

Developing time  
Wednesday 12pm - 5pm  
go to supply room for keys

SATUR day June 8th  
Proficiency test

Friday 9:00am  
Come at 5:00

IAN  
786-7980

X22950  
to ins. buy: 100  
Wednesday

11:30am

**\$225 FILM EXPERIMENT CLASS**

*call known Allison*

GUIDELINES

*Jeff Erbach*

*Sol 952-2368*

THE SHOOT

*925-3450*

*John 228 7914*

As stipulated in the brochure, each participant will get a certain amount of film and gear, in order to undertake their shoot.

- 400 feet of film, kodak 3744
- use of studio for one day (if needed)
- use of \$100 worth of lights and gear for one day (if needed)
- use of Bolex camera for one day

*Wednesday  
Saturday  
SUNDAY*

Participants can book their shoot dates with the Production Coordinator, David Zellis, at 925-3455. It is up to each member to book and take care of their own shoot. Shooting can take place anytime from Wednesday, May 22 to Friday, June 14. If using the studio or picking up equipment after regular hours, it's up to the member to make arrangements with David Zellis. No member should ever use the WFG office after hours for any reason.

*→ June 9*

If a member wants to shoot for more than one day, they will incur the equipment rental expenses. Multiple day shoots will have to be coordinated, and are solely dependent on ensuring that each participant is able to secure a date to do their shoot. Participant's one day shoot will always take precedent over a participant's second or third day of shooting. It is worth noting that the WFG has two Bolex cameras, and may be able to accommodate several multi-day shoots.

**THE PROCESSING**

*Outdoor  
in low-moisture*

*12 ISO rated film processing day  
Not light sensitive SAT 2-4pm*

*bring 100ft film*

It is the responsibility of each member to ensure that their shoot is finished for the processing dates; Saturday, June 15 to Saturday, June 22. Processing dates cannot be extended or adjusted. The processing class takes place on Saturday, June 15 from noon to 4pm. The class will be split into two groups, with one group coming in from noon to 2pm, and the other group coming in from 2pm to 4pm. The processing all takes place in the Floating gallery darkrooms on the 2<sup>nd</sup> floor.

*June 15  
2-4pm*

Processing of projects will take place that entire week, and participants will have to process in groups (it's easier). A schedule will be drafted for the processing class on Saturday, June 15, at which time participants will committ to a date and time to process their footage with other participants. Access to the darkroom (key, card, etc) can be retrieved through Jeff Erbach.

It is up to each member to ensure that their processing is finished by Saturday, June 22. This date cannot be changed or adjusted.

*Cameras  
→ tape  
etc*

*hand pu*

## THE TINTING

A tinting class will be held on Sunday, June 23 in the WFG studio from noon to 4pm. At this time, the tinting process will be analyzed and discussed.

Each member can come in and do their tinting at their leisure. Office hours are 9am to 6pm. Anyone wanting to do tinting after 6pm will need to make arrangements with Jeff Erbach to gain access to the studio (key and card).

It's up to each member to ensure that they are finished their tinting by Sunday, June 30, at which time the studio will be cleared out.

## THE EDITING

Each participant will get access to the WFG steenbeck for 12 hours of editing. Any time used beyond this 12 hours will be billed to the member. Any editing expenses, tape, gloves, etc, are solely the responsibility of the member.

Members can book editing time with David Zellis. Any editing time booked after 6pm will require access (key and card). When editing, please remember to double splice your film! (tape both sides of the edit, or it will break in the projector).

It is up to each member to make sure their films are finished for the last class on Saturday, July 13.

-light reading clock  
aperture

THE WINNIPEG FILM GROUP PRESENTS

**\$225.00**

**FILM EXPERIMENT**

**HAND-PROCESSING / COLOR MANIPULATION WORKSHOP**

**Contents:**

Section One

Hand-Processed Confessions

- a few words about some whacked images

Section Two

Making Film with your Hands

- techniques, recipes, and miscellaneous experiments

Section Three

Breathing Life Into Your Film

- tinting and toning with everything under the sky
- "oops I fucked up again", scratch animation and other excuses to say that you meant to develop an anti-image

Section Four

You and Your Bolex

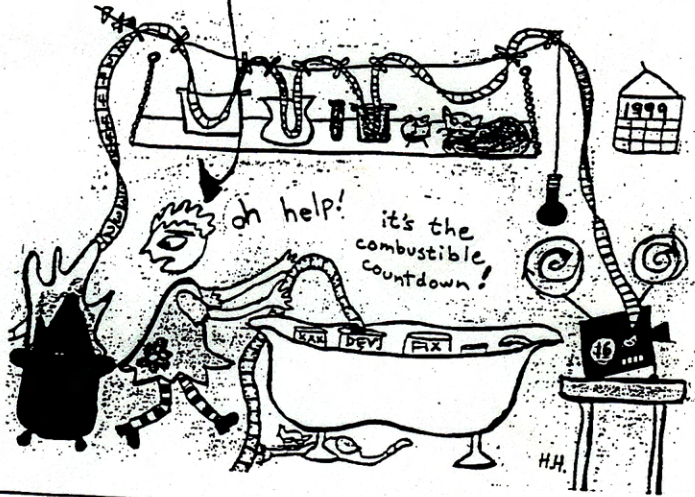
- Bolex Basics, and how to make a light reading so you don't screw up your image

LOIS OT Platt for this taadaanstatic  
WORKSHOP came from

# RECIPES FOR DISASTER

a handcrafted film  
cookbooklets

put together by  
(Hellen Hill)

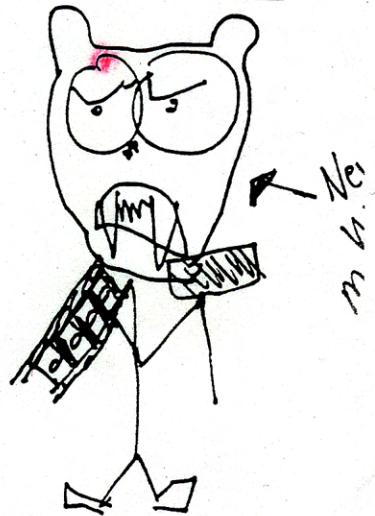


Special thanx to  
this guy



(Phil Hoffman)

who gave me lot's o' info  
when I went to his annual Summer  
workshop!



[Also got some info  
from this issue of  
the LIFT Newsletter]



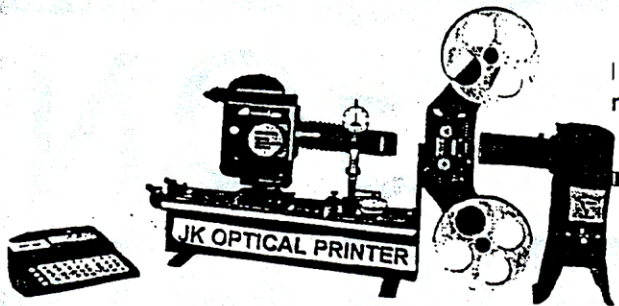
# SECTION ONE

*Hand-Processed Confessions*



# AFTER THE HEARTBREAK: MY FIRST J.K. EXPERIENCE

BY JOHN PRICE



I had bought some second hand, paperback, **how to make a film guide** and it had a picture of a JK optical printer so I called up Simon Fraser University's film dept., and told them I was a film student from Emily Carr. Anyway, I loaded the Bolex wrong and the projector began skipping right away, chewing up my original Super 8 footage. It was heartbreaking in the moment, but when I got the print back from the lab there were actually images...flat and grainy and

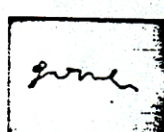
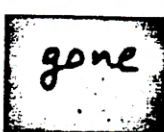
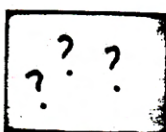
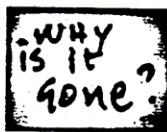
destroyed, yet somehow interesting, like the texture was mirroring my emotional state when I had shot the footage. That was a turning point—letting go of the sanctity of the images, understanding the expressive potential of the film's physical texture—this led naturally to experimentation with processing my film by hand.

## A PRACTICAL DISASTER: HAND PROCESSED FILM AS A LIVING ART EXPERIENCE

BY MADI PILLER



Image processed as negative



I lost the image on the process but I built another idea on the clear film left.

**M**y first experience hand-processing 16mm film was what I like to call a "practical disaster." I shot my 100 feet of b&w film as a well organized test of patterns, movements, color on b&w, lights and shadows. When I started to process, I decided at the last minute to leave a few feet as negative. That's the only part of my film that turned out OK. The rest of the film I wanted to process as reversal using bleach, with solarization effects. Well, it turned out I had a 'Bleach Witch Project.' Images that first were showing up so beautifully started vanishing before my eyes. I didn't know what to do. With my heart fully pumped, my adrenaline climbed to high levels. My hands were grasping the film, pulling it from the bucket, while my eyes scanned the frames, and watched the images flow with the running water. Nothing could stop them

from fading away. I felt like dying with them. I thought briefly about all the things I no longer possess, the people I won't be able to talk to anymore because they're dead...

Anyway, life is a cycle so I decided to use the now empty surface of the film as a canvas to write the dialogue that was never recorded, scratching my experience onto the cleared base. The film was presented at the Images festival 2 years ago and is called "Process." Entering this wild world of hand-processing taught me to make a big mental leap from what is "beauty of perfection and total control" to "beauty of imperfection and unexpected results. Now I understand hand-processing as a living art experience, where nothing can be set and I leave myself the opportunity to start creating within the results.



# GONE, SWISHIN'

INTERVIEW WITH PHIL HOFFMAN AND AYSEGUL KOC

AYSEGUL KOC: When we talk about handmade film it's not necessarily hand processed film.

PHIL HOFFMAN: No, but it's a nice metaphor for it. When you hand process, you are actually putting the film in the developer, swishing it around and putting it through different processes. What's great about hand processed film is that you are never in total control because in a few seconds you can lose a beautiful image you love by leaving it in a chemical too long, or not long enough.

AK: Has that happened to you?

PH: Oh sure, it happens all of the time...it's odd because that image still lives on in your memory. I have a lot of those...that beautiful image you saw in the darkroom...gone...That's life, right? These things move in time and when they're gone, they're gone. This way you go against the idea that the film is precious and understand that the process is more important.

AK: Is there a project about which you would think 'this can only be handmade'?

PH: In a sense yes. It's a way of living and a way of working. In the beginning I may have thought someday I'd make a big feature with real actors and all that, but then I came to realize that this is not the way that I work. The project that I am on now is called "Commute"—I can't say anything useful about it now...it's still in process. I started working on it in 1995 and in 1996 Marion died. I put Commute on the shelf and I did other works. Now it's resurrected again and it's funny because now I am in a position how I want to work with it, where in 1995 it was vague. So, I think after finishing *Destroying Angel* and *What these ashes wanted*, I was reminded of the way I want to work...it may be with some actors, at least friends, but it worked out and the various threads of the story, but I'm not always sure what road will get me home.

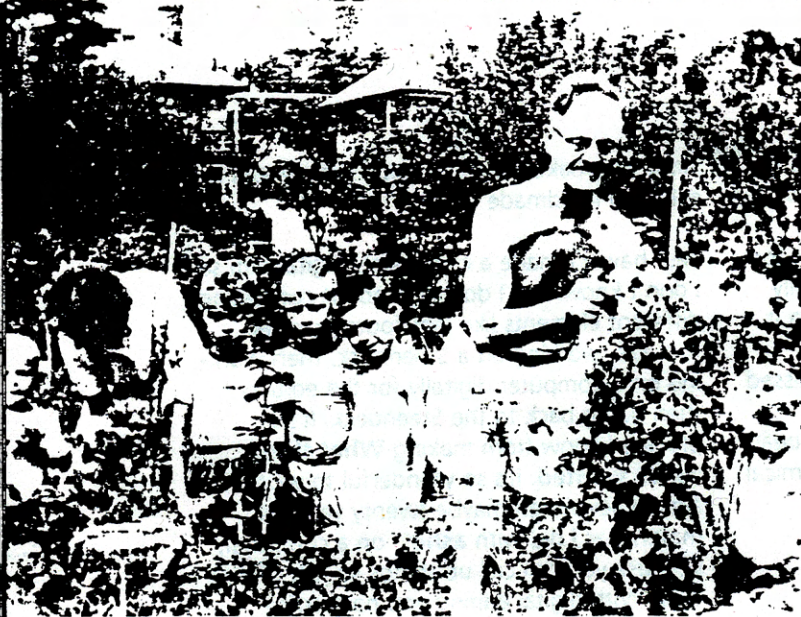
AK: If you make a totally digital film, would it still be a handmade film?

PH: I haven't made a completely digital film so I don't know. But I do know about combining different elements like film footage, video footage, working on a Steenbeck, then working on a computer digitally for the editing then going back to the Steenbeck. It's a process I know from making *What these ashes wanted*. It's so wonderful to work with almost seventeen maybe twenty years of material as I did with *ashes*, on a computer, because you can call up things so fast and so easy. With digital editing you have some headaches of course but...it works just like memory... Boom! It's right there! In *What these ashes wanted* I was working on a Steenbeck and on the computer at the same time. I was shooting with a digital camera off the Steenbeck screen and then dumping it into the computer to work out my ideas. Back and forth. It was a bit crazy because I had footage which was processed and printed way before digital editing was invented and so it wasn't reasonable to do a keycode transfer. I worked out my whole soundtrack, including many adjustments to the narration, on the computer. I found all the images I needed (Super 8, 16mm hand processed, still photos, video) by working out the ideas on the computer. Then I just had to master (through optical printing and video to film transfers) all of the material back to 16mm neg. In the early 90's, I used a similar process for *Chimera*, using digital editing to work out the flow of images, and the frame rates. Then I went back to the optical printer and step printed the Super 8 up to 16 mm neg.

AK: It wasn't an aesthetic choice it was something that helped you work out the material.

PH: When we cross boundaries, we bring what we've learned from one medium and apply it to another, and something new is discovered. Old movements influence new movements, new movements influence old ones. It's a hybrid of practices, you use whatever is possible to use.

Still: from Phil Hoffman's  
*What these ashes  
wanted*



I remember at Sheridan College, when Jeffrey Paull was first asked to teach Photoshop. He was sort of ordered by the administration to make the transition from still film to computers, and he had to teach in one of these computer labs. It was very un-Jeffrey Paull. So what he did was turn off all the florescent lights and bring in some nice lamps and placed them around the room. That's a handmade solution. He just said: "well wait a minute let's not just take what's being shoved down our throats...we can still resist this corporate way of working..."

The term that came to being in the 60s was "living cinema," and I like that. Like handmade film, it's the amateur thing, the Brakhage idea that it's good to make amateur work because amateur stands for love. In handmade film, you make a shot of people at the breakfast table. You don't bring in the big lights; you don't get your daughter to pour the orange juice again, and again. You don't yell, 'action' or 'cut.' You make a shot when the light glistens off the apples on the table and your child is playing with toys. If you miss a shot, you get the next one.

AK: Is this not more possible with the video camera? More people have access to it now and can do amateur work.

PH: With video there is usually sound attached, whereas with a Bolex it's always just the image. In video it's "what are you doing with that toy, Jessie?" The words become important so there's a difference and I don't think it's always better though it can be. It depends on how one works with it. Access is great of course. Apparently everyone has a video camera. For me, it's less to do with technology and more about working "from your hand," or "from your heart".

AK: How did you start making hand made films?

Still: (top) passing through/torn formations, Phil Hoffman; (page 15) Chimera



## **ANTIDOTE FOR A VIRTUAL WORLD**

**~ Hand Processing Motion Picture Film ~**

**by Ken Paul Rosenthal c. 2001**

### The Unbearable Tightness of Seeing

When and where TV puts me in a perpetually pixilated pinch, hand-processing motion picture film serves as an antidote for a virtual world. A 500-channel cable subscription subscribes us to the illusion that more choices permit more control over what and how we see. That illusion is betrayed by the culture cum cult of W A T C H I N G T V. The TV se(c)t dictates resigning the retina to a boob tubular wave of images which neither crest nor crash but continuously roll into our living rooms. We drown in the see of TV because we passively absorb it rather than actively participate with it. Instead of remote control we must *emote* control. TV will consume our vision unless we exercise insight. What'll it be: sink or sink? Or create a swim swim situation? Are you ready to turn the tide?!

### The Texture of the Gesture

The look of hand-processed movie film is pure shake and bake. This process is not for those who prefer the film surface with a smooth polished complexion. Instead, oozing mounds of crusty chemical infections will bleach, bleed and belch all over your perfect Kodak moments. Sometimes the film will become a crumbling arctic ice floe: image chunks will skate and reposition themselves like bad buoys or Pollackesque life preservers. Or it will resemble a fly strip stuck with half-buzzed guts draining and staining the length of the film. YES!!! The colors remind me of smashing gypsy moth caterpillars with a hammer as a child in New Jersey. I never knew what color innards would spill out. I'd expect chocolate, and out came lime green. Hand processing is just like that. It's the flavor of the moment. Even black and white can look like Walt Disney puking.

### A Womb with a View

Though many claim that giving birth to a child in this daze and rage is a decidedly selfish act, my own sleeping dreams of giving birth leave me profoundly pro-creation. Aah, to bare a tiny ray of sunshine projected in one's own image. Hand processing gives you a womb of your own. With the sacred sovereignty of God you are Alchemist, Mod Hatter, and Mad Scientist all in one; transforming sun to silver, opening the can of peanuts which unleashes a celluloid snake, then screaming, "It's alive!!! IT'S ALIVE!!! Dr. Frankenstein should have it so good. We get to bury the goods *and* dig'em out! You'll be the proud parent of a perfectly imperfect creature whose patchwork quilt features will put Boris Karloff to shame. And nothing, I mean NOTHING, beats the first view of a

newborn image damp with birth bath cradled in a frameline crib. You'll be maniacally giddy and passin' out cigars.

