HAROLD E. EDGERTON

PAPERS

MC 25

Series III

Laboratory Notebooks

Number —

Dated August 4, 1952 to Oct. 19, 1952

Massachusetts Institute of Technology

COMPUTATION BOOK

NAME	Number
HAROLD E. EDGERTON	

Course UNDERWATER PHOTOGRAPHY.

Used from AUGUST 4 1952, to Oct. 19 1952.

Notebook # Aug. 4, 1952 - Oct. 19, 1952

Filming and Separation Record

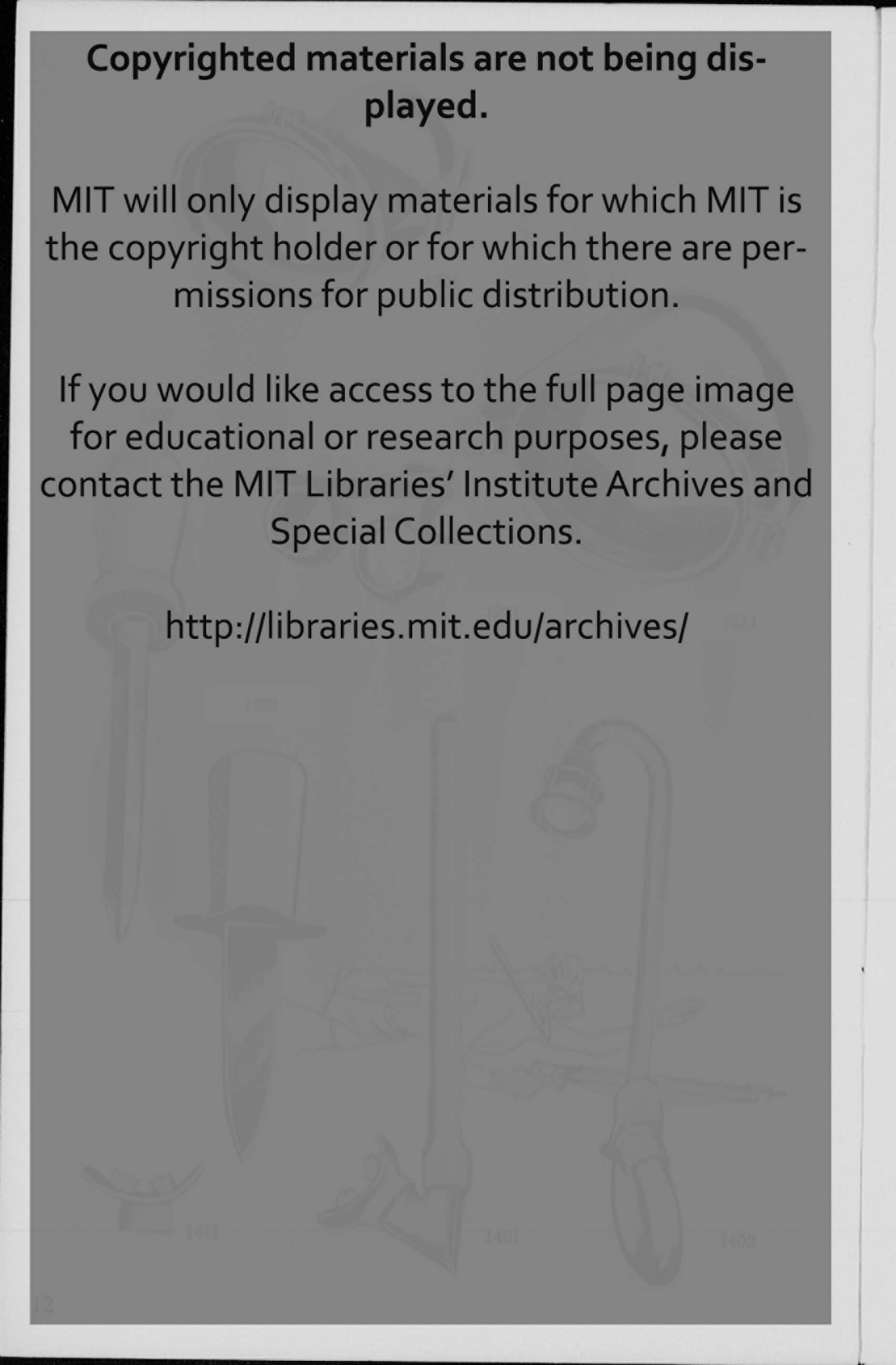
____ unmounted photograph(s)

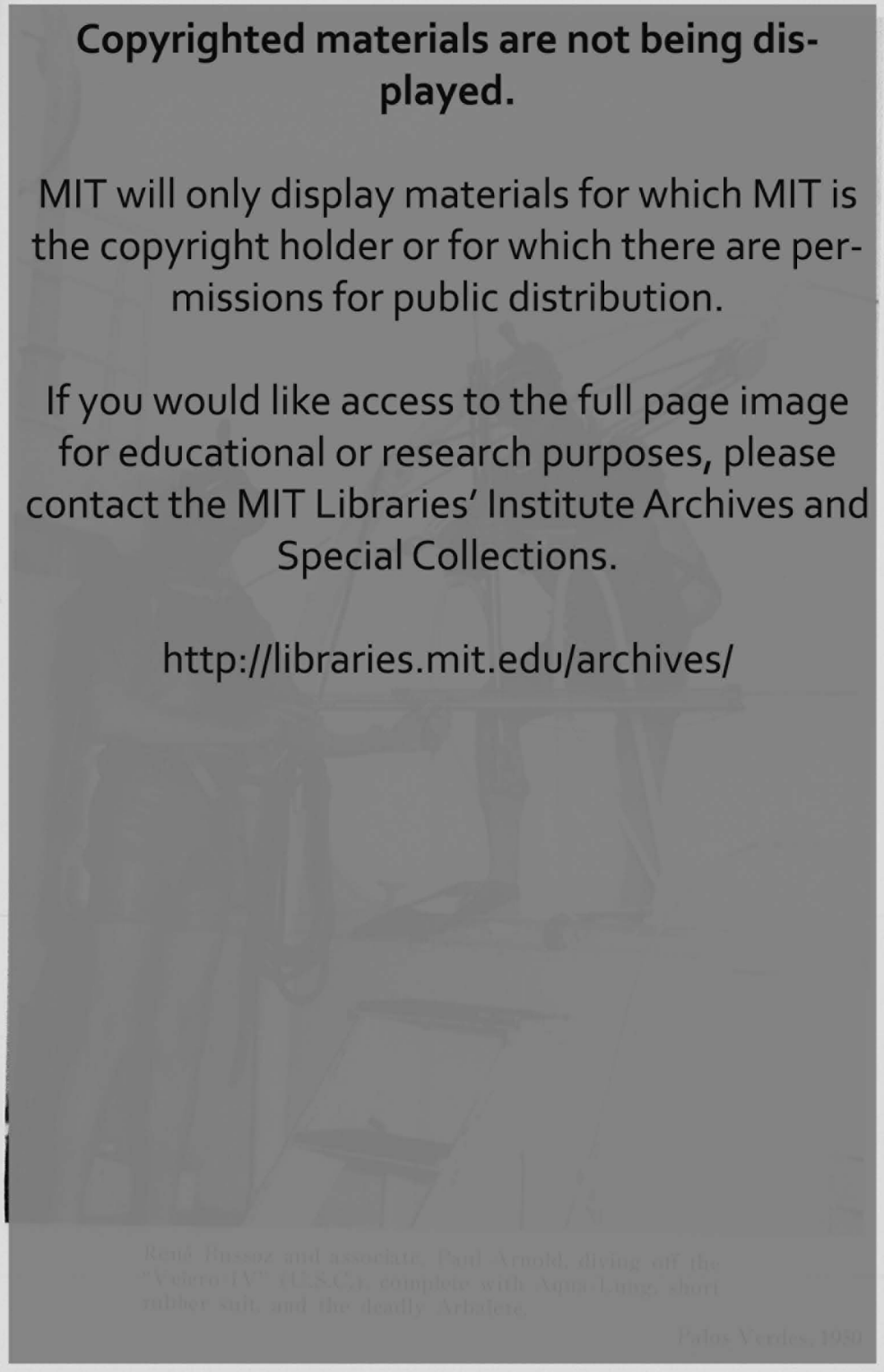
__1__ negative strip(s)

