

A basic guide to

photo graphy

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An Introduction in FAQ Form

What is the purpose of this guide?

This guide is meant to introduce the reader to the basic principles of photography. It will present technical and aesthetic concepts to help the reader (you) make better decisions when photographing. There are chapters on camera functionality, film and digital processing, along with various techniques and approaches that will enhance your photographs.

If I can press a button and take a photograph, why do I need this guide?

Ah! Great question. We have all been able to press a button since George Eastman introduced the first Kodak consumer-grade cameras in 1888. His slogan was, "You Press the Button, We Do the Rest," and that has been the predominate approach since. However, there is so much more to photography than pressing the shutter button. This guide will help you understand how to have control over your images so you make the photograph you want, not the one the camera makes for you.

Hasn't everything been photographed already?

This is my tough-but-honest answer. Yes.

But all is not lost! While there are billions of photographs out there, your photographs reflect your individual perspective, the way you see the world; that is what keeps photography engaging. It is often thought of as one of the "easiest" mediums because of how instantaneous it is. However, one could argue that the ease of making photographs is what makes it one of the most challenging mediums. So, can you use a camera to create something unique in a world filled with images? (Hint: It's possible.)

Why do you keep saying "making a photograph" instead of "taking a photograph"?

While it might seem like a small distinction, the act of making something is much more in line with the creative process we use as photographers. We are not taking something, akin to stealing; we are utilizing available information and transforming it into something new.

Why is there no mention of specific equipment or software?

One of the most frustrating aspects of textbooks and technical guides is how quickly they become dated. This guide will discuss all aspects of current photography but resist the urge to be "of the moment" through hyper-specificity. You will see images of specific equipment, but the guide will address all processes in a manner that can be applied as widely as possible. The goal is for the information contained in this guide to be applied to any camera, any software, or any other equipment.

You do not need the most expensive camera to be a competent photographer; you need to learn to work competently with what you have access to.

If I read this guide, will I know everything about photography?

Nope! The purpose of this guide is to introduce you to photography. Once you understand the basic principles, that knowledge will open up a multitude of possibilities. There is no one way to make a photograph, you can make your process as simple or as complex as you want. You are allowed to break rules, mix old and new technology, and be experimental.

One thing to mention that is incredibly important and not in this guide, it is to encourage you to be constantly looking at photographs. Seeing what others are doing, what has been done in the past, how people are representing themselves and the world around them, all of this (and more) is critical to being an informed photographer. Know how you fit into the larger photographic universe.

Yeah, why are there are no photographs in this guide by other photographers?

This guide is a free textbook meant to share, therefore, if you want to see photographs by anyone other than the author, you must do some legwork and find resources on your own. There is a bibliography at the end of the guide (the one section of this guide that will date itself faster than any other) that will provide you with places to look.

An Explanation of this Guide's Organization

This guide blends history and critical thinking with the technological bits and pieces that make up the photographic process. This guide is "technology heavy" as there are endless ways to make a photograph in the 21st century; this guide just scrapes the surface. There is an intentional blending of analog (film-based) and digital processes, as they work better together than apart.

The guide starts out with an introduction of the camera as an apparatus and considers its transformational power since its invention. We will then examine how a camera works, the basic functions of all cameras, and how to use light to make an image. Film-based chapters come next, with an emphasis on step-by-step processes in the darkroom. After that, we move into digital photography and address the complexity of image making, editing, and printing. The final technical chapter presents more advanced techniques that highlight how film and digital

imagery can be combined. Once we've thoroughly spent time learning how to make photographs, we then discuss why we are making them. In that chapter, there are sections on composition, meaning, and concept development. Finally, the end of the guide contains a photographic timeline, a reference bibliography for further study, and a glossary of the terminology mentioned in the text.

