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**Torn between Chromophobia and Colour Mania:
Developments of Early Technicolor**

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Abstract

From the mid-1910s to the early 1930s, the Technicolor company invented three different technical processes for colour film, all based on two colours. This innovation was marked by many set-backs, before the now famous Technicolor No. IV dye transfer process was introduced in 1932.

This article describes the technical and economic struggle during this early period of colour films that is largely unknown to the general audience. Based on the investigation of numerous historical film prints in European and American film archives, the author analyses the colour design and aesthetics of these films and relates these insights to the technical properties of the processes, including the challenges for the digitisation of these rare and precious films.



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We imagine the history of early film in black and white. Most silent films have come down to us without colour. But this does not reflect the historical facts. From early on numerous attempts were made to enrich film with colour. Two very different

strategies may be distinguished, the applied colours that had to be added to each separate film print and the so-called ‘natural colours’. ‘Natural colours’ – which in this text I will term *mimetic colours* – rely on an apparatus-based correspondence to colour perception. The thinking was to develop a camera that, like the human eye, would refract visible light into three primary colours that could be recombined later, either on the film stock itself or through a mechanical device in the cinema. Predecessors of these ideas had already existed in the photography of the nineteenth century. The physicist James Clerk Maxwell postulated and demonstrated around 1855 that colour photography was possible¹ by obtaining three colour extracts through filters and projecting them back onto a screen. Numerous experiments followed. In 1869 the Frenchmen Charles Cros and Louis Ducos du Hauron hypothesised and to some extent implemented nearly every possibility that would later lead to practical applications. As so often in the development of audio-visual media, insights from psychophysics and epistemology were the impetus for new technical processes. This article is not the place, however, to record a detailed history of all these techniques. They are described with texts and images in the online resource *Timeline of Historical Film Colors*².

¹ See James Clerk Maxwell. ‘Experiments on Colour, as Perceived by the Eye, with Remarks on Colour-Blindness,’ *Transactions of the Royal Society Edinburgh* XXI, no. 2 (1855): 275–298.

² Barbara Flueckiger, ‘Timeline of Historical Film Colors,’ accessed August 27, 2018, <http://zauberklang.ch/filmcolors/>. The database was published by the author online in 2012 in an initial version. It has been in continuous ongoing development since that time. The databank currently contains around 430 individual entries with primary and secondary sources, illustrated with more than 10,000 photographs from historical films. For background information on the project, see also ‘Filmcolors: An Interdisciplinary Approach,’ accessed August 27, 2018, <http://filmcolors.org/>.



Figure 1. Technicolor No. III, Corrine Griffith in *THE GARDEN OF EDEN* (USA 1928, United Artists, Lewis Milestone, 35 mm film). Images courtesy of the Margaret Herrick Library, photograph by Barbara Flueckiger.

A bow to alma mater

When Herbert T. Kalmus founded the Technicolor company together with Daniel Frost Comstock and W. Burton Westcott in 1915, the founders' first choice was a mimetic approach. Kalmus – like his co-founder Comstock, a graduate of the Massachusetts Institute of Technology, to which they showed their reverence in the company name³ – had the insight that the development of a practical colour film process was a promising endeavour early on. From today's perspective, it is astonishing that the company first chose an approach that had enjoyed an early flowering in the Kinemacolor colour process, but which already found itself in crisis around 1915. It is even more surprising that Technicolor as a company had to go through a nearly twenty-year period of setbacks before it could assert itself on the market. It is a story of outrageous reversals as well as an exemplary lesson in how a technological development can establish itself, or fail, in a field determined in equal measure by cultural and economic factors, namely the American film industry in the years of the classical Hollywood era. As is so often the case, it can be seen that the success of a technical innovation was less the result of brilliant engineering

³ Richard W. Haines, *Technicolor Movies: The History of Dye Transfer Printing*, (Jefferson NC: McFarland & Co. 1993).

work than of a clever strategy drawing on cultural, institutional and economic tendencies to generate and satisfy needs at the same time. In his witty essay ‘Technicolor Adventures in Cinemaland’, Kalmus traced the company’s history with ironic interjections:

Webster defines adventure as chance of danger or loss; the encountering of risks; a bold undertaking, a daring feat; a remarkable occurrence or experience, a stirring incident; a mercantile or speculative enterprise of hazard; a venture. The excursions of Technicolor into the domain of the producers, distributors, and exhibitors of motion pictures have been all of these⁴.

Writing in 1938, when the phenomenal success of the Technicolor three-color process was becoming apparent, Kalmus could permit himself an ironic distance as the victor in the competition around colour film. Shortly before the breakthrough of Technicolor in the mid-1930s, the article ‘What? Color in the Movies Again’ appeared in *Fortune* magazine, commenting on the economic conditions of the company’s crisis-shaken early years⁵. Kalmus, Comstock and Wescott had initially founded a consulting company in the technology sector. This was the context in which they were advising a client, William Coolidge, a lawyer faced with an unsuccessful invention. One day Kalmus suggested to Coolidge that he would do better to invest his money in the development of a colour film process. Coolidge agreed. He was the first of a series of investors to lose hundreds of thousands of dollars before the first colour film was ever produced in Technicolor. Apparently Kalmus had a fantastic gift for communicating the company’s plans, inspiring enthusiasm and spreading optimism. In the face of every difficulty, he always seemed to have new solutions to pull out of his hat, motivating the Technicolor engineers to develop unusual ideas together with their team. One of these ideas was a mobile film lab built into a train car, fully equipped with the technological infrastructure to sensitise, develop, test, measure, and print film stock, including a power generator, office and fireproof safe

⁴ Herbert T. Kalmus, ‘Technicolor Adventures in Cinemaland,’ *Journal of the Society of Motion Picture Engineers* 31, no. 6 (December 1938): 564.

⁵ See ‘What? Color in the Movies Again,’ *Fortune*, no. 10, October 1934, 92–97, 161–162, 164, 166, 168, 171.

for storing explosive nitrate film. In 1917, Kalmus and his team took the railway car to Jacksonville, Florida, where they produced the first Technicolor feature film, *THE GULF BETWEEN* (USA, Technicolor Motion Picture Corporation, 1918, 35 mm film), directed by Wray Physioc using Technicolor No. I. Only a small number of highly faded frames are extant from the film.

Technicolor no. I: The first film, the first defeat

The early history of Technicolor began with colour pioneer Herman Isensee's idea to use a rotating filter disc, patented in 1897, in the primary colours of red, green and blue. This allowed three film images to be exposed in a row and recreated in colour when projected via a corresponding filter device. Such an apparatus yielded the first successful colour film process in mimetic colours, the Kinemacolor process. Because three different primary colours required tripling the speed of the camera and of the projector, the inventors George Albert Smith and Charles Urban decided to go down to two colours, namely red and green. This did not reproduce the entire colour spectrum, with blue left out entirely, but it was a workable compromise.



Figure 2. Technicolor lab in a train car.