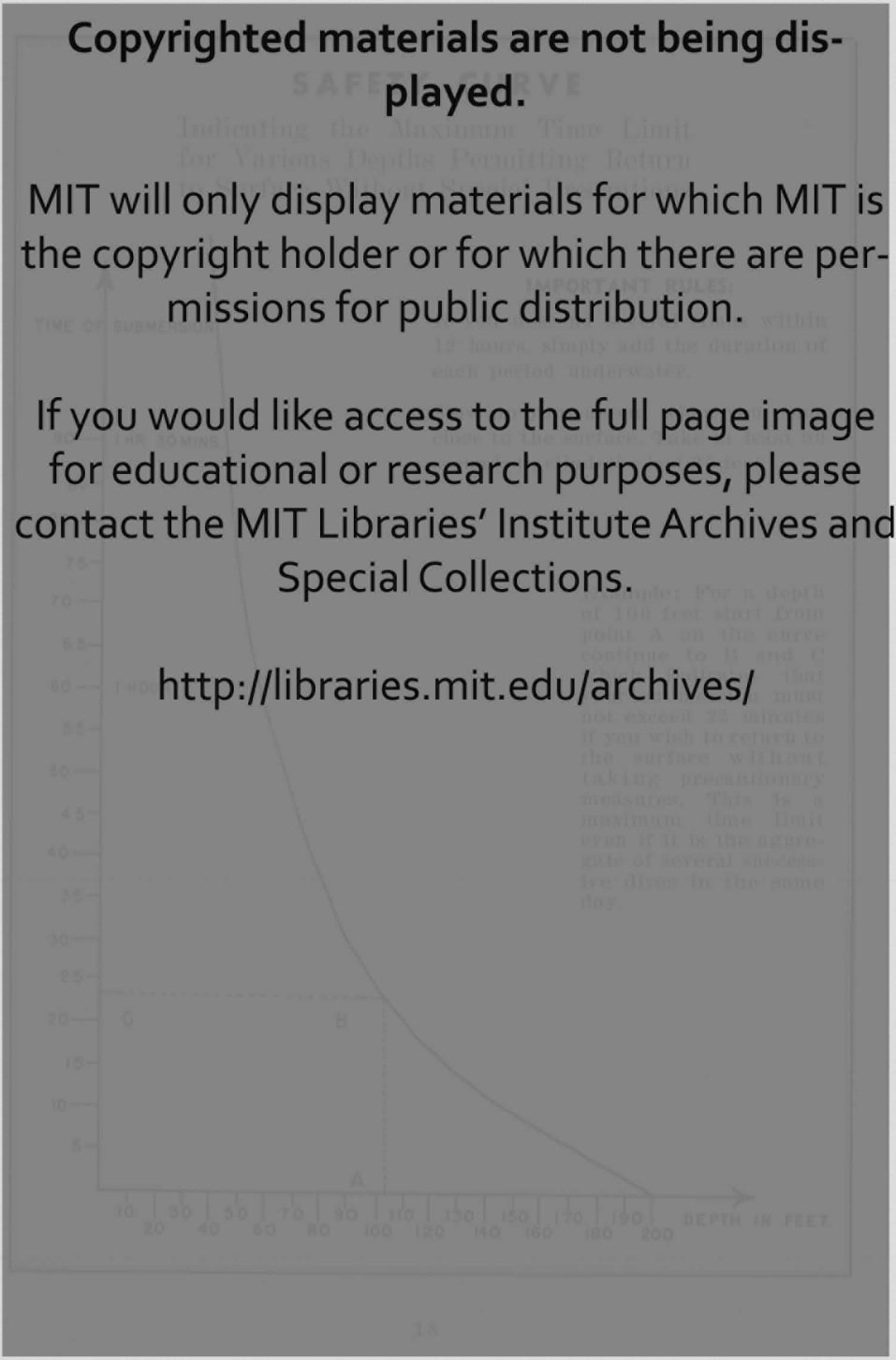
2 pamphlets unmounted page(s) 16-page pamphlet and
(notes, drawings, letters, etc.) 24-page pamphlet.

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

Item(s) now housed in accompanying folder.







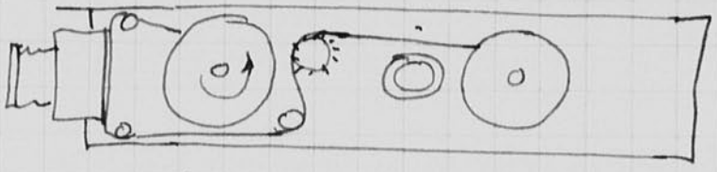
Harold E. Edgerton
Mass Inst of Tech
Cambridge
Mass.

August 4 1952.

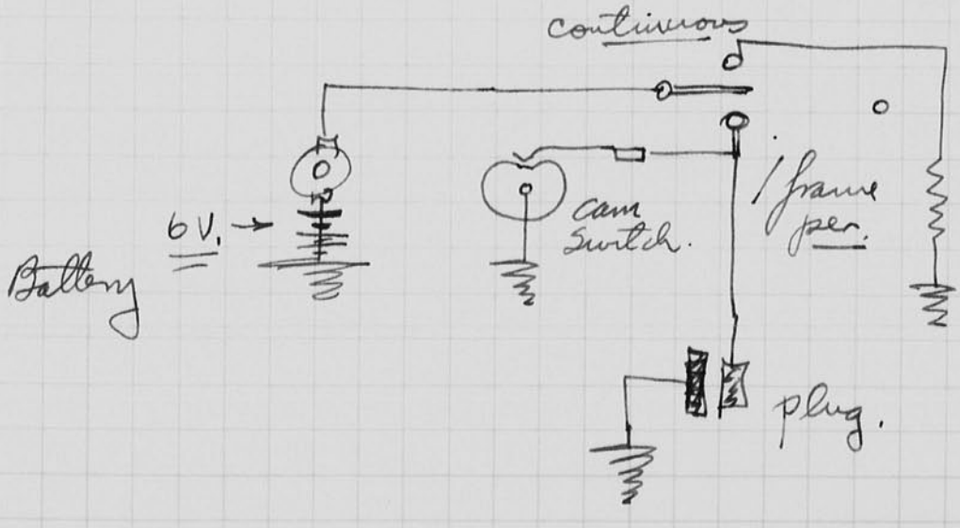
Underwater photography
experiments. —

August 4 1952
Harold E. Edgerton
Woods Hole Ocean Inst. aboard "Bear"

For the past few weeks an underwater camera and light have been made at M.I.T. J. Keefe at the RLE machine shop built the stainless steel case. The camera proper was built on a panel that just fit into a 5¼" I.D. tube case. The camera takes a standard 100 ft roll of 35 mm film. A photo of the camera works was taken yesterday. I hope to put prints in this book later.



A stip belt is used to the take up reel. The recycle time is about 2½ seconds. A cam switch turns the camera off after a double 35 mm frame is wound. Recycling is arranged by a switch that shunts the cam switch



the 10 ohm resistor reduces the rate to about 1 picture per 5 sec.

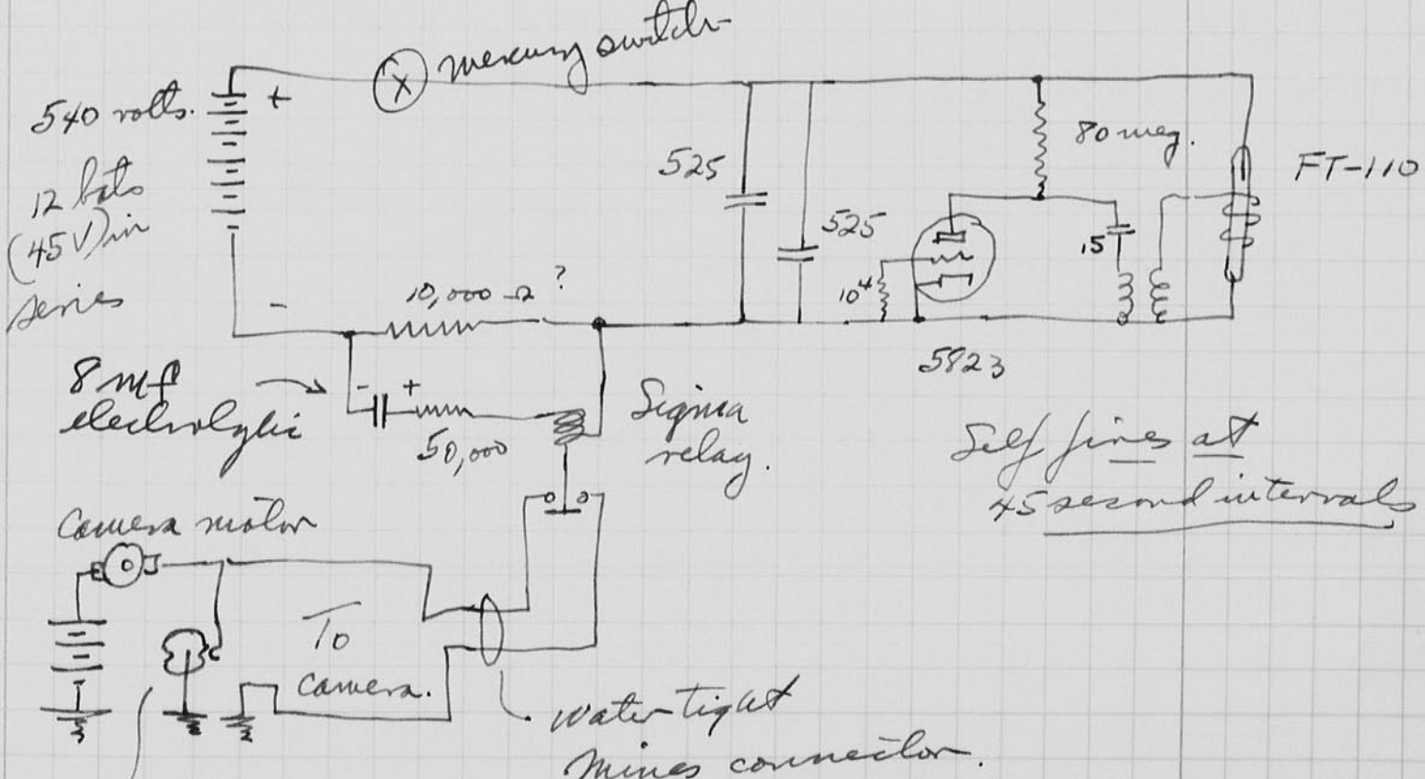
Aug 5 1952
"Bear" at WHOI.

