PECULIARITIES OF USING LIGHTING IN THE PROCESS OF FILM SHOOTING

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Abstract
The purpose of the article. It analyzes the components that influence the creation of movie images. Set the role of lighting in the shooting of an audiovisual product. Identify features and fragments when working with it. Prove the importance of the ability to use light sources in natural and pavilion locations. Identify the factors that affect the quality of the visual material.

Research methodology. Such methods were used in the article: theoretical – analysis of movies, and publications; generalization – the influence of lighting on the quality of visual material; determination of interdependence (light, time of day and auxiliary objects that influence the creation of a frame); empirical – systematization of one's own experience, determination of the relationship between lighting and the quality of visual material. Scientific novelty. The components that influence the creation of a visual image were analyzed for the first time, a detailed analysis of the dependence of the time of day and illumination in the field, which forms the illumination scheme, by means of theoretical analysis of films, the factors that influence the quality of the visual material are determined. Conclusions. In the course of the article, the main techniques of cinematography when creating audiovisual works are analyzed. The concepts of frame composition and the skill of conveying an emotional state are considered. The use of various lighting sources in natural and artificial locations is considered in detail. Based on the analysis of audiovisual products of leading masters, the importance of the ability to use different types of lighting sources has been proven. A list of the features and difficulties of using different types of lighting has been created and the key factors that have a direct impact on the quality of creating an audiovisual work have been outlined.
**Problem statement**

Due to the progress in the development of shooting technologies, the management of video cameras is simplified and the price policy becomes more affordable. Accordingly, the demand for the purchase of equipment is growing. The number of people who want to make movies is increasing.

It should be said that the young generation of cameramen, having received the equipment, neglect training in special schools or educational institutions and start filming, operating on media channels with available free, unreliable information, which contributes to a decrease in the quality of the original visual product. According to the above, neglect of the operator's profession and his skill is created. This leads to the devaluing of their skills acquired over years of work. Young specialists who want to enter the world of cinema should pay attention not only to the purchase of technical equipment but also to development in the audiovisual industry.

Therefore, the importance of possessing and operating the skills of working with light sources is one of the dominant indicators of the professionalism of camera work professionalism. In particular, it should be taken into account that working with light sources is not as easy as it might seem at first glance. During filming, the younger generation of cameramen often do not notice shadows or highlights that can spoil the shot. Light is a factor that should be given the most attention during creating a film, it is worth considering its features and understanding the difficulties when working with it.

**Recent research and publications analysis**

Successfully described the role of lighting in creating an image in natural conditions D. Kilpatrick (1984). The book describes aspects that affect the creation of a lighting scheme according to the time of day.

Described the influence of painting on the cinematographic image A. Bazen (1972). Revealed the detailed concept of the word “photography” and described the effects of lighting L. Dyko (1977).

Noted the importance of the operator's work with light and the creation of a picture on the example of famous master A. Golovnya (1965).

The role of the cameraman in shooting commercials has been studied by the following scholars: E. Timlin, M. Didenko and V. Savchyn (2022).

Characterized light sources and described in detail the interdependence of objects with it during filming by F. Hunter, S. Beaver and P. Fuqua (2011).

Defined the term Photogeny and described the psychological perception of shooting in natural locations L. Delluc (1924).

Characterized the interaction of composition and lighting in the image by L. Dyko and A. Golovnya (1962).

Described the principles and difficulties of working with light in the pavilion at the beginning of the development of cinematography L. Forestier (1945).
Described the intricacies of the cameraman’s work during the making of the film L. Briukhovetska (2011).
Characterized the interaction of light, form and volume in the image J. Itten (1975).
Described the interaction of the cameraman and the director and their interdependence in the creation of cinema H. Aristarko (1966).
Revealed the role of light and lighting in cinematography and characterized it as a way of self-expression M. Gennar (2016).
The symbolism of colour in cinema was analyzed by scholars O. Kovsh and M. Dziuba (2022).
Described the method of using light schemes by French cinematographers of the 20s of the 20th century J. Sadul (1961).
Defined the role of the cameraman in the creation of a film by F. Truffaut (1987).
Pointed out historically important events in the formation of cinematography D. Parkinson (1996).
Described the psychological perception of artificial light in the works of German film expressionist Z. Krakauer (2009).
Revealed the interaction of the operator, film camera, and optics by Y. Lotman and Y. Tcivian (1994).
Described the process of creating the movie Battleship Potemkin and emphasized the subtleties of cinematography when working on the picture by H. Aleksandrov (1976).
Singled out the light’s independent role in the creation of a film image J. Deleuze (1986).
Described practical techniques for working with the camera and light B. Brown (2011).

