show  
the walls lighted.  
24/sec with lens  
flopped down  
to get the sun.



Filer-Ortner W/HO1 came at 9 and we took photos of plancton on 8x10" 1302 film. The results were great. Prints were made and taken to W.H. I gave him 2 flash lamps F&BA.

Nov 25 77. W/Hofstet brought in photos (16 mm film for Tealines). We saw some strange dot patterns on 3 frames?!?! The 35 mm films have not been processed.

Thanksgiving was in Salem MA with Barbara and family. My sister was there to visit her husband and daughter Betty.

A photo exhibit of my work was opened at the Vision Studio Gallery on Nov-23 from 6 to 8. Many of my friends showed up including Jim Miller and Fabian Beshers with son Chip. The show was put together by Gus Kozakos.

Dec 3 77 Double Sprayer was furnished for Aquarium. Lyon 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 Aquarium.

Dad gave us two stroboscopes for this job. We kept one at MIT and gave the other to Lyon. *Demise* *now in J. van* *Ron* *one*



Freshman class  
Dinner at  
100 mem Dr  
Cambridge  
Mass.

Esther

Dec 3 1977 4-410

John  
H. ...  
Dennis  
T...

Tony Beerlings, Report  
Under-water photo 100 WS Elap. sac.  
16 mm opt in Oct. 24  
off 30 aug after problem.

Sonar triggering

U.F. #1. in 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 Wind. oper. 17 Sept 198 counts.  
off Tyndal slave 190 exp.

19 Sept. <sup>Sept.</sup> ~~Sept.~~ 21 lost.  
Castle Bay due to damage to  
Buo

#4 Oct. 2, 1977 443 counts  
250 counts.  
off castle.



at the Aquarium  
for photos of  
Porpoises &  
Sea lions.

18,000 p.c.p.s.

Report typed out and read.  
Dick Kayner & - divers. Bad  
weather.

18 Dec launch Row Boat.  
Hunter broke lines and  
was jumped out.

Algae formation on Alum and glass lens noted.

Heriot-Watt Uni. - Edinburgh.

have submarine and other equipment.

Dark rings artifacts.

need side scan sonar. July. (June?) no date given

July proposal for the expedition.

John Mill's sample & board log

Nelson - Photo tables. Struth. Clyde head man

Heriot-Watt - platform etc.

Harold E. Edgerton. Fritz Dove was here on the 8 and 9. He gave the same lecture on the 9th at 10-12:30 at MIT that he gave at the Mus. of Sci. on Dec 8.

Dec 20, 1977 Hrs. Janice Kay came Dec 18 at 9:45 am from U.C. We attended Payson Park Church and then went to John Bullitt's home in Watertown for a brunch party. Monday, Dec 19 aquarium at noon - Prop. exhibit  
Tues. Dec 20 Mus. of Sci. at noon with Jan, Yolanda Hinton came in with ballistic problems. Plan to take photos tomorrow.

Dec 27 1977. Sun photos from apt. 11:00-11:30 100 memorial Dr. Apt. 11  
Start 7:40 f 25. Paragon Lens 135 mm.  
end 9:20? with 1/1000 sec shutter at  
Plus x film 5 minute interval  
6 min Dev in DK 50 filter 1.35 Density.

Last night at Harold Edgerton's house in Cambridge. Peter was just back from Greece. He goes to the Tall Island Islands next month with 8 people to do work on the old ships there on the beach.

Terry Vose. 238 Newbury St 02116 536-6176  
Picture gallery.

→ Exposure for above ok. The sun <sup>image</sup> was very dark. D = . The buildings on the Boston side were under exposed.

a picture taken on Dec 20 when it was cloudy showed the buildings much better even if the sequence of time was much less

film 135 7:05 to 10 am 1/1000 sec at 5 min

Dec 27, 1977 1 observation.  
Rines, Bob, Kohl (Fall) photos Aug Sept Oct.  
Somer June, July '76 target.

(2) Only when lights & sound are on.

(3) Flash lamp close to camera - may seem best.

[15 ft distance Best  
Waylee 12 ft.]

max 7 or 8 ft with James. Lost after 8 ft.

Traffic is worst in June, July. All July one or two best.

