ACTA UNIVERSITATIS STOCKHOLMIENSIS
Stockholm Cinema Studies
2

Early Discourses on Colour and Cinema

Origins, Functions, Meanings

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Cover image: Frame samples from *Le film vierge Pathé* (Paris: Pathé-Cinéma, 1926), Table 4 (Bibliothèque du Film, Paris)

ISSN 1653-4859
ISBN 91-85445-45-2

Printed in Sweden by US-AB, Stockholm 2005
Distributor: Almqvist & Wiksell International, Stockholm

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Introduction

This thesis is a historical and theoretical study of a number of discourses examining colour and cinema during the period 1909 to 1935. In this study, colour in cinema is considered as producing a number of aesthetic and representational questions which are contextualised historically; problems and qualities specifically associated with colour film are examined in terms of an interrelationship between historical, technical, industrial, and stylistic factors, as well as specific contemporary conceptions of cinema. The delineation of the time period of the study begins in 1909, which was the year of the first public presentations of Kinemacolor, the first 'natural' photographic colour film process to be exploited commercially, which had a certain (although limited) commercial success, and ends in 1935, which marked the first screenings of *Becky Sharp* (Rouben Mamoulian), the first three-colour Technicolor feature film.

Colour has been a common element of cinema from the very beginning, starting with hand colouring of black-and-white film stock in the 1890s, a technique originally derived from colouring magic lantern slides (developing into mechanical colouring after 1905), as well as the even more widespread practice of tinting and toning (colour techniques devised specifically for the film medium, of unknown origins).[1] These and other methods of non-photographic colour were sometimes combined, and applied to all kinds of film genres, fiction as well as non-fiction films.

From approximately 1909, with the first public demonstrations and initial commercial exploitation of Kinemacolor, as well as a large number of experiments and patents for, and occasional demonstrations of, other 'natural' photographic colour processes, in particular during the 1910s, the question of the physical and technical origins of colour in cinema seems to have become more important. Thus, the time period which constitutes the focus of this study is an era characterised by extensive experimentation, an interaction and coexistence between a number of different colour systems, methods and technologies (representing different indexical origins, visual appearances, uses and applications), as well as the interaction between black

[1] For an introduction to the various colouring methods and early colour film processes in silent cinema, see Paolo Cherchi Usai, *Silent Cinema: An Introduction* (London: BFI Publishing, 2000), 21-43. See also Giovanna Fossati, "When Cinema Was Coloured", *Tutti i colori del mondo: Il colore nei mass media tra 1900 e 1930 / All the Colours of the World: Colours in Early Mass Media, 1900-1930* (Reggio Emilia: Edizioni Diabasis, 1998), 121-132.

and white and colour, and towards the end of the time period, the transition from silent cinema to sound cinema.

Despite the variety of colour processes and methods during this period, and the extensive experimentation and discourse, primarily on photographic colour, it is also an era of indeterminacy and hesitation in terms of the possible functions of colour, characterised by an increased interest in and appraisal of black-and-white cinematography. While the functions of (non-photographic) colour as spectacle and affect seem to have been less problematic to integrate within the attractions-based aesthetics of early cinema, the industrial and stylistic changes taking place during the so-called 'transitional' era (beginning in 1907/08), including increased narrativisation, suggested a more indefinite role for colour. During this period photographic as well as non-photographic colour were being used in a variety of ways, in short films; non-fiction as well as fiction films; animation and experimental films; it also occurred occasionally in feature films, as colour sequences, and in a few examples throughout the whole film. The "event" marking the conclusion of the time delineation for this study, the premiere of *Becky Sharp* in 1935, represents the beginning of the integration of photographic colour, entailing an "invisible" technology, and a "full" colour spectrum, in Hollywood feature film production; in addition, the application of non-photographic colour virtually disappeared from film practices during the early 1930s.

Although the functions and values associated with colour in cinema have always been perceived as indefinite, unclear, and perhaps more difficult to define or integrate or describe than any other stylistic or formal element throughout film history (and certainly continued to be so for decades after the mid-thirties), during the particular time period examined in this study, many of the problems or questions associated with colour and cinema are made explicit, not only because of the widespread experimentation, or the coexistence between photographic and non-photographic colour taking place throughout the time period, which constitutes what is unique to this particular period, opening up various questions about origins, functions and status of colour. But more importantly to the study, these specific historical conditions also produced an extensive discourse and debate regarding colour and cinema.

The discourses which are examined in this thesis involve notions about colour and cinema found in trade press, film reviews, publications on film technology, manuals, catalogues and theoretical texts from the era. The term 'discourse' as it is used in this study is not defined in any post-structuralist or Foucauldian sense, neither is it primarily linked to notions of ideology or power, but is defined in a far more general sense, referring to texts or utterances placed in a specific context, as dialogue, exchange of ideas, and how the meanings of these texts or utterances are defined by industrial, cultural and historical contexts.

Thus, the study does not represent a historical outline of the development of colour in film history, or of particular colour film systems and methods. Most of the historically oriented studies, and a majority of the few monographs on colour and cinema deal with colour film technology, with different colour processes and patents, usually in the form of general surveys encompassing a long list of processes, patents and methods.[2]

Likewise, the thesis does not include the analysis of the use of colour in specific films from the period.[3] Among the explanations for the general difficulties in writing about colour, is the notion of the materiality of colour, of colour as a transitory, unstable, ephemeral element.[4] This is particularly the case with colour in film prints, described by Paolo Cherchi Usai as a kind of "imaginary colour": "Colour in the moving image is the most unstable component of an inherently ephemeral medium; anything we can say about it comes from a contradictory mediation between memory and present visual experience."[5] Daan Hertogs and Nico de Klerk underscore that 'colours' in silent film should be referred to in plural, not only because of "the various

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[2] These studies include Adrian Bernard Klein, *Colour Cinematography* (London: Chapman & Hall, Ltd., 1936), Adrian Bernard Klein, *Colour Cinematography*, second edition, revised and enlarged (London: Chapman & Hall, Ltd., 1939), third edition, under the name Adrian Cornwell-Clyne, *Colour Cinematography*, 3rd edition, revised and enlarged (London: Chapman & Hall, Ltd., 1951); Roderick T. Ryan, *A History of Motion Picture Color Technology* (London/New York: The Focal Press, 1977), featuring a survey of technological and chemical properties of a number of colour film systems and patents; Robert A. Nowotny, *The Way of All Flesh Tones: A History of Color Motion Picture Processes 1895-1929* (New York/London: Garland Publishing, Inc., 1983), focuses on attempts and experiments by "pioneers", and the development of colour cinematography, with a number of different processes situated within the author's three domains of "commercial acceptance", "technological advances" and "commercial success". See ibid., 4f.; Esperanza Londoño, "Pour une histoire de la couleur au cinéma" (unpublished dissertation, Paris, 1985), examining technological and scientific properties of a number of patents; Gert Koshofer, *Color: Die Farben des Films* (Berlin: Wissenschaftverlag Volker Spiess GmbH, 1988), featuring a general history of different colour methods and processes. See also Gert Koshofer, "Early Colorfilm Processes for the Cinema", *Il colore nel cinema muto*, eds. Monica Dall'Asta, Guglielmo Pescatore, Leonardo Quaresima (Bologna: Mano Edizioni, 1996), 39-44. See also Herbert T. Kalmus (with Eleanore King Kalmus), *Mr. Technicolor* (Absecon: MagicImage Filmbooks, 1993), 147-159.

[3] While specific films (or film copies) to a limited, or non-explicit, extent constitute source material for the study, I have, however, studied a lot of existant film from the period, although in a less systematic fashion than the study of the primary source material for the thesis. I have had the opportunity to look at early colour film material (as well as having demonstrated early colour methods and techniques) at several European film archives, most notably the Cinémathèque Royale de Belgique, Brussels, the National Film and Television Archive of the British Film Institute, London/Berkhamstead, Centre Nationale de la Cinématographie, Bois d'Arcy, and Nederlands Filmmuseum, Amsterdam. For reference, in addition to taking part in various screenings of early colour film on film, I have also watched numerous early colour films on video, and made use of the extensive compilation of still images, and scanned documents found on the online database of the Gaumont-Pathé Archives: http://www.pathearchives.com

[4] See also Brian Price, "General Introduction", *Color, the Film Reader*, eds. Angela Dalle Vacche, Brian Price (New York/London: Routledge, 2006), 3f.

[5] Cherchi Usai (2000), 39.

ways in which these colours were applied to the film material", but also because of "the various transformations these colours have undergone and are still undergoing".[6] These citations refer to the numerous practical and technical (as well as economic) problems associated with archival policies and the preservation of colour. The chemical instability of dyes makes colour extremely difficult to preserve and reproduce. A number of different preservation methods exist, producing different results,[7] thus copying original coloured nitrate prints onto acetate or polyester safety prints entails changing the colours on the screen, often significantly. Giovanna Fossati has described the restoration of colour film suggestively in terms of "simulation".[8] Likewise, many early colour film processes involve special projection equipment in order to produce colours, which is difficult to replicate. As Cherchi Usai has pointed out:

> Much as we know that a certain colour once existed in a silent film, we must also acknowledge that it is now impossible to experience its actual rendering on the screen. As time goes by, the entity slowly mutates into an imaginary object, a creation of the mind. We collect the few surviving fragments, the apparatus, the chemical formulas, the memoirs of the technicians who designed the systems, the opinions of those who saw them at work.[9]

Cherchi Usai asks how one can establish meaning from this material and at the same time avoid it becoming nothing more than "a fascinating yet empty exercise" or, even worse, a kind of "false consciousness, false representation".[10]

Similarly, William Uricchio raises problems of studying early colour beyond the realms of discourses and production practices, and how "the problem of textual integrity common to much early cinema research takes on new proportions with color".[11] He refers to the lack of reference prints in color, problems with fading, solarisation and decay, as well as the different quality of illumination in current projection, or the difference between colour in nitrate stock compared to acetate or polyester stock etc. Uricchio points out how "making extrapolations from a particular print is far more difficult with the issue of color than with composition, shot length, shot sequence, or

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[6] Daan Hertogs, Nico de Klerk, "Editor's Preface", '*Disorderly Order': Colours in Silent Film; The 1995 Amsterdam Workshop*, ed. Daan Hertogs, Nico de Klerk (Amsterdam: Stichting Nederlands Filmmuseum, 1996), 5.

[7] See Paul Read, Mark-Paul Meyer, *Restoration of Motion Picture Film* (Oxford: Butterworth-Heinemann, 2000), 180-209, 271-313.

[8] See Giovanna Fossati, "Coloured Images Today: How to Live with Simulated Colours (and Be Happy)", *'Disorderly Order'*, 83ff.

[9] Cherchi Usai (2000), 40.

[10] Paolo Cherchi Usai, *The Death of Cinema: History, Cultural Memory and the Digital Dark Age* (London: BFI Publishing, 2001), 85.

[11] William Uricchio, "Color and Dramatic Articulation in 'The Lonedale Operator'", *Fotogenia*, 1, 1994, 268.

the other elements of formal analysis."[12] Uricchio adds that the instability of early colour to some extent may be avoided, "for example, by focusing on the discourse *about* colour – evidence regarding its reception or promotion for example."[13]

By focusing on such discourses, this study to a certain extent avoids the difficulties in drawing general conclusions from colour in film prints, but there are also considerable limitations in terms of constructing a history of colour in cinema through how it has been presented and debated in sources like trade press, film reviews, and promotional materials. The most obvious limitation is the evident discrepancy between these discourses on colour and actual industrial practices; in fact, non-photographic colour in silent cinema was seldom mentioned in contemporary film reviews, and when colour was mentioned, it was seldom discussed beyond general descriptions like "pretty", "true", "effective" and other generalisations.[14]

In contrast, a phenomenon like Kinemacolor, as well as numerous patents for photographic colour film processes, which were displayed to a limited audience (if at all), were covered extensively in the trade press, and in film manuals. Tinting and toning, which were methods for colouring estimated to have been employed in approximately 85 percent of film copies during the silent era (in particular between 1908 and 1921), was seldom mentioned, and was primarily discussed in terms of practical issues, for example, the chemical solution for dyes.[15]

At the same time, much of the history of colour film during this period, particularly the phenomena reflected in the discourses on colour, was situated outside industrial production or exhibition contexts, placed within laboratories and patent offices.

Although these discourses relate to a context of numerous methods for producing colour, to a great extent, they associated colour with something belonging to the future, and present notions of ideal, impending functions of colour, relating to utopias rather than actual film practices. In an article on the history of colour film in 1923, Terry Ramsaye wrote:

> Today, in 1923, the career of screen color has hardly more than begun, and the affairs of its twenty-year life are so closely involved with that which is yet to come that it is difficult to discuss them with all of that detachment and perspective that historical record should require. To tell the story of color

[12] Ibid.
[13] Ibid.
[14] For only a few examples, see *Variety's Film Reviews 1907-1920, Vol. 1* (New York: R.R. Bowker, 1983), January 26, 1907; March 2, 1907; January 7, 1911.
[15] See Thomas Bedding, "The Modern Way in Moving Picture Making, Chapter X: Toning and Tinting", *Moving Picture World*, May 4, 1909, 626ff. See also Cherchi Usai (2000), 23; Carl Louis Gregory (ed.), *A Condensed Course in Motion Picture Photography* (New York: New York Institute of Photography, 1920), 177-198.

> now is something like writing the biography of a promising youth as he nears the age of his majority, with his creative years all ahead.[16]

The year after, D.W. Griffith also stated that "all color processes and tint methods at present in use are wrong", that none of them could last.[17] He envisioned the development of accurate 'natural' cinematography as belonging to the future, and although he is not specific about its inception, the article illustratively deals with predictions about the film medium in 2024, in which Griffith envisages that colour will be integrated in all films (while all thought of "speaking-pictures" would have been abandoned long ago).

Throughout the 1930s, 1940s and 1950s, contemporary colour film production, both in terms of technical conditions and aesthetic conventions, was usually referred to in terms of discontent – how colour reproduction was not satisfactory, or how filmmakers did not know how to use colour, and in connection with proposing and arguing for *ideal* methods for working with colour.

Consequently what these discourses primarily represent are ideas and notions about colour and cinema, which can be understood in general terms, as considering general problems and topics, as well as in terms of the specific historical and institutional contexts in which the various discourses were written. These linkages to historical and institutional contexts are sometimes conveyed explicitly in the primary sources which are examined, and at other times they are contextualised through references to film historical scholarship (regarding ideas about cinema and modernity, the cinema of attractions, the so-called "transitional" period, narrative integration, classical Hollywood cinema, and the relationship between the avant-garde and popular culture in the 1920s and 1930s).

Organisation of the Thesis; Colour in Film Scholarship and Early Film Discourses

This thesis consists of three chapters, each of them examining a specific question regarding colour and cinema, and each of them considering the specific topic through different historical, empirical and methodological points of departure and delineations.

The first chapter examines notions concerning the *origins* of colour in cinema, the question of where colours come from, with regards to the

[16] Terry Ramsaye, "The Romantic History of the Motion Picture: The Hitherto Untold Story of Colored Motion Pictures" (Chapter XX), *Photoplay*, November 1923, 64.
[17] David Wark Griffith, "The Movies 100 Years from Now", *Collier's Weekly*, May 3, 1924, 7.

technical, material (as well as perceptual) origins of colour, and questions concerning indexicality, iconicity and colour reproduction. The question of origins in this wide-ranging sense, is found in discourses on colour and cinema throughout film history, but is placed here within a historically limited phenomenon: the relationship between Kinemacolor as well as other photographic colour processes and the established non-photographic colour methods during the early 1910s. An in-depth analysis of one specific publication, the *Catalogue of Kinemacolor Film Subjects*, published in 1912,[18] which features a number of descriptions of films through the perspective of colour reproduction, functions as the foundation of the study, and as point of departure for a number of historical and theoretical questions. In order to demonstrate the application and relevance of the question of the origins of colour beyond this specific historical period (where the emergence of 'natural' colour on a market dominated by applied colour methods obviously disclose the importance of 'origins' or 'indexicality' as a value), the analysis of the Kinemacolor catalogue is contrasted through a brief discussion on attitudes towards non-photographic colour in the writing of film history and in archival policies in the beginning of the chapter, and on computerised colourisation during the past two decades at the end of the chapter.

The second chapter examines notions concerning the *functions* of colour in cinema, the question of how colours can be used, with regards to stylistic, formal and narrative elements. Here, one specific question functions as a point of departure: the recurring comparisons between colour and sound. The chapter includes a survey of comparisons between colour and sound found in the writing of film history, in discourses concerning early Technicolor talkies and film technology in general, in writings regarding experimental films and experiments on synaesthesia during the 1920s, as well as Eisenstein's notions of the functions of colour in sound film montage. Comparisons between colour and sound are examined in terms of various industrial, mimetic, synaesthetical and metaphorical relationships.

These two chapters deal with two periods of 'transition', where colour is subjected to specific comparisons (as well as resistance). These two periods, placed at the beginning (late 1900s-early 1910s) and at the end (late 1920s-early 1930s) of the era examined in the study represent especially active periods in terms of debate about colour. In the first chapter the opposition between photographic and non-photographic colour (as well as black and white) is also connected to the changing role of colour within the widespread stylistic and industrial changes taking place. In the second chapter, colour (both photographic and non-photographic) as a stylistic element is compared to sound in a number of ways, and also in terms of taking part in industrial

[18] *Catalogue of Kinemacolor Film Subjects: Animated Scenes in Their Actual Colors* (London: The Natural Color Kinematograph Co., Ltd., 1912).

and stylistic changes brought about through the introduction of sound cinema.

It is important to emphasise that the questions of 'origins' and 'functions', being linked to such specific historical periods do not represent a 'development', where preoccupations with the first question gradually 'evolved' into preoccupations with the other. Thus, there is a considerable intersection between the two questions, also apparent in this study: the first chapter, for example, includes a section on colour in narrative films, while the second chapter includes discussions on realism, iconicity, and notions about cinema as "total illusion".

The third chapter features a shorter and more general discussion which is not directly linked to any *specific* historical context, examines the question of colour and meaning in cinema through considering the relationship between colours and objects in colour film images (polychrome and monochrome, photographic and non-photographic) taken from the time period examined in this study, and connects a number of issues from the preceding chapters.

One ambition for this study, in terms of how the various discourses are presented, is to avoid what one might characterise as 'artificial' distinctions or 'hierarchies' between supposedly "empirical" and "theoretical" sources; this means that texts by canonised film theorists or film directors should not be perceived as supplying "theory", while texts taken from trade press and catalogues written at the same time should be read exclusively as empirical or historical primary sources. All the texts which constitute the source material for this study represent specific ideas about colour and cinema, at the same time as they are anchored in specific historical and institutional contexts, as well as with regard to specific agendas, preferences, and general notions about cinema.

However, most references to colour in these discourses are characterised by being brief and fragmentary, scattered in passages, chapters, and short articles. Throughout the thesis, some texts may seem to be privileged above others, and this is motivated by their volume, and their range in terms of the number of themes which they address. Thus, the Kinemacolor catalogue is not only the foundation for an entire chapter; it also represents a unique text by its emphasis on colour throughout more than 300 pages. Similarly, the discussion on colour found in numerous articles in a trade journal such as *The Moving Picture World* between 1909 and 1913 (primarily initiated by Kinemacolor, but also concerning various other colour processes and methods), represents a multitude of approaches to colour, to a greater extent than in most other contemporary journals (as well as in issues of the publication before and after this specific period).

Attention is also given to Adrian Bernard Klein's writing on colour and cinema; Klein's books on colour cinematography, first published in 1936 (with revised and enlarged editions in 1939, and 1951, under the name

Adrian Cornwell-Clyne).[19] These books combine a detailed historical overview of various colour processes with a discussion on contemporary technological and aesthetic issues regarding colour and cinema. In addition, Klein wrote three books on the potential for a medium of abstract moving colours, "colour-music", published in 1926, 1930 and 1937.[20] These texts not only feature comparisons between colour and music, and colour and sound, which provide the foundation for the second chapter; by examining the parallels and distinctions in terms of the ideas about the functions of colour in the two media Klein proposes, general notions of colour, as well of cinema are revealed, shedding light on notions about the specific functions colour is given in cinema (as opposed to other media) found in a number of the discourses examined.

The main focus throughout the thesis is on discourses on colour in *cinema*, but with a limited number of other historical references included; in this respect, Johann Wolfgang von Goethe's colour theory from 1810 serves as the most fundamental cultural historical reference, his ideas on colour as a perceptual as well as aesthetic phenomenon are central to notions on colour and cinema, and are referred to in a number of instances.[21]

The writings on colour by Sergei Eisenstein also have a special position in this study. Eisenstein is the film theorist who has written most extensively on colour; other contemporary classical film theorists' writings on the subject, which are also referenced here, are usually limited to a few pages, in short texts or sections of chapters. Eisenstein's writings on colour are in part anchored in the designated time period (with regard to texts written by him during the late 1920s and early 1930s); however, Eisenstein's preoccupation with colour in cinema increased from the end of the 1930s and until his death in 1948, and a number of texts from this period are also referenced in this study.[22] It is, however, the breadth of perspectives and themes in his writings, the complexity of his discussion of colour (which integrates and juxtaposes a number of contradictions and paradoxes) which makes him a suitable intermediary between a number of different texts and traditions, and the fact that the questions and problems addressed in his writings from the late 1930s and 1940s seem to function as a direct continuation of the discourses taking place in the time period examined in this study, which justifies the number of pages referring to his ideas on colour and cinema.

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[19] Klein (1936), Klein (1939), Cornwell-Clyne (1951).

[20] Adrian Bernard Klein, *Colour-Music: The Art of Light* (First Edition) (London: Crosby Lockwood and Son, 1926); Adrian Bernard Klein, *Colour-Music: The Art of Light* (London: Crosby Lockwood & Son, 1930); Adrian Bernard Klein, *Coloured Light: An Art Medium: Being the Third Enlarged Edition of "Colour Music"* (London: The Technical Press Ltd., 1937).

[21] Johann Wolfgang von Goethe, *Theory of Colours* [1810], trans. Charles Lock Eastlake [1840] (Cambridge/London: MIT Press, 1970).

[22] For an overview of Eisenstein's writings on colour, see Eirik Frisvold Hanssen, "Eisenstein in Colour", *Konsthistorisk tidskrift/Journal of Art History*, Vol. 73, No. 4, 2004, 212-227.

Obviously, the inclusion of Eisenstein among discourses such as trade press and catalogues, for example, also points to an aspiration to integrate a historical account with a number of theoretical questions, as a history of colour in cinema from 1909 to 1935 probably could be imagined excluding Eisenstein. There are, of course, a number of different historiographical choices which can be made in connection with writing a historical study on colour and cinema, involving the choice of material and primary sources to be examined, and of methodological approaches, but it also requires an awareness in terms of the various functions (visual, representational, thematic, and ideological) which can be, and have been associated with colour.

The question of how to write the history of colour film has been addressed by Edward Branigan, who in the essay "Color and Cinema: Problems in the Writing of History" published in 1979 used the early history of colour cinematography as the starting point for a general examination of historiographical problems.[23] In this essay, Branigan discusses four different methodologies in approaching this history, and it is emblematic (and illustrative of the lack of research about colour in film scholarship) that only the first of these methodologies is based on a text which deals with colour; the other three examples feature *possible* ways to write about colour, applying historiographical methodologies taken from texts concerning other topics. The first account, "the adventure of colour", refers to Ramsaye's depiction of the history of Kinemacolor in *A Million and One Nights* in 1926,[24] which focuses on individuals and pioneers, and works in a biographical and anecdotal fashion, following a linear narrative and suggesting an evolutionary development.[25] The second, "the technology of colour", suggested by Patrick Ogle's studies on the technique of deep focus, focuses on different scientific discoveries, and the historically motivated connections between these and contemporary aesthetics, what artistic effects the discoveries actually were able to produce.[26] "The industrial exploitation of colour", suggested by Douglas Gomery's discussion on early sound films, discusses technology in an economic context, exploring financial implications.[27] Finally, "the ideology of colour" presents a Marxist perspective inspired by the theories of Jean-Louis Comolli, placing colour within a social and economic context where ideology informs technological development and the way technology is presented.[28]

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[23] Edward Branigan, "Color and Cinema: Problems in the Writing of History" (1979), *Movies and Methods Volume II*, ed. Bill Nichols (London/Berkeley: University of California Press, 1985), 121-143.
[24] Terry Ramsaye, *A Million and One Nights: A History of the Motion Picture Through 1925* (New York: Simon and Schuster, 1926).
[25] Branigan (1979), 123ff.
[26] ibid., 125ff.
[27] ibid., 128ff.
[28] ibid., 132ff.

Of course, this comprehensive article distinctly demonstrates how colour in film history involves an interplay of numerous factors, which include technological and scientific, aesthetic, financial, and ideological. However, although the four perspectives suggested by Branigan constitute very different notions of history, they nevertheless implicate essentially the same comprehension of what colour contributes to a film, which is primarily understood in terms of "realism", (or lack of realism as a characteristic of art).[29] Most accounts of early colour film processes also emphasise the search for "total illusion", a "complete spectrum". As most discourses on early photographic colour film processes accentuate notions of reproducing the colours of 'reality', these approaches to colour are extremely relevant and accurate. But at the same time, they leave out other obvious visual and representational aspects of colour, which not only are purely 'aesthetic' concerns, but also fundamental in terms of understanding the historical and industrial role of colour in cinema.

One of the problems with writing a history about colour film, is the difficulty in defining the functions that colour can perform in a film, a difficulty which is reflected in the limited scholarship on the subject, both from a theoretical and historical point of view. Three years prior to his essay on colour film and historiography, in 1976, Branigan wrote an essay on the use of colour in Jean-Luc Godard's *Deux ou trois choses que je sais d'elle* (1967), focusing on visual and structural aspects of colour, and at the beginning of the essay he points out: "Criticism of film to the present day has largely proceeded as if all films were made in black and white. Few theorists or filmmakers even comment on the use of color in a film much less consider the structural possibilities."[30] In 1998, Eva Jørholt pointed out that these observations still were valid,[31] and likewise, in the introduction to the anthology *Color, the Film Reader*, published in the summer of 2006, Brian Price also refers to Branigan, and the validity of his statements thirty years later, pointing out the considerable amount of work left to be done on the topic: "despite the centrality of color to the experience and technology of cinema, it has most often been no more than the occasional subject of the theorist, historian, or practitioner; a source more of fleeting observation than of rigorous conceptualization."[32] The claim on the back cover of this anthology (which for the most part consists of previously published texts) that it represents "the first book to focus exclusively on the use of colour within film, and how this has shaped and developed film history" is perhaps

[29] Although Branigan also briefly mentions colour as a compositional element, as well as colour in connection with the representation of female stars. See ibid., 126, 136.
[30] Edward Branigan, "The Articulation of Color in a Filmic System: *Deux ou trois choses que je sais d'elle*", *Wide Angle*, 1:3, 1976, 20.
[31] Eva Jørholt, "Filmens farver: En hvid plet på filmvidenskabens landkort", *Kosmorama*, 222, 1998, 7.
[32] Price, "General Introduction", 1ff.

not entirely accurate. In 1995, Jacques Aumont edited the anthology *La couleur en cinéma*, featuring a number of scholarly essays on various topics.[33] The year before, Aumont wrote the book *Introduction à la couleur: les discours aux images*, an interdisciplinary survey on a number of discourses and theories of colour.[34] Only the last chapter dealt with colour in cinema, characterised as the "difficult" colour, concerning compositional and representational aspects of photographic colour film. Although the book to a very limited extent deals with the time period examined in this study, Aumont's contextualisation of colour in cinema within a larger cultural historical perspective, has brought a number of interesting approaches, which also have influenced the work with this thesis.

What seems to have been a growing interest in colour in early cinema during the past 10-15 years (much of it informed by the archival problems previously mentioned) resulted in a conference focusing on colour in (primarily) early cinema in Udine in 1994, with two publications featuring papers from the conference,[35] a workshop on colour in silent film took place at Nederlands Filmmuseum, Amsterdam in 1995, which also produced a publication with transcripts of the discussions, involving more than fifty participants from a variety of fields (scholars, film directors, archivists, critics),[36] and the journals *Film History* and *Living Pictures* have published special issues focusing on colour in cinema and early visual media, in 2000 and 2003, respectively.[37] The FIAF congress in Stockholm in 2003 focused on colour preservation and restoration, and an interdisciplinary conference on colour, "The Sense of Colour", was organised in Sussex in 2005, and featured a number of papers devoted to colour in cinema. These examples suggest a growing interest in colour and cinema, but nevertheless seem to represent isolated incidents rather than an obvious, continual trend.

Although scholarship on colour and cinema certainly exists, examining various historical and theoretical aspects of colour, it almost solely consists of articles, essays, passages, and chapters offering a variety of separate approaches, a number of which will be referred to throughout this study. There are few lengthy, systematic studies of the topic, and hardly any monographs; there are no established methods or schools for how to analyse or comprehend colour in cinema.

As Scott Higgins points out in what is actually one of the very few monographs written about colour and cinema, a dissertation on three-colour

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[33] *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995).
[34] Jacques Aumont, *Introduction à la couleur: des discours aux images* (Paris: Armand Colin, 1994).
[35] *Fotogenia,* 1, 1994 ; *Il colore nel cinema muto*, op.cit.
[36] *'Disorderly Order': Colours in Silent Film*, op.cit.
[37] *Film History*, 12:4, 2000, *Living Pictures: The Journal of the Popular and Projected Image before 1914*, 2:2, 2003.

Technicolor aesthetics during the 1930s, with regard to what he names "the problem of color": "It is almost tradition that an attempt to understand color as a formal property should begin by admitting to color's elusiveness, its resistance to study."[38] Higgins then refers to Josef Albers (colour is "the most relative medium in art", which "deceives continually") and Rudolf Arnheim ("the serious study of color, as compared with that of shape, faces almost insurmountable difficulties").

The limitations of language when faced with describing colour as a primary example of the relationship between the logic of language and actual experience, have been pointed out by Goethe, Ludwig Wittgenstein and many others,[39] and similarly, in the introduction to his 1995 anthology, Aumont claims that the only thing shared by the variety of essays in the book is the necessity of the "endless" difficulties in expressing anything concerning colour through language.[40]

Thus, a lack of colour theories is not specific to discourses on cinema. Aumont points out the lack of theoretical discourse on colour in general, despite the fact that the expressive qualities of colour is often emphasised, particularly in discourses on the 'abstract' and aesthetic qualities of painting and cinema:

> This value, perhaps the single most important one for the painter, and surely the easiest to control, has only given rise to a metaphorical discourse. We see musical metaphors (presumed equivalences between certain colours and certain sounds) giving rise to fanciful systems. We hear of physiological metaphors, the best-known one deriving from notions of temperature (red is 'hot', blue is 'cold', and so on). We have also had symbolic metaphors which take up, sometimes unconsciously, ancient parallels (red for blood, deep blue for heavens, and so on). All these, and others, have been continually copied and combined by plastic artists, from Kandinsky's lectures to the Bauhaus to Eisenstein's essays on montage. These approaches are not without interest, but they cannot be called theories, not even embryonic ones.[41]

This notion of colour in terms of metaphorical discourse, the fact that colour is often defined and understood in relation to something else is also reflected in this study. In the first chapter, photographic colour is to a great degree examined in relation to non-photographic colour, and in the second chapter, colour is defined through comparisons with sound. In the third chapter the

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[38] Scott P. Higgins, *Harnessing the Rainbow: Technicolor Aesthetics in the 1930s* (unpublished dissertation, University of Wisconsin-Madison, 2000), 3.

[39] See Goethe, [751], 300. See also Ludwig Wittgenstein, *Bemerkungen über die Farbe/Remarks on Colour* (Oxford: Basil Blackwell, 1977), 17e.

[40] Jacques Aumont, "Avertissement", *La couleur en cinéma*, 9. See also *'Disorderly Order'*, 51; Price, "General Introduction", 5; Charles A. Riley II, *Color Codes: Modern Theories of Color in Philosophy, Painting and Architecture, Literature, Music, and Psychology* (Hanover: University Press of New England, 1995), 16ff.

[41] Jacques Aumont, *The Image* [*L'image*] (1990) (London: BFI Publishing, 1997), 216.

possible meanings of colour in films are explored through a notion associated with colour ideas as metaphorical discourse: how colour is usually understood as located in specific contexts, in specific objects. Thus, discourses on colour are often formed by a tension between notions of colour as an independent, autonomous property, and notions of colour as an integrated part of contexts and objects.

This tension is described by Paul Rand, as he sums up what he considers the inadequacies of general colour theories: "A color that is perfect in one instance is useless in another. Color is complexity personified. [---] Color cannot be separated from its physical environment without changing."[42] Rand points out that colour is "a matter of relationships", and assembles a long list of the relationships colour takes part in: materials, textures, finishes, light, shade, reflection, figure-ground relations, contrasts, proportions, quantities, proximity, congruity, repetition, shape, and content. Colour as such is a montage element, and – furthermore – in films, all these relationships are in constant movement and change.

This notion of colour as a "matter of relationships" is in fact interconnected with notions of colour in terms of realism/non-realism. Tom Gunning outlines two primary roles for colour in film, with specific reference to early cinema: on the one hand as an essential part of creating a total illusion, a complete reproduction of the visual world (in a Bazinian sense), but on the other hand, he writes, "color can also appear in cinema with little reference to reality, as a purely sensuous presence, an element which can even indicate a divergence from reality."[43] Here the colour becomes a value in itself, an autonomous entity. Again, colour is altering between autonomy and as being an integrated part of the representation of a specific context ("the visual world").

In the first chapter, with regards to colour reproduction and indexicality, the discourses examined emphasise the connection between colour and object, between the colours on the screen and the real-life objects they originate from. In the second chapter, however, comparisons between colour and sound often involve the ambition to separate colours from the world of objects, in order to function as autonomous elements. Finally, in the third chapter, this tension between colour and object, between autonomy and integration is explored in terms of how colours can produce meaning in cinema. Throughout the study, the tension between colour as a general, individual, autonomous element (producing general questions and problems which are specific to colour as cinematic element), on the one hand, and as a property anchored and incorporated and originating from specific contexts (images and objects, as well as specific historical conditions, specific

[42] Paul Rand, *A Designer's Art* (Yale University Press, 2000), 225.
[43] Tom Gunning, "Colorful Metaphors: the Attraction of Color in Early Silent Cinema", *Fotogenia*, 1, 1994, 249.

technologies, industrial and economic factors), on the other, will be explored.

This tension is significant; as the diversity and ambiguity of colour makes it easy to integrate within a number of different, often opposite conceptions of cinema, or of images and representation in general (being a key proponent of notions of realism as well as of notions of abstraction etc.). This is not only characteristic of the historically-based discourses found in this study, but also of methodological approaches to colour in film scholarship. On the one hand, as I have mentioned, most of the monographs on colour film deal with it as a strictly technological and historical phenomenon, examining patents, techniques, and processes. On the other hand, colour can just as easily serve as a primary example, or gateway to purely aesthetically oriented, overtly a-historical studies, illustrating general notions of cinema as non-representation, affect, sensory experience etc., as is evident in Daniel Frampton's conception of 'filmosophy', of cinema as a particular, autonomous form of thought, in which "film is the *beginning* of our thought, and colour is its most persuasive mood."[44] Frampton employs the example of colour in order to argue for a kind of film analysis which does not recount historical or technological aspects: "For filmosophers what matters is what we see, not what we are told is the name behind the technique."[45]

In addition to the theoretical and historical argument on colour and cinema, as well as the presentation of the empirical material constituted by various film discourses, which are placed in relation to and in dialogue with each other, this thesis represents an effort to argue for the combination and diversity of approaches to colour and cinema, both as an aesthetic or stylistic element in general terms, and as a historical phenomenon.

As Charles A. Riley has pointed out, the diversity of colour, in particular because of the wide variety of media in which it takes part, entails a difficulty in making categorical statements about it.[46] Thus, colour in cinema should be examined in terms of specific cases, problems, and contexts, and the examination of these specific cases also requires notions of colour in cinema as a medium-specific element. In the limited discourse on colour in classical film theory and film scholarship, the colour film image is defined through comparisons with two other forms of images, the black-and-white film image, and painting. While photographic media are often associated with black-and-white images, colour is likewise often associated with painting. The effects of colour in a film image are usually described in opposition to one of these two kinds of image systems. In order to establish the predominating themes and questions associated with colour in cinema,

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[44] Daniel Frampton, "Filmosophy: Colour", *New Scholarship from BFI Research*, eds. Colin MacCabe, Duncan Petrie (London: British Film Institute, 1996), 108.
[45] Ibid., 91.
[46] Riley, 14ff.

which is central throughout the study, I will briefly outline five general qualities associated with colour and cinema, and how these are linked to notions about the relation between colour film in opposition to black-and-white film and painting respectively.

Comparisons with black-and-white images often produce notions about colour in cinema in terms of realism, differentiation, as well as ideas about colour as a secondary, unessential element. Comparisons with painting often produce notions about colour in cinema in terms of movement, and control. These are not conclusive distinctions, however, as most of these themes or properties are interrelated.

Colour Film and the Black-and-White Image

Most accounts of colour in cinema seem to begin by referring to black and white. This has to do with the fact that the emergence of colour in cinema entailed (to paraphrase Gunning) a surge of colour into a previously monochrome territory.[47] As Monica Dall'Asta and Guglielmo Pescatore have pointed out, black and white constitutes a distinctly modernist form of perception, linked to a specific technological, mechanically reproducible visuality:

> at the moment of its most electrifying novelty, when it appears as the ultimate 'discovery' in which modernity momentarily crystallises, all new technology of vision is restricted to black and white. The shock of the new, and of every new form of reproducibility, is a shock in black and white every time it occurs.[48]

Colour in cinema during this period is also connected with the emergence and increase of colour in other media, in industrial products, in a number of cultural practices (these linkages will be explored throughout the study). The fact that photography and cinema initially were "invented" as black-and-white media, and that the capability to reproduce colour by photographic means constituted a later development, entails an "opposite" chromatic history compared to other visual media, for example, painting where the first black-and-white images appeared in the seventeenth century in the form of mass produced engravings.[49]

William Johnson remarks on this discrepancy:

> If Niepce, Talbot, Daguerre, and the other pioneers of photography had found a chemical that distinguished among different wavelengths of light, they

[47] Gunning (1995), 250.
[48] Monica Dall'Asta, Guglielmo Pescatore, "Colour in Motion", *Fotogenia*, 1, 1994, 240.
[49] Aumont (1994), 168.

> would surely not have rejected it in favor of the silver salts that distinguish only between bright and dark. And in that case, black and white would have been the later and more sophisticated development - in both still and movie photography - that it is in the other visual arts. But because color came later, many people saw it as an additive to black and white instead of a medium in its own right.[50]

Aumont criticises the recurring suggestion that the chromatic history of film and photography is reversed or inverted because of the status of black and white as "normality" or origin, which is indicative of the common tendency to understand colour film with regard to (as well as being inferior to) painting, rather than realising that colour film constitutes a history of its own, or rather a number of contradictory histories, which are *different* from painting.[51]

The relationship between colour and black and white is often discussed in terms of preferences, and very often in terms of a resistance towards colour. Many theorists and critics attribute certain general characteristics to each of the two "image systems", in relation to realism and artistic value as part of their argumentation. Johnson, among many others, criticises what he calls a "refuge in generalities, accepting or rejecting the color as a whole."[52]

However, it is an inescapable fact that much of the comprehension of colour (not only in film-related discourses but throughout art history), for better or worse, is informed by an opposition towards colour (in fact, several of the texts which argue against colour feature more interesting and more precise arguments and descriptions concerning the effects of colour in cinema, than many of the texts which feature more enthusiastic, but often quite general, conceptions about future "colour symphonies", colour as "total illusion" etc.).

These preferences and values associated with colour primarily reflect ideas and essentialist notions about cinema, on how the various writers choose to define *film*, as colour is a stylistic element which can be associated with or taken to the extremes in a number of opposite directions; as the chapter on colour and sound demonstrates, colour is elemental in conceptions of cinema as "total" realism or mimesis, as well as in converse conceptions of cinema as pure affect, abstraction etc.

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[50] William Johnson, "Coming to Terms with Color" (1966), *The Movies as Medium*, ed. Lewis Jacobs (New York: Farrar, Straus & Giroux, 1970), 212.
[51] Aumont (1994), 196, 203.
[52] William Johnson, 211.

Colour as Realism

Many of the motives for arguing *for* as well as *against* colour in early film discourses, however, are linked to a notion of colour as enhancing the 'realism' of cinema, sometimes even linked to physiological grounds, contrasting the "normality" of the colour image to the "unnaturalness" of black and white.[53]

In this study, the notion of realism is connected with the issue of colour reproduction, not only in terms of the technological and physical origins of colour, the opposition between "natural" and applied colour methods, but also in terms of notions about "fidelity" (or lack of "fidelity") between the colours of the filmed "reality" and the colours found in the images produced by colour processes like Kinemacolor and Technicolor. These basic notions of the divergence between "reality" and "representation", and between indexicality and iconicity, are furthermore connected to more complicated issues linking the divergence between the human perception of colour, and the "colour vision" of the camera or the film stock to the aesthetic and ideological conditions and choices behind the fact that colours in film look the way they do.

Furthermore, the conception of colour film as enhanced realism is contrasted to the integration of colour in narrative cinema, and notions of cinema as total illusion (mimesis) are contrasted to contemporary notions of cinema as unity of senses (synaesthesia) or *Gesamtkunstwerk* (these oppositions sometimes coincide with the general opposition between abstraction and representation, and sometimes not).

Colour as Differentiation

This constitutes the primary visual difference between colour and black and white, as the values of lightness depicted in the black-and-white image are supplemented by hue and saturation, as the emergence of colour splits the cohesive monochrome image into different hues, which furthermore, are usually linked to the division between different objects. The examination of the Kinemacolor catalogue in the following chapter demonstrates how the emphasis on the reproduction of colours is referred to in terms of emphasising the particular object which the colours originate from.

The differentiation of colour also challenges notions of "purity" and "harmony" associated with black and white, and as Julia Kristeva has

[53] See e.g. W.W. Harmon, "The Optical Desirability of Color in Moving Pictures", *Moving Picture World*, December 25, 1909, 916. See also "Color and the Picture", *Moving Picture World*, July 23, 1910, 182.

articulated, colour makes unified meanings "pulverized, multiplied into plural meanings. Color is the shattering of unity."[54]

Colour as a Secondary, Unessential Element

The differentiation provided by colour onto a medium traditionally perceived as black and white has often been understood as a disturbance, as a purely sensual addition with no essential purpose or function. This resistance to colour film, with reference to the notion of colour as unnecessary, is related to the traditional art historical division between *disegno* and *colore*, between line and colour, usually claiming the superiority of the line, or as art historian John Gage has put it, "the ancient notion that an adequate representation might be made with line alone, colouring being an inessential adjunct to form."[55] Aumont relates this opposition to general Western conceptions of the superiority of the spiritual over the material, and traditional 'dualities' like soul/body, intelligibility/sensibility, idea/appearance, concept/percept, word/image, etc.[56]

Although colour and line constitute a totality within a colour image, the notion of colour as a secondary, subordinate quality also entails the notion of colour as an *autonomous* element. This independence is perhaps demonstrated by the fact that colour can be removed from an image, which allows it to be imagined and discussed independently.