The first Technicolor process, Technicolor No. I, was an additive two-colour process with a beam splitter. Additive processes are processes that combine coloured light with the sum of all colours resulting in white. A beam-splitter separated the incoming light through two filters, one green and one red, exposing two images to be captured at the same time in the camera. Certain sources refer to two negatives, but according to the patent documents a single negative was used, exposing the frames with a three-frame interval⁶. These black and white frames were then reassembled in projection through another beam-splitting prism into a single image, now an additive colour combination of red and green, so that yellow could be reproduced but not blue.

The development team at Technicolor rightly believed that a spatial separation of the beams – also termed *spatial synthesis* – could solve one of the biggest problems of the Kinemacolor process and of all processes using temporal synthesis, namely the colour fringes that always arose when objects, animals or people moved. This is because the sequential photography created a slight time mismatch, a *temporal parallax* between the red and the green image.

Since Kinemacolor photographed the color components by successive exposure, it was nothing for a horse to have two tails, one red and one green, and color fringes were visible whenever there was rapid motion. The Technicolor slogan was two simultaneous exposures from the same point of view, hence geometrically identical components and no fringes⁷.

But Technicolor had underestimated the immense problems that would arise in projection. When in 1918 Kalmus presented Technicolor's first film, *THE GULF BETWEEN*, to an important audience and promised that he would offer them an unprecedented quality, he suffered a harrowing setback. The projectionist had misadjusted the projector during Kalmus' opening remarks, so that the colour fringes were worse than ever. The press, however, was merciful. For example, *The Moving Picture World* wrote under the headline 'First Showing in Technicolor':

⁶ See James Layton, and David Pierce, *King of Jazz: Paul Whiteman's Technicolor Revue*, (Severn MD: Media History Press), 2016, 37.

⁷ Kalmus, 'Technicolor Adventures in Cinemaland,' 565–566.

The new process throws upon the screen a continuous succession of pictures in natural colors that copy nature with the fidelity of a finely executed oil painting. Many of the landscapes and water scenes are of remarkable coolness. The interiors and human element are not so well done, the men and women in particular having a more or less painted or chromo effect⁸.

The fan magazine, *Photoplay*, was somewhat more critical:

THE GULF BETWEEN ... is done throughout in tints that approximate at least the natural colors. But, without actual knowledge of the process, it appears that thus far the manufacturers have been compelled to translate all colors into terms of reds and greens. This, of course, includes yellows, pinks, something like blue, and other derivatives. But while it is a tremendous step forward, it is not always satisfactory⁹.



Figure 3. Technicolor No. II, *THE GULF BETWEEN* (Wray Physioc, USA, Technicolor Motion Picture Corporation, 1918, 35 mm film). Images courtesy of the Margaret Herrick Library, photograph by Barbara Flueckiger.

Technicolor was quick to see that there was no future for additive processes. Not only did these techniques require increased speed and consumption of film stock – at least twice as many photographs had to be taken, printed and projected – but they also required more powerful light sources to compensate for the loss of light through the filters. The greatest difficulty of all was the projection, because the projectors had to be modified and the projectionists faced a tremendous challenge that Kalmus described as follows: ‘During one terrible night in Buffalo I decided that such special attachments on the projector required an

⁸ ‘First Showing of Technicolor,’ *The Moving Picture World* 34, no. 1, 1917, 61.

⁹ Randolph Bartlett and Kitty Kelly, ‘The Shadow Stage: The Gulf Between,’ *Photoplay* 13, no. 1, December 1917, 118.

operator who was a cross between a college professor and an acrobat, a phrase which I have since heard repeated many times'¹⁰.

It was not only a challenge for the projectionist but a fundamental problem of additive processes that cinema owners had to invest in a new technology that would not necessarily succeed – on the contrary. Cinema owners were not only sceptical of innovations with an economic value that was not immediately apparent. They also received films from different distributors and as a consequence would have had to install multiple sets of equipment in the absence of a general standardisation of formats and technologies. This economic obstacle to innovation was eliminated by increasing vertical integration in the 1920s: The studios took over distribution alongside production and ran their own theatres.

A universal principle thus emerged in this early struggle for market dominance, namely that a supplier could win this struggle only if its colour films could be shown on established projection systems. This also meant that the complexity of a colour process had to move away from projection and towards the industrial manufacturing and development of the colour film stock to companies where specialists could establish and implement a standardised process within the structure of a highly professional institution. Ultimately, a group of 45 prominent businessmen came together in a consortium and invested one million dollars in developing and perfecting a colour film process through Technicolor. At the same time, this consortium proposed strict quality control on the screenplays to be filmed in colour. This, too, was a lesson from the disaster with *THE GULF BETWEEN*, of which *Photoplay* wrote: 'The unfortunate thing about this picture is that the story is dull, trite, and drawn out interminably. A good, tense tale would have forced one to forget occasionally the close scrutiny of the colors.'¹¹

Technicolor no. II: First success and another disaster

In spite of Technicolor No. I's catastrophic track record, there was one corner stone that survived every major setback and catastrophe in the further development of Technicolor's colour processes: the beam-

¹⁰ Kalmus, 'Technicolor Adventures in Cinemaland,' 566.

¹¹ Bartlett and Kelly, 'The Shadow Stage,' 118.

splitter. For Technicolor No. II, a new camera recorded mirror-inverted images of the two black and white separations onto one negative film strip. No longer keeping the chain of photography and printing in black and white and reinserting colour in projection, the new Technicolor No. II process employed the subtractive principle. Subtractive means that light is filtered out, such that the sum of all colours results in roughly black. This principle is much more familiar from everyday life than the additive principle. For example, the mixing of paints also functions subtractively.

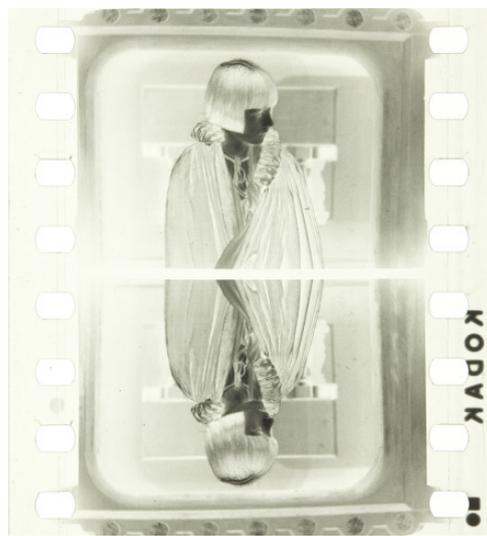


Figure 4. Technicolor No. II negative. George Eastman Museum, Moving Image Department, photograph by Barbara Flueckiger.

Louis Ducos du Hauron had already described subtractive colour processes in 1869. In theory these processes were very well suited for the moving image. The difficulty – as with the additive processes – was in getting two images to match exactly, now not in projection but in the printing process. The inventor Arturo Hernandez-Mejia described such a process of capturing and printing in 1912 and showed with tests that his arrangement worked. Although his company Colorgraph did not get beyond the test stage, his process was so influential that Technicolor had to rely on his patent. Other early processes with this technology included two-colour Kodachrome (1915) from the Eastman Kodak Company and Prizmacolor (1918) by the American William Van Doren Kelley. Prizmacolor was used for the first full-length feature film, *THE GLORIOUS ADVENTURE* (J. Stuart Blackton, GB, Stoll Film Studios

(UK), and United Artists (US), 1922, 35 mm film), a fairly cliché story about a naïve, heavily indebted aristocratic lady of society in glowing turquoise and orange hues, with heavy colour fringes and grotesque make-up.

