

Two Prizma Color films, a curious finding in the Mexican National Film Archive

Paolo Tosini

Vulcanus Film, Italy, vulcanusfilm@gmail.com

ABSTRACT

Few years ago an important collection of silent movies was found in the National Mexican film archive. The collection did not contain any Mexican movie, unfortunately, but it was rich in terms of coloring techniques of the silent era; two findings were particularly interesting, the first on the Apache trail in the United States (around 1921) and the second on the clay making in Ohio (probably 1920s). The added value of both titles is that they were shot using the Prizma Color technique, a very original color-processing invented around 1913 by William Van Doren Kelley and Charles Raleigh. This color system was an additive color technique that eventually evolved into a bi-pack system. Even if a complete restoration is not yet completed, the films were a particular challenge for a proper conservation and film restoration. The paper will examine the research on the film, the color process and suggest some possible restoration techniques.

KEYWORDS Prizma, Prizma Color, Color Restoration, Film, Digital Restoration, Mexico

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1. Introduction

In 2011, while working at the Mexican National Film Archive, I discovered a collection of short films from the 1910's created with unique coloring techniques. My quest to find out more about these films led me on an interesting path of discovery. Two of the shorts used a lesser-known technology called the Prizma Color system, which was introduced in 1913 and disappeared in the 1920's. In this paper, I will discuss this unique coloring system and describe the challenges in restoring this particular kind of technology. Even if -regrettably - none of these materials are Mexican, they give us a glimpse into what the Mexican audience used to watch in the '10s.

2. The Prizma color origins

Cinema is a constant process of innovation; in any era of film history, we can find new systems, technologies or novelties. They all were invented to surprise the audience but also to push the boundaries - and therefore the form - of the movies. We live in a time where digital tools continue to expand the possibility of moviemaking, but technology has always shaped the way of making movies. Since the beginning of cinema, producers, directors and cinema "inventors" were finding ways to add colors to movies; at the beginning with hand painted techniques, tinting, toning and -later on- with more complex mechanical techniques, before the era of multiple layer film material [1].

For the purpose of this research, we will examine one specific technique, known as Prizma Color. Prizma color was a coloring technique invented by the Prizma Company, a company created by William van Doren Kelley, in the '10s. Van Doren Kelley (Fig.1) fathered many original techniques (e.g. Kesdaicolor, Kelleycolor). The Prizmas (Prizma I and Prizma II) were the results of many attempts carried out in the 1910's and 1920's to reproduce colors in the most efficient way.

The first experiment of the Prizma system was made in 1917 with "Our Navy", a movie presented in the American Museum of Natural History. A first experiment was carried out in 1913 with a more ambitious system, the Panchromotion [2] a four color filter (red-orange, blue-green, blue-violet, yellow) technology that was meant to challenge the "Kinemacolor"; the result was not successful especially resulting in color "fringing" (and optical aberration that occurs at the border of the image) and lack of projection brilliance.

Museum of Natural History. "Our Navy" was made using a three-disk system which resulted in instability and flicker when projected, an issue true of many of the disk

technologies used during that era. These required upgrading all the projectors and training the staff to achieve the perfect speed required by the system.

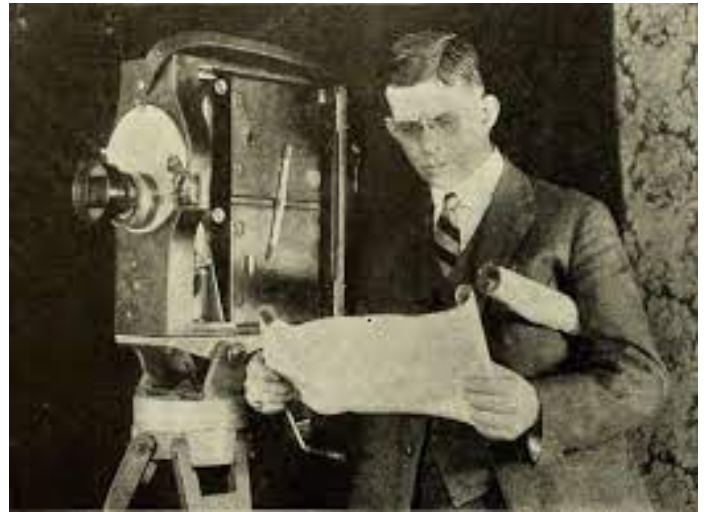


Fig. 1. William van Doren Kelley

3. Prizma I

As a result of these previous experiments, the Prizma I system was developed by combining two techniques. A first frame was colored in red and orange and a second one in blue and green with an additive system. They were then combined with a color wheel. Despite the fact that it was a combination of two different technologies, it continued to have fringing and synchronization problems, and van Doren Kelley was convinced that a subtractive coloring system would help to solve these issues. The visual result of these problems was called "bleeding" colors as the colors of the image were sometime "bleeding" out of the image; van Doren Kelley's quest to solve this instability led him to create a new subtractive system - which resulted in having the colored "captured" on the material rather than adding color directly to the material.