David Batchelor argues that the recurring overt requirement to exclude colour, demonstrates that it is important, as it is considered to be dangerous: colour means something precisely because it gets in the way.[57]

In classical film theory, black and white is also often presented as a more artistic option than colour, for example, in the writings of Rudolf Arnheim, who makes reference to a lack of realism (and automatic reproduction) as a sign of art, and in 1927, Yuri Tynianov presented colourlessness as a 'positive lack', as it entailed a kind of abstraction comparable to language; the same lack of exactitude found in drawings would make the film image function as a *sign*.[58]

In the discourses comparing colour to black and white or sound found in this study, there is an evident difficulty in defining what colour adds to a film (particularly within the realm of narrative cinema), which produces notions of colour as distraction or excess, as an element which should not be

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[54] Julia Kristeva (1980), quoted in Steve Neale, *Cinema and Technology: Image, Sound, Colour* (London/Basingstoke: Macmillan Education Ltd., 1985), 158.
[55] John Gage, *Colour and Culture: Practice and Meaning from Antiquity to Abstraction* (London: Thames & Hudson, 1993), 117. See also Riley, 5ff.; Brian Price, "Color, the Formless, and Cinematic Eros", *Color, the Film Reader*, 78f.
[56] Aumont (1994), 121.
[57] David Batchelor, *Chromophobia* (London: Reaktion Books, 2000), 21ff.
[58] Yuri Tynianov, "Des fondements du cinéma", *Cahiers du cinéma,* 220-221, 1970, 59f.

noticed, which is primarily suitable for genres associated with spectacle and attraction. Similarly, ideas of colour as affect are reflected in linkages between colour and ideas of the feminine, and general conceptions of a non-Western "other". Notions of colour as secondary and unessential are also linked to notions of colour as a subjective perceptual phenomenon, with vague connections to the physical world, and the instability and unpredictability of colour reproduction in photographic processes.

Colour Film and Painting

The notion that colour is a property of painting rather than a property of cinema, entails that the medium of painting frequently functions as a reference for many of the film images described in discourses concerning early film; this includes references to Romantic landscape painting, as well as the role of colour in contemporary Impressionist and abstract painting. However, this study only to a limited degree examines colour in a general art or cultural historical context; this will be dealt with in relation to how the discourses examined in the thesis position colour in cinema in relation to colour in other media. Similarly, the study does not include any detailed examination of specific colour theories, various systems of colour harmony and contrast (as in the influential works by M.E. Chevreul, Johannes Itten and Josef Albers), but refers to general notions about such systems found in the discourses.

Colour and Movement

Just as differentiation constitutes the primary difference between colour and black and white, movement is often presented as the property which separates the colour film image from painting. Béla Balázs remarks on the "moving colours" of cinema specifically in opposition to painting, pointing out how colour thus can produce "an event, not a static condition" due to the "change of colour, a transition from one spectacle to the next", transcending "the rigid abstraction of painting".[59] Similarly, in his first *Cinema* book, Gilles Deleuze outlines three categories of what he characterises as the "colour-image", and points out that it is only the third category, "movement-colour – which passes from one tone to the other [---] which seems to belong in cinema, the others already being entirely part of the powers of painting."[60]

[59] Béla Balász, *Theory of the Film: Character and Growth of a New Art* (London: Dennis Dobson, 1952), 242.
[60] Gilles Deleuze, *Cinema 1: The Movement-Image* [1983] (Minneapolis: University of Minnesota Press, 1997), 118.

In discourses concerning early film, the movement of colour connects colour film to other media than painting; the temporal progression of the expressive powers of colour in cinema results in a number of musical analogies.

The movement of colour is also connected with the differentiation of colour in the sense that the constant changeability of colour suggests the potential for an instability of meaning, and on a technical, material level, movement often results in a visible separation between colours and objects (in hand and stencil colouring, as well as in problems of "fringing" in early colour film processes). Colour in cinema as an element in constant movement and change is also linked to the last general issue: discourses on colour and control.

Colour and Control

The notion of control also contrasts colour with black and white as the differentiation and constant alteration of a colour film image makes it far more difficult to control compositionally than with a black-and-white image. Likewise, the notion of control is connected with general notions of colour as a secondary, unessential, element, as distraction and excess, which should be controlled in order to be subordinated to other elements. This discourse of control is also found in many of the comparisons between colour and sound, in attempts to establish similarly rigid systems of harmony, as can be found in music.

However, notions of control are firstly connected with problems, obstacles and precautions associated with photographic colour reproduction, and here painting is the main reference. Aumont refers to the notion that photographic reproduction of colour is intellectually inferior to painting because of the disparity in terms of how colours are produced.[61] Colours in photography are primarily a trace of the objects they refer to. Painting has thus remained as an unattainable 'model' for cinematographers and film directors, dealt with in terms of both fascination and fear. According to Aumont, it is not primarily the painter's knowledge of colour which is being envied by directors and cinematographers, but rather his presumed closeness to his creation. This is indicative of an idealised conception of the painter and his relationship with colour as immediate, personal, and intentional. A painter's contact with colour is physical, and without any intermediaries, as well as being instantaneous and without delay. Cinematographers and directors, on the other hand, do not touch anything, and have to rely on and wait for a number of technical operations, for example processing, before they get the opportunity to look at the colour on the print. Furthermore, the painter is alone in deciding the colour, while the director is dependent of

[61] Aumont (1994), 180-187.

equipment and various specialised technicians. If technical skills are required in order to master colour in painting, these are nevertheless integrated in the project of the painter. Colours in a film are, on the other hand, produced through a number of coincidences and unforeseen events, and the completion of the project can only be approximate to any initial intentions.

Here, the question of control is associated with colour as a photographic 'trace', as indexical imprint – and thus to notions of how colours are produced, where they come from. The difficult question of the origins of colour is examined in the following chapter.

Origins: Colour and Nature

In this chapter I examine one of the main questions addressed in discourses on colour and cinema – the question of the *origins* of colour, where colours come from, their material, technological, and indexical foundation. This question is primarily linked to the variety of colour techniques found in film practices until the end of the 1920s – tinting, toning, hand and stencil colouring, as well as numerous photographic colour processes – but also to later attitudes towards this diversity of colour in the writing of film history and in archival practices. The lack of interest towards non-photographic colour in both arenas, represents a discourse where colour is hierarchised and valued almost exclusively in terms of physical origins within a specific technology, rather than as an aesthetic element or as an aspect of historical film practice. What has been considered significant is the photographic, the image as indexical trace; when colour has had other origins, it has often been ignored.

In their book on film restoration, Paul Read and Mark-Paul Meyer emphasise the importance of distinguishing between "coloured" films and "natural colour" films during the silent era, referring to William van Doren Kelley (the inventor behind a number of colour processes between 1912 and 1928)[1] who in 1918 proposed that these two separate terms should be used explicitly in advertising, in order to avoid the current confusion (and disappointment of realising that what was presented as a colour film in fact was a coloured black-and-white film), and to "suit the individual taste".[2]

There has been a tradition of perceiving early film as black and white,[3] and film archives have generally preserved black-and-white nitrate negatives, and most tinted original nitrate prints have been copied onto black-and-white safety stock.[4] This has not solely been a result of the difficulties in preserving and reproducing these colours, but is also linked to an obvious indifference to these non-photographic elements. According to

[1] See Cherchi Usai (2000), 34ff., Koshofer (1988), 25, 32, 39ff., 153 Londoño, 64f., 85, 132ff., Ryan, 30f., 34f., 83ff., 91ff.
[2] William V.D. Kelley, "Natural Color Cinematography", *Transactions of the Society of Motion Picture Engineers*, No. 1, 1921, quoted in Read, Meyer, 180.
[3] See also Luciano Berriatúa, "Regarding a Catalogue of the Tints Used on the Silent Screen", *Tutti i colori del mondo*, 135.
[4] See Enno Patalas, "On 'Wild' Film Restoration, Or Running a Minor Cinematheque", *Journal of Film Preservation*, 56, 1998, 35.

Eric de Kuyper, Jacques Ledoux of the Cinémathèque Royale de Belgique described colour in silent films as "the ringing of bells which accompany a trotting horse" ["*un groulot qui accompagne le trot du cheval*"].[5]

Enno Patalas parallels this to the restoration of sculpture in the nineteenth century, where colourful sculptures in churches were painted white.[6] It was also during the nineteenth century that it was recognised that the "pure" white marble of Greek Classical architecture and sculpture, perceived as an essential characteristic of ancient art since the Renaissance and throughout eighteenth century Neo-Classicism, had in fact been painted in a multitude of strong colours.[7]

Giovanna Fossati refers to the historical prevalence of this "purist" attitude of perceiving (and favouring) early cinema as black and white, and has pointed out that in the few instances where colour in silent film has been referred to in the writing of film history, it has usually been labelled as a primitive feature of cinema.[8] For example, Terry Ramsaye refers to the hand colouring of Edison's *Annabelle Serpentine Dance* films from 1894-1897, and points out that this method has been used for various purposes since then; however, Ramsaye claims that it never attained "any particular importance in the screen art. It occurs only as a symptom of desire."[9] Likewise, Jean Mitry describes stencil colouring as being "nothing more than a crude, unsophisticated coloring of black and white images".[10] As Fossati points out, these "purist" approaches "do not have the upper hand any longer in the way we think about cinema, and in general about reproduced images."[11]

The most obvious case in point in terms of understanding this attitude towards colour as a "disturbance", would perhaps be linked to the multitude of non-photographic colours in non-fiction films, where the applied colour may seem to disrupt notions of film and photography as an indexical technology, as trace, not only representing but even *reproducing* the visible world, where the application of colour simply would obstruct the access to these traces of light.

In addition, the approaches and mindsets behind the negligence, in archival practices as well as in the writing of film history, with regard to the applied, non-photographic colour systems throughout the silent era, bring together the general cultural preference for black and white with an

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[5] *'Disorderly Order'*, 18. See also ibid., 23f., 52, 74.
[6] Patalas, 35.
[7] See Gage (1993), 11-27.
[8] Fossati (1998), 130f.
[9] Ramsaye (1926), 118.
[10] Jean Mitry, *The Aesthetics and Psychology of Cinema* [orig. publ. 1963], trans., Christopher King (Bloomington/Indianapolis: Indiana University Press, 1997), 224.
[11] Fossati (1998), 131.

established comprehension of film in terms of "immaterial" *textual* works of art rather than concrete objects.

The identification of cinema as a *photographic* medium entails the identification of a film as a "work of art in the age of mechanical reproduction"; the film medium was characterised by Walter Benjamin as the "most powerful agent" for the shattering of the tradition of the unique existence of an artwork as an object present in time and space, and the elimination of the artwork's "aura": "the technique of reproduction detaches the reproduced object from the domain of tradition. By making many reproductions it substitutes a plurality of copies for a unique existence."[12] Thus, films constitute artworks whose authenticity is not connected to a specific 'original' (the 'original' of a film is in fact a negative); instead they function as "immaterial" texts which can be duplicated into a potentially indefinite number of copies (or positive prints).

In particular non-photographic colours, which exist outside basic film technology, outside the realm of 'cinema' as a photographic medium, disrupts this notion, as it explicitly restates the 'aura', the character of uniqueness of each print. At the same time, as Cherchi Usai has pointed out, this colour is a "mythical entity" to the same degree as what he characterises as the notion of the "model image", the notion of films as immaterial texts rather than material objects, as this 'aura' is missing from the duplicate prints being screened.[13]

In addition, the notion of films as artworks is not only defined through the aesthetics of (black-and-white) photography, but even more importantly (even now, in both archival and film historiographical practices) through the notion of the *auteur*; and the application of colour was very seldom based on decisions and choices made by the director. Besides, most films circulated in both black and white and – more expensive – coloured copies, so the colour never seemed to be an absolute necessity, an integrated part of the notion of the film as a (reproduced, duplicated) "text", but rather a simple addition with an arbitrary function, linked to film as performance or social practice etc.[14]

The new-found interest in colour during the past two decades is connected with an increased interest in films as performance and social practice (characteristics which of course cannot be fully recreated either), and the increasing awareness of other neglected non-photographic elements, for example, musical accompaniment and intertitles.

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[12] Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction" (1936), trans. Harry Zohn, *Illuminations*, ed. Hannah Arendt (London: Fontana Press, 1973), 214ff.
[13] Cherchi Usai (2001), 84f. See also Fossati (1995), 84f.
[14] See Patalas, 36.

In this chapter, the question of colour film and notions of physical origin are placed in the context of Kinemacolor, an early photographic colour film process, which, although never integrated within regular film production and exhibition practices, had a certain commercial success between 1909 and 1914, a period marked by extensive experimentation and debate concerning the search for photographic colour film.

In August 1909 an editorial in *Moving Picture World* remarked that "[n]aturally colored moving pictures are in the air – very much in the air – just now both in [the USA] and in Europe."[15] In December the same year, one of the editors, Thomas Bedding, added: "Everybody in the moving picture field is talking about it, discussing it, praising it, criticizing it, wanting it; the phrase 'natural colors' is passing finally into the vocabulary of the writer on this subject; into the minds of manufacturers; into the minds of the public."[16] In connection with the first exhibition of Kinemacolor in the USA, in Madison Square Garden in New York City in December 1909, described by *Moving Picture World* as "probably the largest meeting interested in the subject of film photography which has ever been brought together in [the USA]",[17] it was referred to as a demonstration of "the commercial application of a most interesting scientific achievement" as well as being an event "of the greatest possible importance in connection with moving picture progress."[18]

The Kinemacolor process was patented in 1906, and involved black-and-white footage filmed and projected at double speed (32 frames a second) with a revolving shutter of alternating red and green filters in front of the lens.[19] The process was most successful in Britain, where it was exploited commercially from 1909, while ventures in other countries did not achieve the same amount of success; the establishment of an American company the following year turned out to be less profitable, despite great interest from the trade.[20] The British company, Natural Color Kinematograph, managed by

[15] "The Natural Color Quest" [editorial], *Moving Picture World*, August 14, 1909, 217.
[16] Lux Graphicus [Thomas Bedding], "On the Screen", *Moving Picture World*, December 25, 1909, 918.
[17] "The Kinemacolor Demonstration", *Moving Picture World*, December 25, 1909, 912.
[18] "Kinemacolor: Demonstration of Moving Pictures in Natural Colors in New York" [editorial], *Moving Picture World*, December 11, 1909, 831.
[19] See Henry W. Joy, *Book of Instruction for Operators of Kinemacolor Appliances* (London: The Natural Color Kinematograph Co., Ltd, 1910), 3ff. See also Charles Urban, "Terse History of Natural Colour Kinematography" (1921), *Living Pictures*, 2:2, 2003, 61f.; Frederick A. Talbot, *Moving Pictures: How They Are Made and Worked* (Philadelphia/London: J.B. Lippincott Company/William Heinemann, 1912; repr. New York: Arno Press/The New York Times, 1970), 295ff.; Lucien Bull, *La Cinématographie* (Paris: Librairie Armand Colin, 1928), 97f.; Homer Croy, *How Motion Pictures Are Made* (New York/London: Harper & Brothers Publishers, 1918), 288; Klein (1936), 7ff.; Koshofer, 22ff.; Londoño, 84; Ryan, 26ff.
[20] See "Kinemacolor in America", *Moving Picture World*, April 16, 1910, 605. See also Luke McKernan (ed.), *A Yank in Britain: The Lost Memoirs of Charles Urban, Film Pioneer* (Hastings: The Projection Box, 1999), 79.

Charles Urban, went into voluntary liquidation in 1914, following a court case which invalidated the Kinemacolor patent.[21]

Other processes competing with Kinemacolor were Gaumont's *Chronochrome* process (1912), a three-colour process of multiple-coloured lenses on a special projector converging onto a single image,[22] and the Friese-Greene process (1909), tinting the frames of the film with alternating primary colours.[23] There were also a large number of similar experiments between 1911 and 1916, of which few materialised.[24]

This chapter does not deal primarily with the complex technological, economic, industrial and legal conditions involved both in the success of Kinemacolor and its eventual commercial breakdown (which have been discussed in a number of texts, although usually somewhat tentatively).[25] The main focus of my discussion is on the notion of *colour reproduction* found throughout materials from the Natural Color Kinematograph, particularly in the company's catalogue published in 1912, describing every film exhibited since 1909, as well as in the reception of the process and debate on "natural" colour in the trade press, primarily *Moving Picture World*, in addition to other contemporary sources. The question of colour reproduction, which structures the argument, should not be read as a historical model of explanation. The "enterprises" of Kinemacolor are placed within a wider and specific historical context, and discussed in terms of contemporary film practices: other colour processes (both "natural" and "artificial"), stylistic and industrial developments, and film genres, etc. In

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[21] See Luke McKernan, "Natural Color Kinematograph" [dictionary entry], Richard Abel (ed.), *Encyclopedia of Early Cinema* (London/New York: Routledge, 2005), 468. See also Eileen Bowser, *History of the American Cinema, Volume 2: The Transformation of Cinema*, 1907-1915 (New York/Toronto: Charles Scribner's Sons/Collier Macmillan Canada, 1990), 228.

[22] See Laurent Mannoni, "Chronochrome Gaumont" [dictionary entry], *Encyclopedia of Early Cinema*, 117. See also Léon Gaumont, "Gaumont Chronochrome Process Described by the Inventor", *Journal of the SMPTE*, 68, January 1959, repr in *A Technological History of Motion Pictures and Television: An Anthology from the Pages of The Journal of the Society of Motion Picture and Television Engineers*, ed. Raymond Fielding (Berkeley/Los Angeles: University of California Press, 1967), 65-67. See also "The Gaumont Chronochrome", *Moving Picture World*, June 28, 1913, 1346; Cherchi Usai (2000), 29ff., George Lindsay Johnson, *Photography in Colours*, 3rd edition (London/New York: George Routledge & Sons, Ltd./E.P. Dutton & Co., 1916), 212f; Thomas, 36f.; Croy, 288f.; Klein (1936), 13; Nowotny, 90-100; Koshofer, 24; Londoño, 22ff.

[23] See "The Natural Color Quest", 218. See also "The Friese-Greene Color Process", *Moving Picture World*, January 21, 1911, 146; Croy, 285ff; Nowotny, 27-40.

[24] For a list of ephemeral additive and subtractive processes 1911-1928, see Cherchi Usai (2000), 33ff. See also Nowotny, 101-143; Koshofer, 21-48.

[25] See Gorham Kindem, "The Demise of Kinemacolor", *The American Movie Industry: The Business of Motion Pictures*, ed. Gorham Kindem (Carbondale/Edwardsville: Southern Illinois University Press, 1982), 136-145. See also D.B. Thomas, *The First Colour Motion Pictures* (London: Her Majesty's Stationery Office, 1969); Bowser, 228-232; Neale, 120-128; Nowotny, 47-89; Ramsaye (1926), 562-572. See also the website *Charles Urban, Motion Picture Pioneer*, edited by Luke McKernan: http://www.charlesurban.com

this chapter I will show how the discourse of colour reproduction, the recurring emphasis on how colours of specific objects and spaces are reproduced (both physically and in terms of the mimetic), makes visible a number of aesthetic and ideological notions of colour and cinema in general, as well as of connotations and contexts associated with colour.

The arrival of Kinemacolor took place in the film historical context of the "transitional" period, often identified as the years between 1907/08 and 1917. In the introduction to an anthology on this period, Charlie Keil and Shelley Stamp refer to the period as the most profound transformation in American film history, establishing the stylistic conventions and industrial structures that were maintained until after World War II.[26] The period was characterised by film narratives becoming more complex, the development of continuity editing and narrative storytelling, and the establishment of the studio system. As Keil discusses later in the anthology, the periodisation of the so-called "pre-classical" era involves a number of historiographical challenges, in terms of relating stylistic changes to contexts of exhibition, reception and industrial practices,[27] and, as Ben Brewster points out, the division into stylistic phases, for example, "cinema of attractions" and "narrative integration" is not "watertight", as characteristics of both phases coexist during this period.[28]

However, it is certain that the period in which Kinemacolor entered the market was characterised by a growing interest in fiction films and narrativisation, with the medium changing noticeably around 1907/08, moving away from an attractions-based aesthetic to an increased focus on storytelling.[29] Kinemacolor differed from contemporary film practices in many ways, perhaps most obviously as about 70% of the films produced by the Natural Color Kinematograph were non-fiction films.[30] Promoted as an innovation and a novelty, many of the discourses and aesthetics associated with Kinemacolor had more in common with early film conventions, and the cinema of attractions: a thematisation of technology and visual pleasure, an emphasis on spectacle rather than narrative, a mode of demonstration based on "showing" rather than "telling".

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[26] Charlie Keil, Shelley Stamp, "Introduction", *American Cinema's Transitional Era: Audiences, Institutions, Practices*, ed. Charlie Keil, Shelley Stamp (Berkeley/Los Angeles/London: University of California Press, 2004), 1f.
[27] Charlie Keil, "To Here from Modernity: Style, Historiography, and Transitional Cinema", *American Cinema's Transitional Era*, 51f.
[28] Ben Brewster, "Periodization of Early Cinema", *American Cinema's Transitional Era*, 71.
[29] See Keil, "To Here from Modernity", 53. See also Tom Gunning, "The Cinema of Attractions: Early Film, Its Spectator and the Avant-Garde", *Early Cinema: Space, Frame, Narrative*, eds. Thomas Elsaesser, Adam Barker (London: BFI Publishing, 1990), 60.
[30] Thomas, 17, 31ff.

The *Catalogue of Kinemacolor Film Subjects*, published by the Natural Color Kinematograph in 1912 features detailed descriptions of a variety of films, all produced in Kinemacolor between 1908 and 1912.[31] This involves a great variety of film genres, the "index of subjects" is divided into categories such as "Travel and Scenic", "Naval and Military", "Drama and Comedy", "State Ceremonies", "Natural Histories – Scientific and Botanical", "Trick Subjects", and "Sport".[32] The main focus and objective of the catalogue, however, is to sell Kinemacolor films for exhibition and to promote the Kinemacolor process (despite the added expenses and practical difficulties it involved)[33] and the merits of colour in general, and thus virtually every film listed in the catalogue, regardless of genre or subject, is described with reference to the aesthetic attributes of colour, and most importantly, to the reproduction of specific colours, and their mimetic and indexical reference to colours in 'reality'. Although it has never been the subject of any previous study, the catalogue represents what appears to be a unique project and a unique text: an attempt, encompassing over 300 close-written pages, describing and defining the functions of colour in a multitude of film images in a variety of genres. In addition to these descriptions, enthusiastic appraisal from numerous international press reviews are scattered throughout the catalogue.[34] Serving almost like a manifestation of the opposition between the artificial and the natural emphasised throughout the text, the catalogue is illustrated by a number of photographs taken from negatives of Kinemacolor films, and coloured by hand. The introduction to the Kinemacolor catalogue, however, in its presentation of the process, calls attention to the fact that "the colors obtained are due to the agency of LIGHT only. No painting, handiwork, stencil-work or similar devices are used."[35]

The notion of colour as *trace* or *index*, as conceptualised by Charles Sanders Peirce,[36] of constituting "natural", indexical colour, produced "by

[31] The list of titles in the catalogue was supplemented by a number of much shorter booklets, such as *Kinemacolor: Supplementary List of Film Subjects to Catalogue, 1912-13* (London: The Natural Color Kinematograph Co., 1913) [November] and *Kinemacolor Films, 1915-1916* (London: Kinemacolor Limited, 1916), only featuring non-fiction films.
[32] *Catalogue of Kinemacolor Film Subjects*, 313-318.
[33] See Thomas Bedding, "Moving Pictures in Natural Colors", *Moving Picture World*, January 9, 1909; "Kinemacolor: Some Practical Aspects of the Process", *Moving Picture World*, December 31, 1909, 959; Charles Edward Hastings, "Natural Color Moving Pictures: Their History and Advancement", *Moving Picture World*, March 26, 1927, 346; George Lindsay Johnson (1916), 210.
[34] See *Catalogue of Kinemacolor Film Subjects*, 19, 49, 60, 67, 90, 95, 105, 113, 138, 151f., 163, 171, 172, 173, 175, 182, 191, 217f., 219, 224, 232, 245, 249, 264, 268, 279, 288, 293f., 310ff.
[35] Ibid., 5. See also ibid., 3.
[36] See Charles Sanders Peirce, "What Is a Sign?" (1894), *The Essential Peirce: Selected Philosophical Writings, Vol. 2 (1893-1913)* (Bloomington: Indiana University Press, 1998), 5.

light only" obviously accentuates the conception of colour as a material quality belonging to and emanated from the visual world.

The question of colour film as representation of reality and its material origins is perhaps primarily an ideological one. In his discussion of a number of specific and possible accounts of the history of early photographic film, and with Kinemacolor as focal point, Edward Branigan suggests a historiography on the topic with a Marxist perspective, suggested in part by Jean-Louis Comolli,[37] where historical development is placed within a social and economic context. Ideology shapes technological development as well as the discourses which represent the technology. The emphasis on film and photography as objective, scientific phenomena, in certain respects even superior to the human eye – a "vision perfected", is particularly relevant in connection with colour film. The 'natural', scientific character of the colours, the fact that they have been produced by light, gives them a different status from non-photographic colour systems. However, there is also a parallel emphasis on technology and the capability of technology to 'capture' this quality of external 'reality' found in the discourses discussed in this chapter. The emphasis on this *capability* of certain specific technologies to obtain these visual qualities of reality, and the incapability of others, suggests that colour not only is a quality of the visual world, but also a quality of vision itself.

The catalogue continues to describe how the colours of the process are, "as it were, lying latent in the photographic picture, and are brought into visibility at the moment of exhibition."[38] This metaphor of the colours produced by light being "latent" in the image refers to Kinemacolor as an additive process, to the fact that the colours were produced in projection: red and green filters alternated in front of the black-and-white film frames.[39] Here, colour is linked to what Mary Ann Doane describes as two nineteenth-century theories of the temporal trace, conceptualising two markedly different relations to referentiality, which both have been influential in attempts to explain the effects of cinema: the index and the after-image.[40]

From the early nineteenth century the conception of colour as a material quality of light was complemented with the notion of and increased interest in colour as a subjective quality of vision. The chief historical reference is Goethe's colour theory from 1810. Goethe's work, a combination of natural science, aesthetics and cultural history features a survey of experiences related to the perception of colours and a classification of chromatic phenomena linked to the subjective experiences of these phenomena, the relationship between the observer and the observed object. Here, colour is

[37] Branigan, (1979), 132ff.
[38] *Catalogue of Kinemacolor Film Subjects*, 5.
[39] See Ryan, 12ff.
[40] Mary Ann Doane, *The Emergence of Cinematic Time: Modernity, Contingency, the Archive* (Cambridge/London: Harvard University Press, 2002), 69.

associated with subjective vision, and to a notion of the human body as an active producer of visual experience without a clear link to an objective world. The first part of the work examines what Goethe characterises as "physiological colours", which belong "to the eye itself", i.e. colours produced by the body of the observer, like coloured after-images.[41] As Jonathan Crary has pointed out, with Goethe, vision itself became an object of knowledge and observation, which led to an increased interest in the physiology of the human body.[42] Crary refers to one of Goethe's examples of experiments to produce after-images, taking place in a dark room, a *camera obscura*, to illustrate the complex relationship of separation between observer and external world:

> When Goethe's experiments repeatedly call for either a darkened room or, perhaps more significantly, the closed eye, he is not simply privileging an experience of being severed from contact with an external world. On one hand he is indicating his conviction that color is always the product of an admixture of light and shadow [.] [---] On the other hand he is also posing conditions in which the inescapable physiological components of vision can be artificially isolated and made observable. For Goethe, […] vision is always an irreducible complex of elements belonging to the observer's body and of data from an exterior world. Thus the kind of separation between interior representation and exterior reality implicit in the camera obscura becomes in Goethe's work a single surface of affect on which interior and exterior have few of their former meanings and positions. Color, as the primary object of vision, is now atopic, cut off from any spatial referent.[43]

Goethe's colour theory generated a movement in the early nineteenth century, which attempted to renew the undervalued prestige of colour, as well as reassess the status of human vision as the only means for experiencing colour. But, as Martin Jay points out, this realisation and awareness rather contributed to diminish the esteem for colour as well as the human eye:

> It might be thought that a renewed stress on color over form would contribute to the triumph of pure vision because only the eye can register color, whereas touch also provides a sense of form. But paradoxically, the lack of that very tactile verification could undermine the authority of the visual by showing its dependence on the physiological apparatus of the viewer alone, thus severing the experience of sight from any objective reality "out there." Once the problematic status of that experience was made explicit, the epistemological

[41] Goethe, [1], 1.
[42] Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge/London: MIT Press, 1990), 67ff.
[43] Ibid., 70f.

> stature of sight was shaken. The emphasis on color seems to have contributed to that result, or at least been symptomatic of it.[44]

Just as the darkness of the *camera obscura* made it a site for the production of colour, the film camera is also often associated with the properties of the human eye, in particular when it comes to producing colours; Cherchi Usai refers to the search for "natural colour" as an attempt to "endow film with the presumed qualities of the human eye".[45]. In a lecture given in 1908, George Albert Smith, the inventor of the Kinemacolor process, referred to colour as first and foremost a property of subjective perception: "Science tells us, with proofs that cannot be disputed, that there is no such thing as color in an objective sense; color is a sensation – a something supplied by our own minds – a subjective phenomenon entirely."[46] Therefore, Smith adds, "the photographer who sets out to record color is seeking to record what does not exist outside of his own mind!"

"Where do the brilliant multi-colors come from," asks a short article from 1912 explaining how the Kinemacolor process works, also referring to colours as a property of "the brain of the observer" – thus pointing out how Kinemacolor films are educational on several levels; the "Delhi Durbar" series (which will be presented later) "not only tells us a great deal about India which we did not know before, but tells us something about what goes on inside our own heads – about which we were probably equally ignorant."[47]

Here, colour becomes an area where the theories of the index and the after-image interweave: Doane points out how the theory of the after-image "in one sense inscribes the indexical image within it" through the assumed analogy between physiology and technology, between the eye and the camera, "in which the retina acts as a kind of photographic plate, registering and retaining, if only momentarily, an image."[48]

The colours produced by Kinemacolor are dependent on temporal progression in order to be made visible, of the interaction of the parallel movements of black-and-white film in projection and the alternating filters, as well as specific perceptual and mental processes within the spectator. Smith connects the production of colour by alternating red and green filters to the notion of "persistence of vision", which is based on the concept of the

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[44] Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century French Thought* (Berkeley: University of California Press, 1994), 151-152n.
[45] Cherchi Usai (2000), 27.
[46] George Albert Smith, "Animated Photographs in Natural Colors: A Paper Read Before the Society of Arts, London, December 9, 1908" [repr. from *Journal of the Royal Society of Arts*, Vol. LVII, No. 2925, December 11, 1908, 70-75] , *Moving Picture World*, January 2, 1909, 7.
[47] "A Popular Explanation of the Kinemacolor Process", extract from "How Kinemacolor Is Produced", *Dundee Evening Telegraph*, 1912, Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, October 10, 1912.
[48] Doane, 69.

after-image, and the most common explanation for the perception of motion in cinema.[49] Hence, colour and movement are connected on a perceptual or cognitive level, the same principle is understood as "a function of color blending as well as motion-blending".[50] The notion of "persistence of vision" has been replaced by concepts of the phi phenomenon and beta movement etc., in connection with the perception of motion; however, the perception of colours produced by alternating coloured filters in additive processes such as Kinemacolor is still linked to how the additive synthesis taking place in the human eye relies on persistence of vision.[51]

Thus, this relationship between colour and movement entails that still photographs from Kinemacolor film frames are not only deprived of movement, but also of colour. Just as the catalogue features hand-coloured photographs, the front cover of the June 1912 issue of *Popular Mechanics* displays film strips with frames from the Kinemacolor film *From Bud to Blossom* (1910), in colour, and although it is stated that "this cover design is exact [sic] reproduction of a Kinemacolor film", this claim is contradicted in the article inside the journal, describing how the colours are produced in the Kinemacolor process: "The cover design of this issue of Popular Mechanics Magazine is not, therefore, a true representation of the 'kinemacolor' film, but has been colored as it would appear on the screen at certain parts of a film".[52]

This manner of producing colours also entails challenges in terms of archival practices since Kinemacolor, as Nicola Mazzanti points out, represents a system or process, among many, which is basically impossible to reproduce in its original form: "Here the archivist confronts the problem: Where exactly is the film experience? Is it on the film, or in the projector, or on the screen? And precisely how do these many things interact with one another?"[53]

In his book on colour cinematography from 1936, Adrian Bernard Klein also understood film technology, and colour film in particular, in connection with the relation between an "external reality" and the subjective experience of the body; the challenges associated with colour film are described as dealing with "recording and reproducing physical stimuli which originate our sensations."[54] Klein pointed out that such a recording apparatus in much of its construction copies a sensory organ: the microphone is an artificial ear recording sound, while the camera lens and the film stock function as an

[49] Smith (1908), 6; Thomas, 14. See also Doane, 70.
[50] Thomas Bedding, "Moving Pictures in Natural Colors", *Moving Picture World*, 31.
[51] See Read, Meyer, 42.
[52] J.Q. Roberts, "How the Colors of Nature Are Reproduced in Moving Pictures", *Popular Mechanics*, June 1912.
[53] Nicola Mazzanti, "Raising the Colours (Restoring Kinemacolor)", *This Film Is Dangerous: A Celebration of Nitrate Film*, ed. Roger Smither (Brussels: FIAF, 2002), 123.
[54] Klein (1936), 27.

artificial eye recording light. To capture the visible world on film in colour is particularly difficult, as colour is a special quality of vision. Klein described "the apparatus and theory of colour photography" as entailing "a very pretty example of the recording mechanism being a copy of the sensory organ concerned."[55] The foundation for colour photography, Klein pointed out, is the three-colour theory of human colour vision defined by Thomas Young in 1802, which involves the assertion that the human eye has three sets of nerves, and each nerve being sensitive to one of the three primary colours: red, green and blue.[56] The physicist James Clerk Maxwell applied Young's theory to the production of a colour photograph, first shown in 1861, isolating the primary colours by taking three negatives through green, blue and red filters, and similar principles of separation have been the foundation for all photographic colour technology. In his lecture, Smith also referred to Young's three-colour theory as the foundation for a number of experiments, and numerous patents (most of which do not work in practice) for reproducing colour in moving pictures.[57]

The similarities between the colour vision of the human eye and the camera respectively entail that photographic colour technology is often explained through physiological or perceptual metaphors. In a book on colour photography in 1916, George Lindsay Johnson, for example, argued for the need to "explain the nature of colour vision and colour blindness" in order for the reader to understand the principles of colour photography.[58] In addition, the book explicitly compares the human eye with a camera, and more specifically, the retina with a colour plate.[59] There is even a section pointing out the "remarkable similarity" between the colour screen plates used in Lumière brothers' Autochrome colour photography system (patented in 1904),[60] consisting of a mosaic of differently coloured dots (dyed starch grains) and a similar "mosaic" found in the retina of birds and reptiles.[61] "Thus," Johnson remarks, "Lumière's discovery has been forestalled by the reptiles and the birds."[62] Consequently, this interrelationship between body and apparatus also seemed to entail a potential for exchangeability of knowledge. Just as studying human perception was instrumental in the development as well as understanding of colour photography, the new

[55] Ibid., 28.
[56] See Thomas, 1. See also Thomas Bedding, "Moving Pictures in Natural Colors: Second Article", *Moving Picture World*, October 29, 1910, 981; Nowotny, 6f.
[57] Smith (1908), 7. See also Neale, 111f.; Bull, 93ff.
[58] George Lindsay Johnson (1916), 47-53.
[59] Ibid., 34-44, 56.
[60] See Bernard Chardère, Guy Borgé, Marjorie Borgé, *Les Lumières* (Lausanne/Paris: Éditions Payot/Bibliothèques des arts, 1985), 124-135. See also Colin Harding, "'The World Will Be Color-Mad': The Autochrome Process and the Birth of Colour Photography", *Living Pictures*, 2:2, 2003, 26-33; Bull, 99ff.
[61] George Lindsay Johnson (1916), 45ff.
[62] Ibid., 46.

technology could also be recognised as a scientific instrument for examining and revealing new insights regarding the principles of physiological perception. Johnson remarked that the "striking analogy between the physiological perception of colours and the phenomena associated with colour photography has convinced me that both the ophthalmic surgeon and the physiologist who have taken up study of colour blindness and colour vision, will find that the serious study of this fascinating science will illuminate many obscure phenomena connected with the physiology of vision and colour blindness".[63]

The fact that the production of colours was founded on scientific "truth", a recognised understanding of the properties of human vision, was also central in the promotion of Kinemacolor, for example by the catalogue:

> It has been pointed out in an American print by a critic, who, by the way, had never seen the results, that "THE MAIN PRINCIPLES OF THE URBAN-SMITH PROCESS WERE KNOWN TO THE SCIENTIFIC WORLD BEFORE EITHER MR. URBAN OR MR. SMITH TOOK UP THE MATTER!" Exactly! Messrs. Urban and Smith admit the fact and take especial pride in it. Their invention *is* based upon the solid foundation of established scientific truths. If it were based upon some fantastic notion not in accordance with the principles of pure science, there would be little hope for its future. It is just *because* KINEMACOLOR is based upon the solid rock of scientific fact that distinguished scientists all over Europe have been enthusiastic in its praise and have predicted a brilliant future for the young art, which has been born to the world for the entertainment and instruction of the people.[64]

The catalogue points out the difference between producing a colour film patent, and producing results.[65] All the competing patents are described as the "ghostly rivals" of Kinemacolor, and are either "laughably unsound" or "pathetic, if dishonest, attempts to infringe upon [Kinemacolor's] master patents by some clumsy adaptation of our system."[66] According to the catalogue, no other schemes work in practice; no actual rivals exist in the field.[67]

The scientific foundation for this new-found "colour vision" entailed a reproduction of the visible world, just as much of the response to Kinemacolor found in the trade press emphasised that the film images were "not pictures, but *realities*".[68] The materialisation of "natural colour" seems to reiterate the typical film discourse of thematising the *view*, the

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[63] Ibid., vii ["Preface to the First Edition", 1910].
[64] *Catalogue of Kinemacolor Film Subjects*, 6f.
[65] See ibid., 7.
[66] Ibid., 10.
[67] Ibid., 11.
[68] Theodore Brown, "My Impressions of Kinemacolor", repr. from *Kinematograph and Lantern Weekly* in *Moving Picture World*, May 28, 1910, 886.

equivalence between watching a film and witnessing a real-life event. The established notion of cinema as a "window on the world" seems to become even more persuasive because of the new colour process. The Kinemacolor catalogue declares:

> a new power has been placed in the hands of those whose business or interest it is to make records of the world's happenings; and the enjoyment of the vast majority of mankind, who cannot attend these happenings, but who delight in seeing them pictorially reproduced will be greatly increased by KINEMACOLOR.[69]

In his 1908 lecture Smith acknowledged the "great interest and educational importance" of black-and-white films, because they enable the spectator to "participate at our ease in scenes and happenings which we can never witness without their aid."[70] However, the fact that "the extreme novelty and wonder of the thing have lost their first spell over our minds," the need for colour to complete the "realistic impression of the situation" is becoming increasingly important.

According to Smith, his awareness of the shortcomings of black and white and determination to develop colour cinematography was initiated after seeing his own film taken at the funeral of Queen Victoria in 1901:

> The picture that I obtained on that occasion, though a faithful record of movement and incident, conveyed no suggestion whatever of the gorgeous coloring of that historic scene. The rich uniforms of our King and Princes, the gorgeous tunics, plumes and gold braidings of the great representatives of continental and other countries, made a blaze of moving color on the broad steps of the Chapel which I shall never forget. My picture, of course, conveyed nothing of all this; and to my mind lost nine-tenths of its interest and truth in consequence.[71]

Smith also declares that the same applies to the depiction of most military scenes. In fact, the rendition of spectacular ceremonies and "state events" such as this was to become one of the principal subjects of the Kinemacolor films which were to follow, and perhaps the type of film genre that, more than any other, brought attention to as well as established the reputation of the process.[72] The breakthrough for Kinemacolor was, in fact, the films of "the sad and memorable scenes" from the funeral of King Edward VII in 1910, described by the catalogue as preserving "an historic record, in perfect actuality".[73] The coronation of King George V in 1911 was also the subject

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[69] *Catalogue of Kinemacolor Film Subjects*, 7.
[70] Smith (1908), 6.
[71] Smith (1908), 6. See also "A Study of Comparative Values", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, October 3, 1912.
[72] See Urban (1921), 64f.
[73] See *Catalogue of Kinemacolor Film* Subjects, 41ff. See also Thomas, 22.

of a number of celebrated Kinemacolor actuality films.[74] Finally, Kinemacolor's greatest success, a programme of films of the royal visit to India in 1911, including the "Delhi Durbar", a commemoration ceremony for the new King and Queen, as well as a number of processions, opened in London in February 1912.[75] The programme lasted two and half hours – an extreme duration at the time, and was described in *Moving Picture World* as "probably the greatest success that moving pictures have scored at any time or place".[76] The 'reality' or 'actuality' of the 'historical events' depicted in these films, were particularly suited to colour as attraction and spectacle, as they involved news events typified by the visual and the theatrical.

Furthermore, the qualities and properties that Smith expressed that he was missing in his black-and-white record are primarily linked to the reproduction of clothing, a subject which is referred to repeatedly throughout the Kinemacolor catalogue, a property of one of the strongest manifestation of colour reproduction: the spectacle of everyday objects.

Colour Reproduction: A World of Objects

The world reproduced by Kinemacolor, as it is depicted in the catalogue as well as in press articles, is not primarily defined by places or incidents. Instead, it is a world of *objects*. The reproduction of the world in colour entails recognition of the specific origins of these colours – and the origins are almost exclusively found in specific objects.

As Aumont has pointed out, colour is never perceived "in the abstract, independently of the whole of perception of a given situation, with its space, its time, as well as – this is less often emphasised but just as essential – its object character. Visual perception in its entirety, in effect, is structured as much by the traditional categories of space and time as by the notion of the object: we neither perceive colours, nor forms, nor textures, nor positions in space, but all these things together – and, undoubtedly at the same time, the practical *concepts* to which they are attached, and these *are* the world of objects."[77]

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[74] See *Catalogue of Kinemacolor Subjects*, 166-172 See also "The Coronation in Kinemacolor" [review], *Moving Picture World*, August 5, 1911, 274; "Kinemacolor Makes a Hit", *Moving Picture World*, August 12, 1911.

[75] See *Catalogue of Kinemacolor Film Subjects*, 280-310. See also H.F.H.[signature], "The Durbar in Kinemacolor", *Moving Picture World*, March 2, 1912, 774.

[76] H.F.H., "The Durbar in Kinemacolor" (1912), 774.

[77] ["dans l'abstrait, indépendamment de l'ensemble de la perception d'une situation donnée, avec son espace, son temps, et aussi – cela est moins souvent souligné mais tout aussi essentiel – son caractère *objectal*. La perception visuelle tout entière, en effet, est structurée, autant que par les catégories traditionelles de l'espace et du temps, par la notion d'objet : nous ne percevons ni des couleurs, ni des formes, ni des textures, ni des positions dans l'espace, mais tout cela à la fois – et, sans doute, en même temps, les *concepts* pratiques qui y sont attachés, et qui *sont* le monde objectal."]. Aumont (1994), 17.

