

Wildflower Macrophotography Workshop



Photographing Nature Up Close with your Camera
Includes use of digital cameras

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INTRODUCTION

Compared to photographing wildlife, wildflowers are easier to capture, for one thing they don't run away! With only a modest investment in camera gear anyone can capture beautiful wild flower images. The main challenges we have are:

- 1) Wind
- 2) Harsh light
- 3) Holding the camera steady
- 4) Getting in close
- 5) Finding a unique view point
- 6) Finding the flowers



Bunchberries photographed with a 50 mm macro-lens at about 0.25 X

WIND

Wind is the nemesis of all wildflower photographers. One way to reduce the effects of wind is to use fast shutter speeds, but for this you will need a high speed film or set your digital camera at a high ISO speed. In general the higher the ISO speed the less saturated the image will be and the grainier it will appear. Some folks like the appearance of grain in their image. Another way to reduce the effects of wind is to build a wind break, anything can be used, garbage bags attached with clothes pegs, an umbrella or reflector, even your jacket. If the wind is not gusting you can use an electronic flash, which will fire a brief burst of light mimicking a high shutter speed. Alternatively, you may decide to use the wind, choose a slow shutter speed and allow the flowers to blur as they move. This often works best if you have field of flowers.

LIGHT

Bright sunlight on a clear day is not the best light for close-ups of wild flowers, as it will often result in burned out highlights and dark shadows with no detail. Soft overcast light, especially after a light rainfall, is ideal. When overcast light is not available, you can mimic its effect by shading the flowers with a large diffuser, or search for flowers growing in the shade. If the light is harsh or directional, try working it into the composition so the light comes from the side, or back of the flower, this can sometimes be used to create a rim light around the edge of the plant. Using an electronic flash takes a bit of practice to achieve satisfactory results. If you shoot from a low

angle, the light falls off quickly behind the flower leaving a black background which some folks like. If you own a digital camera you can preview the results in the field and adjust your exposure compensation to get the best results.

CAMERA SUPPORT

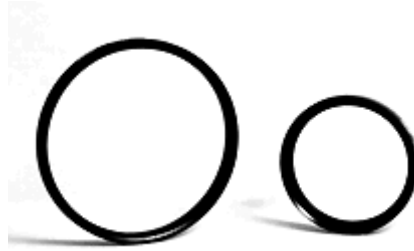
Holding the camera steady so your pictures are sharp means using a tripod or other support item. Tripods with legs that spread flat are ideal. Another option is to use a beanbag as a support – these are cheap and easy to make, you can fill a plastic ziplock or cloth bag with dried beans and then rest your camera on the bag. This will allow your camera to be positioned close to the ground. You can also use your self timer to reduce camera-shake. Because the depth of field is narrower when you move closer to a subject, photographers often compensate by using smaller apertures e.g. F11, 16, 22 or even 32. At these small apertures, your shutter speeds will be quite long depending on the ISO speed of your camera setting; it's not uncommon to have exposures in the range of 1\15 of a second to 4 seconds or more. Hence the need for a windbreak and a tripod. A tripod will also encourage you to compose your images more carefully.



For macrophotography choose a tripod that allows you to spread the legs flat so you position your camera low near the flowers

GETTING IN CLOSE AND MAGNIFYING YOUR SUBJECT

Getting your camera close to your subject requires special filters, lenses or lens attachments. The options vary in cost. The good news is that even economical solutions can make for some great pictures. A good way to start is to purchase a set of close-up filters that fit on your normal or zoom lens. Close-up filters screw on to the front of your lens and allow your lens to focus closer. How much closer you can come depends on the lens you use and the diopter strength of the filter. A +2 diopter close-up filter will permit you to focus on objects 500 mm from the subject and a +4 diopter filter will allow you to focus on subjects 250 mm from the front of your lens when set at infinity. The magnification they achieve will depend on the lens they are attached to e.g



$$\text{Magnification} = \frac{\text{Focal length of Camera lens}}{\text{Focal length of Close-up lens}} \quad \frac{50 \text{ mm lens}}{250 \text{ mm (+4)}} = 0.25 \text{ X} \quad \frac{200 \text{ mm lens}}{500 \text{ mm (+2)}} = 0.4 \text{ X}$$

These are the values for the lens set at infinity focus.

