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From traditional to digital photography

Photography – historical perspective

The beginning of photography gave a camera obscura (Latin: “dark chamber”, “optical darkroom”), drawn by Leonardo da Vinci, introduced by Aristotle and described by Alhazen, an Arab physicist who allowed to get a real picture. For the official birth date of photography, we adopt the year 1839, in year which Louis Jacques M. J. M. Daguerre presents the French Academy a photo obtained on a silver iodine plate, thanks to the influence of a pair of iodine on a polished copper plate previously covered with silver. Photography in Poland appeared on 13 July of the same year, at the time when Maksymilian Strasz published an article about calotype, negative technique, consisting of exposing salt paper with silver chemicals and triggering, thanks to which the image became visible.

Photographic techniques can be divided into:

- noble photographic techniques based on photosensitivity (eg pigment, bromine) and chromate salts,
- traditional photography (monochrome photography and color photography) based on photosensitive silver compounds,
- digital photography is based on registration of the image on the matrix, which was mounted in a digital camera.

When it comes to traditional photography, it can be divided into:

- monochromatic – one color of the coloring substance (black and white pictures),
- colorful – image registration with its color.

Traditional photography consists in applying the image to chemical materials. It is based on silver or chrome photography as well as other photosensitive compounds. It is often confused with analog photography. This type of photography requires more concentration, because we have a limited number of frames to take pictures. When using white and black in photos, we can achieve the effect of distance from reality, thanks to which the picture becomes more surprising and unusual. It is also worth paying attention to light and shadow, because they can offer us more mysterious pictures when using the colorful method at the time of shooting. A good choice is then photos taken against the source of light, because they give an unusual, surprising effect. Photographs in this type of photography are prepared in a specially

prepared room, called a darkroom. Analogue photography consists in reproducing the image by means of an electronic analog device, as a result of which a signal called analogue is created when light is applied to the photosensitive element.

The advantages and disadvantages of traditional photography

Disadvantages:

- no preview of the obtained photo,
- less possibility of taking more photos,
- induced negatives and photos take up a lot of space and need to store them,
- it is not possible to buy a new camera because it is no longer produced,
- expensive cost of operation, because you need to buy a negative, create it and then do a scan or paper prints,
- no possibility of changing the sensitivity, because each negative has a certain light sensitivity,
- it takes a lot of time from taking a picture to calling it, but it's fun and effect.

Advantages:

- the negative adapts well to the bright part of the picture;
- cheap cameras;
- negatives are quite cheap, so you can rescan in higher resolution;
- the pictures are more plastic;
- analog cameras are hard to damage in bad weather conditions;
- greater tonal range.

Ways to develop photos

In order to make your own darkroom in the privacy of your home, we need an enlarger, thanks to which we can bring a larger image from small matrix. It is also necessary to have a dark clock and a mask that we will need to secure the paper, as well as a special container called a "cuvette" for developing photos (where various toners, developers are poured) and fixing them. Traditional photographic darkroom should be equipped with: enlarger, clock, masking frame, koreks, cuvette and chemical reagents.

Digital photography and its didactic possibilities

From traditional photography it differs only from the way of recording, because in digital photography we can save the image in digital form, on various types of media, eg on a disk.

We take pictures with a digital camera or a DSLR camera, then we can transfer them to computers and make all kinds of changes, retouching and enhancing. We find the roots of this type of photography in television technology, in the construction of analog cameras used on television.

Digital cameras use a miniature of digital transducers with a fairly high resolution. Nowadays, cameras have the function of not only taking pictures, but also recording various types of films, and their resolution slightly differs from the resolution used in traditional photography cameras. For saving images after

receiving the RAW source file, we can save in the popular JPEG format, so we can save various photos on memory cards.

The image is obtained by measuring the brightness of selected pixels (thanks to which each image has a specific resolution) located in the matrix through which the light comes through the lens. The frame in the picture is preserved thanks to the measurement of the intensity of light for given pixels, which falls through the lens. In modern photography, we can observe the grain effect that appears at high magnifications.

