

HAROLD E. EDGERTON

PAPERS

MC 25

number B1

SERIES 1. BIOGRAPHICAL MATERIALS

NOTEBOOK: research notes, July 1938-April 1941, diary September 1948-  
July 1989

HARVARD UNIVERSITY  
M.I.T.

COMPUTATION BOOK

NAME	Number
HAROLD E. EDGERTON.	

Course *HIGH-SPEED MOTION PICTURES OF INSECTS.*

Used from *July* 19*38*, to \_\_\_\_\_ 19\_\_\_\_\_.

*FUNDS FROM M.I.T. & FROM ELIZABETH THOMPSON FUND.*  
*HARVARD.*

*4/11/38*



# HARVARD UNIVERSITY

## COMPUTATION BOOK

### GENERAL INSTRUCTIONS

The first page of the book is reserved for the student's name and the name of the course for which the book is used. The student should write his name and the name of the course in the space provided for this purpose.

All computations of whatever kind, are to be made in this book, except in cases where special blanks are provided for specific kinds of computation. Computations may be made in any of the pages, whichever may be more convenient. Irregularity should be done with a soft pencil. All the work of computation should be done in these books, including all detail working.

Each student should begin on a fresh page, so that he may have as much space as he can for his work. The page should be numbered at the top of the page in plain writing at the top of the first page of the book.

Work should be done systematically and as neatly as possible with facility. The book is to be used for the purpose of doing the work of computation, and no unnecessary work should be done for the sake of appearance only. Work should be finished at the end of a page, except when the latter will facilitate the work. Work should not be crowded. Paper cuts less than the time which would be expended in attempting to conserve space in making entries.

When extra drawing or writing paper is necessary, it should be attached to the back of the book, and they should be pasted in the book, except when specially otherwise provided for. Computations should be indexed in the back of the book, by the person using the book.

HARVARD UNIVERSITY

Cambridge, Mass.

# HARVARD UNIVERSITY

## COMPUTATION BOOK

---

---

### GENERAL INSTRUCTIONS

In all work in which *accuracy* and *ease of reference* are important, much depends upon carrying out the computation in a systematic manner. The following instructions, taken from the *Engineering Department Figuring Book of the Allis-Chalmers Co.*, serve as a guide in this matter.

"All computations, of whatever kind, are to be made in these books, except in cases where special blanks may be provided for specific kinds of computation. Computations may be made in ink or pencil, whichever may be more convenient. Pencil figuring should be done with a soft pencil. All the work of computation should be done in these books, including all detail figuring."

"Each subject should begin on a new page, no matter how much space may be left on the previous page. The subject, with the date of beginning it, should be plainly written at the top of the first page of the subject."

"Work should be done systematically, and as neatly as consistent with rapidity. The books are, however, intended for convenience, and no unnecessary work should be done for sake of appearance only. Errors should be crossed off instead of erased, except where the latter will facilitate the work. Work should not be crowded. Paper costs less than the time which would be expended in attempting to economize space in making erasures."

"Where curves drawn on section paper (or sketches) are necessary parts of a computation, they should be pasted in the book, except where specifically otherwise provided for."

"Computations should be indexed, in the back of the book, by the person using the book."

\* \* \* \* \*

HARVARD CO-OPERATIVE SOCIETY

Cambridge, Mass.

High-Speed Motion-Picture Studies  
of Insects.

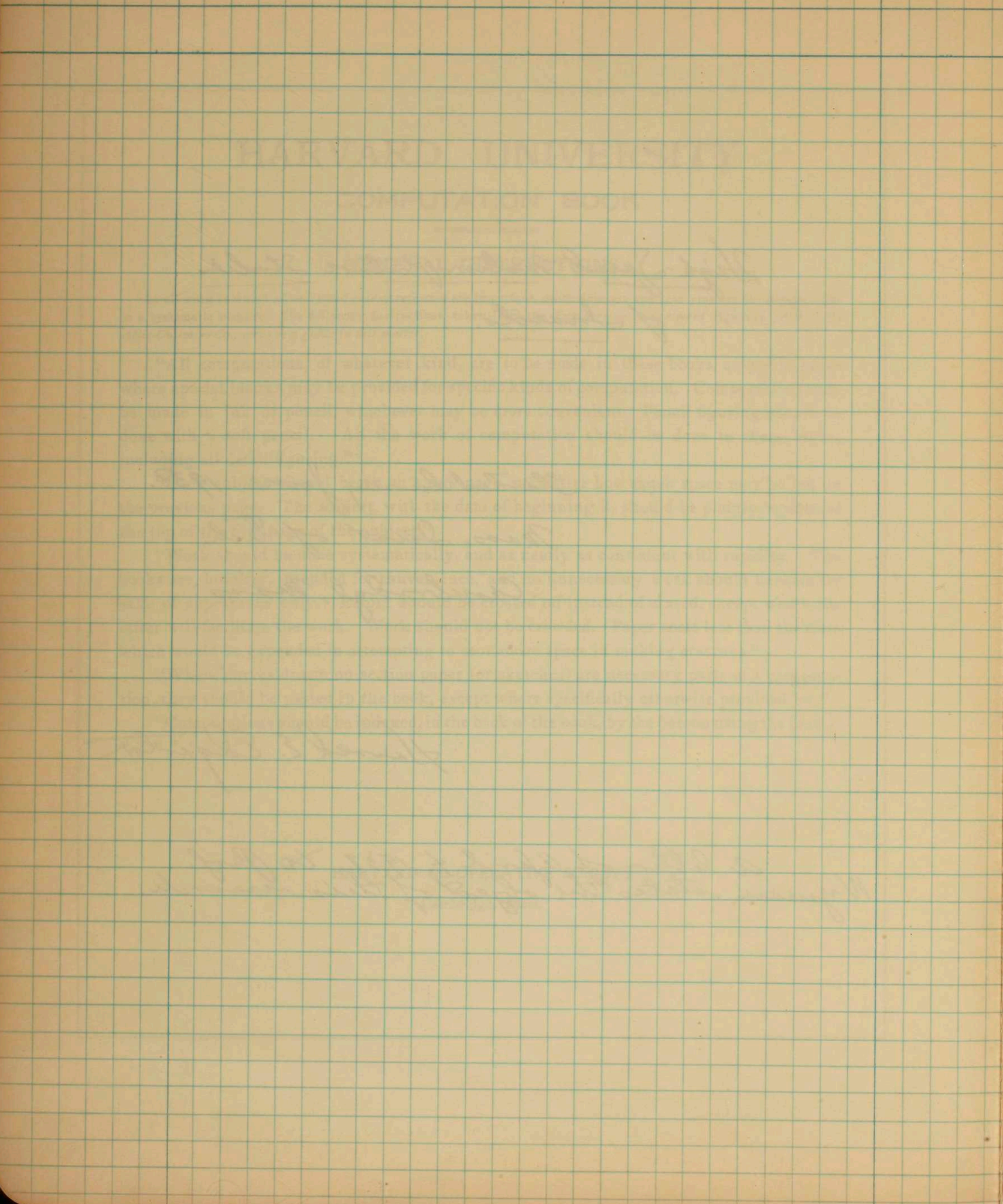
Started during June 1938.

Mass. Inst. of Tech.

Cambridge, Mass.