Yesterday I drove from Cambridge to WHOI with Ray Rhines Bob and Bill together with the underwater camera and lights. We arrived about 930 am and after making some strengthening rings for the clamps on one of the lights went aboard the Bear where we spent the night.

After dark we lowered our camera and lamp off the stern of the Bear and allowed the equipment about 10 minutes of operation time. These photos were developed and showed little. One photo of the end of the boat above water was very good. One photo of the bottom was out of focus.

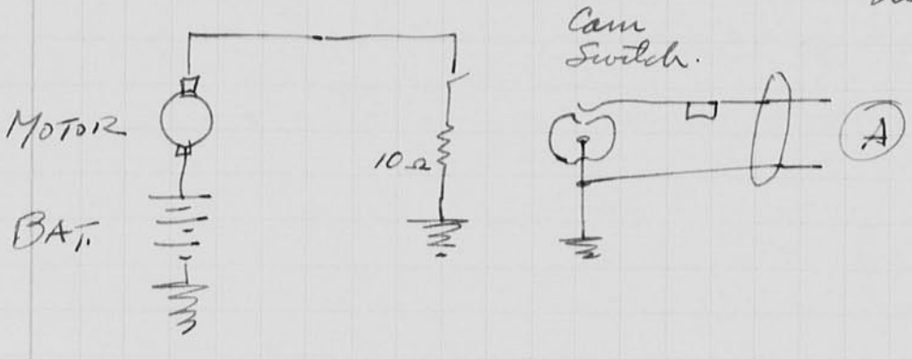
Two types of operation are possible with the camera. The first is described below.

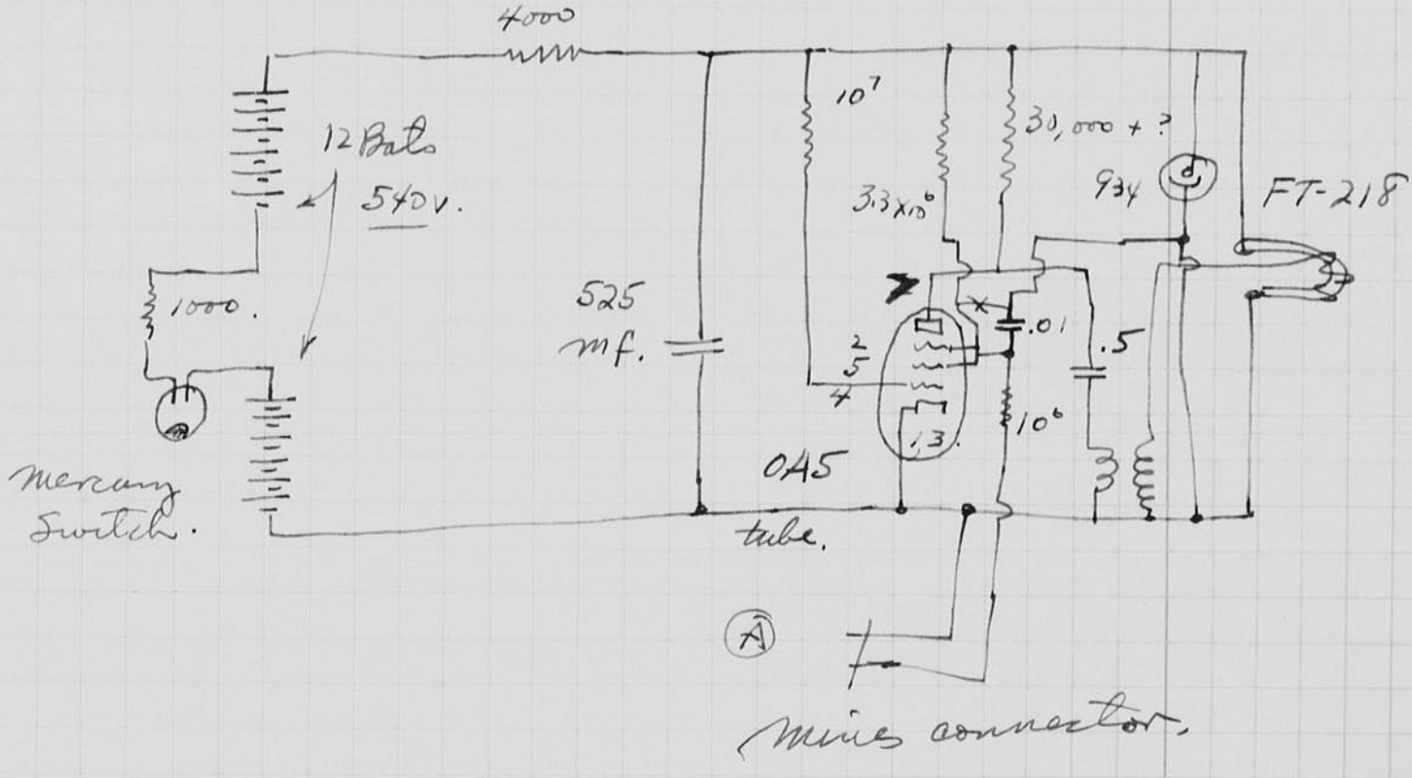
The strob lamp is arranged to flash at 45 second intervals.



The second method of taking photos involves a different flash tube equipment that is arranged to flash at 5 second intervals.

The camera now runs ~~with~~ continuously but with a 10 ohm resistor to slow it down from 2.5 sec to 5 sec per frame. The cam is used to fire the lamp as shown in the circuit below. An open circuit causes the strobotron tube to fire.





Aug 7 1952
on "Bear" about 50 miles south of Woods Hole.

We left on aug 5 from W.H. Some time was consumed in testing a .800 # lead sphere on a flexible jointed cable for horizontal pinging with a Edo sound ranging device.

We hove to while the Risk took off some of the sound men and a winch operator. Then another delay while a mechanic came aboard to fix an inverter and the ice box.

In the afternoon we left Gayhead and headed south. A wind was blowing from the south and the waves were about 10 ft high causing the Bear to roll and pitch. We cruised south until about 1 pm the following day aug 6, where we stopped when we sighted the canyon.

The canyon crew was also photographing the scattering layer. We did not pick up the scattering layer until we reach that position of the canyon.

The camera and light were hooked together and lowered to find the scattering layer. This apparatus is described on page 5 of this book.

From Tex Hoadley's book p 107. Plus X film f 4
Scale set on 10 ft
(actually less than
dale reading).

Roll 1 no shutter camera.

14.45 in water
14.59 270 meters 10° wire angle.
15.17 280 meters
15.31 290 meters
Vessel is rolling 20°-25°.
15 40 332 meters.
1550 345.
1602 Started the camera in to 300 meters after observing that the layer had risen since our 15.50 lowering Stopped at 299 m

We thought the bobbing camera might be causing the scattering layer to change its position.

1614. Started camera in at slow rate

1629 250 meters. While bringing camera up noted on fathometer that scattering layer again got very heavy.

1625 Started lowering the camera

1629½ reached 250 meters started lowering slow to 280 m reached at 1630

at 1630. it was noted that the S.L. had taken a sharp dive but had not shunned We are lowering the camera on more to 289

1641 Fathometer (Volkwan) reports layer started up. Sharp layer.
(The chart will be interesting to study.

1752 up to 200 meters. ← notes omitted on scat layer

1809 bring up to see if light is flashing ok. Back down.

1826. camera @ 191 meters.
1900 camera up and taken aboard ship.

The fast cycling camera was now rigged for closeup photos of the scat. layer. a lens extender was used giving about a 1:1 photo.

Plus x film f16 was used.

The winch was accidently pulled up instead of down. The cable broke and dropped the camera and light to hit the rail of the ship and then the deck. although the aluminum casting on the lamp was broken I thought best to try the gear. It seemed to flash ok so we sent it over the side.

12

2005 camera on and flashing.

Roll 2. 2038 down to 10 meters.

2043 start up slow.

Back to first lamp (45 sec)

Roll 3 21.15 45 sec camera lowered to 21 meters

2200 camera lowered to 300 meters

2230 - 2235 camera lowered to 600 meter.