It follows that Technicolor was in no way a pioneer of this technology, which makes it all the more astonishing that Technicolor chose an approach so complicated and impractical. Unlike other inventors, who had printed the two colour extracts onto two emulsion layers on both sides of the film, Technicolor came up with the idea of producing two very thin films and cementing the two colour extracts onto one another. This arrangement had drastic consequences because the two film strips shrank unevenly under the influence of heat from the projector bulb. This caused the entire film to bend ('cupping') in an entirely unpredictable way, with each change shifting the image out of focus on screen. It was generally difficult to get the two image planes into focus, and the two emulsions scratched significantly due to the increased thickness.



Figure 5. Technicolor No. II frame from *KING OF JAZZ* (John Murray Anderson, USA, Universal Pictures, 1930, 35 mm film). Images courtesy of the Margaret Herrick Library, photograph by Barbara Flueckiger.

Two-colour processes typically applied two complementary colours that together yielded black. Technicolor decided on a combination of red and green, with an orange-red tone and a green tone tending

towards blue-green, but nonetheless clearly on the green spectrum, in contrast to other processes' turquoise to cyan-coloured tones. It is difficult to determine the correct colour tones from a historical distance, because, as already mentioned, nearly all prints of films made in Technicolor No. II are completely faded, the green layer in particular. The analysis of the few frames that are not completely faded suggests the possibility that at most the early tests with film material from *THE GULF BETWEEN*, also analysed by Ulrich Ruedel in his study of the Technicolor Notebooks,¹² may have applied blue-green. By contrast, both the best-preserved frame from the Margaret Herrick Library, a frame from *KING OF JAZZ* (John Murray Anderson, USA, Universal Pictures, 1930, 35 mm film), the fragment from the film *LIGHTS OF OLD BROADWAY* (Monta Bell, Metro-Goldwyn-Mayer, USA, 1925, 35 mm film) and *STAGE STRUCK* (Allan Dwan, USA, Paramount Pictures, 1925, 35 mm film) show a moss-green tone with only a slight tinge of blue.

The exact knowledge of the colour tones used has direct and wide-ranging significance. On the one hand, it permits understanding the film on which contemporary reactions were based. On the other, this knowledge is decisive for reconstructing film colours when digitising films that survive only in faded nitrate prints or black and white negatives, such as Technicolor No. II.

To spread its colour process, Technicolor and its investor consortium produced the film *THE TOLL OF THE SEA* (Chester M. Franklin, USA, Metro Pictures Corporation, 1922, 35 mm film), a loose adaptation of Giacomo Puccini's opera *Madama Butterfly* with a runtime of about 50 minutes, cinematography by J. Arthur Ball, a member of the company's development team and in charge of the two-colour camera. Although *THE TOLL OF THE SEA* celebrated its premiere in New York in 1922, it took almost a year until the film arrived in theatres. The Technicolor lab's insufficient infrastructure caused massive delays in delivering prints. The press responses to the first showing were more often than not positive. The critic of the magazine *Moving Picture World* wrote:

In a great many instances the effect is all that could be desired, especially some in which the human characters predominate, they appear like

¹² See Ulrich Ruedel, 'The Technicolor Notebooks at the George Eastman House,' *Film History* 21, no. 1 (2009): 47–60.

exquisite paintings endowed with life, the effect of the natural colors giving them more of the semblance of reality. There was no fluttering or fringing of colors discernible. ... Judging from the applause which followed the showing of this picture ... it is destined to be a big success and its sponsors should feel highly gratified¹³.

Here we may discern multiple positive positions expressed on mimetic film colours, namely their painterly quality, their tendency to depict reality in a more true-to-life manner, an ennobling of film in harmony with visual art, and an essential quality of film itself and of its heightened effect of reality. Against these positions, the colour spectrum was not entirely satisfactory:

The main defect appears to be in the fact that the green of the trees and plants appears as more of a brown, while in some instances there is an over-vividness in the reds and orange, and a sort of massing of color in some of the scenes where there is a wealth of flowers and foliage¹⁴.

The critic of the *New York Times* was convinced that experts regarded the problem of colour film to have been solved through the achievements of Technicolor No. II¹⁵. Yet the reproduction of skin tone did not seem to convince the critic for *Variety*:

The coloring runs without streaks, the camera catching the natural colors apparently, although what seemed something of a freak in this process is that the pallid color given to the complexion of the Chinese extended to the faces of the Americans as well ... Still, though, the natural colors or the coloring in this Technicolor product is attractive¹⁶.

Skin tone, and in particular the skin tone of whites, was the colour tone that film manufacturers always used for their standard reference – a notion that has been critically evaluated in recent years¹⁷.

The University of California Los Angeles (UCLA) carried out a restoration of *THE TOLL OF THE SEA* in 1985 on the basis of the camera negative, a very rare undertaking because the camera negatives for many films have been lost. Thanks to this outstanding source material, the resolution is very high, surely higher than what contemporary

¹³ *The Moving Picture World* 59, no. 6, December 9, 1922, 573.

¹⁴ *Moving Picture*, 573.

¹⁵ See *The New York Times*, September 22, 1922, 9.

¹⁶ 'The Toll of the Sea,' *Variety* 69, no. 2, December 1, 1922, 35.

¹⁷ See Richard Dyer, *White. Essays on Race and Culture*, (London and New York, 1997).

audiences could have seen. The green tone in this restoration is more of a petrol green, and the red-orange rather pink, causing the skin tone to seem quite brownish. The exotic setting and the protagonist (Anna May Wong) justify an ostentatiously ornamental décor with geometric patterns in the costumes as well. The silks with Jacquard patterns emphasise the ornamental components with their shimmering appearance. Although the racist and sexist attitudes of *THE TOLL OF THE SEA* appear problematic today, contemporary audiences seem to have been enthusiastic, the economic success great. ‘It grossed more than \$250,000, of which Technicolor received approximately \$165,000 [the latter figure, adjusted for inflation, around \$2.4 million].’¹⁸

In the coming years the primary choice remained colour inserts in tinted and hand-coloured films. *BEN-HUR: A TALE OF THE CHRIST* (Fred Niblo, USA, Metro-Goldwyn-Mayer, 1925, 35 mm film) is representative both of this practice and of the break in narration made through the discontinuity in the insertion of colours. With a few exceptions, such as the entry of Ben-Hur into Rome, the sections realised in Technicolor were all biblical scenes. In contrast to the sequences in black and white, tinting or hand colouring, many composed in an extremely dynamic way making use of depth of space, the Technicolor fragments are constructed frontally as tableaux. They employ traditions in pictorial composition familiar from sacred art, with spiritual symbolism determining the visual arrangement. As with later Technicolor films, light is not used in a very expressive way, instead supporting the painterly, surface-oriented effect of the image. *BEN-HUR* remains to this day a monumental fascination, a grand spectacle into which mimetic colours bring a remarkable aesthetic layer. But the colours are a foreign matter in the film, even if a foreign body with an attractive appearance. *BEN-HUR* remained a success for years. Later prints were made in Technicolor No. III and Technicolor No. IV. By 1934, the film had brought in box office receipts of four million dollars (76 million, adjusted for inflation).