Although a number of films in Kinemacolor depicted spectacular state events, like the ones mentioned earlier, and several travelogues were produced in the process, a noticeably large number of films listed in the catalogue deal with mundane, everyday subjects. In the description of images of landscapes, animals, and cities found in the catalogue (and in press articles), the spectacle of colour is located in the spectacle of everyday objects.[78]

The catalogue's description of *Farmyard Friends* (1908), a film featuring a number of "country scenes", is thus structured around detailed descriptions of the reproduction of clothes, skin colours, wisps of straw, wool of sheep, straw stacks, a white cotton hat, a bird's feather, a cat's fur against a "cream-coloured" curtain, and, what is presented as the highlight of the film, the segment "Cows and Calves" and the reproduction of the animal hides:

> This section contains another triumph of color-kinematography. It is a perfectly simple scene, yet strangely attractive because so natural. Just some cows in a meadow, but on the spectator the effect is that of a masterpiece by Sydney Cooper. The grass and trees are like Nature herself, and as for the cows, it seems almost impossible that we are not looking at actuality, their coats are reproduced so perfectly. Some are red-brown cows, some white and one is an Aldernay. Following this – greatest triumph of all – is a speckled cow and all the different splashes of color on its hide are exactly shown.[79]

The spectacle in this sequence is obviously not linked to what is happening in the image but to the demonstration of the powers of the photographic colour process. As the description of the reproduction of the colour gradations of a lamb's wool in the same film puts it: "that this should be perfectly shown is surely most wonderful!"[80]

However, the emphasis on specific objects is not limited to the films displaying everyday subjects; the incessant emphasis on colour reproduction accentuates the object, regardless of subject or genre. Thus, among the descriptions of the ceremonies in connection with Edward VII's death, among coaches and liveries in "gorgeous colours", the catalogue cannot fail to note "how well the stone of Windsor castle is reproduced"[81] Along with depicting the regal as well as exotic splendors in the Durbar series, the catalogue points out how the "perfectly natural reproduction of such every-day sights as a cloud of dust is one of the charms of KINEMACOLOR."[82]

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[78] See Burton H. Allbee, "Impressions of Kinemacolor Films", *Moving Picture World*, December 25, 1909, 915f.
[79] *Catalogue of Kinemacolor Film Subjects*, 18f.
[80] Ibid., 19.
[81] Ibid., 41, 43.
[82] Ibid., 304.

The notion of Kinemacolor films as representing an attractions-based mode of demonstration is above all found in a number of films devoted to such everyday subjects, where the colours of objects, and how they are reproduced, seem to be the most important theme of the film. The descriptions of the films *Our Gem of a Cook* (1910) and *The Chef's Preparation* (1910), both of which display the assembling and preparation of food, emphasise Kinemacolor's "magic ability" to "reproduce as they are in actuality ordinary objects of everyday use."[83] The scene called "Uncooked Meat" is consequently described as a "study in red and whites", and the "startling realism" of the "exact color and texture of raw fat and lean and suet" is brought to the reader's attention, just as the appearance of a number of vegetables and fruits, the "bloom on a peach, the sheen on the scales of a fish", the striking differences in hue between lobster in raw and cooked condition, the colour contrasts offered by various meat pies presented together, the "artistic effect of a well-laid table", and many more examples.

The mode of demonstration connected to colour reproduction is primarily a demonstration of *likeness* between coloured objects on the screen, and their referents in 'reality'. This makes the depiction of recognisable everyday objects, and of minute, mundane changes and movements extremely useful, because it is assumed that there is a direct reference between the image and a known world of objects for practically everyone in the audience.[84] The catalogue recommends that films in this category are presented to an audience seeing Kinemacolor for the first time: "Their realism is so surprising that they win applause that the most thrilling drama fails to elicit."[85]

The reproduction of colour is enough to create excitement, and is initially not perceived as in need of a narrative or anything spectacular taking place; in some ways such elements are only distracting from what often is presented as the key benefit of reproduction for the spectator, which is *recognition*.

After the 1909 New York exhibition, the *Moving Picture World* described the variety of subjects displayed as "an almost universal series of tests on

[83] Ibid., 48, 63.
[84] Films produced in other contemporary colour film systems also to a large extent displayed specific objects. The first films made with the Friese-Greene process displayed a boy signalling with coloured flags (ca. 1904), a revolving vase of flowers (ca. 1908), and a revolving coloured plate with fruits (ca. 1910). See "The Friese-Greene Color Process", *The Kinematograph Weekly*, November 24, 1910, repr. in *Moving Picture World*, December 17, 1910, 1413. Among the films produced in the Gaumont Chronochrome Process, were "flower studies" – *Fleurs: Bouquets dans des vases* (Gaumont, 1912) – as well as studies of glassware (in the film *Venise, Reine de l'Adriatique* [Gaumont, 1912]), multicoloured seashells, and national flags. See "The Gaumont Chronochrome" (1913), 1346.
[85] *Catalogue of Kinemacolor Film Subjects*, 63.

ordinary subjects."[86] Here, the aspect of recognition is what matters for determining the success of the exhibition; the "scientific" interest expressed by the writer in the colours is in terms of being "reasonably accurate renderings of the original." Therefore, in connection with evaluating the quality of colour reproduction in *Floral Friends* (1909) displaying various flowers, the writer has "no hesitation in saying that they are good tests, for the simple reason that we have cultivated most of these flowers, and certainly know what they look like."

A review of a Kinemacolor demonstration in 1907, reports that the spectators got the opportunity to "compare the colours in the pictures projected with some of the actual accessories used," adding that "the rendering of the colours was strikingly accurate, particularly in the case of the reds."[87]

Likewise, the description of the film *Liqueurs and Cigars* (1910) boasts the perfect verisimilitude of "labels on the bottles of liqueurs, the gold lettering on some of them, colored trade-marks, the various hues of the contents when poured out, […] the sparkling, translucent appearance of a wine glass", the boxes of cigars and cigarettes, the shiny diamond on the hand that unpacks them, the flames of a match, the blue smoke of the cigarette; all are "so realistic that one forgets one is looking at a picture screen."[88] The film *Refreshments* (1910) proves that Kinemacolor "is *not* a system of artificial coloring of the film itself" by showing red wine slowly and gradually being added and diffused into a glass of water, and the slow change in hue which follows, "depicted exactly as if the real thing was happening before our eyes […]."[89] In addition to describing the perfect rendition of the peeling of an apple, and the views of a girl and a monkey eating a banana, the catalogue gives an extensive description of the section depicting a man cutting an orange in half, followed by what is presumably an extreme close-up, "a very close view" of one half of the orange being squeezed: "Drops of moisture appear and trickle down his fingers, a severed pip emerges and the flood of juice increases. It is *exactly* the color of orange juice and is so like the actual thing that one's mouth positively waters as one watches the picture."[90] The spectacle of the trivial, mediated through colour reproduction and close-up is echoed in a review describing this particular scene, quoted in the catalogue: "It is like a planet in liquidation, a star in

[86] "Kinemacolor: First American Exhibition of Moving Pictures in Natural Colors; Madison Square Garden Concert Hall, New York, December 1911, 1909: Special Criticism of the Process", *Moving Picture World*, December 18, 1909, 874.
[87] *British Journal of Photography* (6 December 1907), quoted in Mazzanti, 123.
[88] *Catalogue of Kinemacolor Film Subjects*, 67.
[89] Ibid., 85.
[90] Ibid., 86.

deliquescence. The orange looks as large as the earth, and as it pours forth Niagaras of juice, you feel you are […] watching the end of all things."[91]

The close-up of the squeezed orange corresponds to the use of close-ups often found in early cinema; Gunning points out that one of the characteristics which distinguishes the use of close-ups in films belonging to the cinema of attractions from later uses of the technique is the fact that "they do not use enlargement for narrative punctuation, but as an attraction in its own right", sometimes even as the main point of the film.[92] In the Kinemacolor films about objects, the novelty of colour reproduction is usually the main point of the film, and it is remarked that without colour, many of these films would not make any sense: in connection with the film *Beads of the World* (1911), the catalogue points out that Kinemacolor "of course, is the only means by which such a subject could be presented on the motion picture screen. To photograph colored beads in monotone would be a dull and futile proceeding, but in natural colors the film is most attractive."[93] The same argument is reaffirmed when describing *Gems and Jewels* (1911).

Other films primarily demonstrating the process by referring to a world of specific objects, natural or manufactured, rather than places or incidents, are *Natural Colour Portraiture* (1909, presented in a programme as "dealing with details of costumes and flesh tints"),[94] presenting a range of scenes to illustrate the capacity of the process – a flag, flowers, women in a variety of dresses, etc.,[95] *Varieties of Sweet Peas* (1911),[96] *Choice Bouquets* (1910), displaying flowers revolving before the camera,[97] and *Kinemacolor Puzzle* (1909), referred to as one of the company's most requested films, involved moving colours in its most basic form, displaying two revolving coloured discs moving in a "kaleidoscopic fashion".[98]

Natural Colour as Privileged View: Science, Education, Travel

The Kinemacolor "object" films have obvious similarities with some of the scientific and educational films produced in the process. In these films, colour is a necessity, a condition for access to the natural world. A film like

[91] James Douglas, quoted in ibid.
[92] Gunning (1990), 58.
[93] *Catalogue of Kinemacolor Film Subjects*, 145.
[94] See "The Kinemacolor Demonstration" (1909), 913.
[95] *Catalogue of Kinemacolor Film Subjects*, 29.
[96] Ibid., 184f.
[97] Ibid., 69.
[98] Ibid., 39.

The Freshwater Aquarium (1911), displaying colourful fish would, according to the catalogue, have "small value if taken in black-and-white."[99]

The usefulness of Kinemacolor as an educational medium, and as "an aid to science" is often emphasised in the catalogue.[100] Urban and Smith also actively sought to demonstrate the process to more "distinguished" societies outside the film industry, for example the Royal Society of Arts, in order to promote the invention not only as an "entertaining novelty", but also as a scientific innovation.[101] In the reception of the process it was sometimes noted that while the process was not yet ready for practical trade usage, it was nevertheless "of intense interest and value to botanists and students of photographic phenomena", among others.[102]

One of the most famous educational and scientific films by Kinemacolor was *From Bud to Blossom: The Actual Growth of Flowers Shown by Speed Magnification* (1910). The "speed magnification" involved stop-motion animation: the filming of single frames of growing flowers at specific intervals, with the "speeded-up" movement of "various familiar blooms (all presented in their natural colors) opening and reaching their full development in a few moments before our eyes", produced during projection.[103] The scene displaying the growth of a rose is in a June 1912 article on Kinemacolor in *Popular Mechanics* explained as depicting a

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[99] Ibid., 189.

[100] See ibid., 14.

[101] See Thomas, 19. This is also linked to how Kinemacolor film programmes were presented as being intended for and appealing to "the better classes", separating Kinemacolor from other cinema theatres with programmes "consisting principally of sensational or comic films" without interest for "the upper strata of local society", while Kinemacolor "by reason of its unique character as a natural colour process, its artistic beauty and appeal to the intelligence, exactly meets the need of the well-to-do." See "Our Policy – II", Kinemacolor Supplement to *The Kinematograph & Lantern Weekly*, August 22, 1912. This entailed "surroundings to which [the wealthy] are accustomed", and thus included "ventilated, comfortable and attractive" venues for exhibition like the upmarket Scala Theatre in London, converted into a Kinemacolor cinema in 1911, in order to fulfil what *The Moving Picture World* described as the aim "to attract fashionable London and the classes that rather despise the ordinary picture theater", with much higher ticket prices than other cinemas, and programmes running for two months or more. See "Kinemacolor in London: Important Installation in the Beautiful Scala Theater", *Moving Picture World*, May 6, 1911, 1002f. See also "Color and the Picture" (1910), 182; Thomas, 22. In addition, the King and Queen of Britain attended an exhibition of Kinemacolor films in Knowsley in 1909, which marked the first of several screenings of Kinemacolor before members of the royal family, frequently mentioned in advertisements and articles on the colour process. See "Cinematography Honored", *The Moving Picture News*, July 31, 1909, or, in connection with a screening before the royal family of the Delhi Durbar series, "The King and Kinemacolor: Royalty Sees Itself Upon the Screen", *The Cinema*, June 1912, 14. Similarly, the exhibition of Kinemacolor films in the Vatican before Pope Pius X in 1913 was widely covered. See *The Daily Telegraph*, July 12, 1913.

[102] See Henry (sign.), "Kinemacolor Demonstration in Boston", *Moving Picture World*, December 31, 1910, 1533.

[103] *Catalogue of Kinemacolor Film Subjects*, 64. The same concept was reused in the film *The Birth of Spring Flowers* (1911). See ibid., 143f.

period of three days of growth, with exposures made every 4.5 minutes.[104] This trick film technique, placed in a scientific arena was used in a number of popular botanical films during the 1910s.[105] Here, film functions as a scientific instrument, beyond entertainment, but combined with the attraction of colour, trick filming and time manipulation, and was therefore a suitable example of the value and potential of the new process, as suggested by the Kinemacolor catalogue:

> This film admirably illustrates the possibilities of kinematography, and especially of natural color kinematography, when applied to a specific scientific purpose. It is, undoubtedly, one of the most remarkable subjects ever presented on the moving image screen, and it has done more than any other film to bring home the minds of educated people the fact that the kinematograph is not merely a device for providing entertainment but an instrument of immense scientific value.[106]

Just as Benjamin suggested that "a different nature opens itself to the camera than to the naked eye",[107] the Kinemacolor catalogue suggested how the combination of colour and time manipulation reveals what "cannot always be detected by the unaided human vision".[108] The spectacle of (mediated) reality entails a defamiliarisation of the same reality, where ordinary everyday objects suddenly become strange and unfamiliar, acquiring previously unknown spiritual qualities. "If you did not believe that flowers have souls you would have been convinced to-night" one reporter wrote after seeing the film, adding that a "feeling almost uncanny was produced by the unusual picture".[109] Another compared watching the film to assisting at the birth of a flower, causing "a feeling of genuine awe […] and the thought, too, that a child who should see these wonderful things must not only have his soul awakened to beauty but to the knowledge that science brings us close to the divine".[110] The catalogue argued that "Nature's processes are fundamentally the same and this picture enables us to realise in a degree that would be impossible by any other means that growth in both the plant and animal worlds follows the same general principles […]. One of the queerest things one notices in the film is the effort that the plant appears to be making as it opens the buds. Leaves and stem moves in sympathy and it seems as though the plant was making a mighty effort to realise the principal aim of

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[104] J.Q. Roberts (1912).
[105] See Thierry Lefebvre, "scientific films: USA" [dictionary entry], *Encyclopedia of Early Cinema*, 568. See also Marina Dahlquist, *The Invisible Seen in French Cinema before 1917* (Stockholm: Aura förlag, 2001), 100ff.
[106] *Catalogue of Kinemacolor Film Subjects*, 64.
[107] Benjamin, 236.
[108] *Catalogue of Kinemacolor Film Subjects*, 65
[109] Quote from *Detroit Free Press*, ibid., 67.
[110] Quote from *New York Outlook*, ibid., 67.

its existence."[111] The spiritual, almost "anthropomorphic" qualities associated with the flowers in the film are not only the effect of the movement attained by "speed magnification", but more specifically by the movement and continuous variation of *colours*, through the choice of flowers as subject matter. The highlighting of the relation between shapes and colours in this account of one of the scenes by the *Kansas City Star* is evocative and similar to the descriptions found in the catalogue: "A tiny bud with its streakings of delicate pink gently nodded at the end of its green-leaved stem. Slowly, gracefully, mysteriously, the bud expanded petal by petal in a silent growth until a full-grown American beauty rose, with all its richness of deep red and green was presented".[112]

Theodore Brown in the *Kinematograph and Lantern Weekly* in 1910 referred to this film when pointing out that Kinemacolor should be considered "realities" rather than "pictures", as it makes the spectator "realise all the sensations he may experience when looking at the original objects in Nature."[113] The stop-motion technology assisted Kinemacolor in what seems to be the main purpose of the process: "the re-creation of Nature as she is seen by the human eye, not from one point of view only, or at one moment of time, but from all points of view, and at all moments during the evolution of motion."

This notion of the educational value of Kinemacolor, in terms of giving access to different points of view at different moments in time, is comparable to the notion of a similar educational value ascribed to Kinemacolor as a privileged view, giving access to *spaces* otherwise unavailable, in what is perhaps the most obvious film genre in terms of regarding photographic colour as reproduction of reality: the travelogue or "scenic" film: "Only by means of KINEMACOLOR can the great majority, who are unable to taste the joys of travel, realise the pleasures and reap the advantages that are to be derived from visits to foreign countries and contact with nations whose habits and customs are so widely different from those of the visitor."[114] The description of a series of films produced in Egypt boasts that the "exact appearance of that interesting and mysterious land is so perfectly reproduced on the screen that an actual visit would hardly convey a more realistic and lasting impression."[115] Once again echoing early film discourse, the reality of the Kinemacolor travelogue is described as a simulation of travel, and the film medium is described as a "visual

[111] Ibid., 64f.
[112] Ibid., 67. Gaumont also produced a flower study in the company's "trichromie" process: *Fleurs: Bouquets dans des vases* (Gaumont, 1912) also featured a similar stop-motion sequence: "Des tulipes s'ouvrent en vitesse accélérée", in addition to displaying one of the bouquets first in black-and-white, and then in chronochrome.
[113] Theodore Brown (1910), 886.
[114] *Catalogue of Kinemacolor Film Subjects*, 196.
[115] Ibid., 202.

telephone", as the catalogue refers to the prediction of being able to "see and hear what was going on in any part of the world by merely performing some simple action such as pressing a button" – while the "telephone [has] fulfilled one part of the prophecy; KINEMACOLOR fulfils the other."[116]

The notion of Kinemacolor as a kind of "privileged view", found in the catalogue, involves not only the assertion that viewing an event in Kinemacolor "affords the spectator a better view […] than he could possibly have obtained by means of his own vision", but also that it is far more convenient.[117] A film about the unveiling of a Memorial to Queen Victoria in 1911 features a scene of the "distinguished onlookers" on the first row witnessing the ceremony. "The KINEMACOLOR cameras, however," the catalogue eagerly points out, "are between them and the Memorial, so that KINEMACOLOR audiences have an even better view."[118] In the descriptions of the film series on the Coronation procession of the new King, there is also mention of "the public who, unlike KINEMACOLOR audiences, have been waiting for many long hours for the opportunity of seeing what the latter behold so clearly, and without undergoing a preliminary penance".[119] In connection with the films from the royal visit to India 1911-1912, the catalogue states that Kinemacolor "has now become an institution of indispensable public utility. Whenever events of importance occur in any part of the world everyone may be sure of seeing exactly what happened without the inconvenience of long waiting in crowds, or perhaps a journey – for the majority impossible – to a distant land."[120]

In his book on colour cinematography, Klein also linked the possibilities of colour film to the rendering of landscapes and places; again, the promise of colour is linked to a notion of recognition:

> The achievement of correct colour rendering will most certainly lead to a revival of the landscape or travel film. Nothing could be more mistaken than that the public do not like films of scenery for scenery's sake. *They do*. But is it any wonder that there was some reaction against the travel film when the picture was unable to give the one quality which accounts for by far the greatest part of our pleasure in the visible world? A travel picture of the loveliest of this world's scenery rendered only in light and shade cannot hold the attention for long. We are impressed only by elements of pictorial

[116] Ibid. See also "Kinemacolor in Travel Field", *Moving Picture World*, October 26, 1912, 354.
[117] *Catalogue of Kinemacolor Film Subjects*, 169.
[118] Ibid., 149. This notion of Kinemacolor as 'privileged view' is reiterated by one of the reviews of this film excerpted in the catalogue, from the *Brighton Herald*: "The audience probably got a better idea of the scene than many who were actually present, for they were able to see what happened at far closer quarters than thousands of the onlookers." Ibid., 152.
[119] Ibid., 166.
[120] Ibid., 280. The *Belfast Newsletter* adds: "Even amongst those who actually witnessed the great Indian Durbar there could have been few who saw it so completely or at such an advantage as is portrayed by means of this superb series of KINEMACOLOR pictures." Quoted in ibid., 294. See also H.F.H., "The Durbar in Kinemacolor" (1912), 774.

> composition or by the skill of the photographer; but upon the introduction of colour everything is forgotten save the exquisite sensuous pleasure of *recognition*; we are overcome by the magical nature of the thing, this evocation of all that is most precious and evanescent in vision.[121]

When Klein wrote this in 1936, however, he was not referring to Kinemacolor. Although he describes the Delhi Durbar production as "singularly beautiful film",[122] he also blames the defects of the various two-colour films in the past – "all the old history of red trees and sunburnt complexions" – for what he perceives as an understandable antagonism among contemporary audiences towards colour,[123] "nearly everything in colour which has ever been projected upon the screen has been a travesty of nature, a poor distorted tinting, and an offence to the eyes. This condition of affairs lasted so long that it is no wonder that a large percentage of the public grew to resent the very idea of a colour film."[124]

Natural Colour: Index or Icon?

The "scientific" origins of the colours, or the apparent "beauty" that Klein referred to in terms of the interrelation between colour film technology and the eye as sensory organ, the notion of the camera and the film stock as a particular kind of *colour vision*, also adhere to notions of the subjective, the unstable, and the undependable. The emphasis on photographic colour film as "natural" colour revives questions about where the "natural" colours come from. Are they a quality of the objects of the external world, which allegedly are 'reproduced', or a quality of the technology and materiality of the film medium? This is, of course, connected to the relation between the trace and the mimetic, the photographic image as an indexical as well as an iconic sign, having a physical connection as well as a likeness to its referent.[125]

As Aumont points out, one of the problems of the notion of a colour "trace" is that the reproduction of colours in a film, regardless of indexical origins, never has been "exact". [126] This is evident in the significant individual differences between different kinds of colour film stock. Although colours in a film image are not completely "non-realistic" by nature, they are nonetheless never identical with the visual 'reality' being reproduced. Colour in a film image always creates a new kind of 'reality', and involves, like cinema and images in general, a new way of looking at the world.

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[121] Klein (1936), 309.
[122] Ibid., 10.
[123] Ibid., 304.
[124] Ibid.,, 308.
[125] See Peirce (1894), 6, 8.
[126] Aumont (1994), 190f.

Although the Kinemacolor catalogue repeatedly called attention to the "the infinite variety of hue" of the process, [127] its colour range was, in fact, limited. It was based on a spectrum of only two primary colours, red and green, so the Kinemacolor image did not reproduce any pure blues, purples, whites or greys.[128] Many of the newspaper reviews and trade press articles nevertheless seemed to accept Kinemacolor's claim of full range, but there are a number of remarks about how the process is not 'perfect' or fully developed, noting the predominance of red and green. After the first public exhibition in Britain on 26 February, 1909, *The Morning Post* reported: "The process is not indiscriminate. Some colours receive preferential treatment. The reds and the greens are insistent, almost viciously so."[129]

The discrepancy between the trace and the mimetic raises the question of whether another claim made about Kinemacolor is valid, the claim that the process produces "natural" colour. For what does "natural" refer to? Does it refer to the indexical or to the iconic?

In fact, the semantic distinction between the indexical and the iconic – described by Urban as "a pinpoint technicality"[130] – was central in the court case in 1913-1915 (brought by Friese-Greene) which led to the invalidation of the patent for the Kinemacolor process. The claim of the Kinemacolor company that the process produced "natural" colour, despite the limited spectrum, was not acknowledged.[131] The final judgment, as Luke McKernan put it, "was that there was no blue, therefore the claim to be natural could not be supported, therefore the patent was invalid."[132] Thus, in this case, the comprehension of "natural colour" was not linked to the notion of colour as a trace of light from an external reality, since Kinemacolor produced a full colour image through photographic means. The referent for "natural colour" was instead the properties of the human eye, of human colour vision, of the manner in which perception is structured.

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[127] See *Catalogue of Kinemacolor Film Subjects*, 16.

[128] See Cherchi Usai (2000), 29. See also Smith (1908), 8; Talbot, 296f. See also George Lindsay Johnson, *Photographic Optics and Colour Photography: Including the Camera, Kinematograph, Optical Lantern, and the Theory and Practice of Image Formation* (London: Ward & Co., 1909), 36; George Lindsay Johnson (1916), 210; Thomas, 19, 31, 33.

[129] "Palace Theatre", *Morning Post*, February 27, 1909. See also Henry, "Kinemacolor Demonstration in Boston" (1910), 1533; "Exhibitions of Kinemacolor in Chicago", *Moving Picture World*, July 15, 1911, 23.

[130] Urban (1921), 66.

[131] Extract from the judgment of the Court of Appeal, April 1, 1914: "The first and crucial question is what is meant by "so as to have the appearance of being in the natural colours or approximately so." The "colours" spoken of are obviously *all* the colours to be found in the object which is being exhibited. [---] When taking blue – there are numerous shades of blue. If the object photographed is blue, then any shade of blue, not being identical with that in the object, will apparently be a blue. If however, the shade is so changed as to become green, […] the result is not an approximation of the colour." Quoted in "Bioschemes, Limited, v. Natural Color Kinematograph Company, Limited", *The Bioscope*, April 9, 1914, 141. See also Urban (1921), 62; Thomas, 14; Kindem, "The Demise of Kinemacolor", 139ff.

[132] Luke McKernan, introduction to Urban (1921), 60. See also ibid., 68n.14; Thomas, 34f.

The recurring discourse of controlling colour is apparent as Klein pointed out a whole series of transformation processes taking place between what he called recording or analysis, to the final reproduction or synthesis,[133] and that a number of distortions can "so easily occur at any stage in the process."[134] Thus there are also a number of precautions to be taken at each step to control the final result: the source of light for "recording" (either natural or artificial) should be chosen in relation with the right subject matter, with a "controlled selection of pigments, make-up, textures";[135] the light absorption or reflection from the object should be suitably illuminated;[136] the choice of emulsion, filters, beam-splitting systems for the camera, developer, printing process, etc., all influence the final product.[137] And then there is the projection of the film: the intensity and brightness of the projection light, and the whiteness of the cinema screen, or "reproduction plane."[138] Finally, there is also the nature of the colour vision of the spectator, the "reproduction in consciousness" through the "receptor apparatus of the eye, and brain".[139] In the end, the success of attaining all the previous requirements depend on Klein's anticipation that the "eye of the observer will, we hope, be normal in its response to colour."[140]

The idea of the camera and film stock as an individual, and therefore undependable, colour vision is also applicable to black-and-white film. In his 1908 lecture, Smith referred to the scientific notion of the eye as "a very imperfect optical instrument".[141] He pointed out, however, that "the photographic plate is much more imperfect. The photographic plate is partly color-blind." Smith refers specifically to orthochromatic film emulsion, the black-and-white film stock commonly used until the mid-1920, which was not sensitive to all the colours of the spectrum.[142]

Georges Méliès commented on the problems of colour reproduction in black-and-white orthochromatic film in 1907: "Colored sets come out very badly. Blue becomes white, red, greens and yellows become black; a complete destruction of the effects ensues."[143] The solution to this problem was painting the sets in shades of grey (which, incidentally, usually would be coloured on the film print). Similarly, ten years later, the Hollywood actress Norma Talmadge stated in an interview that the choice of the colours

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[133] Klein (1936), 35f.
[134] Ibid., 102.
[135] Ibid., 37-58, 102.
[136] Ibid., 58-63, 102.
[137] Ibid., 64-74, 102.
[138] Ibid., 75-83, 104.
[139] Ibid., 83-102.
[140] Ibid., 104.
[141] Smith (1908), 7.
[142] See Cherchi Usai (2000), 4. See also Croy, 292.
[143] Georges Méliès, "Cinematographic Views", *French Film Theory and Criticism: A History/Anthology, Volume I: 1907-1929*, ed. Richard Abel (Princeton: Princeton University Press, 1988), 40.

of clothes for a black-and-white film was a challenge for a movie star, because of how different colours register: "The combination of colors I sometimes use is ridiculous in themselves but when photographed the gown gives an entirely different effect of light and shade and appears really becoming."[144]

Smith continually pointed out the divergence between the human eye and the photographic apparatus, and "the unfortunate fact, that photographic plates do not see as we do".[145] He also noted:

> before photographic plates can be made to record color waves, even in terms of neutral greys with white at one end of the scale and black at the other, they must be induced to see things more as human eyes see them. At present, whilst the human eye says that yellow is the most luminous color next to white itself, the photographic plate says that violet is. Whilst the human eye says that scarlet is a very bright and luminous color, the photographic plate says it can scarcely see it at all.[146]

But the black-and-white film image is an abstraction by nature, while the emergence of processes claiming to produce "natural" colour, and the discourses surrounding them about the reproduction of reality, seemed to generate a greater awareness between the differences between the way humans and technologies perceive the world, and far more specific expectations of accuracy. In 1936, Klein pointed out "the remarkable fact that the introduction of colour into the picture seems to arouse instant criticism from an audience which will tolerate normally any amount of distortion in black-and-white."[147] In fact, "any slight distortion [in a colour image] is very quickly spotted as 'unnatural.'" This lack of 'naturalness' in Kinemacolor as well as other colour processes, through the reproduction of hues as well as of coloured fringes, was sometimes described as an aesthetic value, a kind of colour *photogénie*, connecting the properties of colour film technology to the expressiveness of colour in painting. One journalist describing Kinemacolor in 1909 observed "an appearance […] of a kind of general blur of lavender greyness which some of the French Impressionists put like a hazy veil over their canvases. It is queer to find Nature confessing to a machine the truth of the painter's intuition."[148] In a 1910 pamphlet which

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[144] "Norma Talmadge on Colors", *Motography*, January 27, 1917, 200. Similarly, decades later, in an instalment of Paramount's series *Popular Science* in 1939 [J-8-5] filmed in the American colour process Cinecolor, colour film is, in addition to demonstrating a high-tech kitchen, employed to "reveal" how colours are registered in black-and-white television images: in one section, we are shown how TV presenters, in fact, are wearing blue lipstick and eyeshadow, as well as red stripes across the face (in order, we are told, to conceal lines), invisible on television, but made visible by photographic colour.
[145] Smith (1908), 8.
[146] Ibid., 7.
[147] Klein (1936), 304.
[148] "Cinematography in Colour", *Sheffield Evening Telegraph*, February 27, 1909.

replies to a number of critical remarks from American trade press concerning the limitations and problems with regard to Kinemacolor, the Natural Color Kinematograph Co. not only suggests that some claims of lack of definition or distinctness of outline in the process "may have been due to the complainant's defective eyesight, or by his being in too close proximity to the screen", but also admits that "some Kinemacolor projections present a softness of outline which furnishes quite a surprising change to the eyes seeking for the brittle sharpness of black-and-white pictures; but this effect (frequently compared to "a richly colored oil painting in animation") is generally regarded as an artistic improvement."[149] Klein acknowledged the argument of "lack of realism" as an artistic quality, but pointed out that "it is unwise to expect the general cinema-goer to appreciate such æsthetic refinements. For them the criterion of excellence in colour will be its approach to absolute fidelity."[150]

Truth and Deception: Natural and Artificial Colours

The dichotomy between the indexical and the iconic is also connected to the opposition between photographic colour processes like Kinemacolor and artificial colour techniques. In the discourses on colour in the 1910s it is often emphasised that the stencil coloured films produced by Pathé do not belong in the "natural colour" category.[151]

In 1909, Bedding drew on the current interest in 'natural' colour to bring attention to the popular coloured Pathé films, to their beauty, artistry and "esthetically pleasing effect on the mind"; Bedding pointed out that the non-photographic colour in Pathé did not fall into the categories of "nature" and "science", associated with Kinemacolor – instead, because of their mode of production, films in Pathécolor fell under the category of "art", in the tradition of "the world's masterpieces in color from the Greek and Roman painters to the present" which for the most part have been "produced by hand".[152]

However, Bregtje Lameris points out that one of the most important claims of Pathécolor, as exemplified through their advertising, was, in fact, to create "a true copy of nature", as a 1911 advertisement put it.[153] One of the major challenges of artificial colouring was maintaining the colour within

[149] *Kinemacolor and Some American Criticisms* (pamphlet) (London: Natural Color Kinematograph Co., 1910).
[150] Klein (1936), 305.
[151] See W.C. Heal, "Keep Your Eye on the Colored Pictures", *New York Dramatic Mirror*, January 29, 1916, 36.
[152] Lux Graphicus [Thomas Bedding], "On the Screen", 918f.
[153] Pathé advertisement, *Ciné-Journal*, 4 March 1911, 15, trans., quoted in Bregtje Lameris, "Pathécolor: 'Perfect in Their Rendition of the Colours of Nature'", *Living Pictures: The Journal of the Popular and Projected Image Before 1914*, 2:2, 2003, 46f.

the edges of objects, without overlaps. Therefore, before 1909, only trick films, *féeries* and dramas, i.e. films produced inside a studio with a static camera, were catalogued as coloured, while 'panoramic views', were not, because of, according to another advertisement from 1910, "the speed with which the landscape would fly past your eyes."[154]

Possibly referring to these difficulties, the Kinemacolor catalogue pointed out that the photographic process represented the only method for "full justice to be done to panoramic and scenic subjects, because the system is the only one which provides the realistic qualities necessary to their full and adequate treatment."[155] As an example of this, the catalogue referred to images of moving landscapes, despite the problems associated with "fringing" in the process, taken "from a railway engine platform, from an aeroplane, a torpedo boat, or any other swiftly-moving conveyance, furnish absolutely faithful reproductions of the actual scenes, and lend practically the true sense of motion."[156]

The mechanised stencil colour system developed by Pathé between 1906 and 1910 increased the precision of the colouring, and from 1909 several non-fictional "dynamic scenes", catalogued as "scènes d'arts et d'industrie" and "scènes de plein air", were beginning to be coloured as well.[157] Lameris demonstrates how the marketing of these films, just like the discourses on Kinemacolor and other 'natural' colour processes, emphasised the perfect "rendition of the colours of nature", the "amazing accuracy and "absolute reality" which the colour provides.[158]

Lameris also examines how the emergence of Kinemacolor and the growing interest in "natural colour" forced Pathé-Frères to obtain new strategies for marketing its non-photographic colour system.[159] This involved attacks on the disadvantages of the Kinemacolor process, "the inconvenience of double film length and doubled prices",[160] and the complications in projection. Instead of being, like Kinemacolor, "a process in black and white coloured by screens" only reproducing two primary colours, Pathécolor was described as "a normal film strip in natural colours".[161] Thus, Pathé made use of the scientific discourse associated with Kinemacolor to make a case for the superiority of Pathé's stencil colour process, being the most technically-advanced system in existence; in fact, the 1910 advertisement claimed that

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[154] Pathé advertisement, *Ciné-Journal*, 2 July 1910, 16f., trans., quoted in ibid., 49.
[155] *Catalogue of Kinemacolor Film Subjects*, 9.
[156] Ibid.
[157] Lameris, 47ff.
[158] Pathé advertisement, *Ciné-Journal*, 2 July 1910, 16f., trans., quoted in ibid., 49.
[159] Ibid., 52ff.
[160] Pathé advertisement, *Ciné-Journal*, 2 July 1910, 16f., trans., quoted in ibid., 53.
[161] Pathé advertisement, *Ciné-Journal*, 9 December 1911, 36f., trans., quoted in ibid., 54. The advantage of Pathécolor over Kinemacolor in terms of being "adaptable to the modern motion picture machine and, for that reason, practicable" was pointed out in the article "Kinemacolor vs. Hand-Color", *Film Index*, January 8, 1910, 3.

Pathé-Frères had "resolved the problem of colour cinematography".[162] The stencil system was patented and named "Pathécolor" in 1911, augmenting the scientific connotations and the notion of the technique as a 'process' comparable to Kinemacolor, and was described in a 1911 advertisement as the process "that is cinematography in colour. The latest progress in modern science, incomparable with any other system."[163]

Cherchi Usai refers to how Pathécolor "justified its owners' claims to supremacy in the colour reproduction in reality", and points out that with the new stencil-colour process, colour shifted from being an element found in fiction films to the domain of non-fiction: "authenticity and realism were the main goals in the reproduction of a landscape as it was actually seen".[164]

In March 1911, *Moving Picture World* stated that Pathé "leads the world in artificial coloring" and in fact, that "some of their mechanically colored films d'art rival the hues of Kinemacolor".[165] In 1916, Johnson stated that in his opinion, stencil colouring, which he pointed out was used to a considerable extent despite the difficulties of the method, was "far more pleasing and agreeable to the eye than the kinemacolor films".[166]

This discourse of Pathécolor as a colour *process* was also articulated in films. The stencil coloured *Chasse à la giraffe dans l'Ouganda* (Pathé Frères, 1910) featured a characteristic red title card proclaiming that the production featured "Cinématographie en couleurs", in other films the process is called "Cinémacoloris" (for example, *Une fabrique de chapeaux de papier au Japon* [Pathé Frères, 1916]), or more often, by the name "Pathécolor".

In November 1909, two weeks after Pathé Frères London advertised in *The Kinematograph & Lantern Weekly* and described their "renowned colour cinematography" as the "triumph of the period and the wonder of the animated picture world",[167] The Natural Color Kinematograph Co. countered by "borrowing" this particular description or phrase, and applying it to the "natural color kinematography" of Kinemacolor in opposition to the "crude" results of Pathé's stencil colouring. The advertisement read:

> Beware of Deception. A prominent firm of film makers who are reputed borrowers of "other people's Thunder and Ideas," are, by their cunningly worded advertisements, endeavouring to pass off on the unwary their mechanical Stencil Coloured Films, thus leading the likely Buyer and Exhibitor, as well as the Public, to believe that such Films embody the

[162] Pathé advertisement, *Ciné-Journal*, 2 July 1910, 17, trans., quoted in Lameris, 53.
[163] Pathé advertisement, *Ciné-Journal*, 9 December 1911, 36f., trans., quoted in ibid.
[164] Cherchi Usai (2000), 22.
[165] "Toning and Tinting as an Adjunct to the Picture", *Moving Picture World*, March 18, 1911, 574.
[166] George Lindsay Johnson (1916), 203.
[167] Pathé Frères London advertisement, *The Kinematograph & Lantern Weekly*, October 28, 1909, 1229.

> marvellous results only possible to procure by "KINEMACOLOR." The only process reproducing the actual tones, tints and hues of nature.
>
> "COLOUR CINEMATOGRAPHY" (so-called) consisting of ordinary Films painted by hand or coloured by mechanical means have been known to the Trade from its infancy, 15 years ago, and are crude compared to "KINEMACOLOR" (NATURAL COLOR KINEMATOGRAPHY) which is "the triumph of the period and the wonder of the Animated Picture world."
>
> Allowance must be made, under the circumstances, for borrowing the above quotation.
>
> DO NOT BE DECEIVED![168]

The advocates of Kinemacolor maintained not only the indexical status of the process, but also the mimetic advantages. The description of *Farmyard Friends* in the Kinemacolor catalogue points out how "the accuracy with which the straw is reproduced" in one scene demonstrates the superiority of Kinemacolor compared to stencil colouring: "In the picture every wisp of straw stands out distinct in its natural hue; the artificial colorist could only put a splash of yellow roughly across the section, and it might go beyond the stack, with ludicrous results."[169]

The advantages of indexical colour of Kinemacolor over the stencil-colour of Pathé are not only linked to these claims of mimetic or aesthetic superiority. The fact that the colours are captured instantaneously by the camera is not only testimony to natural colour as direct trace in an ideological sense; this sense of immediacy or simultaneity also has practical advantages, as "natural" colour, just like black-and-white film, turns out to be a more efficient medium than stencil colour. The Kinemacolor catalogue does admit that "by the older methods, colored moving pictures could be obtained, and are still obtained," but remarks that this is achieved "only by mechanical processes, often taking weeks in the case of long subjects."[170] The catalogue continues: "By the KINEMACOLOR process the colors of nature are photographically recorded simultaneously with the taking of the picture; the completed picture in all its glowing richness of color can be exhibited within a few hours, and duplicates can be issued with the celerity associated with black-and-white subjects."[171] One of the ways Kinemacolor was promoted in France was by demonstrating this efficiency, footage of a motor race at Dieppe was filmed, and shown to an audience in Paris the day after.[172]

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[168] The Natural Color Kinematograph Co. advertisement, *The Kinematograph & Lantern Weekly*, November 11, 1909, 26. This advertisement, and its attack on Pathé films and charges of "deception", was criticised in "Unfair Advertising", *Moving Picture World*, November 27, 1909, 756.
[169] *Catalogue of Kinemacolor Film Subjects*, 18.
[170] Ibid., 5.
[171] Ibid.
[172] This was pointed out in *Le Gaulois*, July 10, 1908. See also Urban (1921), 63; Ramsaye (1923), 127; Lameris, 51f.; Thomas, 29.

Natural Colours as Cultural Creations: A World of Flesh Tones

The fact that film emulsions do not "see things as human eyes see them", raises the question of what standards and what aims are informing the research and the decisions made in relation to the technical development of photographic colour film material – why film stocks "see" the way they do. A world seen through the notion of colour reproduction is, as I have shown, a world defined by specific objects, and thus perhaps also certain objects might be more fundamental than others.

Brian Winston answers this question by pointing out that "colour films are cultural creations", they do not directly register the world, and that the main driving force behind the development of and the research agenda and decision-making processes for colour film in fact has been "the need to reproduce Caucasian skin tones".[173]

Richard Dyer also examines how photographic media "assume, privilege and construct whiteness", linking it to the practice of focusing on the white face as a norm, which has been established since the beginning of portrait photography in the 1840s. This has produced an inflexible technology "developed and adjusted for the white face", creating a number of difficulties when trying to light black people, or having people of different ethnicity in the same frame.[174]

The promotion of natural colour film found in the Kinemacolor catalogue is primarily connected with the reproduction of colour as a more complete reproduction of reality, but the persistent effort found in the catalogue, to continually emphasise the colours in the images, and their direct origins in as well as resemblance of a specific pro-filmic "reality" (and specific objects therein) – as this is what makes all the films described so unique – also discloses other ideas about colour, and what colour represents, in terms of both aesthetics and ideology.

For example, the emphasis on colour and colour reproduction in the Kinemacolor catalogue also entails that the subject of ethnicity – or more specifically, the reproduction of skin colour – is referred to numerous times throughout the publication. The descriptions of the reproduction of skin colour are related to the exoticism of the travelogue genre, and more importantly to colour as *differentiation*, accentuating the significance of often very subtle differences and variations. The meanings that the variety of colours creates are seemingly derived directly from specific bodies and places, from a material, actual, visible discrepancy between 'whiteness' and 'otherness' already there for the technology of "natural" colour film to

[173] Brian Winston, *Technologies of Seeing: Photography, Cinematography and Television* (London: BFI Publishing, 1996), 39. See also Higgins, *Harnessing the Rainbow*, 160ff.
[174] Richard Dyer, *White* (London/New York: Routledge, 1997), 88-102.

recreate. Thus, what is initially an emphasis on colour reproduction also reveals racial and cultural stereotypes.