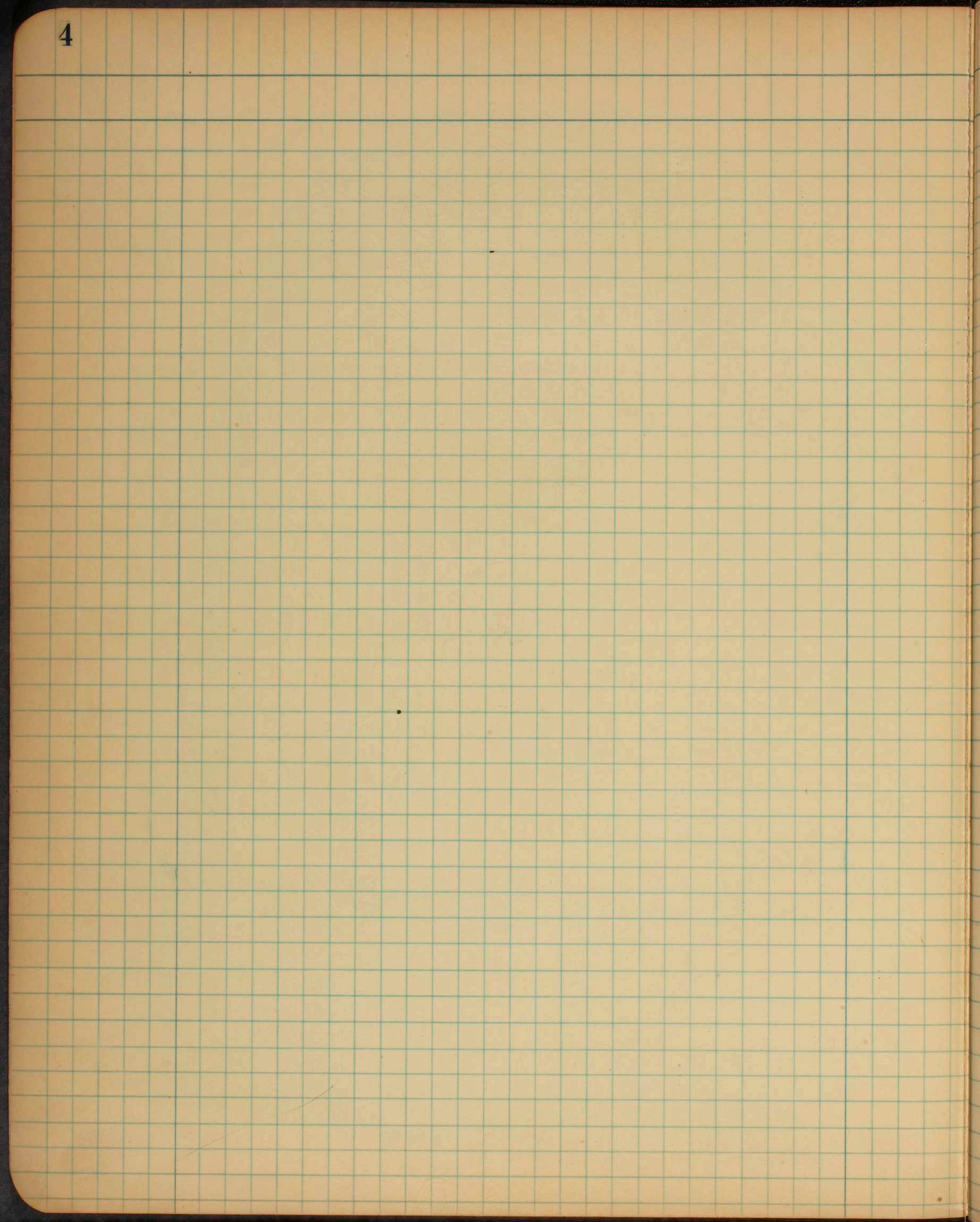
Harold E. Edgerton.

a letter of April 4, 1938, to Prof.  
Wyman states the object of this research.









H. S. Edgerton  
June 1, 24, 1938.

About 600 ft of negative film has been taken to date. The subjects were dragon flies and moths. Some of the film was used in testing the camera.

June 3, 1938.

Chadwick and I had several sessions with dragon flies and moths. About 600 ft more film used - processed at Harvard - and good part printed.

Today Mr Chadwick brought in the prints which we ran on the screen. He plans to leave tomorrow for a 10 day trip to Washington D.C.

During his trip I plan to work with camera to get more light on subject and also to set up and test the movie silhouette equipment.

Aug. 7. 1938  
Harold Edgerton

Worked with Chadwick yesterday  
afternoon. Subjects

Large hummingbird moth (from Va.)  
Closeup photo of thorax  
1000 and 600 frames/sec approx  
2 mf 2000 v argon lamp.

200 ft neg.

Also tried other shot  
of butterfly etc with  
no useful result.

200 ft neg.

Our work has been retarded due  
to rainy weather and vacation.

2 mf 2000 v in argon lamp.

Aug 11. 1938  
H.S. Edgerton.

Movies of butterflies, stone flies, ~~large~~ etc were taken on Aug ~~5~~ 8. Grasshoppers. etc. 400 ft?

Movies of a locust were taken Aug 10 at 200 ft? about 1000/sec.

I have started to set up the silhouette apparatus for photographing flies, bees, mosquitos etc. 3000 possibly 6000/sec.

Aug. 20. 1938

We took some movies this week, of cicadas also about 3 1/2 dozen 9x12 stills of " and others.



Sept 9, 1938.

About 2000 ± ft of positive film was used last week by silhouette photography. Bees, flies, etc were studied.

*[Faint pencil sketches of a landscape or architectural structure, possibly a bridge or a series of arches, spanning across the top portion of the page.]*

Dec 22 1939  
Harold E. Edgerton.

The program on insect flight reported very briefly in this book was a fairly successful one. Chadwick completed a reel of motion pictures and still photographs which were shown on several occasions. Chadwick is now at a western school.

I am keeping this note book at home (205 School Street) Belmont in order to record items that come to my attention there.

Exposure meter for a  
Flash-apparatus.

It is desired to develop an exposure meter for use with flash photography, especially flash photography with the very short exposures from condenser discharges.

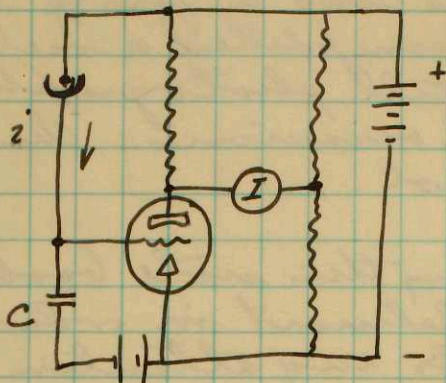
The instantaneous candle power is very high and the time very short. The method should make the reading stay on a meter or otherwise for enough time to read it.

A cathode ray oscillograph and photoelectric cell method was used several years ago with success but the apparatus is some what clumsy and large.

The method shown in the diagram on the next page uses a condenser to integrate the current from the photo cell. A steady steady reading is obtained on the meter. Some sort of retrip method is needed for the discharge of the condenser for the next flash. A switching method can be devised.



cont.



Suppose the current through the photoelectric cell is proportional to ~~current~~ the amount of light.

$$i = kL$$

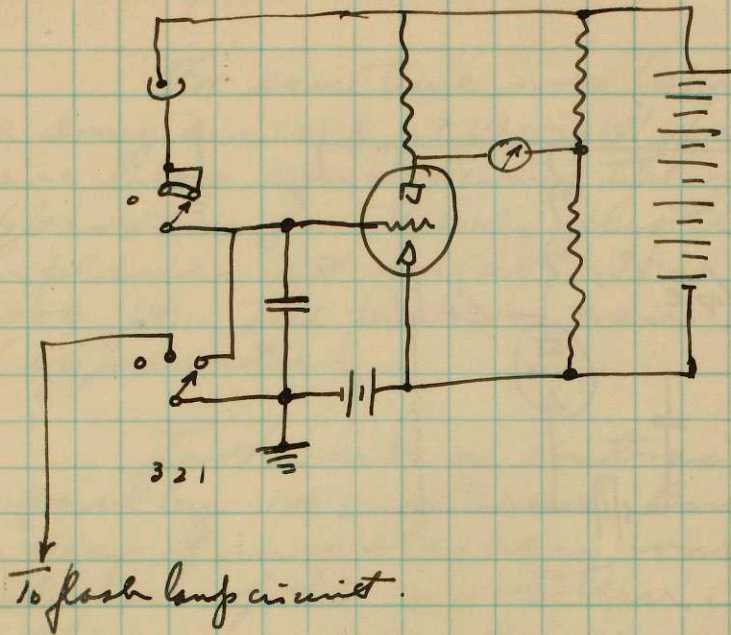
The voltage across the condenser is

$$e_c = \frac{1}{C} \int i dt = \frac{k}{C} \int_{t_1}^{t_2} L dt$$

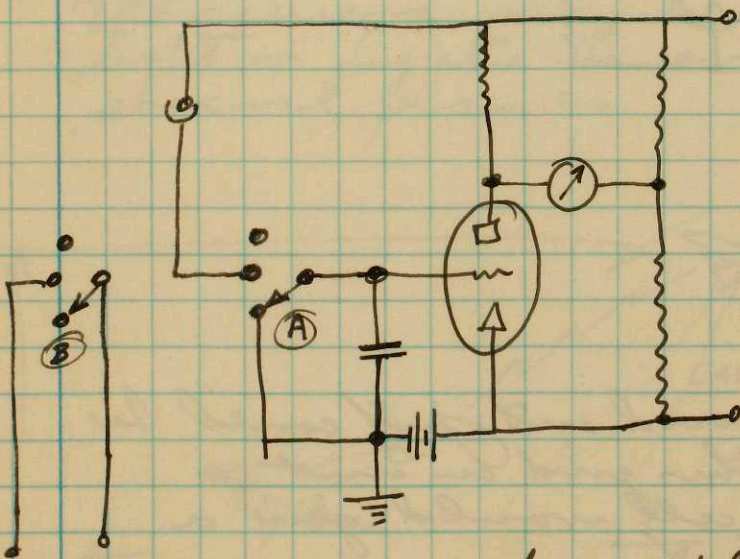
then the condenser will charge ~~until the~~ to a voltage that is proportional to the exposure - the integral of the intensity of light as a function of time.

The unit could be built into a box like a camera with a snap switch (1) to open the short on condenser C, (2) to flash the electrical lamp, (3) to disconnect the photo-cell after the exposure.

cont.