The most economical close-up filters are single lens elements and a set of three (+1, +2, +4) cost about \$50. These filters can also be stacked for further magnification e.g. +1 and +2 = +3. It is recommended you put the highest diopter lens on first. Cannon and Nikon also make multi-element close-up filters that cost more, but are better in quality. Those range in price from \$50 to \$150 each. Close-up filters are easy to carry with you, they do have some loss of sharpness around the edge, but for flower photography this is not a major drawback. Also when the close-up filters are attached to your lens, you camera cannot focus to infinity – they are strictly for close-up photography.

Another option for getting in close is to use extension rings, they too come in different lengths. Because these do not contain any lenses, the quality of the final image will depend on the lens that you attach the extension tubes to. Olympus makes an auto extension tube with varying length. Bellows are another form of lens extension, though I have not found bellows to be convenient for fieldwork. The amount of magnification achieved will depend on the length of extension and the lens that the extension tube is combined with.



$$\text{Magnification} = \frac{\text{Extension tube distance in mm}}{\text{Focal length of camera lens}} \quad \frac{50 \text{ mm extension}}{50 \text{ mm lens}} = 1.0 \text{ X} \quad \frac{50 \text{ mm lens}}{200 \text{ mm extension}} = 0.25 \text{ X}$$

If you own teleconverters (e.g. 1.4 X or 2X) these can be used with most of the lenses you own to magnify the image. Teleconverters reduce the amount of light coming through the lens, a 1.4 X by 1 F-stop, and the 2X by 2 F-stops. This reduction in light can make focusing more difficult. Teleconverters degrade the image slightly, how much degradation occurs will depend on the quality of the converter and the quality of the lens it is paired up with.



Tamron 90mm F2.5 macro lens and an Olympus 50 mm F2.8 macro lens. Note the built in extension on the 50 mm macro lens – this permits the lens to focus closer than a normal lens. Macro lenses are highly corrected resulting in razor sharp images and can also be used for general photography, landscapes and portraits.

For the best quality close-up images consider investing in a macro lens. In general these come in 3 focal length ranges: 50-60 mm, 90-105 mm and 200 mm. If you own a digital camera the effective focal length of these lenses will increase by a factor of 1.5 or 1.6 X. The longer the focal length the greater the distance you can be from your subject and the narrower the angle of view is. A narrow angle of view can be used to advantage to isolate a subject against the background. I own both the 60 mm and 105 mm varieties and I tend to use the 60 mm lens most often. Since I shoot both digital and film based cameras, by placing my 60 mm lens on my digital camera, I have in effect a 90 mm macro lens as well. The 60 mm lens also serves as a general-purpose lens. Ultimately what you buy and use for close-up photography will depend on your budget, how often you take close-up pictures and how serious you are about the quality of your images.

FINDING A UNIQUE VIEWPOINT

Taking pictures of wild flowers is easy, but taking compelling images is not. Wild flowers are a popular subject for nature photographers and images of flowers are everywhere making it difficult to produce images with impact. Some photographers prefer a documentary approach; others like to use soft focus, blur, selective focus or multiple exposures to capture their interpretation of the flower. Another technique is to vignette the edges of the frame and flower by using leaves or other flowers held close to the lens so they are out of focus. For those that use image-editing software there are many digital filters and techniques one can apply—ultimately the viewer must decide whether the artist has been successful regardless of the techniques employed. I like to explore and experiment with many techniques, both in camera and in my computer. I believe that unless an image is destined for a guidebook or other scientific purpose any technique is fair game in striving to create artistic images. I also look for simple backgrounds, soft overcast light and a composition that complements the shapes and arrangements of the flowers.

FINDING WILDFLOWERS

Finding wild flowers is easy as they are everywhere, but finding specific species can be challenging. One of the things I do is to keep notes where and when I encounter certain flowers so I can return again the following year. A variety of guidebooks can also help you identify different flowers and when or where you are most likely to encounter them. The first spring flowers to emerge in Calgary are Prairie Crocuses along the Bow River about mid March. These flowers are remarkably resilient and can survive several days buried under snow. Wildflowers grow almost everywhere and capturing them with your camera is a great way to get out doors, reduce stress, and enjoy some of nature's most colorful creations. Once you find them, they won't run or fly away, but they may not always hold still.