The reproduction of "flesh tones", i.e. white skin tones, has been the touchstone and the main point of reference for the development of colour film stock throughout film history. Leonard T. Troland, a researcher for the Technicolor company, argued in 1927 that "flesh tints" were the most important colours in terms of accurate colour rendering: "If the flesh tints are properly reproduced, other colours can take care of themselves."[175] Flesh tones have always been considered the most difficult to replicate also in relation to artificial colouring of black-and-white images.[176]

The word 'flesh' always refers to Caucasian skin tones, but Winston points out, by referring to a 1951 research report, that the ideal of 'pleasing flesh tones' did not imply attaining a reproduction that was as accurate as possible. In fact, after extensive testing, the skin tones decided upon were actually more 'pleasing' than they were in reality. The colour stocks that were considered successful in this respect actually reproduced white skin tones that were far paler than in reality. What was preferred was therefore "a white shade of white."[177] Thus, as Dyer has pointed out, the norm of whiteness functions as a constructed representation, conforming to ideas of "what colour – what range of hue – white people wanted white people to be."[178]

In the Kinemacolor catalogue, the reproduction of 'flesh tones' (signifying Caucasian skin colour) is often accentuated to display the "naturalness" of the process. The synopsis of the first film listed in the catalogue, *A Visit to the Seaside* (1908), presented as "the first scenic picture taken in KINEMACOLOR", has several references to the reproduction of colour linked to the assertion that "the flesh tints of their bare legs are all perfectly reproduced", an image of a boy on the beach is "remarkable as an illustration of the accurate reproduction of flesh tints", and the "way the flesh tints are reproduced" in another scene "can only be described as perfect."[179] Similar descriptions, linking the reproduction of "natural" skin colour with a demonstration of the possibilities of the colour process, continue throughout the catalogue.[180]

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[175] L.T. Troland, "Some Psychological Aspects of Natural Color Motion Pictures", *Transactions of the Society of Motion Picture Engineers*, 11:32, 1927, quoted in Klein (1936), 155.
[176] See Lameris, 50f.
[177] Winston 55f.
[178] Dyer, 90.
[179] *Catalogue of KinemacolorFilm Subjects*, 16f.
[180] See *Catalogue of Kinemacolor Film Subjects*, 64, 71, 78. The reproduction of skin colour is still used as a touchstone for confirming the capabilities of colour film stocks. On the Kodak website (2006), in connection with the descriptions of the different kinds of camera colour film stocks available from the company, there are numerous references to "flesh" or "skin" tones in order to illustrate the qualities of each particular film stock. Many of these descriptions relate to a discourse of realism or accuracy, involving words like "natural",

The catalogue also emphasises how the travelogue or "scenic" genre provided Kinemacolor with the opportunity to display its powers in terms of a variety of skin colours. Ethnographic images of "native types" were common in early travelogues as part of "displaying the world's racial and cultural difference."[181] What perhaps distinguishes Kinemacolor, is what Fatimah Tobing Rony has described as images of "a racialized Other"[182] which is primarily linked to the display and demonstration of the possibilities of a specific technology.

In the Kinemacolor catalogue's description of a travelogue from Constantinople, ethnicity represents one category of colour among a variety of hues, as the film "proves beyond dispute the superiority of a natural color process in photographic scenes whose interest lies in shades of color, whether of surroundings, or complexion and clothing of natives. Monotone pictures would not reconstruct as these films do, the strange sights to be encountered in Eastern lands."[183]

More usually colour is displayed through a specific emphasis on the "native": the catalogue continually refers to films displaying "close views of native types which make interesting examples of color portraiture", [184] how "dark skins are well shown on the screen",[185] etc. Again, the scientific and educational value of the new colour process is accentuated; the synopsis of the film *Natives of Egypt: Their Customs and Occupations* is described as an "interesting film which is undoubtedly worthy of the attention of the anthropologist" as it displays "Egyptian fellaheen, and natives of the Soudan, Bedouins, Arabs, Copts, Circassians and representatives of many other Eastern races".[186]

The variety of skin colour represents an ultimate challenge for colour reproduction, linked in the catalogue to a thematisation of the differentiation

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"accurate", and "remarkably detailed", but alongside these adjectives there are also numerous descriptions which seem to emphasise aesthetic qualities of skin colour reproduction beyond notions of realism, describing the "flesh tones" achieved by the different film stocks as "soft", "smooth", "beautiful", "pleasing", "flattering" and "clean". However, the notion of "flesh tones" is not necessary limited to one type of skin colour; the effectiveness of the colour film stocks is revealed by their capability to reproduce visible differentiations between. Consequently, there are references to "Kodak's legendary reproduction of the world's flesh tones", and the recurring phrase "range of flesh tones" is in different instances described as "wide", "full", or even "extreme."
See http://www.kodak.com/US/en/motion/products/index.jhtml (March 2006)

[181] See Jennifer Lynn Peterson, "Travelogues and Early Nonfiction Film: Education in the School of Dreams", *American Cinema's Transitional Era*, 205.

[182] Fatimah Tobing Rony, *The Third Eye: Race, Cinema, and Ethnographic Spectacle* (Durham/London: Duke University Press, 1996), 10. For a discussion of early ethnographic film and photography, see also Alison Griffiths, *Wondrous Difference: Cinema, Anthropology & Turn-of-the-Century Visual Culture* (New York: Columbia University Press, 2002).

[183] *Catalogue of Kinemacolor Film Subjects*, 32.

[184] Ibid., 213.

[185] Ibid., 39. See also ibid., 32, 36, 47, 59.

[186] Ibid., 214.

accomplished by colour. The capacity of Kinemacolor for perfect colour reproduction is displayed in the reproduction of different shades of "native" complexion,[187] or scenes where "whites and Indians are equally intermingled".[188] Again, racial prejudice is exposed through what is essentially a discourse about technology and visuality, of how "sensitive KINEMACOLOR is to the slightest variation of hue".[189] This catalogue description of a transition from the image of British soldiers off duty to a scene depicting Indian soldiers is somewhat characteristic:

> The change from the fair, fresh complexions of the British-born soldier to the swarthy skin of his Indian comrade […] is striking indeed, but KINEMACOLOR is in no-wise disconcerted by the sudden transition. These deeper hues are equally well recorded, and so are the slight differences of complexion between one Indian and another. A harder test of color photography, or one more triumphantly met, could scarcely be conceived.[190]

Natural Colour and Otherness, Femininity, Consumption: A World of Commodities

Throughout the catalogue, colour is linked to this kind of exoticism, and to "otherness", to something which first is characteristic of foreign cultures. This notion of otherness goes beyond the varieties of skin colour placed in opposition to whiteness, and is also associated with a number of other cultural expressions. In addition to the reproduction of skin colours, and calling attention to objects in general, colour is recurrently associated with the reproduction and foregrounding of clothing, a practice with ambiguous cultural and representational connotations, and a strong connection with the domain of consumption. Thus, the Kinemacolor catalogue very often displays an ambivalent attitude towards colour.

Gage has pointed out how "a disdain for colour" in Western culture has been seen as "a mark of refinement and distinction".[191] Using the *disegno / colore* opposition as one example, David Batchelor has described what he characterises as the effort to marginalise colour in Western culture.[192] This fear of colour, which Batchelor terms "chromophobia", is manifested by attempts to diminish colour's importance in culture, accomplished either by linking colour to "some 'foreign' body – usually the feminine, the oriental, the primitive", or to "the realm of the superficial, the supplementary, the

[187] See ibid., 212, 221.
[188] Ibid., 296.
[189] Ibid., 39.
[190] Ibid., 305.
[191] See John Gage, *Colour and Meaning: Art, Science and Symbolism* (London: Thames & Hudson, Ltd.,1999), 31.
[192] Batchelor, 22f.

inessential or cosmetic".[193] Colour is therefore linked to the dangerous as well as the trivial.

These attitudes towards colour in Western culture have perhaps their ultimate expression in the taste for white, and in particular black clothing established at the beginning of the sixteenth century, coinciding – as Michel Pastoureau has pointed out – with the introduction of book printing and engraved images, i.e. the emergence of a culture and an imaginary in black and white.[194] The preference for sombre, dark clothing does not only reflect "bourgeois" values, but also what Pastoreau characterises as the "chromoclasm" or "war against colour" being an important dimension in the new Christian morals of Protestantism – in fact, Pastoureau actually links this "chromoclasm" explicitly to the distinct cultural opposition between black and white and colour in cinema.[195] Goethe remarked, for example, how "[m]en in a state of nature, uncivilised nations, children, have a great fondness for colours in their utmost brightness",[196] while "[p]eople of refinement have a disinclination to colours".[197] However, Goethe does not necessarily regard this reluctance as an expression of sophistication in itself; the fact that women seemed to dress in white and men in black is rather "owing partly to weakness of sight, partly to the uncertainty of taste, which readily takes refuge in absolute negation."[198]

Since the Kinemacolor catalogue accentuates the "realism" of the process, its ability to convey the colours of "reality", the reproduction of so-called "neutral", subdued colours is just as central to the discourse of demonstrating the capacities of the process as the spectacle of brighter and more intense colours. This is often underscored in terms of contrast and differentiation: the description of a scene from *A Visit to the Seaside* featuring "young people promenading on donkeys", calls attention not only to the "brightly colored" dresses on display, but also to the fact that "the neutral tints – the browns and greys of the donkeys' coats – are no less accurately presented".[199] In another film, the image of a girl selling coloured balloons does not only reproduce the various colours, "but also the white lines of the wording on the balloons."[200] In fact, perhaps somewhat surprisingly, the catalogue often emphasises the capability of the process in terms of reproducing black, white and grey; for example, it is stated that

[193] Ibid.
[194] Michel Pastoureau, *Dictionnaire des couleurs de notre temps: Symbolique et société* (Paris: Éditions Bonneton, 1992), 160f.
[195] Ibid., 44f.
[196] Goethe, [835], 326.
[197] Goethe, [841], 329.
[198] Goethe, [841], 329.
[199] *Catalogue of Kinemacolor Film Subjects*, 16. See also ibid., 18, 20f., 31, 33, 112, 175.
[200] Ibid., 54.

Kinemacolor "reproduces whites far better than does 'black-and-white' photography".[201]

These notions of differentiation and contrast between 'bright' and 'neutral' colours are also connected with comparable contrasts between cultures or nations, and between 'normality' and 'spectacle'. The catalogue continually emphasises the "colourlessness" of British, or at least Northern European "normal" culture in contrast to the 'excessive' use of colour in other countries.

So when we see "London in its normal aspect, a few weeks before the Coronation", it is a grey, colourless city, with a few patches of colour provided by the red coats of "bootblacks", and the wares of flower girls, "which form masses of bright color in contrast to prevailing greys".[202] Likewise, a film from Berlin is characterised by the naturalness of the "[g]reys and dun-colors that prevail in big modern cities"[203] Goethe also suggested that uses of colour could be seen as a consequence of a peculiar character, distinguishing between "sedate" nations like England and Germany and "lively" nations like France,[204] also suggesting that "the cloudy sky of northern climates may have gradually banished colour".[205]

In this vein, the catalogue declares that "Italy is the land of color; her people and the everyday objects in her streets are more picturesque than in colder northern climes",[206] or how a film about "sunny Spain", "resplendent in nature's colors, enables one to realise the vast difference between drab, colorless London, and the warm south – the land of joy and sunshine."[207] However, this colourfulness is perhaps indicative of more problematic cultural differences, as Spanish cultural identity eventually is defined by the description of a film showing a bullfight, which is characterised as "one of the cruellest 'sports' in the world", involving scenes that are both "terrible" and "repulsive" in content, and although the film is "unsuited for exhibition before at any rate a highly cultured audience containing women and children", the catalogue points out that "it is of great value as throwing light on the characteristics and point of view of a nation whose sentiments are so entirely distinct from those of most of their immediate neighbours."[208]

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[201] Ibid., 16. See also ibid., 52, 181, 190, 213, 231. These assertions are probably also linked to the fact that two-colour processes in fact cannot reproduce pure white or greys. Special filters to control the problem were produced, but were not used in the distribution of the films. See Thomas, 19 and George Lindsay Johnson (1909), 36. In his 1908 lecture, Smith claimed that white is a "comparative sensation", and that the somewhat yellow whites produced during projection could be accepted by the spectator "as white by comparison with other colors in the same picture […]." See Smith (1908), 8.
[202] *Catalogue of Kinemacolor Film Subjects*, 156f.
[203] Ibid., 27.
[204] Goethe, [838], 327f.
[205] Goethe, [844], 329.
[206] *Catalogue of Kinemacolor Film Subjects*, 47.
[207] Ibid., 222.
[208] Ibid., 223f.

In British culture, as depicted in the catalogue, excessive colours exist, but they are controlled, and contained in royal ceremonies, state events, military parades etc., functioning as contrasts to the colourlessness of daily life, and almost exclusively linked to a specific purpose: the promotion of nationalism.[209] We are told that in "colorless Britain one must go to the Army to find the rich, glowing hues", referring to a scene featuring the reproduction of "the variegated colors of the Scotch plaid" worn by a highlanders band.[210] Again, the connection between colour and national symbols entails the capacity for distinguishing between different nations as well as demonstrating the powers of the process. Kinemacolor conveys the different colours in different nation's uniforms and army equipment,[211] and there are a large number of films and scenes where flags, perhaps the quintessential national symbols characterised through colour, comprise the main theme.[212]

However, the equivalence between colour and exotic cultures is, along with ethnicity, most often associated with clothing, with the depiction of "picturesque costumes".[213] The Indian contingent present at the coronation ceremonies in London "afford a splash of color which makes even the Guards seem soberly uniformed in comparison".[214] Likewise, the thousands of children attending a children's festival in Bombay are "mostly natives, and therefore in bright colours".[215] A market scene from Cairo becomes "very picturesque from the bright colors of the natives' costumes",[216] another Egyptian scene becomes "full of color" because of "a crowd of natives in robes of every hue",[217] in Naples, the "bright colors favoured by Italians in their attire make every street scene resemble a beautiful mosaic".[218]

The "picturesqueness" of a street scene from New Delhi is therefore "not so much in the buildings […] as in the natives themselves".[219] The variety of colours is described as being so foreign that it even might be confusing to a Western audience: "This living mosaic has at first a bewildering effect on the spectator, but after a while the kaleidoscopic crowd can be resolved into

[209] See ibid., 53, 112. The promotion of nationalism is reinforced after the outbreak of World War I; the Kinemacolor compilation film *With the Fighting Forces of Europe*, first screened in 1914, and shown all over the world, displaying various (previously released) military scenes, organised by country, and in the 1915 compilation *Britain Prepared*, produced by Urban, comprising Kinemacolor films among films produced by Jury, Gaumont and Kineto, displaying British naval and military forces.
[210] Ibid., 16. See also ibid., 23.
[211] See ibid., 28, 34.
[212] See ibid., 34, 48, 62, 111, 172, 218.
[213] See ibid., 220.
[214] Ibid., 169.
[215] Ibid., 281.
[216] Ibid., 205
[217] Ibid., 210.
[218] Ibid., 199.
[219] Ibid., 284.

separate units, each unit being an independent blend of orange and magenta, green and violet, or silver and scerlet [sic]".

Similarly, the *Moving Picture World* review of the Durbar series also referred to sequences featuring "natives" in terms of colourful clothes, assuming a variety of foreign colours, and therefore surprising to American audiences: "In this view the colors run riot, the like of which it has been given to but few Americans to witness in their native country."[220]

In most of the stencil coloured travelogues produced by the French Pathé-Revue, primarily during the 1920s, after first having focused on landscapes and buildings, there is often a section at the end displaying "studies" of the local inhabitants, or "*types de pays*", of Morocco, Crete, Tunis, Portugal, Madeira, Croatia etc. usually wearing traditional costumes, often labelled "picturesque" and "multicoloured" by the intertitles. These sections also often feature close-ups of specific details of the costumes. An intertitle in the stencil coloured travelogue *La moisson de Bosnie* (Pathé Revue, 1926) comments on the "curious Muslim costumes" ["curieux costumes musulman"] of the Bosnian peasants. *En Italie: Les costumes de Sarrentino* (Pathé Revue, 1926) is a travelogue about clothes, where specific details of colourful traditional costumes are emphasised and at the same time located in a specific place, a specific landscape, which also is in colour.

However, this concentration on particular objects or details, initiated by the presence of colour, and on clothes in particular, is also present in discourses on colour in British culture, and seems to produce a discord between controlling colour as a means of expressing nationalism on the one hand and colour as an evasive affective quality on the other.

In the Kinemacolor catalogue, the Coronation Durbar is described as "an impressive demonstration of the pomp and power of the British Empire, and one the equal of which has probably never before been witnessed in the history of the world."[221] At the same time, the magnificence of the descriptions of formal ceremonial, regal, military, nationalist manifestations is somehow modified and undermined by the emphasis on colour reproduction, which throughout adds to the nationalist discourse detailed descriptions of clothes and fabrics - the "texture of the Queen's beautiful dress", "gorgeous costumes", "handsome robes", the "sheen of silk", etc.[222] – harmonious colour combinations, flowers, decorations etc., including a number of unusual and unexpected metaphors. The crowd of 70,000 spectators present at the Delhi Durbar ceremony is presented as resembling "a Dutch tulip garden, owing to the great variety of colors of the turbans of the natives".[223]

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[220] H.F.H., "The Durbar in Kinemacolor" (1912), 774. See also review of the Kinemacolor film *The Ganges at Benares* (1913), *Variety*, March 14, 1913.
[221] *Catalogue of Kinemacolor Film Subjects*, 295.
[222] See ibid., 180, 281, 288, 292, 297, 299.
[223] Ibid., 295.

The accounts of these events in terms of textures, fabrics and metaphors about flowers as a result of being 'filtered' through the emphasis on colour reproduction, seems to be in line with notions of the linkage between colour and the feminine, what Gage, among others, has pointed out as the recurrent assumption that a feeling for colour is a "feminine" province.[224]

The qualities associated with colour (in opposition to line) in terms of being emotional, irrational, deceitful etc., and dependent on control and subordination, often involve associating colour, physically as well as metaphorically, to women and the 'feminine'. In an 1867 publication, described by Batchelor as "a near-perfect example of textbook chromophobia",[225] French art theorist Charles Blanc compared the hierarchal union between line (design) and colour in painting with the relationship between men and women: "The union of design and colour is necessary to beget painting just as is the union of man and women to beget mankind, but design must maintain its preponderance over colour. Otherwise painting speeds to its ruin: it will fall through colour just as mankind fell through Eve."[226]

Klein mentioned women specifically when he, in 1936, attempted to examine the potential audience for colour film in the future:

> The object is to give pleasure. It is said that by far the majority of the audience in the cinema consists of women. No one in their senses would say that colour did not give pleasure to the average woman, nor would they deny that it plays a very important part in their mental life. This being the case, provided that the colour reproduction is convincingly natural, practically every woman will approve of the addition of colouring to the cold, grey, shadowy image at present flickering away its story upon the white screen.[227]

Steve Neale situates notions about the female body historically within the somewhat contradictory ideological discourses about nature, realism, spectacle and art connected with colour and cinema:

> Since women within patriarchal ideology already occupy the contradictory spaces both of nature and culture (since they therefore evoke both the natural and the artificial) and since also they are marked as socially sanctioned objects of erotic looking, it is no wonder that from the earliest days of colour photography they function both as a source of spectacle of colour in practice and as a reference point for the use and promotion of colour in theory. The female body both bridges the ideological gap between nature and cultural artifice while simultaneously marking and focusing the scopophilic pleasure involved in and engaged by the use of colour in film.[228]

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[224] See Gage (1999), 91.
[225] Batchelor, 23.
[226] Charles Blanc, quoted in Riley, 6.
[227] Klein (1936), 308.
[228] Neale, 152.

Neale refers to the depiction of women in colour photographs from the 1910s and 1920s as well as discourses about feminine beauty (both 'natural' and 'glamorous') linking together Technicolor and the female body. This is linked to notions of the female star, of lighting and make-up.

The relationship between colour, clothing and potential female spectators is found in the hand and stencil coloured fashion actualités and newsreel films, produced by Gaumont and Pathé from the 1890s and throughout the 1930s. Here, colour is connected with another practice associated with women: Victoria de Grazia, among many others, has pointed out the "gendering" of consumption and shopping in Western society as a female activity.[229] Along with travelogues (which, as I have shown, also to a large extent focused on clothing), Pathécolor was in fact mainly used in fashion films, throughout the 1920s until 1931.[230] Titles like *Costumes de bains de mer et costumes de bain de soleil* (Pathé Revue, 1920), *Fantaisies parisiennes* (Pathé Revue, 1920), *Pour le soir* (Pathé Revue, 1920), *Chapeaux et coiffures* (1924), *Élégants ensembles d'après-midi* (1924), *Fantaisies féminines* (1924), etc. featured models demonstrating hats, dresses, fur coats, shoes, jewellery, handbags, lingerie, hairstyles – in salons or picturesque settings like parks (sometimes with multicoloured flowers).

Fashion films were also produced in 'natural' colour, for example, the Kinemacolor production *New York Autumn Fashions, 1912*,[231] and the "cinemagazine" *Kinemacolor Fashion Gazette* which circulated in a few issues during 1913, and featured, as described in *The Kinematograph & Lantern Weekly*:

> beautiful women, posed in the most charming frocks, gowns, furs, hats, boots – in fact, all the various items which go to make the stylishly dressed lady. The beauty of the subjects and their apparel must interest not only the fair sex, but fascinate mere man. Some of the most renowned West End and Parisian firms of costumiers, milliners, etc., have allowed their "creations" to be filmed and every lady who desires to be kept *au fait* with style and fashion should see these wonders.
>
> The advantage of thus presenting up-to-date fashions in all their tints and colours with the effect of movement cannot but be a delight to everyone interested in dress, except, perhaps, the poor husbands who have to pay for them.[232]

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[229] See Victoria de Grazia, Introduction to Part I: "Changing Consumption Regimes", *The Sex of Things: Gender and Consumption in Historical Perspective*, eds. Victoria de Grazia, Ellen Furlough (Berkeley/Los Angeles/London: University of California Press, 1996), 1ff.

[230] See Lameris, 54.

[231] See "The Scala Theatre", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, September 26, 1912.

[232] "A Boom in Kinemacolor: Big Changes and Additional Attractions", *The Kinematograph & Lantern Weekly*, December 9, 1909, 274. See also "Kin Starts New Series", *Variety*, October 17, 1913, 14. See also "Fashions of To-Morrow: Dresses Photographed for Kinemacolor", *Pall Mall Gazette*, September 5, 1913; and "Fashions on Film: A Chat with the

A review of the Kinemacolor fashion film *Paris Fashions* (1913), filmed in Paris and featuring "the newest designs by Paquin and the other French moguls paraded by living models and in their truest colors", described the film as "an immensely interesting feature for women".[233] The "Kinemacolor fashion service" also entailed "special morning matinee performances for ladies only" of "intimate displays […] not for the general public" of "the correct manner of wearing the latest style of French lingerie".[234] A fashion film was also produced in the Gaumont Chronochrome process: *La mode de Paris* (Gaumont, 1913).[235] In these films colour is not only linked to superficiality and to a feminine discourse, but also to the province of consumption: again, colour is connected to a world of objects, which this time also are turned into *commodities* for sale, echoing Ramsaye's description of hand and stencil colouring as "a symptom of desire".

Gunning points out how, with specific reference to the United States, an "invasion of color into all areas of daily life" took place from the 1860s through the early nineteenth century, constituting "one of the key perceptual transformations of modernity".[236] In addition to cinema, colour became available in electric lights, in different (previously black-and-white) print media, in photography, advertising, dyed fabrics, stencil-printed wallpaper (produced by techniques similar to the stencil colouring of films), etc.[237] Just as clothes, jewellery and similar coloured commodities were the topic for fashion films in colour, films about coloured wallpapers were also produced in both Kinemacolor and Pathécolor. The Kinemacolor production, *Choosing the Wallpaper: A Very Severe Test of Color Photography* (1909) displayed differently patterned wallpapers as a means to, as the title suggests, demonstrate the capabilities of the colour process,[238] while the (fittingly) stencil coloured Pathé production, *Le home moderne* (Pathé Revue, 1929), features wallpapers in a number of different rooms, with intertitles emphasising the "perfect harmony of style and colouring between the furniture and the wallpaper" ["parfaite harmonie de style et de coloris entre le mobilier et le papier peint"]. In a Kinemacolor supplement to *The Kinematograph Weekly* in August 1912, it is emphasised how colour "is the great desideratum in these days when the bulk of the population lives in huge smoke-grimed cities where the prevailing hues are grey, black and brown",

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Creator of the 'Kinemacolor Fashion Gazette'", *The Picture Theatre Magazine*, November 22, 1913, 211ff. See also *A Yank in Britain*, 79.
[233] Review of *Paris Fashions*, *Variety*, March 7, 1913.
[234] "Kinemacolor Arranged for Ladies Only", *New York Reviews*, May 10, 1913.
[235] See "The Gaumont Chronochrome" (1913), 1346.
[236] Gunning (1995), 250.
[237] See Talbot, 289. See Ezio Raimondi, Giuseppe Bertolucci, "When the World Stopped Being Black and White", *Tutti i colori del mondo*, 91. See also Gunning (1995), 252.
[238] *Catalogue of Kinemacolor Film Subjects*, 38.

referring to the demand for colour in other commercial fields, colour inserts in magazines and coloured billboards.[239]

According to Gunning, colour in all these different arenas took part in shaping a "culture of sensationalism, based in sensual and emotional intensity".[240] In connection with early Pathé colour films, Richard Abel points out the possible role of cinema in "the larger transformation to a 'modern consumer society' in the United States", referring to William Leach's notion of shopping, for example in department stores, being characterised by a commercial aesthetic and visual culture of "color, glass and light".[241] Erika D. Rappaport points out how the visuality of modern, early twentieth-century department stores, where colour plays an important part, is involved in "a bodily culture stimulating all the senses"; the mixture of fabrics, flowers, foods, tinted soaps etc. brought about a multitude of "oral, tactile, and visual pleasures [which] defined and amplified one another. All appetites were united in a single desiring body."[242] These relationships, both assumed and actual, between colour and consumption, as well as colour and femininity are, as I will show, also central in the discourses about the integration of colour, both photographic and non-photographic, in narrative cinema.

Natural Colour and Narrative: A World of Distractions

In an article about the 1909 New York demonstration of Kinemacolor in *The Kinematograph & Lantern Weekly*, the correspondent praises the colour reproduction of flowers, landscapes, animal life etc., but then adds:

> It was not any of these classes of subjects, however, that the best informed people of the trade awaited with the greatest eagerness, but rather they awaited subjects which would test the power of the process to deal with pictures of the human face and form in motion. Apparently, judging from the remarks of Mr. Smith, it is not fully comprehended in England that in the United States the motion picture business deals almost entirely with a form of *drama*, that the motion picture public goes to see not merely motion pictures, but the motion picture "story" or "play."[243]

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[239] "Our Policy – III", Kinemacolor Supplement to *The Kinematograph & Lantern Weekly*, August 29, 1912.
[240] Gunning (1995), 252.
[241] Richard Abel, *The Red Rooster Scare: Making Cinema American, 1900-1910* (Berkeley/Los Angeles/London: University of California Press, 1999), 40. William Leach, *Land of Desire*, quoted in Erika D. Rappaport, "'A New Era of Shopping': The Promotion of Women's Pleasure in London's West End, 1909-1914, *Cinema and the Invention of Modern Life*, eds. Leo Charney, Vanessa R. Schwartz (Berkeley/Los Angeles/London: University of California Press, 1995), 145.
[242] Rappaport, 145.
[243] "The Demonstration in New York", *The Kinematograph & Lantern Weekly*, December 30, 1909.

The predominance of non-fiction films in the Kinemacolor catalogue was perhaps to a certain extent a result of the fact that Urban was primarily interested in the educational values of cinema, and associated the new colour process as a means to document reality; he in fact stated in 1910: "With the life and scenery of the world, in every land upon which the sun shines, waiting to be recorded in color, time spent in finding ways and means of photographing artificial comedies or artificial tragedies by artificial light is wasted."[244] A *Variety* article on the introduction of Kinemacolor to the United States in June 1909 also points out that Urban specialised in "educational and travel subjects", and Urban is cited, remarking on the low interest and demand for such films in America, aspiring to "stimulate an interest in such subjects".[245]

As I have mentioned earlier, the film output and discourses connected to Kinemacolor had similarities with an attractions-based aesthetic beyond the predominance of non-fiction films. For example, in Brighton in 1897, George Albert Smith produced a film in the "rocks and waves" genre (often associated with the demonstration of movement and notions of simultaneity in early cinema),[246] called *Waves and Spray*. Twelve years later, in 1909, he photographed a Kinemacolor film with exactly the same title and content, whose attractions, according to the catalogue, included the "marked change of shade in the sand every time when the moisture sinks through and leaves the surface dry" as well as the realistic reproduction of the white foam.[247] The *Variety* review of the Kinemacolor film, *Butterflies* (1913), which displays various butterflies pinned to a revolving stick, remarks that the film "has no action" and "depends entirely on its color".[248]

Colour as attraction also played a very important role in early hand and stencil coloured trick films, and was often used to emphasise transformation tricks.[249] This was, however, a genre that gradually declined in popularity during the early years of the transitional period, and Marina Dahlquist has examined how tricks, transformations and the play with visibility distinguishing these films (also in their application of colour) took on a more narrative form during the period 1906-1913, abandoning the theatrical space of early trick films in favour of a realistic space, and thus sharing traits from the cinema of attractions as well as classical cinema.[250] Despite this general trend, a number of Kinemacolor trick films were produced between 1911

[244] Charles Urban (1910), quoted in Thomas, 31.
[245] Charles Urban, quoted in "Urban to Introduce Color Photography on This Side", *Variety*, June 24, 1909, 13.
[246] See Martin Thomasson, "Här, nu eller 'här', 'nu'", *Aura: Filmvetenskaplig tidskrift*, 3:3-4, 1997, 33f.
[247] *Catalogue of Kinemacolor Film Subjects*, 28.
[248] Review of *Butterflies* (1913), *Variety*, March 14, 1913.
[249] See Dahlquist, 53ff. See also Frank Kessler, "trick films" [dictionary entry], *Encyclopedia of Early Cinema*, 645.
[250] Dahlquist, 27.

and 1913, featuring not only transformation scenes, but also reverse projection, which was used in the screenings of the earliest Lumière films.[251]

Early in the Kinemacolor catalogue, however, it is pointed out that Kinemacolor can be "adapted" to "every kind of subject", including dramas and comedies,[252] and there is an ambition evident throughout the catalogue to emphasise the uses and possibilities of colour in narrative films, in accordance with "narrative integration" and the increasing predominance of fiction films on the market. The emphasis on narrative and the development of the classical style has, of course, dominated much of the scholarship and writing of history (in particular before the much referenced Brighton conference in 1978) concerning early, "pre-classical" cinema which often were considered primarily as a 'precursor' of the classical style, undergoing an 'evolution' towards the "birth" of the "story picture",[253] towards narrative cinema and feature films, as Gunning has put it as a "movement, basically due to trial and error and the intervention of certain men of genius, from 'primitive' film-making to the foundation of the later narrative style" or as "a movement from a reliance on theatrical models to a more cinematic approach to narrative."[254]

The Kinemacolor catalogue is organised in chronological order, rather than by subject, and it is asserted that this produces "in correct historical sequence, a record of the birth and development of what is practically a new motion picture science".[255] The development which is revealed also involves a discourse of "evolution", beginning with the emphasis on the attraction and novelty of colour reproduction itself:

> The curious may trace in these pages the gradual expansion of the process beginning with the early examples when simple pictures of a flower, a flag, a lady's face and hair, a familiar object of some kind of other, were all wonderful because, for the first time in the history of animated photography, they were endowed with the colors of nature.[256]

From then on, the catalogue notes, the "advance" of the process into the travelogue, actuality films about state events, in particular the Durbar films, educational films, and the "considerable progress" made in connection with the "presentation of humorous and dramatic plays."

Similarly, in a Kinemacolor supplement to *The Kinematograph & Lantern Weekly* in September 1912, it is pointed out how the regular cinema

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[251] See *Catalogue of Kinemacolor Film Subjects*, 233ff. See also *Kinemacolor: Supplementary List of Film Subjects to Catalogue, 1912-13*, 13.
[252] *Catalogue of Kinemacolor Film Subjects*, 9.
[253] See Ramsaye, 414ff.
[254] Gunning quoted in Thomas Elsaesser, "Early Cinema: From Linear History to Mass Media Archeology", *Early Cinema*, 4.
[255] *Catalogue of Kinemacolor Film Subjects*, 14.
[256] Ibid.

theatre owner is "daily becoming more critical in his appreciation of KINEMACOLOR. The subjects which delighted him two years ago would scarcely satisfy him now. This is largely because the incidents dealt with in our earlier productions were selected more with a view of demonstrating the capabilities of our process than of holding attention by any appeal to the imagination or the emotions. But we have long since seen that KINEMACOLOR must not only march with the times but even keep a little ahead of them".[257]

This involves producing "real stage plays in which the characters are taken by famous actors and actresses" similar to contemporary American, French and Italian productions, but "*with the addition of nature's own colors*". This effort to "adapt" to contemporary film practices, however, involved integration into stylistic and ideological structures where colour was decreasing in importance.

An article in *Moving Picture World* in February 1910 observed that, according to manufacturers, the audience at the time seemed to prefer the aesthetic of black-and-white films like the ones produced by the Biograph company (which were known for using tinting and toning more restrictively than other companies), rather than the various coloured alternatives (even though it is remarked that monochrome images do not correspond to nature).[258] However, it is pointed out that this preference for Biograph films is not necessarily a result only of their photographic quality; more importantly, they are "exceedingly well acted, well staged productions and would be popular, we think, no matter what color the film is printed to."

The signature "Henry" also stated in April 1911 how the preceding eight months "have witnessed less and less colored motion pictures, which is not at all 'as it should be'".[259] One of the reasons for this is the influence of the Biograph company, and the so-called "biograph 'black and white photography'" aesthetic, causing decreased interest in tinting and toning as well as other artificial colour processes.

Richard Abel points out that although American films in 1903-04 were available in both hand-coloured and tinted versions, no American company drew attention to colour in their advertisements, unlike advertisements in the years prior, which often pointed out the opportunities for various colour

[257] "Our Policy – IV", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, September 5, 1912.
[258] "Black and White Pictures: Do the Public Prefer Them?" *Moving Picture World*, February 19, 1910, 245. Gunning refers to a review of D.W. Griffith's *The Lonedale Operator* (1911), calling attention to the tinting and stating "Tinted scenes in a Biograph is enough of a novelty to call for special praise anyway." *New York Dramatic Mirror*, 29 March 1911, 31, quoted in Tom Gunning, "Systematizing the Electric Message: Narrative Form, Gender, and Modernity in *The Lonedale Operator*", *American Cinema's Transitional Era*, 21. Gunning remarks that other Biograph films also featured tinting, "usually the conventional blue for night, but sometimes with symbolic overtones […]."
[259] Henry [signature], "Colored Motion Pictures", *Moving Picture World*, April 1, 1911, 721.

effects.[260] Abel also remarks that the Biograph company never advertised their films as being available in colour. Although Pathé, by 1905, during the initial nickelodeon boom, had become the predominant film manufacturer on the American market, mainly because of their stencil colour films, American companies did very little to counter the French company by advertising their films in terms of colour.[261] Although companies like Edison and Selig used tinting and toning extensively, and produced colour copies, only a limited number of American manufacturers actually referred to colour in their advertisements. Abel connects the reluctance to promote colour to a broader strategy of creating a distinctly American identity in cinema with specific American subjects and aesthetic practices during the period 1900-1910, in which the French Pathé, and the company's use of stencil colour, was deemed a foreign "other".[262]

Abel considers the attention given to the "scientific invention" and "natural colour" of Kinemacolor in the American trade press as an effort to marginalise Pathé's stencil colour films.[263] Referring to Richard Slotkin, Abel traces a discourse about a "masculinised" "aesthetic of authenticity" – i.e. cinema as an arena for "realistic" storytelling and "character building" – replacing a "feminised" "aesthetic of imitation" – i.e. cinema as a cultural space of consumption. While the "visual material of desire" of French stencil colour is suitable for the aesthetic of imitation, which centres on the visual display of "dream worlds" and primarily addresses female spectators ("single, white-collar working women"), colour is unimportant in the emerging aesthetic of authenticity defining the identity of American cinema, where the realist aesthetic of the "orthochromatic" black-and-white picture was promoted as the reigning "colour" of cinema, with Biograph as the prototype.[264]

Kinemacolor started producing dramas and comedies in 1911, at studios in Sussex during the summer, and in Nice during winter.[265] In the catalogue, the value of the "Kinemacolor drama" is linked to colour adding "realism", bringing the drama closer to the external world:

> Presentation of dramatic and humorous plays in motion pictures has been for long an important branch of the kinematograph industry, but it will be readily imagined that a far greater sense of realism will be created if the actors and the surroundings of the plays can be reproduced not as monotone photographs in motion, but endued with every shade and nuance of actual color. No matter how good the acting, moving picture drama must lose a great deal while it suffers under the disability of being only a photograph,

[260] See Abel (1999), 42.
[261] Ibid., 44ff.
[262] Ibid., 47, 122.
[263] Ibid., 123ff.
[264] Ibid., 157f. See also Dall'Asta, Pescatore, 242.
[265] See Thomas, 22.

> with none of the other color reliefs amongst which human beings ordinarily live and move.[266]

The catalogue emphasises the importance and potential for Kinemacolor to "strike out a distinctive line for itself" in terms of dramatic films. However, none of the features listed by the catalogue in this regard are directly linked to any specific narrative features: dramatic films in colour are claimed to be superior to black-and-white ones in terms of "the settings of indoor scenes" ("pictures on the walls, a blazing fire in the grate, a vista through an open door"), the faithful reproduction of costumes from all ages (which gives costume dramas "an educational as well as entertaining usefulness"), the reproduction of natural landscapes, and most importantly, that "those taking part in the story appear on the screen as real people: flesh tints, the color of the hair and every detail being reproduced exactly as in life."[267]

Although the output of fiction films includes a number of different settings, Kinemacolor attempted to integrate the spectacle of colour with narrative in a number of historical dramas, for example, *By Order of Napoleon* (Theo Bouwmeester, 1910),[268] *Cæsar's Prisoners* (Bouwmeester, 1911),[269] mediaeval dramas,[270] and a number of war dramas.[271] The historical drama *A Devoted Friend* (Bouwmeester, 1911), set in mediaeval Holland, is presented as "a wonderful example of the value of KINEMACOLOR as an aid to the revivification of history."[272] *Variety* praised Kinemacolor's *In the Days of Robin Hood* (F. Martin Thornton, 1913) for the colour in costumes and scenery, and the visualisation of the mediaeval setting which would "supersede any rival black and white film covering the same subject".[273]

The historical and the exotic are combined in *The Passions of an Egyptian Princess* (Bouwmeester, 1911), a drama about Cleopatra,[274] and *Galileo: Who Discovered the World Was Round* (Bouwmeester, 1911),[275] as well as in biblical dramas such as *The Fall of Babylon* (Bouwmeester, 1911), *Samson and Delilah* (Bouwmeester, 1911), and *Esther: A Biblical Episode* (Bouwmeester, 1911).[276] The fiction film productions also included some

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[266] *Catalogue of Kinemacolor Film Subjects*, 91.
[267] Ibid., 91. In the *Moving Picture World* from 1912, there are also a number of advertisements by the Kinemacolor Company requesting scenarios, with "comedies especially desired." See *Moving Picture World*, October 26, 1912, 395 and *Moving Picture World*, February 15, 1913, 725.
[268] *Catalogue of Kinemacolor Film Subjects*, 93
[269] Ibid., 116
[270] See ibid., 126, 128, 142, 265.
[271] See ibid., 118, 123.
[272] Ibid., 140.
[273] Review of "*Robin Hood*", *Variety*, August 22, 1913.
[274] *Catalogue of Kinemacolor Film Subjects*, 115.
[275] Ibid., 245.
[276] Ibid., 127, 134, 246.

adaptations of literary classics, such as the "mythological plays" *Telemachus* (Bouwmeester, 1911) and *Œdipus Rex* (Bouwmeester, 1911).[277]

However, although colour was now integrated in a narrative, the descriptions of colour in the catalogue continue to focus on the appearance of objects: furniture, "flesh tints", hair colour, clothes, fabrics, landscapes, and specific details of surroundings in general; the values that sporadically are attributed to the colours are never connected with narrative functions or meanings – colour is described in terms of general values like "naturalness" and "verisimilitude", or as adding "beauty", "charm" etc.[278]

In the catalogue's summary of a scene in the film, *By Order of Napoleon*, showing Napoleon and his staff, focus is given to "the ruddy glow of the fire, over which an iron pot is boiling", and the description of a "bordered picture" displaying Napoleon's point of view through binoculars, calls attention to "a remarkably good reproduction of the exact appearance of a straw stack".[279] Within the context of narrative, the attention given to colour and the reproduction of objects in colour – the main attraction of the process – seems to be presented as a distraction.

When reporting on this specific film, under the heading of "the first Kinemacolor dramatic picture", *The Kinematograph and Lantern Weekly* in November 1910 also pointed out the painterly beauty of the film and, typically, remarked that "of the plot we retain but a hazy recollection, we were so enchanted with the scenes before us."[280] What is emphasised rather than the story is, again, the effect of "reality": "everything is as natural as life, and the impression we have is that of gazing through a window upon an actual scene." The account of the film begins with a detailed description of the colour reproduction of the first scene, of buildings and walls in "the identical hue of stone", trees, plants, the uniforms of the soldiers, the coats of the horses, all giving "the impression of actuality". The article continues to describe interiors, beautiful landscapes, and the reproduction of sunlight. The notion of colour as distraction, and what is practically a conflict between story development and colour is conveyed. In this respect, the review functions primarily as an account of spectatorship, as a description of the writer's personal experience of the film, and the difficulty of following the storyline when there is so much beauty and visual pleasure surrounding it. At the end of the article, after numerous descriptions of the colour reproduction of specific objects, the writer suddenly reminds himself that, in fact "events are happening in this new world whose beauty we are exploring." The

[277] Ibid., 137, 269f.
[278] See ibid., 92-103, 113-142, 244-273. See also "Kinemacolor Company Now Releasing", *Moving Picture World*, October 19, 1912, 231. See also review of *Sin* (1913), *Variety*, August 8, 1913.
[279] *Catalogue of Kinemacolor Film Subjects*, 94.
[280] "The First Kinemacolor Dramatic Picture", *The Kinematograph and Lantern Weekly*, November 24, 1910, repr. in *Moving Picture World*, December 17, 1910, 1413.

article, therefore, begins to describe the action of what appears to be a very dramatic scene, but the writer/spectator is soon distracted once more: "Two soldiers on the other side fire on our gallant rider and wound him. He dismounts to bind the injury, *and our eyes wander off to the surroundings.* We notice the yellow stubble – relic of the recently harvested corn – and the Autumn tints just making their appearance on the trees." [My emphasis]

Almost reverberating this review eight years later, Cecil B. DeMille in 1918 argued that too big a variety of colour on the screen will distract the spectator from a film's "story values": "The moment the spectator says, 'Oh, look how green the grass is' or 'How blue the sea,' the value of the color is gone; it has proved too greatly distracting."[281] In fact, DeMille claims that "color photography, in the sense of absolutely faithful reproduction of natural colors […] can never be used universally in motion pictures." The artificial Handschiegl colour process used at intervals by DeMille in his 1917 productions *The Woman God Forgot*, *The Devil-Stone*, and *Joan the Woman* does not even have any notion of 'resembling external reality' as its point of reference; instead DeMille refers to the 'pictorial' use of colour in other media, articulating the aim to resemble the look of specific book illustrations.[282]

The problem as a spectator of looking at colour as well as following a storyline seems to be linked to the fact that one necessarily dominates over the other (a review of the early two-colour Technicolor western *Wanderer of the Wasteland* [Irvin Willat, 1924] noted that "it is impossible to keep one's mind properly on the plot while pictures far more beautiful than the works of the Great Master are being flashed before the eye"[283]). This leaves the viewer with two choices: being distracted by colour, or – as becomes far more common, both in reviews and in the summaries in the catalogue – to start to ignore it, apart from sporadic, brief references to costumes, landscapes and architecture.[284] This discloses a general difficulty of integrating colour within the film conventions and practices that were being established.