Page Tab Color Key:

- Red = under a safelight only
- Black = in complete darkness
- Grey = on a computer
- Yellow = step-by-step cheat sheet

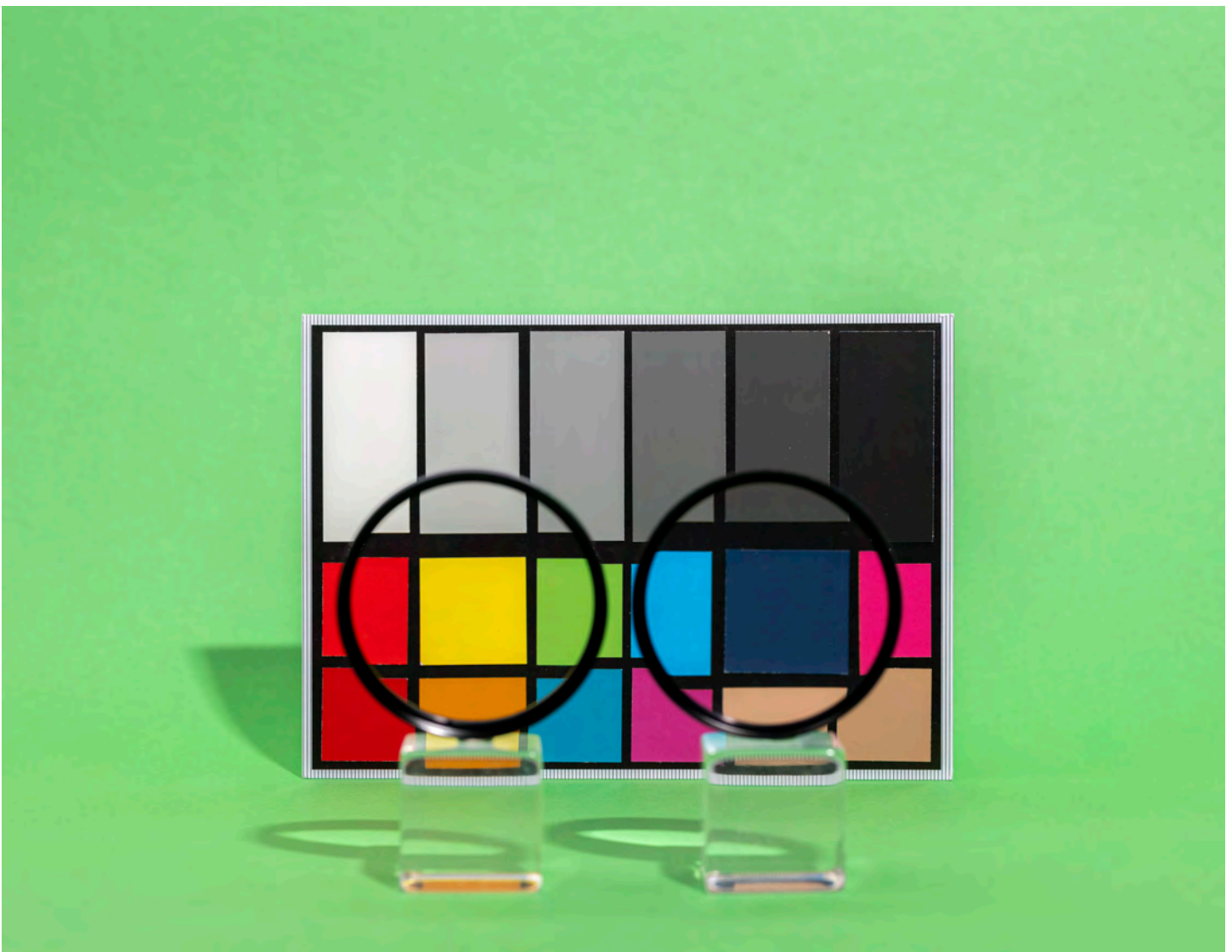


Figure 0: Example of the magnification power of macro filters.



Chapter 1

What is a Camera?

This chapter examines what a camera is in relation to its invention, its connection to light, some of the earliest ideas about photography, and how we understand it today.

What is a Camera?

It's a simple question, yet when we think about a camera, it is easy to get lost in all the things we know a camera can do. The multitude of settings, buttons, and accessories can get in the way of truly understanding what a camera is. It can also be hard to envision what a camera is in the 21st century due to the many forms a camera can take. Most of us recognize them as the tiny lens (or lenses) on the back of our phones, or as a larger DSLR (digital single lens reflex camera), but there are endless varieties of camera styles and functionality.

Cameras are omnipresent; we all have them, and they are embedded into the landscape around us. Amazingly, even though each camera may look different, they all operate around one principle – a principle that was known prior to the invention of photography: light travels in a straight line.¹

When light from the sun (or an artificial light source) hits an object, portions of the light are absorbed by that object, creating variances in the amount of light reflecting off the object. We can point a camera at the object and “capture” the light as it moves toward the camera. The light is then made permanent in our cameras by traveling through the lens and striking either a digital sensor or piece of film. The sensor and the film are capable of recording the light and producing an image.