COMPOSITION & the ELEMENTS of VISUAL DESIGN

Many photographers on purchasing a new camera are preoccupied with learning its various features and controls and no doubt, this is important in obtaining correctly exposed images and an appropriate depth of field. However, once the basic operation of the camera is mastered, one needs to direct their attention to seeing and composing effective images. Effective images are those that command attention and communicate some feeling to an audience. Capturing a “feeling” and your viewers’ attention is a demanding task that requires practice, experimentation and study. Studying the basic elements of visual design and understanding how they work will help new photographers improve their composition, but simply following rules does not guarantee success. Furthermore, how an audience responds to an image depends on their past experiences (memory), interests, and what it is that they are looking for. This is why the same picture often receives a variety of responses from different viewers. To create effective images a photographer must understand the way people respond to various kinds of visual organization. This involves learning the vocabulary of design, viewing examples of artwork that utilize effective design elements, and actively implementing components of design into the process of photography.

Line

A line represents a “path” between two points. A line can be straight, curved, vertical, horizontal, diagonal, or zigzag. Lines imply motion and suggest direction or orientation. A line can also be implied, that is filled in by the mind when several points are positioned geometrically within a frame. Placing four dots on a page in the shape of a square can imply the points are linked as the mind searches for recognizable patterns. The direction and orientation of a line can also imply certain feelings. Horizontal lines imply tranquility and rest, whereas vertical lines imply power and strength. Oblique lines imply movement, action and change. Curved lines or S shaped lines imply quiet, calm and sensual feelings. Lines that converge imply depth, scale and distance – a fence or roadway converges into the distance provides the illusion that a flat two-dimensional image has three-dimensional depth. A line is an effective element of design because it can lead the viewer’s eye. To create more effective photographs actively look for lines and arrange them within your viewfinder to invoke specific feelings.

Shape

Shapes are the result of closed lines. However shapes can be visible without lines when an artist establishes a color area or an arrangement of objects within the camera’s viewfinder. Some primary shapes include circles, squares, triangles and hexagons all of which appear in nature in some form or another. **Space** is defined and determined by shapes and forms. Positive space is where shapes and forms exist; negative space is the empty space around shapes and forms. For images to have a sense of balance positive and negative space can be used to counter balance each other.

Form – Light & Dark

Form refers to the three-dimensional quality of an object, which is due in part to light, and dark areas. When light from a single direction (e.g. our sun) hits an object, part of the object is in

shadow. Light and dark areas within an image provide contrast that can suggest volume. Factors that can affect our feelings towards an image include the direction of the light source, from above or below, and the gentleness or abruptness of the half tones. Light coming from behind a subject can form a silhouette resulting in object that is completely black against a lighter colored background. Silhouettes appear as two-dimensional shapes lacking form. The absence of color often enhances our perception of form for instance in black and white photographs. Light emitted from above and to the side when applied to portraits creates what is often referred to as “Rembrandt lighting”. This form of lighting emphasizes edges and depth. In landscape photography oblique lighting occurs early and late in the day where it enhances the natural texture of the landscape and is often accompanied by warm or cool color casts.

Color

There has been a tremendous amount of research on how color affects human beings and some of this research suggests that men and women may respond to colors differently. Color affects us emotionally, with different colors evoking different emotions. In short color has the capacity to affect the human nervous system.

The vocabulary of color includes:

