

Research on Traditional Darkrooms and Processes

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Abstract: This study conducts a systematic exploration of traditional darkrooms and their technical processes, tracing the historical evolution, dissecting core operational principles, and revaluing their artistic and cultural significance in the digital age. Originating with the 1839 invention of the daguerreotype process, traditional darkroom technology underwent iterative advancements through the wet collodion era (1850s) and the maturation of dry plate techniques, gradually forming a sophisticated system encompassing light control, chemical processing, and manual manipulation. At the technical core lies the precise regulation of photochemical reactions: light-sensitive silver halide emulsions on film form latent images upon exposure, which are then developed into visible negative images via reducing agents in developer solutions, stabilized through fixing with sodium thiosulfate to remove unexposed halides, and ultimately transformed into positive prints using enlargers with controlled exposure and local dodging/burning techniques. Beyond mere technical operation, darkrooms evolved into creative spaces where photographers shaped tonal gradation, contrast, and texture—exemplified by masters like Ansel Adams—establishing an irreplaceable role in the transition of photography from scientific experiment to independent art form. While digital imaging technologies since the late 20th century have marginalized traditional practices, contemporary artists and educators have reignited interest in darkroom processes, emphasizing their unique haptic quality, irreproducibility, and educational value in elucidating photography's foundational principles. This research confirms that traditional darkrooms, as repositories of photochemical knowledge and artistic craftsmanship, continue to serve as a critical link between photography's historical roots and its modern creative landscape, offering alternative perspectives on sustainability and artistic authenticity amid digital saturation.

Keywords: Traditional Darkroom; Photochemical Process; Analog Photography; Artistic Authenticity; Digital Age Revival.

1. The Development and Content of Traditional Darkroom and Processes

The invention of photography in 1839 marked the beginning of the emergence of various traditional photography darkroom processes. This continued until 1975 when Steven Sasson invented the first digital camera. Thus, the glory of traditional photography came to an end. If we describe the development process of traditional darkrooms based on my understanding, it can be divided into four stages. The first stage (1839-1951): When photography was still a technical discipline and not yet an art form, it was in the recording stage. The earliest method for recording images was by using sunlight stones. Neilps used this method to take the world's first photograph. However, the exposure time required by sunlight was too long. It was not until the emergence of the Daguerreotype process that the French Academy officially announced the invention of photography. The Daguerreotype process had a shorter exposure time, and the announcement of this invention immediately caused a sensation worldwide. The invention of photography itself also involved two people, Bayard and Talbot. Bayard's direct positive process and Talbot's Caro-style photography established the concepts of positive and negative films in photography. Each of their three inventions had its own merits, and the more widely spread one was the Daguerreotype process. Although the British maintained the Caro-style photography, the imaging effect of the Caro-style was far less clear than that of the Daguerreotype process. Although it was lightweight and suitable for landscape photography, at that time, landscape photography had far less commercial value than portrait photography, so it was not favored by the industry insiders. From this, we can see that photography is

merely a technical means, and photographers are more like engineers. Photography is more often used for recording portraits. [1-3]



Fig 1. The first photo of that kind in the world in 1825

The second stage (1845-1900): Photography and Scientific Observation, began to be applied in the field of knowledge. Because photography is more objective than painting, it replaced illustrations in various scientific popular science books. The most obvious technique was the blue-washing impression method, which was initially exclusively used for documenting plants. Warren Draylu's record of a total solar eclipse in 1860 was printed out using the paper-based protein process. He also used the wet plate collodion process to photograph the structure of the moon, and in 1874, the passage of Venus posed a new challenge to the recording capabilities of photography in the relevant scientific fields. Finally, he chose the daguerreotype process. There were also applications in geology, zoology, medicine, etc., where photography was used and had a certain scientific supporting role.