In February 1913, Louis Reeves Harrison referred to Kinemacolor and how the "commercial men now profiting by early exploitation" of the new medium "are so overcome by the reception people are according this new form of communication that only a few grasp the necessity of having

[281] Cecil B. DeMille interviewed in "Lasky Chiefs Working on Color Process", *Moving Picture World*, February 9, 1918, 832.
[282] In fact, Frederick A. Talbot suggested in 1912 that "picture-plays" could be the "true province" of Kinemacolor, as the limitations in terms of colour range and reproduction could be controlled through staging. See Talbot, 298.
[283] Harriette Underhill, "On the Screen", *New York Herald Tribune*, July 7, 1924.
[284] See review of the Kinemacolor film *House That Jack Built*, among others, "Kinemacolor", *Moving Picture World*, February 8, 1913, 574; and "'The Rivals' (Kinemacolor)" [review], *Moving Picture World*, September 27, 1913, 1373.

something to communicate."[285] While he was very enthusiastic about Kinemacolor's presentation of "historical and geographical facts of live interest", Harrison was far less impressed by the quality of the company's fiction films.[286] The quality of these films, in terms of acting and directing rather than colour reproduction, despite some enthusiastic reviews,[287] was generally considered to be modest.[288] A review of the Kinemacolor western *The Call of the Blood* (1913) characterised the story as "the lesser value of the picture".[289] Harrison pointed out the important divergence and lack of interaction between technological concerns and stylistic concerns, in terms of integrating colour into contemporary film practices:

> Moving picture enterprises of all kinds start from the commercial side. The medium itself is developed before much attention is given to what is to be conveyed through it. That is like hiring a theater and a company of actors and telling them to go ahead and [act]. Act what? It has not yet reached some men in the business that recording and presenting natural scenery and facts simply replaces publications devoted to similar subjects. The moment they enter the dramatic field quality of what is to be recorded and presented absolutely essential to success.[290]

The notion of realism seems to be the clear objective in the development of photographic colour film processes like Kinemacolor, at least this is taken for granted in the accounts of this technological development, and it is certainly the main focus in the discourses on "natural colour" in the 1910s. In his work on the technical history of photographic colour film systems, considering experiments from the nineteenth century as well as more than 100 different colour processes and patents, Esperanza Londoño, for example, concludes that the initial imperative in these attempts was to reproduce natural colours.[291] But most of these technological developments were carried out by technicians independent of the film industry. Paolo Cherchi Usai points out that the "fact that these efforts came principally from scientists, rather than arising out of the demands of filmmakers […] helps to explain the relative detachment from most attempts to control colour for stylistic reasons."[292]

There are, in fact, only two films described in the catalogue where colour is explicitly linked to narrative development, where colour serves as an

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[285] Louis Reeves Harrison, "Sauntering with Kinemacolor: Critical Review of the Work in Progress for Popularizing a Unique Idea in the Photoplay", *Moving Picture World*, February 15, 1913, 661.
[286] Ibid., 662.
[287] See *Variety's Film Reviews 1907-1920, Vol. 1*; March 14, 1913, March 28, 1913.
[288] See Thomas, 27, and *A Yank in Britain*, 78.
[289] Review of *The Call of the Blood* (1913), *Variety*, March 7, 1913.
[290] Harrison (1913), 662.
[291] Londoño, 226.
[292] Cherchi Usai (2000), 27.

integrated story element. As is the case with the various 'non-fiction' films produced in the process, the purpose of colour in these films is also defined within the main framework of colour reproduction. In both cases, colour is narrativised through conflicts between the 'artificial' and the 'real', between nature and the simulation of nature.

In the short comedy *Gerald's Butterfly* (Bouwmeester, 1911), the main character paints a paper butterfly in order to make a "keen old naturalist" think it is a real one – the catalogue certifies his skill at imitating reality by referring to the Kinemacolor reproduction of the fake butterfly.[293] Here, the accuracy of the colour process is a precondition for recognising the likeness between reality and simulation.

A somewhat longer narrative film outlined in the Kinemacolor catalogue where colour seems to serve an essential role for the film's story is also a comedy, *The King of Indigo* (Bouwmeester, 1911). In addition to the conflict between the real and the simulated, colour as narrative element in this film is – perhaps predictably – related to ethnic differences, as the film's plot focuses "on the contrast in complexion between men of different race", a disparity which, as the catalogue points out, "can only be made clear in KINEMACOLOR".[294] The story deals with two tramps who drug the king, described as a "dusky traveller", and his vizier, and take their place and impersonate them by way of "make-up in a style similar to that of [the victims]".[295]

This implies a thematisation of colour not only in terms of ethnicity and identity, but also on the subject of colour "reproduction" as mobility and autonomy. Colours that originate in specific objects or bodies can be extracted and copied, through a variety of means, onto new entities, and thus transform them: through make-up, the two tramps seemingly change their ethnicity and thereby their identity. However, as the two films seem to suggest, likeness does not in itself assure authenticity. In both films there is a clear and definite distinction between what is real on the one hand, and what is fake (a trick or a fraud) on the other, no matter how similar the two

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[293] *Catalogue of Kinemacolor Film Subjects*, 232.

[294] Ibid., 103.

[295] The Kinemacolor Company of America also filmed an adaptation of Thomas Dixon's *The Clansman* in 1911, which, however, was never released. The project was later taken over by D.W. Griffith and transformed into *The Birth of a Nation* (1915). See Bowser, 230. See also Linda Arvidson (Mrs. D.W. Griffith), *When the Movies Were Young* [1925] (New York: Dover Publications, 1969), 245ff. In addition, the first two-colour Technicolor feature film, *The Toll of the Sea* (Chester M. Franklin, 1922), a melodrama set in China, featuring a love story between an American man and a Chinese woman (who eventually is abandoned for an American woman, with the Chinese-American actress Anna May Wong in the leading role, was also, in a review considered notable for the "unique feature for American audiences" of "the appearance of a Chinese girl". The Chinese setting, with "picturesque costumes […] and colourful Chinese interiors" is also noted as offering "exceptional opportunities for a test of the merits of this process." See "*The Toll of the Sea*" [review by C.S. Sewell], *Moving Picture World*, December 9, 1922, 573f.

defined opposites may *look*. The application of colour through paint or make-up involves an element of untruthfulness, a potential for deception. The simulation of the colours of 'reality' fabricated by stencil-coloured Pathé films may *seem* just as convincing (or maybe even more convincing) than the "natural colour" equivalents in Kinemacolor. Nevertheless, the direct, photographic nature of the Kinemacolor films, the fact that their colours are not only copied from reality but originate directly from it, seems to give Kinemacolor a moral advantage, which is not only linked to persuasiveness, but perhaps more importantly to truth.

Coda: Computerised Colourisation 1986-2006

The dichotomies between perceiving colour as truth or as simulation, between authenticity and similarity, also interfere with notions of how colour in cinema can represent historical truth, and how colour can be legitimately integrated in films as textual artworks. The past decades do not only involve a history of *removing* non-indexical colours in archival practices, but also of *adding* equally non-indexical colours through computerised colourisation.

The common apprehension that colour was non-existent in cinema until the 1930s also has informed the heated discussions about computerised colourisations of black-and-white Hollywood classics carried out in the late 1980s and early 1990s for television and video.[296] As Michel Chion points out, perhaps contrary to popular opinion, colouring black-and-white material was not a new idea invented in the 1980s, it is, of course, a technique used throughout the history of photography.[297] There is obviously a great aesthetic difference between the application of colours on silent films, where this practice was a natural part of contemporary film industry, and the colourisation of films from the 1930s, 1940s and 1950s that were intended to be shown exclusively in black and white.

One of the main arguments against computerised colourisations, apart from the aesthetic ones, has been how they distort and destroy our cultural heritage, our sense of history.[298] As Charles R. Acland points out, there is confusion about what these colourised versions are representing (which, of course, also has been the case in the handling of non-photographic colour in silent cinema): "Colorization modifies and shifts what is presumed to be the permanent arrangement of the film as historical artefact in cultural history: it tampers with the inventory. [---] Colorization creates a rift in the

[296] See e.g. Paul Grainge, "Reclaiming Heritage: Colourization, Culture Wars and the Politics of Nostalgia", *Cultural Studies*, 13:4, 1999, 621-638.
[297] Michel Chion, "Colorisations", *La couleur en cinéma*, 63.
[298] See e.g. Riley, 312ff.

representation of our cultural heritage; the colorized classic simultaneously *signals* particular histories and *transforms* them."[299] In the late 1980s, these versions were extremely popular (although the popularity only lasted for a few years), and Acland's explanation of this popularity is not the colour itself, but the colourisation, the conflict between the representation of a unified reality and the negation of this reality produced by the added colour, as well as the technological novelty: "Contrary to popular opinion, color *per se* does not attract audiences. It is the *colorized* – the spectacle of the refinished product, a creation of technological wizardry – that succeeds in doing so. By implication, audiences recognize the tampering and either do not care or find it playfully entertaining."

The notions of authenticity and cultural heritage in opposition to colourisation were not linked to history or memory in general terms, but to authenticity as an *aesthetic* category, to films as immaterial textual artworks, to the entitlements of the creator of the films, to the fact that many of the films which were being colourised were canonised classics like John Huston's *The Maltese Falcon* (1941) and Raoul Walsh's *White Heat* (1949). Consequently, terms like "desecration", "mutilation" and "robbing a grave" were used to describe the practice.[300] Again, the introduction of colour entails the production of a new version and challenges the textual integrity of each film as a specific, already 'complete' work of art.

In the late 1990s and the beginning of the twenty-first century, however, the role of colour as spectacle and 'novelty' seemed to move from the realm of classic black-and-white feature films from the 1930s and 1940s to documentary material from the same period. Suddenly, a number of archive-based television documentaries and DVD releases were produced, exclusively featuring colour film footage from the Second World War and the period preceding: *Das dritte Reich – in Farbe* (Spiegel TV, 1998), *The Second World War in Colour* (Carlton/TWI, 1999), *Britain at War in Colour* (ITV, 2000), *WWII: The Lost Color Archives* (2000), *The Color of War* (IM3 Entertainment, 2001), *Japan's War in Color* (2003), *D-Day in Color* (2004), *Hitler in Colour* (2005), to name just a few of the titles.[301] Here, colour is not only an attraction, it also functions as the most important structural element for narrativising history. As Simon Brown has pointed out with regard to *The Second World War in Colour*, the content of all of the series is determined by which images of historical events are available specifically in colour.[302]

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[299] Charles R. Acland, "Tampering with the Inventory: Colorization and Popular Histories", *Wide Angle*, 12:2, 1990, 15.
[300] Grainge, 625.
[301] The information and quotes concerning these titles are taken from the websites *The Internet Movie Database* [http://www.imdb.com] and *Amazon* [http://www.amazon.com].
[302] See Simon Brown, "Dufaycolor: The Spectacle of Reality and British National Cinema" (2002): http://www.bftv.ac.uk/projects/dufaycolor.htm (May 2006)

This time, the spectacle of colour, of viewing these events in colour rather than in black and white, links colour to a discourse of authenticity:

> Seeing the war through the ubiquitous black-and-white footage has always made the experience somewhat distant, but in clear, crisp color, the enormity of the war and its horrors is startling and dramatic. Films of Nazi rallies are all the more disturbing; a viewer seeing the scene in color realizes the massive crowds saluting Hitler are no longer gray and faceless masses, but gatherings of well-dressed civilians. Color combat footage, from across Europe and the Pacific, is frighteningly immediate […].[303]

Hannu Salmi has pointed out how the 'reality' traditionally attributed to photography, both in films and still pictures, the domination of black and white in documentary footage, the use of black-and-white flashback sequences in more recent films, etc., all add to the use of the black-and-white image as a narrative and stylistic element, signifying the past, the idea of history: "Without over-generalizing, it could, perhaps, be argued that the history of the 19th and 20th centuries, as a whole is conceived as monochrome, since images regarded as authentic from that period are […] in black and white."[304] Colour, on the other hand, represented "non-history or falsified history". Regardless of indexical or material origins, black and white has been more frequently associated with the past, and with the photographic trace than has been the case with colour.

Roland Barthes accentuated the medium of photography as an invention carried out by chemists, and connects the direct trace of light, this literal "emanation of the referent" to the authenticity of black and white, and the artificiality of colour: "I always feel (unimportant of what actually occurs) that […] color is a coating applied *later on* to the original truth of the black-and-white photograph. For me, color is an artifice, a cosmetic (like the kind used to paint corpses)."[305]

However, in the colour documentaries about the Second World War, and subsequent series such as *The British Empire in Colour* (2002), featuring the remaining fragment of the Kinemacolor Delhi Durbar film, colour is instead directly associated with representation of the past, of actually giving a more authentic, more complete display of specific historical events. Just as colour sometimes has been associated with non-reality and non-history regardless of indexical origins (cf. Barthes' notion that it is "unimportant what actually occurs"), the seemingly 'new-found' status of colour as being capable of representing *further* historical accuracy also can function independently of how the colours are produced.

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[303] Robert J. MacNamara on *World War II: The Lost Color Archives*: www.amazon.com.
[304] Hannu Salmi, "Color, Spectacle and History in Epic Film", *Fotogenia* 1, 1994, 299f.
[305] Roland Barthes, *Camera Lucida: Reflections on Photography* [orig. *La chambre claire*, publ. 1980], trans. Richard Howard (London: Vintage, 2000), 80f.

The series *World War I in Colour* (Nugus/Martin; Sony/Universal, 2003) represents a 're-entry' of computerised colourisation, as black-and-white footage from the war has been, according to the DVD cover, "painstakingly colourised using the latest computer-aided technology to bring the first world war to colour, as experienced by those who fought and endured it." The introduction to the first episode of the series explains, as the images change from colour to black and white, and back again to colour:

> World War I has always been seen as a war in black and white. It was the only way pictures from the front and scenes recreated for the camera could be filmed. But it was not the reality. The reality happened in colour. The slaughter, the innovation, the shock, the political upheavals, victory, defeat. The fields were green, the mud brown, the flames bright.

In the DVD extras and promotional material for the series, colour is emphasised both as simulation, as something which has been constructed – we are told about the advanced technology, the time-consuming, complicated work, encompassing "5 months and 490 experienced technicians" – as well as being an element which reconstructs history. The producers talk about how the war is being "brought to life" through the "reality" of colour, how it emphasises that "these were *real* people, these were *real* events, it wasn't all happening in black and white, it was a real war involving real people".[306]

The 'reconstruction' taking place, in this series as well as in the miniseries, *The Russian Revolution in Colour* (IWC Media/Channel 5, 2005), which also included colourised archive footage, is not of the film footage in itself, but of the historical events of which the black-and-white footage only functions as a trace. And unlike the black-and-white film classics colourised during the 1980s, where the monochrome photography represented 'perfection' and 'completeness' in an "immaterial", textual and aesthetic sense, the black-and-white images of the First World War are incomplete, just like any 'archaeological find', and seemingly dependent not only on identification and contextualisation, but also of specific colours which are chosen as a result of extensive research. The origins of these historically "accurate" and "faithful" colours are still achieved through the assembly of specific objects, of different kinds of uniforms, flags, medals, insignias, etc., and using them as reference.

A similar strategy of deriving colours from physical objects is found in another recent re-entry of colourisation, this time taking place within the realm of black-and-white fiction, as eight "Three Stooges" shorts from the 1930s were colourised for the DVD editions *Goofs on the Loose* and *Stooged and Confused* (Columbia Pictures, 2004). The choice to pick films for

[306] Jonathan Martin, series producer/director, interviewed in DVD extra: "Making the Series" (dir. Peter Kindness, 2003).

colourisation which in some measure belong outside a cinematic canon of 'classics' is, perhaps, a deliberate one: the debate about colourisation during the 1980s revealed notions of which films were classics and which were not (and in effect could be colourised without much protest).[307] In addition, the DVD features a function called "ChromaChoice" which allows the viewer to use the remote control to toggle between the colourised versions and the black-and-white "originals". Thus, it is emphasised that the addition of colour does not threaten the existence of the authenticity and validity represented by black and white (as it never has done). In addition, the possibility to continually switch between the two versions relativises the stability or hegemony of any of them.

As well as calling attention to the sophistication and complexity of the innovative new technology, the precision and craftsmanship of applying colour, the DVD extras also emphasise the "historically accurate", "realistic" characteristics of the colour, and the extensive research on specific objects featured in the films: information about the colour of clothing, props, artefacts, cars, architecture, dyes, fabrics, kitchen appliances etc. are taken from museums, reference books, antique stores and, very importantly, colour photographs of particular objects on eBay. Thus, there is still a direct connection between the colours in the films and specific objects, although the colours have not been produced through photochemical means.

"Adding colour to film is an art form", the project manager tells us, but what is the purpose of all this effort? The philosophy of the project, we are told, is actually "that colour should not be a distraction, it should not be in the way"; its main purpose is to be "a frame for the action" – in fact, hopefully, "no one's going to even notice the colour".[308] Although the DVD cover tells us that the films will be "funnier in color!", it is never explained how. Instead, the ideal functions of colour are connected with negating the powers of colour: colour should not distract, should not be noticed – despite the tremendous effort involved in developing technology, researching and adding colour to the films.

This difficulty in knowing what to do with colour, of determining or defining the functions or effects of colour beyond notions of 'realism' or 'distraction', found in the discussions regarding both Kinemacolor narrative films and computer-colourised films, is characteristic of discourses on colour and cinema throughout film history, and is examined further in the next chapter.

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[307] See Grainge, 626.

[308] Bob Simmons (project manager) and Jane Parks (art director), interviewed in DVD extra: "Colorizing the Classics" (2004).

Functions: Colour and Sound

In this chapter I consider discourses on the functions of colour in cinema through a specific question or theme: the relation between colour and sound. In addition to considering aesthetic and historical comparisons between colour film and sound film, this chapter aims to consider conceptions (that were particularly prevalent between the 1890s and the 1930s) of parallels between sound and colour in general. These parallels are located and debated within a number of different media and contexts. In discourses on cinema, this sound-colour relation is often associated with diverse notions of colour as an integrated component of sound film.

The contexts which are examined in this chapter are first, discourses on colour and sound in connection with classical Hollywood cinema during the late 1920s and early 1930s, primarily concerning early sound films in Technicolor, and second, a broader art and media context primarily supplied by discourses and films produced by European avant-garde filmmakers and artists from the 1910s through the early 1930s. As disparate as these two concurrent contexts perhaps may seem, there are significant similarities and connections between them, not only in terms of the extent to which the relationship between colour and sound is discussed and explored, but also in terms of the considerable interaction, collaboration and mutual influence on a number of levels between popular culture and the avant-garde, and the "art world" in general during this time period,[1] just like the connections between the aesthetics of the cinema of attractions and contemporary modernist avant-garde notions of cinema demonstrated by Gunning.[2] As Esther Leslie, in the introduction to *Hollywood Flatlands*, her study about the relationship between the European avant-garde and the American cartoon industry, points out:

> It is presupposed here that artefacts – such as the cartoon, the suprematist canvas, the fairy-tale – can be understood only in the context of the whole scope of culture. Just as it is recognized that the pursuit of realism in painting

[1] See Kerry Brougher, "Visual-Music Culture", *Visual Music: Synaesthesia in Art and Music Since 1900*, eds. Kerry Brougher, Jeremy Strick, Ari Wiseman, Judith Zilczer (New York/London: Thames & Hudson, 2005), 96-125.
[2] See Gunning (1990), 56ff.

> smashed into the invention of photography, so too coloration in painting comes to make sense in relation to the possibilities of Technicolor.[3]

At the same time, there are significant institutional and ideological differences between these 'contexts'; thus, these related ideas and notions about colour nevertheless often lead to opposite conclusions, different preferences, artistic differences etc. in terms of the (potential or actual) functions of colour in cinema which the linkage between colour and sound seems to produce, and which will be addressed in this chapter: problems concerning colour and realism, temporality, movement, abstraction versus representation, the notion of colour as an autonomous element, and how colour film images differ from images in black and white.

In addition to these two 'contexts', the question of the relationship between colour and sound in cinema will be examined through Eisenstein's extensive writings on the topic. Eisenstein's increasing interest in colour originated in his growing focus on sound film montage, and his texts include numerous references to both the 'contexts' described above. Eisenstein was not only directly and personally associated with both the European avant-garde and Hollywood; his potential as an 'intermediary' between different texts and traditions, due to the complexity and contradictions in his writings on colour mentioned in the introductory chapter will be explored in this chapter through his notions of specific thematic and representational functions, synaesthetical and emotional correspondences, as well as notions about the relativity, changeability and arbitrariness of colour in cinema. Eisenstein's role in this chapter will to a great extent be as both a historical and a theoretical "prism", binding together separate institutions and notions about colour, as well as disclosing differences and oppositions between them.

The discussions on colour and sound within these contexts disclose three central questions regarding this relationship that will inform my argument. The first question has to do with colour and sound as a specific, historically-based relationship. This relationship takes place on a number of different levels: technical, historical, physiological and psychological factors are involved, as well as more media-specific notions of the combination of colour and sound in cinema as "completion" of either a mimetic illusion of reality or aesthetic, expressive audiovisual equivalents. The second question deals with the relation between colour and sound as a theoretical problem or idea in a general sense – whether the one can be understood and explained by the other. The third question, which to a certain extent constitutes the direct opposite of the previous one, deals with the relation between colour and sound as a metaphor (or even as a meta-language). The recurring

[3] Esther Leslie, *Hollywood Flatlands: Animation, Critical Theory and the Avant-Garde* (London/New York: Verso, 2002), vii.

grouping of colour and sound (as well as of vision and hearing) also entails a reflection on the possibility or rather the difficulty of language to 'capture' colour, to describe, define or discuss it. Describing colour through musical terminology is one metaphorical discourse among many others, which in itself is problematic. Attempts to describe colours as music and music as colours are concerned with a tension between an apparent search for an actual correspondence (i.e. a deeper understanding of the phenomena, of the relation between the senses etc.) and the search for a suitable metaphor, the attempt to find words and linguistic strategies to describe and make sense of colour.

Colour and Sound as Completion: Mimesis and Synaesthesia

The most obvious connection between colour and sound in film history is probably their collective status as innovations or additions, replacing silent and black-and-white cinema, and giving rise to new aesthetic and representational challenges and possibilities. Besides, the emergence and initial integration of (photographic) colour (with the introduction of Technicolor) and (synchronised) sound in Hollywood film production was virtually simultaneous, and took place in the late 1920s.

This concurrence is also the basis for many historical comparisons between colour and sound film, particularly connected with the development from the late 1920s throughout the 1930s, where a concept of the two separate 'histories' of colour and sound often arises, founded on the question of which factors contributed to the fact that sound film replaced silent cinema within a period of a few years, while colour film was not "naturalised" in the same way until decades later. John Belton, among others, points out how colour "was relegated to the status of a novelty" from the beginning of film history through the early 1950s.[4] Gorham Kindem has shown how U.S. feature films in colour did not constitute a majority of the output until after American television converted to colour in the mid- to late 1960s (with the percentage of feature films in colour increasing rapidly from 54% in 1966 to 94% in 1970).[5] This reluctance, in contrast to the integration of sound, was also noted upon during the 1920s and 1930s, as Stephen Watts wrote, in 1938, when considering the position of colour in cinema: "Its transformation of the finished article of film production has not been so much like a clap of thunder as was the coming of sound. It has been more

[4] John Belton, "Introduction: *Colour Film*", *Film History*, 12:4, 2000, 339.
[5] Gorham Kindem, "Hollywood's Conversion to Color: The Technological, Economic and Aesthetic Factors", *The American Movie Industry*, 146, 154ff.

like the gradual appearance of a rainbow, creeping steadily across the sky, until its arc is complete."[6]

This notion of "completion" is significant, as what is generally considered as the most important result of the 'additions' of colour and sound (both separately and combined) is a conception of a more 'complete' reproduction of real life, of cinema becoming closer to the reality it depicts. The linkage between colour and sound is thus often connected to perceptions about what André Bazin in 1946 in one of his famous essays labelled "the myth of total cinema", referring to cinema as a "total" or "partial" illusion of reality, where the presence or absence of these two elements is a fundamental principle. According to Bazin, the guiding aspiration of the inventors of cinema was "a total and complete representation of reality ; they saw in a trice the reconstruction of a perfect illusion of the outside world in sound, color, and relief".[7]

In a book on film technology in 1921, Austin C. Lescarboura articulated the aspiration of the combination of colour and sound like this:

> A clear, stereoscopic, flickerless image on the screen, in natural colors, accompanied by a true and convincing reproduction of the sounds emitted by the subjects appearing before our eyes, the successive images and sound waves being in perfect synchronism – that, in brief, describes the eventual goal of cinematography. In other words, absolute realism is the ideal; and everything that does not quite come up to the ideal is but temporary and can only be considered a milestone in the steady progress of the art.[8]

Lescarboura also envisioned that the emergence of colour in cinema was forthcoming before the emergence of sound, since sound, unlike colour, required new projection technology.[9]

Although colour and sound in different forms have always existed throughout film history, the absence of these two features in the basic technology of cinema was often commented upon, and referred to sometimes as a shortcoming, and sometimes as a fundamental principle in the distinctive aesthetic character of film as a medium or art form. One of the most famous articulations of how the *absence* of colour and sound was noticed and commented by spectators, is the short essay Maxim Gorky wrote in 1896 after watching Lumière's films for the first time, claiming that they were not showing the real world, only its shadow, or a kingdom of

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[6] Stephen Watts, "Editor's Note" [to Natalie M. Kalmus, "Colour", 116-127 (adapted from "Colour Consciousness", 1935)], *Behind the Screen: How Films Are Made*, ed. Stephen Watts (London: Arthur Barker Ltd., 1938), 114.

[7] André Bazin, "The Myth of Total Cinema" ["Le mythe du cinéma total" (1946)], *What Is Cinema? Volume I*, ed., trans., Hugh Gray (Berkeley/Los Angeles/London: University of California Press, 1967), 20.

[8] Austin C. Lescarboura, *Behind the Motion-Picture Screen* (New York: Scientific American Publishing Company/Munn & Company, 1921), 290.

[9] Ibid., 396ff.

shadows.[10] This and similar reactions that, moreover, often express a desire for the absent total illusion potentially generated by colours and sound, are by some theorists, among them André Gaudreault and Jean-Pierre Sirois-Trahan, used as an explanation why colour was applied to black-and-white material during the silent era.[11] Gaudreault and Sirois-Trahan refer to a journalist who, after seeing one of the first motion picture shows in Montreal in 1896, suggested that "to render a complete illusion, one only lacked colours and the phonograph reproducing sounds".[12] Bazin also pointed out how colour existed in cinema independently from the photographic technology, referring to the applied colour elements in Émile Reynaud's *praxinoscope* creations and Georges Méliès' films.[13]

In 1920, the German physician, Gustav Schleich, criticised cinema without sound or colour as painting "a completely wrong, distorted and one-sided picture of all the processes of life as a whole. […] a world of cold grey, a ghostly, eerie world, distorting the phenomena the film transmits. [---] relationships in life become freezing cold, unattractive and lose their magic. This cannot but affect the soul of the viewer. [---] the world will of necessity slowly move to an untruthful, wrongly lit objectivity".[14]

Parallel to the numerous essentialist notions of cinema as the medium of 'total illusion", there were similarly essentialist conceptions of the medium where the absence of colour and sound were not considered to be deficiencies, but rather a unique and essential aspect of cinema as an art form.

When the psychologist and early film theorist Hugo Münsterberg, attempted to identify the "true meaning of the photoplay" in a 1915 essay, he refers to this absence of sound and colour (as well as three-dimensionality) as defining the nature of the medium:

> The color is lacking and so is the depth of the stage; above all, the tone of voice is absent. Yet we do not miss the color, the depth, or the words. We are fully under the spell of this silent world, and the Edison scheme of connecting the camera with the graphophone, and so to add spoken words to the moving pictures, was not successful for very good reasons. It really interfered with the chance of the moving pictures to develop their original

[10] Maxim Gorky (1896), quoted in Jay Leyda, *Kino: A History of the Russian and Soviet Film* (London: George Allen & Unwin, 1960), 407ff.
[11] Cf. André Gaudreault, Jean-Pierre Sirois-Trahan, "Des sujets hauts en couleur, dès les premiers temps du cinéma", *Il colore nel cinema muto*, 78
[12] ["Pour rendre l'illusion complète il ne manquait que les couleurs et le phonographe reproduisant les sons."] Ibid.
[13] Bazin (1946), 22.
[14] Gustav Schleich, "Der farblose Film und Goethes Farbenlehre", *Die Gartenlaube*, no. 33, 1920, 549, trans. Inge Degenhart, quoted in Inge Degenhart, "On the Absence and Presence of Colour", *Fotogenia*, 1, 1994, 274f.

> nature. They sank back to the level of mere mechanical imitation of the theater.[15]

Thus, adding colour and sound, and thereby increasing the medium's mimetic relation to the real world or to another art form such as the theatre, implies betraying what separates cinema as an art form both from other media and from real life. Rudolf Arnheim, who in his work *Film als Kunst* in 1932 endorsed the endangered black-and-white silent film as the cinematic expression that would validate film as a unique medium, and pronounced the definition that "[a]rt begins where mechanical representation leaves off", [16] argued strongly against the use of colour film. Arnheim's notion that the "reduction of actual colour values to a one-dimensional grey series (ranging from pure white to dead black)" of black-and-white film was more artistic, because it offered a "welcome divergence from nature",[17] does not only represent a traditionally modernist (or Kantian) conception of art as differing from nature, but is, like Münsterberg, above all connected with more general ideas of visual perception and cognitive psychology. While Arnheim's works deal with perception and cognition of visual art in general through an approach established on Gestalt psychology, Münsterberg regards cinema, because of its detachment from real life as well as the theatre,[18] as a medium projecting the human psyche:

> We must be strongly conscious of their pictorial unreality in order that that wonderful play of our inner experiences may be realized on the screen. This consciousness of unreality must seriously suffer from the addition of color. We are once more brought too near to the world which surrounds us with the richness of its colors, and the more we approach it, the less we gain that inner freedom, that victory of the mind over nature, which remains the ideal of the photoplay. The colors are almost as detrimental as the voices.[19]

This shift of concentration from the representation of reality to the perceptual and cognitive capabilities of the spectator is essential in the

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[15] Hugo Münsterberg, "Why We Go to the Movies" (1915), *Hugo Münsterberg on Film: The Photoplay: A Psychological Study and Other Writings*, ed. Allan Langdale (New York/London: Routledge, 2002), 174.
[16] Rudolf Arnheim, *Film as Art* [*Film als Kunst* (1932)] (London: Faber and Faber, 1958), 55.
[17] ibid, 62.
[18] For a discussion on Arnheim in relation to Münsterberg, see Ara H. Merijan, "Middlebrow Modernism: Rudolf Arnheim at the Crossroads of Film Theory and the Psychology of Art", *The Visual Turn: Classical Film Theory and Art History*, ed. Angela Dalle Vacche (New Brunswick/London: Rutgers University Press, 2003), 161f.
[19] Hugo Münsterberg, "The Photoplay: A Psychological Study" (1916), *Hugo Münsterberg on Film*, 148. See also Jean Goudal, "Surrealism and Cinema" ["Surréalisme et cinéma" (1925)], trans. Paul Hammond, *French Film Theory and Criticism, Vol. I*, 357, where Goudal defines cinema as constituting a "conscious hallucination", warning against trying to "perfect" cinema's "true technique of black and white film" by "adding 'improvements' like color, relief or some kind of sound synchronization." Trying to bring cinema closer to reality would "run counter to and slow down its genuine development."

discourses surrounding colour and cinema in general, and the connection between colour and sound in general. But in this respect, the myth or aspiration of 'total cinema' is not necessarily limited to the model of the mimetic, the representation of external reality; it is simultaneously linked to a model of synaesthesia.

Gage has demonstrated how the experience of colour in Western culture has always been intertwined with the experience of music.[20] The Jesuit priest Louis Bertrand Castel, who with his *clavecin oculaire* was one of the earliest experimenters with so-called "colour organs", projecting moving coloured light controlled by a keyboard, pointed out in 1740 how light has always been compared with sound, referring to Athanasius Kircher, who created the magic lantern in the seventeenth century, and his notion of sound in his "Musurgie" as "le singe de la lumière" ["the ape of light"], suggesting that everything which is visible to the eyes can be available to the ears, and vice versa.[21] Both colour and music are organised in scales and notes, and many terms used to describe music are also used to describe colour (just as music is discussed through the use of chromatic concepts, cf. *Klangfarbe* etc.). Notions of colour harmony in painting are often connected with the notion of harmony in music, and thus many paintings are based on musical analogies, involving attempts at creating visual representations of tonality and rhythm (painters who explored these correspondences during the twentieth century were Paul Klee, Piet Mondrian, and Wassily Kandinsky).[22] As Melinda Szaloky points out, synaesthesia is a somewhat ambiguous and confusing term, since it refers to metaphorical, artistic associations as well as to actual involuntary physical reactions (where the stimulation of one sense automatically leads to the additional perception of another sense).[23] According to Gage, the years between 1890 and 1930 represent a period during which extensive research was carried out on synaesthesia, and this had a huge impact on many painters' approach to colour, primarily in Russia and Germany.[24] Attempts within painting to visualise the tonality and rhythm of music through colour, often based on more or less scientific foundations,

[20] See Gage (1993), 227-246. See also Gage (1999), 261-268; Aumont (1994), 161-168; Luke McKernan, Introduction to Alexander Wallace Rimington, "A New Art: Colour Music" (1895), repr. in *Living Pictures: The Journal of the Popular and Projected Image Before 1914*, 2:2, 2003, 69f.

[21] See Klein (1926), 2. See also Louis Bertrand Castel, "L'optique des couleurs" (1740), *Poétique de la couleur: une histoire du cinéma expérimental*, eds. Nicole Brenez and Miles McKane (Paris: 1995), 29-35. See also Kenneth Peacock, "Instruments to Perform Color-Music: Two Centuries of Technological Experimentation", *Leonardo*, 21:4, 1988, 399ff.

[22] Gage (1993), 228, 236-243.

[23] Melinda Szaloky, "Sounding Images in Silent Film: Visual Acoustics in Murnau's *Sunrise*", *Cinema Journal*, 41:2, 2002, 113. See also John E. Harrison, Simon Baron-Cohen, "Synaesthesia: an Introduction", *Synaesthesia: Classic and Contemporary Readings*, eds. Simon Baron-Cohen, John E. Harrison (Oxford/Cambridge: Blackwell Publishers, 1997), 3-16.

[24] Gage (1999), 55.

formed an important groundwork for the development of abstract painting during the nineteenth century. In the 1920s and 1930s, the concept of "colour-music" was accomplished through different media: opera, orchestral performances accompanied by shifting stage lighting, specially constructed "colour-organs", and other technologies custom-built for this purpose. In cinema during this period, there was an extensive search for correspondences between film and other art forms, such as music, poetry and painting, and the pursuit of "colour-music" was explored in abstract animated films, often hand-painted directly onto film stock, by filmmakers such as Walther Ruttmann, Oskar Fischinger, and Len Lye.[25]

The search for "colour music" or "visual music" thus entails the interaction between a number of different media, and it has been pointed out that the hybrid character of the experiments, involving the interrelation of painting, cinema and "light art", is one important reason why these practices have not been examined to any great extent.[26] There has however, been a growing interest in these multimedial experiments in recent years, both in terms of their influence on the development of abstract art during the nineteenth and twentieth century, as well on the development of contemporary installation and performance art. Within an art context, there have been a number of large exhibitions, which also have produced catalogues featuring various academic essays, dealing with the relationship between image and sound, all of them including experimental films, and focusing extensively on the role of colour.

To mention just a few of the latest and most comprehensive examples: *Aux origines del'abstraction, 1800-1914* (Musée d'Orsay, Paris, 2003-2004) demonstrated the link between the interest in the scientific fields of optics, colour theory and different properties of synaesthesia and the development of abstraction in painting during the nineteenth century.[27] In addition to featuring samples of Léopold Survage's drawings for the unfinished abstract film project *Rythmés colorés* (1913), discussed later in this chapter, the exhibition also included three hand-coloured dance films: *Annabelle Fire Dance* (1897), as well as two *Danse serpentine* films (1899 and 1900); *Sons & lumières: Une histoire du son dans l'art du XXe siècle* (Centre Pompidou, Paris, 2004-2005), and *Visual Music: Synaesthesia in Art and Music Since 1900* (Hirshorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C / The Museum of Contemporary Art, Los Angeles, 2005) demonstrated the visualisation of music and sound throughout the twentieth century, in paintings, "light art", installation art, as well as a number of

[25] For texts on colour by these three directors, among others, see *Poétique de la couleur*. See also Guy Fihman, "De la 'Musique chromatiques' et des 'Rythmes colorés' au mouvement des couleurs", *Fotogenia*, 1, 1994, 319ff.
[26] See *Visual Music*, 10f.
[27] See *Aux origins de l'abstraction, 1800-1914*, eds. Serge Lemoine, Pascal Rousseau (Paris: Éditions de la Réunion des musées nationaux, 2003). See also Crary, 137-150.

experimental films by Viking Eggeling, Hans Richter, Oskar Fischinger, Len Lye, Norman McLaren and others (the Paris exhibition also included storyboards from Disney's *Fantasia* from 1940 among these works).[28]

Obviously, notions of synaesthesia and visual music involve a vast field, and a long history, including discourses in philosophy, neuropsychology, art theory, music theory, and poetry. They involve all types of intermediality, and hundreds of specific examples of theoretical ideas, elaborate systems of correlations, practices, expositions and performances featuring moving coloured light and music, and patents for a number of "visual music" instruments etc. In order to navigate within this enormous field, this chapter focuses on a number of specific examples and discourses where notions about the relation between sound and colour (rather than sound and image in a general sense) are linked specifically to cinema (both popular and "avant-garde"); or some of the instances where paintings, light art works etc. are understood and described explicitly in relation to the film medium.

Most descriptions of colour in cinema in terms of musical analogies deals with the potential for a specific expressiveness combined with temporality and movement; in advertisements, Kinemacolor films were often described as "melodies of color".[29] In visual arts in general, musical analogies are often linked to emulating the non-representational aspects of music through visual means.[30] The French avant-garde of the 1920s accentuated the relation between music and cinema, because of rhythm: notions of "cinematic purity" were linked to concepts of "visual music", "rhythm of light", and "visual symphonies", described in the writings of Abel Gance, Jean Epstein, Louis Delluc, Germaine Dulac and many others.[31] Delluc also specifically suggested the potential for what he described as "photogénie en couleurs", the expressive possibilities of mobile colour in cinema. [32]

In Eisenstein's film theory, the question of colour, as a possibility as well as a problem, becomes more and more central, in particular in the context of the emergence of sound film and issues concerning sound film montage. Most of Eisenstein's articles which discuss colour were written after the coming of sound film in the late 1920s. The possible connections and attempts to find links between image and sound, and between colour and music, are essential concepts in all of Eisenstein's writings about colour film, and the role of colour in sound film montage becomes increasingly important throughout the 1930s and 1940s.

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[28] See *Sons & lumières: Une histoire du son dans l'art du XXe siècle*, eds. Sophie Duplaix, Marcella Lista (Paris: Éditions du Centre Pompidou, 2004) and *Visual Music*, op.cit.

[29] See Natural Color Kinematograph Co. advertisement, *The Kinematograph & Lantern Weekly*, December 9, 1909, 274.

[30] See *Visual Music*, 7.

[31] See Mitry, 109-120.

[32] Louis Delluc, "Photogénie en couleurs" (1920), *Écrits cinématographiques. II.2: Le cinéma au quotidien* (Paris: Cinémathèque française/Ed. de l'étoile/Cahiers du cinéma, 1990), 178.

In the "Statement on Sound" that Eisenstein co-wrote with Vselovod Pudovkin and Grigori Alexandrov in 1928, which discusses sound as a montage element, accentuating the counterpoint between sound and image as the ideal way to approach the new medium, the authors claim that "it is easy to distinguish the insignificance of colour […] in comparison with the great significance of *sound*".[33] Nine years later, in the essay "Unity in the Image" from 1937, Eisenstein claims on the contrary that colour *cannot* be considered a marginal development; in fact it is rather an indisputable element in the totality that is implied in sound film as a synthetic, i.e. audiovisual and spatio-temporal art form.[34] The emergence of colour in cinema has not been considered as significant as the coming of sound, because colour has only mistakenly been dealt with as an additional expressive element rather than as a structural element inherent in sound cinema. In the essay "Vertical Montage" from 1940, Eisenstein claims that "the problem of colour is nowadays the most topical and intriguing problem for our cinema".[35] In 1947, Eisenstein refers to the sound manifesto, almost twenty years after it was written, claiming that the importance of colour was underestimated due to a lack of concrete experience at the time in terms of actually working with and exploring the possibilities of visualising sound: "the actual longing for colour grows directly from work on sound-visual counterpoint. For only color, color, and again color, is fully able to solve the problem of measuring and reducing sound values to a common unit of sound."[36]

The discussion in Hollywood on colour and sound also to a certain extent dealt with sensory *effects* on the spectator, and on the relation between sound and image, hearing and seeing, in a more general sense. In 1935, Rouben Mamoulian stated in an interview that the visual primacy of film had been challenged by the emergence of sound, but that colour films had brought back the emphasis on the visual even in sound films: "color balances the ear, sets off the sometimes distracting pull of sound. With color, pictures are once more primary visual – and now at last the perfect talking picture approaches."[37]

Both models characterising the association between colour and sound in cinema, the synaesthetic on the hand, and the mimetic (whether one is trying to attain it or one is warning against it) on the other, involve attempts at

[33] S.M. Eisenstein, Vselovod Pudovkin, Grigori Alexandrov, "Statement on Sound" (1928), ", S.M. Eisenstein, *Selected Works, Volume 1: Writings 1922-34*, ed., trans., Richard Taylor (London/Bloomington/Indianapolis: BFI Publishing/Indiana University Press, 1988), 113.
[34] S.M. Eisenstein, "Unity in the Image" (1937), S.M. Eisenstein, *Selected Works, Volume 2: Towards a Theory of Montage*, eds. Michael Glenny, Richard Taylor, trans. Michael Glenny (London: BFI Publishing, 1991), 274.
[35] S.M. Eisenstein, "Vertical Montage" (1940), *Selected Works, Volume 2*, 336.
[36] S.M. Eisenstein, "Color (2)" (1947), S.M. Eisenstein, *Immoral Memories: An Autobiography*, trans. Herbert Marshall (London: Peter Owen Ltd., 1985), 257.
[37] *Variety*, June 12, 1935, 2.

achieving a kind of unity, totality, simultaneity, of a continuous representation of *experience*, with emphasis either on the concrete, physical reality (*mimesis*) or on the experience of this reality through the body and the senses. Both these models of colour and sound correlations are bound up with a strong teleology, where technological and scientific evolution is emphasised as conditions for achieving the synthesis. As Judith Zilczer has pointed out, the search for visual music is characterised by a tension between idealism and scientific positivism. [38]

According to Eisenstein, colour film is a medium approaching the ancient and contemporary ideal of audiovisual synthesis, established by, among others, Wagner and Scriabin: "To demolish the contradictions between picture and sound, between the visible world and the audible world! To create a unity and a harmonic concordance between them!"[39] The fusion of colour and sound elements entails "the most inspired images of audiovisual exaltation".[40]

In 1927, the artist Louis Favre also promoted the ambition of a new art form, "musique des couleurs", featuring the projection of moving colour, and claimed that although notions about this art form had been a dream throughout human history, it could not have been realised until the present-day, due to the aesthetic development of the other art forms, as well as technical and scientific evolution, supplying the necessary means for a new art medium.[41]

In his book on the development on colour-music as an art form, *Colour-Music: The Art of Light* (1926), Adrian Bernard Klein also referred to the evolution in science and art, and the new inventions made use of by artists.[42] He also argues for the need of a book on the subject, in order to establish a general idea of the knowledge obtained in the field up till then (as well as its potential in the future), referring to what he recognises as a common and counter-productive notion of the art form as an entirely new concept or practice: "Nearly every one who has imagined an art of colour-music has laboured under the delusion that he was the first in the territory, and that he was blazing a track through an entirely unknown and unexplored region. The lack of a reliable account of the progress which has been made has led to considerable duplications of research work."[43]

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[38] Judith Zilczer, "Music for the Eyes: Abstract Painting and Light Art", *Visual Music*, 27.
[39] Eisenstein, "Vertical Montage" (1940), 337. See also S.M. Eisenstein, "Not Coloured, But In Colour" (1940), *Notes of a Film Director*, ed. R. Yurenev, trans. X. Danko (New York: Dover Publications, 1970), 118.
[40] S.M. Eisenstein, *Nonindifferent Nature: Film and the Structure of Things* (1945), trans. Herbert Marshall (Cambridge/New York/Melbourne: Cambridge University Press, 1987), 109.
[41] See Louis Favre, *La musique des couleurs et le cinéma* (Paris: Les presses universitaires de France, 1927), 30f.
[42] Klein (1926), xii-xiii.
[43] Ibid., v.