We must add that, in general, companies devoted to innovation in film production were devoted to more than one project, working on multiple levels to eventually achieve a goal, in this case to develop a more stable coloring system.

In this case we have to mention that another coloring system was experimented by Prizma, the Kesdaicolor. This coloring technique was first used on "Our American flag" (1918). It was also a two additive system but used a filter made with a lens and a prism to achieve a diffused light and compose the image [3].

4. Prizma II

After few years of testing, on April 4th, 1922 the Prizma Company patented a new system; the Prizma II, a complete shift in the previous projects of the company. Prizma II was a subtractive system to be projected on regular projector (vs. Kinemacolor) anticipating "bipack" system.

Two films were shot simultaneously (Fig. 2). One strip was sensitive to red-orange, the other to blue-green. Both negatives were processed and printed on "duplitzed film" (film material with emulsion coating on each side) and then each emulsion was toned its complementary color, blue-green by an iron solution, and the opposite side red-orange with uranium.

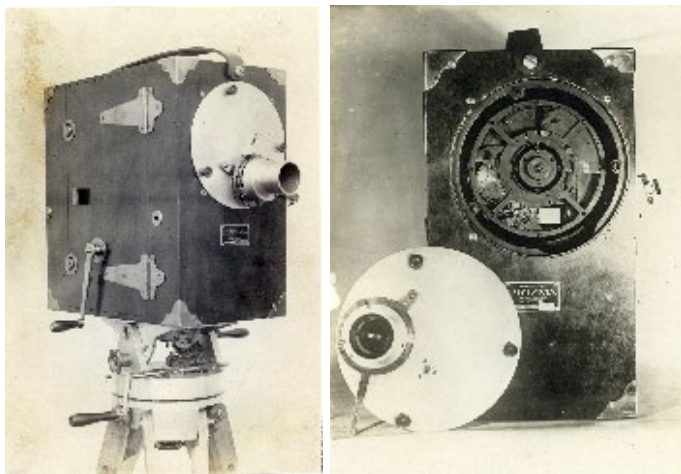


Fig. 2. Prizma II camera (Jonathan Silent Film Collection)

Looking at the original patent (Figs. 3-4) we can better understand how the original object was considered as decomposed by two negatives (a red and a green one), and printed on a positive, then dyed blue-green and red-orange in a final complete positive copy. In this way, Prizma II was "imbedding" the color information in two negatives and untimely in one positive, so that could be projected in any venue, with no need for further technological upgrades.

Here is a very brief filmography of movies that were created with the Prizma company systems and screened:

- Way down easy (1920)
- The Gilded Lily (1921)
- Broadway Rose (1922)
- The Glorious adventure (1921)

Also, 26 shorts (or more) were produced and released to demonstrate the Prizma II and in 1925 Robert Flaherty took a Prizma II camera to the set of "Moana" (1926) but he was not able to shoot any material. The reasons for this are unclear.

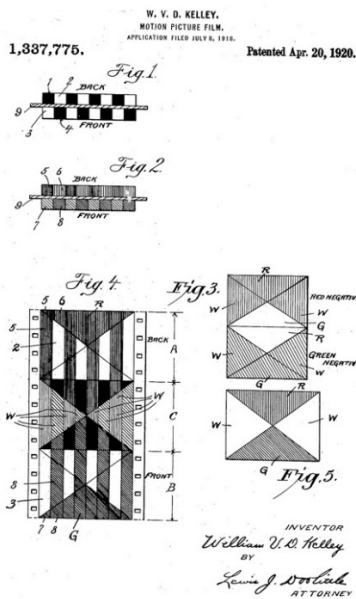


Fig. 3. Prizma II patent

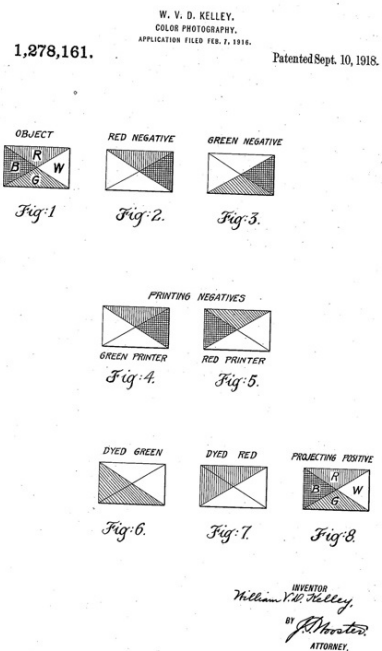


Fig. 4. Prizma II patent

As a conclusion to this very limited chronology of the Prizma Company, van Doren Kelley's last project was the Kelleycolor, which was unsuccessful. In 1928 all the patents belonging to the Prizma Company were acquired by the Consolidated Film Industries - part of Republic Pictures - and were re-branded as Magnacolor.