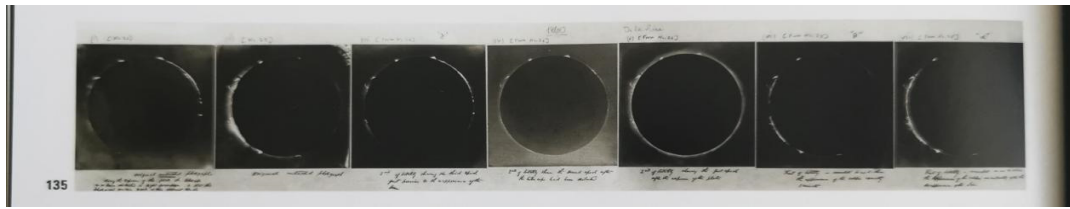


Fig 2. Warren Drull's Total Solar Eclipse Record

The third stage (1857-1917): Photography became an art, no longer just a technique. In the 19th century, apart from scientific and industrial models, photography also attempted to cross the most distant threshold of art. Thus, various photography schools emerged, starting with the Pre-Raphaelite movement in Victorian England, followed by straightforward naturalism, then impressionism and symbolism. Photography was inspired by various artistic trends of each era, and since 1900, it began to break away from the decorative tastes of art. During this period, the question always revolved around: Is photography an art? An emergence of an artistic practice: Pictorial photography. It became a significant turning point of the century, and the artistic category of photography was officially formed 50 years after its invention. Techniques kept emerging, from wet plates to dry plates, the invention of film, carbon impression process, platinum, gum chrome salt process, relief impression process, etc. However, regardless of the technique, these techniques were no longer a universal competition for who was better, but rather serving art. Each technique had its own strengths, and using different methods ultimately produced different effects. For example, the carbon process was thick and could be colored, the gum process was relatively cheaper and allowed more freedom in controlling the characteristics of the image, and it was also more widely used than ordinary processes. The invention of film made it more convenient for photographers. [4-6]

The fourth stage: The curtain begins to fall. The invention of digital cameras has greatly impacted the traditional darkroom. Due to its convenience and speed, photography has become more popular and accessible to the general public. Everyone can take photos, but not everyone can take good photos. Although digital cameras are great, they still cannot replace what the traditional darkroom provides. Therefore, the traditional darkroom will never be forgotten or abandoned.

2. The Significance of Traditional Darkrooms and Techniques in the Current Digital Age

Firstly, for us photographers, digital cameras are indeed convenient. Even with the widespread use of auto-focus and various automatic systems nowadays, everyone can pick up a camera and take photos. Does this make the threshold of photography lower, and does it make us, those who are professional photographers, forget our roots and fail to truly master the fundamentals of photography, instead relying entirely on the current digital era.

So, the significance of traditional darkrooms is learning, and better learning photography. Only by mastering those traditional manual photography techniques can one study more solidly on the path ahead, rather than relying on equipment and technology.

Furthermore, the significance of traditional darkrooms for the current era is that they are stepping stones beneath our feet.

Because of these traditional techniques, the art of photography can truly stand firm. And traditional darkrooms cannot be replaced. Each technique showcases unique graininess and depth that cannot be simply replaced by the contemporary digital era.

3. The Application of Traditional Photography Techniques in the Current Digital Era

Firstly, for photographers, due to the development of digital and network technologies, photos have become cheaper and easier to copy, resulting in a lack of uniqueness. However, if one wants to stand out, film photography is a great choice. Nowadays, many renowned photographers still adhere to film or traditional photography techniques because they have higher value and are less prone to being copied.

Also, the final effect of traditional photography, such as graininess, is utilized in various photo editing software. For example, film texture filters and so on.

4. Accurate Photometric and Exposure Experiments

See Fig 3.

5. Gum Reinecke Process

In the field of traditional photography, success often comes from exploring the process itself rather than pursuing the photographic effect. Skill, patience, and attention to detail will eventually pay off. Moreover, unexpected events that occur during the process, after repeated scientific experiments, often become new artistic means. Therefore, unexpected results are the best reward that photography gives you. It is precisely with this concept that I am able to exert more creativity and imagination during operation.

The Gum Reinecke Transfer Process, from the 1880s to around the 1920s, was widely used in pictorial photography. At that time, the masters who were recognized for their proficient use of this method included Robert Demachy (1859-1936) from France and Emil, as well as several members of the American Photographic Separationist Group. This method is still popular among many artists today because the materials are relatively inexpensive and it allows for more freedom in controlling the characteristics of the image, and it has a wider range of applications than the ordinary process. When I first came into contact with the Gum Reinecke process, I felt it was not complicated. However, when I started working on this process, its complexity deeply touched me. The charming aspect of the gum process lies in the fact that the chemical substances used are very simple, and only water is needed for developing (accurately speaking, it is water that washes away the excess solution), and various colors of watercolor paints can be freely selected. In addition, this

process is very flexible and can be combined with other classical processes. Because watercolor paints, paper, and

brushes were used in the process, it can also be created using "technique" skills.