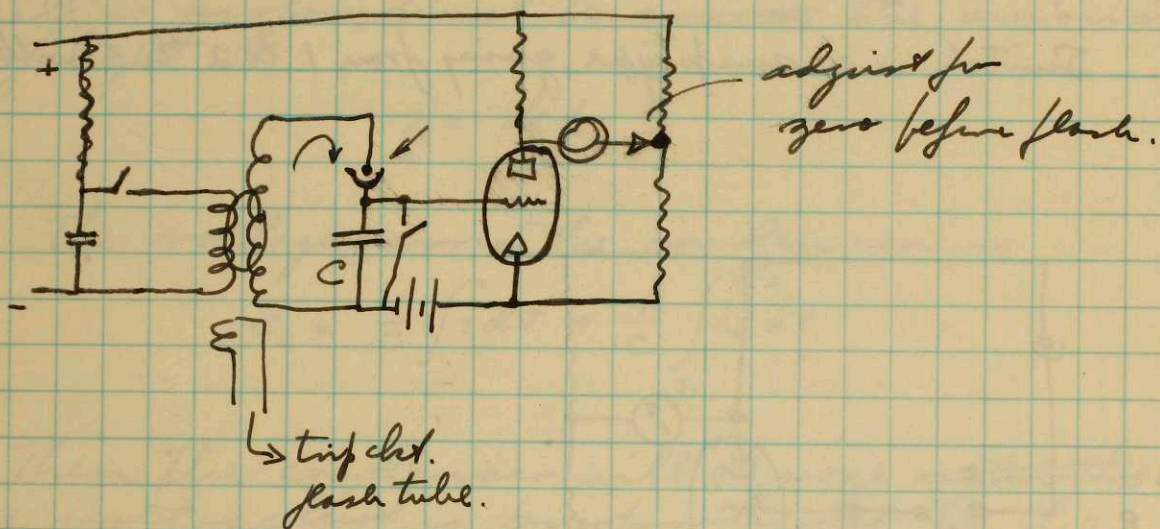
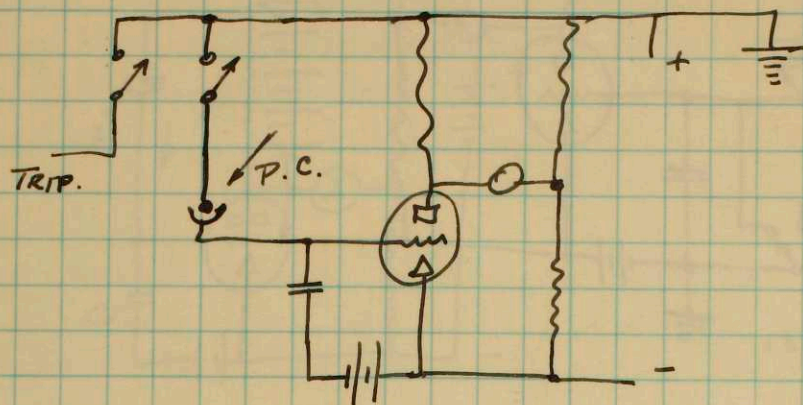


Switch is a snap type going from 1 to 2 to 3 with one snap.



to flash lamp cl. the two switches oper. simultaneously  
 Ⓐ switch must be closed before B closes.

Cont.



A two tube balanced out just could be used. In the other grid circuit a reversed photo cell would give a differential effect.

The instrument should have adjustable capacity,  $C$ , for different ranges.

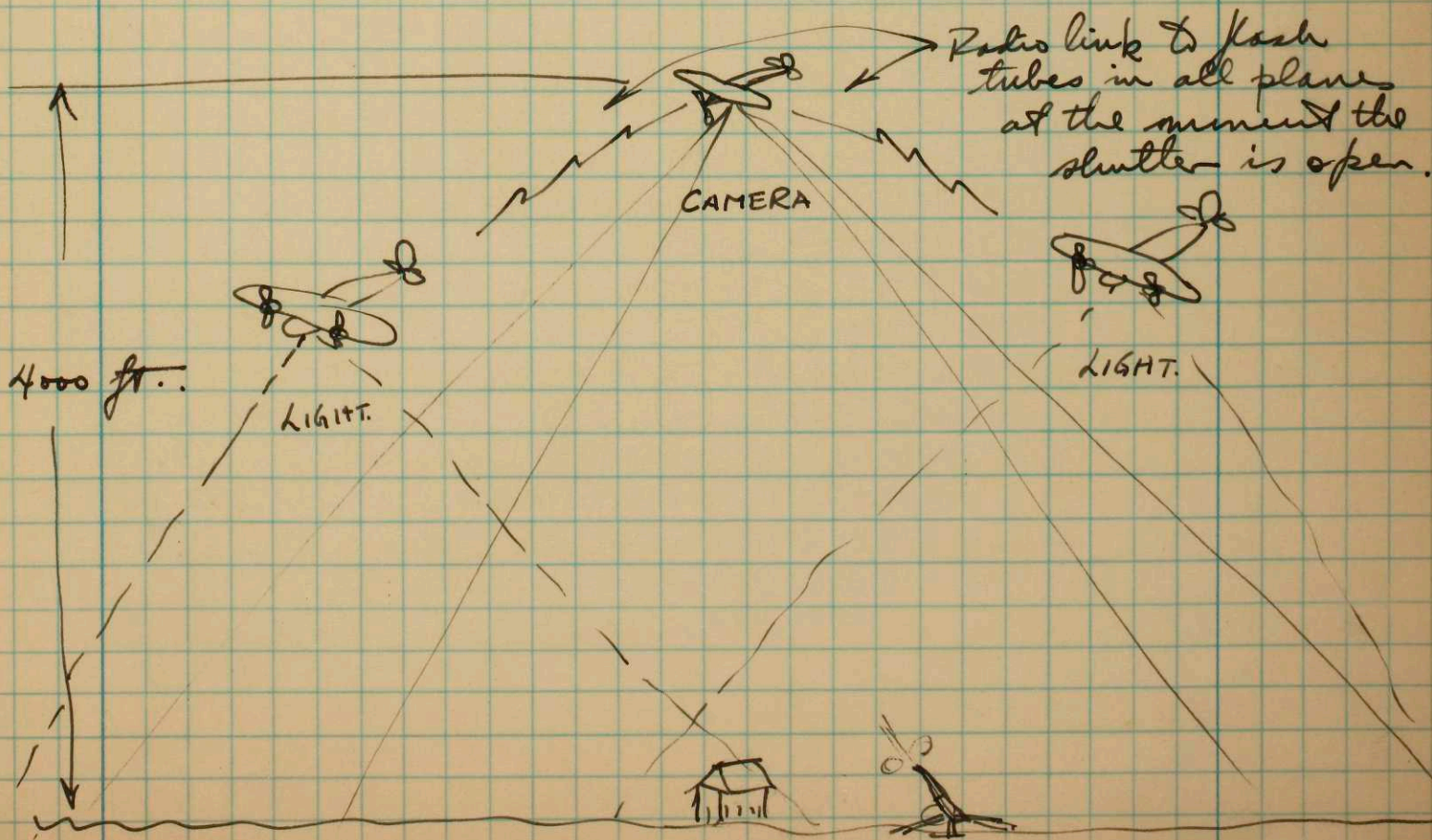
Jan, 6, 1940.

Harold E. Edgerton.

For some time now (since last summer) the army air corp at Wright field, Major Goddard, have been considering the use of flash apparatus for taking photographs from airplanes at night. It is desired to shoot at 4000 ft. The planes can take up 14,000 pounds of apparatus.

Last week a contract invitation was signed by M.I.T. (Rhind, Bersar) for 15,000 to cover a year of investigatory work towards the solution of the problem. If it is accepted by the government we will have a busy time with new lamps of very large size.

We plan an electrical method of tripping such as has been discussed before. The camera may be in one plane and the light or lights in an other or possibly several planes.



Jan. 6, 1940  
David E. Edgerton

Major Fiske of the mil. sci. department suggested the use of many lamps for confusing bombers at night. The idea was to use many lamps directed upward so that the aviators could not distinguish rivers, lakes and other land marks for target goals.

Feb. 2, 1940.  
 David E. Elyator

Spent considerable time with Jennison the past week taking photographs of sneezes.

The link between the camera and the lights for the arrangement on page 15 might easily be "light" instead of radio.

a flash lamp <sup>at</sup> the camera plane would flash when the shutter was open. This would be picked up by photo cells on the other ships and fire the flashes within a few milliseconds or less.

No word has been received from Wright field about the project to date.

Feb 12 1940  
James E. Edgerton

Saw Sage about the Army contract through Wright field for an illumination apparatus for night photography. This contract has just been accepted by the government. It calls for a 1 1/2 years program \$15,000.

MSM  
Mr. Morgan from Metro-Goldwyn-Meyer was here today. He wants to make a one reel short on the stroboscope and movie camera. It was discussed with Mr. Rowlands. Pathé and two others wish to make reels also.

Feb 18<sup>19</sup> 1940 9 P.M.  
H. Edgerton.