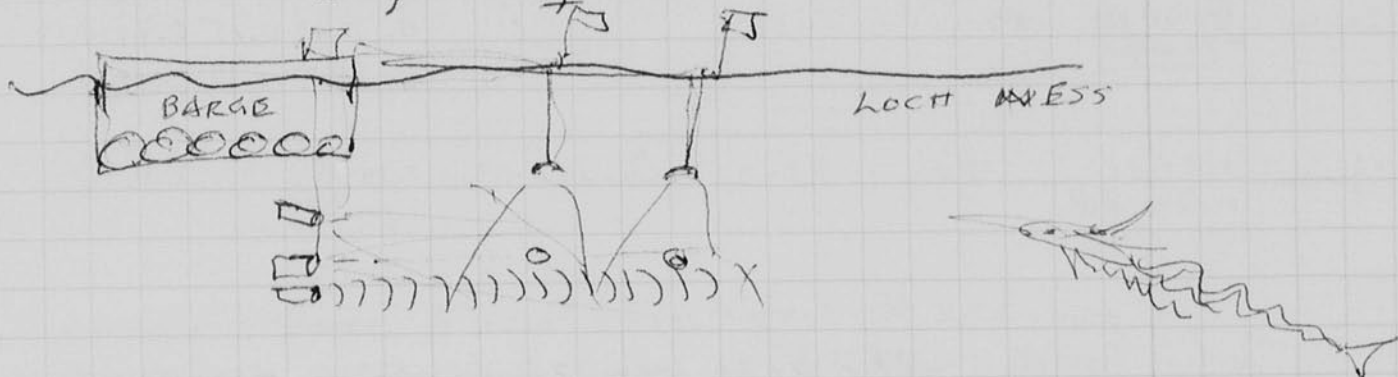
Four plans to look. Tigger.  
Should go back to color film.

Shields photo. Shows mouth - Small head. 2 jawlines  
neck smoother

Smith photo 2 pictures of Head & neck.  
Similar to the Shields photo.

Aug - Sept <sup>nighttime</sup> Hump ~~photo~~, several.

Conclusions. Study the 16mm equipment  
Augelling.



Array



Summer

Michael, Peter Mid-July diving, timing best  
Heriot Watt submersible.  
John Mills.

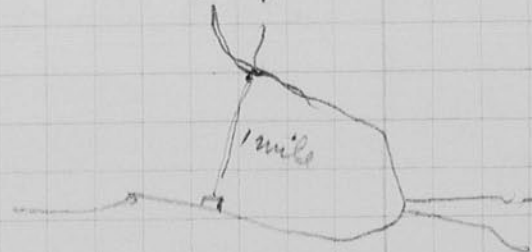
Return  
1 16mm + 2hr  
1 35mm movie  
more lights.

Raines asked  
me to go in  
July to look  
over with  
newer side  
scan equip.

June = Klein  
July = H.E. on shore -  
Baltimore study  
Late July. Cameras etc  
Aug

Urquhart Bay  
Area for long  
sequel.

Practising experiment.



Dec. 27, 1977.

Roger Allen D.D. will come tomorrow to discuss Lohman paper on sonar at 10 am. Bring in slides etc. The journal is called Spectrum.

David Mahaffey will bring in slide tomorrow for multi-flash photos. Nealey St 492-4108 9x10 Polaroid color, on Tomorrow Thurs.

Film tests.

| Light      | D                  | Film  |        |               |          |      |             |      |      |      |     |  |         |
|------------|--------------------|-------|--------|---------------|----------|------|-------------|------|------|------|-----|--|---------|
| 0.3 hrs.   | 89 cm              | 7302  |        |               |          |      |             |      |      |      |     |  |         |
| 3 min.     | 0.3 hrs            | 17 cm | SO 343 | Graded strip. | Exposure | oil. | Washed out? |      |      |      |     |  |         |
| 3 min      | 0.3 hrs. + 16 mfd. | 17    | SO 343 | " "           |          |      |             |      |      |      |     |  | Density |
|            |                    |       |        |               |          |      |             |      |      |      |     |  | 1.27    |
|            |                    |       |        |               |          |      |             |      |      |      |     |  | 0.4     |
|            |                    |       |        |               |          |      |             |      |      |      |     |  | 0.04    |
| 1 1/2 min. | 0.3 hrs + 16 mfd   | 17 cm | 7302   | Graded strip. | 2.84     | 2.97 | 2.77        | 2.46 | 2.01 | 1.45 | 1.0 |  |         |

FOSS John ~~Mitchell~~ 787 5721 wants to borrow a dropper & slide

MITCHELL 322-7777 wants to borrow a strobe with lot of red output for the destruction of cells and virus etc.

now → 0.3 hrs. uniform lighting N.G. out. 50 mfd 17 cm SO 343. Graded strip. angles not good. too big a film for distance.

40 SO 343 Salivaria with water to show 60 μ cells from the mouth. one FX6A cracked seal. Thin so distance changed to 40 cm

50 mfd as above. 40 SO 343 avg density = 0.65 3 min in Detstab 1:1 72°

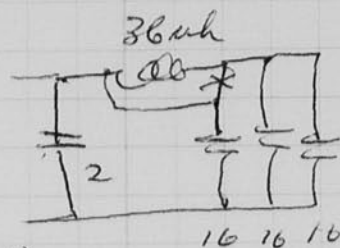
Note Dec 29 <sup>clear</sup> these particles in this film are about 60 μ in diameter. They are irregular shaped compared to previously photographed solid samples.