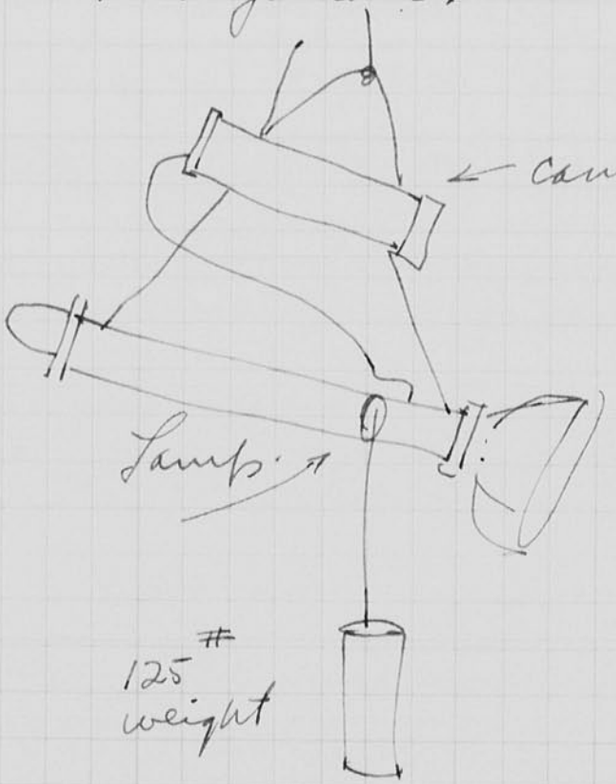
Brought up slowly. - flashing obs when brought aboard.

This is the leg.

today we reworked the camera where it was broken in the gate due to the bumps on the deck yesterday.

The 10" Aluminum reflector was installed on the 5 sec interval lamps.

Roll 4. an attempt was made to photograph the bottom at 40-50 fathoms.



the device was lowered until the bottom was hit. then it was taken up about a meter and held while the ship rolled.

Notes.

1. It would be very difficult to change batteries at sea. I was under the weather most of the time. Bob and Bill spent about all their time in the sack.

2. a fast rigging method is needed for attaching the lamp and camera on the desk to the winch and to the weight.

3. A camera with a shutter is really needed so that daylight will not interfere with the photography.

4. An on-off switch is required for standby condition while on deck waiting for the inevitable delays that come up.

5. The back plate should not turn on the camera and trouble is ~~found~~ to occur due to the twisting wires.

6. Low impedance circuits are really needed!

7. The Mines connectors did not seal pinching on 6 V. but may have on 200 with 1 meg input. However they were ok when dried and greased.

8. no trouble with O. Rings.

9. Camera condensation was very bad when the camera was brought up from deep and exposed to air. Some method should be devised to warm up camera. Also an effort should be made to reduce condensed water in camera on lenses and windows.

Position of photography of Scattering Layer.

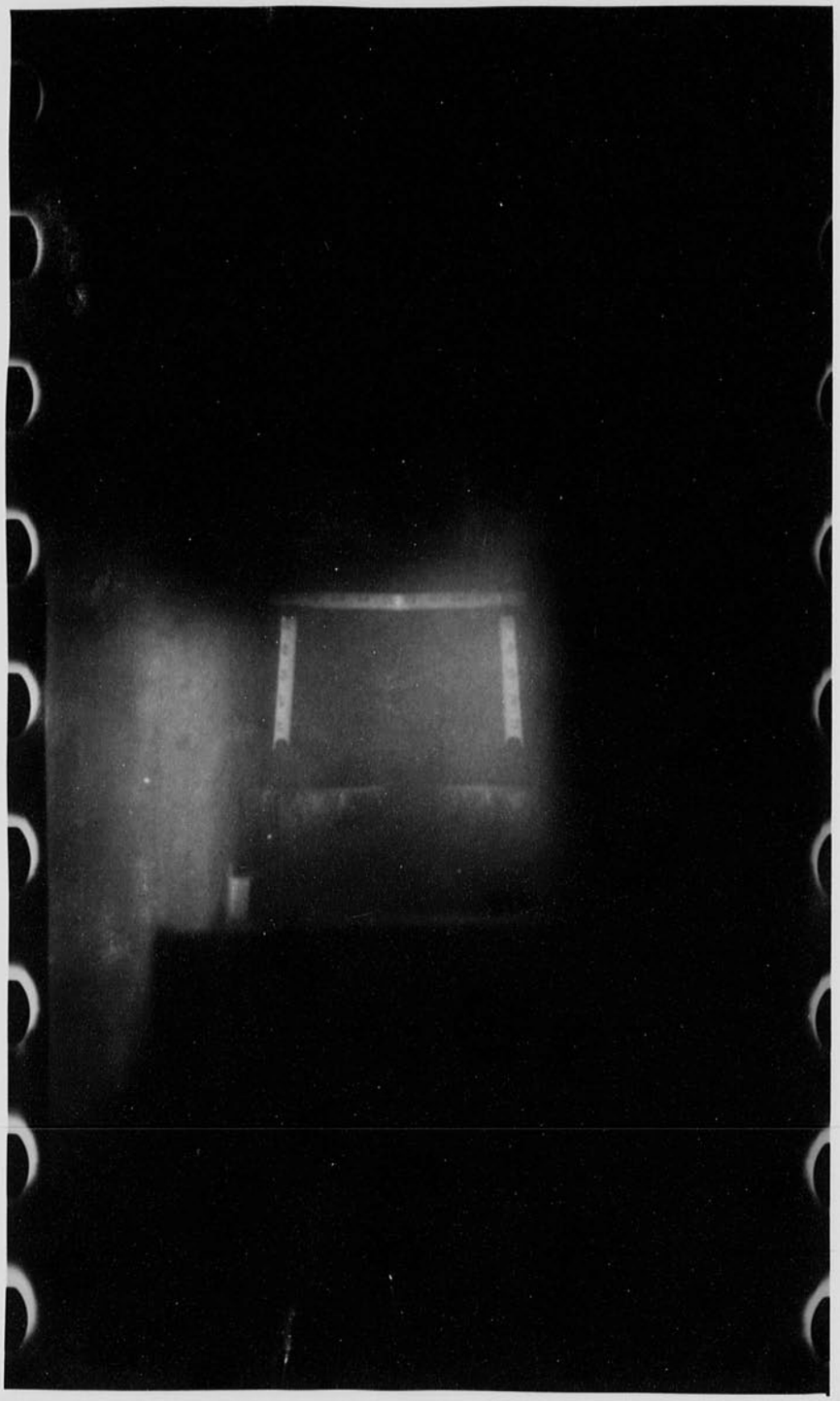
71° .5' }
38° 50' }.

August 7 1952.
Harold E. Edgerton.

The Bear docked about 5 pm yesterday. We had trouble getting our car started due to moisture and the long delay while away. Whispering Willie and Dave Owen helped us to get the Plymouth started.

Today I had the negative developed at the Master motion picture plant in Boston.

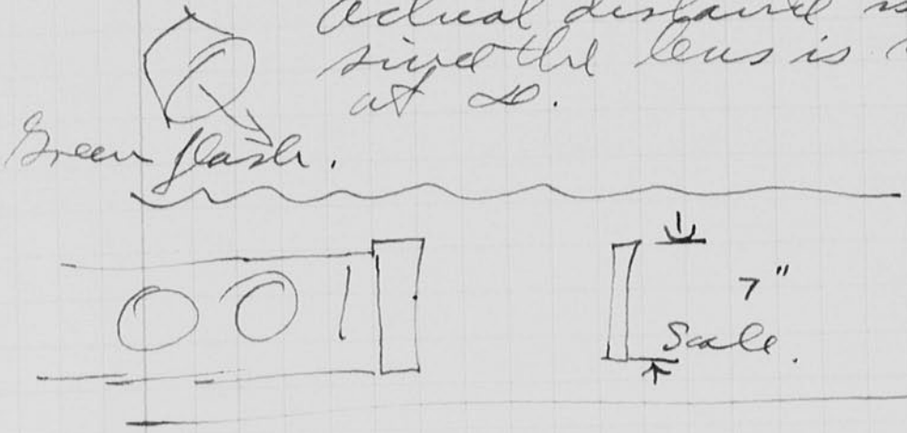
The first negative showed an animal on the fourth frame, thus about 3 minutes after the camera was put in the water. See notes on Roll 1 page 9. Also many of the photos showed spots of light. Dave Owen had reported similar spots.



August 8 1952
~~H E Edgerton~~
Bob Edgerton
141T 20D 102

Under water tests of conductors as used in Bell & on the Bear.

Camera set at ~~10 ft~~ 10M on scale. f 4.
Actual distance is less than this since the lens is not set correctly at ∞.



#1 Scale at 6" from front of glass plate.