The advantages and disadvantages of digital photography include:

Disadvantages:

- matrices do not exactly reflect the details in bright parts of an image;
- the possibility of taking a large number of photos and saving them on the memory card, and then playing them on another medium, e.g. on a computer, so that the performer does not focus on refining the details, the frame;
- trouble when storing a large number of photos;
- it's easy to lose photos, delete them by mistake;
- large costs associated with the purchase of the appropriate equipment;
- failure of the device, e.g. software, electronics, lack of resistance to weather conditions;
- a large amount of work put into pictures by using graphics software.

Advantages:

- the possibility of photo retouching;
- immediate image preview;
- you do not have to go to the photographer to develop, just use the printer;
- the ability to make multiple copies of the image;
- smaller size than in traditional photography;
- low storage costs;
- the matrix performs better when giving details in the dark parts of the picture;
- the ability to change the light sensitivity;
- the ease of sending photos or even making them available on the Internet;
- ease of image processing, removing imperfections.

Traditional and digital photography – an attempt to compare technologies

Grain, which is the equivalent of the noise in digital photography, is quite often used as an artistic effect, an addition to a photo that does not cause discoloration in the image compared to chemical photography. In the case of mechanical devices, the battery has a long life, often even missing. In digital photography, the films have quite high resolution (SLR cameras up to 160 MPix). Images stored on media need to be renewed or transferred to other media, as they may be damaged or corrupted, and in the case of negatives with good storage, they may be useful all lifetime. The matrix image development progresses quite quickly, which results in low-quality photos taken a few years ago, because they have a lower resolution. However, the photograph created on a photosensitive film can be scanned again until the border is crossed.

Photography in the school lab techniques

The school's studio of technology can successfully apply:

- scientific photography, examination and documentation of monuments, digitalization of library collections, criminal photography – various types of cameras,
- macrophotography – Sinar large format camera, Olympus microscope, Olympus GX71 optical microscope,
- infrared photography – digital cameras.

Scientific photography allows:

- registration of test items, registration of light beams invisible to the human eye, small elements of materials, makes it easier to see something that is not available to us,
- examination and documentation of monuments: conducting material and technological research by means of microscopic observation in visible, reflected ultraviolet light and transmitted light. Documentation of the works is shown by means of micrographs (digital method),
- digitalization of library collections: transfer of works of art, documents to a digital replacement,
- criminal photography,
- recording photograph – shooting to identify criminals and suspects,
- documentary photography – consolidation the course of procedural activities,
- research photography – revealing the features and properties of objects invisible or not visible to the human eye under normal conditions,
- a detective photograph – taking pictures by the body prosecuted discreetly without the knowledge of other people – makrofotografie,
- close range photos (eg metal materials when showing their invisible elements), which give the effect of enlargement. It is possible to cooperate with the microscope. Thanks to photomicrography, we can provide information about the structure, type and composition of tested material,
- infrared photography – thanks to this type of thermal radiation, we can see and examine layers of substances that are invisible to humans.

Summary

The evolution of photography is very important because nowadays it has a very large application in many areas. Not only it became part of our life, but have also application in scientific laboratories and photographic studios, were we can properly use it. In technology, we can use it in various kinds of scientific research carried out by students and scientists, but not only. Thanks to constant inventions, photos become documentation that we can pass on to generations, thanks to which our achievements will last for many long years and will be able to contribute to new discoveries.

References

<http://fotografia.bizhat.com/>

<http://napradze.waw.pl/fotografia-cyfrowa-a-analogowa/>

<http://sebiology.org.uk/fotografia-cyfrowa/>

<http://sebiology.org.uk/wynalezienie-fotografii/>

http://www.fotografuj.pl/Article/Poczatki_fotografii/id/23

<http://www.historiasztuki.com.pl/strony/011-00-00-FOTOGRAFIA-LID.html>

<https://pl.wikipedia.org/wiki/Fotografia>

https://pl.wikipedia.org/wiki/Historia_fotografii

Abstract

Photography is one of the most interesting field of creative actions and passions. We can find many interesting applications of this profession in various technical laboratories, its begin in the form of traditional photography to photography that is currently known to us and is extremely popular thanks for range of devices that are price friendly, namely digital photography.

Key words: photography, laboratory, hobby

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