#### Getting a Grip (sort of...)

Whereas commercial film labs are chemical chameleons yielding consistently inconsistent color and contaminated costs, hand processing is a mercurial and serendipitous mixture of control and non-control. Plus it's remarkably economical. I've processed up to 10 rolls of Super 8 with one \$30 home developing kit, ignoring the instructions about the number of rolls per run and "exhausted" chemicals. **IMPORTANT:** Expired chemicals do not mean beat results, rather, beatific ones. The idea is to get what we *didn't* pay for.

Hand processing grants you SOUL CONTROL. It inspires an attitude of non-, if not anti-intention; an embracing of the gesture rather than a prescribed result. *It requests disregard for expectation.* THAT is the throbbing heart of this pulsing push and pull PROCESS which breathes and breeds between inspiration and form. To be specific, *expect the unexpected* and learn to appreciate it!

# SECTION TWO

*Making Film with  
your Hands*

SECTION

TWO

Making film with

your hands

## Reversal Processing

*The development of an image on a negative or on a print made from a negative has been discussed. The reversal process produces a positive instead of a negative image on the material which received the original exposure, and thus eliminates the need for making a print.*

- The reversal process forms a positive image directly or, in other words, a reproduction that looks like the original subject. It is used in the production of amateur movies, positive black-and-white transparencies for television, positive line reproductions in the graphic arts field and some color motion pictures, transparencies, and prints.

Although proper control of exposure and development in negative processing is desirable if you wish to obtain a good-quality negative, some variation in exposure or processing does not prevent the use of the negative for making prints. The range of contrast provided in photographic papers and the possibility of changing the printing exposure permit corrections of some errors in negative making. In other words, there is considerable exposure and development latitude in the use of most negative materials.

This is not the case in reversal processing; because a good-quality image can be obtained only when the exposure and first development are correctly balanced. Any variation from this balance will degrade the picture quality. Because of this dependence on the exposure-development balance, as well as possible image degrading effects in the other processing steps, reversal processing requires very careful control. It is for this reason that the manufacturers of both black-and-white and color-reversal products have generally processed these films for their consumers. In recent years, improvements in products, equipment design, and processing techniques have made it possible for the consumer to do his own processing, but close control is still a most important factor.

The chart in Figure 11 shows a comparison of the two processing systems with respect to the basic steps. In negative and print processing, the exposed silver halides are developed and then the undeveloped silver halides are removed by the fixing bath.

Notes on  
Cinematography  
by Robert Bresson  
Translated by Jonathan Griffin



Not to shoot a film in order to illustrate a thesis, or to display men and women confined to their external aspect, but to discover the matter they are made of. To attain that "heart of the heart" which does not let itself be caught either by poetry, or by philosophy or by drama.

Someone who can work with the minimum can work with the most. One who can with the most cannot, inevitably, with the minimum.

Rid myself of the accumulated errors and untruths. Get to know my resources, make sure of them.

The truth of cinematography cannot be the truth of theater, nor the truth of the novel, nor the truth of painting. (What the cinematographer captures with his or her own resources cannot be what the theater, the novel, painting capture with theirs)

Shooting: Put oneself into a state of intense ignorance and curiosity, and yet see things in advance.

Master precision. Be a precision instrument myself.

What has passed through one art and is still marked by it can no longer enter another.

Set up your film while shooting. It forms for itself knots (of force, of security) to which all the rest clings.

The faculty of using my resources well diminishes when their number grows.

CINEMATOGRAPHY: IS A WRITING WITH IMAGES IN MOVEMENT AND WITH SOUNDS.

□

Shooting. Stick exclusively to impressions, to sensations. No intervention of intelligence which is foreign to these impressions and sensations.

Don't run after poetry. It penetrates unaided through the joins (ellipses).

No actors.  
(No directing of actors).  
No parts.  
(No learning of parts).  
No staging.  
But the use of working models, taken from life.  
BEING (models) instead of STEERING (actors).

Metteur-en-scène, director. The point is not to direct someone, but to direct oneself.

Two types of film: those that employ the resources of the theater (actors, direction, etc.) and use the camera in order to reproduce; those that employ the resources of cinematography and use the camera to create.

No music as accompaniment, support or reinforcement. *No music at all.*

The number of films that are patched up with music! People flood a film with music. They are preventing us from seeing that there is nothing in those images.

The noises must become music.

□

It is only recently and gradually that I have suppressed the music and have used silence as an element of composition and means to emotion.

Not to use two violins when one is enough.

—

Draw from your models the proof that they exist with their oddities and their enigmas.

□

Acting, which seems to have an existence of its own, apart, outside the actor; to be palpable.

Between them and me: telepathic exchanges, divination.

It would not be ridiculous to say to your models: "I am inventing you as you are."

Not have the soul of an executant (of my own projects). Find, for each shot, a new pungency over and above what I had imagined, invention (re-invention) on the spot.

Dig deep where you are. Don't slip off elsewhere. Double, triple bottom to things.

—

In reversal processing, the exposed silver halides are developed as before, then this negative silver image is removed in a bleach bath and the remaining silver halides are developed to form a positive image. This can be done by exposing them to light and then using a conventional developer. However, in some processes, the re-exposure is not necessary, because special fogging developers can be used to convert all of the remaining silver halide to silver without the use of light.

In reversal color processes, it is not necessary to remove the negative silver image before the second development. Instead, it can be left while the color developer produces a positive image consisting of silver and dye. Then the silver of both the negative and positive images is removed, leaving the desired image of colored dyes. This is frequently an advantage, because when the negative silver image is removed before the second development, the bleach bath must not affect the silver halides that are needed to form the positive image. When the silver is not removed until after the second development, the bleach bath is not limited by this requirement. However, this is possible, of course, only when the final positive image is composed of dyes, not silver.

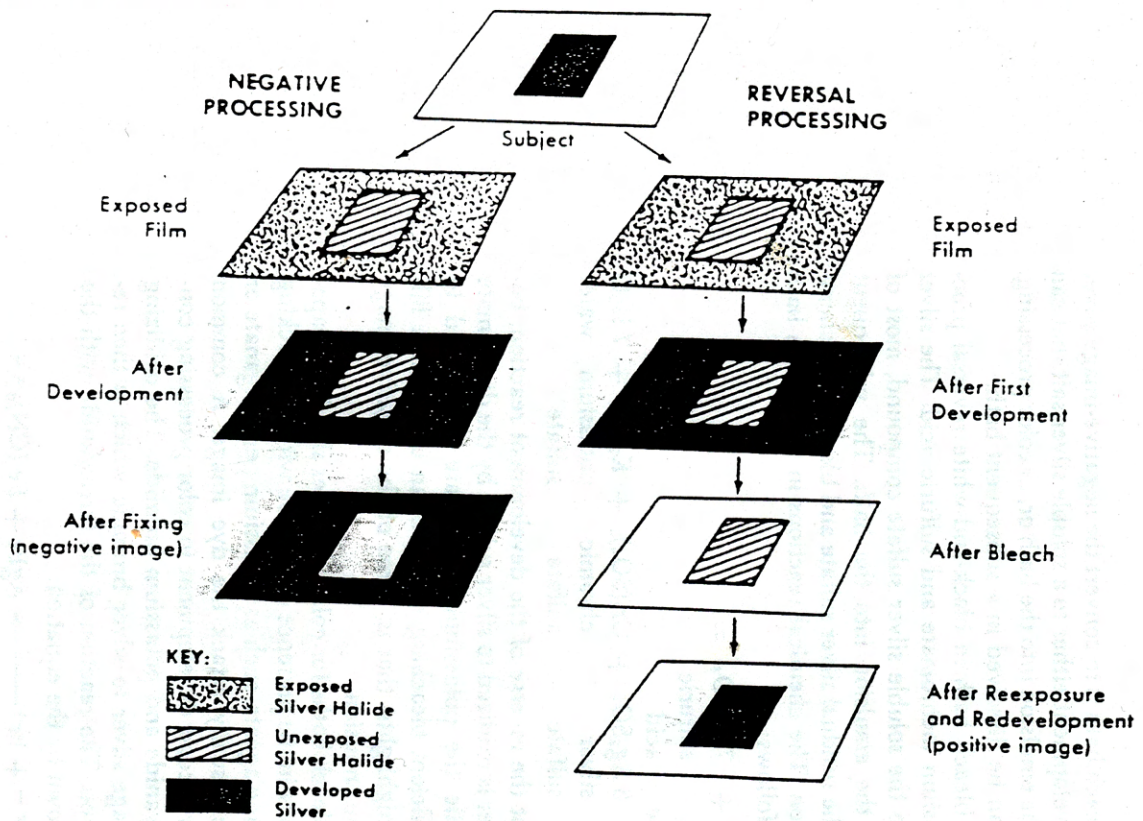
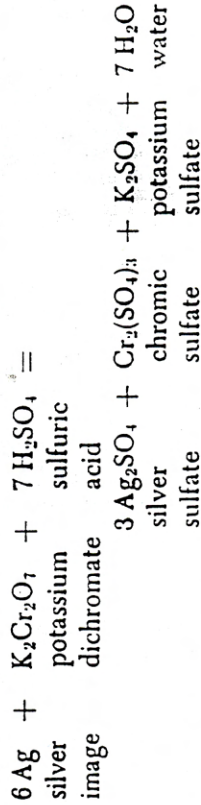


FIGURE 11 Comparison of negative and reversal processing systems.

## BLEACH BATHS

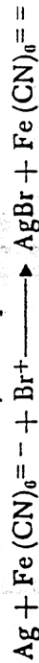
The purpose of the bleach bath is to convert the negative-image silver formed in the first development either to a soluble silver salt that can readily diffuse from the emulsion into the bath or, in color processing, to a silver salt that can be dissolved in a subsequent bath.

A commonly used bleach bath in black-and-white reversal processing contains potassium dichromate and sulfuric acid. The silver image is converted to the soluble silver sulfate compound, most of which diffuses from the emulsion into the bath. The subsequent water rinse removes the residual silver sulfate and bleach bath chemicals from the emulsion. The chemical reactions in the bleach bath may be expressed as follows:



Chemically, this is just the reverse of the development reaction, because the metallic silver is oxidized to silver sulfate by the dichromate in acid solution, while the potassium dichromate is reduced to chromic sulfate. Insufficient bleaching results in an undesirable filling-in of the picture highlights, that is, some of the negative-image silver may be left in the emulsion.

The agent used in bleach baths for color processes should be capable of oxidizing the silver in the presence of a halide without attacking the dye image. Oxidizing agents, such as potassium permanganate or potassium dichromate, usually attack the dye image. A common bleach bath used after second development in color processing contains potassium ferricyanide and potassium bromide. The oxidizing agent converts the image silver to silver bromide which is then removed by fixing in hypo. The reaction of the ferricyanide with the image silver can be shown by the equation:



The metallic silver is oxidized to silver ions, which immediately combine with the bromide ions to form silver bromide, and the ferricyanide is reduced to ferrocyanide. The silver bromide is dissolved in hypo in a subsequent fixing operation.

This may be an oversimplification of bleach chemistry in some color processes but represents a commonly used bleaching bath. A decrease

in the number of solutions in color processing is always a desirable objective. Improved bleaching and fewer solutions have both been accomplished in some color processes by combining the bleach and fix chemistry in a single solution called a "blix" bath. (See Chapter 13)

## RINSE BATHS

It is important to avoid contamination of the various baths used in reversal and color processing. Consequently, it is necessary to make considerable use of rinse baths, even though they increase the number of processing steps and lengthen the time required for the process.

Rinses are used to remove the chemicals absorbed by the emulsion in one bath in order to avoid undesirable effects in the succeeding bath. For this basic purpose, plain running water is quite efficient. Frequently, however, certain chemicals may be added to a rinse to make it more effective in stopping the action of the previous bath and in neutralizing or removing certain of the chemicals.

In negative and print processing, an acid stop bath is often used to stop the development action quickly and uniformly and to keep the alkaline developer from affecting the hardening action of the fixing bath.

In reversal processing, each chemical operation is usually followed by a water rinse with the exception of some color processes, e.g. E-6 Color Process. However, following the dichromate bleach used to remove the image silver formed in the first development, a solution of sodium sulfite or sodium bisulfite is employed to react with any residual dichromate which would interfere with the action of the second development. A rinse bath used for this purpose is known as a "clearing bath." The chemical composition of this bath depends upon the processing cycle, particularly the type of bleach bath used. It is therefore imperative to use the clearing bath or other rinse baths specified in any particular process.

In the black-and-white reversal process, practically all of the silver halides are exposed and developed in the first and second developers. Therefore, a fixing bath is not required for removal of undeveloped silver halides as in negative-positive processing cycles. Following second development, however, a rinse bath is required to neutralize the alkali from the developer and to harden the gelatin in the emulsion to make it more resistant to subsequent handling. The bath used for this purpose is frequently a conventional acid hardening fixing bath.

# HAND PROCESSING WORKSHOP

## MATERIALS

### \* DEVELOPER:

Dektol - D19 - for higher ASA

-mix as directed on package  
-dilute concentrate : water : 1 : 9

### REVERSAL BLEACH:

Kodak B&W Reversal Bleach R-9  
-should be available at Kodak  
-use full strength  
-Water 1 L. / Sodium Dichromate 9.5 g. / Sulfuric  
Acid 12 mL. - *from 100 mL*

### \* CLEAR BATH:

Sodium Sulfite and Water CB-2  
-Sodium Sulfite available at darkroom/photo shops  
-250 grams Sodium Sulfite to 1 litre water  
-use full strength

### FIXER:

Kodak or Ilford Rapid Fixer with or without  
hardener  
-mix as directed  
-use full strength

### WETTING AGENT:

Kodak Hypoclear or Ilford Wetting Agent  
-use as directed for film  
-avoid bubbles on surface

### TONERS:

Berg Colour Toning/Tinting Systems  
-2 parts - bleach & toner  
-mix as directed on box (1 bottle to 1 litre)

• Someone who can work with the minimum can work with the most.  
One who can with the most cannot, inevitably, with the minimum.  
from NOTES ON CINEMATOGRAPHY by ROBERT BRESSON



**Effects of exposure and development variations in the reversal process.**  
 Left — Result of overexposure or overdevelopment in the first developer.  
 Center — Correct exposure and development.  
 Right — Result of underexposure or underdevelopment in the first developer.

### CONTROL OF REVERSAL PROCESSING

No one series of reversal processing solutions can be used to obtain direct positive images on all photographic materials. The process must be worked out in detail with respect to solution composition and the times of treatment in each solution for a specific product. Special reversal-type emulsions are manufactured for black-and-white applications, such as amateur movies, and the processing procedure worked out by the manufacturer should be followed closely.

The exposure must be correct. Too much exposure produces a thin picture in which highlight detail is lost, as, for example, in the fine tonal range in the face of a person. Since the positive image must be formed from the silver halides left after the negative image has been developed, it is obvious that overexposure will result in the removal of too much of the silver required for the positive image. Similarly, too little exposure will leave too much silver for the positive image and it will be too dark. Remember that these effects are just the opposite to those obtained in negative development, where overexposure, for example, produces a darker-than-normal negative. There is very little exposure latitude in a reversal process, and the camera exposure must be correct if good results are to be obtained by the recommended processing procedure.

The first development is critical, and it is essential that instructions be followed closely for time of development and agitation. Overdevelopment and underdevelopment give results similar to overexposure and underexposure. The time of development at a specific

temperature will vary somewhat according to the method of processing, e.g., tray, reel and tank, small tanks, or rewind processing equipment, because of the differences in the effective agitation. The published instructions should be considered as a starting point and guide. A few trial-and-error experiments may be necessary to determine the slight variation required to obtain acceptable results with any particular equipment. However, in those cases where the manufacturer has prepared instructions for reversal processing in specific equipment, good results should be obtained if all of the factors are carefully controlled according to specifications.

In most of the steps following the first development, the chemical action should go essentially to completion. Therefore, in black-and-white processing, the control of time and temperature in these steps is not particularly critical so long as the following three general rules are observed:

- (1) Do not allow one chemical to contaminate another,
- (2) Use adequate washing between solutions to be certain that all residual chemicals are removed from the emulsion before it is immersed in the next solution, and
- (3) Allow the full recommended time of treatment in each of the solutions.

In color processing, variations in the conditions of any of the steps are likely to have some effect on the color balance between the three final dye images. Therefore, within the limits recommended for the particular process, the temperature, time, and agitation must be carefully controlled in all steps.

### REPLENISHMENT OF SOLUTIONS

Replenishment of the developers and other solutions can be accomplished successfully if adequate tests can be made. For this reason, replenishment usually is practical only for large-volume continuous-processing operations. For the amateur, it is preferable to use fresh solutions as suggested in the instructions, because exhausted solutions are almost certain to cause unsatisfactory results.