# 2	6"
# 3	12"
# 4	18"
# 5	24"
# 6	30"
# 7	36"

all over exposed

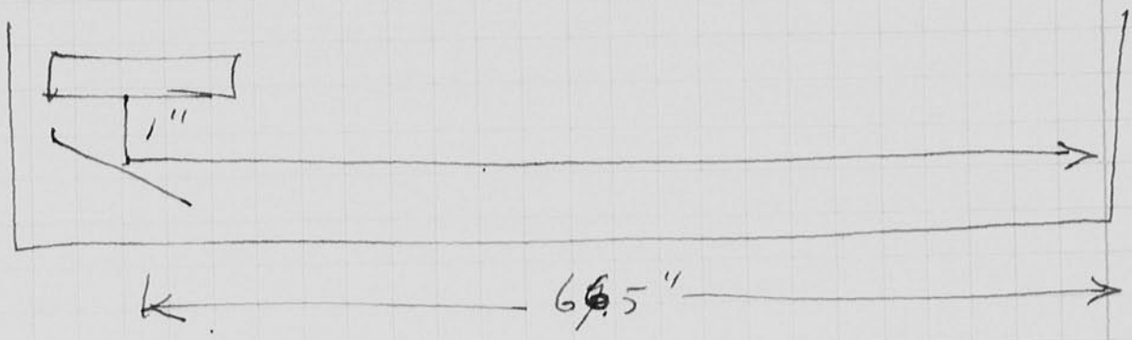
experiment repeated with towel over lamp. ~~# 2 eliminated.~~

The dial was ~~set~~ at 8 meters instead of 10

6"	
3"	
6	
9"	
12"	
18"	
24	
30	
36.	
42	

Note the last photo at 42" was just coming into focus.

A minnow was then put in the sink as shown.



42" # 1 nothing sp.
42" # 2 ~~42~~
54" # 3 ~~#~~
60" # 4
66" # 5
60" # 6

67.5
25.5
42.0
13.5
54.0

67.5
42
25.5
6.
19.5
13.5
7.5
1.5.

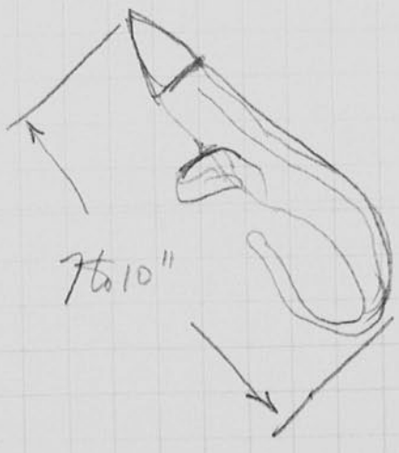
42"
48
54
60
66.

5'4"
5'6"

Focus is sharp at max distance 5'6". or 5'.

A photo of a ruler was made to establish a scale.

The animal photographed was thus about 9 inches long, if in sharp focus.
Better estimate 7 to 10 inches in length.



Reference

Robt S. Dietz U.S. Navy Elect Lab San Diego 52 Calif.

Deep Scattering Layer in the Pacific and Antartic Oceans.

Sears Foundation Journal of Marine Research
Vol. VII No 3 Nov 15 1948 P 430-442 Fig 1-3

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150 to 450 fathoms in Pacific
700 2700 ft.

D.S.L. discovered in 1942

Deimal cycle
Zoo plankton
Copepods
Pelagic prawns
Euphausiids

Phyto plankton
Nekton such as fish or squid
Lyman (Squid). Sci Monthly N y 66(1) 87-88

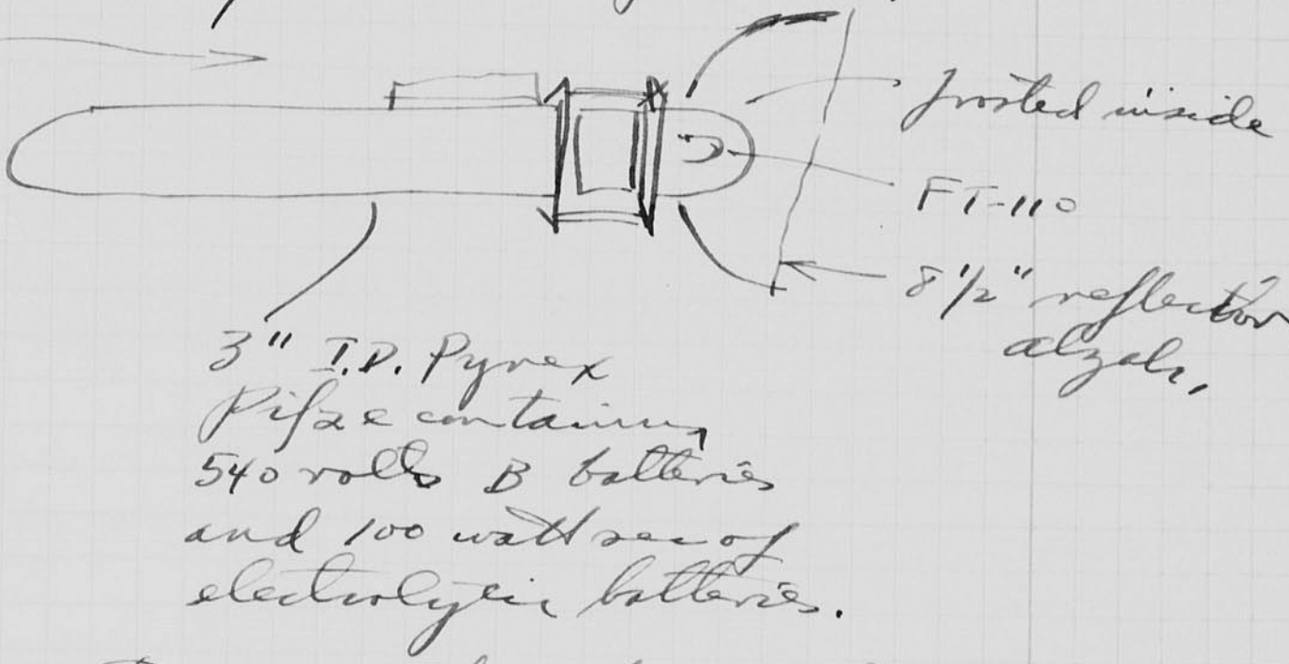
ECK CF Eyring
RJ Christensen
RW Raitt.
} Univ of Cal. Mar Research.

F4BP

Sept 1. 1952.
Harold Edgerton.

A camera and light system was tested yesterday in the ocean at Jolly Cove Rockport Mass. Bill Westell and my son Bob helped.

The system is as follows.



The water was rather Hazy. I could see about 10 ft. the water had a green appearance due to the blue rays.

Photos were taken on Kodachrome with the camera set for

f 3.5

D = 1.25 meters

A board 2' by 10" was used as a plane on the camera legs. The equipment was made buoyant. Modifications are being made today to shield the plane for work and to cut away a wood cover that makes the rear end too buoyant.

Tests were made last
thursday Aug 28 in the M.I.T pool with
the same equipment of page 26
with the addition of a side light
of 200 watt sec - photocell controlled.

I was helped by my sons Bob and Bill
a friend of Bill's, Rick was there also.

I had the aperture set at f 2.

Distance 1.5 meters or scale.

An entire roll of 20 Kodachrome
was shot in the pool of the
aqualung equipment and the
camera deep etc. the last
photos were taken in the M.I.T. pool
with a lens through the window.
the photocells on the under water
lamps did the firing.

Sept 6 1952
H E Edg M.I.T Pool tests.

~~Sept~~ + Blodrand white tests

2" Lens at f 12.5 Plus X film 150 watt sec unit. camera focused at 1.75 meters.

This film was ~~over exposed~~ developed? by an unknown amount. Overdeveloped is probably a good idea since it increases the contrast.

Exposure seems ok at 12 ft but begins to get thin at the distance a person is about covered.

I note that I have difficulty in aiming the camera and I cannot see through the eyepiece on the Visiola case.

On Sept 5 two Kodachrome daylight views shot.

FILTER CC15 — Ball + 50 mm 2" lens f 3.2 1.5 meters,

FILTER CC15 — B 35 mm Lens f 3.5 1.5 meters,

The sidlight of 200 watt sec was used on some of the photos. this equipment has been revised so that the photo electric cell is more effective.