¹⁸ Kalmus, ‘Technicolor Adventures in Cinemaland,’ 567.



Figure 6. Technicolor No. III dye-transfer print with sound of *BEN-HUR: A TALE OF THE CHRIST* (Fred Niblo, USA, Metro-Goldwyn-Mayer, 1925, 35 mm film). Národní filmový archiv/ National Film Archive, Prague, photograph by Barbara Flueckiger.

Hollywood still remained sceptical for two reasons. First, producers found the film developing and printing prices too high. They insisted on a massive reduction in price to one-third, from 27 cents to 8 cents per foot. Second, the Technicolor lab was still in Boston, and therefore unable to develop dailies or rushes to check on filming in progress. More pressing than the practical problems may have been fundamental reservations about colour, as expressed by Cecil B. DeMille in a manner representative for many others:

I believe that color photographed at its full value will call attention to itself and thereby detract from the theme of the photoplay ... Anything that calls attention to the technical or mechanical features of a screen production is a handicap to its success. Not only will color photography at its full value detract from the subject matter of the photoplay, but it will, it seems to me, tend to cause eye strain. If you have ever sat at the window of a fast moving train and watched the brightly colored scenery move by you will be able to realize how tiring it is to the eyes to watch colors move¹⁹.

¹⁹ Cecil B. DeMille, 'The Chances of Color Photography in Motion Pictures,' *American Photography*, no. 17 (January 1923): 15.

Invocations of ‘eye strain’ or ‘eyesore’ run through the negative assessment of film colour in the 1920s and 1930s like a recurring mantra. Was moving colour rejected because it represented a break with traditional aesthetic experience, as DeMille argued by reference to the train? Or was it the defensive reflex against colour in Western culture that David Batchelor has termed *chromophobia*? In Batchelor’s view, colour is assessed as an expression of the ‘Other’, as feminine, oriental, primitive, childish and vulgar, as well as superficial, superfluous and cosmetic²⁰. All of these explanations could have contributed to the reluctance to adopt colour for film production. What might predominate over them, however, could have been a cultural and institutional rule that governed the style of the classical studio era: the idea of the continuity system, according to which the formal elements of narration must be subordinate and achieve value only when they are in the service of the narration and assume a clear function in it. In professional discourses in all areas of film form, anything else was regarded as superfluous and excessive. This ideology also became apparent in Technicolor’s company strategy when its colour consultants began to develop restrictive colour schemes consistent with Natalie Kalmus’ text, ‘Color Consciousness’, which can be understood as a manifesto of sorts²¹. Natalie Kalmus, head of Technicolor’s Color Advisory Service and Technicolor’s Color Consultant, was an art historian – this was in any event what Technicolor always stated, although according to James Layton no evidence can be found to support the claim – and presumably brought with her an idea from academic art that a restrictive use of colours is tasteful. Natalie Kalmus sought to enhance the status of film colours by using artistic concepts borrowed from painting. She proposed taming colour stimuli into restrictive, precisely controlled colour schemes. Three sets of goals were central to this effort, namely *naturalness* of colour in keeping with the continuity system, so that colours would seem as inconspicuous and natural as possible, *narrative functions*, assigning a direct narrative use to colours, and, in connection with

²⁰ See David Batchelor, *Chromophobia*, London, 2000, 64.

²¹ See Natalie M. Kalmus, ‘Color Consciousness,’ *Journal of the Society of Motion Picture Engineers* 25, no. 2 (August 1935): 139–147.

this, *conventions* that referenced established colour symbolisms such as red for passion and love²².

Technicolor said that it invited DeMille to test the use of colour with Technicolor for his film *THE TEN COMMANDMENTS* (Cecil B. DeMille, USA, Paramount Pictures, 1923, 35 mm film) free of charge. As film historian Rudy Behlmer has retraced, DeMille accepted the offer and allowed Technicolor's cameraman Ray Rennahan to film the biblical exodus sequences in parallel with two-colour cameras²³. In contrast to *BEN-HUR*, the scenes of the masses inserted in Technicolor are composed in deep staging when the streams of Israelites cross the desert in a setup with an epic effect. It is evident that this composition was not chosen by Technicolor's restrictive control, and so not reduced to an intimate play tableau, but instead showing a vastly expansive spatiality. This strategy appears to have paid off, since the Technicolor scenes were met with great enthusiasm: 'There are many impressive colorful scenes of the Israelites in the desert, some of them appearing better and more natural than other such effects we have witnessed on the screen.'²⁴

Thereafter the Famous Players-Lasky Corporation, later to become Paramount, produced their film *WANDERER OF THE WASTELAND* (Irvin Willat, USA, Paramount Pictures, 1924, 35mm film), a Western based on the novel by Zane Grey, in Technicolor. According to Irvin Willat, whose brother worked at Technicolor, he as the director had to convince Famous Players-Lasky to produce the merely middling screenplay in Technicolor²⁵. Producers remained sceptical and, in Willat's opinion, extremely risk-averse. Willat worked to obtain an optimal impact from the colours through *mise-en-scène*.

Kalmus received a nasty letter from Famous Players-Lasky all the same after the film had been shown in theatres:

We have concluded not to do more Technicolor pictures for the present, for two reasons: first, because we have had a great deal of trouble in our exchanges due to the fact that the film is double-coated and consequently

²² Kalmus, 'Color Consciousness,' 139–147.

²³ See Rudy Behlmer, 'Technicolor,' *Films in Review* 15, no. 6 (June/July 1964): 339.

²⁴ *The New York Times*, December 22, 1923, 8.

²⁵ See Robert S. Birchard, 'Conversations with Irvin V. Willat,' *Film History* 12, no. 1 (2000) 44.

scratches much more readily than black and white, with the necessity of having to order more replacements, and it is an added bother to our operators; and, second, because the cost is out of all proportion to its added value to us. We paid \$146,000 additional for Wanderer prints. We understand that you need volume to get your costs down. At an 8-cent price we would be interested to talk volume²⁶.

Kalmus wrote that Famous Players-Lasky was right, and the production had been a nightmare for Technicolor itself, with its limited capacity causing difficulties in processing 175 prints for the US release. As though that were not enough, the prints had to be replaced on an ongoing basis due to the aforementioned problems with the cemented film stock. Even so, there were delighted responses from journalists and moviegoers.

When seeing *THE WANDERER OF THE WASTELAND*, they ... start raving about this production. It is a work of art. That is the only expression to describe it. There have been color processes before, but none has given the screen anything of the perfect tones that are here. There are shots that one would swear were by Remington done in colors ... It is the biggest step in picture since the close-up was first used²⁷.