"SQUAME" cells see page 146

The layer of water was too thick for the 40 condenser, with the full FX6A series

Handwritten

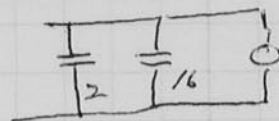
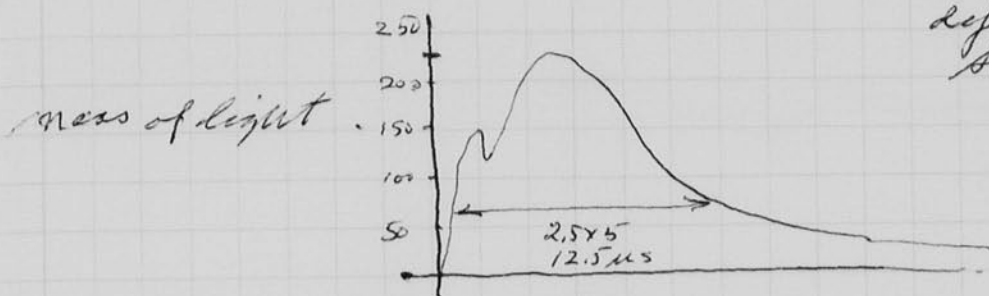
The Fx6A lamp had a crumpled seal seal N.G.  
I put a 36  $\mu$ h inductor in series  
with the 16x3 capacitor to cut down  
the peak current.



Fx6A

40cm film. 10x onto 50 343. (yesterday, I  
used 40x.)

this should get better  
definition of all the  
subject.



Dec. 31. 1977.

Donald Krause 5 old town Road # 236  
ayor wa 01432 came in yesterday. He  
gave me a transparency of a brick  
wall photo with outside clouds. He  
was proud of the dark 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 financing.

Krause is a friend of class. Wyzeloff.

40x800  
120600  
Dus Kayafas came in with pictures & he  
signed for the folios. also checks from Warty  
for \$120 and \$600 for prints.

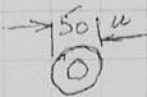
He discussed the program and  
gave me an accounting for the rest.

*avella vulgaris diffugia*

Small discs 50  $\mu$  ±  
shells in water.

Q

from Garrett.





Copyrighted materials are not being displayed.

MIT will only display materials for which MIT is the copyright holder or for which there are permissions for public distribution.

If you would like access to the full page image for educational or research purposes, please contact the MIT Libraries' Institute Archives and Special Collections.

<http://libraries.mit.edu/archives/>

New  
Promoted

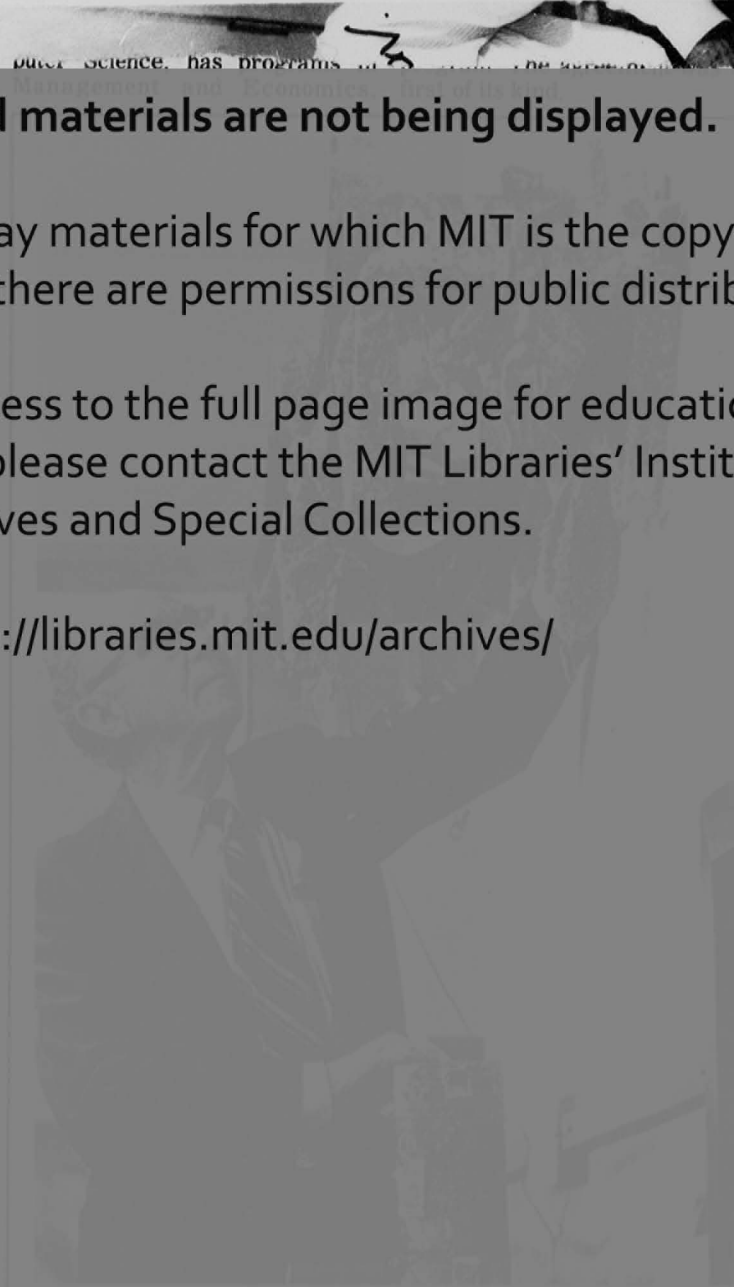
...has been named associate director of the center.