Just home from tech. another snow storm tonight, wet and sticky. On last Wed we had 12 inches with wind that caused a lot of trouble.

Grier hooked up an <sup>?</sup>CA64 (three element glow tube) with a photo cell to operate the flash unit. The power was received from the trip connection. He tried it in the studio at M.I.T. and it worked ok after he got the tube connected right.



April 2 1940  
 Harold E. Edgerton.

Morning yesterday with Mr. Rine  
 discussing 685,501 and other applications.

Mr. Sandell of Eastman Kodak  
 co came yesterday to spend week  
 with us leaving high-speed  
 photography.

Took photos at 4 pm of two  
 boxers punching a bag. Mr. Collier  
 and Ferguson of the Garden brought  
 them over.

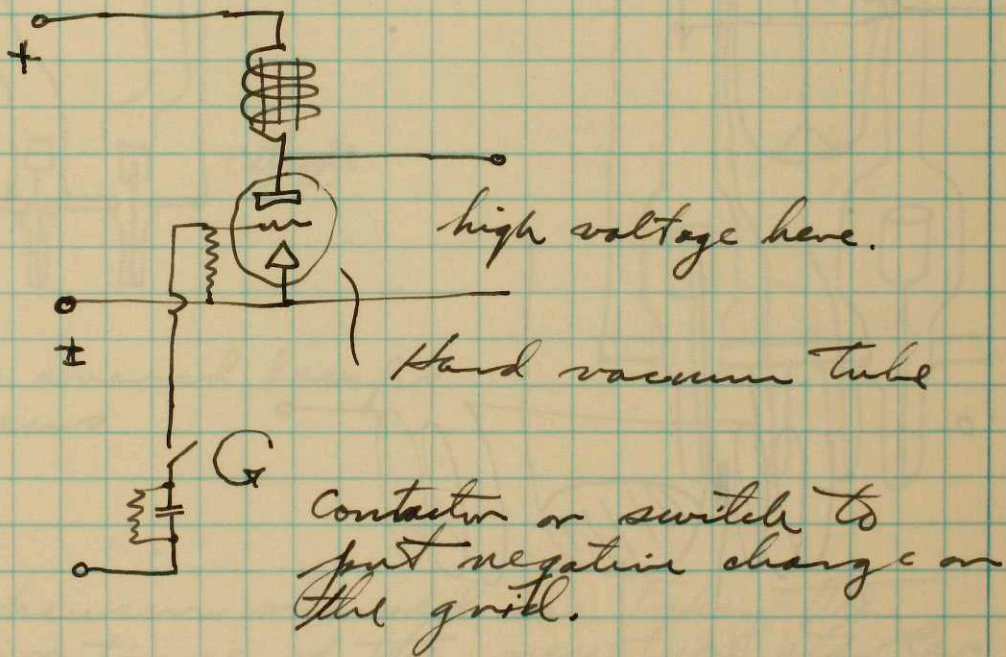
Mr & Mrs C. Frazer and Ted  
 came to M.I. and shot some  
 color and black and white of them  
 in the studio.

Dinner at Sand House  
 with Frazer and Sandell.

at seven again in studio with  
 stroboscopic practice for dance  
 for April 12 in Walker. Miss  
 Spear dances to "Nightmare".  
 Miss Winton & Miss came with her.

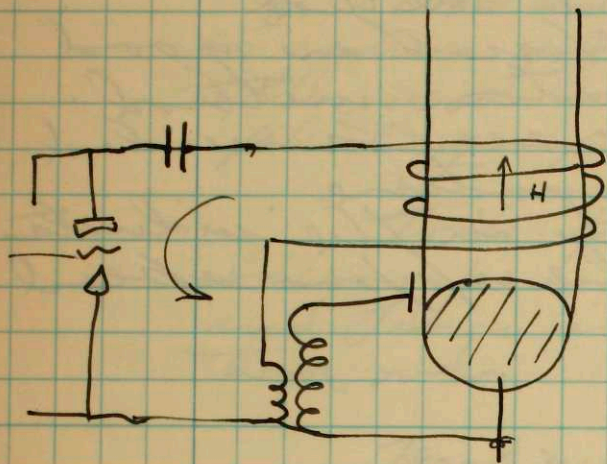
April 2 1940  
 R. S. Johnston

Dave Koenig experimented several weeks ago with vacuum tubes to produce a high voltage for control of other tubes. He has now completed his experiments. The method seems practical but not as good as our present thyatron method. Considerable energy seems needed to charge the grid negative, also the build up time in the inductance is a limitation to the upper speed.

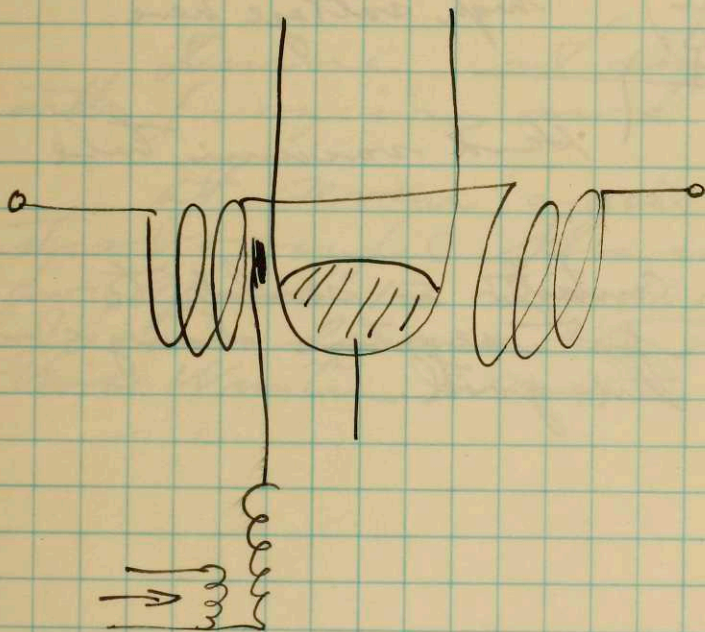


## Arc Starter.

Magnetic field to push arc spot  
from the ignition point on the  
glass.



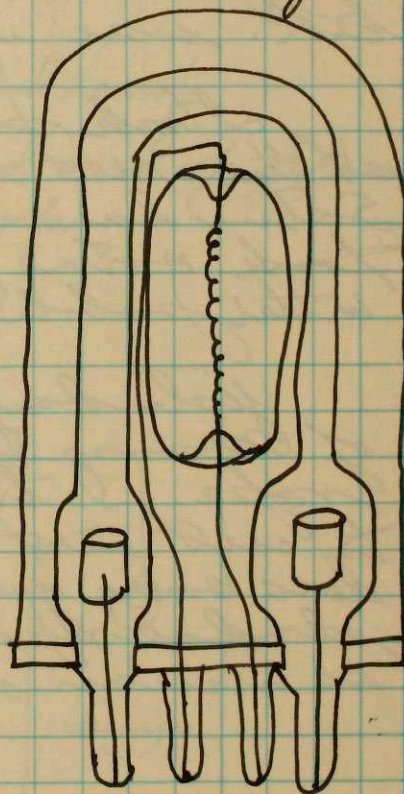
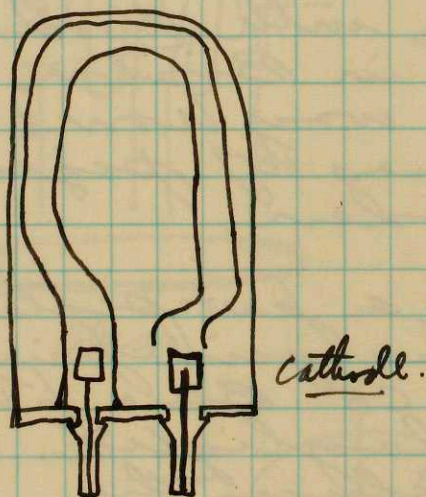
No effect if  
H and I are in  
same direction for  
steady state.



May 13, 1940.  
 David Edgerton.

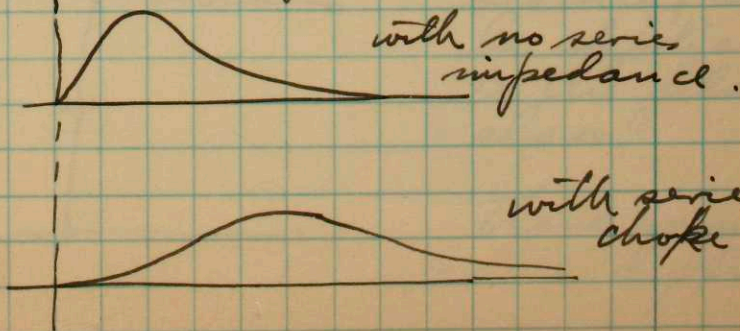
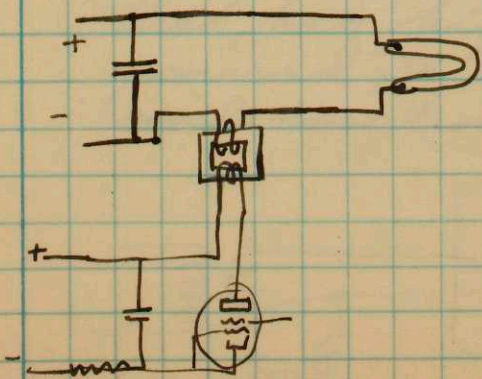
Just returned from a trip to Cleveland, Dayton and Cincinnati where I gave three talks on high-speed photography.