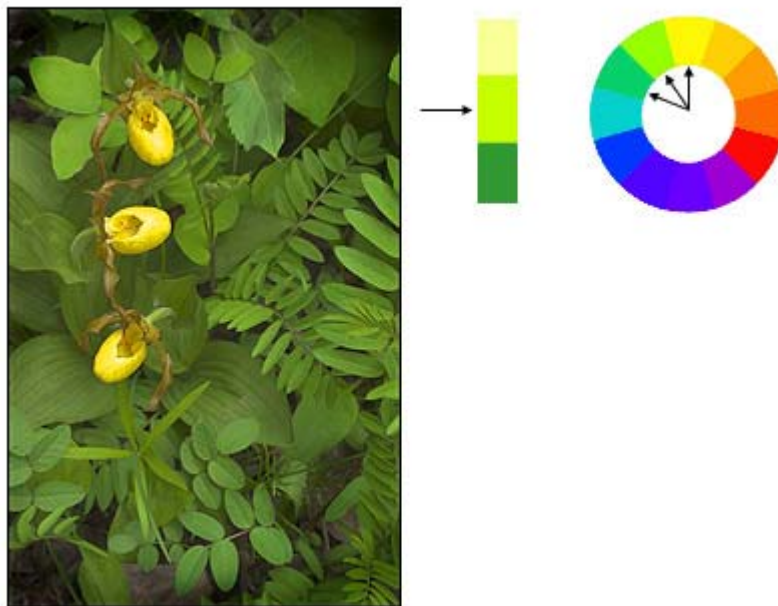
Hue: refers to the names of the primary colors, red, green and blue.

Value: lightness and darkness of the color – the amount of white or black added.

Intensity: the purity or saturation of the color

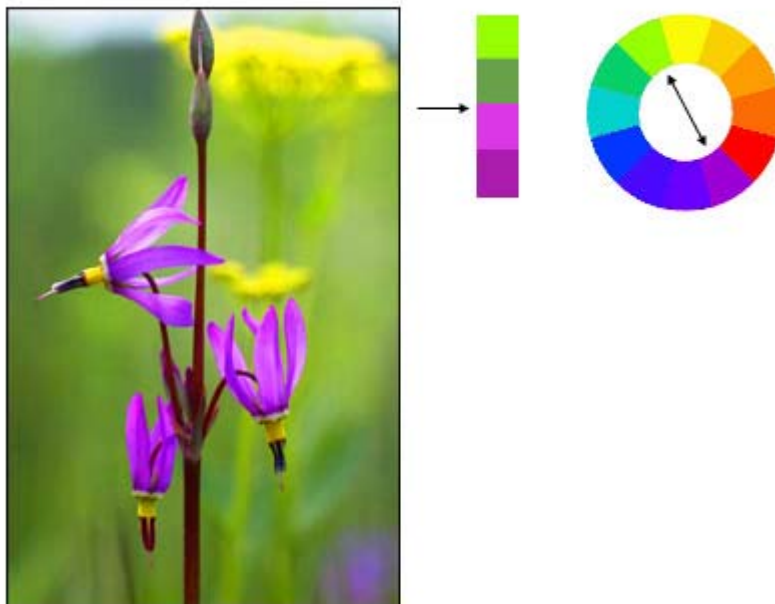
Monochromatic color: use of one color where only the value of the color changes

Analogous colors: colors that are adjacent to each other on the color wheel, e.g. yellow and green



Analogous colors next to each other on the color wheel “get along” and are referred to as being harmonious. Analogous colors are often used in visual design and have a soothing affect.

Complementary colors: colors opposite to each other on the color wheel, e.g. Blue-violet and yellow, represent colors positioned across from each other on the color wheel. Complimentary colors exhibit more contrast when positioned adjacent to each other –for example yellow appears more intense when positioned on or beside blue or violet (see picture below)



In the photograph above – green and yellow are analogous colors that harmonize where as the violet color of the shooting stars appears more intense against a complementary colored background.

Warm colors include: yellows, red and orange we associate these with blood, sun and fire.



Sunrise behind a popular tree at Writing-on-Stone has a warm fire like feel to it.

Cool colors include: violet, blue and green because of our association with snow and ice.



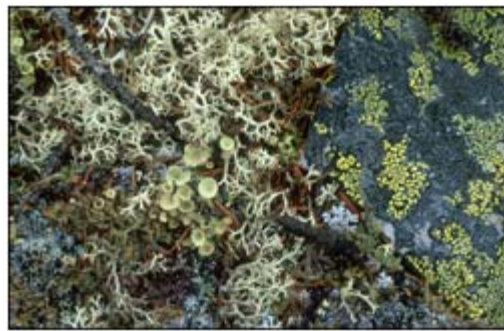
Banff Springs Hotel with light blue filter emphasizes the coldness of winter (Monochromatic color)

Colors are called warm or cool because of our association with various elements in our surroundings. Red, yellow and orange are considered warm colors whereas blue, green and violet are considered cool colors. These contrasts are relative since yellow-green are cool next to red, orange or yellow, but would be considered warm next to blue-violet. Photographers can position different colors in an image to maximize contrast between them and also to provide perspective. Perceptually, cool colors tend to recede into the distance whereas warm colors appear to advance (see image below).