Building on this hype, Douglas Fairbanks proposed producing his next movie, *THE BLACK PIRATE* (Albert Parker, USA, United Artists, 1926, 35 mm film), in Technicolor. Fairbanks' plan was to shoot a pirate story in the style of Dutch painting and French Impressionism. In this way, he wanted to create an explicit repudiation of the hardened prejudices that colour was not suitable for feature films. Technicolor had carried out tests with different levels of saturation to optimise its reproduction of colour. According to Rudy Behlmer, Fairbanks tested equipment, costumes, make-up and the landscape of Catalina Island off the coast of California for six months, ultimately deciding to do 95 percent of the production with studio filming, since the landscape and vegetation could not be reproduced on film to his satisfaction²⁸. This account differs from that given by Herbert T. Kalmus, who described shooting with four Technicolor cameras

²⁶ Kalmus, 'Technicolor Adventures in Cinemaland,' 571.

²⁷ 'Work of Art, Is Color Film, F. P.-L. Product by Willat. *The Wanderer of the Wasteland*,' *Variety* 75, no. 1, May 21, 1924, 26.

²⁸ See Rudy Behlmer, 'Technicolor,' 340-341; see also Layton and Pierce, *King of Jazz* 2016, 131.

on Catalina Island²⁹. To avoid the ‘eye strain’ feared by DeMille, the director slowed down the action and reduced the colour scheme to a small number of colour values. Colour was intended to give lustre to images and to have low saturation.

The color scheme decided upon was green and brown, with the emphasis on multiple shades and tones of each color within the frame. ‘Greens of all the softer shades,’ director Albert Parker noted, ‘and brown running the whole gamut from the lightest tint of old ivory to the deepest tone of mahogany.’ There were only two exceptions for brilliant color – a green parrot and a red flash for an explosion³⁰.

Mordaunt Hall of the *New York Times* praised the muted use of colour in the highest terms:

Mr. Fairbanks realized that color must be subordinated to the action of the episodes, and therefore, although the telling prismatic effects occasionally reap their full reward, they are put forth with deliberation and restraint... For the most part modulated shades are employed, such as sepia, the dominating tone which is far more effective than a lavish scattering of reds and greens. In fact, decisive red is only depicted to show the blood on the hands of a man or on his sword³¹.

Much as colour’s opponents dismissed colour with a relatively limited arsenal of arguments to legitimate their reservations, colour’s supporters notoriously used the discursive pattern of ennobling film by reference to paintings of old masters. The composition of the images is in fact quite striking. The masterly camerawork was overseen by Technicolor cameraman J. Arthur Ball, who created wonderfully modelled images in chiaroscuro style that imbue the film with a historical and timeless quality. Ball himself described the exceptional difficulty of capturing a modelled, nuanced light in Technicolor³². Interior and exterior shots in daylight and artificial light are interwoven into a varied body of images full of adventurous plot

²⁹ Kalmus, ‘Technicolor Adventures in Cinemaland,’ 570.

³⁰ David Pierce, entry on ‘The Black Pirate,’ in the catalogue of *Le Giornate del Cinema Muto*, Pordenone, 2014, 103.

³¹ Mordaunt Hall, ‘The Black Pirate,’ *The New York Times*, March 9, 1926, 21.

³² See J. A. Ball, ‘The Technicolor Process of Three-Color Cinematography,’ *Journal of the Society of Motion Picture Engineers* 25, no. 2 (August 1935): 134.

twists, including romance and comedy. Douglas Fairbanks' astounding physique allowed for stunts that fascinate to this day.

It is very hard to judge how the colours really looked in *THE BLACK PIRATE* on the basis of the source material available today. The chromogenic print made by the National Film Archive in 1984 under the direction of Harold Brown shifts the green tones into a metallic blue with a hint of turquoise but no hint at all of the green apparently originally conceived according to the Technicolor dyes. What is especially striking on the DVD versions in circulation is the total inconsistency of the colours. The sea, the blue tone of which could not be reproduced at all with the two primary colours used in Technicolor No. II, causing both sky and water to generally look green, appears in the DVD versions in a dark blue tone. It is extremely regrettable that this silent film, which is still exciting and entertaining even today, has not survived in its original appearance.



Figure 7. Technicolor No. III print of *THE BLACK PIRATE* (Albert Parker, USA, United Artists, 1926, 35 mm film). George Eastman Museum, Moving Image Department, photograph by James Layton.



Figure 8. DVD screenshot of *THE BLACK PIRATE* (Albert Parker, USA, United Artists, 1926, DVD). DVD: Park Circus, 2011.

Technicolor no. III: A colour mania in the late 1920s

Unlike with the two processes that preceded it, the products of which are either entirely lost or faded, it is finally possible with Technicolor No. III to investigate aesthetic characteristics more precisely because many films have come down to us in historical nitrate prints that preserve the original colours. Research at the Academy Film Archive in Los Angeles, the George Eastman House in Rochester, the Czech National Film Archive in Prague, the Library of Congress in Culpeper and the UCLA Film & Television Archive has involved the inspection

and photographic documentation of about 30 well-preserved prints from the years between 1927 and 1932. Some of these films are available as safety film prints or are in circulation as DVDs, although often in highly questionable quality. Through the study of Technicolor No. III, it is possible to identify certain idiosyncrasies and strategies of the process and the company's normative aesthetic control that were later to play a decisive role with three-color Technicolor, namely Technicolor No. IV.

In his remarks in the *Journal of the Society of Motion Picture Engineers*, Herbert T. Kalmus claimed to have had a dye-transfer process in mind from the very start of the switch to subtractive colour processes. What is certain is that Technicolor had great difficulties in transferring to film a process that had long been established for still photography. This is because real-time film photography, even at the lower speeds of 16 to 18 frames per second, as were typical in the silent period, requires a much greater amount of film stock and shorter exposure times than does still photography, not more than 1/32 second with a shutter angle of 180°. In brief, a relief printing process is based on the same black and white colour separation negative as in the previous Technicolor process. The same camera with a beam-splitter was used as with Technicolor No. II, recording two black and white mirror-inverted images on one negative. Unfortunately, one often sees the term 'two-strip Technicolor' even in otherwise well-informed literature, but the term is absolutely misleading, since neither in the camera nor in the print does this process use two film strips. After exposure and development, the black and white negative is printed to produce matrices for the dye-transfer. Matrices are film positives on which the silver image is tanned, hardening the exposed parts of the images. In the next stage of the process, the unexposed, thus soft parts of the image are washed off with warm water, creating a wash-off relief on which only the exposed parts are raised. Lastly the silver is bleached, creating colourless matrices for printing that then absorb the dyes. Green and orange-red hues were applied for Technicolor No. III. The actual dye transfer process took place on a 'pinbelt', a metal belt with pins aligning the film position, with the printing colours

diffusing into the emulsion in a step that took multiple minutes³³. The greatest difficulties in this process related to the exact alignment of the two layers, since the slightest deviations resulted in colour fringes and reduced resolution and perceived sharpness, as had also been the case with Technicolor No. II. Another difficulty – and as film archivist James Layton has written, it took years to address this problem – was in achieving utmost precision in transferring the dyes, which tended to diffuse in the emulsion ('colour leaking'). The emulsion thus had to be treated with a specific mordant to make it colourfast.