Mr. Enfield of the D.E. Co. at meca. park entertained me in Cleveland. The D.E. wish to help us with lamp manufacture.



all glass covered lamps with focus.

Gemeshausen showed me today the duration trace of the new type starter with a series inductance. With 112 mH the delay was somewhat longer ~~but~~ and the tube was slower in starting to operate.



Sept 2 1940  
 James Edgerton

I experimented almost all of last week with the portable battery operated flash unit.

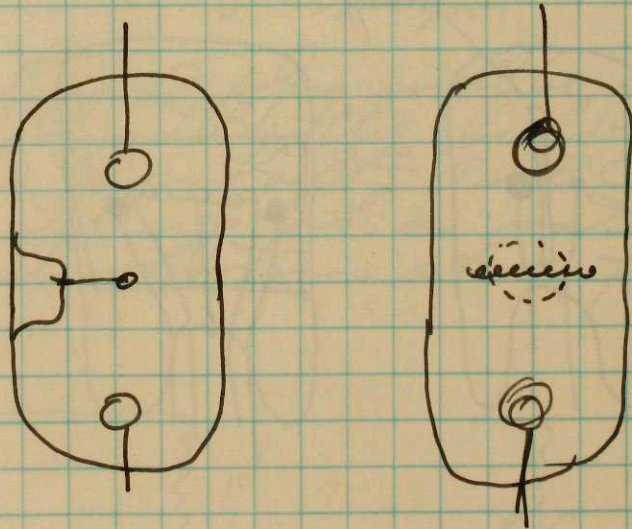
First I tried 9 microfarads, then 15, now 28. I am using a spiral lamp of the type that B.K. use in the stroblux unit.

Took pictures with Woodruff at the INS office in Boston on Saturday. On the way home I took some pictures of pigeons in the public garden.

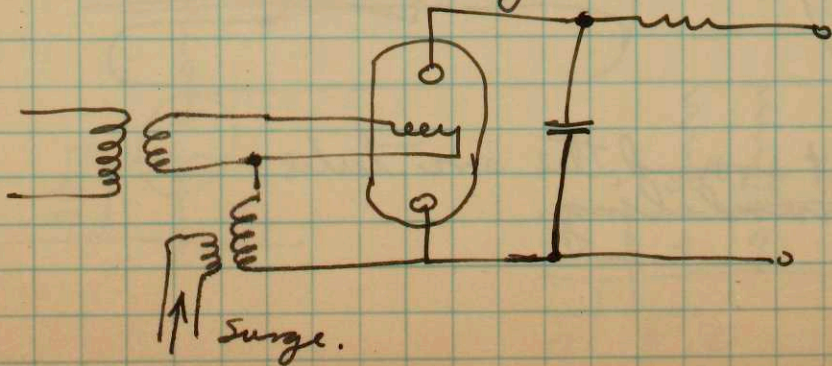
Yesterday I took a few pictures of many touzise jumping rope. I tried a C5 Blue filter to cut out the daylight. It does some good. Reduces the strobe exposure some but not as much as the daylight.

Sept. 8, 1940  
 David S. Edgerton

Spot light tube.  
 Design.



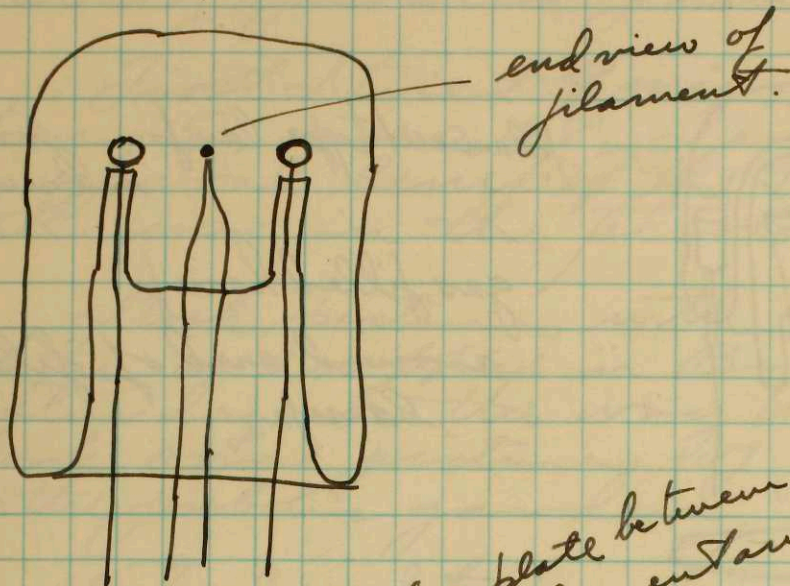
Filament to be excited by a transformer that has high voltage insulation, to ground, to isolate the filament from the condenser discharge circuit.



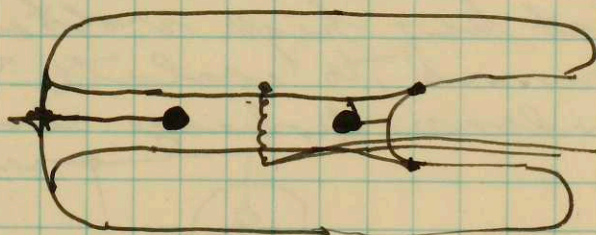
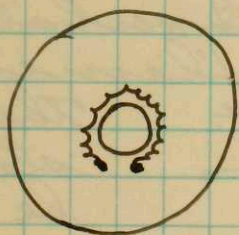
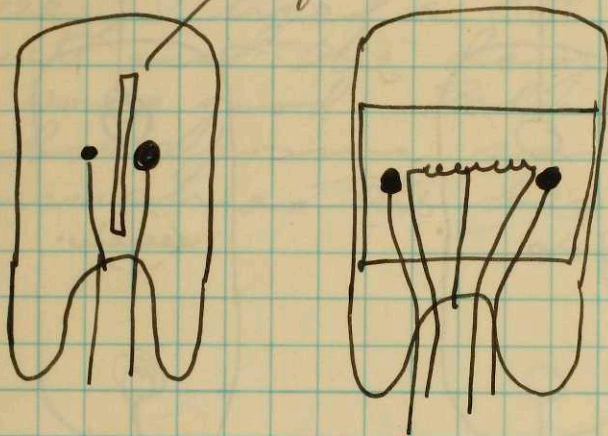
The surge for starting could be applied to the filament also.

There may be some difficulty

in the practical design and operation due to light and ionization from the hot filament.



glass plate between filament and arc.



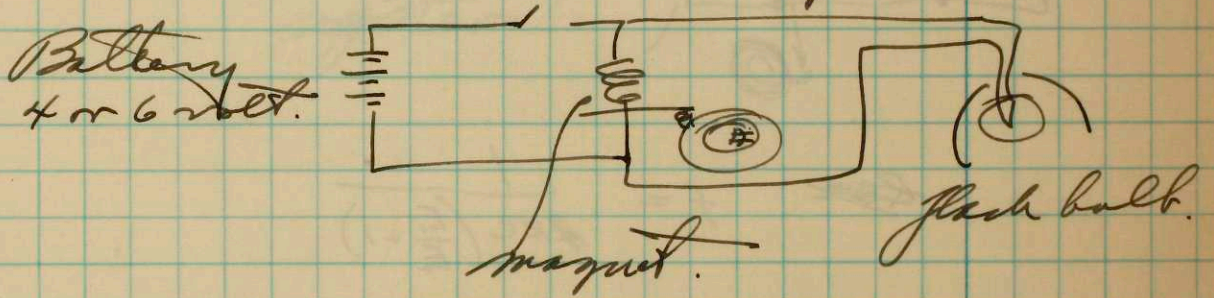
filament around the arc tube for modeling.