Furthermore, Klein referred to what he characterised as a general "movement from simplicity to complexity" throughout art history, a development further enhanced by the progress of science, which does not only benefit the development of the new art form, but of art in general:[44] "Already the interaction between science and art, as between science and religion, has begun. The science of psychology will inevitably lead to a clearer understanding of the process by which the art-languages convey ideas and emotions."[45]

The interaction between art, popular culture and science in terms of interest in synaesthesia is demonstrated in the four *Farbe-Ton-Forschungen* ["colour-sound research"] congresses held at the University of Hamburg between 1927 and 1936, where papers on the studies on synaesthesia in fields like psychology and medicine were brought together with colour organ performances and screenings of "synaesthetical" films.[46] Oskar Fischinger, who screened a number of his films during these congresses, also presented a paper about the challenges generated by colour and sound in connection with the screening of the film *R.5*, during the second congress in 1930.[47]

The recurring notions of cinema as a Wagnerian *Gesamtkunstwerk* underscores that the synaesthetical model is not only related to the unity of senses, but also to the combination between different media and art forms, as well as the synthesis between art and science. The unity of senses is achieved through the capability of new technology to represent "inner life", as envisioned by Ricciotto Canudo in 1923:

> Film will increasingly serve as Art's powerful coadjutor. When the painter and the musician truly wed the poet's dream, and when their triple expression of a single subject is achieved in living light by the *écraniste* – at least while we wait for the screen's Wagner to embody all three at once – films will reach us with a supreme clarity of ideas and visual emotions. We will recognize cinema as the synthesis of all the arts and of the profound impulse underlying them. It will be our immaterial Temple, Parthenon, and Cathedral. It will be a lucid and vast expression of our internal life, infinitely more vibrant than all previous forms of expression. Cinema will be able to construct the synthesis-temple of our intense inner life, in the heavens that its new strength will illumine and "illustrate" by means of the incomparable findings of Science.[48]

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[44] Ibid., xii.
[45] Ibid., xii.
[46] See *Visual Music*, 238ff. See also Leslie, 188, and Favre (1927), 32n.
[47] Oskar Fischinger, "The Problem of Color and Sound in Film" ["Farbe-Tonprobleme des Films"] (1930), *Der deutsche Avant-Garde Film der 20er Jahre / The German Avant-Garde Film of the 1920's*, eds. Angelika Leitner, Uwe Nitschke (München: Goethe-Institut, 1989), 120ff.
[48] Ricciotto Canudo, "Reflections on the Seventh Art" ["Réflexions sur le septième art" (1923)], trans. Claudia Gorbman, *French Film Theory and Criticism, Volume I*, 293f.

The perception of silent monochrome film images as *lacking* colour and sound, as in being in need of them in order to be fully complete, also entails that the *presence* of one of these missing qualities might generate ideas about the other. This is particularly the case with colour, because of its status as primarily a subjective perceptual phenomenon, perceived exclusively through the eye (in comparison to visual form, which also can be sensed through touch).

Thus, colour often functions ideologically (and structurally within a text) as a principal gateway to the other senses, to notions about experiencing the world through the body and the senses. In the 'colour vision' of early photographic colour film, the colours in the image seem to be a physical trace of the camera's unique 'perceptual' capability, that brings the film closer to the reality it depicts (or tries to reproduce or duplicate). Thereby, the presence of 'natural' colour is sometimes referred to as increasing the spectator's ability to imagine the sensory aspects that still are missing from the film experience, in particular hearing: the presence of colour is supposed to generate ideas about sound. These notions are also evident throughout discourses on early 'natural' colour processes like Kinemacolor. In the Kinemacolor catalogue, the depiction of chickens in the film *Barnyard Pets* (1910) is described like this: "It is really surprising how natural they look; when they open their beaks to squeak one can almost imagine one hears them."[49] After the first public demonstration of Kinemacolor in the USA in 1909, Burton H. Allbee also remarked that the reproduction of a harvest was "quite as lifelike as they would have been had one been standing on an eminence watching the various operations at a little distance. The life of the scene was all there but the spoken word," he points out, adding "and a little distance away that would have been inaudible".[50] The naturalness of the colour seemed almost to create a need for sound: "So perfect is the reproduction of the exact appearance of the surf", claims the catalogue in the depiction of a rocky coastline in *Scenes in Cornwall* (1910), "that with appropriate sound effects the picture may be made most realistic".[51] The realism of the footage of the unveiling of a Queen Victoria memorial in 1911 is, according to the catalogue, so convincing that with the addition of "suitable music and effects this film is the most perfect resuscitation of an actual occurrence that it is possible to conceive".[52] When the film shows a conductor striking up a specific hymn, it is suggested that a verse of this song should be played or sung, in order to increase "the effectiveness of the film", and likewise, simultaneously as the statue is unveiled, "the first boom

[49] *Catalogue of Kinemacolor Film Subjects*, 49.
[50] Allbee, "Impressions of Kinemacolor Films", 915.
[51] *Catalogue of Kinemacolor Film Subjects*, 52. See also ibid., 53, 55, 70.
[52] Ibid., 148.

of the guns should be heard and the choir should sing 'God Save the King'".[53] Sound effects, which were common during early cinema screenings, were manufactured and performed specifically for Kinemacolor productions. In 1911, *Moving Picture World* reported on the introduction of sound effects in association with the screening of Kinemacolor's Coronation film in a New York cinema.[54] The "sound imitations" were praised for their "absolute realism", and the manufacturers were described as a "firm of nature fakirs". Similarly, in a "Kinemacolor supplement" to *The Kinematograph & Lantern Weekly* in August 1912, "the paramount values of (1) an efficient musical accompaniment, (2) an inexpensive but wonderfully efficient installation of modern 'sound effects'" are emphasised as adjuncts to Kinemacolor film programmes.[55]

The use of sound also suggested a substitution for colour images. While films of the Coronation processions through London in 1911 were shot in Kinemacolor, no filming was allowed of the actual Coronation ceremony. This was compensated for during the subsequent screenings at the Kinemacolor theatre in London, by the orchestra, playing fanfares, a choir singing hymns and intermittently shouting tributes to the King and Queen, single voices reciting the words of the Archbishop and the King during the ceremony, as well as sound effects of guns and church bells.[56] The Kinemacolor catalogue describes these proceedings in detail, recommending prospective exhibitors to include a similar auditory reconstruction in order to "greatly aid the realistic presentation".

Kinemacolor was also linked to music in a metaphorical and intermedial manner. A film consisting of, to use Balázs' term, the "colour events" of Egyptian sunsets were described as visual symphonies, and specific musical pieces were suggested as accompaniment in the catalogue.[57] In September 1912, the Scala Theatre in London exhibited the production *Mephisto* (Alfred de Manby, F. Martin Thornton, 1912), which involved a combination of live staged opera and film scenes in Kinemacolor, featuring a choir and orchestra performing selections from Charles Gounod's *Faust*, with "every *motif* being in keeping with the particular incident shown on the stage"; the "staged scene and moving picture story" were presented as "being dovetailed into one another in so surprisingly realistic a fashion that, as the pictures themselves will be presented in natural colors by KINEMACOLOR, it will be difficult at times to be sure where actuality

[53] Ibid.,, 150.
[54] "Kinemacolor Sound Effects", *Moving Picture World*, August 26, 1911, 548.
[55] "Our Policy", Kinemacolor Supplement, *The Kinematograph & Lantern Weekly*, August 15, 1912.
[56] See the *Catalogue of Kinemacolor Film Subjects*, 168.
[57] Ibid., 215ff.

begins and moving picture ends."[58] Furthermore, the natural colour of Kinemacolor were sometimes also connected to notions of other senses than hearing; an excerpt from a review in the *Bournemouth Echo* of the film *A Run with the Exmoor Staghounds* (1910), quoted in the catalogue, suggested that the colour in the film is so realistic "that one can fancy one hears the bay of the hounds, smell the odour of the bracken crushed by the galloping huntsmen, and feel the fresh moorland breezes blowing".[59]

Although features like stereoscopy and the wide screen were more commonly mentioned as obvious and expected future technological developments after the introduction of sound and colour, still confining the definition of cinema as an audiovisual medium, and usually within the realm of the mimetic, there are even singular examples of conceptions, and plans or attempts at expanding the synaesthetic fusion between colour vision and hearing by adding other sensory elements, in particular olfactory components. These features were, on the other hand, usually associated with synaesthetic *spectacle*, rather than with attempts at a more 'complete' reproduction of reality. For example, the "all-star revue" *The Hollywood Revue of 1929* (Charles Reisner, 1929), featuring several of MGM's contract players, comprised a number of Technicolor sequences, among them a dance sequence during which, according to the review in the *New York Times*, "the faint perfume of orange blossoms arises to one's nostrils. It was something that was introduced with this audible offering during its run in Hollywood."[60] Walt Disney's original conception for *Fantasia*, the large-scale visualisation of music in a full-length film, included, in addition to the stereo sound which was achieved for the project, unrealised plans for wide screen, for showing the abstract visualisation of Bach's *Toccata and Fugue* three-dimensionally, and plans of adding flower scents during the flower ballet accompanying *The Nutcracker Suite*.[61]

Alexander Scriabin's concept of synaesthesia encompassed the fusion of hearing and sight, but also combined with smell. Scriabin claimed that "through music and colour, with the aid of perfume, the human mind or soul can be lifted outside or above merely physical sensations into the region of purely abstract ecstacy and purely intellectual speculation".[62]

In an article on the representation of smell in cinema, Vinzenz Hediger and Alexandra Schneider point out that "unlike color or sound", technologies to create olfactory environments during film screenings never became a

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[58] "'Mephisto': Next Week's Great Kinemacolor Production at the Scala Theatre", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, August 29, 1912. See also the Kinemacolor supplement, September 12, 1912.
[59] *Catalogue of Kinemacolor Film Subjects*, 82.
[60] Mordaunt Hall, "Fun and Catchy Music", *The New York Times*, August 15, 1929, 20:5.
[61] John Culhane, *Walt Disney's Fantasia* (New York: Harry N. Abrams, Inc., 1983), 10f., 38.
[62] Alexander Scriabin as cited in John F. Runciman, "Noises, Smells and Colours", *The Musical Quarterly* 1, no. 2, April 1915, 149, quoted in Olivia Mattis, "Scriabin to Gershwin: Color Music from a Musical Perspective", *Visual Music*, 219.

standard feature in film exhibition.[63] Smell has never really been culturally coded, and has never been an integrated component in traditional art forms or media; Laura U. Marks points out that although smell can be considered as the most immediate of all sense perceptions, "it has escaped most efforts to regiment it in the realm of signs".[64] Hediger and Schneider refer to how odours were consciously and gradually removed from the public spheres in western culture, beginning in the eighteenth century, primarily linked to the increasing concern with public hygiene.[65] A "de-odorisation" of the public sphere, with industrially produced fragrances entering the market, took place in the late nineteenth century parallel with the invention of cinema. The addition of smell during screenings serving as a narrative, diegetic element is restricted to a few limited experiments (including experimental filmmakers Angela Ricci Lucchi and Yervant Gianikan who, in the 1970s, accompanied some of their films with a "smelling organ", comparable to the colour organs that were common earlier in the century), and even a film like John Waters' *Polyester* (1981), originally screened with a "scratch-and-smell" card titled "Odorama" is, according to Hedinger and Schneider, a display of the repression of smell through its technology reproducing odours in a controlled fashion.[66] Discourses on smell have thus been associated with discourses of control even to a greater extent than colour. Marks relates smell to Deleuze's affection image as a mimetic image connecting directly and instinctually to the body.[67] She also points out that Peirce, whose concept of 'Firstness', i.e. an immediate quality perceived by the body (in contrast to 'Thirdness', referring to more abstract, immaterial and symbolic signs), serves as a source for Deleuze's notion of the affection-image, mentions a number of smells as examples of signs possessing 'Firstness'.[68] Deleuze also associates what he characterises as the "colour-image" in cinema to the affection-image, which is epitomised by the close-up, where the isolation of the face in this type of image detaches it from concrete causal relations and the specific time and space of the action.[69] Thus, both the close-up and the colour-image constitute "any-space-whatevers" whose function is not to depict or represent anything specific, but through its abstract character, create a kind of pure affect.[70] Moreover, Eva Jørholt

[63] Vinzenz Hediger, Alexandra Schneider, "The Deferral of Smell: Cinema, Modernity and the Reconfiguration of the Olfactory Experience", *I cinque sensi del cinema / The Five Senses of Cinema*, eds. Alice Autelitano, Veronica Innocenti, Valentina Re (Udine: Forum, 2005), 244.
[64] Laura U. Marks, *Touch: Sensuous Theory and Multisensory Media* (Minneapolis/London: University of Minnesota Press, 2002), 114.
[65] Hediger, Schneider, 244f.
[66] Ibid., 247.
[67] Marks, 114f.
[68] Ibid., 115f.
[69] Deleuze, 102ff.
[70] Deleuze, 118.

points out that Peirce also mentions the colour red as an example of 'Firstness'.[71] Peirce explains that the "First is that whose being is simply in itself, not referring to anything nor lying behind anything. [---] The idea of the absolutely First must be entirely separated from all conception of or reference to anything else. The First must therefore be present and immediate, so as not to be second to a representation. [---] […] every description of it must be false to it."[72]

Marks goes on to consider a number of audiovisual strategies to represent smell in cinema.[73] She points out that the reason that smell is usually represented through audiovisual means is not only due to technical limitations, but because, she continues:

> sight and hearing are the most public of senses. Along the continuum of mimetic and symbolic images, visual and sound images tend to be symbolic signs. While we experience their rawness, their immediacy to perception, images and sounds tend to quickly resolve themselves in our understanding, so that we are pulled in their symbolic, quasi-linguistic meaning. [---] Visual and sound images call up, to different degrees, a shared cultural symbolic.[74]

The comparison with smell demonstrates the ambiguity of colour as an expressive or affective visual element. Mikhail Iampolski points out Kandinsky's distinction between visible colours, always taking place in a context, on the one hand, and colour as a pure linguistic abstraction, as a relation between the possible, the idea and the real, on the other.[75] Kandinsky remarks: "Colour cannot stand alone; it cannot dispense with boundaries of some kind. A never-ending extent of red can only be seen in the mind; when the word red is heard, the colour is evoked without definite boundaries."[76] Although colours, just like odours, can be imagined independently from objects or contexts, as a kind of 'pure' affect, their direct integration with and origin in contexts, objects and images nevertheless make them much more effective as a means of communication. To the same extent that colour escapes meaning, it is also extremely functional in *creating* systems of meaning. Colour, regardless of medium, is, like cinema in general, usually bound up in a cultural tradition of representation.

Nevertheless, most efforts to create analogies between sound and colour in cinema contain the admission that the two elements are fundamentally

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[71] Eva Jørholt, "Deleuze i farver", *Kosmorama*, 221, 1998, 105.
[72] Charles Sanders Peirce, *Peirce on Signs: Writings on Semiotics by Charles Sanders Peirce*, ed. James Hoopes (University of North Carolina Press, 1991), 188f.
[73] Marks, 116ff.
[74] Ibid., 118.
[75] Mikhail Iampolski, "Color as a Language", *Re: The Rainbow*, ed. Aris Fioretos (Stockholm/Lund: IASPIS/Propexus, 2004), 31.
[76] Wassily Kandinsky (1912), quoted in ibid., 31.

different. This has to do with the fact that the dissimilarities between colour and black-and-white film images are very different from the dissimilarities between sound cinema and silent cinema, and far more difficult to define. As Norman Lee pointed out in 1937, in a book on screenwriting: "Talk supplied a vital, missing part. While the screen remained dumb it remained artificial, a mere shadow of stageland, and unreality. Every film fan subconsciously *wanted* talk. But do they need and cry for colour?"[77] At the same time as colour in an image can be described as subjective, changeable or unreliable, and linked to a number of different kinds of "colour vision", it is nevertheless usually an integrated part of the world already made visible by the black-and-white image. As William Johnson points out, "color was *not* an addition (like sound) or a simple modification (like the wide screen)".[78]

Sound, on the other hand, represents an additional, separate track, and an independent medium outside the image. Pudovkin's and Eisenstein's concepts about sound as a montage element and the audiovisual counterpoint relies specifically on this notion of separation.[79] Most of the attempts to describe colour through musical or aural metaphors, treat colour as a separate, individual, independent element. Furthermore, the soundtrack consists of a number of easily discernible elements, performing different functions, like speech, sound effects, and music. Comparisons between colour and sound often involve the ambition of making colour perform the same variety of functions as different sound elements do, from the "moods" and notions of 'pure' affect provided by music, to the clear, communicable meanings provided by speech and verbal language.

Colours, Speech, and Music

The rapid conversion from silent to sound film production in Hollywood between 1927 and 1928 was essential to the growing interest in colour as the next logical step. Herbert T. Kalmus, the president of the Technicolor company and co-inventor of the original process, argued that the conversion and confidence in the future of sound film "was a great help to [Technicolor] in introducing color. Prior to that, studio executives were loath to permit any change whatsoever in their established method of photography and production. But with the adoption of sound, many radical changes became necessary."[80] The cinematographers Hal Hall and William Stull described the

[77] Norman Lee, *Money for Film Stories* (London: Sir Isaac Pitman & Sons, 1937), 79.
[78] William Johnson, 213.
[79] See Eisenstein, Pudovkin, Alexandrov (1928), 113f., and Vselevod Pudovkin, *Film Technique and Film Acting* (London: Vision Press, 1954), 183ff.
[80] H.T. Kalmus, "Technicolor Adventures in Cinemaland" (1938), *A Technological History of Motion Pictures and Television*, 55. See also Neil Harris, *Cultural Excursions: Marketing*

development this way in 1930: "The advent of sound set the industry upon its toes, as it were, and progress was the watchword of everyone. Perhaps no greater progress was made during this year than that in the field of color cinematography."[81]

This new openness to change also led to the belief that colour film would have the same immediate success as sound film. In a three-page advertisement in 1930, the Technicolor company described the recent evolution of the film industry: "For more than thirty years the motion picture told its stories in silent grey shadows. Then came sound – a great step forward. Now color – natural color – Technicolor! And at last the motion picture lives!"[82] In a letter to *Variety* in 1929, Jerome Beatty, the national publicity director of the Technicolor Company made this prediction: "in two years, or less, black and white motion pictures will be as scarce as silent pictures are today. Practically everything will be in Technicolor."[83] A Technicolor advertisement in *Variety* exclaimed how "[m]ore than 100 feature pictures – all or part Technicolor – will be playing in America's motion picture theaters in 1930. A year ago the big box-office draw was SOUND. TODAY IT IS TECHNICOLOR."[84] John Seitz, the president of The American Society of Cinematographers emphasised in 1930 how the emergence of sound, "to an almost unbelievable extent", created a new demand and need for colour photography: "No doubt the incongruity of black and white images speaking lines and singing songs like living beings created a demand for a greater illusion of reality. This color photography helps to supply."[85] A 1930 book on sound film aesthetics, by Walter B. Pitkin and William Marston, described how "the motion picture industry stands comitted to color as a basic feature of its production program for the year 1929-1930, with a promise of increasing amounts of color in all pictures to follow in the future".[86] In *The 1930 Film Daily Yearbook of Motion Picture*, sound, colour and the wide screen had one page each dedicated to them, and there, as well, the recent conversion from silent to sound was linked to the idea of an approaching conversion from black and white to colour:

Appetites and Cultural Tastes in Modern America (Chicago/London: Chicago University Press, 1990), 325f.

[81] Hal Hall, William Stull, "Motion Pictures in Natural Colors", *Cinematographic Annual 1930, Volume One*, ed. Hal Hall (Hollywood: The American Society of Cinematographers, Inc. / The Hartwell Publishing Corporation, 1930, repr. New York: Arno Press Inc., 1972), 273.

[82] "Technicolor Is Natural Color!" (advertisement), *The Saturday Evening Post*, 202, January 11, 1930, 60ff., quoted in Nowotny, 235.

[83] Jerome Beatty, *Variety*, December 18, 1929, 9.

[84] Technicolor advertisement, *Variety*, January 15, 1930, 15.

[85] John Seitz, "Introduction", *Cinematographic Annual 1930*, 16f.

[86] Walter B. Pitkin, William Marston, *The Art of Sound Pictures* (New York/London: D. Appleton and Company, 1930), 241.

> The industry is rapidly becoming color conscious. With the major problems of sound successfully solved, the studios and color processes are now bending their efforts to the further development of color cinematography. [---] In this business of surprises, it is within the bounds of possibility that color will eventually transplant the black and white film. Even as today a silent feature strikes the sound-educated public as more or less of an oddity, it may come to pass that in the future a black-and-white subject will appear outdated in comparison with an all-color film.[87]

In 1935, Mamoulian also predicted that once 'natural' colour and speech had been introduced to cinema, they could not be taken away without producing a sense of absence:

> They say that what we do not have, we do not miss. No one ever missed electricity until it came to replace oil and gas. No one missed dialog upon the screen while the screen was silent. However, let a dumb man, after thirty years of life, acquire the gift of speech; would he want to give it up and go back to his silence? Speech came to the screen and stayed – victorious. Now, let a man with ailing eyes wearing black glasses through which the world looks gray, suddenly recover his sight, throw away his glasses, and see the luxury of color of the sky, the earth, and the flowers; would he ever go back to his black glasses? We never missed color upon the screen because the very art of the cinema was born black and white. It was a convention that had to be accepted. But once real color comes to the screen, we shall feel its absence as forcefully as we feel the absence of sound when looking at a silent film made some years ago.[88]

Belton remarks that one of the most interesting aspects of the technological optimism expressed in predictions such as these is "just how far off the mark they are. What is fascinating for the historian of technology about the invention, innovation, and diffusion of colour within the industry is the relatively lengthy span of time that it took for it to occur."[89]

Between 1929 and 1932 there was an extensive production in Hollywood of so-called "color talkers" using (two-strip) Technicolor process no. 3.[90] The first film distributed in this particular category, whose attraction to an important degree relied on the combination between sound and colour, was the Warner Bros. musical *On with the Show!* (Alan Crosland, 1929), which was a huge box-office success.[91] The status of these films as innovation and

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[87] *The 1930 Film Daily Year Book of Motion Pictures* (New York: John W. Allicoate, 1930), M.

[88] Rouben Mamoulian, "Some Problems in Directing Color Pictures", *Journal of the Society of Motion Picture Engineers*, 25:2, 1935, 148f.

[89] John Belton, "Cinecolor", *Film History*, 12:4, 2000, 344.

[90] See Nowotny, 231ff. See also James L. Limbacher, *Four Aspects of the Film* (New York: Brussel & Brussel, 1968), 29f.

[91] See Donald Crafton, *History of the American Cinema, Volume 4: The Talkies: American Cinema's Transition to Sound, 1926-1931* (Berkeley/Los Angeles/London: University of California Press, 1999), 196f., 279f.

novelty was compared to the emergence of sound cinema and as a natural continuation of the change that sound had set in motion. The *Variety* review of this film stressed, like in many other instances, the economic potential of colour, and used *On with the Show* as proof that "the talkers are young enough to be advanced by experimentation of engineers or directors", and that the colour could be regarded as "a decided step".[92] The review continued with a discussion on the possibilities of the wide screen, also a recurring theme in many of this publication's reviews of early Technicolor sound films, and suggested how this film would have profited from the advancement of a huge screen in addition to sound and colour.

In the reviews of the "color talkers", the qualities of the colours were often compared to those of the sounds and the voices in the same film, both in terms of their mutual origins as 'trace', how they were registered, but also as interacting aesthetic elements. In *The New York Times*, the reviewer of another Warner Bros. colour musical later the same year, *Gold Diggers of Broadway* (Roy Del Ruth, 1929) considered how the film "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 comedy".[93]

The same critic, in his review of *On with the Show*, praised "the beauty of [the film's] pastel shades" but disliked the "raucous voices" which accompanied them:

> The dialogue, so jarring on one's nerves, sometimes comes from cherry-red lips on faces in which the lily and the rose seem to be struggling for supremacy. It is like hearing Eliza Doolittle argot in "Pygmalion" when she is arrayed in all her Mayfair glory. 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 production […]. [---] Some of the utterances cause one to ponder on what might happen if the works of old masters were suddenly gifted with speech. It would have been better if this film had no story and no sound, for it is like a clumsy person arrayed in Fifth Avenue finery. [---] It is better to please the eye with reds, greens and other colors than to listen attentively to the squabbling of a group of players who are impersonating fourth-rate theatrical troupers.[94]

In this review, the novelty of colour was compared to objects of beauty and refinement, such as flowers, sophisticated clothing, and paintings, and thus contrasted to the coarseness of not only the words of the dialogue, but even more importantly the voices uttering them. A review of the "all dialog" and

[92] Review of *On with the Show* ["(ALL DIALOG) (With Songs and Technicolor)"], *Variety*, June 5, 1929, repr. in *Variety's Film Reviews 1926-1929, Volume Three* (New York/London: Garland Publishing, Inc., 1983).
[93] Mordaunt Hall, "Fair Forty-Niners", *The New York Times*, August 31, 1929, 13:4.
[94] Mordaunt Hall, "Dialogue and Color", *The New York Times*, May 29, 1929, 28:6.

"5% Color" musical *Glorifying the American Girl* (John W. Harkrider, Millard Webb, 1929) pointed out how the colour as well as lavish costumes "tended to increase the impression of costliness".[95] But there were also several instances in reviews of early "color talkers" where the colours, and perhaps even more importantly the nature of the sequences where Technicolor was displayed, were accused of distracting from other elements. The musical, *Paris* (Clarence G. Badger, 1929), which included two lengthy Technicolor sequences, was criticised for being "too generously padded with prismatic sequences in which there are lengthy interludes with parading chorus girls"; the sumptuous colours were accused of "haulting the narrative" and "stealing laughs from the show".[96] The Technicolor operetta, *The Vagabond King* (Ludwig Berger, 1930), was reproached for having "scenes that depend too much upon the color effect" and for being "too generous with their tinted scenes", causing interference which lessened interest in terms of narrative.[97]

The connection or association between the musical genre and colour film (in particular Technicolor) was evident from the first "color talkers". Gorham Kindem has pointed out that, according to the American Film Institute Catalogue of feature films, "fourteen of seventeen full color features, and twenty-three of thirty-four black-and-white feature films with color sequences, released in 1929 and 1930, were musicals".[98] And when Pitkin and Marston in 1930 suggest that color "has come to stay", their main reason for this is "the necessity for color in 'girl shows,' revues and musical entertainment which are now taking their place in motion pictures as a result of sound recording and reproduction."[99]

The end of silent cinema also coincided with prints with non-photographic, applied colour diminishing from distribution. Approximately 85 per cent of the total production during the silent era had tinting, toning or a combination of both systems, but after 1925, and particularly after the introduction of the optical soundtrack on film, more and more films were distributed in black and white.[100] The soundtrack on film is often used as an explanation as to why the pre-tinted positive film stocks that were used for tinted prints during the early 1920s became almost obsolete, as the colour of the existing types of tinted base (and the splicing of different film bases)

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[95] Review of *Glorifying the American Girl* ["(ALL DIALOG) (5% Color)"], *Variety*, January 15, 1930, repr. in *Variety's Film Reviews 1930-1933, Volume Four* (New York/London: Garland Publishing, 1983)

[96] Mordaunt Hall, "Irene Bordoni and Jack Buchanan", *The New York Times*, November 8, 1929, 31:2.

[97] Mordaunt Hall, "A Romantic Villon", *The New York Times*, February 20, 1930, 22:4.

[98] Gorham Kindem, "Hollywood's Conversion to Color", 156f., reference to *The American Film Institute Catalogue: Feature Films 1921-1930* (New York: Bowker, 1976).

[99] Pitkin, Marston, 241.

[100] See Cherchi Usai (2000), 23 and "The Evolution of Film", *Cinematographic Annual 1930*, 37f.; Ryan, 19.

interfered with the soundtrack.[101] However, Eastman Kodak developed a new series of 17 tinted positive film bases, Sonochrome, which was compatible with the existing sound systems,[102] and tinting was applied to a number of films long after the coming of sound.[103] But as Steve Neale has pointed out, although the opportunity to use tinting and toning was still available after the coming of sound, it was not often exploited. Neale's explanation is, rather, that the coming of sound introduced a new kind of aesthetic realism based on synchronised, recorded sound, and the soundtrack had the same kind of status as *trace* as the photographic image had: "sound was added to image, speech to the body, dialogue to the fiction, and so on. And this realism had a particular technological base, both in theory and in practice, that is synchronised, recorded sound."[104] The monochrome colours of tinting and toning represented rhetorical or symbolic functions, often motivated by mood rather than by narrative. Thus, Neale suggests that "the colour technology appropriate, so to speak, to the predominant aesthetic of sound cinema was found in 'natural' photographic colour systems".[105]

Although the combination of 'natural', photographic colour, or "colour-recording through the camera",[106] and a synchronised soundtrack was often presented as an important step toward a more 'complete illusion', a closer resemblance to reality (with the stereoscopic, three-dimensional film often considered as the next logical step), the majority of "color talkers" belonged to a genre representing fantasy, non-reality, spectacle and escapism. This 'double function' of colour in terms of representation, as both enhanced 'reality' and 'non- reality', is evident throughout film history, regardless of system or 'origin'; as mentioned earlier, the applied colour methods of the silent era were widely used in all film genres. Hand and stencil colouring were frequently used to accentuate the artifice and spectacle of the fantasy worlds depicted in, for example, *féeries* and trick films, as well as to imitate and simulate the "authenticity" colours of landscapes as they were seen in the real world in great detail, in stencil coloured travelogues of the 1910s.[107]

With the "color talkers" of the late 1920s and early 1930s, this tension becomes especially evident, as colour is both being compared to and combined with sound. During this period colour and sound are both direct trace or imprint as well as attraction and novelty. The functions associated

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[101] Other explanations for the disappearance of tinting was the introduction of Technicolor and other colour systems and the introduction of panchromatic film, which were not as suited for tinting or toning as orthochromatic film was. See Cherchi Usai (2000), 23.
[102] See Loyd A. Jones, "Tinted Films for Sound Positives" [1929], *Abridged Scientific Publications from the Kodak Research Laboratories,* Volume XIII, 1929 (Rochester: The Eastman Kodak Company, 1930), 223f.
[103] See Limbacher, 6f., for examples of tinting used in sound films in the 1930s-1960s.
[104] Neale, 119.
[105] Ibid.
[106] Watts, 114.
[107] See Cherchi Usai (2000), 22.

with colour and the extent to which they are applied, both in this specific time period and the development which followed, are the results of a number of technological and economic, as well as aesthetic and ideological factors. Ultimately, the so-called "necessity for colour", or for sound, was determined by general ideas about cinema, about what films should be about, which cinematic features or possibilities filmmakers should emphasise, and which features they should restrain.

The technological development of different colour film systems is closely linked to specific aesthetic results and, therefore, even to the specific contexts and associations colour in cinema has been connected with. The idea of colour in film as enhanced reality was challenged by the fact that the colours of Technicolor looked noticeably different than the colours of the reality which was being reproduced. In an essay on illusion and cinema published in 1929, Paul Fejos expressed scepticism towards using the currently available colour photography in sound films:

> So far, reality in color has not been approached. The real medium of sound pictures, I believe, is in black and white. As yet color films have only succeeded in transferring the prismatic hues which belong on the teacups to the screen, making of men and women not human beings but painted dolls. That is a start, however.[108]

This lack of fidelity to the colours of real life was sometimes commented upon in reviews, but was not necessarily considered a problem. A review of *Sally* (John Francis Dillon, 1929), an "audible, Technicolor pictorial" musical, points out that the "prismatic glimpses may not always be true, but that does not make them any the less lovely".[109] One of the seven Technicolor numbers in the revue film, *Paramount on Parade* (Dorothy Arzner, Otto Brower, Edmund Goulding, Victor Heerman, Edwin H. Knopf, Rowland V. Lee, Ernst Lubitsch, Lothar Mendes, Victor Schertzinger, A. Edward Sutherland, Frank Tuttle, 1930), featured Maurice Chevalier and chorus girls performing the aptly titled song "(Up on Top of a Rainbow) Sweepin' the Clouds Away" during the finale. The *New York Times* review described the "rainbow of pretty girls" presented in the number, and concludes that the "colors may not be true to the prism, but […] they are effective".[110] The functions of colour in cinema, and perhaps particularly in the musical genre, were obviously often expressive or affective rather than realistic. When trying to identify the aesthetic motivation for the association between two-strip Technicolor and musicals, Kindem considers this

[108] Paul Fejos, "Illusion on the Screen" [orig. publ. *National Board of Review Magazine*, June 1929], *Hollywood Directors 1914-1940*, ed. Richard Kozarski, (London/Oxford/New York: Oxford University Press, 1976), 225.
[109] Mordaunt Hall, "Marilyn Miller", *The New York Times*, December 24, 1929, 14:4.
[110] Mordaunt Hall, "A Hollywood Studio Frolic", *The New York Times*, April 21, 1930, 20:4.

inaccuracy of the colour process, its limited range and unpredictability in terms of colour reproduction as producing "an atmosphere of unreality" suited for escapist and fantasy genres like the film musical.[111]

Thus, the technical imperfection of the colour system suggests a level of abstraction. Since the colours in the films differ radically from the objects, people and phenomena of the reality that is being depicted, the colours seem to transcend and change the objects that embody them in the image to become autonomous affective qualities with a potential for creating new kinds of images. The association with the film musical suggests that the properties and qualities of colours are likened with the affective qualities of music rather than with sound in general. Colour seems essential when visualising *singing* rather than *talking* (just as an early sound film like Crosland's *The Jazz Singer*, 1927, uses synchronised sound primarily for song sequences, while dialogue for the most part is represented through intertitles). This connection between colour and music is not necessarily only related to a historically- and technologically-based common status as spectacle and non-reality, but maybe to other affective and structural affinities between colour and music in general.

The success and interest in Technicolor around the early 1930s was relatively short-lived, and by 1932, the production of "color talkers" more or less discontinued.[112] The sudden great demand of colour films directly after the coming of sound was more than the Technicolor company or any of the other new colour processes developed and launched during this period were able to meet, which led to a decrease in the quality of the prints they produced.[113]

In addition to the relation between imprecise reproduction and aesthetic associations, Kindem suggests that the upsurge and decline of "color talkers" was linked to Hollywood's general response to the depression and its social consequences, which during its first years were largely ignored (both in terms of financial risks being taken, and in terms of content). The musicals and the "other relatively expensive (sound and colour) escapist fare" of the early 1930s were eventually replaced with more realistic and pessimistic black-and-white films (e.g. gangster films) as the depression progressed.[114] In this aesthetic of realism, sound played a natural, integrated part, while colour had no comparable purpose or function. Dyer argues, however, that Kindem over-emphasises the 1930s' "gangster and social problem films" over the black-and-white "escapist" films from the same period (comedies, musicals, fantasy and adventure films), and asks, in line with his argument on whiteness, if "what was not acceptable was escapism that was too loud and

[111] Kindem, "Hollywood's Conversion to Color", 157.
[112] See Nowotny, 237-243. See also Limbacher, 29f.
[113] See Nowotny, 238.
[114] Kindem, "Hollywod's Conversion to Color", 157.

busy, because excess colour, and the very word 'gaudy', was associated with, indeed, coloured people?"[115]

These polemics demonstrate the difficulty of discussing colour in terms of specific, singular representational values or associations – but more importantly they suggest that most films produced in Hollywood during the 1930s, regardless of being "realistic" or "escapist", did not necessarily seem to need colour.

The association between Technicolor and non-reality is obviously not limited to the early two-strip processes. Aumont discusses how the name "Technicolor" was associated with excess and artifice in France even after World War II, despite the company's overt policy of "colour restraint" and employment of colour consultants.[116] In a discussion on the development of sound and colour in Hollywood, Edward Buscombe points out the interaction between economic and ideological factors which preconditions technological innovations:

> Economic theories can only partially explain technological innovations, since economics cannot say why innovations take the form they do, only why they are an essential part of the system. Economics can explain the necessary but not the sufficient conditions for innovation. No new technology can be introduced unless the economic system requires it. But a new technology cannot be successful unless it fulfils some kind of need. The specific form of this need will be ideologically determined; in the case of cinema the ideological determinant most frequently identified has been realism.[117]

This notion of realism seems also to have been a clear objective in the development of photographic colour film processes, at least, as I have pointed out, this is taken for granted in the accounts of this technological development, usually emphasising the search for "natural" colour in terms of a more complete reproduction of reality rather than any other stylistic functions. The "detachment" between scientists and filmmakers in terms of the development of colour processes discussed in the previous chapter was

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[115] Dyer, 94.

[116] See Aumont (1994), 206. J.P. Telotte also remarks on the fact that three-colour Technicolor first was adopted by the Disney company entailed that colour was integrated in films whose style "was most accommodating to the sort of double discourse that seemed to swirl around discussions of color cinematography", combining notions of the "lifelike" and natural with notions of "spectacle" and exaggeration of the real. See J.P. Telotte, "Minor Hazards: Disney and the Color Adventure" (2004), *Color, the Film Reader*, 33. See also "What? Color in the Movies Again?", *Fortune* 10, October 1934, 92. See also Richard Neupert, "Painting a Plausible World: Disney's Color Prototypes", *Disney Discourse: Producing the Magic Kingdom* (New York/London: Routledge, 1994), 106-117. See also Fred E. Basten, *Glorious Technicolor: The Movies' Magic Rainbow* (Camarillo: Technicolor, Inc., 2005), 35ff.

[117] Edward Buscombe, "Sound and Color" (1978), *Movies and Methods, Volume II: An Anthology*, ed. Bill Nichols (Berkeley/Los Angeles/London: University of California Press, 1985), 87.

also reflected in discourses about the aesthetics of three-colour Technicolor during the late 1930s. Higgins refers to what he describes as a "tension between the scientist and the 'cameraman'", as a number of articles in *American Cinematographer* demonstrated a general critical attitude towards colour and more specifically towards "Technicolor's pride in the process's accurate rendition of color, and the concomitant desire for a properly exposed negative, for an inflexibility which was out of keeping with both the day to day demands of studio practice and the visual range necessary to serve film drama."[118] Higgins connects this conflict about colour to a similar tension between studio personnel and sound engineers during the early sound film period, referring briefly to James Lastra's division between the technician's ideas about sound representation in terms of "perceptual fidelity" or "realistic duplication" and the model of "intelligibility" characteristic of the classical Hollywood style, centring on dialogue and diegetic representation.[119]

In the same vein, but with regards to the development of colour-music, or light art, Klein also pointed out in 1926 that although the recent technical development of "suitable light sources" has been a requirement for considering the development of such artworks at all, still the "illuminating engineer is not an artist, and most artists are not engineers".[120] Thus, a colour-musician should be concerned with ideas relating to visual experience in general rather than technology.

Buscombe points out that realism alone is not necessarily sufficient as an ideological "need", as the hesitation in introducing both colour and sound not only was due to technical problems, but also to aesthetic objections.[121] The notion of a realist aesthetic is not necessarily the exact reproduction of reality or the perception of reality, "it has never been a question of what *is* real but of what is *accepted* as real. And when it first became technically feasible, color, it seems, did not connote reality but the opposite."[122] Notions of 'realism' in a Hollywood context are perhaps first and foremost distinguished by concentration on narrative functions, rather than replication of reality per se, and elements that may interfere with, and even be experienced as separated from, the elements of story or characters, like colour, should be controlled and subordinated.

Buscombe quotes the industry manual, *Elements of Color in Professional Motion Pictures*, published by the Society of Motion Picture and Television Engineers in 1957, which displays many of the aesthetic and ideological

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[118] Higgins, *Harnessing the Rainbow*, 149.
[119] See James Lastra, *Sound Technology and the American Cinema: Perception, Representation, Modernity* (New York: Columbia University Press, 2000), 138ff., and Higgins, *Harnessing the Rainbow*, 206n.21.
[120] Klein (1926), xiv.
[121] Buscombe, 87f.
[122] Ibid., 88.

approaches to colour within the classical Hollywood cinema, and points out that there are exceptions to the rule of 'subordination' to narrative: one is the value of "the feminine star" who should "be given undisputed priority as to the color of make-up, hair and costume which will best complement her complexion and her figure".[123] Another exception is "musicals and fantasy pictures", and in this case the role of colour as element of pleasure, of affect, is directly compared with the affective qualities of music:

> Musicals and fantasy films are open to unlimited opportunities in the creative use of color. Here we are not held down by reality, past or present, and our imaginations can soar. Musicals and fantasies are usually designed to provide the eye with visual pleasure in the way that music pleases the ear.[124]

Thus Buscombe links the non-narrative affective functions of colour in these genres to the song and dance numbers in musicals, which "sometimes succeed in cutting free of narrative altogether and functioning outside it".[125] Colour in Hollywood before the introduction of colour television is, therefore, according to Buscombe, functioning to "signify luxury or celebrate technology", becoming a self-reflexive rather than realistic or narrative cinematic element.[126]

Colour Percentages: Spectacle and Diegesis

The functions associated with colour are not necessarily limited to genres, or – for that matter – to specific films in their entirety. During the implementation of sound cinema during the late 1920s a number of films produced were characterised by their 'hybrid' forms, combining silent sequences with sound sequences, dialogue with intertitles; and many of the early "color talkers", though mostly being "all-dialogue", combined sequences in Technicolor with sequences in black and white. The quantities of dialogue and colour within a specific film were often stated in percentages in connection with reviews in *Variety*. The musical, *The Show of Shows* (John G. Adolfi, 1929), was thus categorised as being "ALL DIALOG, Songs, Dances" and "86% Color";[127] another musical, *No, No, Nanette* (Clarence G. Badger, 1930), was described as containing 42% colour.[128] The

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[123] *Elements of Color in Professional Motion Pictures* (New York: Society of Motion Picture and Television Engineers, 1957), 40, quoted in ibid, 90.
[124] *Elements of Color in Professional Motion Pictures*, 42, quoted in ibid.
[125] Ibid.
[126] Ibid., 91. See also David Bordwell, "Technicolor", in David Bordwell, Janet Staiger, Kristin Thompson, *The Classical Hollywood Cinema: Film Style & Mode of Production to 1960* (London: Routledge, 1985), 355.
[127] Review of *The Show of Shows*, *Variety*, November 27, 1929.
[128] Review of *No, No, Nanette*, *Variety*, January 8, 1930.

sequences shot in Technicolor in these chromatic hybrids were usually connected with spectacle and music:[129] Technicolor was, to name a few examples, used for stage performances and production numbers,[130] nightclub sequences,[131] ballroom scenes,[132] Mardi Gras sequences,[133] and dream sequences.[134]

What is described as the "impressive conception of a stage girl's delirious dream" shot in Technicolor in the 27% colour musical comedy, *It's a Great Life*, was praised in *The New York Times* for its "modernistic settings, with action that is downright clever".[135] However, the critic also pointed out "another passage in natural colors, one concerned with a stage performance". With regards to this sequence he complains: "It is rather confusing, however, to look at the same background first in rainbow hues and then in plain black and white, for only half of this chapter is in pastel shades."[136]

That Technicolor was used for a dream sequence as well as a stage performance within the same film, and particularly the fact that the theatre setting was shot partly in colour and partly in black and white, demonstrates not only that Technicolor had certain connotations associated with it, but also that the relation between colour and black and white in these early part-Technicolor films was not connected with specific, diegetically-determined spatial or temporal conditions. The chromatic montage effect was not linked to the integration in terms of narrative functions usually associated with classical Hollywood cinema. As *Variety* pointed out with regard to the

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[129] This list of examples has been made from information found in *The New York Times Film Reviews, Volume I/1913-1931* (New York: The New York Times & Arno Press, 1970); *Variety's Film Reviews 1926-1929*; *Variety's Film Reviews 1930-1933*; *The American Film Institute Catalog of Motion Pictures Produced in the United States: Feature Films 1921-1930* (New York: Bowker, 1971); and *The American Film Institute Catalog of Motion Pictures Produced in the United States: Feature Films 1931-1940* (Berkeley: University of California Press, 1993).