Chapter 2

Basic Camera

Operation

This chapter will introduce you to camera operation. It is designed to help you with 35mm film cameras, DSLRs, and mirrorless cameras, but much of this material can be applied to any camera. You will read about the physical camera, how a lens works, and how a manual exposure is made.

Things to think about before getting started

What type of camera will you use? For most people, it will probably be a digital camera or 35mm SLR film camera. But some readers may have a large format camera, a point-and-shoot, a cell phone camera, a box camera...who knows?! The one thing to keep in mind is that all of these cameras follow the same principles and utilize much of the same terminology.

Camera choice can depend on a wide variety of decisions, such as: What are you interested in photographing? How much weight do you want to carry? How much money do you want to invest? How quickly do you want to be able to make a photograph?

When getting started in photography, it's generally easiest to use a camera that has the ability to do

do a variety of operations giving you flexibility and the chance to try out different approaches. Over time, you will figure out your personal preference.

Below you will see examples of two cameras: a 35mm SLR (single-lens reflex) film camera and a DSLR (digital single-lens reflex) camera. A 35mm film camera takes a roll of film that is 35mm wide (hence the name) and comes in two lengths, 24 exposures or 36 exposures. This means that dependent on which film you are using, you can either make 24 or 36 photographs. A DSLR camera will have a sensor that records your images. The sensor's size can vary which alters how many photographs will fit on your SD (secure digital) card, as will the storage size of your SD card.

Many cameras are a *single-lens reflex* design meaning that when you look through the viewfinder, you see exactly what the camera's lens is seeing. This is the style of camera described in both examples below.



Figure 3: Diagram of 35mm camera body. **Figures 4 and 5** (on right): Diagrams of mirrorless digital camera.

General Parts of 35mm and DSLR Cameras⁷

Camera body: The camera body is basically everything but the lens. It is the portion of the camera that you hold when making a photograph.

Lens barrel: The lens barrel is mounted to the front of the camera and contains all of the lens elements.

On/Off or Lock/Unlock: Most cameras (but not all) have an on/off switch. This is to keep the battery from draining when not in use. In some instances, they are referred to as a lock/unlock switch, which, when locked, keeps the



Chapter 3

Film Photography

This chapter will introduce you to *film processing*, the act of taking your roll of film and turning it into usable negatives. We will discuss what film is made of and how it responds to light (and when it doesn't work as expected). The chemical process will be broken down by function and time along with a troubleshooting list and some methods to change the look of your negatives through processing. Film processing is more fascinating parts of film photography. While it takes some patience, your experience of the world is transformed into a tangible, physical object.

What is Film?

Contemporary film comes in a variety of shapes, sizes, and speeds. Film is produced in three standard forms:

- Black and white negative: produces a black and white positive image when printed on black and white darkroom paper or when scanned and inverted.
- Color negative: produces a positive image when printed on color darkroom paper or when scanned digitally and inverted.
- Color positive (also known as chromes or slide film): produces positive images on film. Produces a print in the darkroom with positive-to-positive paper or an *internegative* (a negative made from the film positive). Otherwise, they can be digitally scanned very easily.





Fig. 49



Fig. 50



Fig. 51



Fig. 52



Fig. 53



Fig. 54



Fig. 55



Fig. 56



Fig. 57



Fig. 58



Fig. 59



Fig. 60

These images do not depict every step of the process. Please refer to the text on the adjacent page for complete instructions.

Figure 49: Pouring developer into tank.

Figures 50-52: Proper agitation with a tank. Make sure to hold the lid with your hand to ensure it does not fall off. However, do not hold the tank continuously while processing as the heat from your hand can change the temperature of the developer.

Figure 53: Pouring developer out of tank.

Figures 54 + 55: Pouring stop bath in and out of tank.

Figures 56 - 58: Pouring fixer in and out of tank. After fixing, your film is light safe and the tank can be opened.

Figure 59: Placing film into hurricane washer for water wash.

Figure 60: After using a wetting agent, your film can be squeezeed and hung up to dry.

