



SERGEL (MULTI-PINHOLE)

I have always been drawn to alternative photographic processes for many reasons. Among those reasons exists the potential for what I call “happy accidents”: events and outcomes that occur without intention and that ultimately result in a better print.

Typical happy accidents are often related to the print-making process: an unintentional spill of emulsion on paper, a brush-stroke taking on a shape of its own or a color shining with an unexpected hue. Such accidents, commonplace in the pinhole photography, can lead to a very pleasing print (and, in my case, a very happy photographer).

These “accidents” may also occur in-camera, however: intriguing light leaks, a failure to fully wind between exposures, or an imperfect container all can result in surprisingly beautiful images. When it comes to building a pinhole camera, though, why leave these events to chance? If one can create his or her own luck, shouldn't it also be possible to lure the happy accident into forming?

## Unique Characteristics of Pinhole Photographs

Many special effects can be created by modifying a pinhole camera. As an example, the camera can be designed with a bent film plane, which distorts horizons and subject matter. Additional effects can be obtained by modifying the focal length: a camera with an extremely short focal length creates a wide angle effect, whereas a telephoto effect may be created by building a camera with a long focal length. Another alteration involves zone plates, which are a series of clear and opaque rings that add soft focus and sometimes a halo to the subject. Furthermore, a “cubistic” effect (multiple exposures) can be achieved by building a “chest of drawers” style camera. This effect involves several pinholes exposing light on the paper or film.

When it comes to uniqueness and special effects, my favorite pinhole camera technique involves using multiple pinholes. The first multiple pinhole I ever set eyes on was taken by Jan Kapoor with her 360-degree camera. With such a camera, subjects and landscapes merged in Jan's images, touching and interacting with each other. Jan's pinhole camera was created using a hexagonal box. It has six separate pinholes of the same diameter on each side of the box. Inside the camera, the film is wrapped around a cylinder, making it possible for Jan to expose the film from several angles. She is able to use those six pinholes individually, simultaneously, instantly or over a period of time to create her wonderful landscapes.

## Constructing Multiple Pinhole Cameras

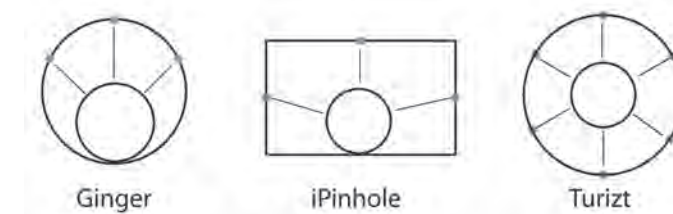
Now that we've covered some basics, let's delve a bit deeper into my favorite pinhole camera technique. In the experiment I will describe, I had a particular goal in mind: I wanted to see what kind of results I could get by creating and comparing two multiple pinhole cameras of similar size but of different shape: one square, the other round.

The first step? Choosing my containers. I admit that I am one of those computer nerds who buys software and then keeps the boxes, full of manuals and CDs, on the bookshelf. When I was looking for a container for my most recent camera a big, sturdy, completely black (and therefore already prepped as a pinhole camera) “Apple” box caught my eye. I was forced to sacrifice a few manuals into the recycling bin, but I decided this box would be perfect for making a square multi-pinhole camera. The second container was even easier to choose, as it involved washing down a tin of very tasty “Anna's Gingerbread Biscuits” with a few cups of tea to free up a perfectly round container.

I then spent a day with Lena Källberg, in her studio in Stockholm, to build and test my two cameras (ingeniously named “iPinhole” and “Ginger”). Lena, who is also an avid pinholer, built her own multi-pinhole camera using a round cake tin. She named it “Turizt” after the name on the box. You can call me crazy, but I have a theory that computers and cameras work best when they have a good name. If you don't already have names for your cameras, give it a try...you might be surprised by the results.

After contemplating the technical details, I decided to give the iPinhole camera three openings (the openings would eventually hold a piece of aluminum, through which the pinholes would be drilled): a square opening in the front - piercing the Apple logo - and one in each side. Ginger received three openings as well, each spaced evenly across the front of the tin. Lena decided to make hers a 360-degree camera, which meant the Turizt camera was the beneficiary of three openings, carefully measured and spaced exactly equidistant around the box - she is a perfectionist!

Each of our cameras received an inner circular can for fastening the paper. For the iPinhole and Ginger, the inner can was



placed at the back wall, and in the Turizt 360 camera it was placed in the center. The inside of Ginger was then sprayed with matte black paint. Turizt was given a coat of matte cardboard paper while iPinhole, already black both inside and out, needed no extra coloring.