The appointment was announced before he joined CAES, will have wide responsibilities in each of the center's main operating areas: Advanced Study Program, Self-Study Program, Tailored 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 Taylor 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.



FROM OCEAN BOTTOM TO DOC'S WALL—An underwater 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.

Page 3, Tech Talk, January 4, 1979





STROBE PROJECT LAS  
FALL 1976 MIT



### Copyrighted materials are not being displayed.

MIT will only display materials for which MIT is the copyright holder or for which there are permissions for public distribution.

If you would like access to the full page image for educational or research purposes, please contact the MIT Libraries' Institute Archives and Special Collections.

<http://libraries.mit.edu/archives/>





Hansel Skjoten

Party last night to celebrate 1978 arrival at Ruth Appen's house in Belmont. Right mayors, Justice Kispert, Holden's guests.

I wrote MacWhorter 148 Hacienda Ct 939211 about the use of 50343 film thru a 10x enlargement to a 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.

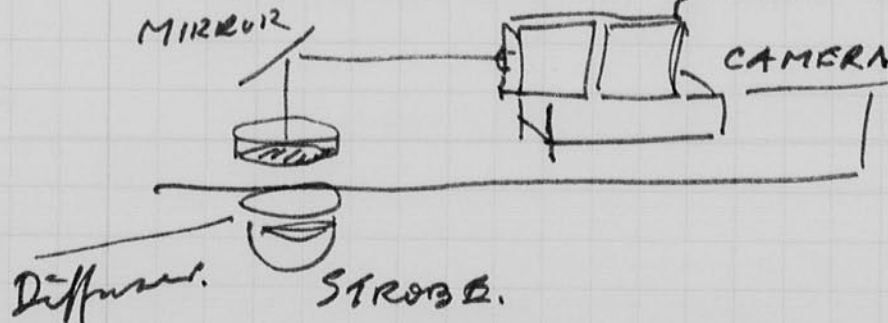
I find that focusing the enlarging lens is mighty difficult. I need excellent optics in the lens. What aperture gives the maximum resolution?

Jan 3, 1978 I worked on the videotapes of the monitor for the Feb 13 demonstration.

Julia (with Prof Green) told me that the mouth cells were called "Squame" these are about 60  $\mu$  in diameter.

Jan 4 '78 Ed Pappas and I discussed plants growing with stroke. He wants to do combination of daylight and strobe or chemflash. 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 exposures with success. 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.



Arquitecto  
 TOMAS J. SANABRIA  
 Centro Comercial  
 Santa Monica  
 Of. 204  
 Caracas Venezuela  
 (104)

around 1945  
 Mr. Xmas.  
 PHOTOLPS are  
 instrumental 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  
 0.1ohm

Jan 11 1978. Test of FX6A with circuit added.



Gossen meter

2.2 on scale  $S=100$   $f32 \times 1ft = DA = 32 = \sqrt{BCPS \frac{100}{25}} =$   
 $BCPS = \frac{32^2}{4} = 250$

$$\begin{array}{r} 32 \\ 32 \\ \hline 64 \\ 96 \\ \hline 41024 \dots = 250 \end{array}$$

Tried two P.R. light meters at 1 foot

~~0.8~~ 8. lumen<sup>sec</sup>/sq foot  $\times 1ft^2 = 8$  BCPS

perhaps this phototube cannot average  
 this short peaks.

~~High~~ Honeywell flash unit on (M) 726 BCPS at 340V. on AC

Gossen meter ASA 25 Reads 5 at 4ft. Guide factor =  $D \times A$  Reads  $\frac{5}{2}$  on  
 meter scale with  
 $f$  to  $f 8 =$   
 say 7.

$$7 \times 4 = 28 \quad \frac{28^2}{4} = BCPS = 196$$

$$\begin{array}{r} 28 \\ 28 \\ \hline 56 \\ 784 \text{ BCPS about right.} \end{array}$$

Lamp is 3cm long, in Reflector  $4.7 \times 2$  cm.  
 make a circle  $1/2$  cm long

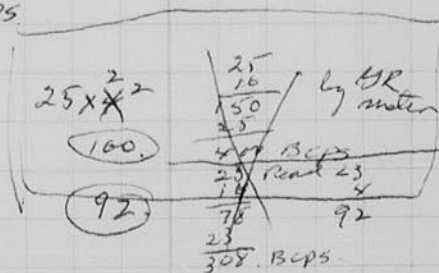
Mask 8mm. circle over the reflector Gossen 2.2 at 4ft.  
 Read f3 on scale at ASA 25

$$DA^2 = BCPS = (3 \times 4)^2 = 12^2 = 144 \text{ BCPS}$$

$$IT = \frac{BCPS}{D^2} = \frac{144}{.40^2} = \frac{144}{.16} = 900 \text{ lumen sec./sq meter}$$

Let assume the output is now 100 BCPS into  
 the 0.8 cm hole  
 at 40 cm away.

$$IT = \frac{100}{.4^2} =$$



$$96 \times 1 = 96 \text{ BCPS}$$

Gossen shows 144

Jan 7 1978

H&D of S0343 film

Lamp ~~Head~~ 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,  $100/0.5^2 = 400$  lumenseconds/sq meter.