Catalogue # KMM 29415388 <sup>bucket</sup> each label

Film Developing Times and Techniques for  
Kodak Stock 3374 - Panchromatic 16mm  
reversal film stock

1. Developing Reversal

Developer 4 minutes ① <sup>swish</sup>  
 Wash 1-2 minute ② <sup>slowly</sup>  
 bleach 2 minutes ③ <sup>In Complete Darkness</sup>  
 wash 1 minute ④  
 clear bath 2 minute ⑤ <sup>at</sup>  
 wash 1 minutes ⑥ <sup>15secs last</sup>

*put film in bucket*  
*fill to line*  
*black bucket water*  
*CB #8 4L*  
*change water*

RE-EXPOSURE / CHANGE WATER

developer 2 minutes ①  
 wash 1 minutes ② <sup>With lights on</sup>  
 fix 3 minutes ③  
 wash minutes ④

*light on*  
*CB*  
*bucket in sink - constantly flowing*  
*change # 4*  
*sit'n wash (few minutes)*  
 1) take film spool  
 4 arm lengths  
 cut w/ scissors  
 put film back in  
 box  
 set clock

2. Developing Negative

Developer minutes  
 wash minute **In Complete Darkness**  
 fix minutes  
 wash minutes

Dev- developer  
 R9 - bleach  
 CB - clear bath

dunk chemicals  
 turn off all  
 knobs

3774 →

KMM 319505 COKM



### 3. Developing Solarized Reversal

Developer            minutes

FLASH LIGHT

Wash                minute

bleach              minutes

wash                minute **In Complete Darkness**

clear bath          minute

wash                minutes

### RE-EXPOSURE / CHANGE WATER

developer            minutes

wash                minutes

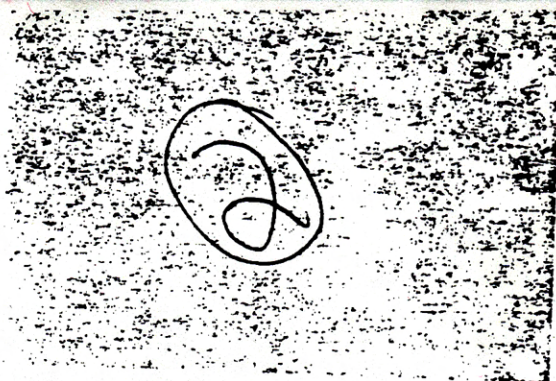
fix                  minutes

wash                minutes

**With lights on**



a little "urination for a blo



## PROCESSING WITH URINE

Processing in urine tends to boost and white reversal film (almost like the urine samples are collected from drinkers, where the potency is great).

Supplies for processing black and white reversal in a urine mixture:

### FIRST DEVELOPER:

1 pack of KODAK D-19  
3.8 Litres of urine X 2 (that's 7.6 Litres in total)  
Sodium Thiocyanate to modify 1st developer --  
this also makes the image a little "brighter" (optional) OR

### SECOND DEVELOPER

1 pack of KODAK D-19  
3.8 Litres of urine

### EVERYTHING ELSE

Bleach, Clearing Bath (or vinegar mixture, or rinse in water many many times), Fixer, and some photoflo to mitigate streaks.

### Mixing the Developers

In two separate containers, pour 3.8 Litres of urine. In order for the D-19 crystals to be able to dissolve completely, you will need to heat the urine in a pot on the stove or in a microwave. I use the stove to heat the urine, as I prefer to use a non-porous, metal container. The urine doesn't need to come to a rolling boil, but it does need to be VERY hot. (It's similar to making jello; if the liquid isn't warm enough the crystals won't entirely dissolve, leaving a gritty residue at the bottom of the container and the overall mixture less potent than it ought to be.)

Then add a package of D-19 to each container, and stir constantly. Don't forget to wear a mask and gloves, since the chemistry tends to splash around a lot.

Once all of the dissolving has occurred, add the liquid sodium thiocyanate to the first developer, if you're using it and stir.

Seal both developers in separate air tight, light-proof containers and let cool to room temperature for standard processing (or you may play with the temperatures for reticulation effects).

Then process as you like.

### SOME THINGS TO REMEMBER:

Wear a mask and gloves.

Don't modify the 2nd Developer with Sodium Thiocyanate.

Store the mixture outdoors if you can, as it has an offensive odor.

Any questions? email me: [tfredexi@sfu.ca](mailto:tfredexi@sfu.ca)

TL Frederick

Also, I should mention that

the outcome is maybe more "sparkly" than glossy what with the whole pH imbalance

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Second main paragraph of text, appearing as a block of faint, illegible characters.

Third main paragraph of text, appearing as a block of faint, illegible characters.

Fourth main paragraph of text, appearing as a block of faint, illegible characters.

Fifth main paragraph of text, appearing as a block of faint, illegible characters.

Sixth main paragraph of text, appearing as a block of faint, illegible characters.

Seventh main paragraph of text, appearing as a block of faint, illegible characters.

Eighth main paragraph of text, appearing as a block of faint, illegible characters.



# BATHTUB FILM PROCESSING & TONING BY GARY HOROVICH

## I. BATHTUB FILM PROCESSING

### INTRODUCTION

You should read all of these notes carefully before you buy any of the items listed. These notes and this system were developed to suit my needs at a particular time and in a particular space...you'll have to do the same.

There are numerous ways to process and tone your own movie film. I chose open trays in my bathtub because it gave me darkness, running water, and most importantly I could work at any time in my own space, at my own pace. I was also interested in working directly with the surface of the film emulsion by using both suggested chemicals and anything available. At the very least you'll usually be putting some scratches on your film when you use this method — my interest was in working with scratches, water blotches, polarization, split toning and image fragmentation. However, if you're careful and adapt this system slightly (for example, using shorter lengths of film, using a rack system and deeper tanks, etc.) you can get lab quality images. In fact, I've often processed clean, pristine images in my bathtub; it's just that this system lends itself to experimentation and an idiosyncratic, personal approach.

These notes are a revised version of workshop notes I first wrote in 1986. The original notes developed out of a series of workshops given by Jeffrey Paull at Sheridan College in 1982.

### THE TOOLS YOU'LL NEED: (EXCLUDING CHEMICALS)

**4 OR 5 PLASTIC TUBS** at least 10 cm deep and about 40 x 30 cm to contain the chemicals, water and film during processing. I use a larger tub for the water — it helps the wash. I put 3 tubs in the bathtub and the others on the floor next to the bathtub (see diagram 1). You'll need 5 tubs if you plan to use a stop bath (more on that later).

**1 WATERPROOF THERMOMETER** (for darkroom use). It should go to at least 50 C. You don't need a fancy thermometer — a cheap one is fine for mixing chemicals (this B&W processing system doesn't require precise temperatures within a fraction of a degree).

**1 PLASTIC FUNNEL** for mixing chemicals and NO OTHER USES.

**1 PLASTIC 2 GALLON PAIL** for mixing chemicals.

**1 LONG PLASTIC OR WOODEN SPOON** for stirring chemicals AND NO OTHER USES.

**1 PHOTOGRAPHIC SAFE LIGHT.** You can buy them in all sizes, styles and colours. You'll have to check the info sheets available on film stocks to determine which colour you'll need. I made my safe light for a few dollars with a simple socket and electrical cord and a few inexpensive light bulbs. It's not recommended but it worked for me — I kept the light at least 4 feet away and covered it with a wash cloth to reduce its brightness.

**PLASTIC JUGS:** 3 or more 1-gallon plastic jugs to store chemicals. You can use recycled jugs (household bleach jugs are good) or buy them for a few dollars each at a darkroom store. You'll need one each for the developer, bleach and fixer. If you use a stop bath you'll need another jug; you might want to store two types of fixer, one with a hardener, one without (I'll explain why later), so you'll need another jug for that. If you're into toning, you'll need a few more jugs.

**TIMER OR CLOCK:** If you feel relaxed and comfortable and reasonably accurate you can just count. If not, use an expensive darkroom clock or an inexpensive watch that glows green.

**A PAIR OF LOOSE FITTING RUBBER GLOVES.**

**A LINE AND CLOTHES PINS:** Clothes line, string, wire — anything on which you can hang your film to dry.

**A SPLICER AND PROJECTOR** so you can watch your images when you're done.

## STOCKS:

You can process most B&W movie film — Super-8, 16mm, 35mm (Kodak, Ilford etc.) I've used mainly Kodak B&W camera and printer stocks. I always ask Kodak to send me their free info sheets on the stocks I use — they give you good starting points for a developer and development times. (Info sheets can also be found on Kodak's website at [www.kodak.com](http://www.kodak.com))

I'd recommend doing tests and making notes so that you can repeat what you do, if you need to. Printer stocks aren't designed for camera use, but they create great high contrast images, and hi con is best for split toning. With most of the printer stocks you'll have to do tests to find an ISO to shoot at (most of them are around 2 to 12 ISO, so if you're shooting indoors you'll need a lot of light. I've used 3000 watts at 4 feet to get a good indoor image).

I'd suggest you process at least a couple of rolls of film before you begin toning to familiarize yourself with the process and provide images to choose from — stuff you don't mind losing (as you become familiar with toning you'll likely watch the emulsion slide off the film a few times).

## EXPERIMENTATION:

You can process neg as reversal and reversal as neg, you can solarize images, you can push and pull development, you can use spray bottles filled with developer to create spotted development. In the beginning you should consider everything you do as a test...experiment, take notes. Film things you care about but that you don't mind losing.

## THE CHEMICALS YOU'LL NEED:

**DEVELOPER:** If you're filming with regular B&W stock check the info sheets for a recommended developer and use it or an equivalent. I use D-19 or other hi-con developers for my hi-con images. I usually put 2 gallons of developer in the plastic tub, and that's enough to do about 400 feet of film or more.

**STOP BATH:** For a few bucks you get a small bottle of stop bath which helps stop development. I don't use it; I wash my images really well after development and don't worry too much about critical development times.

**BLEACH: A REVERSAL BLEACH** — 1 litre of water to 9.5 grams of potassium dichromate and 12 ml of sulfuric acid (concentrated). Stir the potassium dichromate into the water, then add the sulfuric acid. You can find these chemicals locally although they aren't immediately accessible — you're dealing with chemical companies and highly toxic and dangerous chemicals. It's probably a good idea to share reversal bleach with others interested. Again, I'd use about 2 gallons, or about 8 litres, of bleach to a tub. I found I could do between 400-800 feet with this quantity.

**FIXER:** If you intend to tone your film, use a non-hardening fixer; if you don't, use a fixer with hardener to protect and preserve your film. Both are available. Some fixers come with hardener in a separate container that you can mix in. Fixer life is harder to gauge, especially with toning factored in; if you're doing a lot of footage you should have a few packages of fixer around.

Mix the chemicals ahead of time so that they can cool to room temperature before you begin processing. I work with development times based on a room temperature developer (development time decreases as the temperature of the developer is increased).

Leave a bit of space between the different chemicals i.e. between the plastic tubs in your bathtub (see diagram 1) so that you don't splash one chemical into another and contaminate it. I could only get 3 plastic tubs in my bathtub, so the other tubs would sit outside and next to the bathtub.

## GETTING STARTED:

Make sure your bathroom (or work area) is light tight. After a few minutes in the dark you may find a bit of light seeping through a crack in the door or window. If you can see your hands or objects around the room then there's too much light leakage (especially for faster films stocks). For regular camera stocks such as Plus-X, Tri-X etc., it's recommended that you work in total darkness; for slow

printer stocks you can work with the recommended safe light.

Always wear rubber gloves! These chemicals are toxic. I had a little pin hole at the end of my glove that let in reversal bleach, and I thought it was insignificant. My thumb turned prunish and took 9 months to heal, to mention that these chemicals can make their way into your bloodstream. Be careful about splashing chemicals onto your clothes or skin.

## PROCESSING:

**1. DEVELOPMENT:** Determine your development time using the film stock info sheets as a starting point. Reversal is usually processed for about 2-3 minutes, negative about 5-7 minutes. The printer stocks require shorter development times (some require about 3 minutes for neg, or 1-2 minutes for reversal). I've found that printer stocks shot on an optical printer require a longer development than when they are shot with outdoor lighting. Do your own tests.

Set up your darkroom space, get a sense of where things are, then turn off the lights. I take my 100 ft. 16mm roll, or 50 ft. super-8 cartridge, and wind off a portion (you can pull the super-8 out, or break the cartridge open). I usually use 30 ft. lengths at a time because that's what fits comfortably into the tubs of chemicals. If you put too much film into the tub, the film will get tangled and stuck together, causing uneven development (which may be what you want). This system requires that I break off 30 feet indiscriminately and in the middle of a shot — if this bothers you, you can always use bigger tubs and more chemical and do 100 feet at a time.

Once you've broken off the length you will work with, put the remainder back into a light tight can, and dump the mass of film you have in your hands into the tub of developer. Start counting immediately. If you want even development, don't wind your 30 ft. off the reel directly into the tub — gather it up in your hands and dump the whole mass in at once. (It may be awkward at first, but it gets easier with experience.) Gently work with the film in the developer — separating it from itself, submerging it (you may have film sticking up out of the developer). You

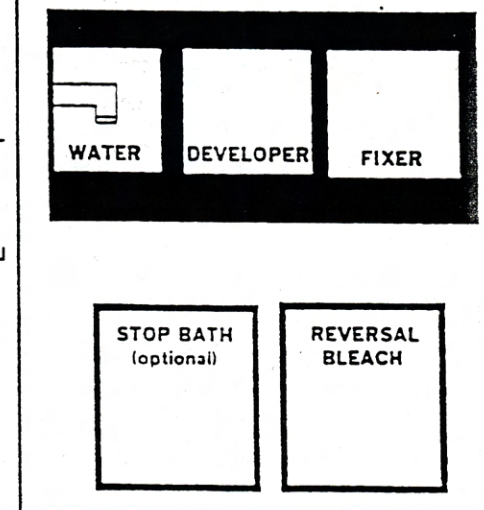
must keep the film moving to provide fresh developer to the surface of the film, because as the developer's chemicals come into contact with film they become exhausted.

**2. WASH:** After development, lift and drain the bundle of film dump it into the water tub. In your wash you should always use run water (room temperature, like the chemicals). Again, gently move a separate the film in the wash. Wash for 1-3 minutes. If you're using stop bath, it cuts down on wash time and can preserve the life of your fixer. I cup this step because of space considerations, and I wash a longer. There's a tendency to cut down the wash time because of impatience — it may mean you allow the film to overdevelop (because of residual developer on the surface of the film) and it could reduce the amount of chemicals that the film goes into next.

Always wash your film before moving on to another chemical.

The next steps depend on what you want — NEGATIVE or REVERSAL images.

\*\*\*diagram 1



## NEGATIVE IMAGES:

**1. & 2.** Develop and wash as above.

**3. FIX:** After the wash, go directly into the fixer. You're still in the dark, or with the safe light on. Check the info sheets for fixer time — it's usually about 5 minutes. The rule for fix time is twice as long as it takes to clear the film (when the milky whites become transparent), which is usually about 2 minutes. Then you can turn the light on for the remainder of the fix time. The fixer clears the film and rids it of chemical by-products and residual developer.

**4. WASH:** Wash again for about 5 minutes. The info sheets probably will tell you to wash longer and it's always a good idea. I often wash for just a few minutes because I'm in a hurry to do a lot of footage and because I'm not worried about the longevity of my images because I'm usually reprinting and reprocessing. If you're at all concerned, wash longer — up to 10 minutes — or use a hypo clearing solution to cut down on wash time, help preserve your film, and save water.

**5. DRY:** Finally, hang your film to dry. It gets all tangled like a mass of spaghetti, so you need a clean surface to do the untangling. I

use newspapers and hang the film to dry on a clothes line strung across the apartment. As the film dries, go back into the washroom and do another 30 feet. It seems difficult and involved at first, but it gets quite easy, and it's really rewarding and a thrill to watch your own images developing.

You can now project, or reprint your negative images. You can also tone them at any time in the future. Remember, a non-hardening fixer works best if you plan to tone your film, and hardening fixer is best to protect and preserve your film.

Finally, a few additional techniques. Instead of dumping your film into the tub of developer, put the film into a dry tub and try filling a s bottle with developer and spraying the surface of the film, then proceed as usual through the subsequent steps. Or try solarizing with the Sabattier technique — mid-way through the development stage, flick your washroom light on and off very quickly, or use a quick burst from flashlight. This will cause a partial reversal of the tones — a stunning radiating effect.

## 2. TONING

I've experimented with different types of toning techniques. Remember, this info I'm outlining is not a rule — it's a system that worked for me. Experiment for yourself. I prefer toning negative hi-con images. You should try various stocks and techniques to see what you prefer — they work differently.

The best type of film to tone is one with a fair amount of density, i.e. blacks. That's what gets toned. Toning can cost a lot of money. The toners are expensive and don't last that long. If you're doing a lot of footage you'll need a lot of toner to ensure that all of your film will be submerged, or at least enough to swish around periodically and get a good potent colour to take to the film.

What follows is a rough sketch — there is no one method. The process involves looking, studying, guessing, chance and repeated attempts. Experience and note taking are your guides.

### BATHTUB FILM PROCESSING (CONT):

#### REVERSAL IMAGES:

**1. & 2.** Develop and wash as above.

**3. BLEACH:** After development and wash, transfer the film to the bleach, and gently move and separate the film. Bleach for 30-40 seconds. Don't splash — remember, this chemical is extremely toxic, so don't get it into your eyes, nose or mouth, or onto your skin. If you do, wash it off immediately.

**4. WASH:** Transfer the film back into the water. You may now turn on all the lights. Wash for 2-3 minutes. Your water will be quite yellow — I dump it entirely at least once through this wash cycle. Your film will look pale milky white. Don't worry, you haven't lost the images.

What you have done is developed the exposed silver halide particles and turned them black, then removed them through the bleach stage. So what you have is clear transparent areas, and milky white areas. The milky whites are the unexposed silver halide particles.

**5. RE-EXPOSE TO LIGHT:** After washing, remove the film from the water and hold it near a regular light bulb for about one minute. You are exposing the rest of the unexposed silver halide particles on your film.

**6. SECOND DEVELOPMENT:** Next, dump the film into the

developer again. I use the same developer (yes, you are working with the lights on now). You are developing the remaining silver halide particles you just exposed to light, turning them to dark silver. The hi-con stocks take only a minute or so; other stocks take a few minutes. It's a process you can watch, so you can determine when your blacks are black enough.