The purpose of the article is to analyze the constituent part of creating a film image. Establish the role of lighting when filming an audiovisual product. Highlight the features and difficulties when working with it. To prove the importance of the ability to use light sources in natural and pavilion locations. Determine factors that affect the quality of visual material.

Main research material

In the first years of cinematography, the leading masters of the new art understood that light is the most important component in creating a visual image. Louis Delluc made this observation in the 1920s. Describing his friend Abel Hans, the author believed: “The success of Hans, when he was just starting, came entirely from his ability to use light. The director must know that the light has a meaning. The cameraman may still be completely absorbed in producing a good photograph, but he is only a cameraman” (Delluc, 1924, p.38).

It is worth agreeing and denying Delluc's opinion at the same time. The Director of Photography, as an artist, must give not only a good image, but also a dramatic component, which he can create with his professional means, namely the technique and the visual component: film with special effects, camera, optics, perspective, camera movement and, most importantly, light. Its properties are much more complex than it seems at first sight.

A person who does not belong to the profession of cameraman and does not have an adapted view will not be able to understand the complexity and subtleties of the artist’s skill. In particular, David Kilpatrick (1984) noted, “Without a thorough understanding of the nature of light and illumination, professional skill cannot be achieved in image recording systems” (p.7). Lydia Dyko (1977) also rightly noted the importance of having skills in operat-
ing devices, stressing that “a photograph is drawn by light. The word “photograph” has become commonplace, its original meaning is often forgotten, and in literal translation, it means light painting” (p.223).

It should be noted that during its existence, cinematography has gone through a long way of formation. The equipment, filming conditions, and the nature of the events in the frame changed, and the devices and the skill of the cameramen were improved. But at the beginning of the development of cinematography, the possibilities for filming were limited. Despite the circumstances, artists learned to create a variety of artistic effects, mixing the effects of falling rays of sunlight, candles, lamps, fire from a fireplace, etc. One of the first leading masters, the Soviet Director of Photography Louis Forestier (1945), recalled the working conditions at the beginning of the 20th century: “In those days, all cinema pavilions were built like large photo studios with glass roofs and walls, with white curtains to protect from the sun” (pp.11-12). These memories confirm that light is the most important factor in the creation of a motion picture.

There are many different devices in the operator’s arsenal, but depending on how they are located about the object in the frame, their role and the nature of the created picture changes. According to Phil Hunter, the light sources are divided into the following:

1. Drawing
2. Filling,
3. Counter,
4. Background,

It should be noted that the cameraman starts working with them in the order specified in the list. The most important thing is drawing, depending on how this source is located relative to the main object or person, it creates character and sets the future mood of the frame. By directing the device from above, we get the effect of Hollywood lighting, from below – horror, from the side – mystery. But there is a so-called classical technique among artists, which is called “Rembrandt’s”. With such an artistic solution, the device is located at an angle of 45 degrees relative to the person’s gaze and is raised on the rack above eye level. As a result, one side of the face is completely illuminated, and from the other, in the middle of a deep shadow, an imaginary triangle can be seen under the eye.

Thus, A. Golovnya (1965) singles out the operator O. Levytsky – he called him the “father” of artistic film lighting: “He began to widely use the so-called “Rembrandt’s” lighting, characterized by deep shadows and protruding light areas” (p.110). This technique can be traced in the film, where Levytsky acted as a cameraman, in The Extraordinary Adventures of Mr. West in the Land of the Bolsheviks (1924, directed by L. Kuleshov). During the scene where a man and a woman are sitting on a sofa with a newspaper, the artist imitates the fall of light from a lamp. The “Rembrandt’s” technique can be traced on the man’s face. It is also worth noting that Levytsky does not leave the background without lighting, creating an accent that directs attention specifically to the heroes of the film. A. Golovnya (1965) characterized the work of O. Levytskyi as follows:

“The cameraman set himself the task not only of illuminating the object for photography but also of building a light composition based on the director’s mise-en-scène in
such a way as to reveal the actions of the actor in the best possible way, to achieve unity of light and compositional solutions”. (p.110)