Resulting from this technological background are a series of aesthetic consequences that are applicable for Technicolor No. IV as well. These consequences have rarely been discussed, because the discussion requires a precise knowledge not only of the technical and material background but also an in-depth study of the epistemological foundations, institutional practices and historical aesthetics of their application. In consequence, the weaknesses of the relief printing process caused Technicolor to avoid small-scale colour compositions and instead privilege flat, graphical distributions of colour. Perhaps the most serious influence of Technicolor's characteristics of material aesthetics resulted from the application of colour, which differs dramatically from the later chromogenic colour processes typically used since the mid-1950s. These more recent film stocks use colour clouds with fine-grained structures, scattering light like thousands of little diffusion filters to create transparent luminosity. In comparison, Technicolor has a dense and darkly saturated appearance. These characteristics of material aesthetics have their roots in the epistemological foundations of the process.

As a printing process, Technicolor is tied to a mechanistic worldview, in other words to the primacy of the material and the natural laws it obeys. The source of this worldview lies in the mechanistic conception of perception embodied in the psychophysics of the nineteenth century, in which James Clerk Maxwell, building on Thomas Young's theory of three-color vision, first applied, as we mentioned in the introduction, a physical imitation of this principle to colour photography in 1861. This mechanistic, arbitrary translation of colours in Technicolor is not very

³³ See Ball, 'Technicolor Process,' 144.

true to perception and generates non-linearities that correlate only weakly with human visual perception. Thus the result is a pronounced transformation of the object depicted, especially for coloured lights, which in Technicolor develop a shift to autonomous colours that can be controlled only with difficulty. Therefore, Technicolor has idiosyncratic colour characteristics – a very special Technicolor look – and these characteristics are even more pronounced in the two-colour process than in the later three-color process. As a result of the relief printing process Technicolor creates a dye layer with an opaque, weakly structured appearance. An analogy could be made – though the comparison should not be taken too far – to thick, light-absorbent oil paints.

Another deficit of Technicolor is the loss of detail in the highlights, the brightest parts of a frame, that contain minimal structure and tend to become almost entirely transparent. To avoid this limitation, the company secured the dominance of a highly controlled, low-contrast lighting, which further strengthened the flat, two-dimensional character of the Technicolor image. At the same time, it becomes clear how proactively Technicolor, through its company strategy with the Color Advisory Service, sought to exercise a normative control to prevent these problems from the outset. Further aesthetic analyses of certain exemplary two-colour productions will show which peculiarities resulted from the interplay of technology and institutional control. According to Kalmus the insight that such a control of aesthetic production could be one of the most important strategies in the successful implementation of a colour film process emerged when they were introducing Technicolor No. III:

I wanted ... to prove to the industry that there was nothing mysterious about the operation of Technicolor cameras, that the transition from what the eye saw to what the emulsion recorded was susceptible of reasonable control through understanding, that black and white cameramen could easily be trained to light for Technicolor cameras, that talented art directors could readily begin to think in terms of color³⁴.

Later, Technicolor was to expand this strategy systematically, not only reviewing the design of scenes, costumes and make-up but also

³⁴ Kalmus, 'Technicolor Adventures in Cinemaland,' 570.

forcing their own camera crew onto productions along with the special Technicolor camera. The company thereby kept control over all aspects of technology and design from the film stock through to post-production.

Kalmus first produced twelve short films, the series GREAT EVENTS, to establish Technicolor No. III in Hollywood with historical subject matter and to showcase the advantages of the new relief printing process. Natalie Kalmus designed the colour concept and Technicolor cameramen Ray Rennahan and George Cave composed the images. The inspection of historical nitrate prints of these films, including BUFFALO BILL'S LAST FIGHT (John W. Noble, USA, 1927, 35 mm film), CLEOPATRA (Roy William Neill, USA, 1928, 35 mm film), and THE HEART OF GENERAL ROBERT E. LEE (Roy William Neill, USA, 1928, 35 mm film) confirms the supposition that these productions' colour aesthetics was not in any way ostentatious, instead they were applying very restrictive colour schemes that translated the process' idiosyncrasies into pastel hues and earth tones. Often, the film base is tinted with a bright yellow, which expands the colour spectrum and endows the images with a soft and warm golden basic tint. Instead of saturated orange-red and green tones, there are softly shimmering gold colours, light shades of chestnut red or velvety lime green, and desaturated earth tones, fully in harmony with Natalie Kalmus' call for natural colours. Art historian Rolf Sachsse describes such a colour set as typical of spiritually oriented movements in Europe of the 1920s: 'Nature-oriented groups like the Anthroposophists chose as their main colors the warm shades from yellow to orange and from lime green to pine green. Brown became the preferred color of anti-modern movements.'³⁵ Although it is improbable to infer a direct interaction between Natalie Kalmus and these movements, the spiritual to mystical underpinnings can be found in colour theories from antiquity to Johann Wolfgang von Goethe to Philipp Otto Runge and later to the theorists of the Bauhaus.

³⁵ Rolf Sachsse, 'Weissbunt,' Rolf Sachsse, *Wilhelm Ostwald: Farbsysteme: Das Gehirn der Welt*. Peter Weibel, ed. (Ostfildern, 2004), 15.



Figures 9, 10, and 11. *CLEOPATRA* (Roy William Neill, USA, 1928, 35 mm film). George Eastman Museum, Moving Image Department, photograph by Barbara Flueckiger.

Technicolor sought to counteract the wide-spread critique of film colours as garish and tasteless by selecting a more painterly approach. This was particularly underscored in the film *CLEOPATRA*, with its majestically ornamental art nouveau set design with numerous tulle elements, wrought-iron decorative grates, peacock and ostrich feathers, and gemstones and pearls. As with later films produced in Technicolor No. IV, design was placed entirely in the service of a planar, graphical composition. Small-scale patterns that would reveal problems in resolution and insufficient registration of the dye layers are consciously avoided. The title design for *CLEOPATRA* shows a lightly structured brown background. Earth tones and green tones predominate, by contrast, in *THE HEART OF GENERAL ROBERT E. LEE*. *BUFFALO BILL'S LAST FIGHT*: it is the most daring in its use of colour, with a saturated red tone for the soldiers' uniforms and the Native Americans' feather trimming. With certain unusual light effects – night shooting and an iconic silhouette of horse and rider – this Western-style film stands clearly apart from the other two productions with their uniform high-key lighting. It is precisely in *BUFFALO BILL'S LAST FIGHT* that the limitation of the gamut, meaning the reproducible colour spectrum, becomes apparent, because the sky and the water are always shown in a specific pale green tone tending towards the turquoise resulting from the absence of blue in this spectrum. Yellowish titles on a brown background with a slightly shiny organic texture reminiscent of leather are also striking.



Figure 12. BUFFALO BILL'S LAST FIGHT (John W. Noble, USA, 1927, 35 mm film). George Eastman Museum, Moving Image Department, photograph by Barbara Flueckiger.



Figures 13a and 13b. TWELVE MINUTES IN GLACIER NATIONAL PARK (USA 1928, 35 mm film). Library of Congress, photograph by Barbara Flueckiger.

A quite spectacular film is TWELVE MINUTES IN GLACIER NATIONAL PARK (USA 1928, 35 mm film), recently rediscovered in the Library of Congress, one of the few documentaries not to have been made in a studio and thus without complete colour control. Alongside landscape images, representatives of the Blackfeet tribe contribute to the production's

exotic colour, a depiction which, as Jennifer Lynn Peterson³⁶ has shown, does not provide a very accurate document of the time.