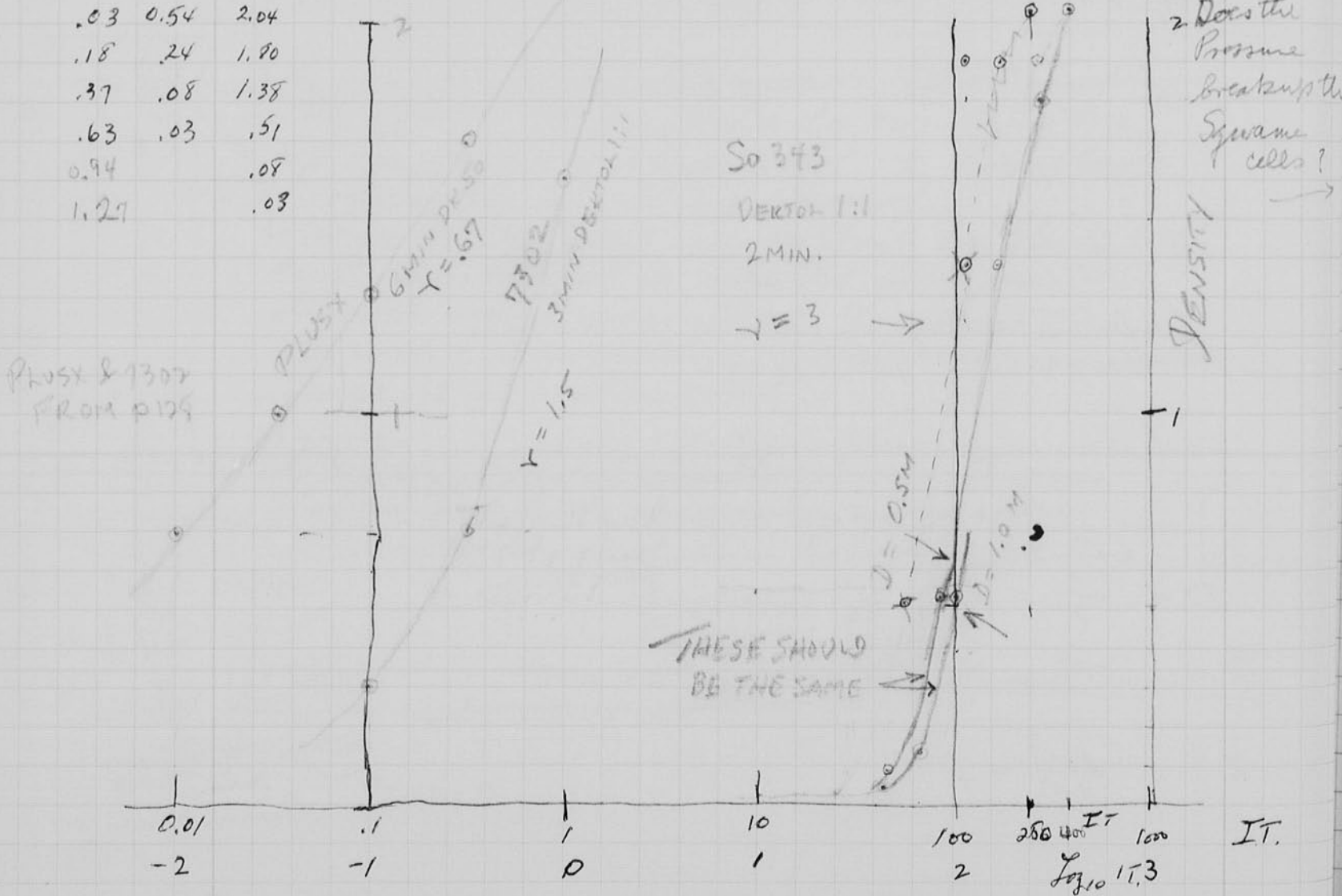
#2 " = 1.0 meter  $100/1^2 = 100$  lumenseconds/sq meter.

Picture made of salina in log on S0-343 film 2mm Deblor II. 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-salina mixture. A 5x5 cm slide cover made of glass was put on top of the liquid. This should force the layer of water to be thinner and the resolution to become better. See example! →