It should also be noted that the main source of light cannot always be the sun. In the movie *Nomadland* (2020), directed by Chloé Zhao and with cinematography by Joshua James Richards, there is a scene where the protagonist Fern is sitting inside a van, in a small and enclosed space. The shot shows a halo created by an object, which can be a lamp, candle, bonfire, TV, or any other light source. The only source of light is a gas lamp, which is justifiably used in relation to the location. So, for a specialist, when creating a picture, it is important to understand and determine the factors that affect the level of illumination, brightness, saturation, contrast, angle of incidence of the beam and other things that are a component of creating a picture for the future visual product. The main drawing source when creating an image in nature is the sun. All weather conditions should be taken into account when shooting. It is important to note that it affects the emotional colouring of the picture. The bright sun causes a smile, gloomy weather – calm, rain and thunderstorm – fear. The above becomes an important tool in the hands of the DOP. An artist can either emphasize the atmosphere and the director’s intention or disrupt the integrity of the scene, thereby wasting the budget and spoiling the picture.

In this regard, it should be said that David Kilpatrick (1984) pays attention to shooting in the morning and in the evening, the so-called “golden hours”. It is a period that lasts two hours after sunrise and two hours before sunset (pp.55-61). During this period, the sun is closest to the horizon, which creates a sharp angle of incidence of the rays and allows the cameraman to create spectacular lighting schemes due to deep shadows and changing the colour balance from neutrally warm to bright yellow with a golden tint. Filming at dawn requires the artist to wake up at 3 a.m. and travel two hours to the location, but it’s still a normal occurrence for the cameraman. Kilpatrick (1984) believes that filming at these hours is: “One of the possibilities of transmitting the third dimension in two-dimensional photography and videography” (p.59).

It is worth paying attention to the picture *Nomadland*, yes, in the scene where the main character Fern talks to a representative of the nomads, and then she walks through their improvised town, where wagons stand in the middle of the field, imitating the outline of the territory, the DOP chooses to shoot at night, in gold hours. The sun is as low above the horizon as it can be. The camera follows the heroine in a long continuous shot, creating the effect of the presence of the viewer, letting rays of the sun, which are reflected in the lens and flicker, into the frame. The DOP also emphasizes this with a colour scheme. The sun surrounds the protagonist with a warm glow that competes with the blue sky. During the conversation with the nomad, light and colour visually divide Fern’s face and her mood. The warmth of the sun, which is about to set over the horizon, is reflected in the eyes and on the cheek of the heroine, illuminating her inner hope. On the other hand, the face sinks into the shadow and takes on a more purple hue, which creates a feeling of anxiety about the future.

Among cinematographers there is a slang concept of “shooting in mode”, if the aforementioned golden hours are the
time when there is direct sunlight, then with “mode” the opposite is true. This is the period when the sun has just set behind the horizon in the evening, or at dawn, when it has not yet appeared. The actual working time for filming is about forty minutes. The peculiarity of this period was described by Lydia Dyko (1977), noting:

“The effect of lighting in the early evening, when there is still a small amount of daylight and the evening lights are already lit, is extremely picturesque. …> There is a minimal amount of scattered light on the object, and this allows you to get pictures with fine processing of details in the shadows”. (p.211-212)

Cameramen often use shooting “in mode” to reproduce night scenes in the film. In this short period, there is enough light to outline the horizon, and the trees, to create volume, and at the same time, not enough to create a daytime effect. This is due to the fact that no matter how high-quality and expensive a film camera is, its dynamic range loses its properties at night. The result is a loss of volume and unfinished textures and shadows.

It is worth noting that the operator must be knowledgeable not only in the field of art but also in physics, because as a result of the sun's rays of the spectrum hitting the object, he absorbs all the colours of the spectrum, except for his own, for example, red. As a result, it creates “reflexes”. An experienced operator must be able to see them, emphasize the created image, or vice versa – find an opportunity to hide the reflection that distorts the frame. Reflexes can be coloured or colourless. David Kilpatrick (1984) notes: “A completely white sheet of paper reflects about 95% of the rays falling on it” (p.10).

In the arsenal of the cameraman, there is also a so-called “black reflector”. It has the opposite effect of white, that is, it absorbs light. When shooting on location, reflectors become one of the most important units that help achieve the creation of an artistic light pattern. The artist must know and be able to apply this knowledge when choosing filming equipment, reflectors, devices, locations and, directly, during filming.