Processing

The film must go through six stages of processing: Water – Developer – Stop Bath – Fixer – Water – Wetting Agent

Each chemical must be measured and diluted according to the instructions listed on the container. If working in a lab setting, follow the posted directions. Developer is temperature sensitive, so if you are mixing it, ideally it should be 68-70 degrees Fahrenheit. The warmer the developer, the shorter the development time...but anything too warm can lead to processing issues.

Note that your film processing tank has two lids. One that is light-tight and one that is not. For all film processing steps, you only want to open the light-tight lid to pour the chemistry in and out of the tank. This ensures your film is not exposed to light.

Terminology You May Encounter

Concentrate: undiluted chemistry.

Stock Solution: chemistry diluted with water but still strong.

Working Solution: chemistry diluted with water to the correct strength for use.

Agitation: slowly turning your film processing tank over 180 degrees and then right side up repeatedly for a predetermined amount of time. This ensures that the film has even contact with the liquid in the tank.

Let's Review Film Processing Steps

- **Water.** Water is the first step because it softens the gelatin on the film making it more receptive to chemistry, for more even development. Do not use hot or cold water, aim for room temperature. Pour water into the tank until it is full and close the lid. Agitate constantly for 1 minute. The water may come out of the tank with a tint or color to it, that is normal.
- **Developer.** Developer is what allows your latent image to appear and is the most critical step to film processing. Follow the processing time that the film's manufacturer recommends and make sure that your developer is the correct temperature with a thermometer (usually 68-70 degrees Fahrenheit). Fill the tank and agitate for the first 15 seconds and then for the first 5 seconds for every minute thereafter until you've reached the final development time. Dispose of this down the drain, it cannot be reused. Developer is made of alkaline (i.e. base) chemicals and works by "reducing" the silver halides to a metallic gray. The gray will vary dependent on how much light it received when exposed (more light = darker gray). If a silver halide did not receive light, it will not turn gray.
- **Stop bath.** Stop bath is acidic and neutralizes the developer by "stopping" the development process. Stop bath is poured into the tank and constantly agitated for 30 seconds and then returned to its container. It can be reused until it is exhausted. Some stop bath will change color to let you know that it's exhausted, while others will mention on the label the average number of rolls of film it can process before reaching exhaustion.
- **Fixer.** Fixer does two things: First, it removes all the silver that was not exposed to light. Second, it makes the film light safe. After you have fixed your film, you can open the tank and expose your film to light and it will not be damaged. Most fixing times are between 5-10 minutes, check your film brand. Fixer follows the same agitation pattern as developer: 15 seconds of agitation for the first minute, and 5 seconds for each minute thereafter. Fixer can also be reused and should never be poured down a drain as it contains the silver remnants from your film. It requires special disposal.
- **Water wash.** Your film now needs to be cleaned to remove any residual chemistry. There are a variety of washers, but you can always wash your film in the tank if you do not have a washer. However, you need the film reel to be washed for at least 5-10 minutes in running water.
- **Wetting agent.** This is a soap-like chemical that is heavily diluted with water. This final step creates a surface on your film that allows the water to bead off more efficiently, reducing the amount of streaks or water marks. Pour this into your tank and agitate slowly for 30 seconds, then pour back into tank if reusing or down the drain. Slow agitation is key to not make any bubbles.

Now you can dry your film! Depending on where you are working, you can use a traditional film dryer or hang your



Chapter 6

Digital Output

This chapter will focus predominately on preparing your file for traditional inkjet printing, but we will also discuss exporting for other uses. Digital photographs (or digitized photographs) have the potential to be presented in a bunch of compelling ways. Sometimes it requires experimentation to determine what is the right material for your work. But, beyond anything else, getting a result that you are happy with requires an understanding of how to prepare a file.

What is digital output? *Output* can be translated as any type of finished digital piece that is ready for presentation. Presentation can take many forms but they are generally defined as physical forms; an object generated from your file. For our purposes, the definition will include traditional output in the form of prints, but also images that are prepared for use on a screen or projection. Let's think of "output" as a file that is ready to be viewed in its final form.

Types of Digital Surfaces

Photographic images can be printed, transferred, or mounted onto a wide range of surfaces. Each one of these materials will require file preparation and testing, just like printing in a darkroom. Below is an abbreviated list of materials to give you a sense of how many possibilities there are:

- Inkjet printing: This is by far the most common technique. The inkjet process shares much of the same language as the darkroom. Papers are available in many of the same surfaces and weights (the thickness of the paper) along with similar sizes. They require special handling and care to

keep the surface pristine. The inks are pigment-based and very stable, meaning that the prints are archival and have a long life span. The papers come in single and double-sided for traditional printing or bookmaking.