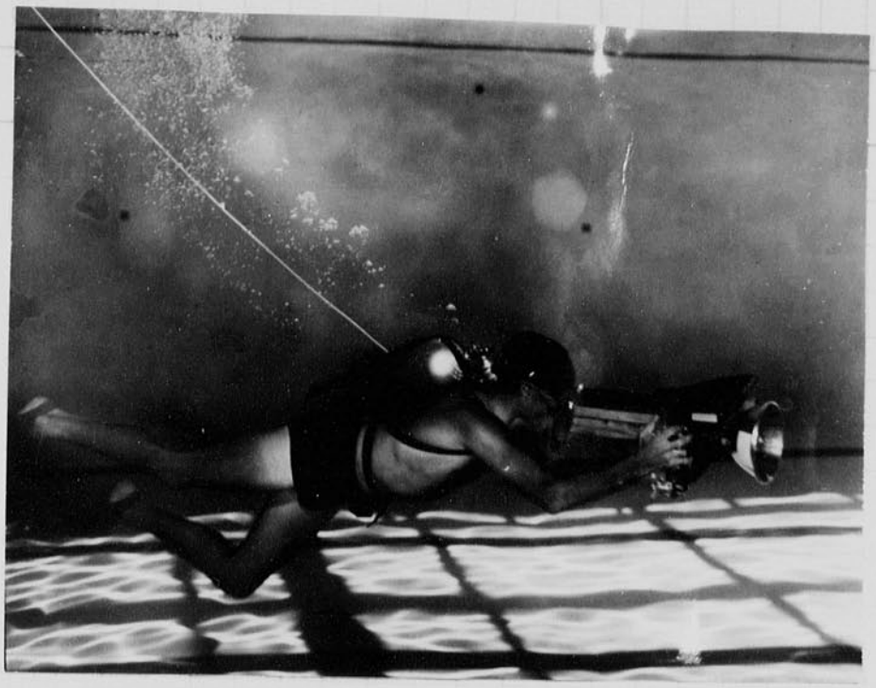
Sept 6 cont

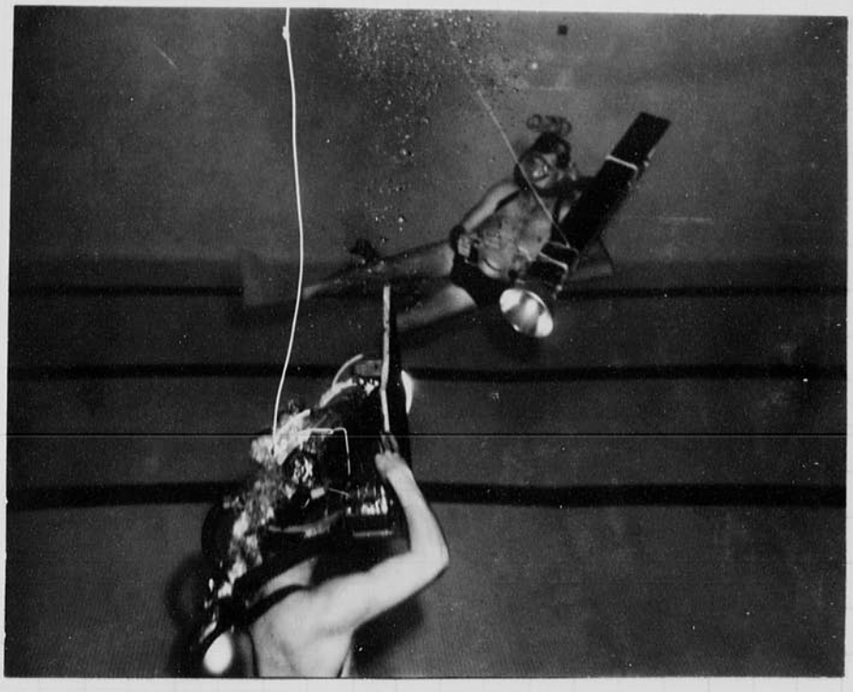
Black and white

35 mm Summilux Leica at f11
Plus x film.
1.5 meters focus.

1. Daylight view (no flash) of lab.
   Light meter at
2. Ditto but with flasher
3. Lab view of pumps etc. ▭
4. " " " " " ▯

at M.I.T. Pool.
3 ft.
6 ft
9 ft
12 ft
15 ft.





Letter from O. E. Sette. Sept 12. 1952

Sonic reflecting layer cannot be found at will. Good results at ~~dir~~ divergent - convergence where plankton are richer than anywhere else!

Haigh M. Smith departs Honolulu Oct 1, return Nov 21.

Letter from Otis Barton. BENTHOSCOPE. Aug 21 writes from Pier C Long Beach Calif Pacific Towboat & Salvage Co.

E. R. Fairmont Johnson.
Ten John 90 cricket ave Ardmore Pa.

Scientific Monthly - July 1952
K.O. Emery
Submarine Photography with the Bentheograph.

Hestorial Development in U.W. Photography
Henry S Morris.
PSA Journal Vol 17 Nov 1951

The deep sea layer of life Fenel A Wolford
Scientific American Vol 185 No 2
August 1951

Aug 1948 Physics Today C Iselin VI No 4

Deep Sea Photography.
Edmund Harvey & Edward R Boyton

Sears Foundation Journal of Marine Research
Vol VII No 1 Apr 15 1945 p 10-16.

Photography of the Ocean Bottom.
Maurice Ewing
allyn Vine
J. L. Worzel
Journal of the Opt. Society
V36 No 6 307-321 June 1946

D.S.L in the Penetration of the Ocean.
Robt S. Dietz
Sears Foundation J of M R
VII No 3 Nov 15 1945

Vernon Brodz T. Fish. Unit.

Henry Kierstead N.E.L. Photo Lab.

Bob Dill	Ocean	Nov 15	Nov 20 to 25. Kwaj & Fiji. 500 miles.	
Robt Dietz	"			

A Scripps boat will be at Eni for a short time - or two say several weeks. Bob Dill will be aboard.

From Enemy Sept 22, 1952.

Jap Bell & W. camera Geo Ploy

Univ. Tokyo.

Sept 24 1952

arrived in Honolulu last night by air. Now at Hale Kulani Hotel on Waikiki beach room 2110. Wyckoff and family were also on the plane a united Stratoliner.

I went to the fish and Wildlife service and met Harold Smithers (Belle was out). W.F. Royce Barth Murphy also.

Arrangements were made to ship the W camera from Boston to be used on a cruise of the Hugh Smith

Bill Boslin came about 4 pm and we went for a swim at Waikiki beach. Took a roll of Kodachrome with the cork unit. More weight is needed to keep it down.

Roll 1. Daylight Kodachrome at f 3.5 1.5 meters.

The water was murky - yellow? Shots were made of Boslin Coral heads - small fish etc. Surf was good for me but Boslin said it was quiet.

Sept 26 Thursday,
Hale Koa Lani Hotel
Honolulu

Tooly rolls 2, 3, 4, at Hanauma Bay
Koko Head yesterday

f 3.5 35 mm lens.
2 meters ±
CC 15 filter (Pg)?
Daylight Kodachrome.

William Goshire } Wm Hoe
Dick Stroup } Bur Fish &
Ike Ikehara } Wild Life.
Dick Shomura }

Friday Sept 27 1952

Met Miller, Lt Donald, USN in morning – Went to Eastman with film shot the day before.

Then went to Fish and Wild Life on Dole ave to fit Robot to lamp and sync. Tested in the swimming pool at Univ Hawaii for leaks – water and electrical – O.K.

Made a trip to Hanauma Bay in the late afternoon. Dick Stroup was there with two friends

Bill Monahan
2843 Park St
Calvin Brisk
3860 Tantalus.

Several films were exposed on Kodachrome in the Leica as marked on the boxes. I used a CC 15 filter on all shots.

E. L. ~~Herne~~ Hearne and wife at Hanauma Bay. in some photos

Sat Sept 28 1957
27

AB Edgerton

Took plane at 9am for ~~Kailua~~ Kona
Kailua ~~Honolulu~~ ~~Hawaii~~

Vernon Brock met us with a truck
to take our 400 lbs of apparatus to the
Lihikai Hotel. Roy's place.

Jimmy Pa 2302 Hoonanea St
Georges G. Gilbert 1307 N Vineyard St
Yoshio Yamaguchi Bldg Agr and Forest Sy.

Leon Wollard
1553 W 52nd St ~~Cal~~ 62 cal ax 30297
United pilot with plenty of cameras.

We went by car to Capt Cook's bay - then
took a boat at Lester's place. Sonny Boy
~~Henry~~ Lester Jr. was our pilot to see the
monument. One of the boys knew where
the tablet was located in the water where
cook had his trouble with the natives.
I tried to take an under water photo of it
with the red flash.

Kealakekua Bay.

Sunday Sept 28 29 1952. Kona Bay.

Harold E. Edgerton.

KEAHOLE Point.

We took a boat at the Kona bay and went west by north. A large square light house was passed first. Then several miles further we saw another light house near a place where the lava rocks had gone down to the sea. At this light house point the Brock crew layed out their 300 foot line for the fish survey.

Brock took the Leica with the 100 WS unit using Black and white film. The lens was set at 2 meters (air) and the aperture at f 11. He endeavored to record the fish survey groups, Gilbert and Yamaguchi.

A second roll of film Kodachrome was exposed at 1 meter at f 8 CC15 filter. Brock reported many fishes.

He then ran an roll through the Robot camera using a guide factor of 20 to 30. no filter 1/100 sec.

A third roll of film Kodachrome was put in the Leica. I shot 50 or 60 exposures - then the film would not wind. I came up for lunch - freed the wind and re assembled the camera. Unfortunately I caught the chip over the edge of the plastic case. this made the camera leak. Sad! I flushed the camera with fresh water twice and let it dry.

Monday
Sept 29 1952.
Lichiria Hotel. Kailua Kona Bay Hawaii.