After prepping the cans and the box, it was time to work out optimum pinhole sizes. We elected to use “PinholeDesigner”, which is a great calculator that can be downloaded and installed from this site: [www.pinhole.cz/en/pinhole designer](http://www.pinhole.cz/en/pinhole designer). Our calculations revealed that the optimum pinhole size for both iPinhole and Ginger was between 0.31 mm and 0.40 mm. Turizt had an optimum pinhole size of 0.36 for all six holes.

Making nice, round pinholes of the right size is one of the trickiest challenges in constructing a pinhole camera. We elected to use an old beer can, which was cut, sandpapered smooth, pierced with a needle, scanned in and measured in Photoshop, pierced, sandpapered again, scanned and measured again, and again, and again.

One might ask at this point: why drive ourselves crazy trying to make the perfect hole? For this reason: a perfectly calibrated pinhole camera has an infinite depth of field, which means that everything in the final photograph will be in focus. That quality is what we were after, and we managed to make all the holes with a difference of less than 0.02 mm.

After we had determined the size of the pinholes and the focal length, we could easily work out the f-stop of our cameras using this formula:

$$\text{focal length/diameter of pinhole} = \text{f-stop}$$

## Testing the New Cameras

All three cameras were quite close in their f-stops. The iPinhole camera had f-stops ranging from f/179 to f/211. Ginger's range landed between f/160 and f/184, and Turizt had an f-stop of f/180.

When the paint had dried and we were finally happy with the pinholes, it was time to test for light leaks. We journeyed into the darkroom and inserted a brand new sheet of unexposed paper into each camera and placed the cameras in the sun for a few minutes, WITHOUT opening the shutters. The paper was then developed and each sheet emerged white as snow - perfect, no light leaks!

We could finally head out to the park to field test our cameras. It was late in the afternoon, but it had been a lovely day and it was still sunny. The September sun was setting behind a number of buildings. After consulting the exposure chart listed in From pinhole to print (also shown here) I decided on an exposure of “cloudy at f/180”. This translated to an exposure time of two to four minutes, so I elected to expose the paper for an average of three minutes.

Ginger behaved excellently during the exposure, and the black tape shutters worked fine. Turizt also performed well. iPinhole, however, was a different matter. The use of a black tape shutter on a cardboard box was not optimal, as part of the box's paper

| Exposure table - a starting point |                               |         |           |           |           |
|-----------------------------------|-------------------------------|---------|-----------|-----------|-----------|
| Weather                           | F-stop of your pinhole camera |         |           |           |           |
|                                   | 128                           | 180     | 256       | 360       | 512       |
| Bright sunshine                   | 15 s                          | 30 s    | 60 s      | 1.5-3 min | 3-6 min   |
| Hazy sunshine                     | 30 s                          | 1-2 min | 3-5 min   | 5-10 min  | 15-45 min |
| Cloudy but bright                 | 60 s                          | 2-4 min | 6-10 min  | 10-20 min | 30-90 min |
| Cloudy                            | 2-4 min                       | 4-8 min | 15-30 min | 30-60 min | 1.5 h-3 h |

If you are taking photographs indoors with your pinhole camera, you can use the “Cloudy” exposure time and double it as a starting point.

tore loose when I pulled the tape away for exposure. This not only ripped pieces off the box but also rendered the black tape useless for further exposures. As I had not taken this into consideration, I had no more black tape with me in the field and had to cover the holes with my hand on the way back to the darkroom. Not ideal.

It was now late, however, and the sun had set. It was time to call it a day - no more time for test shooting. We returned to



When light enters a pinhole camera, the image is reversed and upside down. A multi-pinhole camera will not make panoramic images, as perhaps would be expected, since each image is reversed. An object that sits at a dividing line between two pinhole projections will be split into two pieces that are on the far sides of the negative. To achieve panoramic images you would in fact need a very complex design using mirrors. What you achieve instead with a multi-pinhole camera is an interesting blend of the landscape and an unexpected merging of objects. The images reverse into each other, one after another.

the dark room to develop our prints. iPinhole's test print did develop a black patch on the side of the paper - I suspect due to an inability to close the shutter properly. That very night, I used a beer can to create a reinforced plate over the holes in iPinhole, so I would be able to remove the black tape without parts of the box falling off. Much better!

The cameras were now complete, and the test prints developed. Complete, at least, in the cases of iPinhole and Ginger. Lena achieved a very nice test shot with her Turizt but, because she is a perfectionist, has decided to fine-tune her camera. She is working out the optimum space between the inner can and the outer can to make a perfectly seamless gap between each image. So far, her conclusion is that five pinholes, coupled with the use of a smaller outer can, will result in a perfect multi-pinhole camera.