Technicolor went further, not only producing the series of short films itself but also with *THE VIKING* (Roy William Neill, USA, Metro-Goldwyn-Mayer, 1928, 35 mm film), a feature film to show the industry the superiority of its technology and that audiences could get excited about films made entirely in colour. MGM bought the film, which covered all production costs for Technicolor, but the film was not a success and was, in spite of Technicolor's expectations, unable to build on the popularity of *THE BLACK PIRATE*. Kalmus offered two possible explanations:

There seemed to be two principal troubles with *THE VIKING*, both of which I suspected but without certainty. First, it came out among the very last silent pictures in 1929 and, second, whiskers. Leif Erickson, the Viking hero, true to character, had a long, curling mustache, whereas American audiences prefer their lovers smooth-shaven. At times the whole screen seemed filled with viking whiskers. But the picture was a good color job and the first to be synchronized with music and sound effect³⁷.

In 2012, the silent film festival *Le Giornate del Cinema Muto* in Pordenone showed a version of *THE VIKING* made from a colour reversal intermediate (CRI), since the negative had been lost. With its harsh contrasts, this print unfortunately could not do justice to the specific softness of Technicolor No. III, even though the hues seemed to some extent accurate as James Layton noted in the catalogue. Mordaunt Hall, critic of the *New York Times*, found the film's colour quality inadequate, an interesting change from his reviews of the Technicolor No. II films:

The prismatic effects in this production may not always be the desired quality, especially when it concerns fire and water, but they are none the less agreeable. There is the glint of metal and the flashing of semi-precious stones on the wristbands of the horned or wing helmeted, flaxen-haired warriors of bygone ages. Occasionally there are scenes that are like beautiful paintings, but here and there the colors, while they do not fringe or mix, are not quite true³⁸.

³⁶ Jennifer Lynn Peterson, *Education in the School of Dreams: Travelogues and Early Nonfiction Film* (Durham NC: Duke University Press, 2013), 256–257.

³⁷ Kalmus, 'Technicolor Adventures in Cinemaland,' 573.

³⁸ Mordaunt Hall, 'A Picture in Colors,' *The New York Times*, November 29, 1928.

In spite of the restrained reception of *THE VIKING*, Jack L. Warner, co-founder and head of production at Warner Brothers Pictures, embraced the spirit of change surrounding Hollywood's switch to sound and produced, with the musical *ON WITH THE SHOW* (Alan Crosland, USA, Warner Bros., 1929, 35 mm film), the first sound film in colour. It garnered devastating reviews,³⁹ but was a major success with audiences.

This presentation, known as *ON WITH THE SHOW*, is to be felicitated on the beauty of its pastel shades, which were obtained by the Technicolor process, but little praise can be accorded its story or to the raucous voices. Nobody in the course of this picture speaks with anything but harsh notes, and therefore one looks upon the prismatic effects as the heroine of the production⁴⁰.

With the next musical *GOLD DIGGERS OF BROADWAY* (Roy Del Ruth, USA, Warner Bros., 1929, 35 mm film), also from Warner Bros., an incredible colour mania began in Hollywood at the end of the 1920s. The audiences and this time the critics, too, were excited.

'*THE GOLD DIGGERS OF BROADWAY*,' ... coupled with the lovely pastel shades, the tuneful melodies, a sensible narrative, competent acting and elaborate stage settings, resulted in an extraordinarily pleasing entertainment. It caused one to meditate in the end on the remarkable progress of the screen, for not only are the voices reproduced with rare precision, but every opportunity is taken of the Technicolor process in producing the hues and glitter of a musical comedy⁴¹.

To the extent a judgment can be made on the basis of the meagre quality of the DVD version in circulation, the colour concept of *GOLD DIGGERS OF BROADWAY* used muted pastel tones in flamingo and gentle green tones optimally aligned with the colour spectrum of Technicolor No. III. As in *CLEOPATRA*, there are many shimmering fabrics on display, feathers, tulle and pearls of every kind, in short all of those materials with a soft glow that brought a bit of structure and play into the textureless surfaces of the Technicolor universe. Another one of the few films that stood out amidst the mediocre productions was *WHOOPEE!* (Thornton

³⁹ See Robert A. Nowotny, *The Way of All Flesh Tones: A History of Color Motion Picture Processes*, (New York, 1983), 1895–1929.

⁴⁰ *The New York Times*, May 29, 1929, 28.

⁴¹ Mordaunt Hall, 'Gold Diggers of Broadway,' *The New York Times*, August 31, 1929.

Freeland, USA, United Artists, 1930, 35 mm film), a musical with choreographies by Busby Berkeley in his typically excessive style with ornamental top shots.

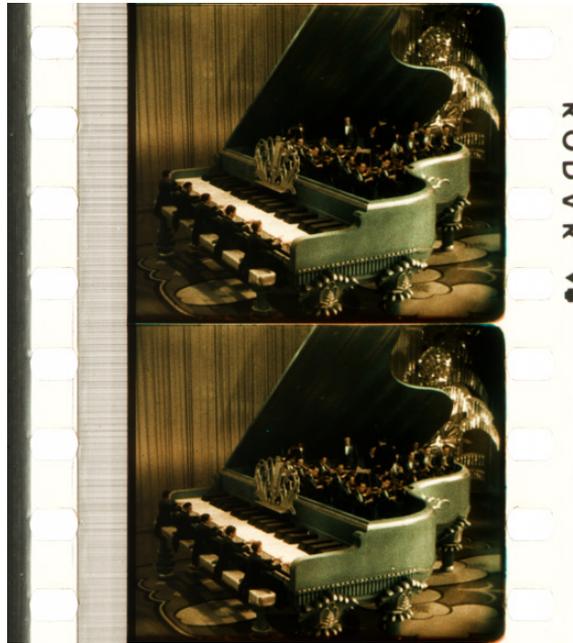


Figure 14. KING OF JAZZ (John Murray Anderson, USA, Universal Pictures, 1930, 35 mm film). George Eastman Museum, Moving Image Department, photograph by Barbara Flueckiger.



Figure 15. WHOOPEE! (Thornton Freeland, USA, United Artists, 1930, 35 mm film). George Eastman Museum, Moving Image Department, photograph by Barbara Flueckiger.

Some striking departures from the flat compositions with barely modelled placement of lighting, as seen in nearly every other production in Technicolor No. III, were Lucien Hubbard's *THE MYSTERIOUS ISLAND* (Lucien Hubbard, USA, Metro-Goldwyn-Mayer, 1929, 35 mm film), *KING OF JAZZ* (John Murray Anderson, USA, Universal Pictures, 1930, 35 mm film), and *DOCTOR X* (Michael Curtiz, USA, Warner Bros., 1932, 35 mm film). As a fantasy film, *THE MYSTERIOUS ISLAND* evokes an uncanny mood expressed in a chiaroscuro style with abundant shadows. Unfortunately, this film has only come down to us in a chromogenic print rediscovered in the National Film Archive in Prague in 2012. The print is regrettably limited in its reproduction of colour and exhibits hard contrasts that only inadequately capture the quality of Technicolor. In addition, the last reel has been lost and exists only as an inadequate black and white print. *KING OF JAZZ* – newly restored mostly from a Technicolor negative in 2016 – is very remarkable in its combination of experimental staging, excessive set and costume design and bold lighting styles⁴².