A reflector can be any object that reflects light, including paper, buildings, walls, ceilings, asphalt, and even the sky. Consider the scene where Inspector Gustave apprehends and locks the protagonist, the boy Hugo, in a cage in Hugo (2011, dir. M. Scorsese, cameraman R. Richardson), where the DOP masterfully creates a visual resolution. He chooses sources with a cold colour temperature and hard rays, which he fixes under the ceiling. The light falls on the shoulders of the boy and the inspector, creating a counter pattern. Richardson installs a reflector in front of the officer, and harsh rays fall on it, which are softened and reflected on Gustave’s face. The boy decides to leave the reflection of light from the floor, which will have a lower power of reflection and become a characteristic of being in the cell.

Another successful example of the above-mentioned cinematographer, Robert Richardson, can be considered the first frame of the film Kill Bill (2003, directed by Quentin Tarantino). The artist uses a harsh light source, creating a dramatic drawing of the face of actress Uma Thurman. But when using a device with such power, it should be remembered that the camera will not be able to display the shadow part of the face in detail, which the DOP takes into account. It places the reflector on the opposite side. As a result, the frame turned out to be detailed, the contours of the face, veil, eyebrows and eyes, and drops of sweat and blood are
visible, which testifies to Richardson’s professionalism. He managed to convey the image as seen by the human eye.

Often, filming in natural conditions requires additional sources of lighting, because the perception of reality by a movie camera and the human eye are significantly different, where the latter has a wider dynamic range. Accordingly, the technique needs to be helped to “catch” the necessary objects that will be in the frame. They must be illuminated in relatively the same light tone for the camera to capture them. If this level drops, there may be gaps in the shadows and light areas, where the technique will not record information in the matrix system. It is important to monitor the level of light tonality of objects because such material will be considered a defect.

According to L. Dyko (1977), the operator “It is not enough to know that the object is illuminated and visible, he must be able to assess the quality of the lighting, understand how the light flux falls, what is the shape of the shadow, what contrasts have developed, etc.” (p. 106). Complementing the author, it is worth noting that it is important for an artist not only to be technically advanced and know the techniques of using sources, but also to be able to present this knowledge artistically.

Contrasts play an important role in creating a film frame. They are both soft and hard. Their degree depends on the level of illumination. With hard rays directed at the object, we get a strong contrast due to deep shadows. With soft lighting, there is a smooth transition from light to dark. Thus, the contrast is reduced. Johannes Itten (1975) says: “It is important to feel how much darker the background should be so that the circle appears white” (p. 17). The operator must develop the skills of creating a contrasting image until it is created not only by light but also by colour. Each of the methods is irreplaceable in creating an effective light pattern that conveys the mood in the future movie.

Director Louis Delluc (1924) advises young filmmakers not to chase strong contrasts. According to him, in such photographs “the sun eats the tree trunks, cuts the green shadow of the leaves, the rivers seem like pitiful streams” (p. 46). The author suggests moving the shooting to spaces dominated by halftones, where the illusion is created that the line separating the sea and the sky is disappearing, to places where smooth colour gradients dominate, not contrasts (Delluc, 1924, p. 46).

It is appropriate to note that “The entire shooting time of the day can be divided into several periods, each of which has its lighting characteristics and allows getting a unique colour of the picture” (Dyko, 1977, p. 116), thus agreeing with the opinion of the author, it is worth paying attention to the film The Legend of Hugh Glass or better known as The Revenant (2015, directed by Alejandro González Iñárritu, cinematographer Emmanuel Lubecki). The filming of the above film, lasted 11 months. Filming of individual scenes by creators was postponed for several weeks to wait for the right weather and light pattern, the colour of the sky and other factors that were important for creating a shot. This was done to emphasize the emotional state of the hero. The film The Revenant would not have achieved popularity if it had a primitive, unremarkable, nature of filming, cutting the budget and filming time, without prior planning and preparation, etc. Each frame carries the baggage of knowledge and experience that artists applied during the creation of a visual work.
The cameraman’s task, as a creator, is to create a visual image with the help of technical means, to convey its atmosphere according to the mood and character of the middle of the frame, and to enhance it with light and angles. Young artists, usually in pursuit of a beautiful picture, add too many special effects, which distort the future film. An experienced cameraman must understand the mood of a particular shot and either enhance the image with expressive means or not prevent the picture from “breathing” with what is inherent to it: highlights, light or twilight and unfinished details. All this creates an atmosphere and, as a result, creates a sense of presence in the viewer. Thus, L. Dyko (1962) says: “The highest task of a photographer’s work with light is to use a light pattern to express the meaning of what is happening. Solving this task, the photographer in some cases chooses, in others specially creates lighting conditions that help convey content, saturate the picture with mood” (p.55).