- Digital c-print or digital fiber print: There is a hybrid process that combines digital technology with the darkroom. With this process, the image is inscribed onto a light sensitive (darkroom) paper with a laser. The paper is then processed in photographic chemistry.
- Dye-sublimation: This process uses a heated ink that is absorbed by the treated surface it is printed on. This process is noteworthy because metal and other rigid surfaces can be used.
- Transparency film: This is a thin plastic sheet that will allow an image to be installed in a window or backlit. The film comes in varying levels of opacity. Several different printers can print on this film.
- Laser printers, photocopiers, Risograph: these are all less archival tools for digital output and duplication. They are great ways to make affordable artist books or zines.
- Digital negatives: Printing your digital negatives onto specialized plastic film allows you to use your digital images in the darkroom.
- Transfer film: This is another clear plastic film that acts as a receiving layer (a layer that is just “holding” the image, it is not permanent) so that it can be transferred onto a paper surface. This is useful if you want your image on a textured or handmade paper. It also allows for hand manipulation of the image as you transfer it.

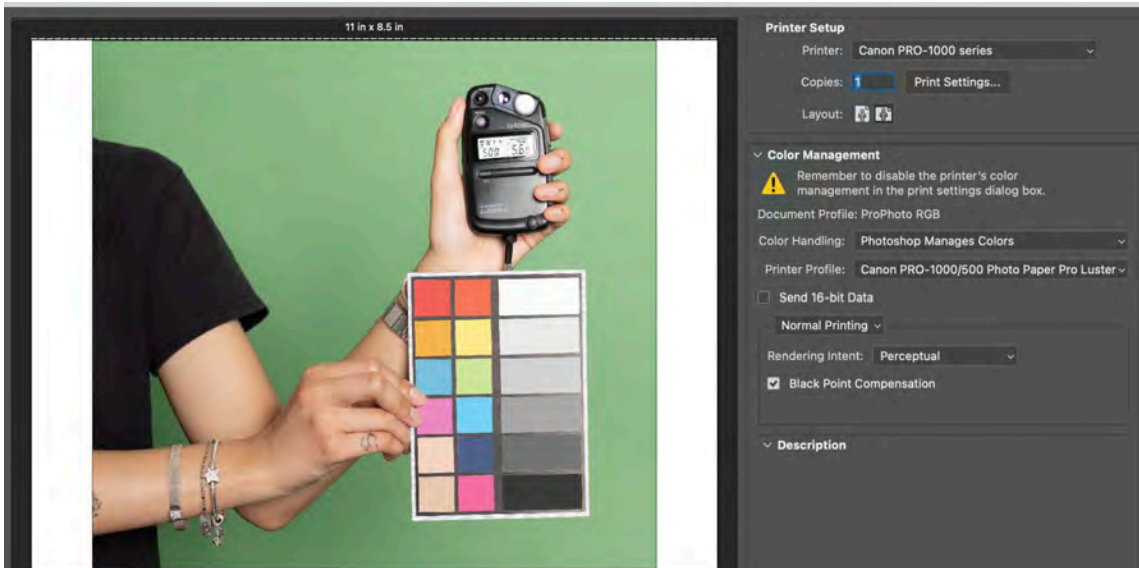


Figure 138: Example of a printer dialog box. This is where all the printer settings (size, paper type, color profile, etc.) are chosen prior to making a print.

Checking Color

This section will discuss printing on inkjet paper, but most of the same steps apply when preparing a file for any material. Check with the manufacturer or whomever you are sending the file to regarding specific file settings.

Color Spaces + Color Profiles

A **color space** is a three-dimensional model of how your device (computer, phone, etc.) can render visible colors. The visible color range of the color space is called the **gamut**. Any colors that are “out of gamut” cannot be printed or reproduced with one hundred percent accuracy. That is due to the limitations of the screen or ink; our eyes can see more variation in color than we can reproduce in our photographs.

Color profiles make color consistent from device to device; they apply the color space to the file you are working on. There are some color profiles that are geared more towards screen-to-screen consistency, while others are helpful for transitioning from screen to print.