April 26 1941  
 Harold E. Edgerton

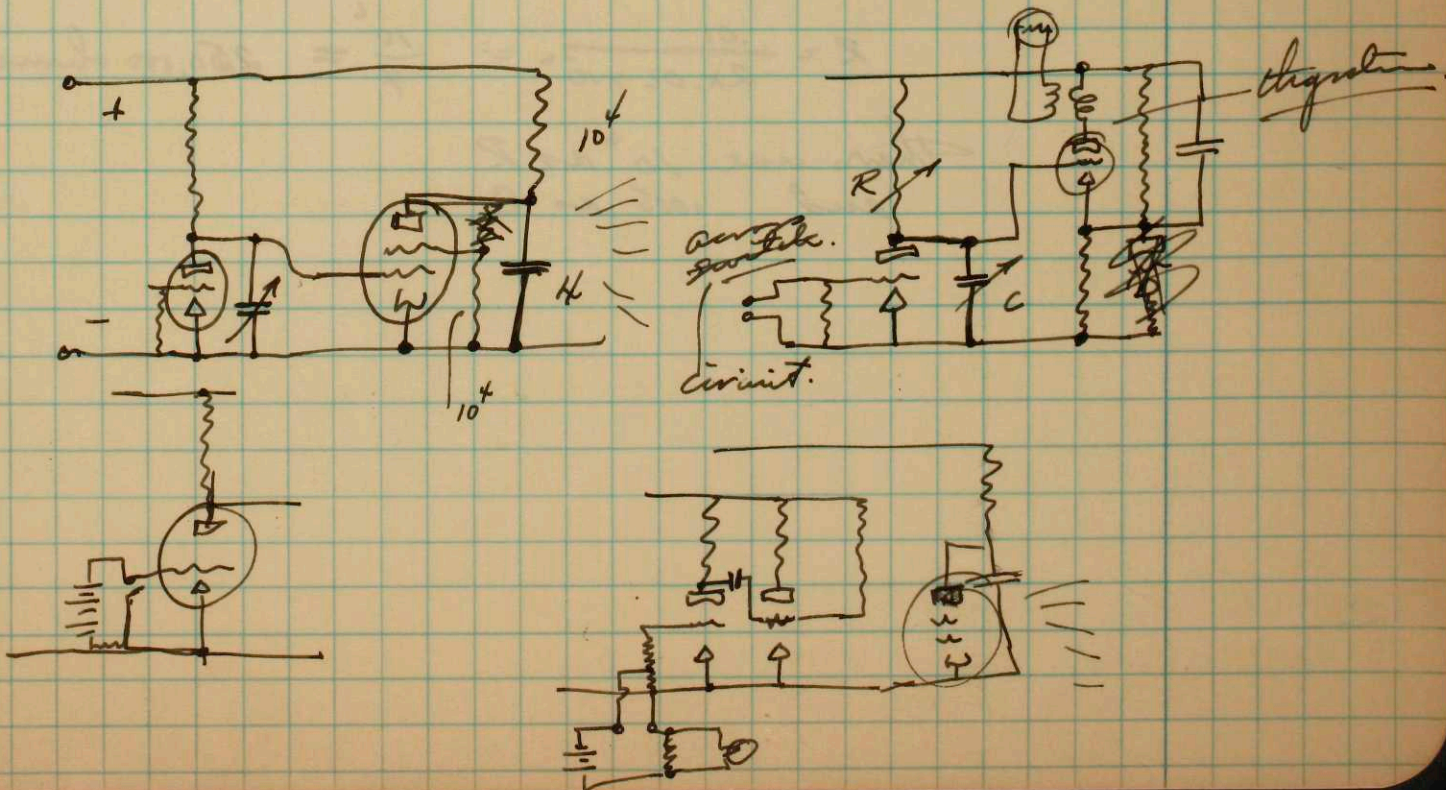
Timer for synchronizing  
 flash bulbs using a  
 stroboscope.

The stroboscope tube will flash  
 at a time .01 seconds after the  
 switch is closed. This approximates  
 the delay of a flash bulb to the peak  
 illumination.

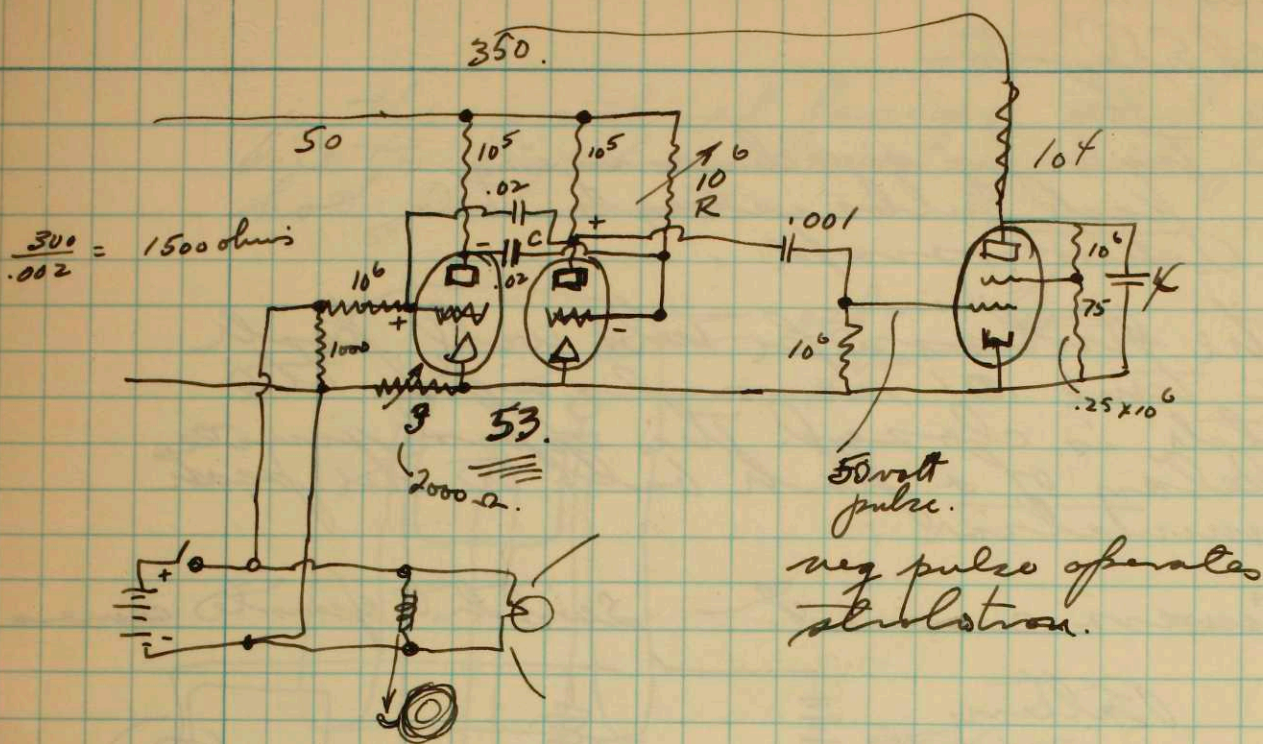
Camera circuit Switch to operate camera.



An additional plug will be used  
 in parallel with the bulb to bias  
 a lamp tube to cut off. An RC circuit  
 will then build up at a rate to  
 flash the stroboscope at a predetermined  
 time.







~~RRC~~  $f = \frac{1}{ARC \left( \frac{E_1}{E_2} + 1 \right)}$

$T = ARC$  since  $E_1/E_2 = 1$

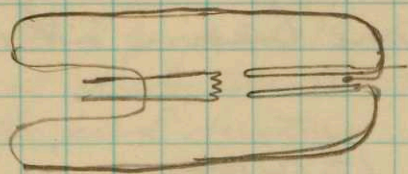
$T = .01$  to  $.02$   
 $.005$  to  $.03$

$C = .02$

$R = \frac{.01}{2 \times .02 \times 10^{-6}} = \frac{10^6}{4} = 250,000 \text{ ohms.}$

then use  $10^6$  as  $R$   
 and  $.005$  as  $C$

Sept 19 1948  
Harold E. Egerton  
Belmont, Mass.  
205 School St.



Cleaning off desk tonight,  
preparing for year's work.

Mary Lou started  
Cornell uni this week as  
freshman.

My parents were here from  
Nebraska last week. Now in  
Wilmington with sister and then  
to Washington to visit other  
sister.

Feb. 4, 1952

Howard Edgerton

Mary Lou now senior at Tufts (Jackson)

Bill has finished one term at M.I.T.  
with cum. of 4.0

Bob has another  $1\frac{1}{2}$  years in high school.

I was at Eniwetok in Spring of 1948  
and 1951 for A bomb tests. Each trip took  
about three months.

Have taught 620 at M.I.T. the  
past few terms. This covers measurement  
by electronic methods, and control.

November 11, 1953.

31

Howard E. Edgerton.

Mary Louise married Chas. Dixon Aug 16 1952. They now live at Hickory U.C. where Chas is a lawyer.

Bill quit M.I.T. about a year ago and went to U.C. after a while, started Columbia in second term. He took math and history at M.I.T. in summer. Now in his Junior year at Columbia.

Bob is a freshman at the uni. of Rochester. May specialize in optics or science.

I was at Eniwetok in the fall of 1953 for two months. Bill dropped out while I was away. Very important ~~the~~ <sup>of MIT</sup> non-nuclear experiments were made at this time at the atoll. Things might have been different if I had been home.

Bob went with me to France in July 1953 where we spent 2 1/2 months on the "Calypso" the ship of Cousteau, J.Y. My job was the deep sea camera applied to the scattering layer (D.S.L.) problem. We had an eventful summer in the Mediterranean sea.