**7. WASH AGAIN** for 3-4 minutes. You now have dark area clear areas, in a reversal image.

**8. FIX:** Then put your film into the fixer. You don't really need to agitate the film much in the fixer — just a few times is sufficient — but you usually have to sit there with it to make sure all the film is submerged. Fix for 1-2 minutes.

**9. FINAL WASH:** for 5-10 minutes.

**10. DRY.**

Once you've done your entire roll of film and dried it, splice the processed lengths together. The first batch goes onto the empty reel first — and remember that the image feeds into the projector upside down, emulsion facing out. (If you wet your fingers or lips and touch the film surface, the emulsion is the sticky side.)

**YOU SHOULD ALWAYS DOUBLE SPLICE THE FILM.**

#### FINALLY:

##### PROJECT YOUR FILM

It takes just over an hour to actually develop 100 feet. The whole process, though, is long and takes a lot of work. I find I need anywhere between 6-12 hours at a stretch to feel good about what I'm doing, since it takes a long time to set up and get organized and it takes time to clean up (stains in the bathtub etc. can be removed with cleanser, water, brush). If you can keep some of your tools set up you can work for shorter periods, on and off.

Remember, this is my method. Yours might be different, tailored to your own needs. Experiment and be prepared to lose work and (seemingly) to waste time. It's all part of the process

Finally, this is all technique. At first you may be able to dazzle people with your images, but it can become empty technique without thought and feeling involved. That's where your own personal investment has to come into play.

# THE TONER

**TONERS:** I use Berg toners in sepia, blue, gold and copper. You can buy 1 quart or 1 gallon boxes. Warning: the Berg Colour Toning System is actually a box of multi-coloured tints; tints are dyes that colour the clear areas of your film. Toners chemically transform the black silver of your film into another chemical/colour.

**ABOUT 4 PLASTIC JUGS:** for containing the toner bleach and the toners. I recommend 1 gallon jugs — even if you don't buy the 1 gallon boxes of toner, you may do so in the future (it's more economical).

**3 CONTAINERS: FOR TONING.** I've used different systems. The best for me is 3 plastic garbage pails (about 2 feet tall) with lids that can be fastened shut. I use 3 different coloured pails for the 3 different toners I'm using. You can use smaller containers, but I find I need this size. I like to work with about 30 ft. lengths of film.

**1 PLASTIC 2 GALLON PAIL:** you already have this.

**1 TUB FOR DEVELOPER:** you already have this.

**1 TUB FOR FIXER:** you already have this.

**WEIGHT:** Something to keep the film submerged in the plastic pail (I use a 400 ft. super-8 take-up reel).

I only buy the sepia toner for the toning bleach included in the box; I like the other colour toners better, and find less use for the sepia. This sounds like a waste, but the other toners have no bleach included in the box. I have been able to purchase an order of bleach alone in the past because I made a very large order of chemicals — try asking around. Kodak sells a separate toner, but I personally don't like it much; it seems less potent. You can also mix your own toner bleach (I tried but didn't find a formula that worked for me).

## INSTRUCTIONS:

### USE GLOVES!

Mix the toners according to package directions (later you might want to experiment with greater degrees of potency).

Mix the bleach.

Put each of the toners in separate pails. You don't need to keep these three toner pails in the washroom at all times — it gets cluttered so I carry mine back and forth (see diagram 2).

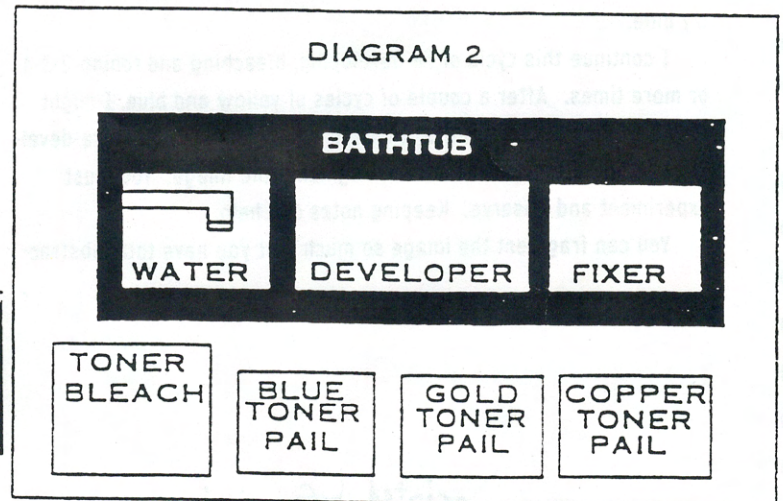
I start by submerging my film in the pail of bleach, using a super-8 take-up reel to keep all the film submerged. The blacks must be turned to a sort of beige colour. This takes a long time the first time you submerge a particular piece of film — anywhere from 5-20 minutes, sometimes more. The time depends

on the stock and the density, as well as the strength of the bleach. The bleach lasts a long time but it does diminish in strength; once it starts taking 30 minutes or more to work it's time to dump it. You might have to re-arrange the film in the pail of bleach — sometimes the film sticks to itself so tightly that the bleach can't get into some spots to change the black to beige.

Once you've transformed all the blacks to beige, pull the film out, drain it and wash for a few minutes.

Then put the film into one of the toners for about 5 minutes or so. You can then wash for 1-2 minutes, dry, and project your film. You will have whites, and the black will have been replaced by the toner colour you chose.

DIAGRAM 2



## TONING (CONT.)

You can continue the process. When I begin, I often start with yellow because blue can be too powerful to begin with. In yellow, the film will turn a brownish colour in the first few minutes (it gets more intensely yellow the longer you leave it in the toner).

For the first round of toning I usually leave the film in for a few minutes, then remove it and wash. I then put the film into the developer for just a few seconds — I can't say how long exactly. Sometimes it's 10 seconds or so. The developer will take the toner out and start returning some of the blacks. Quickly remove the film from the developer and wash it. This process will give you split toning and image fragmentation later.

I then put the film back into the toning bleach, which takes away the blacks that have re-appeared and prepares the film for retoning. This bleaching usually takes only a couple of minutes.

Wash again. Now place the film into another coloured toner — try blue.

I continue this cycle of re-developing, bleaching and toning 2-3-4 or more times. After a couple of cycles of yellow and blue, I might reverse the process. That is, I bleach first, then wash, then re-develop, wash, and tone. This further fragments the image. You must experiment and observe. Keeping notes can help.

You can fragment the image so much that you have total abstrac-

tion. Sometimes the emulsion just slides right off (not often). Sometimes the film becomes so heavily scratched that you lose the image. Again, experiment.

Once you feel you've done enough to the image, stop. Wash for a few minutes, dry and project it. You can always continue the process at any time in the future.

If you feel that the image is too dense — i.e. it's thick with developer residue, toner and by-products — you can thin it out. A good test is to see if you can look through the image. Is it semi-transparent? If it's not, if you can't see through it even though it's coloured, the projector light will not be able to pass through and the screen will be dark. By placing the film in the fixer briefly you can thin out the film. If it stays in the fixer too long you lose your image — it slides right off or thins right out. I often fix the film for a few seconds, rinse, and try looking through it again. If it's still too dense, try fixing again. You might lose a few before you get it right; your eye must become experienced.

**N.B. AFTER YOU'VE FIXED THE IMAGE YOU CANNOT TONE IT AGAIN. SO MAKE SURE YOU'VE TONED AS FAR AS YOU FEEL IS NECESSARY BEFORE DOING THIS. IF YOU TRY TONING AGAIN AFTER YOU'VE FIXED YOU'LL LOSE THE EMULSION — IT COMES RIGHT OFF.**

printed before in:



(Reprinted from April 1995, Vol. 14  
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here's my portrait:

010101  
010101  
010101

good luck  
gary

Gary Popovich may be  
contacted through LIFT  
in Toronto.

# SECTION THREE

*Breathing Life  
Into Your Film*

RECEIVED

THE STATE

of New York  
into your file

# Tinting and Toning

by Marty Bennett and Christina Zeidler

Tinting and toning are chemical processes which add colour to your film, usually to black and white material, but experiments with colour film will provide interesting results as well. The principal of toning is that the chemicals on the film (the emulsion) are loosened from the base of the celluloid and then tone (colour) is introduced. This puts colour into the blacks effectively replacing the black with colour, e.g. a red and white image. Tinting puts colour on the entire image, e.g. a black and red image effectively staining the entire image. Well that's the theory.

Our introduction to tinting and toning originated at Phil Hoffman's Experimental Film Workshop. See Phil's article "Fish in the Sky". On returning from Mount Forest and equipped with all the inspiration imbued from that experience we decided to hand colour the footage we shot. What follows is not in any way a comprehensive examination of tinting and toning but rather a brief account of our summer experimentation with this process.

As well as shooting our own footage we had worked on a little project together called "The Ungnome" based on our experience of camping at a trailer park/golf course for a week. We thought this would be perfect because it was only 5 mins of footage. "Why bother editing first?" we thought, "we can always decide later what to use." We later found that tinting and toning is a labour intensive project like no other and it can get tedious as well as expensive...make sure you edit first or as much as you can.

We set up our lab in Marty's garage. The garden hose proved a more than adequate water supply and we purchased a dozen reasonably air tight containers (1 liter or larger, yogurt containers will work too) for mixing chemicals, rubber gloves, stir sticks for mixing and for jiggling the film in the chemicals, a clothes line with attached paper clips for drying and of course the berg colour-toning system which we purchased at Henry's-shop around for the best deal. In addition we purchased the berg copper toner and the berg blue toner which are sold separately. The total cost for the set up was less than 100 dollars and we probably coloured about 600 to 800 feet of film. Follow the mixing instructions on the package, we mixed everything in two batches in order to preserve the chemicals longer.

O.K. this is totally pedantic but it completes the picture. This is the basic recipe for success: break off a short section of film. If toning with a one-step chemical, put it in, let it sit, then stir, checking it all the time then take it out and wash. If using the berg toning system, put film in the activator, wash it, put it in the colour, then wash again. If you wanted to only tone with the berg system it goes straight into the colour then for a wash. How long??? How many times?? Well that all becomes part of the process. After the bath the film can be hung to dry on a clothes line...quite literally. Just loop the sprocket hole through a paper clip (bent slightly to form a J) and attach the paper clip to the clothes line. Voila!

There must be other companies ...but all we could find was berg. The berg colour toning system can act both as tinter or toner depending on if you use activa-

tor (the chemical which lifts the emulsion from the base) or not. The system comes with separate bottles of colour (blue, red, green, yellow, red, violet) and activator. We found that with most of the colours you had to use the activator even if you just wanted to tint. You have pay attention to how long you leave some thing in the activator or your image could entirely lift off the emulsion. This process is incremental, greys first and so on so it can provide amazing results. Experiment.

We were not happy with most of the colours in the system package and mixing the colours does not work like normal colour theory. But you can mix the colours. You can do something called a duotone (two colours) but the ones you are supposed to do it with we didn't appreciate...violet in the whites with green in the tone...blughhhh.

This is where most of our experimentation happened. We went duotone/colour mixing mental. We would approach it like, "let's make orange" (a seemingly impossible colour with the berg combo plate) and then go crazy trying to get it...and we did. Our favorite colours in this respect were: yellow (please note the yellow must be mixed at a stronger concentrate and you must use activator to make it take) yellow was always a good base or mixer colour and the copper toner which could rescue any colour disaster with a couple of seconds worth of dipping.

The Copper and Blue toners (there are also sepia and yellow but we stuck to these two) are strictly toners. The chemicals come all in one and it does the activating itself but more gently than straight activator. The blue is fairly straight forward but in the copper if your film is left in too long the greys will start to fall off the effect is as though the film becomes slightly solarized, again be careful you don't lose the image altogether! We did most of our experiments with high contrast black and white film. Which would enhance the solarized look. We often tried to get more out of our exposure with this which works to a small degree. In all cases you can control the amount of saturation or activation by watching the chemicals closely and rescuing your film at the appropriate moment. You can also use household bleach instead of activator in the berg colour toning system process which proves both mercileous and beautiful. You can also "adjust" the picture by rubbing the film in this state.

Other crazy experimentation happened with: painting on the film with un-mixed toner, using permanent markers at various stages in the process, using rubber cement and scotch tape to block sections from being effected, and a strange experiment with beet juice and mould which the jury is still out on.

Hand processing and hand colouring require acceptance of a rule not usually associated with filmmaking -your film is not precious. This loss of control, this fearless handling of the material is where the process begins and the beauty is revealed. But this mystical process can lead to your best footage being wiped out of memory for all time...oh well.



WARNING:  
RESULTS MAY  
APPEAR UNEVEN!

The process becomes one of trial and error are extremely vulnerable to the laws of chance cially if you work out of a garage. So we decided the process dictated that we must include variables like timing, chemical exhaustion, contamination temperature (heat wave) memory failure and p even drunkenness -it was summer after all and from the "lab" consisted of trips to the back yard drinking beer while we waited for the chemicals adhere to the celluloid or often waiting for them slide off.

Fixing: we didn't do this very much but you Washing: a slippery issue because it is part of y variables. It is best to wash in-between each st order to preserve the chemicals but if you don't enough the film will continue to be contaminated you wash too much it will often result in a loss o colour...best to pay attention...re-tone things that etc. Disposal: also a sticky issue, we now own a pile of fairly toxic containers...any suggestions?

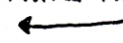
We would often rent the cineviewer and win from LIFT so we could view our progress in the garage, we should mention that we were not appri tive of our results until we saw the material proje Then we experienced the sense of exultation at ou efforts.

For more detailed information please consult "Bathtub Processing" by Gary Popovich (available a the LIFT office). His explanations are very good a very accurate. But we disagree with the last part o the article: he argues that with out content this process is empty, we argue that nothing is empty if this process, it will lead you.

From: "christina zeidler" <muddyknuckles@hotmail.com>



This article was first printed in





# Cameraless Animation

BASIC TIPS!

Get clear leader from an editing supply shop, or find old film and dip in household bleach and water until the images fade all away.

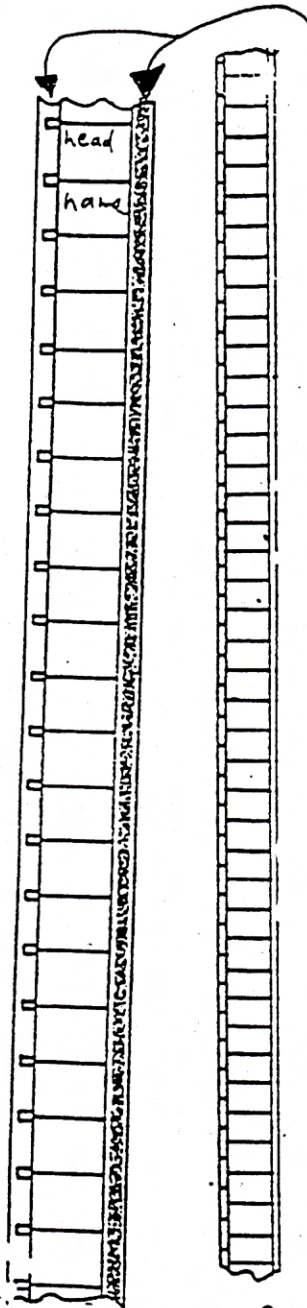
Or scratch into coated films.

Use permanent markers (not water based.)

① Keep the sprocket holes on the left and work from the top down (otherwise your doodles may be backwards or upside down).

② There are **24** frames in a second.

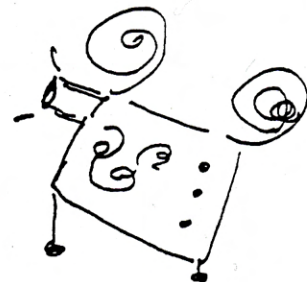
③ Keep checking your film by holding it up to the light or a window. Anything opaque will project as solid black (because it will block the light from the projector).



④ Note the two margins (for sprocket holes and a soundtrack). A projector will not project the area reserved for a soundtrack (even on a clear film without a soundtrack).

⑤ WATCH OUT!! Anything that peels off, flakes off or rubs off after it dries MAY WRECK YOUR PROJECTOR!

④ notice the frame lines

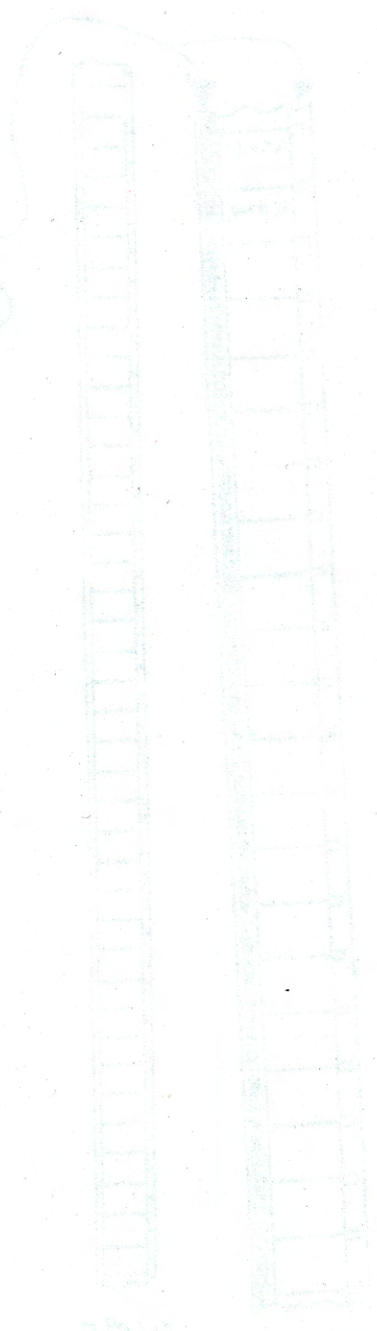


← you'll need a working projector to see it  
BIG

Helen Hill

# Camera Obscura

Use a cardboard box with one end closed. Cut a hole in the closed end. Cover the hole with a piece of translucent paper. Use a ruler to draw a grid on the paper. Use a sharp knife to cut out the grid. Use a sharp knife to cut out the top of the box. Use a sharp knife to cut out the bottom of the box. Use a sharp knife to cut out the sides of the box. Use a sharp knife to cut out the front of the box. Use a sharp knife to cut out the back of the box. Use a sharp knife to cut out the top of the box. Use a sharp knife to cut out the bottom of the box. Use a sharp knife to cut out the sides of the box. Use a sharp knife to cut out the front of the box. Use a sharp knife to cut out the back of the box.