| 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  |

Must change picture? →



PLUS 8 1307 FROM p 129

Does the Pressure break up the Square cells? →

DENSITY

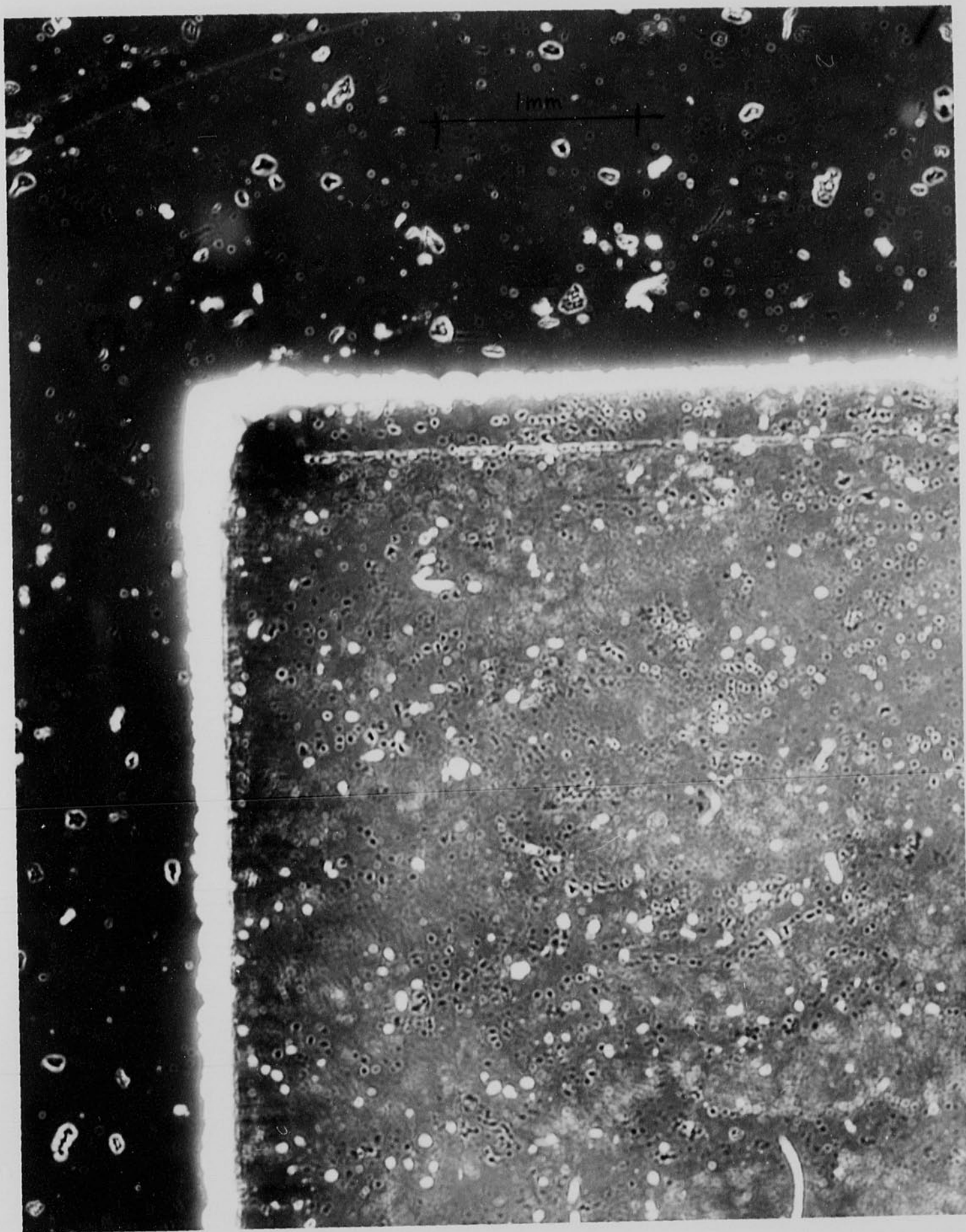
IT.

Log<sub>10</sub> 17.3

Enlarged  
40XEmulsion  
water  
liquid ↓SQUAME  
↓ cells

$$\frac{5 \text{ mm}}{40} = 0.125 \text{ mm} = 125 \mu$$

$$\frac{1.5}{40} = 0.0375 \text{ mm} = 37.5 \mu$$



↑ →

glass cover.

Notebook # 32

### Filming and Separation Record

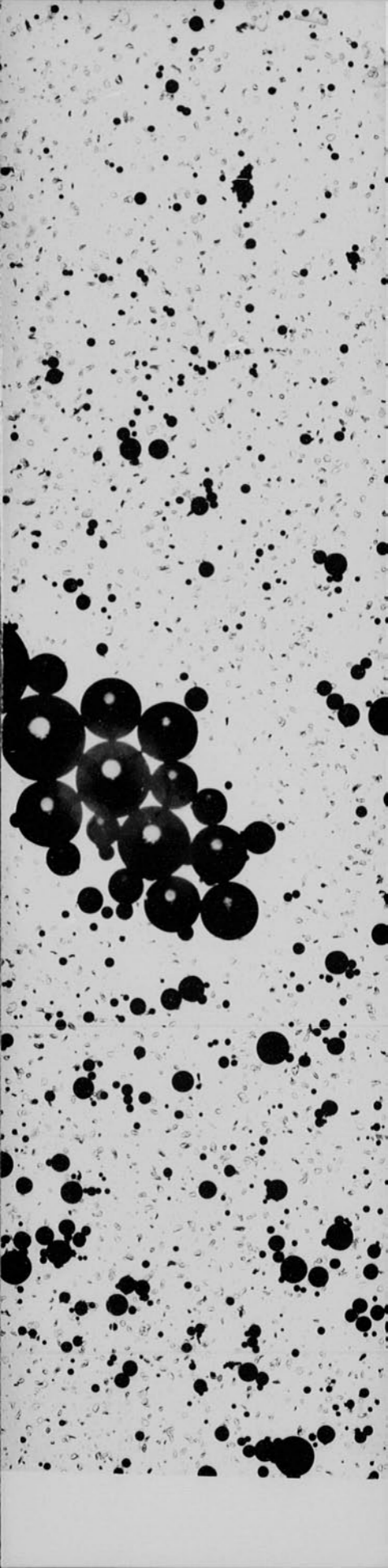
1 unmounted photograph(s)