A.E. Edgerton

We went by car today to the city of Refuge Honaunau south of Capt Cooks Monument.

Brock and Miller went down about 150 fat with the aqualungs into a hole in the bay.

Brock used the Robot with flash while Miller used the Fen John camera movie.

I went down about 50 fat but my ears hurt some.

Brock shot some plicboo at 50 ft down of an eel that was speared by Gilbert.

Then the Robot failed to flash the tube. I changed batteries at the Hotel - the thing still did not fire. A coil is probably shot or the flash tube.

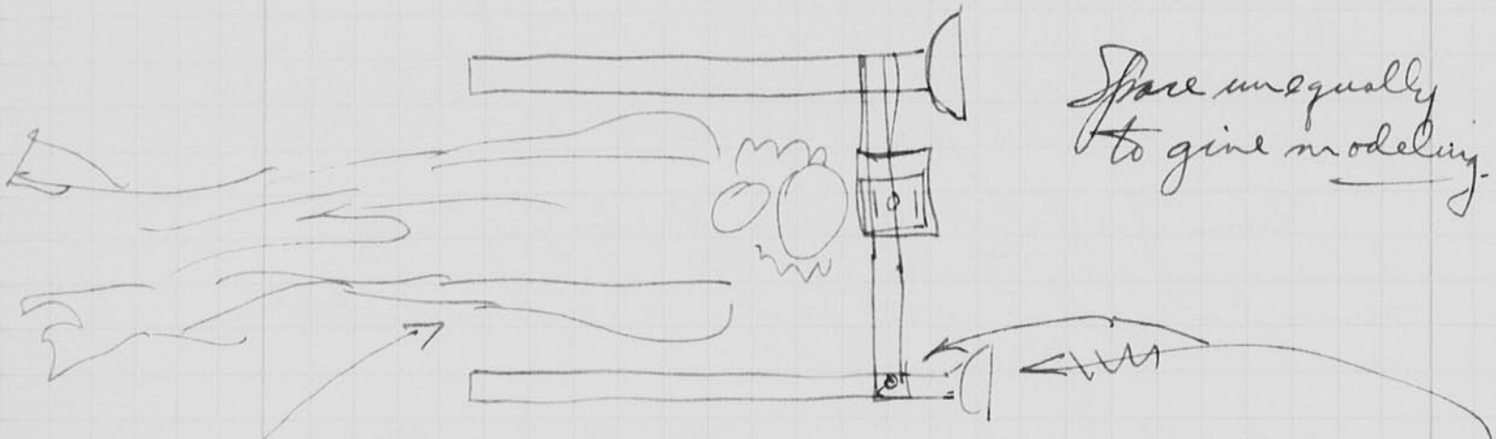
I sent the camera to Oahu this morning via Wolfard. (Wolland).

52 Sept 29, 1952 Kona.
Harold E. Edgerton
Comments upon present design of U.W. Lamp and suggestions for new model.

Balance is very important - both total and fore and aft. The square job seems to be about right.

More light could be used for Kodachrome and color film.

Two lights could be used on the same camera with a support between the two.



Space unequally to give modeling.

Provision for twisting lamps should be made.

A back ~~spacer~~ spacer could be used for carrying the device in the air. This back brace could be taken off with a clamp when the device is put in the water.

The entire party at Kona left by truck and car for Hilo on the morning of Sept 30. Lt Miller and I took an army plane to Hickam field.

Returned apparatus to the Fish and Wildlife office for repair and adjustment. The Leica is in very bad condition after flooding at point. Weather hot with rain.

On the Oct 2 I went with miller to the sub base at Pearl Harbor. He took a sequence of photos of a diver leaving the escape hatch in the tower.

Then we went to the mine demolition base at Barbers Point where we met Lt Brooks of the U.S.N. Mine Disposal Unit-1.

Two rubber boats with six men were assigned to us for use at Nanakuli Beach. (or Maili Point)

My boat was flipped over by a large wave in about 6 ft of water. Nothing was damaged. It was exciting to have three men, two aqualungs, and a camera with strobe plus fins, masks etc come down on top of me in the water. The water was not clear at this place due to the Kona (South) wind.

~~Oct 3 (Tue~~ Evening of Oct 2 Garth Murphy tested the 200 ft camera in the pool at Mt Hawaii. Although there was a slight leak the photos were ok. A series were taken on Super X at f 5.6 at several distances to show depth of field.

Oct 3. Tested flash equip, Robot, exposure meter, and Den John for magnetic fields. The meter was the only device which had much effect on the field, all the others are safe a 4 ft away.

54 Oct. 4, 1952

H. E. Edgerton. (Kailua 62251)

R.P.

Lt Clark USAF pilot assigned to Hickam field invited us to work with him in his boat on the north side of the island. I called Lee Carr and he went with us. Clark lives at Kailua. From there we went to his landing on the ~~west~~ South side of the Mas Kaneohe Bay.

We went north past coconut island to two islands that were covered with birds. Frigate and sooty terns. Moku Manu. (Island Bird)

There is a large cave in the north side of the largest island.

We anchored on the lee side of the largest island and went under sea with the aqualungs. Don took movies of fishes and the still camera.

I shot quite a few photos of the propeller and the rudder of the boat.

Miller then took the still camera and shot some fish on the bottom at 30' deep.

H E Edgerton
Oct 5 1952

Took day off - went swimming in beach at Waikiki off Halekulani Hotel. Took tanks to Sub Base for refilling

Gave talk at Halekulani Hotel in evening. Showed some fish pictures.

Large white fish at Hanauma in schools.
Ophiurus kalla
Naso hexacanthus

Butterfly fish
Kihi Kihi
Heniochus acuminatus

Orange spot Surgeon fish
Pakuu kuu
Acanthurus achilles.

Notebook # Aug 4, 1952 - Oct. 19, 1952

Filming and Separation Record

____ unmounted photograph(s)

____ negative strip(s)

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

was/were filmed where originally located between page 54 and 55.

Item(s) now housed in accompanying folder.

~~This meeting~~

Today ~~I wish~~ it is my pleasure ~~to~~ to show you some pictures - in particular some pictures of underwater subjects. I am here in Hawaii to test out an experimental type of flash equipment that seems to have some uses for underwater still picture photography. This effort is being sponsored by a small grant from the Naval Geo Society to M.I.T. where considerable development effort has been expended upon electronic flash systems.

The underwater world is more vast than the above water, in fact more of the earth's surface is covered by water than not. Furthermore the deeps are deeper than the mountains are high.

HALEKULANI

HONOLULU 15, HAWAII

Those who endeavor to learn of the mysteries of the sea have many methods - all of which are employed by oceanographers and geologists. One of the most powerful methods for visual observation is the camera. The object of my effort is to make this medium for research more powerful.

Every device is a compromise. I hope to get under water camera devices to be well designed and easy to use by a host of people who endeavor to learn of the under sea world.

One riding in a glass bottomed boat gets a preview of the under water world. However one who dives especially with the new Aqua Lung equipment actually becomes a part of the new world. He floats

with the greatest of ease. Everything is different. Above him is the flat top ceiling - the top of the water above which we live. To him it is a surface to avoid - a boundary.

As a diver goes down he notices that the red light fades very quickly with depth. At 30 or 50 feet down even in the clearest water - the reds are gone. As he goes below a hundred feet everything becomes dark. Now photography requires light. Lots of light and this is where I come in.

For some years a group of us at M.I.T. have been developing stroboscopes and high speed flash devices for taking records of rapidly moving devices and subjects.

Probably many of you are familiar with the Electronic flash system. I have a portable type here which has the ability to take many photosynplus. the speed of the flash can be very short. and as many pictures as desired can be taken.

this kind of lamp is what is needed for underwater scene.

Monday Oct. 6. 1952

Lt Miller and I left for Kailua (Kailua) with Brock at 9 20 am. Here we met

Kaneke J.S.

Mealor Leonard

Daniels J. W

Thomas L.D.

MacDonald R.T.

All above from the mine disposal unit no. 1. Barbers Point. this group brought two rubber boats, and equaling equipment from their station.

We went by navy boat to Bird Island. the swells on the ocean were very large and there was a strong current. I did not go in but Miller and Brock did for a while. Brock shot 40 color shots on the Robot.

Upon return Miller packed his gear for departure to Washington on the Mass tomorrow.

I am scheduled to go on Wed Oct 8. via Nals to Eniwetok.

Oct. 17, 1952

Alice Bogalura Eniwetok atoll
AE Edgerton
Frank Stribula.

Teletronic checkout #.

The 160" cassegrain teletronic #8 was brought to this island on last Saturday by Whitney-Norton. It was installed on the south wall of the concrete plants house looking out the upper right hand port. (looking at Bobab site).

Checkoff list #.