1. Keep the camera obscura in a room that is dark. The light from the scene outside will pass through the hole and project an inverted image on the opposite wall.
2. There are two types of camera obscura: a simple camera obscura and a camera lucida. The simple camera obscura is a box with a hole in one end. The camera lucida is a box with a lens in one end.
3. Keep the camera obscura in a room that is dark. The light from the scene outside will pass through the hole and project an inverted image on the opposite wall.
4. The light from the scene outside will pass through the hole and project an inverted image on the opposite wall.

Use a sharp knife to cut out the top of the box. Use a sharp knife to cut out the bottom of the box. Use a sharp knife to cut out the sides of the box. Use a sharp knife to cut out the front of the box. Use a sharp knife to cut out the back of the box. Use a sharp knife to cut out the top of the box. Use a sharp knife to cut out the bottom of the box. Use a sharp knife to cut out the sides of the box. Use a sharp knife to cut out the front of the box. Use a sharp knife to cut out the back of the box.



Hand manipulation tips from Jen Proctor,  
Austin Cinemaker Co-op  
[canetoad@mail.utexas.edu](mailto:canetoad@mail.utexas.edu)  
[www.cinemaker.org](http://www.cinemaker.org)

Accidents are the one of the most exciting contributions that can be made to handcrafted film. I love to work on my hardwood floor after my cat's been rolling around on it, just in the hope that I might pick up some cat hair or bug legs or dirt on the film surface. Often, these bits of otherwise unwanted junk create spectacular textures or shapes, or become useful discoveries for creating layers of color or interactions of movement. I never put my film away when I work on it. I always leave it out and am sure to let the ends sweep across the floor as I paint each frame. Following are a few tips and discoveries I've made through my art of carelessness.

1. The basic materials I like to use: india ink of various colors, paintbrushes, Fresh Wildflowers scented Clorox (a little easier on the nose), q-tips, toothpicks, fingertips, masking tape, x-acto knives.

2. Other materials I like to use:

Vegetable oil. One of my favorite discoveries. Vegetable oil (or other oils, I'm sure) is wonderful for creating layers and depth between applications of ink. Put a layer of ink down on the film, let it dry, then apply the oil. Let it sit for a while, then add another layer of ink. Blot it dry with a tissue after a few minutes. The oil is thick enough to make one layer of ink feel like it's floating above the other when projected, while not so goopy that it damages the film or projector. You can also apply ink directly into the vegetable oil for interesting swirls and other effects. Or any variation of the above.

• Salt. Another favorite discovery. Sprinkle it on top of wet ink, and the salt will suck up the liquid. The result is wonderful, tiny sunbursts or explosions within the ink, little crackles and crunchy bits of texture.

• Beading needles. Great for intricate, detailed scratching on film. Purchase a fine needle at a bead store and insert it into the eraser of a pencil. X-acto knives also work for larger, rougher scratches.

• Spray paint. Creates fantastic sprays of color and texture, sometimes with a fine, subtle spiraling effect. The drops tend to be quite varied in shape and size, so the effect is one of depth and layers, with some drops seeming out-of-focus.

• Toothbrushes. Also good for spray/rain effects. Dip an old toothbrush in ink, then run your fingertip (or fingernail) across the bristles to spray the ink onto the film surface. Creates nice, small blobs of color.

• Ink dropper. When using ink with a dropper top, squeeze almost all the ink from the dropper until just a film remains. Squeeze the last bit out as a bubble on to the frame's surface, and let the bubble pop on to the film. Creates an even circle of color with a thick ring around the edge.

• Sandpaper. Wonderful for grainy scratches and scratches that follow each other in movement across the frame. Also creates interesting curved maze-like textures when combined with ink.

· Sponges. Like fingerprinting when you were a kid, sponges can be used for fun blots of unpredictable color and design, especially when multiple shades of ink are used on one sponge.

· Masking tape. Of course, this is the wonder tool for painters of all kinds. It's perfect for masking off a section of the frame and bleaching or painting around the rest. You can do almost anything to the rest of the frame and the masking tape will not let the ink or bleach bleed through.

Reticulation. Reticulation is my favorite part of working with india ink. For the most part, I've only managed to find black ink that cracks in those wonderful webs of movement, and even then, only really does it for Higgins me. Dr. Martin's tends to coat on more evenly and thinly, with less cracking. Over time, Higgins will continue to reticulate, causing your film to evolve and change and grow before (or without) your eyes. I love it.

India ink. Vs. Drafting ink. India ink goes on unevenly, with a blotchy consistency, tending to pool in some areas and fade in others. This can be fantastic if you desire randomness and unevenness in texture. India ink also rests on top of the film so it can be scratched or used to block light from getting through the projector. The flip side, of course, is that it tends to scratch easily inside the projector and can flake off over time.

Drafting ink, on the other hand, absorbs into the celluloid, creating an even, translucent slice of color. Drafting ink is useful for coloring without changing the texture of the film's surface. Food coloring can be used in a similar way to drafting ink, though it's not as vivid.

My philosophy in handmade film is raid the pantry and see what you can discover. It's amazing what brilliant effects can be created using items just sitting in your fridge (especially those that have been there a long, long time). Let your mind go, drift into that hand-painting meditation, and your finished work will likely become a startlingly beautiful document of your grocery list.

# RETICULATION

Michael Teres

Reticulation is commonly viewed as a processing error caused by extreme changes in the temperature of film developing solutions. The result is a pattern or texture, a crinkling of the gelatin emulsion, and a migration of the silver particles, which clump together into varying patterns.

Reticulation need not always be a mistake. In fact, it can be used as a deliberate technique to create textures and manually distort the photographic image. It is one means of shifting from the traditional "taking" of photographs to the "making" of images through post-visualization. You can select individual frames from normally processed film and determine the type and extent of reticulation desired. The film may even be several years old. You can use a normally developed negative and perform a series of distortions upon it, producing a variety of effects in the final print.

As the negative reticulates — as it begins to dissolve — an entirely new range of images begins to appear. There is the excitement of discovery in working with the dissolving images. As the original photographic reality begins to disappear, a new image with its own reality emerges. The dissolution can be halted and fixed into a picture.

As the emulsion dissolves, the manipulation of some of the areas on the negative distorts the traditional ground line and disturbs the normal orientation of figures in space. The resulting illusion is of a free-floating, other-worldly space. Rather than the commonly accepted reality, the resulting image implies additional dimensions of reality. It hints at philosophic concerns and points to a mythic reality.

Traditionally, a photograph stops time, interrupting the flux of visual sensations and fixing a moment into an image. It dematerializes the three-dimensional world and re-creates it as a thin emulsion. My images are moments of transition in time. Through reticulation, they move from the static scene captured by the camera through a fluid state freed from time and arrive evolved into something new, the normal time-space relationship having been altered in the process.

Reticulation is the photographic process that best expresses my image-making concerns. The personalization of a process is a vehicle of expressive content, often a content that cannot be articulated without the medium at hand. Through reticulation I can arrest the image that before I could only sense.

# What Is Reticulation?

The process of reticulation is somewhat unpredictable. In fact, totally different results may occur on each negative from the same roll of film. Often this unpredictability is caused by variables that cannot be controlled: manufacturer's changes in film emulsions, minor variations in the strength and activity of the developer and fixer, contrast and brightness range of the subject matter, temperature loss of the reticulation solution or variations in the individual negatives used. Despite the variables and the unpredictability of the process, several stages occur often enough to become categories: simple reticulation, radical reticulation, veiling, and differential reticulation. Each is an extension of the same basic process — simple becomes radical, radical can

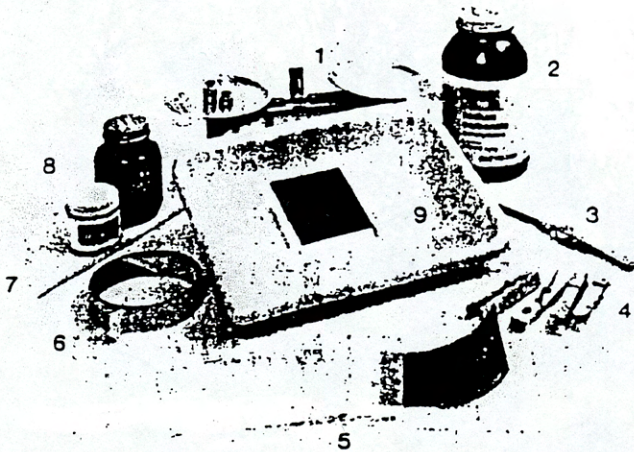
become veiling, and differential can be any of the three.

All the images and information presented here result from the use of Kodak Tri-X 120 roll film. Although all manufacturers incorporate hardeners into their films to prevent reticulation, the process will work with most films. The film may even have been processed several years ago. The older the film, however, the harder the surface and the more limited the potential for variations of reticulation patterns. Film type, developer used, hardening or nonhardening fixer, the temperature and concentration of the reticulation solution, and the length of time between film development and reticulation attempts will influence the end result.

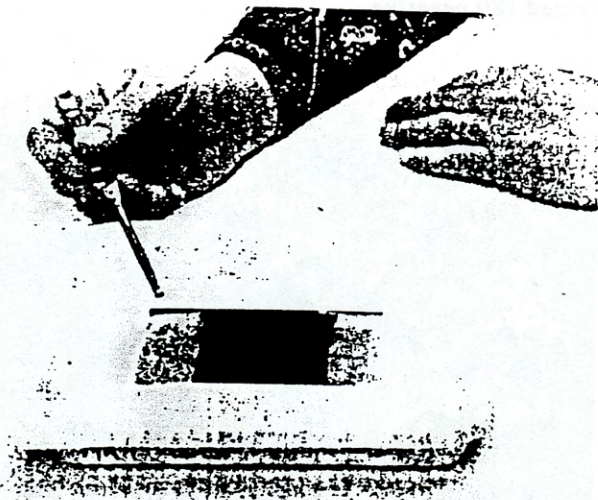


*This simple reticulation pattern could have been caused by temperature fluctuations in*

*processing baths. Slight reticulation is often mistaken for graininess.*



*Materials necessary for reticulation.*



*Immerse the negative in hot sodium carbonate solution to begin reticulation.*

## The Materials

Materials needed for reticulation, beyond those necessary to process your film, include:

1. Gram balance or scale
2. Sodium carbonate, available in most photo stores
3. Tweezers or small tongs
4. Clothespins
5. Small sheets of thin Plexiglas or glass
6. Masking tape
7. Spotting or #0000 artists' brush
8. Maskoid or rubber cement
9. Small plastic darkroom tray

SATURDAY JUNE 15

2-4 processing  
Jas J

# Simple Reticulation

Simple reticulation is an overall pattern in which the film emulsion stays intact; it is the reticulation often referred to and illustrated as a processing fault. The procedure begins with a fully developed, fixed, washed, and dried negative.

**Mix the reticulation solution** in a small tray: 30g of sodium carbonate in 500ml of water at 60°–65° C. I use an electric coffee pot as a source of constant-temperature hot water. The useful range of temperatures for the sodium carbonate bath is from 40° C to about 70° C. Lower temperatures take long periods of time; higher temperatures deform the plastic film base, which prevents the negative from staying flat during printing.

**Attach the negatives**, singly or in strips, to a piece of thin Plexiglas at least 2cm larger than the negative in both dimensions. This is to facilitate immersing the negative in the sodium carbonate solution. Use masking tape on one long edge only. Work with the largest film size that you can. Negatives 6x7 cm or 6x6 cm (2½" square) are large enough to allow visual appraisal of the work in progress. If you are working with 35mm film, cover both sets of sprocket holes with masking tape to prevent the reticulation pattern from becoming too active in the area in which the holes are punched.

**Immerse the film** in the hot sodium carbonate solution and watch as the liquid almost immediately begins to cloud. A slime will appear on the surface of the film and rise to the surface of the solution. This is a protective coating on the emulsion. In most cases the loss of this coating is inconsequential, but with some films its removal produces a visible density difference and texture in the printing.

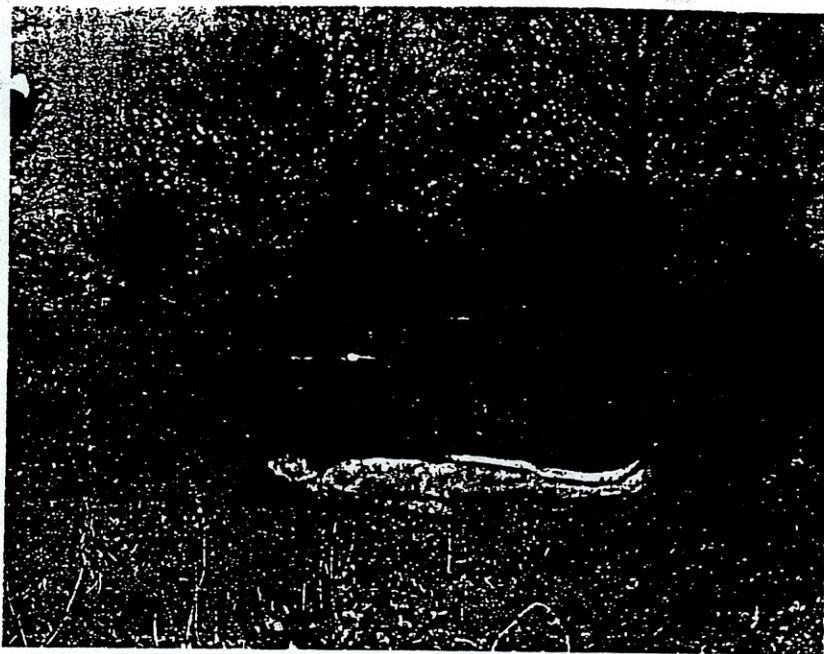
With films that have not been fixed in an acid hardening fixer, simple reticulation can be



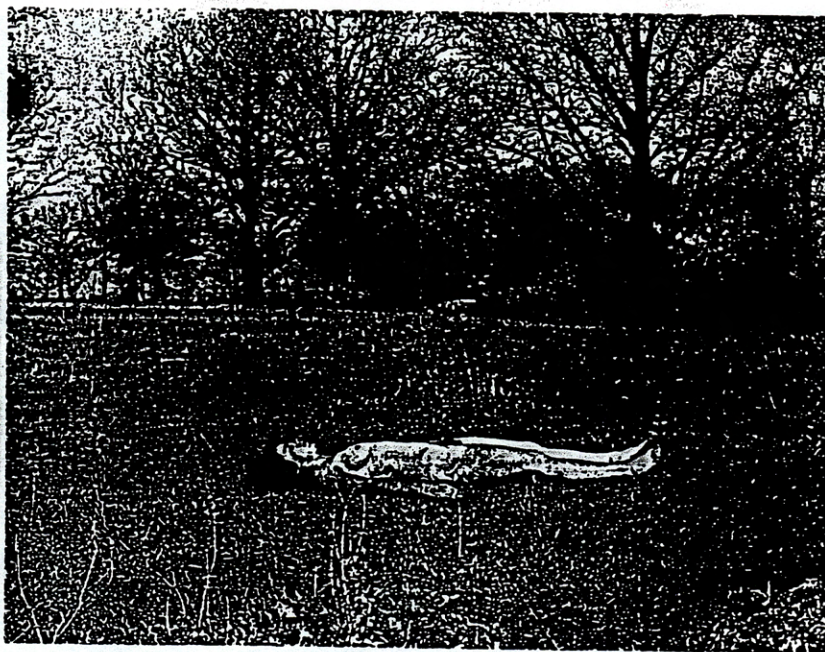
*This print was made from a normally processed 120 negative.*



*Upon immersion in the sodium carbonate solution, the protective gelatin layer dissolves.*



*The earliest stages of simple reticulation show a slight texture.*



*Texture becomes pattern as the alteration becomes more apparent.*

achieved by soaking the film in plain water at about 65 ° C. Since there is no danger of radical reticulation, the film can be left in the water until it cools, then hung up to dry. The resulting pattern is much finer than would occur using a sodium carbonate solution.

As the size of the reticulation pattern is ordinarily about the same for all films, it is important to establish your own limitations. Reticulated 35mm film may be enlarged only so much before the overall pattern becomes overwhelming, whereas 4x5 film may need to be greatly enlarged before the pattern becomes visually effective.

Not all films react to the sodium carbonate solution in the same way, and not all films reticulate readily. Kodalith will not reticulate, nor will most copying films, such as direct duplicating film. I have had most success using Kodak Tri-X, although it is possible to use Plus-X and Panatomic-X. There are some problems with these alternates. In some cases, the rapid dissolution of the film as it begins to reticulate thins the density or quantity of silver in the emulsion until it becomes difficult to print. Tri-X seems to resist this dissolution best.

Leave the negative in the solution from five to twenty minutes, depending on the magnitude of the desired pattern. If you want a simple pattern that permeates the film as a very fine texture, five minutes will suffice. If the desired pattern is larger or more exaggerated, up to twenty minutes in the sodium carbonate solution may be necessary.

Rinse off the negative in cold water when you have achieved a satisfactory reticulation pattern and hang it up to dry.