Loaf Mountain – warm glow of sunrise advances where the cool blue shadows recede.

Texture refers to the surface quality or “feel” of an object – smooth, rough, soft, etc. Textures may be actual (felt with touch – tactile) or implied (suggested by the way an artist has created the work of art –visual). Texture is often emphasized in oblique lighting as it strikes the objects from one side.



Composition

Organizing the various elements within the frame of the viewfinder in order to create an effective design is more challenging than it might seem at first. A painter can position the elements where they want, whereas a photographer must search, find and organize visual elements within the camera viewfinder. Although a photographer can sometimes "arrange" objects in a natural environment such as leaves, this often results in a contrived looking picture. Nature is not perfect and variation within organization leads to greater interest. Effective composition of natural images is always a balance between arranging elements within the view finder and allowing a certain amount of disorder.

The decision-making processes we make when taking a photograph starts first with being able to see possibilities. What we see depends on what we are interested in, what we are looking for and what our minds are prepared to show us. Seeing, in short, involves the mind and our memory as much as it does our eyes. Improving our visual sensitivity requires quieting our minds, relaxing, and preparing by learning as much as we can about our preferred subjects. Once we see things that are of interest, then we need to isolate parts of the scene, and organize the important visual elements within our viewfinder to effectively convey how we feel about them.

Unity refers to an ordering of all elements in an image so that each contributes to a unified aesthetic effect so that the image is seen as a whole. Failing to accomplish this results in the premature termination of the viewer's experience – they look away. There are a number of ways to achieve unity to attract and keep the viewers attention.

Dominance and Subordination:

An artist or photographer attempts to control the sequence in which visual events in the frame are observed and the amount of attention each element receives. Making an element dominant can be done through size and color. Large objects dominate smaller ones and warm colored objects dominate cooler pale colored objects. Another way of achieving dominance is through positioning various elements within the frame. A centrally located object will draw more attention than one at the periphery. However the center is not the best place to position the most dominant element – usually just to one side of the center is more effective.

Another method to achieve dominance is through convergence or radiation of lines. The eye tends to follow these lines to the point where they converge.



Veins on this leaf converge at a single point making it the dominant element in the image.

Dominance can also be achieved through nonconformity i.e. difference or exception. If all the elements are similar and one is different in color, tone or shape– it will stand out and become dominant. The brown cattail leaf below is dominant because it is different from those around it.

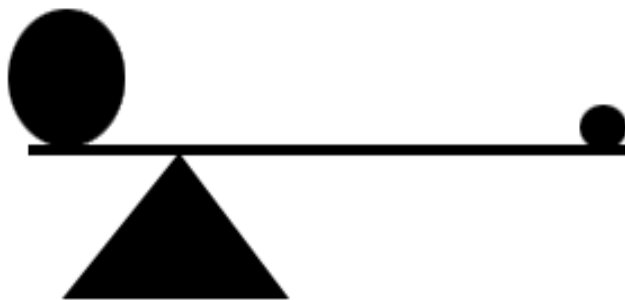


Coherence refers to the belonging together of the various parts of the artwork. In reality these parts may be unrelated, but within the confines of the image their color, shapes, and size form a sense of unity. Visual coherence can be achieved through the use of analogous color and color tonality. It can also be achieved through similarity of shape, color size or texture. However too much similarity can lead to boredom – we need some variety to add “spice” to the image.



This image of smooth stones uses similarity in shape, size and colors to provide coherence.

Balance implies that the visual elements within the frame have a sense of weight. Large objects generally weigh more than small objects and dark objects weigh more than light colored objects. The position of the elements is also critical. We unconsciously assume the center of a picture corresponds to a fulcrum. A heavy weight on one side can be balanced by a lighter weight on the other side if the lighter weight is located at a greater distance from the fulcrum.





Another way to achieve balance is through symmetry. Reflections of the landscape in still water are an example of almost perfect symmetry. Reflections can take on an abstract quality that resembles a Rorschach inkblot used in a psychological testing.