I have 6 students this term in 6.631, Gascon conduction. We are doing a lot of experimentation, especially on flash tubes.

October 11 1954 205 School St Belmont.

Harold E. Edgerton  
+

Another year away! Again cleaning my study room.

Mary Lou and Charlie Dixon at Hickory N.C. have a daughter Janice Louise born Aug 14, 1954. Esther and Bob have seen her.

Bill went with me to France where we lived on the Calypso. The first month was at Toulon where we mounted an external camera on the bathyscaphe. I had one dive to 1700 feet in this remarkable machine. Then we went on a cruise to Tunisia with 4 scientists of the Endoume station at Marseille.

The new term is started. I have a section of 620 and 5 students in 6.631. Lots doing as usual at M.I.T. Ray Swansen is working with me.

Feb. 3, 1956.  
Harold Edgerton.

33

Organizing my room again at 205 School St  
Belmont Mass.

Mary Lou and Juice were here shortly  
after Christ was for a 10 day visit. Lou and Charlie  
have now bought a home in Hickory.

Bill is a graduate student at Columbia  
taking work in mathematics.

Bob is in his third year at Rochester.

Bob went with me to France last  
summer where we boarded the "Calypsso" in  
Marseille. We had the deep sea camera in the  
sea many times. The deepest was about  
14,000 feet off Mallepau Greece.

Dr. John Haramundanis is living with  
us this winter as he attends the Belmont  
High School.

October 20 1956

205 School St Belmont Mass.

Harold E. Edgerton

Busy summer this year. First I went to Honolulu with my wife Esther for a few days. Then to Eiiwetoh to use the multiflash repatronie shutter which was made by Geo LeCompte and Ray Swansen. Very successful photos were made of some of the tests. This camera took 5 exposures on a General Radio movie film camera.

I then went to Duana for a day, Tokyo for several days, Paris one day, Ubidjan French West Africa to join the Calypso with Cousteau.

We made pictures at 25,000 feet in the Romandre Trench. Two exposures came out ok, showing rocks. A star fish is in one photo. Small animals about 1 inch long are shown in both photos.

Bill lost his life in a diving accident with an experimental rebreathing lung at Nanucket Island while with Lambertson, the inventor. They were on the "General Jameson" owned by John Light's diving company. Depth 12 feet!

Bill had been teaching aquasubmery diving lessons this summer for Light's outfit. His mother said he was having a wonderful summer with lots of exercise and experiences.

This would have been Bill's last year at Columbia in math for a Drs degree. Maybe two years, if he taught some. It is a real tragedy to lose a 23 year old son who was our pride and joy.

My wife Esther is at 421 14th ave N.W. Hickory  
N.C. now with our daughter Mary Lou to  
help with a new grandson, William Palmer.  
The birth date was Oct. 11, 1956.

Bobby is a senior at the Uni of Rochester this  
year. He is a councillor at one of the Doms. He  
writes us after knowing that we need help.

We were in Europe for a month. First  
London for the high speed photography  
congress - then Vienna (after Frankfurt)  
Basel, Eindhoven, Köln, Paris. We returned  
to Boston Oct 7<sup>±</sup>. I am trying to pick up  
loose ends at M.I.T. and get into the  
swing again.



Dec 27 1958  
205 School St  
Belmont.

Still under a cloud. It is hard to forget,  
Especially at Christmastime etc.

Bobby was home from Rochester N.Y. where he is an assistant in the Physics (optics) Dept at Roch. Uni. By the end of this year, his second as a good student, he plans to try for the master's degree.

Mary Lou and her husband Chas. Dixon now have three children. Mary Ann is over a year old now. They spent Christmas with Charles's mother in Belmont N.C.

Bob, Esther, and I drove down to Hickory N.C. last year at Christmas time 1957.



Esther



Harold

Mary Anne Bill

Jan

July 21 1963

Lewell Reynolds

Now at 205 Sorting our things  
after Dave Chlauder and family moved  
out. We have moved into an apartment  
no 8-3A 100 Memorial Drive Cambridge  
as of 3 years ago.

Jan. Bill and Marguerite Dixon  
are visiting us from Hickory NC.

Yesterday we had a 95% eclipse  
of the sun at 5:20 pm.

Bob now has his D.Sc. degree  
from U. of R. He will teach at  
Carleton College in Minnesota next  
year. Physics Dept.

Miss Buck and 3 children  
move into 205 in a few weeks

June 22 1969 Sunday.

Ester and I are closing out the house at 205 School St where this book has been in my study for years.

We have been in Apt 11-6A and 11-17A at 100 Memorial Drive since a year or so ago.

This house will be sold to on Aug 1 if all goes as planned.

Bob and Elizabeth, Eric, Nina, and Sylvia all live at Stillwater Maine. Bob is a professor of physics at the Univ of Maine. He spent 2 years at the materials lab at Cornell before coming to Maine. We had Nina and Sylvia for 11 days while Bob and Liz went to Seattle Washington.

Mary Lou, Ches, Julie, Bill, Mary Anne and Ellen live at Hickory 421 14 Ave SW. They move next month into a new house that has just been finished - near the lake.

July 5 1969.

We are still storing things into files.  
one for Mary Lou  
one for Bob.

Some for the apartment  
Don't store.

Lots to throw out! It is amazing how much can be collected in 33 years.

I am glad that my summer expedition on the R/RCHADU has been delayed due to technical reasons. I was to have gone aboard in Southampton England on June 25 for a 6 week cruise to the mid-Atlantic Rift Valley.

1969

1936

33

October 11, 1971

Harold Edgerton

I found this note book in the boxes that we brought from 205 School St in 1969.

ROPER

Bob is now teaching near Detroit Mich at the Homer <sup>ROPER</sup> school in Bloomfield, they bought a house at 221 Ottawa Drive Pontiac Michigan. He teaches math and Physics.

Mary Lou Dixon  
 Charles  
 Janice  
 Bill  
 My name  
 Ellen

Bob, Mary Lou and their families met in Colorado in the summer for a camping and expedition trip. 7 children

Robert Dixon  
 Elizabeth  
 Eric  
 Nina  
 Sylvia

I am loaded with students in a freshmen seminar on Strobe and a project lab. 6.714.

Recently I realized that I am soon to reach the age of 70. Should be "retired" for almost 3 years. I must find some way to keep the strobe lab going.

Oct 17/1983.

Harold & Esther.

Both Esther and I have passed the 80th birthday.

There was a big party for me on April 6 when the stroke alley was formally christened. We had a cake, music, speeches, and fun.

Bob and Mary Lou put on a party for Esther. Everybody came & it was a lot of fun.

Jan and Lyndon Kay are in Japan for a technical meeting. Nelson went to N.C. with Mary Lou.

Bob now is a physicist for E.C.D Energy Conversion Devices of Troy, Michigan.

I still go in regularly to the stroke club. Chas Miller teaches the one term course G.1940. I help now and then.

Oct 18/1983.

Harold Edgerton

100 memorial Dr. Oct 11-7A. Cambridge Mass.

Conference with Bob Reins yesterday.

Why not vertical camera to use day/night air silhouette. This was suggested because of the "heat" picture of Langage.

Camera 16 mm 50 ft magazine, motor rewind.

Lens Switar 1:1.6 f 10 mm

Interometer designed by Bill Mac Roberts.

24v dc. batteries.

Operates at 10 second interval today.

40 photos per foot of film.

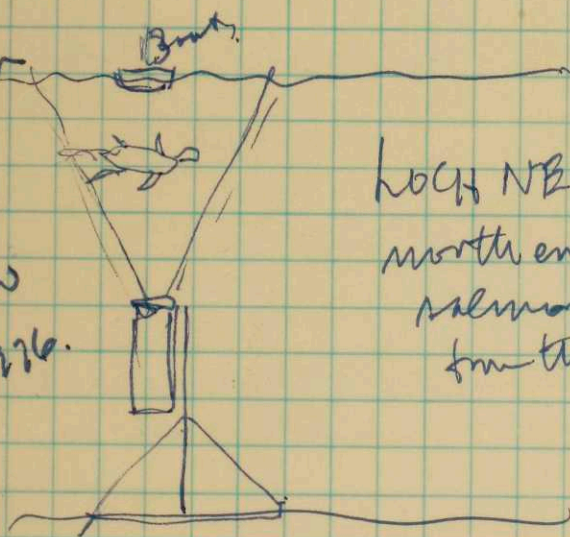
 $40 \times 50 \text{ ft} = 2000 \text{ photos.}$ Elapsed time = 2000 seconds.  $\approx 33.3$  minutesFixed with camera.  $\approx 5.55$  hours.

+ 2 hours

Slow down camera to 20 sec.

Elapsed time =  $20 \times 2000 = 40,000 \text{ sec.}$  $\frac{40,000}{3600} = 11.11 \text{ hours.}$ 

Boat  
See photos of  
p 35 of  
antenna  
Tech Review  
month Apr 1976.