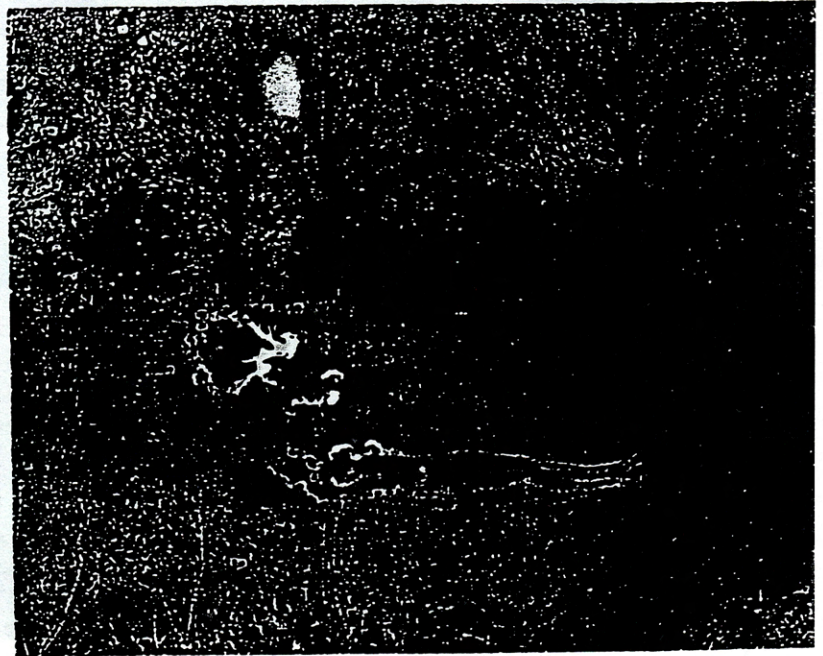
It is helpful to make your measurements of chemistry by weight instead of volume, and to use identical developer, fixer, and processing procedure for all of your film in order to have more consistent results in spite of the variables and unpredictability.

# Radical Reticulation

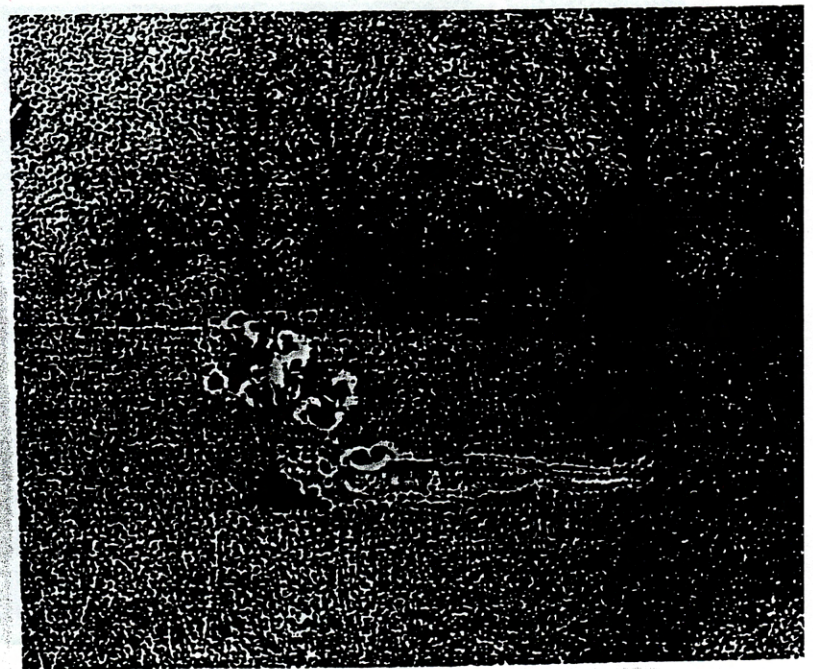
Radical reticulation results when the pattern begun as simple reticulation becomes so large that areas begin to dissolve and there is a physical breakdown of the emulsion. The image then becomes liquefied and movable, and part of the emulsion may detach or dissolve.

Use a weaker concentration of sodium carbonate for a radical reticulation. A solution of 15g of sodium carbonate in 500ml of hot water works best. After two minutes, the film will begin to soften and lie flat, and the protective gelatin coating will begin to disintegrate and float away. Gradually, the emulsion itself will begin to melt and dissolve. This second softening or blistering of the emulsion is the critical point. If your timing is wrong, even with supports, the image will be lost. The support piece of glass or plastic slightly larger than the film is useful and sometimes necessary. When the emulsion begins to liquefy, it can easily slip off the base because of pressure from the surface tension of the solution. The glass acts as a rigid backing and allows you to break the liquid with its edge so that the film can stay on its support.

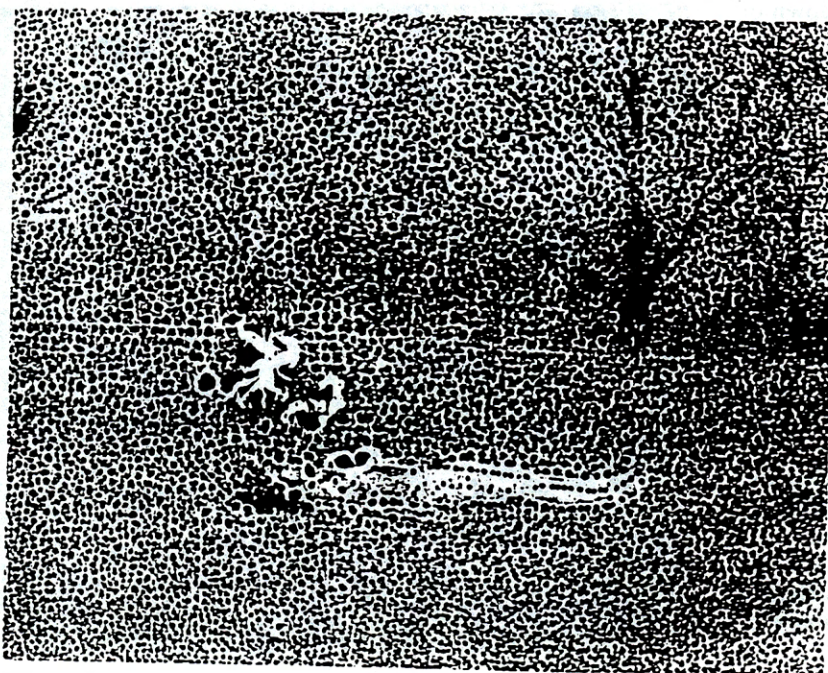
Time and temperature are the controlling factors. In a very weak solution of 7.5g of sodium carbonate to 500ml of water, Tri-X Pan Professional will begin to dissolve and flow in approximately five to ten minutes, whereas ordinary Tri-X will have achieved only a moderate to fine textural pattern in the same period of time. The ordinary Tri-X takes about twenty minutes to reach the point at which it will flow and dissolve.



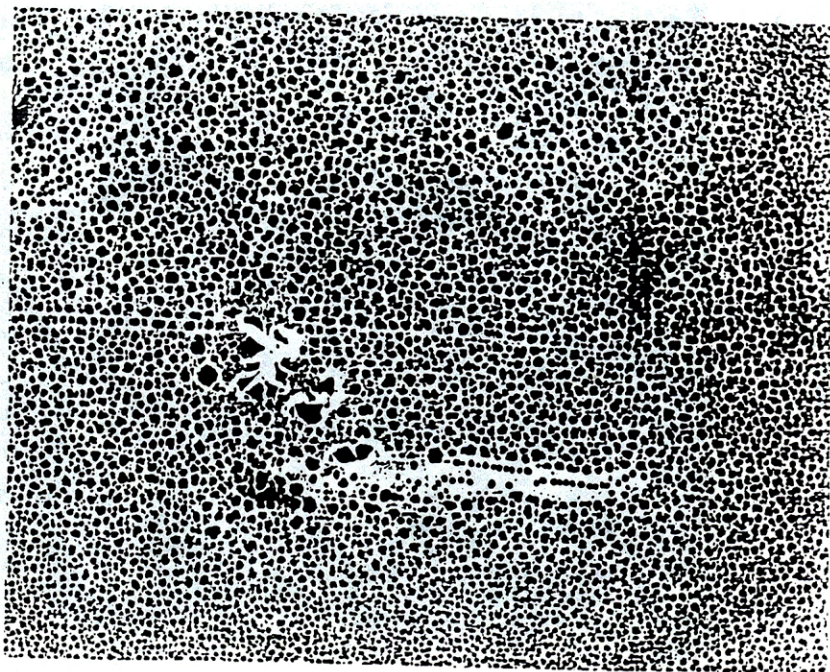
*Radical reticulation appears as a breakdown of the emulsion.*



*The pattern of radical reticulation continues to enlarge.*



*The original image gradually becomes unrecognizable.*



*Abstracted by pattern, the image space becomes two-dimensional.*

The temperature of the sodium carbonate solution should begin at 65° C. Once the temperature goes below 35° C, the time necessary to achieve a reticulation pattern is so great that it is preferable to heat the solution, mix up a fresh batch, or immerse the material in a plain hot water bath.

Some of the film reticulated in my experiments has been as old as three years, but because film hardens as it ages, the process takes longer and the results are quite unpredictable. In some cases, no reticulation will occur, sometimes only a trace, sometimes a full reticulation pattern, sometimes the emulsion will dissolve completely. If you are lucky, a radical reticulation will occur. Some of the older negatives I have used were soaked for as long as two weeks before any satisfactory results were achieved. Despite the length of time necessary to soften the emulsion, there is a critical period of time, usually only a few minutes, during which the film must be removed from the sodium carbonate solution or the emulsion will slide off the base. This spontaneous stripping happens more rapidly to newly developed film, often occurring within the first five minutes in the solution.

Once the emulsion reaches the flow point it is quite pliable and the image can be moved around with a fingertip or its movement directed by tilting the Plexiglas to which the film is attached. As in simple reticulation, the film development time, kind of developer, density, and age of the film, and whether a hardening fixing bath was used will affect the film's reaction.

# Veiling

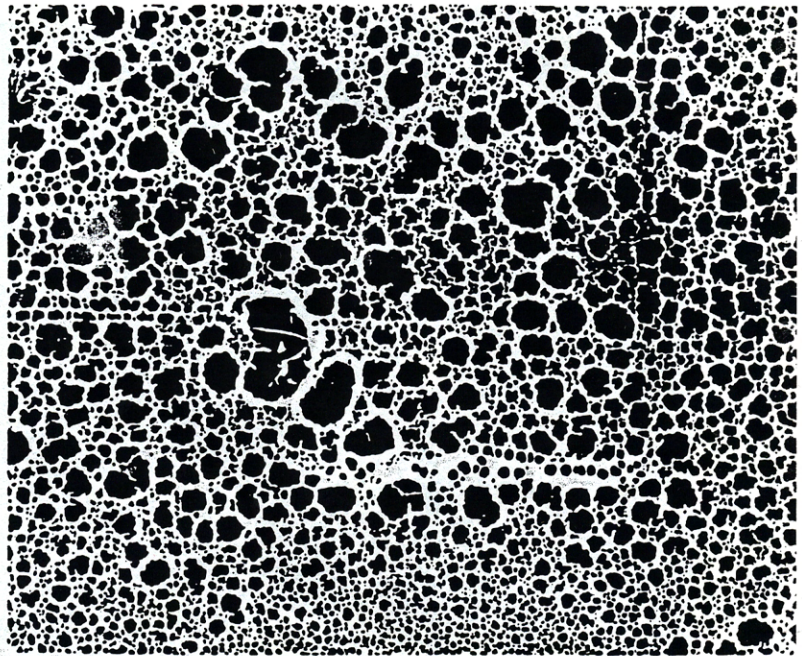
Veiling results from the physical breakdown of the emulsion. As the film continues to disintegrate in radical reticulation, the individual pockets of clear area within the textures begin to open and the original image breaks down. The emulsion begins to dissolve and large areas undergo a radical change.

Hold the film in a vertical position to cause areas that have swollen and filled with liquid to rupture. The veiling pattern will appear as the emulsion begins to stretch out. The emulsion remains attached to the film base, with portions of the emulsion folded over onto itself, creating greater image buildup and density. This will often result in veil-like or net-like patterns.

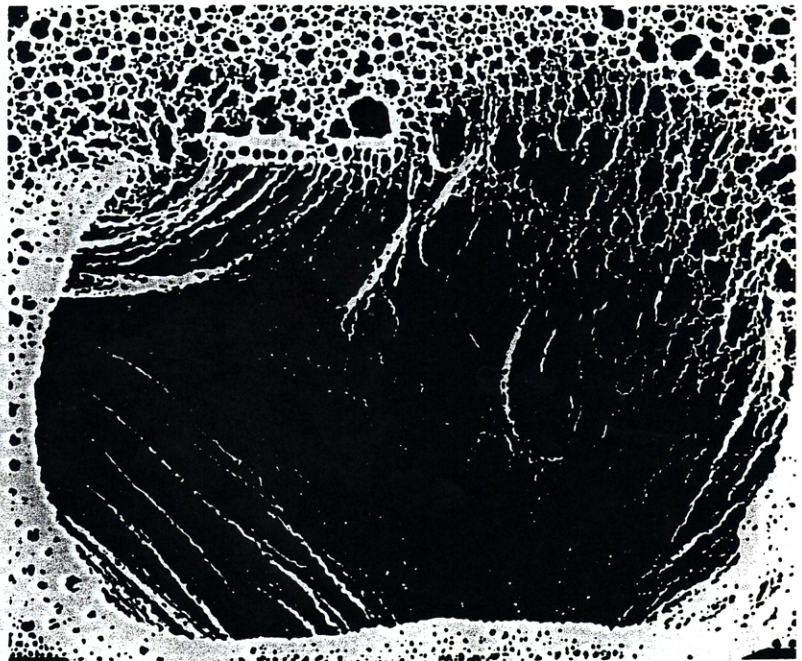
The veiling results when the emulsion begins to lift or float off the base and is physically folded over onto itself and allowed to float on the film base until dried onto it and solidified. The film begins to soften earliest in the clear areas where there is no silver buildup. Thus, the edges soften first.

Push the stripped emulsion from the edges toward the center. Be very gentle. This procedure allows the emulsion to remain attached in the center while free to frill or flap up and down at the outer edge. The film is so resilient that you can stretch the image and it will usually return to the original form. Occasionally it becomes necessary to cut or break the emulsion image if it stays in its distended form.

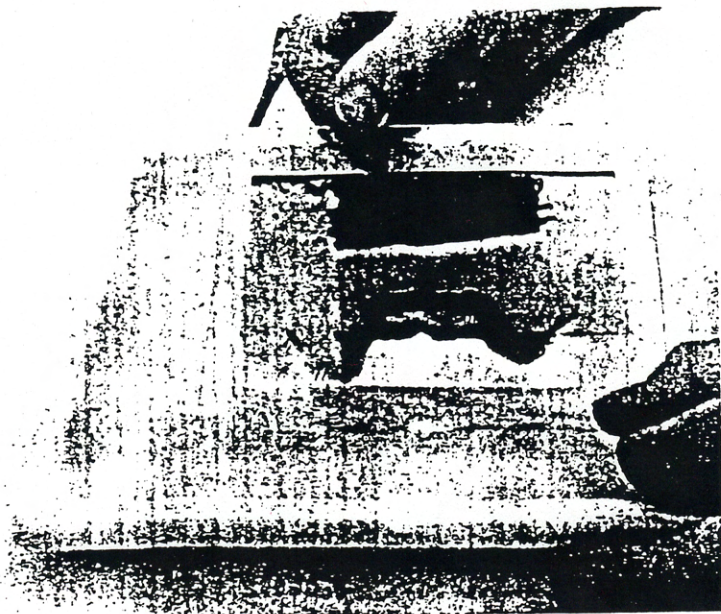
Veiling is begun by the liquefaction of the film. Your clue to the onset of liquefaction will be a series of soft, undulating waves or large blisters on the surface. If the film is lifted out of the sodium carbonate solution at this point, it can be held vertically until the emulsion runs or begins to slide. After the film begins to dissolve and the areas filled



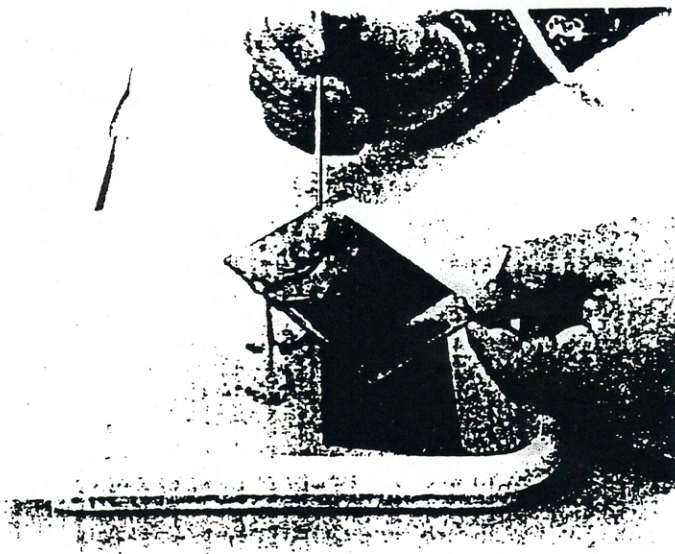
*The image is almost completely dissolved into pattern.*



*Veiling occurs as the emulsion begins to slide off the film.*



*Radical reticulation becomes veiling when areas of the emulsion begin to fold over one another.*



*Directing a thin stream of water at the negative with this hose attachment allows selective removal of unwanted areas.*

with liquid have begun to rupture as the emulsion stretches out, the film can be replaced in the solution so that it will undercut and open up much more quickly.