You can set your camera to shoot using a specific color profile so that they are ready to edit or you can convert them once you are in your editing software.

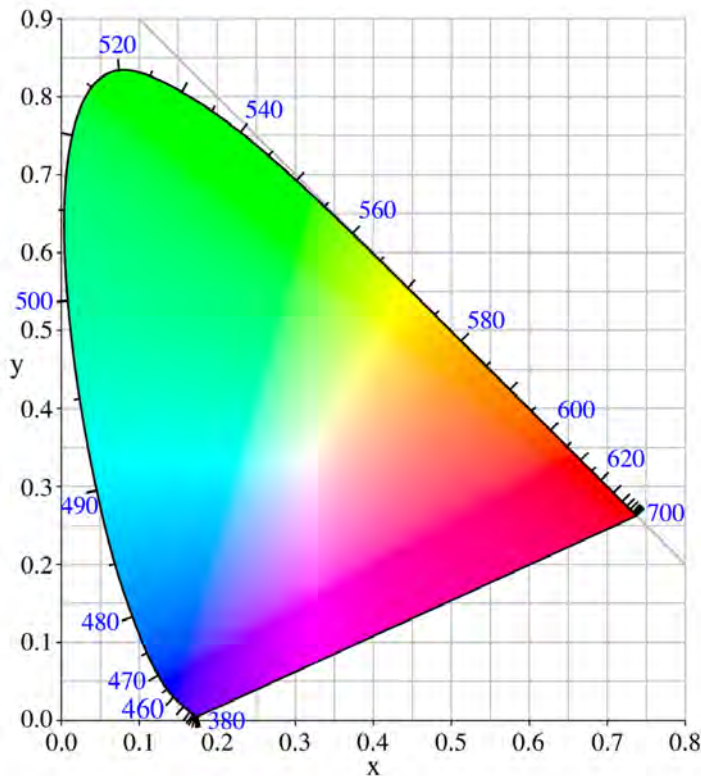


Figure 139: Public domain illustration of sRGB color space. This chart shows the range of colors that are “in gamut” and thus printable.

Paper Profiles

Paper profiles tell the software which paper you are going to be printing on and instruct the printer on how to apply ink to compensate for the paper surface. Ink will “sit” differently on various surfaces (glossy, luster, matte, etc.). Along with that, papers have different bases to them (cool white, neutral, warm, silver, etc.) that can affect the image’s colors. By selecting the paper profile that is for your brand and style of paper, the software will process your image to accommodate the paper surface.

Our task is to align the image on screen with the image we end up with on paper as closely as we can. Color profiles manage how we see colors on a screen and try to best reproduce them accurately on paper.