5. Two findings

The Mexican National Film Archive includes an interesting collection of Nitrate materials. It is still unclear how much of the collection was destroyed in the fire of 1982 but since then there has been a big effort reconstruct what was lost. It is likely that a collection of 25 silent film were donated to the archive, although it was not possible to trace the original donor. These materials survived because in the 1940s this selection of silent films were used by a teacher as visual illustration for his geography and history classes. All of these titles are either travelogues (the non-fictional one) or historical films (the fiction ones) but they all have some particularly original coloring techniques.

This research project was born when we found the first title “La senda de los apaches de Arizona” or “The Apache trail” (1919 ? [4]) (Fig. 5), not the positive original copy but a '90 dupe negative copy of this short movie, meant to show scenes from the Apache trail, taking advantage of the Prizma II system in big scenery shots. Even if the collection had not been studied or restored at the moment of the finding, the '90 dupe negative (as for some of the titles) clearly indicate that there was an intent to preserve the materials. By reading the edgemark on the positive, one could clearly see that the film had been made using the Prizma system, and from there we began on our journey to discover the origins of this unique coloring technique.



Fig. 5. A frame of “The Apache trail”

Another Prizma title we found in the collection was “La industria ceramica” (1920?)(Fig. 6), a movie that begins as sort of industrial documentary, but then moves more to a peculiar and imaginative creation as the beauties of the ceramic industry in Ohio are shown by an exotic magician. The positive copy of the movie was also marked with the Prizma brand and had the same color effects as well as the same problems.



Fig. 6. A frame of “La industria ceramica”

6. An attempt at restoration

When dealing with such unique materials, the first concern was to understand as much as we could of the technique, including the desired color effects as well as the aberrations resulting from the failures of the of the Prizma technique. As we first approached the dupe negative material of “The Apache trail” we realized that the copying system (on Eastman material) was actually quite accurate, but it was definitely lacking the brightness of the original. This idea was confirmed as soon as we find the original positive copy.

After a complete inspection and reparation, we followed our regular scanning procedure of the Laboratorio de Restauracion Digital Elena Sanchez Valenzuela, the digital facility of the Cineteca Nacional: the three copies were scanned in a 3K resolution selecting accurate LUT for each material. It became clear that three main problems we would face in the image and color restoration process would be heavy flickering, color instability, and “Fringing” or “Bleeding”.

All three problems were created by the Prizma system itself, which resulted in a color that was not always centered, a heavier than usual image flickering and an instability of colors in the image (and in the same frames) which caused a “Fringing” or “Bleeding” effect (Fig. 7). It is probable that these defects were the main reasons why Prizma was not widely used in its time.

It must be noted that the system was mostly effective for scenes with limited camera movement (such as scenery shots) but definitely less effective in scenes that involved more action.

We decided to apply a minimal stabilization to the image and, after many attempts, a minimal color correction was successfully applied to match the two original positives.



Fig. 7. A frame with a "Bleeding effect"

7. Conclusion

Finding a new collection is often the impulse for new research and can ultimately lead to significantly broadening the field itself, especially when there is little that is already known about techniques used to create them. The finding of two Prizma color movies in a more complex collection in Mexico reaffirmed that film history can be changed from any part of the world. While a final solution to correcting the "Bleeding" problem was not found, we have hope that digital technology may, in the near future, be able to resolve it, perhaps with a digital division of color layers (maybe in a three-dimensional space, decomposing film material as complex object more than the result on the screen) or even without any intervention.

8. Conflict of interest declaration

The author declare that no financial/personal interests have affected the author's objectivity. Therefore, no conflicts of interest exist.

9. Funding source declaration

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10. Short biography of the author

Paolo Tosini has studied Film Restoration in Udine and Berlin. He has been the founder and director fo the digital restoration lab in the Mexican National Film Archive. He is currently the coordinator of the Film heritage conservation school for the CSC and teaches Film History at the Università del Salento, Lecce

Notes

- [1] For example, Technicolor, Eastman color, Agfacolor, Ferraniacolor but also Dufaycolor, Kinemacolor and Gasparcolor among many others.
- [2] For more information: Nowotny, R. A. (1983): "The Way of All Flesh Tones. A History of Color Motion Picture Processes, 1895-1929" Garland Pub., pp. 154-156
- [3] For more information: Ryan, R. T. (1977): "A History of Motion Picture Color Technology", Focal Press, pp. 34-35.
- [4] We estimated the year from the edge code of the stock material.

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