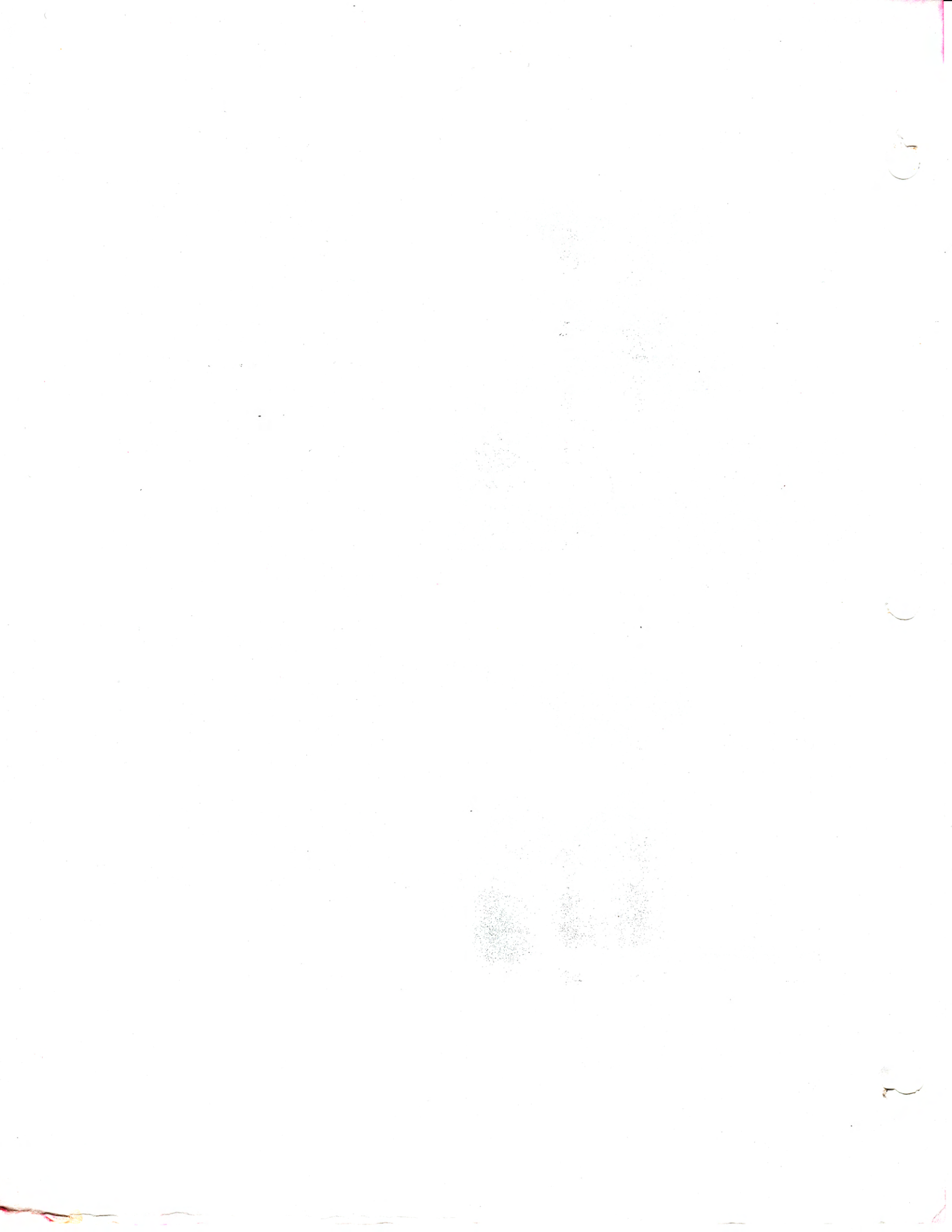
**Push the emulsion about** with a finger or brush. At this point it can be physically manipulated. I occasionally use a faucet attachment similar to a Water-Pik tip to direct a thin stream of water at the negative to wash off softened parts of the emulsion.

As with radical reticulation, the film should be taped emulsion side up on Plexiglas. While the emulsion is in a liquid state, concentric or parallel linear patterns can be created by holding the film vertically or twisting it about as the emulsion flows.

The back of the film will also melt, producing some linear effects or visible density differences in the final print. When folding over or allowing the emulsion to sag, density differences are built up which may necessitate considerable burning or dodging of various parts of the image during printing.

**Take extreme care** to prevent dust and dirt from coming in contact with the wet film. The emulsion is particularly susceptible to dust in this state, and it is impossible to remove. Any dust adhering to the negatives at this point will cause problems in spotting the image, because the dust spot will never have the overall texture of the rest of the image, even if the spotting dye matches the tone exactly.

**Hang the film to dry** with a clothespin at each corner. This will help the film to dry flat, although some film will still be quite curly or distorted, particularly larger pieces of 120 size film. It may be necessary to print warped negatives in a glass negative carrier.



# SECTION FOUR

*You and Your Bolex*



## BOLEX 16MM CAMERA

A spring wound camera giving a maximum length take of up to 28 seconds. The camera should be wound after every take to ensure a full wind is available should it be required. The bolex takes 100 ft spools of film on daylight loading spools (2:40 sec).

There are two main types of film; reversal and negative which both come in either colour or black and white. Within the colour variety the film stocks are balanced for two different types of light - daylight and tungsten. Daylight stocks are to be used when daylight (skylight, overcast light) are the principal source of illumination. Tungsten should be used when professional photo

lights are the main source of illumination. The stocks can be used with their "improper" light source if filtration is applied either to the camera or the light sources. The principals of "correct colour balancing" can be disregarded if a particular effect is desired.

Most bolexs can accommodate up to three lenses of any length. The following is a guideline of the different "looks" of various lenses:

normal lens 25mm

telephoto longer than 25

wide angle less than 25

Bolex runs in speeds from 12 fps to 64 fps. Effective Bolex shutter speeds are as follows:

12 fps = 1/40 sec

24 fps = 1/80 sec

48 fps = 1/160 sec

64 fps = 1/220 sec

single frame = 1/40 sec

Bolex can do manual fades by lifting shutter angle lever and sliding down towards the bottom of the camera. Remember to leave shutter angle lever up and locked into open position (red line) to ensure full exposure.

The bolex always needs the filter drawer in it's place (behind lens) regardless of whether or not a filter will be used. If the filter holder is not in place the film can get fogged. A way to safeguard against this is to tape over the filter holder's slot if a filter holder is unavailable.

The eyepiece (diopter) must be focused to an individual camera person's eye. This is done before inserting lens so that ground glass can be seen. To focus on ground glass, point camera at bright object (light) and rock eyepiece nut back and forth until ground glass is sharp. Then lock nut in place and eyepiece will be focused for that individual.

Remember the acronym **FAST**:

**F** stands for focus - rear diopter focus as well as image focus.

**A** stands for aperture - the lens opening or  $f$ /stop determined by the Sekonic light meter.

**S** stands for shutter angle - determined by the position of the shutter angle lever (up is open - down is closed)

**T** stands for tachometer - the camera's speed which gives you the camera's shutter time (eg. 24fps = 1/80 sec)

## THE SEKONIC LIGHT METER

1. Set ISO/ASA to correct setting.
2. Obtain incident light reading by pointing meter at the object.
3. When shooting in high intensity light situations (i.e. - direct sunlight) use HIGH SLIDE (it slides in at top of the meter). Don't forget when using the high slide that you now take the reading from the arrow on the foot candle scale.
4. When shooting objects too far in the distance to obtain an reading, obtain a reading by pointing the meter in a similar lighting situation. (Eg. If you are shooting the horizon, and you are in direct sunlight, but the horizon is covered by clouds, then try to get an incident light reading in a shadowed area.
5. The "correct" aperture is obtained by setting the foot candle scale (to the corresponding reading on the meter). This moves the APERTURE scale at the bottom of the Sekonic. Then you must decide what frame rate you will shoot at and get the corresponding f-stop reading.

Steve Sanguedolce

**WORKSHOP MATERIAL**  
**LOADING THE CAMERA**

**7373 + PX** Use exterior shade or dimmer. **TX:** use Dark bag/changing bag or fairly dim light

1. Wind spring motor completely & store handle.
2. Open and set lid in clean place. **NO LINT!**
3. Lift up chrome-plated **gate-locking pin** and check inside gate for no dust or film flecks.

**\*Clean only with canned air blast or clean brush.  
Never use your breath or metal anything.**

---

4. Close gate and confirm chrome locking pin is locked in place and secure.
5. Remove **take-up reel** from **take-up spindle**, using the **reel-eject lever**.
6. Close the **threading-path shoes** using the **chrome film-path set-up lever**.
7. Place **supply reel** on the **supply spindle**. (Note square spindle and square reel hole.)

**\* Film feeds off according to the white-dotted threading path line painted on the body.**

---

8. Clip leader **between sprocket holes** using the **film-end clipper** at the body's bottom.

9a. Start Camera motor (slow, at 12 FPS is OK).

9b. Feed end-clipped **supply film** into path of rotating **sprocket wheel** by dotted line and arrow.  
Film will be drawn from your hand, and move through the **threading path**, exiting by the **take-up sprocket wheel**.

9c. Run out about 20-25cm of film beyond the take-up sprocket wheel and stop the motor.

---

10a. While holding the **take-up reel** in your hand, stuff film's end into the **hub slot**.

10b. Wind 2 complete turns of film around the **reel hub**, allowing the reel to move closer as needed.

10c. Seat square-hole of take-up reel fully onto the square **take-up spindle**, rotating the take-up reel, as needed, to take up any extra film slack.

10d. Once take-up reel is seated on the take-up spindle, turn the reel using your finger, to confirm film is securely on the hub.

10e. Pop open the **threading path shoe-release button** (in the threading-path lever).

10e. Run the camera for 1-3 seconds observing film runs smoothly through threading path, and is secured to the take-up hub.

---

11. Close and lock the lid. **CHECK THAT LID IS COMPLETELY SECURE.** Some people use black photo tape.

12. Run off **lightstruck head-leader** until **footage counter** moves from its initial **minus-zero position**, to **zero feet**.

13. Wind camera's spring motor fully.

UNLOADING FILM

1. Stop shooting at 100'.
2. Run off tail leader until the footage counter doesn't move any more. (At equivalent of about 105') (About 12 seconds.) Listen for run-out change in sound as film runs out completely.
3. IN DIM LIGHT OR CHANGING BAG: Remove full take-up reel and secure paper band, and put into film box.
4. Wrap sticky tape around box or box lid. Write "EXPOSED" on the tape.
4. Label the box:
  1. YOUR NAME
  2. AMOUNT OF FILM (USUALLY "100"')
  3. SORT OF FILM: "B & W REVERSAL" (or whatever),
  4. DEVELOPING PROCESS YOU WANT: ("Dev. B & W REVERSAL") or whatever

BOLEX CAVEATS:

- \* Never run empty at more than 24 fps.
- \* Your shutter speed is designated as 1/50th OF A SECOND FOR MOST 16mm cameras BUT USE 1/80 FOR BOLEX (see below for explanation)
- \* Cold weather (>5°) may thicken mechanism grease and slow down chosen FPS rate.
- \* Footage counter drops back to zero when camera lid is removed.
- \* Wind up the motor spring after each and every shot.
- \* park the wind crank after each wind.
- \* 1 full wind = 27-30 seconds. (28 secs exact)
- \* Bolex has 2 tripod sockets: #1: "1/4-20 American" and, #2: larger "European"

EXPOSURE USING YOUR SEKONIC WITH A BOLEX

1. The Bolex finder directs about 30% of the lens light to the finder. Only 70% exposes the film.
2. Because of the loss of this film-exposing light to the viewfinder, you must increase your Sekonic readings by about 1/3 of a stop to compensate.
3. The easiest way to do this is to set your meter's ISO setting
  - \* 1/3 less than the real ISO number.
  - \* 1 click lower than the regular ISO number.

OR JUST USE 1/80th Shutter speed on Sekonic

VIEWFINDER

PREFOCUS (Needs to be done only at beginning of camera operator's day.)

1. Open viewfinder blind.
2. Remove body cap, but don't put on lens, yet.  
No lens means you only see ground-glass texture which is what you need to see.  
If you have a lens in place, you see the ground-glass texture and also the image of what's in front of the camera. That can be confusing.
  - \* If a lens is already on the camera, point it at a blank surface such as a wall or the sky, so the ground-glass texture is the easiest thing to see.
3. Loosen eyepiece lock  
CAMERA TYPE 1: \*turnable black collar surrounding eyepiece  
CAMERA TYPE 2: \*chromed knurled screw by eyepiece.  
CAMERA TYPE 3: \*NO LOCK AT ALL: eyepiece can drift, so be alert for change.
4. Point the lensless camera to a light, or bright surface and peer into the eyepiece.  
(Distance doesn't matter for this step.)
5. Focus the eyepiece to see the clearest, sharpest sandy-grain texture of the finder's ground-glass surface.
6. Re-lock the eyepiece lock.

\*As long as the person doing this pre-focus step is the only person focusing the camera, the eyepiece doesn't have to be re-focused. If someone else needs to focus the camera, take off the lens and re-set the eyepiece for that new person's vision.

FOCUSING

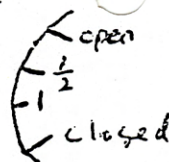
1. **Most reliable:** tape measure from focal plane mark.
2. Visual focus:
  - \*Set lens wide open.
  - \* null focus back & forth through sharpest focus, narrowing range each time.
  - \*Stop down aperture to required F-stop.  
**Always finish setting F-stop from the wider-open direction only.**  
**Never set it from smaller F-stop direction.**
3. Use depth-of-field scale markers on lens barrel to indicate range of sharpness and to choose focus setting.
4. Use hyperfocal distance to maximize sharpness range from infinity to the closest possible distance (which changes as the F-stop changes).  
  
But Hyperfocal distance always includes infinity.

## SHUTTER RELEASE

1. Run film: choose
  - \* front release button,
  - \* side release lever
    - \* push forward for single frame.
    - \* push towards the rear for continuous run.
    - \* push further back for **continuous-running lock**.
    - \* attach 2-way cable release for continuous run or single-frame.
2. Press or release shutter without hesitation to prevent "chatter".

## VARIABLE SHUTTER

1. Use locked "open" position: lever in uppermost position. shutter speed = 1/50th sec.
2. Orange arrow or "flag" in finder means shutter is partly closed.
3. Lever in down-most position = shutter completely closed. No light can hit film.
4. May be varied during filming to provide fade-outs or fade-ins.
5. Locking variable shutter at 2 marked intermediate positions cuts light by 1 or  $\frac{1}{2}$  F-stops.  
Good for F-stop control
  - \* to lessen depth-of-field,
  - \* allow high-sensitivity films in sunlight,
  - \* brighten finder using very small F-stops while follow-focusing action.



## TRIPOD

1. Each tripod leg locks. Hand-tightening is all that's needed. Muscle folks need not apply.
  - \* If locks are too loose, the tripod will sink.
  - \* If the legs are locked too tightly, you will freeze locking mechanism. U-PAY 4 REPAIRS!
2. Panhead won't do an acceptably smooth pan unless it is a fluid head panhead.
3. ATTACHING CAMERA: #1: screw tripod screw into body maximum amount.  
#2: Secure tight using larger surround knob.

Plastic 35mm camera body alert: tripod screw may be longer than your camera's socket. Full screw-in may punch a hole in your camera. Eyeball your camera's tripod socket depth first. Then be gentle as you screw.

4. Use correct feet for terrain. Use spider as needed.
5. Confirm tripod is level with the horizon. USE A BUBBLE LEVEL.
  - \* Inadvertently tilted horizons are unacceptable.
  - \* Pans must stay perfectly horizontal throughout pan. TEST AND PRACTICE FIRST.
6. Confirm legs and feet are clean and dry when re-collapsing legs.

SOURCES OF SHARPNESS/ SOFTNESS

1. Maximum F-stops degrade sharpness.
  - \* Contrast is lower wide open.
  - \* Overall sharpness is lower wide open.
  - \* Corner sharpness is further degraded wide open.
  - \* Minimum depth-of-field allows no variation in Z-axis sharpness, or slight movement variations of figures. You could wind up with sharp nose and soft eyes.
  - \* You focus wide open. If there is a slight error in your focus setting, there is no chance to gain forgiving increased depth-of-field when stopping down. Your focus tech has to be perfect to shoot at the same aperture you focused with.
2. Minimum F-stops degrade all-over sharpness even tho depth-of-field is at maximum.
  - \* The degrading culprit is diffraction.
  - \* Viewfinder very dim, it's tough to confirm framing while shooting.
3. Middle F-stops are sharpest.
  - \* Forgiving of modest focusing errors.
  - \* Forgiving of modest talent displacement towards or away from camera.
  - \* Every lens has a **critical F-stop about 2 f-stops down from maximum opening.**
  - \* The lens, at critical F-stop, renders maximum detail across the field at the focused distance. Usual depth-of-field applies.
4. **depth-of-field scale reveals Z-axis range of sharpness.**
5. **Hyperfocal distance** maximizes close sharpness limit when Z-axis sharpness is locked at **infinity distance**. The close-sharpness limit gets closer at **smaller F-stops**.
6. Dim finder means you can't **follow-focus**.
7. Correct follow-focus achieved only by pre-measuring and noting near and far distances, and rehearsing synchronized timing of **focus-puller** and actors who can repeatedly **hit their marks**. In other words, forget it for now. Take 1, take 2 . . . . take 8 . . . .