Rorschach inkblot created by folding a piece of paper covered and filled with ink to form a symmetrical pattern.



Positive and Negative Space

Positive space is where shapes and forms exist; negative space is the empty space around shapes and forms. In the photo below the black area is negative space and it serves to balance the area in which the marmot and rock occupy. Areas of a picture that contain “nothing” are important visual elements that provide balance in an image.



Rhythm

Rhythm refers to the regular repeating occurrence of elements in the scene just as in music it refers to the regular occurrence of certain musical notes over time. In photography the repetition of similar shapes sets up a rhythm that makes seeing easier and more enjoyable. Rhythm is soothing and our eyes beg to follow rhythmic patterns. To be effective, rhythm also requires some variability – rhythm that is too similar or perfect may be boring. Therefore when composing your images look for repetition with variation. For instance if you are photographing a fence – one that is perfect will not hold a viewers interest for long, but one in which some of the posts are bent, broken, larger or smaller will generate more viewer interest.



Differences in the height of the fence posts add interest to an otherwise monotonic rhythm. The yellow marigold is balanced by the negative space of the complimentary colored blue sky.

Proportion – Golden Ratio and Rule of Thirds

Proportion refers the size relationship of visual elements to each other and to the whole picture. One of the reasons proportion is often considered important in composition is that viewers respond to it emotionally. Proportion in art has been examined for hundreds of years, long before photography was invented. One proportion that is often cited as occurring frequently in design is the Golden mean or Golden ratio.

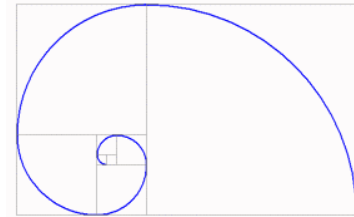


Golden Ratio: 1, 1, 2, 3, 5, 8, 13, 21, 34 etc. Each succeeding number after 1 is equal to the sum of the two preceding numbers. The Ratio formed 1:1.618 is called the golden mean – the ratio of bc to ab is the same as ab to ac. If you divide each smaller window

again with the same ratio and joining their corners you end up with a logarithmic spiral. This spiral is a motif found frequently throughout nature in shells, horns and flowers (and my Science & Art logo).

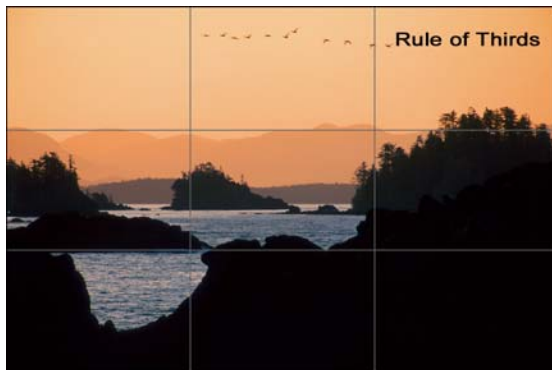
a b c

The Golden Mean or Phi occurs frequently in nature and it may be that humans are genetically programmed to recognize the ratio as being pleasing. Studies of top fashion models revealed that their faces have an abundance of the 1.618 ratio.



tlc.discovery.com/convergence/humanface/articles/mask.html

Many photographers and artists are aware of the rule of thirds, where a picture is divided into three sections vertically and horizontally and lines and points of intersection represent places of position important visual elements. The golden ratio and its application are similar although the golden ratio is not as well known and its' points of intersection are closer together. Moving a horizon in a landscape to the position of one third is often more effective than placing it in the middle, but it could also be placed near the bottom one quarter or sixth. There is nothing obligatory about applying the rule of thirds. In placing visual elements for effective composition, one must assess many factors including color, dominance, size and balance together with proportion. Often a certain amount of imbalance or tension can make an image more effective. This is where we come to the artists' intuition and feelings about their subject. Each of us is unique and we should strive to preserve those feelings and impressions about our chosen subject that are different.