Although we have improved our chances of avoiding accidents, we are still treated with unpredictability of pinhole photography and those aforementioned happy accidents. To the seasoned photographer, pinhole cameras may seem too simple to offer much versatility in the area of image-making. However, these "limitations" often help a photographer free him or herself from the discrete and often rigid technical settings that more modern cameras possess. Such pinhole cameras, utilizing one or more tiny, drilled holes, record the world differently than the way our eyes see it and add unexpected characteristics to reality. In this way, what were

once limitations may then become the opposite: they may become, in fact, opportunities, inspiring creative problem-solving in less than perfect situations. §

Check out "From pinhole to print - Inspiration, instructions and insights in less than an hour" by Gary Fabbri, Malin Fabbri and Peter Wiklund. The book is designed to guide beginners to build a simple camera and develop a print. The photographers' gallery chapter shows some advanced features and effects and truly inspires.

[alternativephotography.com/books/pinhole\\_to\\_print.html](http://alternativephotography.com/books/pinhole_to_print.html)



SUSHI BAR (MULTI-PINHOLE)

## The Pinhole Camera

by Brian Krummel

To be perfectly honest, when I learned the title of Brian Krummel's new book *The Pinhole Camera* I couldn't help but think "not another pinhole book." After spending some time with the book however I was delighted to learn that it is just that; "NOT just another pinhole book!"

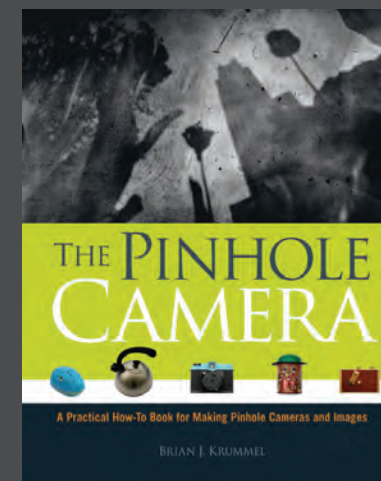
Characterized by his own photographs, Krummel has put together a very unique perspective on pinhole photography

that includes valuable information for the beginner and advanced pinholer alike. Most of Part II of the book "The Pinhole Camera" is neatly wrapped up with a Beginner Track section, an Advanced Track section and, my favorite, the Creative Opportunities section. Krummel treats the readers with images of prefab pinhole cameras as well as homemade cameras, including everything from tin cans to deer skulls to sourdough rolls, each accompanied by photographs taken with the camera - furthermore complimenting the how-to process.

As a photographer, my favorite aspect of workbooks is the photography that accompanies the instruction. These are meant to inspire the student to push the bounds of the art form and see not only a history of the art but a future. Krummel does do this by delivering a balanced, well illustrated and designed book chock-full of information for the beginner and advanced pinhole photographer. Even if you are an advanced pinholer, *Chapter 6 - Printing* could be new territory that you may want to wander into.

I highly recommend this how-to book to educators looking for innovative pinhole techniques as well as the DIY photographer. The big bonus is that because of the images throughout and the showcase section, "The Pinhole Camera" doubles as a photography coffee table book. Get two, one for the darkroom, and one for the coffee table.

More information at [pinholecamera.com](http://pinholecamera.com).



## You Gather My Darkness Like Snow Watch it Melt

Paula Rae Gibson

Singer, Songwriter, Poet, and Photographer...it goes without saying that Paula Rae Gibson is multi-talented. When I first opened *You Gather My Darkness Like Snow Watch it Melt* it seemed I was peering into her personal journal. Comprised of poetry, photography and other collage, the book acts as a coping mechanism, either for the loss of the artist's husband, or more so, the emotional turmoil of the relationships in general. Taped, painted, glued and chemical-stained self portraits expose her vulnerability and in turn, offers up her strengths. Most pages are balanced with introspective prose that reflect the moodiness of the images. For example:

The she before  
would have done anything for  
one minute of ecstasy  
live blindly  
out of her mindly  
hanging on a thread  
to  
believe  
in  
rare  
things

Unfortunately, after reading the book and writing this review I found out that *You Gather My Darkness Like Snow Watch it Melt* is out of print. You may be able to find it online somewhere...the good news is, Gibson has a new book titled *I'll Always Walk Away* which comes with an accompanying DVD that validates her as a filmmaker, composer and singer as well. You can find it at most book sellers. For more information visit [paularaegibson.com](http://paularaegibson.com) or [babellabel.co.uk/paularaegibson.htm](http://babellabel.co.uk/paularaegibson.htm).