SOURCES OF FOG

1. **Side Gelatin-filter holder** is not in place. It must be in place, even when empty.
2. **eyepiece blind** was open when a strong light (such as the setting sun or a strong light just behind the camera shone into the finder. Especially probable if nobody was looking through the finder during shot. Their body and head might block the light.
3. Too-bright light when loading or unloading film.
4. **Lid** not tightly locked on

WHEN FINISHED SHOOTING

1. Run Bolex spring down completely.
2. Get all lens and body caps out of your pockets and onto their home places.  
Lost caps cost amazingly big bucks. Be impressed: pay for a missing lens cap.
3. Confirm everything on the case-list is back in the case.

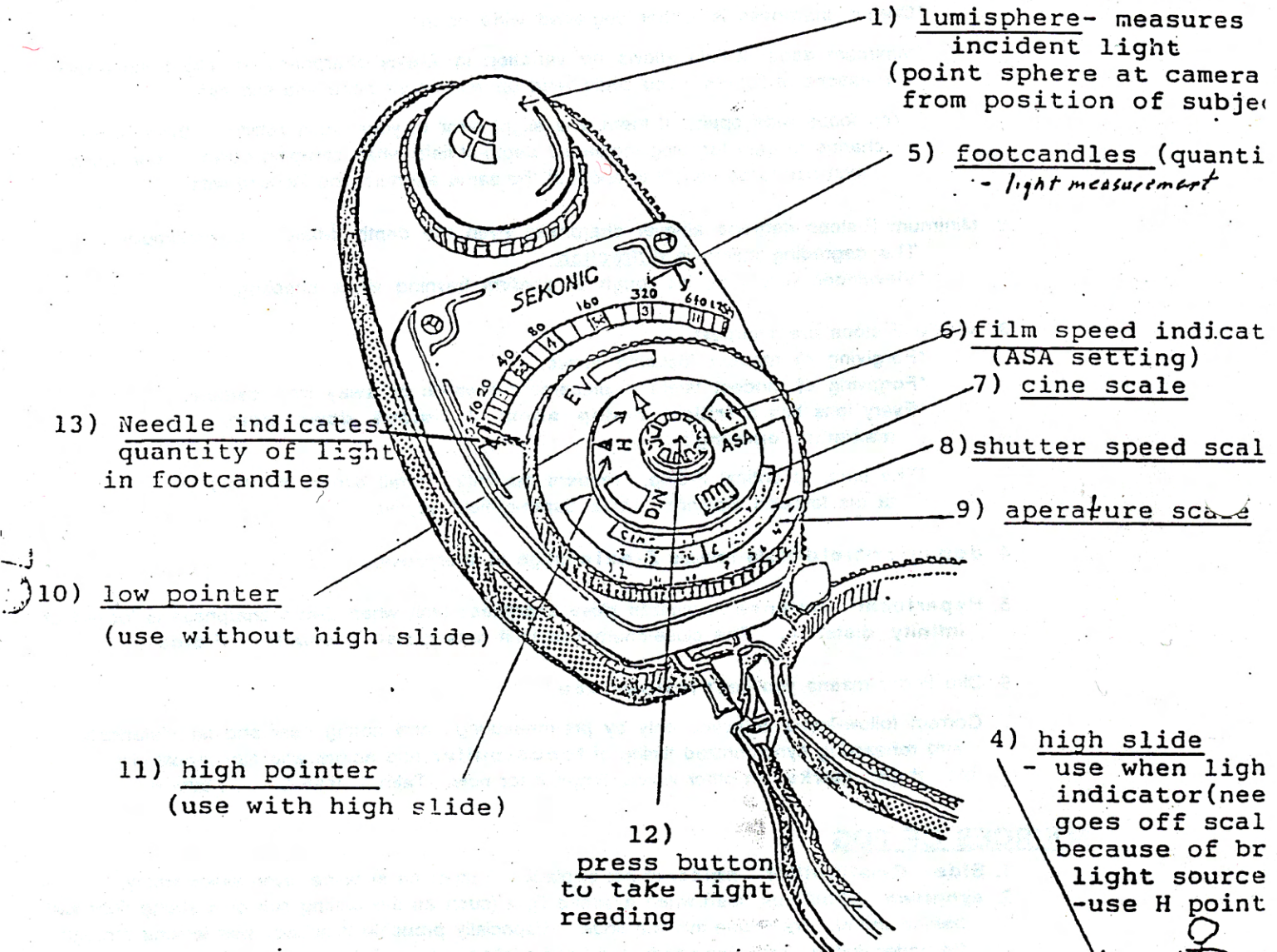
written by Jeffrey R. Hall

1/76

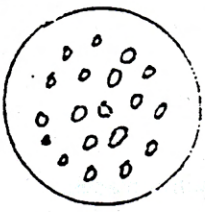
SEKONIC LIGHTMETER

Incident Light Reading - measures light falling onto subject (use sphere)  
 POINT METER AT CAMERA FROM POSITION OF SUBJECT

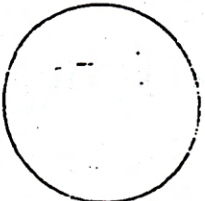
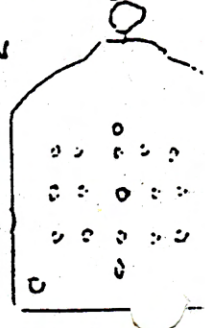
Reflected Light Reading - measures light reflected off subject (use grid)  
 POINT METER AT SUBJECT (ideally at grey card)



4) high slide  
 - use when high indicator (needle goes off scale because of bright light source - use H point)



2) lumigrid - measures reflected light (point meter at subject)



3) lumidisc - measures incident light  
 - used for measuring light ratio  
 - used for measuring light on flat surfaces

## IN-CAMERA SUPERIMPOSITIONS USING THE BOLEX

Set the lens aperture according to the lightmeter reading for shot 1 (for ex: dark moving water)

Half close the VARIABLE SHUTTER by locking the lever in position "1" ( each shot gets one F-stop less light in a double exposure)

Take note of frame number on FRAME COUNTER

Film the water (shot 1)

Note the reading of the FRAME COUNTER after shot 1 is taken

Fully close the VARIABLE SHUTTER (lowest position) and lock the lever into that position to avoid light leak on emulsion

Disengage MOTOR/SPRING ("0" position)

engage the TRIGGER ("m" position)

REWIND film until FRAME COUNTER is back to initial position

Set the lens aperture according to the light reading for shot 2 (for ex: a brightly lit face)

Disengage TRIGGER (stop)

Re-engage MOTOR/SPRING ("mot" position)

Set the VARIABLE SHUTTER to "1" (1 F-stop less light)

Film shot 2 until FRAME COUNTER reaches the destination of shot 1

When the film is processed the brightly lit face will show through and blend with the dark moving water

# MAYA DEREN



The window as a reflector of the self in Hamud and Deren's *Meshes of the Afternoon* (1942)

Maya Deren, one of the first American avant-garde filmmakers put it succinctly in "Amateur Versus Professional," *Film Culture*, No. 39:

\* Cameras do not make films: filmmakers make films. Improve your films not by adding more equipment and personnel but by using what you have to the fullest capacity. The most important part of your equipment is yourself: your mobile body, your imaginative mind, and your freedom to use both.

These filmmakers reflect the periods in which they live and work—their films do not so much represent a movement, but rather they exhibit trends, drifts. The 1940's, influenced by the art movements of Surrealism and Dadaism, by Freudian analysis, by a sense of post-war absurdity, saw psychodramas and Surrealist films. In 1943, Maya Deren (*Meshes of the Afternoon, A Study in Choreography for Camera*) started to work and talk on films. She stressed the poetic, dream-like qualities of film and the ability of editing to displace a normal sense of time and space. Deren, as Lucy Fischer shows in her essay on program 1, influenced many independent filmmakers through her concerns and her major preoccupation with the conflict between interiority and exteriority. It was Deren's idea of hiring the Provincetown Playhouse, New York, to show her films which inspired Amos Vogel to establish *Cinema 16*, a showcase for experimental films.

But perhaps the most fundamental instance of the dialectic of interiority and exteriority in the work of Deren occurs on the level of the filmmaking process itself. For Deren, that procedure involves two distinct phases:

*photography*, by which actuality is recorded and revealed . . . in its own terms; and *editing*, by which those elements of actuality proper may be re-related on an imaginative level to create a new reality.<sup>5</sup>

Clearly in this vision of filmmaking, photography is associated with the external world and editing with the interior province of creativity. Thus the filmmaking endeavor itself implicitly involves the kind of passage from one world to another that we find explicit in the narrative of *Meshes*.

Editing is similarly the central agent for creating the repetitions and displacements of the film, so reminiscent of oneric structure. A narrative action (like that of a character entering the house) can be repeated endlessly by the connection of footage; and objects can be mysteriously relocated by the mechanics of a splice. Thus in *Meshes*, a shot of a knife poised in a loaf of bread may be followed by an image which relocates it under the covers of a bed.

In delineating the plot structure of *Meshes* Deren has said:

The very first sequence of the film concerns the incident, but the girl falls asleep and the dream consists of the *manipulation of the elements of the incident*. (Italics mine.)<sup>6</sup>

In so characterizing the narrative, Deren would seem, perhaps unconsciously, to have given a description of the creative process as well. For

just as Deren the dreamer elaborates the incidents of waking life, so Deren the filmmaker fashions the photographic material of external reality into poetic expressions of interiority.

"This film is concerned," Maya Deren wrote,

with the interior experiences of an individual. It does not record an event which could be witnessed by other persons. Rather, it reproduces the way in which the sub-conscious of an individual will develop, interpret and elaborate an apparently simply and casual incident into a critical emotional experience.

This film . . . is still based on a strong literary-dramatic line as a core, and rests heavily upon the symbolic value of objects and situations. The very first sequence of the film concerns the incident, but the girl falls asleep and the dream consists of the manipulation of the elements of the incident. Everything which happens in the dream has its basis in a suggestion in the first sequence—the knife, the key, the repetition of stairs, the figure disappearing around the curve of the road. Part of the achievement of this film consists in the manner in which cinematic techniques are employed to give a malevolent vitality to inanimate objects. The film is culminated by a double-ending in which it would seem that the imagined achieved, for her, such force that it became reality.<sup>7</sup>

In the program notes for a screening of her complete works at the Bleeker Street Theater in 1980, Maya Deren warned, as was her custom, against a psychoanalytical reading of this film: "The intent of this first film, as of the subsequent films, is to create a mythological experience. When it was made, however, there was no anticipation of the general audience and no experience of how the dominant cultural tendency toward personalized psychological interpretation could impede the understanding of the film." Within the film itself, the double ending mitigates against interpretation, showing the maker's preference for sustaining the dream-like ambivalence over the formal features of a rounded sleep.

MOTOR/SPRING - Disengage (0) / Engage (Mot)

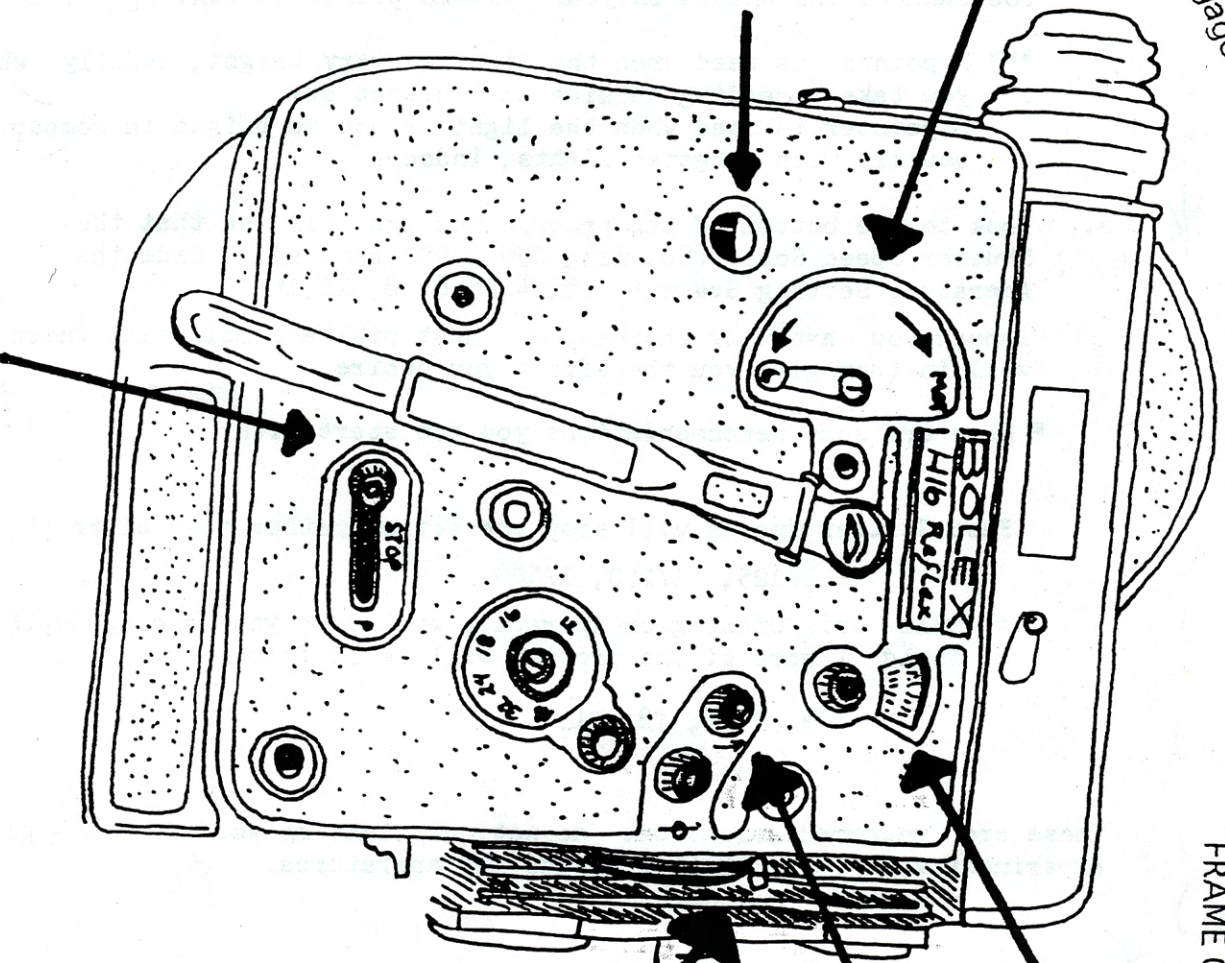
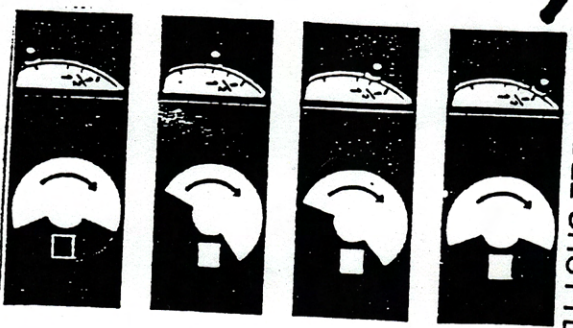
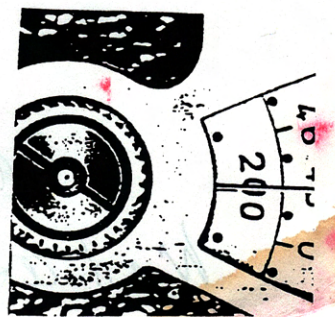
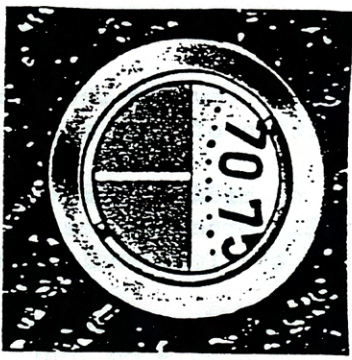
FRAME COUNTER

REWIND

VARIABLE SHUTTER

FOOTAGE COUNTER

TRIGGER - Engage (M) / Disengage (Stop)



(FOR STILL PHOTOGRAPHY)

How to use the Sekonic Light Meter (Incident Light Reading - using lumi-sphere)

1. Zero the light meter - hold meter in upright position, cover lumi-disc so no light enters light sensitive conductor, & turn screw at back of Sekonic until needle on front reaches zero.
2. Set film speed in ASA window on front of Sekonic (ex: ASA 64 Kodachrome)
3. Point lightmeter towards the camera (point Lumi-sphere toward camera) from the position of your subject
4. Press button on middle of Sekonic - this activates the Sekonic and in turn will force the needle in the top window area of the Sekonic to move along the footcandle scale (ex: 0/5/~~10~~/20/40/80/160/320/640)
5. Adjust either H or L pointer so that it corresponds with the amount of footcandles the needle on your Sekonic points to (ex: 160 ftclds)

\*\*\* H pointer is used when the light is very bright, usually when you take a reading outside on a bright day  
L pointer is used when the light is not so bright in comparison, usually with tungsten lights, indoors

- \* 6. Look to the bottom of the sekonic and you will see that the Shutter Speed Scale (60, 125, 250, 500) runs along side the Aperature Setting Scale ( 2.8, 4, 5.6, 8, 11,16)

Though you have many choices, you must pick a combination which will in turn give you the effect you desire.

\* Here are some recommendations you can start with:

Fast Shutter Speeds will stop the action rather than blurr it  
1/125, 1/250, 1/500

A Small Iris Opening or Aperature will give you a deep depth of field ( more of the picture will be in focus)

f4, f5.6, f8, f11.

These are recommendations but do not, only, take my word for it - please experiment with other shutter speeds and aperature. Ph

(Lesson)

- \* use  $\frac{1}{80}$  shutter speed when using BOLEX +  
 $\frac{1}{50}$  when using Canon.

Overexpose by  $\frac{1}{3}$ rd

Ward after every take