[130] *Paris, The Dance of Life* (John Cromwell, A. Edward Sullivan, 1929), *Footlights and Fools* (William A. Seiter, 1929), the "all dialog – 3% color" musical comedy *Pointed Heels* (A. Edward Sullivan, 1929), *Glorifying the American Girl* (5% colour), the 10% colour musical *Chasing Rainbows* (Charles Reisner, 1930), *Red Hot Rhythm* (Leo McCarey, 1929).

[131] *Broadway* (Paul Fejos, 1929).

[132] *Rio Rita* (Luther Reed, 1929), *Hell's Angels* (Howard Hughes, 1930).

[133] *Dixiana* (Luther Reed, 1930).

[134] *The Broadway Melody* (Harry Beaumont, 1929), *It's a Great Life* (Sam Wood, 1929). Two of the last films produced in two-strip Technicolor, *Doctor X* (1932) and *Mystery of the Wax Museum* (1933), both directed by Michael Curtiz, belonged to another "spectacular" genre, the horror film. The "ghastly details" of *The Mystery of the Wax Museum* were, according to the *New York Times* review, "accentuated by being filmed in Technicolor", and the plot deals with topics often associated with photographic colour; indexicality and the relation between imitation and reproduction, as remarkably "life-like" wax figures eventually are revealed to be made out of real corpses. The film was remade in 1953, by André Toth, as *House of Wax*; here, appropriately, the spectacular simulation of reality achieved by colour has been augmented by 3D. See Mordaunt Hall, "Lionel Atwill and Fay Wray in Gruesome Narrative About a Mad Modeler of Wax Figures, *New York Times*, February 18, 1933, 13:3.

[135] Mordaunt Hall, "The Duncan Sisters", *The New York Times*, January 18, 1930, 21:1

[136] ibid.

"Technicolor ball" sequence of Howard Hughes' "Multi-Million Dollar Air Spectacle" *Hell's Angels* (1930): "The one color sequence runs about a reel and is not important. Probably included because Hughes wanted to cover everything."[137]

Colour, in these cases, is not only an integrated part of images, but also an *image system*, co-existing and alternating with black-and-white sequences. The interaction between colour and black and white (rather than colours and objects) in these early "color talkers" reflects and concentrates not only connotations associated with colour, but also a general divergence from how classical Hollywood cinema narration is usually defined, linking the relationship between colour and black and white not only to notions of spectacle or "excess" associated with the cinema of attractions, but also to other, later modes of storytelling.

In an essay examining the history of films combining black and white with colour, Philippe Dubois emphasises the central movement in terms of the logic of colour in cinema from the applied colours interfering with the black-and-white base as an essential practice of the cinema of attractions to the emergence of photographic colour systems, associated with classical and modern cinema, where colour becomes "complete", incarnate in the film image.[138] Dubois also demonstrates how the first instances of 'natural' colour during the 1920s entailed isolated sequences in otherwise black-and-white films, in spectacular silent epics like Cecil B. DeMille's *The Ten Commandments* (1923) and Fred Niblo's *Ben-Hur* (1925), or in later displays of spectacle in the early "color talkers", where the colour sequences not only represented moments of attraction for the spectator, but also as a means to market the films for producers. However, Dubois points out that during the period of coexistence between the two chromatic regimes, colour and black and white from the 1930s through the 1960s, when black and white was dominant, the combination of these two 'image systems' as a rhetorical figure in classical Hollywood films during this period usually involved a diegetisation of this figure, and is articulated in terms of theme and narrative structure.[139] According to Dubois, this dialectic is usually explored through a passage and circulation between two universes, and the two diegetic situations he explores are passages into dreams (*The Wizard of Oz* [Victor Fleming, 1939], *The Blue Bird* [Walter Lang, 1940], *A Matter of Life and Death* [Michael Powell, Emeric Pressburger, 1946]), and passages into paintings (*Portrait of Jennie* [William Dieterle, 1948], several films by Albert Lewin: *The Moon and Sixpence* [1942], *The Picture of Dorian Gray* [1945], *The Private Affairs of Bel Ami* [1949]) .[140] Here, the passages

[137] Review of *Hell's Angels*, *Variety*, June 4, 1930.
[138] Philippe Dubois, "Hybridations et métissages: Les mélanges du noir-et-blanc et de la couleur", *La couleur en cinéma*, 79.
[139] Ibid.
[140] See ibid., 79-87.

between colour and black and white are relocations between reality and fantasy, objectivity and subjectivity.

There are obvious similarities between the passage from black and white into a two-strip Technicolor dream sequence in *It's a Great Life*, and the similar transition from the sepia rendition of Kansas to the three-strip Technicolor dream world "over the rainbow" in *The Wizard of Oz* a decade later: the association between colour and unreality, making use of this unreality to display and accentuate technology. But, unlike the effort to control and subordinate the affective and expressive qualities of colour through consistent diegetic coding in the 1939 film, the interaction between colour and black and white in "part-color talkers" is not motivated diegetically, through focalisation or passage in time or space. On a concrete visual level, the montage effect is the same, but its rhetorical function becomes different, which lends new functions to the two visual image systems that constitute the montage effect, detached from the model of narrative integration associated with classical Hollywood cinema. However, such a seemingly unsystematic combination of colour and black and white is not unusual in films that represent other "stylistic modes." David Bordwell draws on films from the "post-classical" era that combine black and white and colour without diegetic motivation to exemplify the form of narration he classifies as "art cinema narration" as opposed to the classical system, and he refers to this kind of interchange in Lindsay Anderson's *If*... (1968) and Claude Lelouch's *Un homme et une femme* (1966) as examples of the narrative category *Authority*, i.e. that the film's "author" establishes himself as an omniscient narrator through the deliberate application of elements that are incompatible with categories like verisimilitude, objectivity and subjectivity: "The surest signs of narrational omniscience […] are the least capable of realistic justification."[141]

The sudden appearance (and disappearance) of Technicolor in sound films from the late 1920s and early 1930s is perhaps comparable to a greater extent to the use of colour in the second part of Eisenstein's *Ivan the Terrible* (1946), which is predominantly black and white with two colour sequences, a 16-minute banquet sequence and a short epilogue. The transitions between colour and black and white constitute a sequential, temporal montage effect independent from narrative functions. According to Dubois the banquet sequence in *Ivan the Terrible* represents the origins of modernistic use of colour in cinema: here, the colour passage becomes a significant *event* with a value in itself, just like music, rhythm, and composition etc.[142] Colour becomes part of the fabric of cinematic expression and establishes its own value systems independently from the represented

[141] David Bordwell, *Narration in the Fiction Film* (London: Routledge, 1987), 212.
[142] Dubois, 87.

drama, and the colours are liberated from the objects that incarnate them. Colour thus becomes an autonomous, abstract sign.

Eisenstein also pointed out specifically how the relation between black and white and colour, and the transition from one colour scale to another entails an effect that might be used in the construction of *pathos*, an exalted emotional state created by the experience of artworks, and an essential concept in Eisenstein's late montage theory, defined by the relation between the organic structure of a film and emotional experiences, that are both physiological and psychological. In his book *Nonindifferent Nature* (1945), Eisenstein defined the pathos of an artwork with reference to its *effect* on the spectator, which he characterised as 'ecstacy': "*pathos* is what forces the viewer to jump out of his seat. It is what forces him to flee from his place. It is what forces him to clap, cry out. It is what forces his eyes to gleam with ecstasy before tears of ecstasy appear in them. In word, it is everything that forces the viewer to 'be beside himself.' […] we might say that the effect of *pathos* of a work consists in bringing the viewer into the point of ecstasy […] *ex statis* (out of state) means literally the same thing as 'being beside oneself' or 'going out of a normal state' does."[143]

This entails recurrent transitions to different, opposite qualities: "a continuing leap of each separate element or sign of the work of art from quality to quality, in proportion to the quantitative growth of the ever-heightening intensity of the emotional content of a shot, sequence, or scene in the work of art as a whole."[144] Such a leap, for example, takes place in *Battleship Potemkin* (1925) at the point of culmination when a hand-painted red flag appears within the otherwise black-and-white image:[145] "at this point the black-gray-white light range of photographs is suddenly hurled to another dimension – to paint, to *color*. Depiction by light becomes depiction by color".[146]

However, the construction of pathos in Eisenstein's conception often involves a leap from the literal to the metaphorical, from representation to non-representation, and Eisenstein points out that this particular red colour has concrete and specific implications, in an ideological as well as historical sense. In another text, he even claims that "[t]he red of the flag pierced *Potemkin* like a fanfare but here its effect was due not so much to the colour itself as to its meaning."[147] Paradoxically the pathos inherent in the themes and situations in *Potemkin* makes it difficult to define how the pathos is *structured*.[148] A film like *The General Line*, with more mundane, less dramatic themes and situations, achieves pathos solely through composition

[143] Eisenstein, *Nonindifferent Nature* (1945), 27.
[144] Ibid., 38.
[145] Ibid., 22, 58.
[146] Ibid., 26.
[147] Eisenstein, "Not Coloured, But In Colour" (1940), 117.
[148] Eisenstein, *Nonindifferent Nature* (1945), 38.

and expressive means.[149] In the most celebrated sequence in that film, the exhibition of a milk separator, images of flowing milk are intercut with images of fountains and subsequently with flickering colour-tinted images of fireworks: "a shimmer of soaring fire sparks, sparks not only kindled by light, but flickering with multicoloredness with a new quality – color."[150] This transition to colour is also a transition to a new dimension, and these coloured images are interchanged with monochrome images, stylised graphic black and white images that differ from the previous grey-toned images. This exchange again entails another leap to a new quality, as the film as a structural system on the level of colour makes a qualitative leap from representation to non-representation.[151] The colour scheme shifting from grey to colour to black and white is repeated and developed in *Ivan the Terrible*.

In all these examples, the intrusion of colour can be linked to Kristin Thompson's notion of "excess", defined as "an inevitable gap in the motivation for the physical presence of a device", as it "retains an interest beyond its function in the work."[152] The notion of "excess" is recurring in Thompson's analysis of *Ivan the Terrible*, while classical Hollywood cinema is usually associated with films which "encourage viewing procedures that lead us to ignore excess" and a narrative style which "attempts to minimize our concentration on excess by subordinating the material aspects of the film to the narrative flow".

Gilles Deleuze maps out a schematic distinction between classical montage, exemplified by D.W. Griffith's use of crosscutting or parallel montage, and the Soviet school of montage exemplified through Eisenstein, in terms of how these two montage traditions make use of the close-up.[153] Within both traditions, the close-up represents an image different from other images, constituting a new dimension. With regard to Eisenstein, this alteration is characterised as *absolute*; the film as organism is based on a dialectical nature, the opposition between images is not an accident that needs to be corrected, but a prerequisite for achieving the qualitative leaps Eisenstein refers to above, a formal and absolute change of dimension.[154] With regard to Griffith, however, the alteration is described as *relative*: the classical Hollywood cinema entails the ideal of an organic totality.[155] Here the difference between the close-up – which establishes an opposition between subjectivity and objectivity – and the other images, creates a conflict, which along with other elements on the level of the narrative,

[149] Ibid., 45, 53f., 58.
[150] Ibid., 53. Eisenstein calls this method "the grandnephew of the method of hand coloring the red flag" in *Bronenosets Potyomkin*. Ibid.
[151] See ibid., 54, 58.
[152] Kristin Thompson, *Breaking the Glass Armor: Neoformalist Film Analysis* (Princeton: Princeton University Press, 1988), 259.
[153] Deleuze, 35f.
[154] Ibid., 36f.
[155] Ibid., 30ff.

threatens the organic totality. However, by means of crosscutting and other typically classical montage techniques, this totality will be re-established at the end of the film.

Thus, in *The Wizard of Oz* a more explicitly articulated opposition is introduced between the sepia-coloured normality of Kansas and the colourful dreamland of Oz than in the transitions between black and white and colour in Eisenstein's *Ivan the Terrible* or the "part-color talkers" a decade earlier. But the transformation in the 1939 film also remains relative: the dream world is given a diegetic, subjective position within the psyche of the main character, the two worlds are connected by having the same characters (and actors) appear in both, but in completely different guises (the mean neighbour in Kansas becomes the wicked witch in Oz). Immediately after Dorothy arrives in the land over the rainbow that she has dreamed about, she sets out to figure out how to get back home to the sepia-coloured reality, re-establishing the world introduced in the film's prologue ("There's no place like home"). Although colour per se represents spectacle and technology, its articulated opposition to black and white has been 'neutralised' or reduced through systematic narrativisation.

Colour Control: Colour as Form, Colour as Music

In his work on the aesthetics of three-colour Technicolor during the 1930s (beginning with *La Cucaracha* [Lloyd Corrigan, 1934], the first live-action three-colour Technicolor musical short), with emphasis on the integration and incorporation of Technicolor into the classical Hollywood style, Scott P. Higgins points out the limitations of what he characterises as the "ideologically oriented studies" on Technicolor by Buscombe and Neale, emphasising the role of colour in terms of realism or the dialectic between narrative and spectacle.[156] Higgins' proposal is to study "three-color as a new device that filmmakers experimented with to serve a range of functions, building up norms of use that accorded with the aims of classical Hollywood cinema."[157] A study of Technicolor aesthetics based on the concept of a gradual development towards the principles of classical Hollywood style can hardly be said to be less "ideologically oriented" than studies based on different notions of realism and spectacle etc. (besides, Buscombe's characterisation of "realism" is to a great extent corresponding to a more general conception of classical Hollywood narration). Higgins identifies Bordwell's, Staiger's and Thompson's *The Classical Hollywood Cinema* as the foundation for his study and, more specifically, Thompson's

[156] Higgins, *Harnessing the Rainbow*, 33.
[157] Ibid., 34.

neoformalist approach as the basis for analysing film style.[158] Higgins points out that Technicolor during the mid-1930s was not only restricted to genres like musicals and adventure films, but was also used in genres like contemporary drama (*A Star Is Born*, William A. Wellman, 1937) and rural "outdoor" melodrama (*The Trail of the Lonesome Pine*, Henry Hathaway, 1936), and that which defined most of the Technicolor films produced between 1935 and 1938 was in fact a *restrained* mode of design, with subdued colours and reduced contrasts.[159] One of the main questions in the discussions on colour design during this period was the problem of "how color could be subordinated and still fulfill expressive functions".[160] This entailed the attempt to overcome notions about colour as novelty or spectacle, at the same time as providing something noticeably different from black-and-white photography in order to justify the vastly increased expenses.[161] Higgins also points out that the increasing commercial success of colour films in the late 1930s was linked to films like *The Adventures of Robin Hood* (Michael Curtiz, William Keighley, 1938) and *Gone with the Wind* (Victor Fleming, 1939), which were far less restrained and more assertive in their colour designs than the films produced during the "experimental" phase of 1935-1938.[162]

One strategy to control colour aesthetically was the introduction of Technicolor "colour consultants". In order to use Technicolor in a production, one had to hire equipment and a number of personnel from the company, among them a colour consultant, planning the colour schemes and compositions.[163] The leading colour consultant (or at least the most credited) during the 1930s and 1940s was Herbert Kalmus's former wife Natalie Kalmus, who to a certain degree theorised her work and ideologies. She also understood the cinema of sound and colour in terms of an "ultimate" art form, encompassing all other art forms: "Music, graphic art, and acting have now been united, and become one expression of more ultimate art. Now for the first time a perfect expression of the combined inspirations of producer, writer, artist, actor, and musician can be adequately presented to an audience. Color has touched the sound picture and it fairly lives."[164] The principal task of the colour consultant was to prepare a colour chart or colour "score" for the entire production; and both Herbert and Natalie Kalmus separately compared the preparation of such a chart to the writing of the

[158] Ibid., 28.
[159] Ibid., 30, 40, 145. See also Jean-Loup Bourget, "Esthétiques du Technicolor", *La couleur en cinéma*, 112f.
[160] Higgins, *Harnessing the Rainbow*, 40.
[161] See ibid., 144, 170.
[162] Ibid., 40.
[163] See Richard Neupert, "Technicolor and Hollywood: Exercising Color Restraint", *Post Script*, 10:1, 1990, 24f.
[164] Natalie M. Kalmus, "Color Consciousness", *Journal of the Society of Motion Picture Engineers*, 25:2, 1935, 147.

film's musical score; Natalie Kalmus even pointed out how it "amplifies the picture in a similar manner".[165] Similarly Natalie Kalmus argued for the need for "the average person" to be "trained in color appreciation", by using analogies to music: "In order to appreciate operatic or classical music, people study music appreciation. Color appreciation, as a study, is almost entirely neglected, although color plays a most important and continuous part in our lives. The average person listens to music for only a short portion of the time, but every moment of the day he looks upon some form of colour."[166]

Natalie Kalmus also distinguished between the emergence of colour as completion, as "enhanced realism" and portrayal of "life and nature as it really is" and the specific requirements of narrative cinema; a film, she asserts, "will be merely an accurate record of certain events unless we guide this realism into the realms of art. To accomplish this it becomes necessary to augment the mechanical processes with the inspirational work of the artist. It is not enough that we put a perfect record on the screen. That record must be molded according to the basic principles of art."[167] These principles were to be found in classical painting, and the "colour consciousness" that Kalmus suggested (in terms of harmony, composition, colour psychology, etc.) led to a general principle of "restraint": "We must constantly practice color restraint. In the early two-color pictures, producers sometimes thought that because a process could reproduce color, they should flaunt vivid color continually before the eyes of the audience. This often led to unnatural and disastrous results, which experience is now largely eliminating."[168]

The call for 'restraint' in the use of colour in connection with the introduction of three-colour Technicolor, is often mentioned as a strategy to avoid some of the 'excesses' that tarnished the earliest sound films, in terms of explicitly displaying the new technology. Rouben Mamoulian, who directed the first three-colour Technicolor feature film, the costume drama *Becky Sharp* (1935), also referred to these films as having "too much talk and too much noise coming from the screen. The cinema must not fall into such another trap, and must not go about color as a newly-rich. Color should not mean gaudiness. Restraint and selectiveness are the essence of art."[169]

Natalie Kalmus also described the relation between 'realism' and 'art' with regard to colour in a film and the spectators' need for 'naturalness' (on a psychological and physiological level), creating an analogy between colour and voice:

[165] Ibid., 145. See also H.T. Kalmus (1938), 55.
[166] Natalie M. Kalmus (1935), 140f.
[167] Ibid., 140.
[168] Ibid., 147.
[169] Mamoulian, 151.

> It is a psychological fact that the nervous system experiences a shock when it is forced to adapt itself to any degree of unnaturalness in the reception of external stimuli. The auditory sense would be unpleasantly affected by hearing an actor upon the screen speak his lines in a monotone. The mind would strive to supply the missing inflections. The same is true, but to a greater degree, of the visual sense. A super-abundance of color is unnatural, and has a most unpleasant effect not only upon the eye itself, but upon the mind as well. On the other hand, the complete absence of color is unnatural. The mind strives to supply the missing chromatic sensations, just as it seeks to add the missing inflections to the actor's voice.[170]

In addition to suggesting specific aesthetic ideals for using colour, this quote also includes interesting analogies between image and sound/voice in order to describe the difference between colour and black and white. Unlike many comparable analogies, the black-and-white image is not linked to the *absence* of sound in silent cinema; instead, the possibilities to vary the character of an image, regardless of content, are compared to similar possibilities to vary the character of a voice, also regardless of what it is saying. Thus, the monochrome nature of black and white is connected to a voice speaking in monotone, and the missing variation and differentiation re-emerging in a "realistic" colour image is compared to the missing nuance of inflection reappearing in a voice speaking "normally". Likewise, the "unpleasant effect" of the exaggerated use of colour (on the eye and the mind) could be compared to the effect of listening to screaming (hence the expression "screaming colours"). Thus, the relation between colour and black and white does not represent any opposition between absence and presence; instead, the addition of colour potentially modulates and transforms that which is already present and made visible in black and white.

As Higgins has pointed out, the colour aesthetics of Natalie Kalmus and other Technicolor designers, in particular their ideas of colour harmony, to a great extent refers to traditional colour theories.[171] Traditional attempts to control and systematise colour primarily in relation to painting are often based on a terminology shared with music, notion of "colour harmony" and "colour chords" etc. The concept of colour harmony, usually applied to painting is linked to the visual purity of colour through musical analogies. The cinematic equivalent to these notions of purity, and visualisation is traditionally, however, the black-and-white film image, rather than a colour film image. Black and white is not only considered to be the first and most basic of film images, but it is also far more easily integrated in relation to the notions of purity and harmony that is characteristic for the 'musical model' for cinema, and as Aumont has pointed out, with discourses about *disegno*

[170] Natalie M. Kalmus (1935), 141f.
[171] Higgins, *Harnessing the Rainbow*, 20ff

and *colore*: the image is 'cleansed' by removing colour, by eliminating that which is superfluous.[172]

Klein also provides a thorough overview of a number of theories of colour harmony in his book on colour-music, in order to establish what he characterises as the necessary theoretical foundation for the synthetic art of light and sound that he proposes.[173] In 1926, Klein refers to the art historian Walter Pater's assertion in his book on the Renaissance published in 1868 that all art "*constantly aspires towards the condition of music*" – because the constant aim of every art medium is to obliterate the distinction between matter and form – as the notion which has guided the evolution of art during the preceding half-century, and Klein claims that it also should constitute the philosophical foundation for colour-music.[174] Pater continues:

> It is the art of music which most completely realises this artistic ideal, this perfect identification of matter and form. [---] Therefore, although each art has its incommunicable elements, its untranslatable order of impressions, its unique mode of reaching the 'imaginative reason,' yet the arts may be represented as continually struggling after the law of principle of music, to a condition which music alone completely realises […].[175]

Again, in representational live-action cinema, the artistic ideal based on the notion of the primacy of *form* over matter, with reference to music, is associated with the stylisation in black-and-white film images far more often than with colour film images.

Arnheim's notion that black-and-white cinema was superior to colour film both ideologically and compositionally, is connected with a conception of *form*, sketching out an opposition between a painter's intentionality and control over colour on the one hand, and the accidental, automatic imprint of photography on the other, within his characteristic notions of the relations between art and nature, between the aesthetic and the practical:

> Nature is beautiful, but not in the same sense as art. Its color combinations are accidental and hence usually inharmonious. Where accidentally it seems to indicate an interesting, harmonious motif, the painter can seize upon it and realize it [...]. We have become used to seeing a painting as a structure full of meaning; hence our helplessness, our intense shock on seeing the majority of color photographs. We do not find any form in them; neither can we decide to see them as nature.
>
> The "practical" sense of seeing is but a means for one to navigate in one's surroundings. Colors help to distinguish objects and make them stand out against each other. Hence the interest is directed to single objects, not to the

[172] Aumont (1994), 167f.
[173] Klein (1926), v, 61-117.
[174] Ibid. (1926), xv. Walter Pater, *The Renaissance: Studies in Art and Poetry* [1868] (Oxford University Press, 1998), 86.
[175] Pater, 88. See also Klein (1926), xv.

> relationships between their optic appearances. [---] It is only the aesthetic way of seeing (not to be confused with "delight in nature") that provide elementary basis for all optic forms of art.[176]

Similar ideas had been articulated in trade press discourses during the 1910s and 1920s; in 1917 the cinematographer, Lewis W. Physioc, pointed out that the problems and faults connected with colour photography did not necessarily have to do with technical matters of colour reproduction, but to the fact that not everything in nature is worth filming, and to the lack of control and intentionality characterising photographic media: "Nature abounds in beautiful, big broad effects, but they must be sought out by the discerning mind . [---] In photographing in natural colors we are unable, as in painting, to modify or idealize our color schemes in response to feeling or temperament."[177] In 1923, director and cinematographer, Phil Rosen, stated that "[s]triving for realism, as introducing color into dramatic photography, does not necessarily constitute the artistic. True art does not necessarily mean the exact reproduction of nature which is not always artistic. True art extracts from nature, but forms its own composition."[178] Jean-Louis Schefer refers to such discussions regarding the role of colour in film, and how colour often is used as a means to connect cinema to painting, and has been given a specific role in the endless comparison between painting and cinema, a more recent variation of the question of whether colour or line is more important.[179] Schefer, however, argues that painting is closer to the black-and-white image. In black-and-white film everything is composed from the same substance (similar to paint), and is, therefore, connected within the same scale of lightness. What is displayed by light is also devoured by the light; all elements are moulded from the same substance, thus there is a substantial bond between the characters and the landscape in the image. With colour film this unity is broken or, as Schefer puts it, mutated. The projected world is split and differentiated into different objects and bodies, substances, entities and qualities, and there is no longer any bond between the characters and the landscape. The dreamlike, impressionistic environment of black and white is broken and replaced by the real world.

Thus, both Arnheim and Schefer suggest that the dichotomy between the concept of *disegno* as encompassing meaning or representation, and the concept of *colore* as entailing affect or non-representation is somewhat contradictory, since colour, as long it is tied to concrete objects and situations, to a great extent *distinguishes* these particular objects from each

[176] Rudolf Arnheim, "Remarks on Color Film" (1935), *Film Essays and Criticism* (Wisconsin: University of Wisconsin Press, 1997), 21f.
[177] Lewis W. Physioc, "Color Photography and Some of Its Faults", *Cinema News*, July 1, 1917, 1.
[178] Philip E. Rosen, "Believes Color Will Not Aid Dramatic Cinematography", *American Cinematographer*, 3:10, 1923, 4.
[179] Jean-Louis Schefer, "Matière du sujet", *La couleur en cinéma*, 13ff.

other. Colour often emphasises the *matter* of objects rather than transcending or obliterating it, by breaking the formal unity of black-and-white images, and the differentiation produced by colour suggests potential for narrative information in certain instances unavailable in the black-and-white image.[180] These conceptions of form and harmony also demonstrate the striking similarity in terminology when referring to colour, regardless of medium or stylistic preference: Klein's excerpt from Pater refers to the formal principles and harmony of abstract, non-representational images; Kalmus, for example, refers to more or less the exact same principles and ideals, but in her case applied to representational, narrative, classical cinema.

The system of colour consultants, and of independent, 'external' colour charts being "applied" to action and narrative, met some criticism. In 1935, Rudolf Arnheim, with reference to Kalmus, criticised "the present grotesque habit, [having] a color specialist subsequently put color into a scene already established as action in the shooting script and as bodily shapes and movements by the director."[181] Eisenstein also criticised the widespread tendency to devaluate the importance of expressive means (often associated with classical Hollywood cinema, but also characteristic of the anti-formalist aesthetics of Soviet socialist realism in the 1930s and 1940s), through viewpoints stating that "good music in a film is that which you do not hear; that good camera work is that which is unobtrusive; and that good direction is that which you do not notice," and subsequently that "in a good colour film you are not conscious of colour".[182] According to Eisenstein, this is an idea which primarily is argued for by directors whose abilities are limited to working with actors, claiming that "the great variety of expressive means in the films should by no means allow film-makers to neglect one for the sake of another. On the contrary, he declares, they should be able to make full use of the potentialities of each and to assign to it the proper place "in the general *ensemble* of the film."[183] Colour must thereby function as a *visible*, independent element, in order to succeed within the organic unity of a film. Eisenstein emphasised the necessity of equating colour with other montage elements.[184] As with every other expressive element, colour should be used at given moments when it can be employed to accentuate specific themes and ideas within the totality of the film. Colour, music, and all other components

[180] In 1938, ten years before his first colour film (*Rope*, 1948), Alfred Hitchcock points out how colour produces "more intermediate shades" compared to black-and-white, and suggests how this can be used for mise-en-scène and narrative purposes: "a gangster story: the leader of a gang is sitting in a café with a man he suspects. He has told the gunman to watch the table. 'If I order a glass of port, bump him off. If I order green chartreuse, let him go.'" Alfred Hitchcock, "Direction", *Footnotes to the Film*, ed. Charles Davy (London: Lovat Dickson, 1937), 11.
[181] Arnheim, "Remarks on Color Film" (1935), 22.
[182] S.M. Eisenstein, "Colour Film" (1948), *Notes of a Film Director*, 119.
[183] Ibid., 120.
[184] S.M. Eisenstein, "On Colour" (1937), *Selected Works, Volume 2*, 261.

thus function in cinema predominantly as dramatic elements. In the same way that music "spreads over the shots, twines itself around the heroes and the action and, without losing its independent line, merges with the running stream of representation, into a single stream of impressions", colour must also "surge into the shots and overflow their frames".[185] The organic unity of montage requires, according to Eisenstein, that colour constitutes a "line" in a temporal sense, in analogy with the function of music within sound film montage, a "line" that has dramaturgical as well as expressive functions.[186] This "colour line" should follow the same principles as the relation between representation and soundtrack, where it is possible to distinguish between a number of "lines" or components on top of each other: various musical instruments, dialogue, and sound effects represent different lines that constitute simultaneous layers in the soundtrack. However, the colour line is much more difficult to apprehend and follow, because it is tied to the representation of objects.

Nevertheless, there were significant examples of conceptions of colour design in Hollywood during the 1930s that did not primarily emphasise restraint and subordination when considering the connections between colour and narrative development. Robert Edmond Jones, the production and costume designer of *La Cucaracha* and colour designer of *Becky Sharp* described the functions of colour in relation to narrative in terms of a musical metaphor, arguing that "the color film stands in the same relation to the black-and-white film that opera does to the spoken play. In the one case color is added to the story; in the other music is added. Both are added for a reason: to enhance the dramatic values of the story."[187] Jones stressed the necessity for colour designers to integrate colour and drama correctly, and to make colour function as an essential component of film production rather than as an added ornament,[188] and he described the ideal working relationship between colour designer and film director in the following way:

> The color designer should lay out the sequences of his pictures in the same way that a composer lays out the movements of a symphony or the scenes of an opera. The director of the picture should direct the various sequences of the picture just as a conductor conducts the music of a symphony or opera.[189]

Higgins locates the colour aesthetics of the two films designed by Jones in what he calls a "novelty-based approach", or a 'demonstration mode' (which

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[185] S.M. Eisenstein, "First Letter About Color" (1946), *Film Reader*, 2, 1977, 181.
[186] Eisenstein, "Colour Film" (1948), 123-126.
[187] Robert Edmond Jones, "Color Should Be 'Organised' on the Screen" (originally published in *The Screen Guild's Magazine*, July 1935), repr. in Anna Kate Sterling (ed.), *Celebrity Articles from* The Screen Guild Magazine (Metuchen/London: The Scarecrow Press, Inc., 1987), 77.
[188] See Higgins, *Harnessing the Rainbow*, 58.
[189] Robert Edmond Jones (1935), 77. See also Mamoulian (1935), 151.

is later followed by the restrained mode, and in the late 1930s and during the 1940s, a more assertive, but narratively integrated mode), functioning as a 'test' of the process.[190] The technology of Technicolor is displayed and 'foregrounded' through the showcase of strong colour contrasts, and colour is often bound to narrative through stylised, strongly coloured 'mood' lights, absorbing the characters at specific heightened moments, articulating the emotional states of the characters, rather than being diegetically motivated. Higgins remarks, with regards to *La Cucaracha*:

> Jones attempted to solve the basic problem of making colour serve drama, but he did so in a way that was too obtrusive, that pushed style too much to the foreground and invoked conventions that seemed too far afield of accepted, black-and-white norms. In this sense, the film is a sort of false start, an attempt to slot colour into a ruling position rather than negotiate its place among established techniques for rendering visual style expressive. Indeed, throughout the 1930s efforts were focused on integrating colour into conventional film style, or finding ways to let colour cooperate with established and respected techniques rather than dominate the system.[191]

Robert Edmond Jones' ideas on the functions of colour in cinema (expressed in his writings as well as in his colour designs) in many respects seem to have far more in common with Eisenstein than with the later notions of colour restraint in Hollywood. Despite this, and despite rumours about personal conflicts between Jones and Mamoulian on the one hand, and Natalie Kalmus on the other, Higgins points out that Jones echoed Kalmus' notions of restraint by emphasising that "to think in terms of color […] does not mean an abundance of color".[192] In addition, the connection between Eisenstein and Jones is perhaps chiefly on a theoretical level, in terms of general ideas about colour, as Eisenstein in fact, although briefly, criticised the "naïve" use of colour in one scene in *Becky Sharp*.[193] However, on a theoretical level, there are striking similarities. For example, Eisenstein also points out that the production of a colour film differs from the creation of a painting, he is envisioning films "*in colour* and not *coloured*, to preclude any association with something coloured, painted"[194] – colour should be an innate and integrated part of the film, and not just an external "supplement". The 'foregrounding' of colour in *Becky Sharp* was criticised for being obtrusive

[190] Scott Higgins, "Demonstrating Three-Colour Technicolor: Early Three-Colour Aesthetics and Design", *Film History*, 12:4, 2000, 364ff., 376ff., see also Higgins, *Harnessing the Rainbow*, 64-78, 88-130, 436ff.
[191] Higgins, "Demonstrating Three-Colour Technicolor", 369.
[192] Robert Edmond Jones (1935), quoted in Higgins, "Demonstrating Three-Colour Technicolor", 377.
[193] S.M. Eisenstein, "Montage 1937" (1937), *Selected Works, Volume* 2, 54n.
[194] S.M. Eisenstein, "Not Coloured, But In Colour" (1940), 118.

and distracting in contemporary reviews,[195] and Jones addressed this criticism of the "demonstration mode" display of colours as follows:

> Many of the critics of *Becky Sharp* have felt that the colour should be more subdued. The critics, in this case, are wrong. Color in color pictures does not need to be subdued, any more than music in an opera needs always to be played pianissimo. To ask for a color picture without color is like asking for an opera without music. Color has to be organized on the screen just as music has to be organized in an opera or symphony. Music has to be handled by musicians or we get no music. Color must be handled by colorists or we get no color.[196]

In 1938, Jones criticised the contemporary "restrained mode" dominating three-colour Technicolor films, and in particular the approach to colour maintained by the company that colour, ideally should not be noticed, and contrasted this principle to how sound was regarded and utilised during the same period: "The public is not expected to forget that there is music in a musical picture or that there is talk in a talking picture. But the public is definitely expected to forget that there is color in a color picture!"[197] Jones also overtly describes colour in cinema – "mobile color, flowing color" as "a kind of visual music", through its function as a temporal and affective element in constant movement, an element that is both autonomous and organically integrated with the other elements in a film, and he points out how colour is "flowing from sequence to sequence just as music flows from movement to movement".[198] Colour in a film is not interesting "by its harmony but by its progression from harmony to harmony".[199]

Along these lines, Eisenstein described how colour as an independent, temporal dramaturgical cinematic element can be expressed in a number of different ways: as "monologue", "exclamation", "pause", related to "the movement of a mass of objects" or as a "hardly imperceptible gesture".[200] This entails a choice of colour "melody", consisting of one voice or instrument, or a more complex and varied colour "orchestration".[201] Although the application of colour is similar to the application of music, Eisenstein pointed out that another significant difference between them is that colour is visible and present throughout the film while music only appears when it is necessary. However, he claims that this does not change

[195] See Higgins, "Demonstrating Three-Colour Technicolor", 378f.
[196] Robert Edmond Jones (1935), 77.
[197] Robert Edmond Jones, "The Problem of Color", *The New York Times*, February 27, 1938, repr. in *The Emergence of Film Art*, ed. Lewis Jacobs (New York: Hopkinson and Blake, 1969), 207.
[198] Robert Edmond Jones, "A Revolution in Movies", *Vanity Fair*, June 1935, 13, quoted in Higgins, 59.
[199] Robert Edmond Jones (1938), 207f.
[200] Eisenstein, "Colour Film" (1948), 121f
[201] Eisenstein, "First Letter About Color" (1946), 182.

how colour should be used dramatically. When colour has no specific purpose it should rather function as a "frame".[202] But this should not be the "neutralisation" found in the ideals of classical Hollywood cinema, but rather a "pause" necessary in order to gain force for the moments when colour is needed in order to fully express a specific theme. Like music, colour functions on various levels, sometimes as theme, sometimes as accompaniment.[203]

Jones echoes Eisenstein in emphasising how the temporal flow of a film enables colour to change according to the function it should perform at each particular moment, being more or less prominent, more or less manifest, once again employing musical terms:

> Color on the screen, shifting, flowing from sequence to sequence – *largo*, *allegro, fortissimo*, *scherzo*, *grave* – is an orchestral, symphonic accompaniment to the melody of the drama. Color enlarges the drama, supports it, enhances it, actually impels it; becomes an organic part of it, just as Wagner's music becomes an organic part of the great emotional surge of the love motif of *Tristan*. [---] A Marvelous new instrument is given us, by means of which we may combine the beauty of painting and the emotional flow of music. This instrument must be *played upon*.[204]

Jones' reference to Wagner, and to colour film as a "new instrument" echoes broader efforts to exploit colour in movement in order to create a new medium, a medium referring to cinema as well as painting without belonging to any of them. In 1938, Jones even refers to the medium of colour film, being restrained by Hollywood, as "a new form of art […] about to be born into the world, an art for which there is as yet no name but which holds an extraordinary and thrilling promise. Shall we call it visual opera? Color music-drama? No matter. It is enough to say that this new mobile color may quite conceivably turn out to be the art of tomorrow."[205]

Colour and Sound as an Independent Medium

These references are emblematic as notions of colour in cinema are usually taken from other media and other contexts. Through colour, and particularly through the linkage between colour and sound, the film medium is contextualised and associated with a variety of other media and phenomena. As mentioned earlier, attempts to connect music to visual art in general

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[202] Eisenstein, "Colour Film" (1948), 123.
[203] S.M. Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), S.M. Eisenstein, *Selected Works, Volume III: Writings, 1934-47*, ed. Richard Taylor, trans. William Powell (London: BFI Publishing, 1996), 324.
[204] Robert Edmond Jones, "A Revolution in Movies", 13, 58, quoted in Higgins, 58.
[205] Robert Edmond Jones (1938), 208.

usually reflect the ambition to develop a visual medium based on the non-representational qualities of music, its independence from the visible world, and its immateriality (as a result of its temporality).[206]

Jeremy Strick argues that the search for visual music functions as "an alternative history of abstract art of the past century".[207] According to Malcolm Le Grice, it is impossible to discuss colour in art without historical reference to the development of abstraction.[208] Abstract form in temporal visual arts, like cinema, video and digital media, are closely linked to the tradition of abstraction in painting. Le Grice points out how the history of western painting is characterised by an emphasis on the object and its location in space.[209] Within this ideology, colour is perceived as an intrinsic property of a specific object, while one of the characteristics of the movement of abstraction in painting, starting with French Impressionism, was the disconnection of colour and object, making colour a separate, autonomous element which, through becoming a dominant means of expression, implicitly contributed to the dissolution of a fixed perspective.[210] Thus, musical metaphors in painting are, in additional to the ambition to establish chromatic laws comparable to theories of harmony in music, primarily used as a strategy for colour abstraction, for the discharging of colour from a concrete context or object, from the constraints of imitation and narration, and as a foundation for the visual representation of time, rather than involving a strategy for any *exact* equivalence or correspondence between colour and music.[211]

Colour is a particularly important quality of an image because the sensory perception of colour and music are similar, as Strick writes: "Immediately apprehended without much effort from the subject, color requires no interpretation or decoding, yet can act directly upon the emotions, like a musical note."[212] In 1911, the futurist painters Arnaldo Ginna and Bruno Corra's experiments with "colour music" included painting directly onto film stock, and Corra also wrote the manifesto, "Abstract Film – Chromatic Music", the same year.[213] Similarly, the painters Morgan Russell and Stanton

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[206] See Karin von Maur, "Bach et l'art de la fugue: Modèle structurel musical pour la création d'un langage pictural abstrait", *Sons & lumières*, 17ff. See also Wulf Herzogenrath, "Light-Play and Kinetic Theatre as Parallels to Absolute Film", *Film as Film: Formal Experiment in Film 1910-1975* [exhibition catalogue, The Hayward Gallery] (London: The Arts Council of Great Britain, 1979), 22ff.
[207] Jeremy Strick, "Visual Music", *Visual Music*, 15.
[208] Malcolm Le Grice, "Colour Abstraction – Painting – Film – Video – Digital Media" (1995), Malcolm Le Grice, *Experimental Cinema in the Digital Age* (London: BFI Publishing, 2001), 259.
[209] Ibid., 262f.
[210] See Gage (1999), 77f.
[211] See Zilczer, 81
[212] Strick, 18.
[213] Bruno Corra, "Musique chromatique" (1912), *Poétique de la couleur*, 52-60. See also *Film as Film,*79f.*; Sons & lumières*, 130f.

Macdonald-Wright during 1912 and 1913 combined the production of paintings based on concepts of "colour rhythms" and "colour chords" and attempts to represent a temporal dimension, with experiments of designing a 'kinetic light machine', projecting moving colours.[214] In 1912, the painter Léopold Survage started preparing hundreds of colour drawings, which were going to serve as a scenario or "storyboard" for a prospective abstract animated film, a project he called, "Le rythme coloré", which he planned to produce in cooperation with Gaumont, using the Chronochrome process.[215]

In his manifesto about the work, Survage pointed out that his project should in no way be seen as illustrating or interpreting a musical work: "It is an art unto itself, even if it is based on the same psychological phenomena as music."[216] The connection between "sound rhythm" and "colour rhythm" is succession in time, which can be achieved through the film medium, and the aim of the dynamic art of coloured visual form is to evoke the same kind of intimacy between author and audience, to create a visual language, which – like music – expresses the author's "state of mind, his inner dynamic being".[217] The three elements of this medium are identified by Survage as abstract visual form, rhythm (i.e. movement and changes of the visual form), and colour.[218] Through movement, the colour transcends the static compositions in painting, and through being bound up with rhythm, "it ceases to be an accessory to objects, it becomes the content, or even the spirit, of abstract form".[219] The project was interrupted by the First World War and was never completed, but several of the drawings from the "rythme coloré" series were included in Survage's 1913 and 1914 exhibitions.

Apollinaire wrote in 1917 that Survage had "invented a new art of painting in motion", and that he represented "'the glistening bridge (*le pont chatoyant*) between the painters of the past and 'the magnificent urge that is to transport the new painters'".[220] Despite aspiring to use film as a 'technological platform', or "instrument", Survage understood his experiments not primarily as cinema, but as a new visual art form, combining the recent liberation from form found in painting with the affective and temporal qualities of music and cinema:

> Painting, having liberated itself from the conventional forms of objects in the exterior world, has conquered the terrain of abstract forms. It must get rid of

[214] See Zilczer, 43ff. See also *Sons & lumières*, 132-139.
[215] Léopold Survage, "Colored Rhythm" ["Le rythme coloré"] (1914), *French Film Theory and Criticism*, Vol. I, 90-92. See also Robert Russett, Cecile Starr (eds.), *Experimental Animation: An Illustrated Anthology* (New York/London: Van Nostrand Reinhold Company, 1976), 35.
[216] Survage, "Colored Rhythm", 90.
[217] Ibid.
[218] Ibid., 91f.
[219] Ibid., 92.
[220] Apollinaire (1917), quoted in *Experimental Animation*, 35.