Rule of thirds grid applied to a landscape



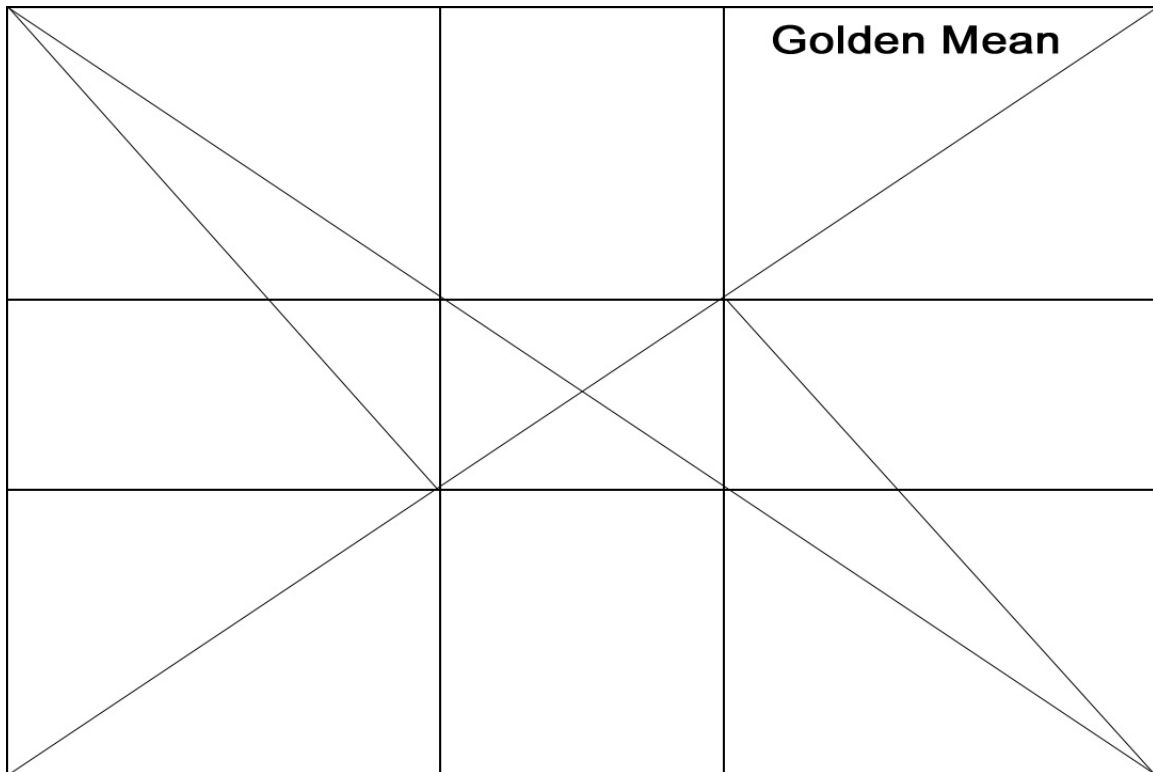
Golden mean grid applied a simple composition

On analyzing some of my favorite photographs by laying down grids (thirds or golden ratio in Adobe Photoshop) I find that some of my images do indeed seem to correspond to the rule of thirds and to a lesser extent the golden ratio, however many do not. I suspect an analysis of other photographers' images would have similar results. There are a few web sites and references to scientific studies that have studied proportion in art and photography but I have not come across any systematic studies that quantified their results– maybe I just need to look harder (see link for more information about the use of the golden ratio <http://diser.org/GoldenMean/>).

In summary, proportion is an element of design you should always be aware of but you must also realize that other design factors along with your own unique sensitivity about the subject dictates

where you should place items in the viewfinder. Understanding proportion and various elements of design are guidelines only and you should always follow your instincts combined with your knowledge. Never be afraid to experiment and try something drastically different, and learn from both your successes and failures. Also try to be open minded about new ways of taking pictures, new techniques, ideas – surround yourself with others that share an open mind and enthusiasm and you will improve your compositional skills quickly.

		Rule of Thirds



35 mm film has the dimensions 36 mm by 24 mm (3:2 ratio) – golden mean ratio of 1.6 to 1
Points of intersection are recommended as places to position important elements in your picture.

Chaos – Simplicity versus complexity.