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.





15x

Squawk  
cells



1977



1312

0.03

0.13

0.31

0.63

Jan 9, 1978.

Harold R. Gorton

I started a series of lectures today for this week of IAP (Independent Study Period). Our room 4-402 was packed for the slides and movies of high speed action with strobe light. Then Ron Buckino showed some of those kudo photographs bullets.

Judy brought in some of Greer's experiments and we started a set up for elapsed time photography. After some discussion we finally selected a G.R. Stroboscope as a light source. It now has been coupled to our 16 mm elapsed time camera. Greer wants 3 minute intervals. Our max on this equipment is about 1 minute for 50 ft of film 40 exp per ft  $\times 50 = 2000$  exposures.

$\frac{1 \times 2000}{60} = 33.3$  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  $\times \frac{2000 \text{ sec}}{166 \text{ sec}} = \frac{12 \times 100}{100} = 120$  speed up.

$1'' = 2.54 \text{ cm}$   
 $= 25 \text{ mm}$

$\frac{1}{2} = 12.5$

Handwritten calculations:  
 $\frac{31}{25} = 1.24$   
 $\frac{2106}{4170} = 0.505$   
 $\frac{24}{160} = 0.15$   
 $\frac{144}{100} = 1.44$

Handwritten calculations:  
 $\frac{12}{160} = 0.075$   
 $\frac{2000}{340} = 5.88$   
 $\frac{370}{370} = 1$

Try a stroboscope output = 0.3 B.P.S.

Kodachrome 25 requires what IT for density of 0.15?

$IT = \frac{0.3}{d^2} = \frac{0.3}{.015^2} = 1333$  lumens sec/square meter.

Let  $d = 15 \text{ mm}$   
of lens

See Treatment in Electronic Flash Strobe. The New Hill page

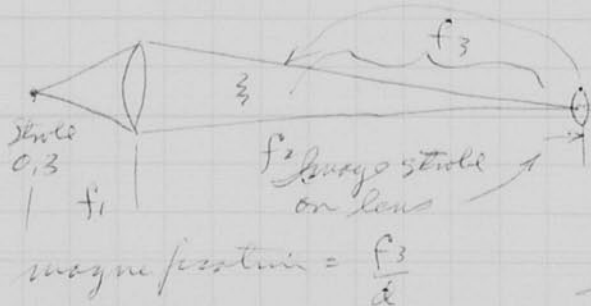
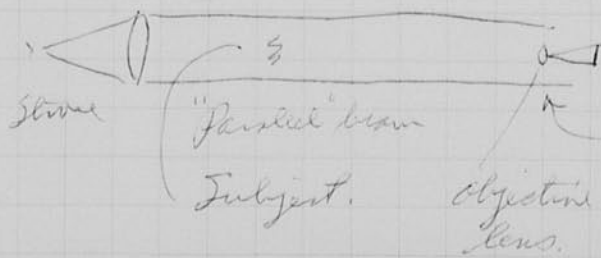


Image lens on Subject.

Parallel light system.

In a practical application the image of the lamp will be larger than the lens. Thus 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 & the previous volume 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 tide gauge and penetrator. A snow storm started the night before and completely stopped the airport. My gear, 407 lbs, is at Eastern Airlines waiting for flight 881 to Ft Lauderdale at 10.15. I may get out on the 22<sup>nd</sup> 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 way. Mac Allister is in on this too. ~~\*\*\*~~

ZINK 305 525-8284  
marina motel(?)

Jan 31, 1978 I went to Bimini on Jan 22 with David Zink on the MARGO IV a 42' Hatteras Cruiser. We took tide gauge 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 good reflector and a 6KC Double mass.

Jan 30. I took a series of photos of the sun set out of building 7. Sun set was at 4:45 pm I. and one day before exact alignment Jan 31, today. I hope to try again if there are no clouds. There were low clouds yesterday.

Sun  
internals  
4:45

Plus X film f 25 1/100 so. Density filter  $D = 1.97$ .  
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

D2 4:25

D2 4:30 pm sun on lens? Edge

D2 4:35 " " ok

D2 4:40 " " "

D0 4:45 " Sun behind cloud, on horizon or below

Plus X

6 min.

DK50 fresh

72°

Jan 31 1978 Sun photos.