Film holder with xxx film. (Polaroid type holder)

1. Check image and focus.
2. Take zero photo 1/10 sec.
3. Cross polaroids.
4. Close slow shutter and check.
5. Open fast shutter.
6. Install fuse shutter.
7. Check plugs and cables.
8. Set switches "on".
   - Low voltage
   - High voltage
   - 10 m.s. delay.
   - Set delay for 4 on scale (10 m.s).
9. Set 3KV variac to max (134 V)
10. Set 24 KV to 110 volts.
11. Remove front cover.
12. Turn Tider marker on.
13. Install film holder and remove slide.
14. Check switches on bat supply lower level.

58 Cont.

Strobels returned to Tarry Island at 3:30 pm by duck. I went as far as "Gone" Island. where I fired up the Sun flash with Jack O'Donnells help. We put the entire 10,000 watt sec into one lamp with out an extension cord. It was located at the fence about 200 ft from the buildings.

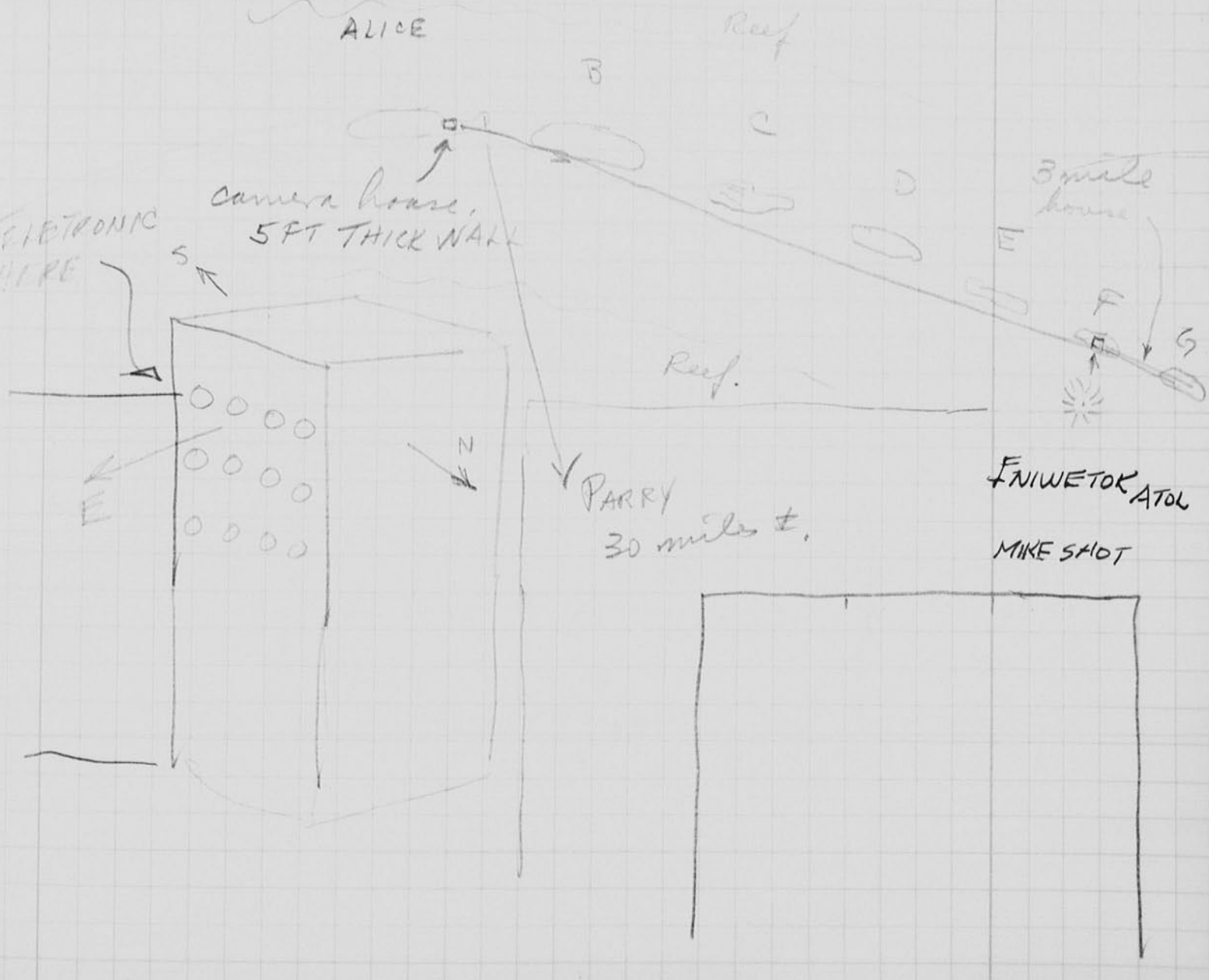
I have the 160" Cassegrain focused on the bomb house. The shutter will be open when the sun flash goes off. Aperture is about f 20. Uncorrected polaroids give about Density 1. to 1.5. Tri-X film.

Oct 19 1952
W. Edgerton
"Alice"

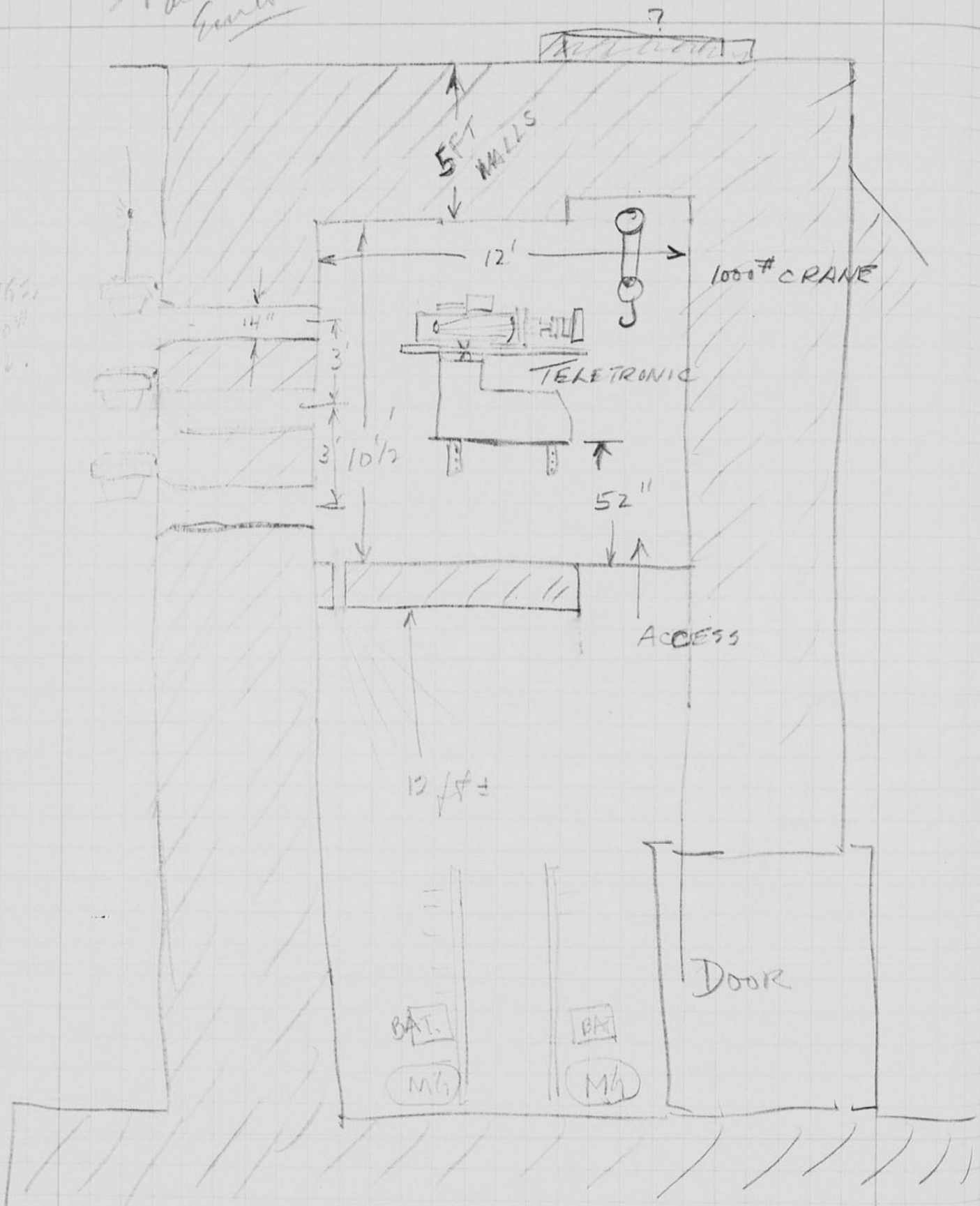
Wydnoff came from Parry Island yesterday afternoon. We met at "Bert" island had coffee here by duck at 530 pm.

Photos were made of the house on microfile film - 100 sec exposure. Wydnoff reports the exposure thin but ok.

The Zero Pack is now set up for about 50 ft from the bomb. I hope to make the exposure tonight at the zero position. Tents and work trailers are to be removed from the line of sight.



SOUTH WALL OF BLOCK HOUSE.



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