LOCH NESS

north end where  
salmon enter  
from the canalPossible  
location for  
cameraLIGHT  
HOUSE.Canal to  
ocean. $9 \text{ sec} \times 2000 = 18,000 \text{ sec}$  $\frac{18,000}{3600} = 5 \text{ hours.}$  $8 \text{ sec} \times 2000 = 16,000$  $\frac{16,000}{3600} = 4.4 \text{ hours.}$  $7 \text{ sec} - 3.88 \text{ hrs.}$  $6 \text{ sec} - 3.3 \text{ hours}$  $5 \text{ sec.} - 2.7 \text{ hours.}$

Dec 31 1983.

Harold Bygones at 100 memorial Dr. apt 11-7A and 11-64.

Esther is working on a party tonight. We have traded off on new year's parties for years.

Guests. Mr & Mrs Reigtoys

" " Bob. Holden (Anne)

" " Rightmeyer (Brandon & Mercedes)

Janice Kisgant.

Ruth Hoken

Bill Sigant.

Bob and Liz were here for Christmas with  
Siri, Nina and Sofia. from Pontiac Mich.

Sylvia is still in Boston visiting a camp friend  
Krachneyer (?).

Bob went to Pontiac via Vermont. We just had a  
phone call that they arrived.

Jan, Lyndon, and Rebecca went to  
Relight and History n.c. for Christmas. Now  
home on carter at Brookline.

Report Mar Apr 1876

Revised

July 9 1989 by AS

Returned yesterday from Scotland where  
Chris Wyzdoff worked with a sled dog team  
using the team.

Further work is planned by  
Adrian Shinn, Wyzdoff, Rives, & others.

See page 76 →



Jan 10 Sunday 1985

Harold Edgerton.

Esther and I went to Hickory N.C. to leave Christmas with Mary Lou and family.

Jan. Key (Mary Lou's daughter) and her husband Lyndon Key live in Brookline with their two daughters, Rebecca and Emily. They all went south with us to Charlotte N.C. on Eastern Air line. We were met by Mary Lou and Chas and others. All went to Belmont N.C. to the home of Mrs Dixon, Charles mother. A delicious lunch was served. Rebecca had a chance to see the cows and chickens. Then we went to Hickory where Mary Lou had her measurement apartment ready up for us. It was a most happy time.

There is a Nova program scheduled for Jan 15 Tues at 8 pm. entitled "Edgerton's Incredible Story unrolled". It will run over the entire country. The tape was first made for Nebraska T.V. 50 minutes long. Gary Holman, Lincoln made. Nova bought the title and Bebe Dixon redited it extra 1 hour tape. A copy has been given to the U.S. Historical office, Warren Seamus.

Jan 23, 1985. Mary Lou Dixon and friend Joe Robinson from Hickory N.C. came yesterday. We are having a very cold spell in Boston. Ellen has a job at Whitehead's Inst.

Feb. 14<sup>th</sup> 1986 Cambridge Mass apt 11-7A.

Esther and I went to Washington D.C. to the Marriott hotel to attend an affair sponsored by the Patent Office. I was introduced into the Hall of Invention at a very nice social affair.

Mary Lou and Charlie were there. Also Mary Ellen and Watson with Sam John. They had a big banquet at the hotel. It was a very happy affair.

I am officially out of my 1-7 apt 2 yrs in being out and find plenty to do. Chas Miller has taken over all the house hold.

Bill and Roberta coming in Tues and staying 7 nights out. Jan money is due on 1st of Dec amount in from 4-405.

Apr 11-7A

12 memorial dinner.

13  
Cont July 1986  
Cambridge mass

A book "Sonar Images" came out a few weeks ago by Prentice-Hall. It has many examples of the uses of sonar.

I am finishing the 3rd edition of my book "Electronic Search, Study" which is a product of the MIT Press.

"Moments of Vision" - picture book is being put into production by the M.I.T. Press. James Hillman is the co author!

Ellen Dixon is a senior thesis in Chemistry at M.I.T. She is looking a few for next year.

July 4, 1987 Sat.

"  
A third book 'SONAR IMAGES' was published about a year ago by Prentice-Hall in N.Y. I am collecting material for a revision second edition at the present time.

"  
A picture book 'STOPPING TIME' is to be published by Harry N. Abrams N.Y.C. in Sept 1987. This Koyama has been editing. The book is published in Japan. There are lots of pictures. We hope it will have a large distribution.

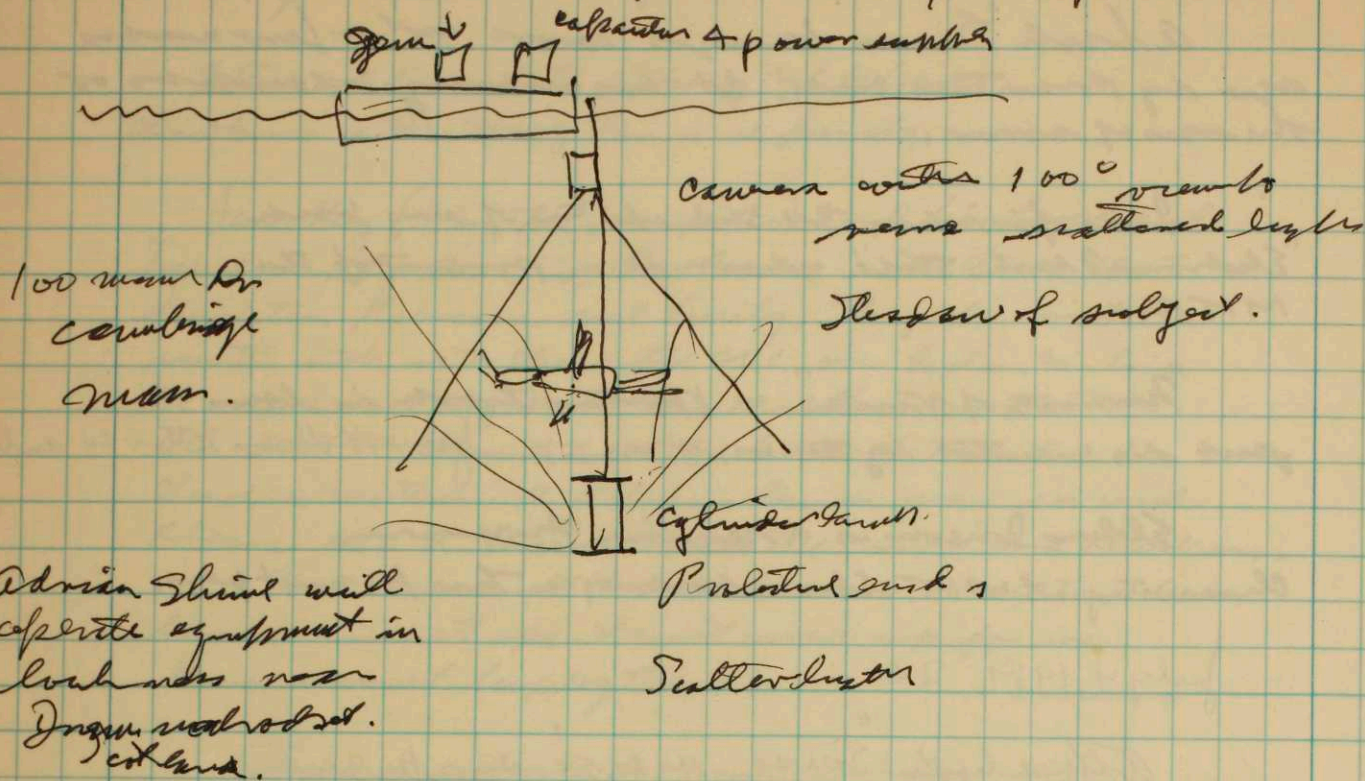
Recently I picked up the dried costs from Gus who has become involved in the starting of a color printing laboratory. My cost to sell is all the income will be used to pay off this cost to me. Then we go 50-50.

Yesterday Esther and I loaned Gus 50,000 for a 4 day period to help him over a financial bind.

Tonight there will be a party at Ruth's Sprou's apartment. Then all of us come up here to see the find works in the Charles River.

July 9<sup>th</sup> 1989.

Silhouette system using large studio.



100 mm or less camera lens

Camera with 100° view to some scattered light

Shadow of subject.

Cylinder lens.

Polaroid and 1

Scatter light

Adrian Shind will operate equipment in low noise room. Inquire about set. col. lms.

Notebook Number: B-1

**Scanning and Separation Record**

Pages 47-152 are blank and were not scanned.

\_\_\_ unmounted photograph(s)

\_\_\_ negative strip(s)

\_\_\_ unmounted page(s)  
(notes, drawings, letters ...)

was/were scanned where originally located between page  
\_\_\_ and \_\_\_.

~~Item now housed in accompanying folder in MC 25, box 166~~

COOPER  
COOPER  
MAY 18

COOPER  
COOPER  
MAY 18