Plus X film

3:45 South of horizon?

50

55

4:00

05

10

15

20

25

30

35

40

45

50

55

South of horizon?

"

"

"

~~Part in way?~~ ~~Half~~

ok 1/2 photo of Airin

ok

ok

ok

Last photo. dim and half sun

f 25

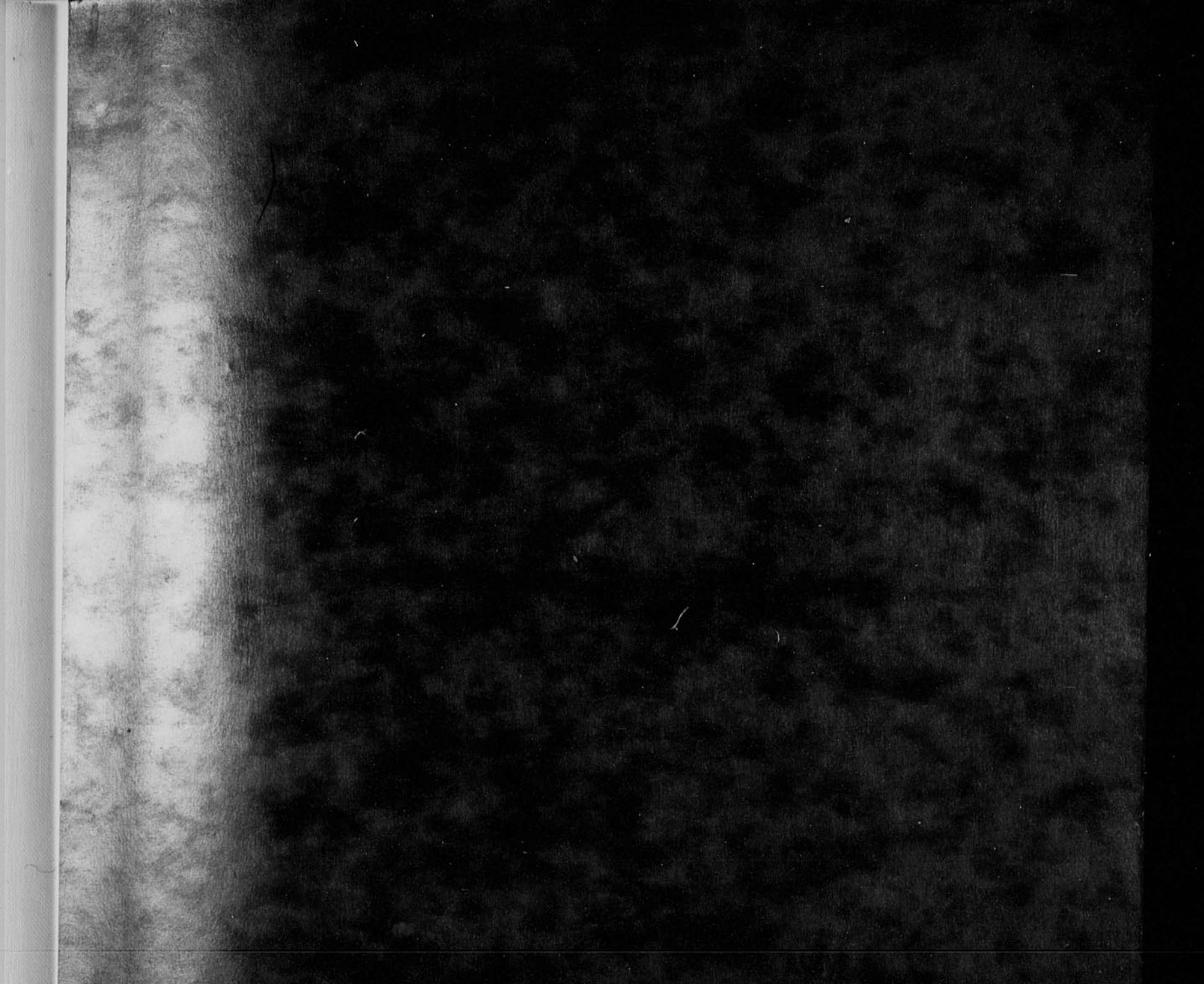
D = 2. f/2.5

7mm DK50

Sky clear.

Audrey Hanshall Chambered Tombs of Scotland  
Museum Press 1965.

Lump FX-24 Russo 6926 6829 1-356-5929. Ipswich. Bird photos. Oct 20 '77  
Austin juggler 492-2321. & MIT.



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 <sup>2</sup> chem. Daniel Lu.  
fillin.

Plus 4.20

|       |      |    |              |   |
|-------|------|----|--------------|---|
| ✓ .25 | 26   | No | sun on lens  |   |
| ✓ .30 | 30.5 | No | sun on lens? |   |
| ✓ .35 | .    | .  |              | 0 |
| ✓ .40 | .    | .  |              | 0 |
| ✓ .45 | .    | .  | Over         |   |
| ✓ .50 | .    | .  |              |   |
| 55    | .    | .  |              |   |

Jan 30, 1978,