Chaos is a disordered state of elements and it is found frequently in nature. The goal of many photographers is to take a picture that exhibits some underlying organization so the viewer sees what the artist intends for them to see, but leaves enough chaos within the frame of the image so the viewer has to put forth some effort to explore and fully appreciate the image. New photographers often include too many elements in their images and can often improve their composition by removing unessential elements. Beyond a certain point, however an image that is too simple fails to hold one's attention (e.g. single leaf above has interesting elements but after a few moments I find little to hold my attention). Compare this to an image I took with my 4 x 5 camera of the rainforest shot below, and I find the rainforest image has so many textures and patterns that I can look at and explore the image for extended periods of time and still continue to discover things I have not seen before. The ability to introduce and handle complex elements within the frame of an image and still produce an effective composition requires a maturation of seeing that takes time to develop. I have also found that larger film formats encourage compositions with more detail and complexity than using smaller digital and 35 mm film based cameras. In short, the size and format of camera you use will also influence what you shoot, and how you compose your images.



Summary & Conclusion

Understanding elements of visual design and how they can affect our emotions can also help us make our photographic images more effective. However, keep in mind that no rule or guideline can ever guarantee success. A successful image depends upon a multitude of things that must come together including: timing, lighting, color, composition, and an audience sensitive to what it is you are trying to communicate. It is likely that many artists carry out design intuitively and arrange elements so they “feel right” and since art is in part a way of expressing our feelings to others no other guiding principle may be required. As Freeman Patterson put it so eloquently “Good composition is always harmonious with the design of the material being photographed”, *Art of Seeing* 1985. Elements of design can be compared to the scales in music, they are starting points around which music is made but the elements are by themselves only building blocks. In conclusion, an understanding of the elements of design will not by themselves make you a better a photographer, but they can provide a framework in which to evaluate images and their effectiveness.

Another way to improve composition is to compare your images with those of others whose work you admire or respect. Mimicry is one way to begin to develop your skills and learning to copy the styles of certain artists is in part the road to towards developing your own style, although many artists may not admit to it. Take those stylistic elements you like and then integrate them into your own point of view. Evaluate and compare your work both technically and aesthetically against those of other photographers. Be realistic and critical when you evaluate your own images and edit your images ruthlessly. The better you become the more critical you will become of you own

work and those of others. Listen to what others have to say when they view your images, what they like, what they don't like but always be true to yourself and what your vision is. My wife may not be knowledgeable about design, but if she responds to image I know others will too.

One method to measure your success is when others wish to own or purchase your work. If you don't have to sell your photography to pay the rent or eat – you have a freedom that many professional photographers do not. You can take photographs for the sheer joy of it.

References

1. E. D. Feldman (1987) Varieties of Visual Experience, Harry Abrams, Inc. New York. Part three the structure of Art. ISBN 0-8109-1735-1
2. Z. Szabaro (1986) Landscape Painting in Water Color, Stoddart Publishing company, Ltd. Toronto, ISBN 0-7737-2074-X
3. F. Patterson (1994) Photographing the World Around You, Quebecor Printing Inc., ISBN-1-55013-590-2.
4. F. Patterson (1977) Photography for the Joy of it. Van Nostrand Co. New York, ISBN 0-442-29883-8.

Itinerary for June Workshop

Details provided at our first meeting, dress in layered clothing for any kind of weather and bring extra batteries, your camera manual and lots of film or digital media. If you own a tripod please bring it.

We will be getting down and dirty so old clothing, or a garbage bag, knee pads, old towel or small blanket to lay on might be useful for photographing flowers close to the ground.

We will be leaving at 7:00 am and returning in the early evening. We recommend you bring a lunch and a few dollars.

Early June is the best time of year to photograph a variety of Wildflowers in the Mountain Valleys. Some of the wildflowers we will be photographing include:

Sparrow's egg lady's slipper	Prickly Rose	Yellow Dryads
Calyspo Orchid	Oldman's whiskers	False Huckleberry
Round Leaf Orchid	Shooting Stars	White Geraniums
Yellow Lady's slipper	Mist maiden	Western Wood Lily
White Mountain Lady's slipper	Salomon's Seal and False Salomon's Seal	Heart Leafed Alexanders Indian Paintbrush
Elephant Head Orchids	Blue & Yellow Columbine	Baneberry
Blue Clematis	Canada Violets	Glacier Lilly