Proofing

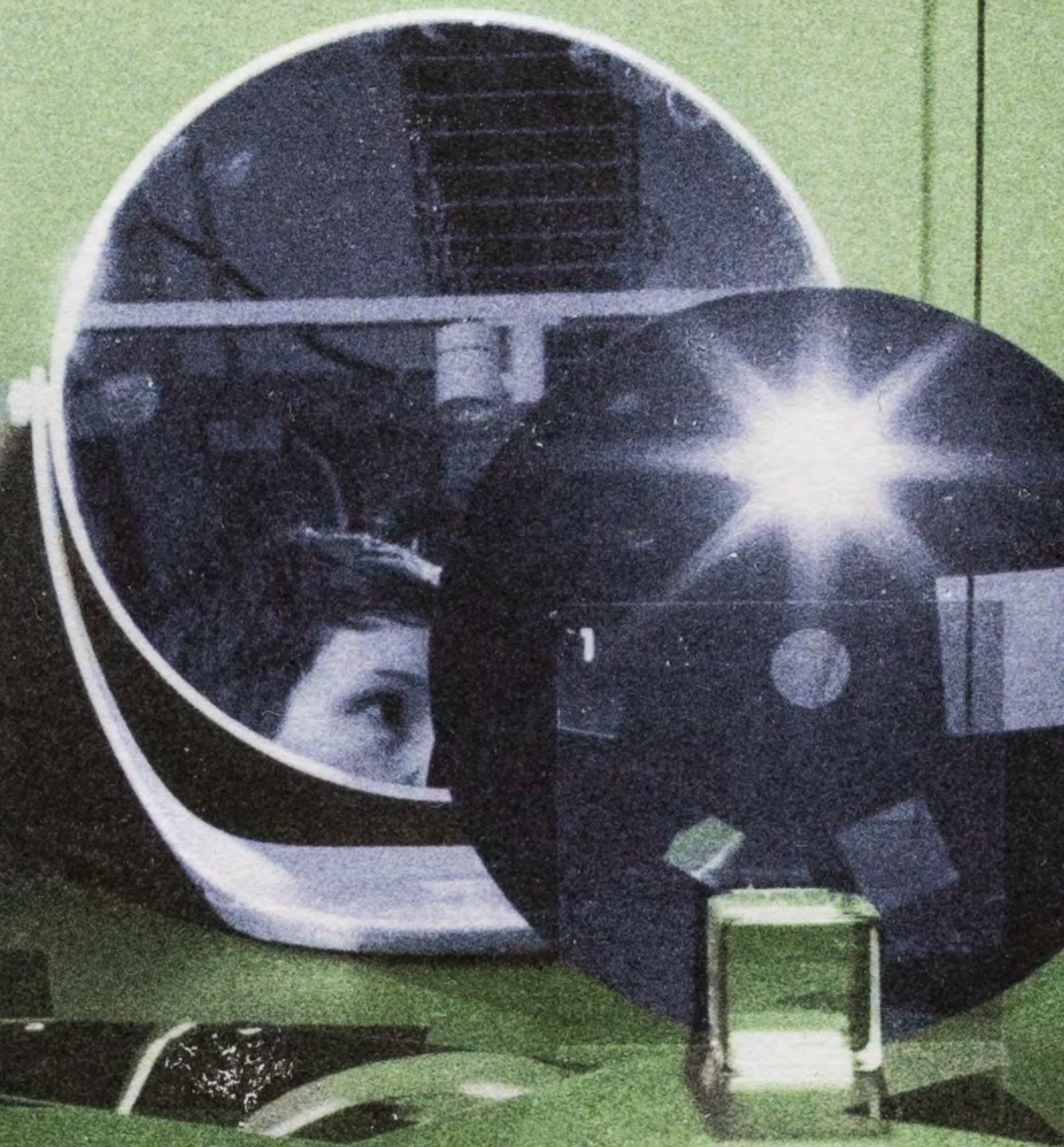
So, you think you are ready to print, hmmm? Keep in mind, it is always a good idea to proof your work before making your final print. Paper and ink are both easily wasted; by proofing and double checking your work, the “print success rate” will increase exponentially.

Soft proofing is a screen-based method of proofing your print colors before printing. Most software has a soft proofing option. Generally, you can select the paper profile from a dropdown menu and see the colors shift slightly as they attempt to replicate what your printed image will look like. You should be able to turn the proof on and off so that you can take a closer look at the colors.

As long as you have a color-calibrated monitor, this will work well. If you are unsure about the monitor you are working on (especially if you are working in a lab or shared computer), then you should make a hard proof as well.

If you are working on a calibrated monitor and have full control over your color management, you can soft proof and potentially skip hard proofing (although making small proofs before moving to larger paper is still recommended).

Hard proofing means to make a physical print to check the color and accuracy of the image before making a final



Chapter 7

Technical

Exploration

This chapter will review a range of topics to help you improve your work once you have become comfortable with your camera, and general photographic processes. There are both film and digital tools and techniques, with an emphasis on how they can be combined.

Medium + Large Format Cameras

These are cameras that have larger sensors or will use larger film. We will discuss them here briefly, mostly to highlight their differences from smaller cameras and why you might opt to use them.

Medium Format Cameras

Medium format cameras are available in both digital and analog (film-based) models. They utilize a larger sensor or bigger piece of film. This increases the amount of information captured. The result is that your images will have more detail at a larger size.

These cameras have more variety to them; the sensor sizes can differ from model to model and, on film cameras, they can shoot a variety of shapes. They generally weigh more than a 35mm or DSLR because of the larger physical elements they require. They can look very different from model to model. Some are similar to a 35mm-style shape and function in the same way, while others are more square and have a detachable film back that can be switched in the midst of a roll. There are



Fig. 144



Fig. 145



Fig. 146

Figures 144 -146: A TLR (twins lens reflex) camera. The top lens is for the viewfinder, the bottom lens responds to the shutter button. It has a waist level viewfinder, meaning that you hold the camera low and look down into it. The crank on the side advances the film. The focus and apertures are also on the side of the camera.

