July 2010

History of Photography

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Photography is derived from two Greek words *photo* and *graph*. Together they literally mean "writing with light."

The principle of the *camera obscura*, a large room that could show images on a wall, was understood by the Arab Scholar Alhazan in the 11th century, who defined the principles that would be later developed into photographs.

The most basic principle of the *camera obscura* is based on the concept that light travels in a straight line. Light reflected from a scene outside a dark room travels through a small hole in a thin membrane. The light traveling through the hole will reach the opposite wall and show the outside scene, except it is upside-down and backwards to the actual scene. This is because the light reflected from the outside scene that is below the hole travels upward through the hole and continues to a high point on the wall. The light from the high point of the outside scene travels down through the hole to a low point on the wall. The light from the left and right will also do the same. Thus, the picture on the wall is backwards and upside-down.

The hole in the membrane is the same as the aperture in the lens of modern cameras (see the Understanding Aperture fact sheet). It was discovered that adding a convex lens helped to clarify the image.

Figure 1. The camera obscura concept.

Light sensitive paper was developed in the early 1800s and photographs were taken using silver compounds to record an image. Early cameras were able to record images of still objects directly onto the paper, but the size of the picture was determined by the size of the film. The early commercial cameras, such as this Daguerreotype Camera, could not adjust the lens or enlarge photos from film.

Figure 2. An early Daguerreotype Camera.

The following photograph of Abraham Lincoln in 1847 was taken with a camera similar to the one above. In this picture Lincoln had to sit completely still for several minutes for the film paper to record the image.

Figure 3. An 1847 portrait of Abraham Lincoln.

The Invention of High Speed Photos

In the 1870s new advances in chemistry led to the ability to capture subjects in motion. Cameras were equipped with a fast moving shutter that could open and shut in a fraction of a second. It was now possible to capture the image of a crowded street such as this scene in Chicago in the 1880s.

Figure 4. Downtown Chicago, Il, Circa 1880.

As the technology advanced so did the availability of the cameras. In the 1880s, George Eastman marketed film that could fit into a consumer camera. Using the cameras, such as the one below meant the average person could shoot pictures quickly and easily with affordable equipment.

Figure 5.
A typical camera from the late 19th century.

During the 20th century features such as flashes, telephoto and wide angle lenses were developed. In the 1930s film that could be developed into color pictures became widely available to the public. Today, black and white film is still in use mostly for art applications.

Figure 6.
A typical 1930s camera with a mounted flash.

Progression of Lenses

While better film was being developed (pun intended) lenses were also being improved. The simple convex lens of the beginning did not provide a clean picture toward the edges of the photograph. Experimentation with different lens shapes used together has produced the excellent quality lenses available in modern photography.

Arguably, lenses may be the most critical component of the camera. The first lenses were mostly suitable for landscape photography. Improvements made it possible to take good portraits as long as the subject remained very still. During the 1860s the Single Reflex Lens (SLR) was invented. This lens made it possible for the same camera to use multiple types of lenses. The development of various compound lenses makes it possible to take telephoto, wide-angle, macro, and standard photographs. A good quality lens provides the photographer a lot of flexibility.

Figure 7. These lenses show the different types that are available for use in normal circumstances, telephoto, or wide angle.

Digital Cameras

The word *digital* comes from Latin roots and means "Using numbers to represent values." *Digital photography* is the process of assigning numbers in a binary code to form an image from light. Digital cameras function according to the same principles as film cameras. The technology to record an image

has changed but the principle of balancing proper lighting to record correct exposure of an image remains the same.

In 1973 Steven Sasson, an engineer for a major camera company, invented the world's first digital camera. It took 23 seconds to record a 10,000 pixel photograph. (Most cameras today can take pictures 800-1,000 times larger.) The picture was recorded onto a cassette tape and was very blurry. However, the camera shown below has served as a prototype that has revolutionized the way pictures are recorded and edited.

Figure 8 The first digital camera.

Today cameras can record detailed images of fast moving objects. Figure 9 is a fairly sophisticated camera that is available to consumers that uses a memory card to record images instead of film.

Figure 9 A modern digital camera.

Summary

The process of recording an image onto a photosensitive surface has drastically changed in the past 200 years, but the principles involved with taking pictures remain the same as they did 1000 years ago. Digital cameras have become the preferred method of many professional and amateur photographers. Digital photography is very exciting as it allows for experimental learning without any extra cost. A photographer can practice with different settings and if the picture doesn't look good the results can be seen immediately and it can be deleted.

References

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This publication is issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Noelle E. Cockett, Vice President for Extension and Agriculture, Utah State University. (4-H/Photography/2010-01pr)