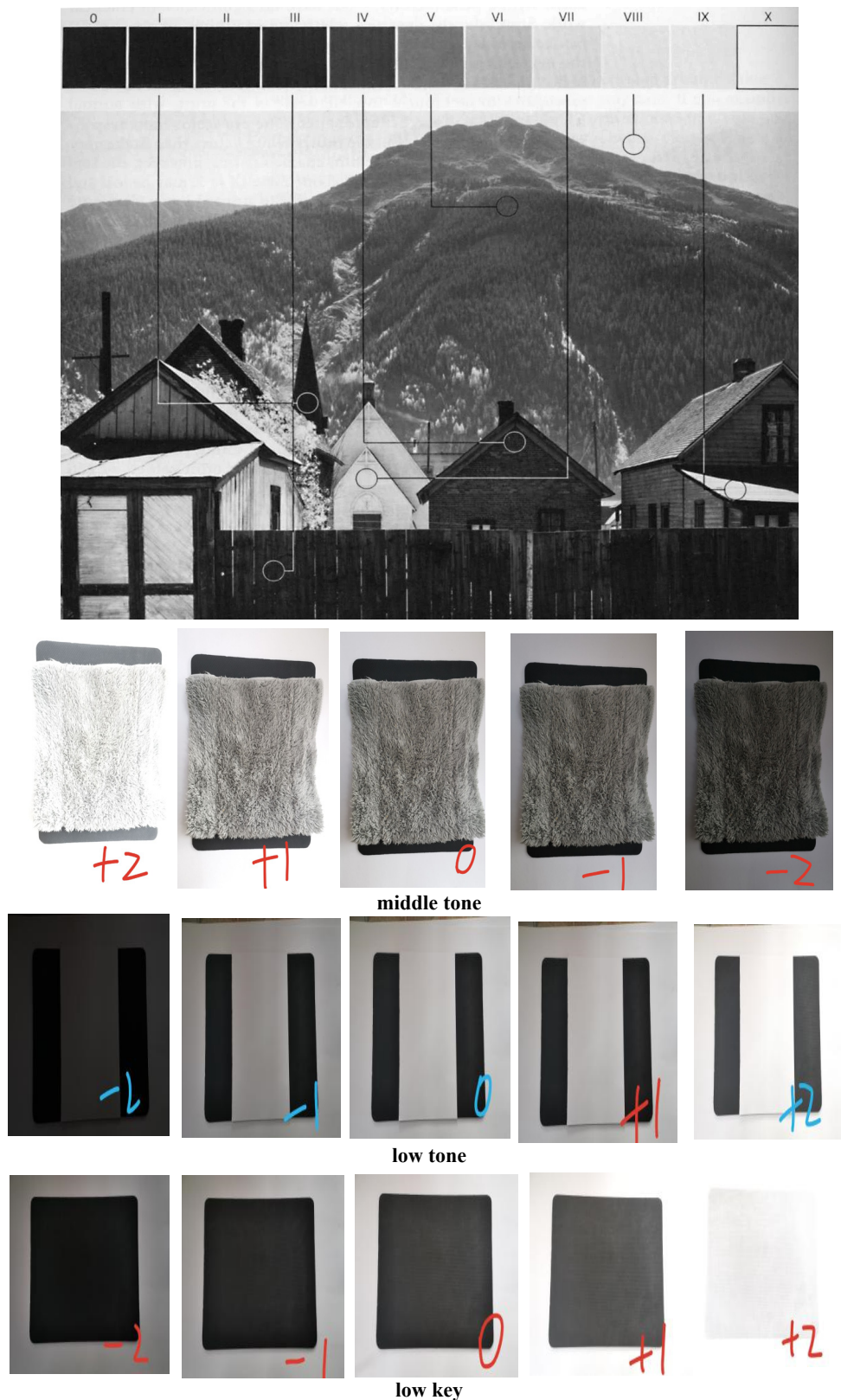


Fig 3. Accurate Photometric and Exposure Experiments

6. Conclusion

This research systematically examines traditional darkrooms and their associated processes, covering three core dimensions: historical development, technical mechanisms, and contemporary significance. Historically, traditional

darkroom technology evolved progressively—starting from the 1839 daguerreotype invention, advancing through the 1850s wet collodion period, and maturing with dry plate techniques—ultimately forming a comprehensive system integrating light control, chemical handling, and manual operation. Technically, its foundation relies on precise photochemical reactions: silver halide emulsions on film form

latent images after exposure, which are then developed into negatives via developer solutions, fixed with sodium thiosulfate to stabilize, and converted into positive prints using enlargers alongside dodging/burning techniques. Artistically, darkrooms transcended mere technical spaces to become creative hubs—exemplified by figures like Ansel Adams—playing a pivotal role in elevating photography from a scientific experiment to an independent art form. Though marginalized by late-20th-century digital imaging, traditional darkrooms have seen renewed interest from contemporary artists and educators, who highlight their unique tactile nature, irreproducibility, and educational value in explaining photography’s fundamentals. Ultimately, the study confirms that traditional darkrooms, as custodians of photochemical knowledge and artistic craftsmanship, remain a vital bridge between photography’s historical origins and modern creative practices, providing alternative insights into sustainability

and artistic authenticity in an increasingly digital world.

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