Figure 147: A roll of 120mm film. This is the standard film for all medium format cameras. Depending on your camera's aspect ratio, you may get anywhere from seven to sixteen photographs on one roll.

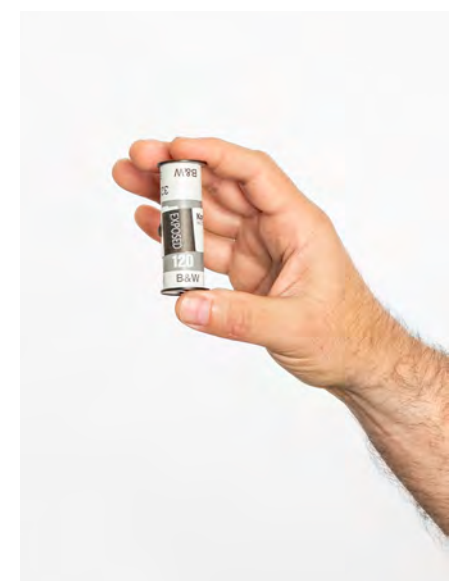


Fig. 147



Fig. 148



Fig. 149



Fig. 150

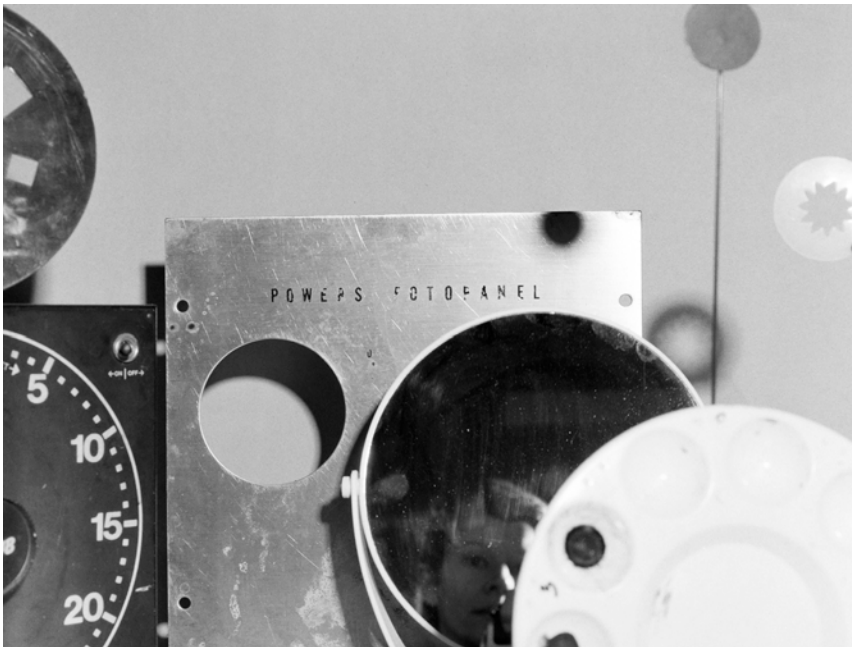


Fig. 151

Figures 148-150: A medium format rangefinder camera. Rangefinder cameras have a viewfinder that is a separate window not connected to the lens. This camera loads and operates very similarly to a 35mm camera.

Figure 151: An example of a negative made with the rangefinder camera that is pictured above. It has a 6x4.5 aspect ratio.



Chapter 8

Thinking

Photographically

This chapter delves into aesthetic and conceptual decision making behind your photographs. It will explore compositional techniques, creating meaning, and developing a project, along with posing some larger questions about photography as a medium. Now that you have the tools to make photographs, you need to figure out why you are making photographs and what you want them to say. The way you utilize the camera can transform your subject, along with your printing and presentation choices. Altogether, those choices produce images that are read by the viewer in a specific way. Knowing this better prepares you for the decisions you will make when working on a singular image or a body of work, also called a **series**.

Why Make Photographs?

This question goes back to the introduction of this guide. Why do we make photographs? Almost everyone on the planet has used a camera in one form or another, and, if everything has been photographed, why do we continue to make more? One answer is: we are individuals and a photograph can present your version of a particular subject or story. Another answer might be to convey a message. Whether making photographs for yourself or for a client, each image brings information to the viewer that they interpret. By thinking strategically about how you compose and present an image, you can shape the message within the image.