It is also appropriate to note that when creating a film image, it is important to win the attention of the viewer, for this it is necessary to direct his gaze to the necessary point. As A. Golovnya (1965) notes, “It is completely wrong to believe that the viewer must choose the object of attention in the frame” (p.90). Both the director and the cameraman have a range of techniques for solving this issue. The light solution comes in handy again. The artist can emphasize a specific point in the frame, the background, an object or a person by increasing the brightness. As a result of directing the device to, for example, the eyes, and leaving the rest of the frame in the shadows, an accent is created, where the viewer turns his gaze.

The film Kill Bill should be mentioned again, the cameraman has an arsenal of techniques for creating an accent. In the scene where the main character’s legs fail, the operator decides to draw attention to them with the help of composition. It can also be emphasised by applying framing and shooting a close-up. But it is worth noting the lighting. Let’s recall the scene where the main character stands surrounded by two dozen people with whom she will have a battle. The DOP decides to clearly outline with a diode tape the place where she is standing. The rays also fall on the bodies of the people she killed. All this is the creation of accents that the operator selects to appeal to the audience.

Conclusions

Cinematography depicted in films 100 years ago, or just two, proves that the presentation of visual material using lighting schemes is dominant in the making of cinema. Such films still keep the audience close to the screens. The reason for this is the careful preparation when creating each shot, one of which artists can spend several weeks shooting. There will be not enough theoretical material in the study of peculiarities and difficulties in working with light, but this article gives an understanding of where to draw the most attention and work in practice. Only working on mistakes will allow a beginner to understand how to use it and what effect it can create.

Mastery and manipulation of light is the most demanding skill in any cameraman’s arsenal. With the help of this knowledge, the artist will be able to create an image emphasizing the director’s intention, the character of the main character, will be able to convey his emotional state, etc. The cameraman is the eyes of the viewer and it is he who visualizes the story.


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ОСОБЛИВОСТІ ВИКОРИСТАННЯ ОСВІТЛЕННЯ В ПРОЦЕСІ ЗЙОМКИ КІНОФІЛЬМУ

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Анотація
Мета статті – проаналізувати роль освітлення в процесі зйомки кінофільму та окреслити основні аспекти впливу щодо якості створення кінозображення. Встановити роль використання різноманітних джерел освітлення під час створення аудіовізуального продукту. Виокремити особливості роботи з різноманітним освітленням. Довести важливість уміння користуватись джерелами світла в натурних і павільйонних локаціях. Визначити основні чинники, які впливають на якість створення візуального матеріалу. Методи дослідження. Були застосовані такі методи: теоретичний – аналіз кінофільмів, наукових публікацій з теми дослідження; узагальнення – вплив освітлення на якість візуального матеріалу; визначення взаємозалежності (світла, часу доби та допоміжних предметів, які впливають на створення кадру); емпіричний – систематизація власного досвіду, визначення взаємозв'язку освітлення та якості візуального матеріалу. Наукова новизна. Уперше проаналізовано складники, які впливають на якість створення візуального зображення; проведено детальний аналіз взаємозв'язності часу доби та освітлення в натурних умовах, які формують схему освітлення; за допомогою теоретичного аналізу кінофільмів визначено чинники, які впливають на якість візуального матеріалу. Висновки. У статті проаналізовано основні прийоми операторської роботи в процесі створення аудіовізуальних творів. Розглянуто поняття композиції кадру та майстерності передачі емоційного стану. Детально розглянуто використання різноманітних джерел освітлення на природних і штучних локаціях. Ґрунтуючись на аналізі аудіовізуальних продуктів провідних майстрів, доведено важливість уміння використання різних типів джерел освітлення. Сформовано перелік специфічних особливостей використання різних типів освітлення та окреслено ключові чинники, які мають прямий вплив на якість створення аудіовізуального твору.

Ключові слова: світло; тінь; зображення; оператор; контраст; об’єкт; кінофільм