For its part, *DOCTOR X* anticipates much later developments of Technicolor, with its daring use of green, silhouettes in front of background cut-outs, and the use of coloured lights for mood lighting. Even *LA CUCARACHA* (Lloyd Corrigan, USA, RKO Radio Pictures, 1934, 35 mm film), Technicolor's first three-color film, which chose an ostentatious mode of colour representation that the film tries to justify with its Mexican décor combined with dance scenes, introduced coloured lights only to convey the characters' mental states in direct visual metaphors, wholly in accordance with Natalie Kalmus' demand for narrative functions that translate culturally determined colour conventions into metaphors. In *DOCTOR X*, however, mood lighting assumes the functions of both creating and expressing mood to give insight into the inner world of characters. Like the dramatic reversal of figure and ground, the coloured lights are an expressive stylistic means of affectively addressing the spectators and translating the threatening configuration of horror into colour. Whereas most other films in Technicolor No. III, when not directly depicting dance scenes, are tied to a restrictive use of colour and kept in a spectrum of pastels

⁴² Layton and Pierce, *King of Jazz*.

or earth tones, making green almost always seem muted, here the slightly bluish saturated green is on view in its full luminosity.

When Fay Wray was selecting her wardrobe for *DOCTOR X*, an all-Technicolor production, Natalie Kalmus, the color scientist for the Technicolor Company, suggested a robe of turquoise blue which was scientifically the best color. Fay looked ravishing – both to the naked eye and to the more delicate one of the color camera. But Fay didn't like it. She felt uncomfortable. She did not vibrate to it. She chose, instead, a dark blue robe. She couldn't explain her reactions. She said, 'I just feel better in it.' Natalie Kalmus knew the robe would go green for the picture. She didn't tell Fay. ... Mrs. Kalmus knew no actress could do her best work with wrong radiations emanating from the color she was wearing⁴³.



Figures 16a and 16b. *DOCTOR X* (Michael Curtiz, USA, Warner Bros., 1932, 35 mm film). Library of Congress, photograph by Barbara Flueckiger.

The phenomenal success of *GOLD DIGGERS OF BROADWAY* (Roy Del Ruth, USA, Warner Bros., 1929, 35 mm film), with box office receipts of \$3.5 million (inflation adjusted 52 million), triggered a wave of Hollywood Technicolor productions. Technicolor's publicist announced in *Variety* at the end of 1929 that within a few years black and white film would be a niche product, like silent films. *Fortune* wrote sarcastically in retrospect: 'Producers swarmed down upon Dr Kalmus, waving cash and demanding footage. They put up more than \$1,500,000 as down payment on future contracts. But as the French Marshal is quoted as

⁴³ Lois Shirley, 'All Hollywood Has Now Gone Color-Conscious,' *Photoplay* 42, no. 3, August 1932, 48-49, 118.

remarking about the Charge of the Light Brigade, “It is magnificent, but it is not war.”⁴⁴ Technicolor had to double its capacity to satisfy demand, but they were not up to the rush even when charging producers a deposit of \$25,000 simply to be able to plan a film in Technicolor in the first place.

Technicolor laboratories were not equipped to handle one-tenth of the volume they actually turned out. (In 1929 and 1930 – 76,700,000 feet.) At one time the extremely delicate process of printing the film was being carried on in a building of which one wall had been torn away to make room for enlarging the structure. A job that requires virtually laboratory conditions was being performed amid the debris of falling bricks and the roar of the riveters’ gun. And it was not being well performed⁴⁵.

As is so often the case, the market was quickly saturated with repetitive, formulaic approaches. The hastily prepared musicals and costume dramas were of low quality and in no event conceived for production in colour. There was also a shortage of sufficiently trained experts available. Herbert T. Kalmus himself blamed first and foremost the bad screenplays for the decline, along with a critical self-assessment of the company’s strategy of aggressive expansion. At the same time, growing numbers of moviegoers became increasingly aware of the limitations of the two-colour process, and the novelty swiftly wore off. In the wake of the world economic crisis of 1929, dramatic reductions in living conditions affected the United States, with massive consequences for the entertainment industry as well. Although Technicolor undertook a major advertising campaign in the fan magazines and trade journals, it was unable to stop the downward trend.

Technicolor used revealing advertising slogans in praise of film colour, namely that the beauty of people and nature could be expressed only in colour and that black and white showed only half of reality. Even Technicolor’s striking fascination with red hair, which continued through its entire history, in particular in the later three-color process, was mentioned in the ads: ‘I didn’t know she had red hair.’ *THE WANDERER OF THE WASTELAND* and *THE BLACK PIRATE* had already shown the Titian red

⁴⁴ ‘What? Color in the Movies Again,’ 95.

⁴⁵ ‘What? Color in the Movies Again,’ 95.

of actress Billie Dove's hair, but Clara Bow, star of the advertisement and of the film *RED HAIR* (Clarence Badger, USA, Paramount Pictures, 1928, 35 mm film), was the first 'It Girl' in film history. 'For *RED HAIR* (1928), Clara Bow's hair was faded and then hennaed to render it redder for the Technicolor process'⁴⁶. With her chestnut red frizzy hair and the image of a flapper, she was one of Paramount's most famous female stars in the late 1920s. In spite of the advertising campaign, Technicolor once again had to accept a bitter defeat before trying again, using the three-color process in combination with a rigid company strategy orchestrating every factor from technology to image composition, décor, costumes and make-up, to overcome once and for all the pitfalls of the previous twenty years of its company history.



Figures 17a and 17b. *RED HAIR* (Clarence Badger, USA, Paramount Pictures, 1928, 35 mm film). Library of Congress, photograph by Barbara Flueckiger.



Figure 18. Technicolor advertisement in the fan magazine *Photoplay*.

⁴⁶ See Layton and Pierce, *King of Jazz*, 192.

The 1920s and early 1930s were an immensely exciting and productive phase of innovation in the field of colour film technology and its practical application in film production. A great deal of material from this time, and not only Technicolor films, remains largely undiscovered and unexplored in film archives. As the history of the early Technicolor has shown, analogue chromogenic prints of these early colour processes have almost never led to convincing results. It was basically impossible to translate these highly idiosyncratic colour characteristics into the photochemical domain. Digital technologies are available today that can permit superior results. But historically and technologically informed approaches to digitisation are quite uncommon. Moreover, a film heritage not in the canon, and thus not suited for successful commercial sales, is condemned to go on slumbering on film archive shelves. It is time to create a cultural and political consciousness of this scandal, and it's time for this wonderful film heritage to circulate again and to be accessible to a broader audience.



Figure 19. Trailer BEN-HUR: A TALE OF THE CHRIST (Fred Niblo, USA, Metro-Goldwyn-Mayer, 1925, 35 mm film). Library of Congress, photograph by Barbara Flueckiger.

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