> its last and principal shackle – immobility – so as to become as supple and rich a means of expressing our emotions as music is. Everything that is accessible to us has its duration in time, which finds its strongest manifestation in rhythm, action and movement, real, arranged, and unarranged.
>
> I will animate my painting, I will give it movement, I will introduce rhythm into the concrete action of my abstract painting, born of my interior life; my instrument will be the cinematographic film, this true symbol of accumulated movement. It will execute the "scores" of my visions, corresponding to my state of mind in its successive phases.
>
> I am creating a new visual art in time, that of colored rhythm and of rhythmic color.[221]

Survage's experiments demonstrated the need for technological platforms or 'instruments' in addition to painting, as the limitations of painting in terms of visualising music are linked to the fact that music is a temporal medium.[222]

The medium of the colour organ, in all its different guises the chief instrument for performing the moving colours of "colour-music" or "light art" liberated colour not only from representation but also from the medium of painting.[223] This time-based medium was represented as being a new art form, which referred to music, painting and cinema without belonging to any of them. "Is not the whole of the Modern Movement of Painting", Klein asked in 1926, "a natural preparation for the birth of an Art of Light which will be more than a quaint experiment or an exercise in theatrical aesthetics?"[224] Later on, he claimed that painting no longer was a vital art form, as it no longer satisfed any spiritual need, as 999 out of 1000 seem content with the media of photography and cinema.[225] He continued: "Inversely as painting has declined music has grown. *Music is pre-eminently the important art of the age*."[226]

When presenting his "reflektorische Farbenspiele" performed on a colour-organ (the first time at a film matinee in Berlin in 1923), Ludwig Hirschfeld-Mack also referred to the need to go beyond the possibilities of painting and into continual movement.[227] Louis Favre argued for the development and creation of colour-music ("la musique des couleurs"), a new spatio-temporal art form, based on the same structural principles as sound-music ("la musique des sons"), in several publications between 1889 and 1927.[228] In the

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[221] Léopold Survage, "Color, Movement, Rhythm" ["Un nouvel art visuel"] (1914), *Experimental Animation*, 36.
[222] See Strick, 18f. See also Klein (1926), 31-37.
[223] See Zilczer, 25f.
[224] Klein (1926), xiii.
[225] Ibid., 31.
[226] Ibid.,, 32f.
[227] Ludwig Hirschfeld-Mack, "À propos de la partition de 'Reflektorische Farbenspiele'" (1925), *Poétique de la couleur*, 64. See also Peacock, 404.
[228] In 1926, Klein refers to Favre introducing the concept in his book *La verité, pensées* (1889), writing an article on colour-audition ("chromæsthesia") in 1891, and developing his

book, *La musique des couleurs et le cinema* (1927), Favre presented the new medium as an expressive spatio-temporal art form of moving colour, which does not yet exist and must be created.[229] The music of colour should essentially function as the music of sounds, expressing various emotional states, joy and sadness, excitement and despair, through the affective powers of light and colours in movement, producing colour melodies, harmonies and contrasts.[230]

As the development of "colour music" involved the attempted liberation from the constraints of painting, the various instruments and performances involved and artworks featuring projected light entailed that visual art in performance began to occupy a number of new arenas outside the art gallery: concert halls, theatres, cinemas, etc. In 1932, Thomas Wilfred designed self-contained units programmed with automatically repeated light compositions, which he claimed "may be exhibited or installed permanently in museums, galleries, halls, waiting rooms, or in private homes".[231] According to Favre, the projection of moving coloured light could be performed in open air (against the sky, on the sea, on monuments, or illuminating waterfalls or fountains) or in auditoriums.[232] He pointed out that colour-music projection could take place in any kind of auditorium, but cinemas were particularly well suited, not only because many cinema auditoria were already illuminated by coloured lights, but also because cinema as a visual medium attracts audiences that have already shown an interest in moving images: "In these rooms, one also finds assembled an audience which carries interest in everything regarding the view, they come to watch."[233] However, Favre pointed out that the success of colour-music in the context of cinema theatres depended on achieving a medium that, by nature, is independent from the film medium. If the identification of cinema as the seventh art is justified, then colour-music will be the eighth art; the two new art forms can and must support each other in their individual development. According to Favre, the colour-music pieces being performed in the cinema do not necessarily only entail the direct projection of colours by a keyboard, but even the projection of a *film* (in 'natural' colours or by the existing applied methods) transmitting the colours corresponding to the piece.[234] In this case, however,

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thoughts on the new art form in the brochure "La Musique des Couleurs et les Musiques de l'Avenir" (1900). See Klein (1926), 11ff.

[229] Louis Favre, 7f.

[230] Ibid., 10. Favre identifies a number of expressive and emotive values found in light and colour, e.g. pitch, timbre, intensity, tonality, as well as volume, form etc., which combined with the properties of movement (speed, duration, rhythm, etc.) can be used to create these new "melodies" and harmonies. Ibid., 11.

[231] Thomas Wilfred, "Lumia, the Art of Light", quoted in Zilczer, 81. See also Peacock, 404f.

[232] Favre, 22.

[233] ["Dans ces salles aussi, on trouve réuni un public qui porte interêt à tout ce qui touche la vue; il vient pour voir."] Ibid., 22.

[234] Ibid., 23.

as was the case with Survage, film is only a technical platform for the new medium or art form of colour-music; although film technology is employed to produce, store and perform the new compositions, these do not belong to the medium of cinema. In 1926, Klein also referred to the cinema theatre as a possible resource for the expensive and complicated development of colour-music, not referring to the film medium, but to the coloured illumination in certain auditoriums, presented between performances, and in some cases even alternating rhythmically in time with music.[235]

Intermedial Colours

The notion of mobile abstract, non-representational colours, as well as the musical metaphors used to describe the phenomenon, were associated with a number of cultural phenomena, and one of the most recurring was fireworks. In an early outline for colour-music as a prospective art form, H.R. Haweis in 1875 referred to fireworks to distinguish the new medium from natural phenomena as well as existing visual artworks: "I select fireworks as an illustration in preference to the most gorgeous sunset, because I am not speaking of Nature but of Art […], and I select pyrotechny instead of painting of any kind, because in it we get the emotional property of velocity, necessarily absent from fixed colouring."[236]

In his outline of the "evolution" of "colour music", Favre also referred to fireworks as a precursor for the new art form, entailing the realisation of "jeux de couleurs", play with colours, rather than true, expressive art.[237] Other existing phenomena accomplishing the play with colours necessary for "colour music" without becoming art, are illuminated fountains (Favre refers to Versailles, the World Expositions in Paris in 1889 and 1900, as well as "l'Exposition internationale des Arts décoratifs" in 1925, and other examples found in casinos and circuses), the coloured illumination at night of the Niagara Falls and the Eiffel Tower, and advertising signs featuring moving coloured lights.[238]

Similarly, in his presentation of Survage's *Le rythme coloré* in 1914, Apollinaire pointed out that although the work could be compared to music, such analogies are superficial as "it really is an independent art having infinitely varied resources on its own".[239] The art of moving colours, which

[235] Klein (1926), 225. See also Klein (1937), vi*b*-vi*c*.
[236] Rev. H.R. Haweis (1875), quoted in Klein (1926), 5.
[237] Favre, 25ff.
[238] Klein mentions Favre illustrating colour-music in his 1900 brochure through reference to the play of colour in illuminated fountains and dancing. Favre distinguishes the future art form from these phenomena due to their arbitrariness, their lack of structuring colour intervals in accordance to laws. See Klein (1926), 13.
[239] Apollinaire, "Colored Rhythm" (1914), *Experimental Animation*, 38.

goes "beyond static painting, beyond cinematographic representation" in fact refers to a much more varied culture of visual impressions as it "draws its origins from fireworks, fountains, electric signs, and those fairy-tale palaces which at every amusement park accustom the eyes to enjoy kaleidoscopic changes in hue".[240] This again links the practices of moving colour media like colour film and "colour music" to the 'perceptual transformation' involving the emergence of colour into a number of previously monochrome arenas, discussed in the previous chapter, including print media as well as industrial products in colour. In fact, John Seitz predicted in 1930 how future uses of colour cinematography would "play a great role in the future, in influencing public taste in the choice of dress, household furnishings, wall and floor coverings".[241]

During the 1920s and 1930s further industrial products for everyday use were produced in colour. An article in *Fortune* in February 1930, asserted that the "Anglo-Saxon is released from chromatic inhibitions", and how, "during the past few years a great pail has up-ended itself over the American scene, has splashed our household goods and gods with a rich, warm stream of flat, bright color".[242] The article goes on contrasting "the home of 1920 and 1925" – where most objects were in "natural colors", i.e. "deriving its color from the material of which it was fashioned" – with "the thoroughly painted home of 1928": here we find kitchen sinks in a variety of colours, orange refrigerators, dishes, pots, pans in "bright gay tints and tones", a bathroom pervaded by the colour green, in the tiles, the tub, the towels, and even the toilet paper, as well as coloured glasses, cloths, garbage cans, typewriters, furniture, cars, etc.[243]

Klein also connected what he described as an increased interest in developing the art of colour-music to an growing interest in colour in general, taking place in a variety of fields:

> The remarkable experiments during and immediately following the War in connection with the treatment of nerve cases by exposure of the patient to specially coloured interiors illuminated by coloured light, the direction of taste exhibited by modern interior decoration, contemporary dress, the colouring of fabrics, stage productions, the ballet, painting, the art of hoardings, are all indications of a general pleasure in "colour for colour's sake."[244]

These phenomena did not only represent a broader cultural context for a new medium of colour in movement; they were also understood as areas for exploration and study of colour, taking part in the development of the new

[240] Ibid.
[241] Seitz, 17.
[242] "Color in Industry", *Fortune*, February 1930, 85.
[243] Ibid., 85f.
[244] Klein (1926), vi.

medium. In 1926, Klein referred to his opportunity to experiment with colour harmony through "advisory work on the colouration of printed textiles" as valuable in the development of his colour projection compositions.[245] In 1929, he referred to coloured light in electric signs, some of which even present "colour sequences", as a "powerful element by means of which the advertising expert succeeds in arousing in the observer the reaction he intended", and he advised experimenters in colour- music to study coloured electric signs in American and European cities thoroughly.[246] In the third edition of his book on colour-music published in 1937, he referred to the wide-ranging "industrial pre-occupation with colour phenomena" in the USA and Britain, for example, the British Colour Council, established by British manufacturers, which "controls or attempts to control the tendencies of colour in fashion", as essential to the development of "the technique of future light expression".[247] Similarly, the colour organ inventor, Alexander Wallace Rimington, in 1895 referred to the "industrial uses to which the instrument might be applied […] for instance, as a means of testing combinations of colour for decorative designs, etc.".[248]

Colour, Sound, Movement: Abstraction and Representation

Film technology seemed to represent the medium most appropriate for many of the synaesthetical experiments carried out during the 1920s and 1930s, including the early black-and-white abstract films by Hans Richter and Viking Eggeling (Richter's *Rythmus 21* [1921] and Eggeling's *Symphonie diagonale* [1924]), which were presented as a continuation of the tradition of abstract painting. As Richter declared:

> Problems in modern art lead directly into film. Organization and orchestration of form, colour, the dynamics of motion, simultaneity, were problems with which Cézanne, the Cubists and Futurists had to deal. Eggeling and I came directly out of the structural problem of abstract art *nolens volens* into the film medium.[249]

[245] See ibid. (1926), 28.
[246] Klein (1937), vi*b*. Thomas Wilfred also conveys how he, because of his light art instrument, the clavilux, was contacted by advertising companies offering him "tempting contracts for display and signboard use – Stockings, Chewing Gum, Laxatives, Cigarettes." Thomas Wilfred, "Light and the Artist" (1947), *Thomas Wilfred's Clavilux*, ed. Michael Betancourt (Borgo Press, 2006), 15.
[247] Klein (1937), xviii.
[248] Rimington (1895), 75. See also Peacock, 401f.
[249] Hans Richter, quoted in Brougher, 100. See also Eleanore Doppenberg, Karel Dibbets, "Abstract Films and Color", *Il colore nel cinema muto*, 216ff.

Moholy-Nagy described Eggeling's work with the *Symphonie diagonale* as having "turned the original color piano into a new instrument, an instrument not so much for producing color combinations as for rendering the *structure* of a *motion space*".[250] The practice of colour organs during the 1920s and 1930s served as direct inspiration for many abstract filmmakers, and as William Moritz has pointed out, the film medium, with its standardised methods for production, reproduction and exhibition, seemed to many to be the ideal vehicle for the concept of colour-music.[251] Thus, a number of abstracts films handled the synchronisation between colour and sound. Richter hand-coloured the film *Rythmus 25* (1925), which he based on his 1923 scroll painting "Orchestration der Farbe", which employed colour in an attempt to visualise time.[252] Walther Ruttmann's hand-painted *Lichtspiel Opus 1* (1919-21), with music by Max Butting, was described in a review as "Visible music, audible light", as "the rendering of light and color as sound and the transformation of music into visible motion".[253] The spiritual, and even scientific aspirations of many of these films were explained in the 'manifesto' introducing Fischinger's MGM production *An Optical Poem* (1938): "To most of us music suggests definite mental images of form and color. The picture you are about to see is a novel scientific experiment – its object is to convey these mental images in visual form."[254]

Le Grice points out that this abstract movement in cinema during the 1910s and 1920s has never been considered beyond the margins of cinema history, contrary to the great influence of the abstract movement in painting which took place at the same time.[255] He links this to how the invention of photography liberated painting from the model of representation founded on perspective, which instead became the fundamental principles of the camera, and eventually the development of cinema. While painting during the twentieth century established an aesthetic which expressed a separation between objects and their properties through abstraction, the new medium of film instead reinforced the notion of the coherent, spatially positioned object within a specific narrative.

Many of the discourses on hand-painted abstract films in colour emphasised the absence of photography as a quality which distinguished these films from cinema in general. Bernhard Diebold described Ruttmann's

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[250] László Moholy-Nagy (1925), quoted in *Der deutsche Avant-Garde Film der 20er Jahre*, 26.
[251] William Moritz, "Musique de la couleur – cinema intégral", *Poétique de la couleur*, 10.
[252] See *Der deutsche Avant-Garde Film der 20er Jahre*, 68. See also von Maur, 27.
[253] Review of *Lichtspiel Opus 1* by Herbert Ihering, *Berliner Börsen-Courier*, May 6, 1921, repr. in *Der deutsche Avant-Garde Film der 20er Jahre*, 80. See also Moritz (1995), 11.
[254] See also Walther Schobert, "The German Film Avant-Garde of the 1920's: A Short Survey of Its Three Periods", *Der deutsche Avant-Garde Film der 20er Jahre / The German Avant-Garde Film of the 1920's*, eds. Annika Leitner, Uwe Nischke (Munich: Goethe-Institut, 1989), 18.
[255] Le Grice, 264.

Opus I in 1921 as a a new art, a "marriage of painting and music", which can be named "absolute dance" or "music for the eye" blurring the distinction between spatial and temporal art, and emphasised that "the new kinetic art has nothing to do with cinema in the usual sense of the word. Certain woodwind instruments can imitate the sounds of animals but are also capable of producing serious music; and the difference is as great as that between the old handicraft of film and the new art."[256]

One of the most interesting features of Klein's comprehensive books on colour music on the one hand and colour cinematography on the other, which he alternately wrote and revised during the 1920s and 1930s, is the sharp distinction he makes between the two media of colour-music and colour film, and especially how the ideal function that he assigns to colour in each medium are virtual opposites. While colour-music is presented as a medium of non-representational moving images, with colour at the absolute forefront, cinema is primarily characterised as a representational and narrative medium, where the function of colour should be one of restrained subordination.[257] In his book on colour cinematography published in 1936, Klein pointed out how the sound film radically changed the development of cinema, as sound elements in films have almost become more important than visual elements. This makes sound film a hybrid art form, where sound and image alternate in being the most important factor, while the ideal artistic integration of sound and image will be achieved in the future "synthetic art" of colour-music.[258] However, Klein asserted that "introduced into the film in its present form colour cannot take precedence in the story-telling of either the action or the sound. It can only assist"[259] – by inducing a mood, by emphasising certain important details, or by making the image more realistic. Klein's discussion of colour in cinema is characterised by an emphasis on notions like restraint and control, quite similar to the prevailing debate concerning Technicolor during the same period,[260] pointing out (in 1936): "We are now in a position for the first time to forget experimentation, and to make use of colour as a contribution towards an end – and that end, we should always remember, is the making of a *good film*."[261] In an article

[256] Bernhard Diebold, "A New Art: The Visual Music of Film" ["Eine neue Kunst: Die Augenmusik des Films"] (1921), repr. in *Der deutsche Avant-Garde Film der 20er Jahre*, 98ff.
[257] Klein (1936), vii.
[258] Ibid., viii.
[259] Ibid.
[260] Klein even suggests that the colour structure of a film should be composed as a "colour score", similar to the colour scores described by Natalie Kalmus; here, the hierarchy as well as correspondence between sound and colour is expressed by the idea that colour composition for a film should take place after the general conception of sound has been made, preferably not until the film music has been recorded. The colour score should also be based on the standard of a specific colour atlas, in order to be as precise as the notation in a musical score. See ibid., 300f.
[261] Ibid., ix.

two years later, titled "What's Wrong with Colour?", he described "colour incidents" that divert the audience from the drama in a feature film as "an intruder destroying the unity of the film and usurping the proper functioning of other more important elements of the film dynamics".[262] At the same time as he is promoting an art medium of non-represential colour, labelling it as "an art of light", Klein – when referring to cinema – warns against "stumbl[ing] into the pathetic fallacy of the painter Monet, who said, 'Light is the subject of the picture.'"[263] And he continues: "*Colour should never attract the attention without carrying a significance necessary for the more complete presentation to the observer of the unfoldment of the drama*. The observer should never be conscious of colour at all until it means something."[264]

However, the clear distinction Klein drew between cinema and the abstract moving images of colour-music is primarily related to media-specific *content*, but not necessarily to any specific technology. When referring to the slow and somewhat directionless development of the independent medium of colour-music in 1937, eleven years after the first edition of his book on the subject (and one year after his book on colour cinematography), Klein somewhat unpredictably admitted that "[s]urpassing all other recent manifestations of visual art in the directness of its formative and educative power in relation to colour-music is the colour film."[265] And he continued, echoing Richter: "It is sufficient to assert here that the colour film seems by far the most direct method of realizing nearly everything which had occurred to the imagination of the pioneers of colour-music. Hardly the fringe of the possibilities have been explored."[266] He refers to the films of Fischinger and Lye as approaching certain aspects of the synthesis between colour and sound.[267] Like both Favre and Survage, he still referred to abstract, moving colour images as an independent medium, produced, stored and projected through the technical platform of film, without ever becoming *cinema*. Within the framework of colour-music, Klein thus presented a number of technical methods for producing abstract colour films: different kinds of established animation techniques as well photographing and reproducing projected images from colour-music instruments, such as

[262] Adrian Bernard Klein, "What's Wrong with Colour?", *The Cinema*, 1938, repr. in Klein (1939), 413.
[263] Klein (1938), 413.
[264] Ibid. However, Klein admits that there may be "one or two categories of films in which it might be permissible to allow the colour to become one of the *principal* motifs. Such are perhaps all cartoon films, and films of the dance, revues, ballet (yet to be exploited), documentaries on the visual arts, and unquestionably the travel or landscape film." Ibid., 414.
[265] Klein (1937), xviii.
[266] Ibid., xix.
[267] He also contends that their films would have been better if they had read his book on the subject. Ibid., xix.

Thomas Wilfred's clavilux.[268] He also pointed out two methods which he attributes to Len Lye.[269] The first is the "direct film" technique of hand-painting directly onto clear 35mm film which was then reproduced upon Gasparcolor film (the first film Lye made with this technique was *A Colour Box* in 1935).[270] The second method (found in *Rainbow Dance* from 1936) entails shooting on black-and-white stock, then "colourising" the material in the laboratory by manipulating the three separate strips of Gasparcolor film.[271] Lye connected this method to the recurring notion of "colour control", having the *artist* separating the colours rather than the colour filters.[272]

Within the framework of the notion of colour-music as an independent medium, detached from cinema, Klein nonetheless lists a number of advantages found in these "film methods" to accomplish most of the ambitions of colour-music, among them, the elimination of expensive and unique equipment, perfect sound synchronisation, access to a large audience, unlimited creative possibilities, etc.[273] However, Klein also lists a number of disadvantages, among them the fact that film is a medium of mechanical *reproduction* rather than performance, thereby eliminating the performer as well as his instrument, and since Klein is still determined to develop a new art form comparable to music, this ideal "probably necessitates the ability to own and learn to play an instrument".[274]

The clear division Klein suggests between cinema on the one hand and a medium of non-representational moving colours on the other was in fact not really echoed to the same extent in contemporary popular culture. Kerry Brougher points out the transformation of "visual music" from belonging to the avant-garde, colour organ inventors etc. to becoming "a more public-oriented phenomenon with mass appeal".[275] Brougher refers to 1930s Hollywood as expressing huge interest in abstraction and surrealism, and being open to interaction with the avant-garde.[276] This interaction between popular culture and the avant-garde is found in Disney's *Silly Symphonies* series, the choreography of Busby Berkeley, Fischinger's work in

[268] Ibid., xxvii-xxviii.
[269] Ibid., xxviii-xxix.
[270] See Jonathan Dennis, "A Colour Box", *Len Lye*, eds. Jean-Michel Bouhors, Roger Horrocks (Paris: Éditions du Centre Pompidou, 2000), 192. See also Anne Fleming, "*A Colour Box* (Len Lye Recovered)", *This Film Is Dangerous*, 126f.
[271] See Len Lye, "Experiment in Colour" (1936), *Len Lye*, 225.
[272] Len Lye, "Voix et couleur" ["Voice and Colour", *Life and Letters Today*, 14, Spring 1936], *Poétique de la couleur*, 92f. Lye also praised Klein's *Coloured Light* (1937) in a review of the book. See Len Lye, "Compte-rendu de 'Coloured Light', un livre du Major Adrian B. Klein" ["Len Lye Reviews Major Klein's *Coloured Light*", *The Cine-Technician*, December-January, 1937-38], repr. in *Poétique de la couleur*, 96f.
[273] Klein (1937), xxix.
[274] Ibid., xxix.
[275] Brougher, 96.
[276] Ibid., 105ff.

Hollywood, and the fact that several of Ruttman's, Fischinger's and Len Lye's abstract formal experiments were released as advertising films. There is another direct link between animation in Hollywood and German abstract filmmaker Fischinger, who while in Hollywood, contacted the conductor Leopold Stokowski about basing a film on Bach's *Toccata and Fugue*, while Stokowski thereafter contacted Disney about the idea which eventually turned into the full-length feature, *Fantasia*.[277] Fischinger eventually withdrew from the project, as his original designs were made more figurative by Disney's animators, and Disney represented both a fascination for as well as some uncertainty towards the 'pure' abstraction advocated by Fischinger, as is expressed in this transcript from a 1939 meeting:

> Everything that has been done in the past on this kind of stuff has been cubes and different shapes moving around to the music. It has been fascinating. [---] If we can go a little further here, and get some clever designs, the thing will be a great hit. I would like to see it sort of near-abstract, as they call it – not pure. And new.[278]

With regard to the role of colour, Eisenstein also seems to reject both the "extremes" of the division Klein suggests between 'cinema' and 'colour-music'. Eisenstein denounces notions of "pure" abstraction or "expressiveness", and he strongly rejected Kandinsky's notion of 'inner resonance' of colours as an end in itself, as a "liberation".[279] According to Eisenstein, Kandinsky's conscious effort to separate form and content and remove thematic elements, only led to "a *vaguely disturbing effect*", and nothing else.[280] Instead, the interaction between line, shape, and colour should form an organic unity in an expressive as well as thematic sense.

Eisenstein stated that, in principle, there is no difference between working with music and working with colour, producing a colour film means creating 'music in colour'.[281] Cinematic colour is always connected with movement, and every frame in a film is a temporal rather than fixed structure. Therefore musical terminology is also suited to describe and explain the functions of colour in cinema.[282]

Eisenstein outlined three types of correspondence between music and image: a metric, "primitive" correspondence, a more complex rhythmic correspondence, and "the most splendid correspondence": the melodic.[283]

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[277] Leslie, 187.
[278] Walt Disney (transcript, 1939), quoted in William Moritz, *Optical Poetry: The Life and Work of Oskar Fischinger* (Bloomington/Indianapolis: Indiana University Press, 2004), 84. See also Leslie, 190f.
[279] Eisenstein, "Vertical Montage" (1940), 349ff.
[280] Ibid., 352.
[281] Ibid., 322f..
[282] Ibid., 333.
[283] Ibid., 321.

The simplest form implies complete correspondence on all levels between the action in the image and the character of the music ("a march tune plays and soldiers march in time with it, while it is also echoed in the rhythm of the montage").[284] The more complex rhythmic correspondence entails a number of parallel rhythmic "series" or "lines" (music, movement of the actors, editing) in accordance with one basic rhythmic structure. But, in addition to the visualisation of the rhythmic and temporal aspects of music, one should also attempt visually to depict tonal and melodic qualities.[285] Eisenstein found the foremost example of audiovisual correspondence where the lines and contours of the image capture both the rhythm and the tonality of the music that accompanies them in Walt Disney's black-and-white cartoons.[286] These films were frequently used by Eisenstein as examples of this correspondence, and Disney is characterised as a unique master of the cartoon medium. The lines in Disney's film constitute figures and characters that "can wriggle like snakes, twist, contract and expand"[287] and thus tonal images of music are created. The cartoon entails a 'total' compositional control entirely different from filming physical 'reality': "just you try and make a real pair of trousers produce a trembling, shivering line – a physically non-existent line – which can separate the shape of a leg from its background, or sing to a tune played by a saxophone, etc.".[288] To capture the same ideal synchronization when filming 'real' objects one must make use of the interaction and contrasts between graphic shapes and textures and how they are affected by light. This entails a kind of movement on a higher level than the relocation of objects, namely the oscillation of light particles and their interplay with shapes and surfaces, and an even more subtle kind of oscillation or movement is expressed through colour. The complete synthesis between music and image can only be achieved through colour, and in this respect, "the filming of real objects will share all the advantages of the animated cartoon!"[289]

However, Eisenstein's criticised Disney's use of colour (from 1931 and onwards) to the same extent as he admired his earlier black-and-white productions, claiming that he was not able to achieve a musical

[284] Eisenstein, "On Colour" (1937), 254.
[285] Ibid. See also Eisenstein, "Vertical Montage" (1940), 335.
[286] Eisenstein, "On Colour" (1937), 254f. Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 321, 335ff. See also S.M. Eisenstein, *Eisenstein on Disney* (1940-41), ed. Jay Leyda, trans. Alan Upchurch (Calcutta: Seagull, 1986), 2, 10f. In addition, Russell Merritt points out that Sergei Prokofiev, who composed the music for Eisenstein's *Alexander Nevsky* (1938) as well as *Ivan the Terrible*, also was strongly influenced by Disney's use of music; both Eisenstein and Prokofiev had visited the Disney studio before the production of *Alexander Nevsky*, Eisenstein in 1930, Prokofiev in 1938. Russell Merritt, "Recharching *Alexander Nevsky*: Tracking the Eisenstein-Prokofiev War Horse", *Film Quarterly*, 2, 1994-95, 44.
[287] Eisenstein, "On Colour" (1937), 254.
[288] Ibid, 255.
[289] Ibid.

correspondence between colour and sound; colour does not participate in the interaction between line, shape, melody and rhythm.[290] Eisenstein was particularly disappointed by *Bambi* (1942), which was characterised as an example of a "colour catastrophe" where Disney's blindness for the musicality of both colour and landscape is evident.[291]

Leslie points out the evident affinity between sound and image in animated films: "in cartooning, with its frame-by-frame fully controllable structure, the links between sound and image could be drawn so tightly that a symbiosis, a perfect rhythmic synchronization, could occur".[292] The rhythmic synchronisation of sound and image, the relations between the visual and the aural – often called "Mickey Mousing" – was not only evident from Disney's first animated sound film, *Steamboat Willie* (1928), but functioned as the chief structural element in many of his early cartoons, in particular in the *Silly Symphonies* series, where what was going on in the image was initiated by the progression of the music.[293] The first film in the series was *The Skeleton Dance* (1929), where skeletons danced and twisted in synchronicity with music by Grieg. The first film made in three-strip Technicolor, *Flowers and Trees* (1931), was also a cartoon belonging to this series. Leslie also points out how, in the 1930s, Disney cartoons often were described as a new form of audiovisual art form, and often were compared to opera and ballet, as well as abstract art.[294]

In an essay from 1937 criticising most of the use of colour in films, the painter Paul Nash saw possibilities in colour and cinema primarily through its use in Disney's films,[295] and most importantly, in the films of Len Lye, whose "aesthetic philosophy of colour", according to Nash, involved a "new form of enjoyment quite independent of literary reference; the simple, direct visual-aural contact of sound and colour through the ear and eye. Colour sensation!"[296] Thus, in a film like *A Colour Box*, the "features of the musical form dictated, more or less, the pattern of the colour arabesque".[297] In his writings, Lye also continually emphasised the notion of "pure colour sensation", synchronised exactly with rhythmic music, "a direct and immediate impulse-feeling as opposed to the literary feeling that requires a memory background finely filtered through consciousness of realism".[298] Echoing the reception of early Technicolor sound films, where colours and

[290] Ibid. Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 321f., 336f.
[291] Eisenstein, *Nonindifferent Nature* (1945), 389.
[292] Leslie, 26f.
[293] See ibid., 27ff.
[294] Ibid., 104, 159.
[295] Paul Nash, "The Colour Film", *Footnotes to the Film*, 128ff.
[296] Ibid., 134.
[297] Ibid.
[298] Len Lye, "Notes on a Short Colour Film", *Life and Letters Today*, 15:6,1936, 162. See also Lye, "Experiment in Colour" (1936), 226.

voices were presented as interacting aesthetic elements, Lye also outlined possible, non-hierarchal relationships between colour and voice, and envisioned the "voice-and-colour film", consisting of colour arrangements in connection with speech, as a "sensory ballet, consisting of words, pictorial shapes and sound knit into a film continuity in such a way that any one of these elements could become dominant in turn, in the rendering of the sense definitions in it".[299] However, Lye's films, just like Disney's early sound cartoons, are characterised by a sense of "impurity" as abstract hand-painted colours are not only synchronised to jazz and popular dance music, but also combined with live-action footage: *Trade Tattoo* (1937) featured documentary footage showing the "rhythm of work-a-day Britain" (as the film's introductory title tells us), as many of his films were shown as advertisements to promote the British G.P.O. (General Post Office), titles like "G.P.O. – cheaper parcel post" were superimposed to the abstract images at the end of *A Colour Box*, and the film, *Rainbow Dance*, was based on live-action footage of a dancer interacting with the motion of animated images. Ian Christie has pointed out how Lye represents a continuation of the practice of using dance as a catalyst for the mixing of the arts characteristic of modernism.[300]

One of the sources of inspiration for the development of colour music was dance as a visual phenomenon, and the technical advances in stage lighting during the early twentieth century. Klein referred to Loïe Fuller as a pioneer in her use of coloured lights as "an integral part of the emotional scheme of the ballet", and described a serpentine dance which, with its shifting colours projected on moving cloths, accompanying the movements of the dancer, was the subject for a number of hand-painted films during the 1890s.[301]

Klein also referred to the ballet as a potential medium for the temporal organisation of light that painting had failed to realise, but at the same time pointed out a number of limitations and 'imperfections' of the medium in terms of the ideal of an image in continuous change, consigning it to a "lower plane than the ideal art of music, which we must take as our standard": in ballet, not only is the movement taking place against a background that is virtually unchanging, but the movements are furthermore limited to the figures of the dancers.[302] Again, the notion of the image or visual performance as music, or as having musical qualities, is challenged or

[299] Len Lye, "Voice and Colour" (1936), quoted in Rachael Low, *The History of the British Film 1929-1939: Documentary and Educational Films of the 1930s* (London: George Allen & Unwin, 1979), 104. See also Lye, "Voix et couleur" (1936), 92.
[300] Ian Christie, "Colour, Music, Dance, Motion: Len Lye in England, 1927-1944", *Len Lye*, eds. Jean-Michel Bouhors, Roger Horrocks (Paris: Éditions du Centre Pompidou, 2000), 188.
[301] Klein (1926), 179. See also Barry Anthony, "Loïe Fuller and the Transformation of the Music-Hall", *Living Pictures*, 2:2, 2003, 40f.
[302] Klein (1926), 36f.

at least complicated by the concreteness of the elements in the image: the *bodies* of the dancers.

Colour and Sound: Metaphors and Correspondences

The tension between abstraction and representation in terms of notions about the synchronisation between colour and sound, and the fact that the integration of colour in specific objects and actions seems to pose a problem in many of these discourses, brings about questions about the association between colour and sound as a metaphorical discourse.

John E. Harrison and Simon Baron-Cohen refer to discussions of whether certain writers, artists and composers may have had (developmental) synaesthesia, and demonstrate how literature and music with synaesthetic characteristics often seem to reflect metaphors or analogies, or the ambition to create a synaesthetic dimension to a work (often informed by cultural associations), pointing out that "since metaphor is widespread in language this provides ripe conditions for confusion with developmental synaesthesia".[303] Language, with reference to certain established idioms (e.g. 'to see red') is often used to authorise the notion of physiological, emotional or psychological relations between sense impressions; Favre referred to such linguistic metaphors as intuitive aesthetic correspondences.[304]

There are obvious connections between synaesthesia and semiotics, as notions of synaesthesia first and foremost reveal a discourse of metaphors: just as an image can be described by referring to another image, or a sound can be described by referring to another sound, within the concept of synaesthesia, sounds are *described* by referring to images, and vice versa. Concepts like "colour music" suggests blurred boundaries between the metaphor (language, colour or image) on the one hand and the actual phenomena on the other. Basically, such recurring metaphors seem to reflect the difficulty in 'capturing' colour through language.

Notions about the specific emotional and psychological effects of specific colours have consciously been used for therapeutic purposes. This practice, often referred to as "Chromotherapy", was developed during the 1880s and 1890s, and involved treating mental patients with coloured light, or placing them in specifically painted rooms, based on the presumed effects of specific colours (red light was exciting, blue was calming, etc.).[305] Neil Harris connects the use of colour for various psychological or emotional purposes in the United States during the 1920s and 1930s to the interest in colour through cinema, print media and commodities: "Color was installed in

[303] Harrison, Baron-Cohen, 8ff.
[304] Favre, 16.
[305] Gage (1993), 206f.

asylum rooms to speed recovery: red chambers for depressives, yellow for hysterical paralytics, blue for the violent. Engineers placed colors on moving machine parts to diminish fatigue and improve industrial safety. [---] Color engineers showed stores how to increase sales, and factories how to improve production."[306] Paint manufacturers specified colour combinations for therapeutic purposes, a number of articles with titles like "Making People Do Things by Wall Colors" (1916), "Emotions Due to Colors", and "The Colour Cure" (1926) were published.[307]

Favre also pointed out that the affective correspondence between colours and specific qualities was not only something imagined by poets, but an actual fact, "revealed by observation and experience, from laboratories and from life" ["révelée par l'observation et l'expérience, celles du laboratories et celles de la vie"].[308] Favre referred to how this knowledge was made use of in factories (the colour red stimulates activity) and in therapy (the colour blue has a soothing effect).

The main scientific source to provide evidence for the connection between colour and sound is taken from wave theories in physics, the discovery that both light (and colours) and sounds are distributed through energy waves and vibrations. Thus, there is, on a physical level, a vibratory equivalence between painting and music.[309] These principles of physics, and the emphasis on the vibration of waves were significant in the search for a "general formula" for general principles of harmony which characterised notions of "visual music".[310]

The most apparent "evidence" of this correlation was perhaps the optical soundtrack, found on sound-on-film systems, where sound waves were recorded optically, and rendered on the filmstrip as graphic traces analogous with the images. Parallel to this, there were a number of experiments with "acoustic inscription" or "synthetic sound", which entailed painting visual patterns not only in order to *represent* sound, but to *create* soundtracks through visual means, for example, Rudolf Pfenniger's *Tönende Handschrift* experiments in 1931, and Fischinger's experiments with "ornament sound" in 1932, which involved a further development of the synaesthetical experiments found in his abstract films.[311]

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[306] Harris, 336.
[307] See ibid., 481n. See also Gage (1999), ill. 103.
[308] Favre, 13.
[309] See Gage (1993), 233 and Zilczer, 35ff. See also Georges Roque, "'Ce grand monde des vibrations qui est à la base de l'univers'", *Aux origines de l'abstraction*, 51-67.
[310] See von Maur, 19. See also Hall, Stull, 273.
[311] See Thomas Y. Levin, "'Tones from Out of Nowhere': Rudolf Pfenniger and the Archeology of Synthetic Sound", *Grey Room*, 12, Summer 2003, 32-79. See also Philippe Langlois, "Les pionniers de la synthèse optique", *Musiques et images au cinéma*, eds. Marie-Noëlle Masson, Gilles Mouëllic (Rennes: Presses Universitaires de Rennes, 2003), 147-158; Moritz (2004), 42ff.; *Sons & lumières*, 208ff.

Similarly, George Albert Smith referred to the material 'inscription' of sound waves in sound reproduction media as an analogy for the similar inscription of "colour waves" in the black-and-white film images of Kinemacolor films:

> A wax phonograph or gramaphone [sic] 'record' of a band of music or the voice of a singer is in reality an engraven record of the complex sound-waves set in motion by these performances, and when the wax tablet or cylinder is placed in a suitable machine these sound-waves can be repeated and the original music reproduced. In the same way, a small roll of kinematograph film bearing, say, 5,000 little photographs, these photographs having *no trace of colour* about them, carry within themselves, in their long range of tones and half-tones so to speak, a record of the colour-waves received by the lens when the picture was taken, and when this film is run through a bioscope projector fitted with the proper attachment the recorded 'colour-waves' are again set in motion, and the scene is reproduced to our eyes in proper colours.[312]

Rimington also emphasised the varying frequencies of vibrations, some of which are perceived optically, and some aurally, as the basic connection between colour and music.[313] Eisenstein's first mention of colour as an element of montage appeared, according to Richard Taylor,[314] in the essay "The Dramaturgy of Film Form" in 1929.[315] Here, conflict is caused not only by the relationship between different colours, but more specifically through the physiological perception of the different vibration frequencies of the colours.

Favre also described the multitude of rays and radiations, natural and otherwise, that affect the human organism both physically and mentally, referring to x-rays as well as electromagnetic, infrared and ultraviolet rays, in addition to the rays emitted from the telegraph, television, and wireless telecommunications, advocating the emergence of colour-music by stating that the human eye and ear are especially perceptible to rays and radiation when it comes to aesthetics.[316] The affective qualities of specific colours are connected to wavelength and radiation frequency. Favre referred to the widespread division between "cold" colours (violet, blue, green) and "warm" colours (yellow, orange, red) at each end of the spectrum.[317] He pointed out that this distinction is not only used by painters; physicists also understand

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[312] George Albert Smith, quoted in "Animated Photography in Natural Colors", *Chamber of Commerce Journal*, June 1908.
[313] Alexander Wallace Rimington, *Colour-Music: The Art of Mobile Colour* (London: Hutchinson & Co., 1912, repr. Elibron Classics, 2004), 16ff.
[314] Richard Taylor, "Introduction – Eisenstein: On Socialism, Soviet Cinema and Reel Life", *Selected Works, Volume I*, 17.
[315] S.M. Eisenstein, "The Dramaturgy of Film Form (The Dialectical Approach to Film Form)" (1929), *Selected Works, Volume I*, 166.
[316] Favre, 6f.
[317] Ibid.,, 11ff.

the energy of "cold" colours as short-wave and high-frequency (in terms of vibrations), while "warm" colours are characterised by long-wave and low-frequency energy. "Warm" and "cold" colours also constitute an opposition between expressive and emotional qualities. Warm colours represent excitement, force, activity, passion, and joy, while cold colours represent calmness, rest, contemplation, and melancholy.

The polar contrasts of "warm" and "cold" colour, which is a classification based on perceptual experience, were introduced in Charles Hayter's colour circle from 1813, but Gage points out that they had been common in English painterly discussions since the eighteenth century.[318] Gage points out that this is a cultural, metaphorical division, though colours are the visible symptom of radiation. In this respect, however, the division warm/cold entails the opposite of the metaphorical usage: blue-violet signals the greatest capacity to heat, while red signals the least.

As notions about correspondences between colour and music continually change between discourses based on scientific presumptions, and a more metaphorical discourse, there are obviously several very different conceptions of how, and to what extent, these correspondences work. One of the recurring conceptions in this respect, which refers directly to notions of vibratory equivalence, concerns whether and in what way specific colours can be analogous with specific musical notes. The most basic reference is Isaac Newton, who in 1704 suggested the correspondence between the assumed number of seven colours of the rainbow and the seven notes of the Western musical scale.[319] Rimington, among many others, applied the same analogy between spectrum and octave, and compares the frequency of vibrations of certain notes with that of certain colours, suggesting that there exists "some common foundation or organic basis in nerve structure, or in mental constitution for receiving both colour and musical expressions".[320] In the various examples of systematic correlation between colours and notes/keys (in particular with regard to colour organs), music does not only serve as a model for colour in terms of 'purity', immateriality etc, but also as a precise and defined structural system. Riley points out that despite the fact that colour seems to evade all attempts of systematic codification, it is also a subject which has generated a lot of thinking in terms of systems, because of the multimedial and pervading nature of colour, "because it is such a devourer of models and systems".[321]

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[318] Gage (1999), 22f.
[319] See Gage (1993), 233. See also Ruggero Pierantoni, "One Colour for All Seaons: Knowledge, Measures and Myths at the Beginning of Cinema", *All the Colours of the World*, 98; Mattis, 213; Klein (1926), 62; Alexander László, "Préhistoire du parallèle entre les sons et les couleurs" (1925), *Poétique de la couleur*, 36.
[320] Rimington (1912), 20.
[321] Riley, 1.

Although the search for correspondences between image and sound often were associated with an emphasis on non-representation, in some cases the systematic visualisation of music was made use of in order to display certain representational qualities of certain kinds of music. In 1900, E.G. Lind outlined an analogy between the seven colours of the colour spectrum and the seven notes of the musical scale, based on a concept of vibratory correspondences.[322] Lind used these parallel scales to translate melodies into colours, as well as "spoken words, or non-musical sounds" (reproduced in Klein's book are the visual renderings of "a child's wail" as well as of "the brilliant ending of a speech of a noted lawyer").[323] He also translated a number of "national airs" according to this system, in order to demonstrate how the characteristics of specific nations expressed in these songs also were visible in colour. Thus, songs like "Yankee Doodle" and "God Save the King" were presented as being, respectively, distinctly American and British in their aural as well as visual form; the transcriptions of Irish songs surprise, however, for the prevalence of orange rather than of green, as was expected, while the Scottish characteristics of "Auld Lang Syne" could "be at once detected by its strong resemblance to a plaid".[324]

Newton's correlation between the colour spectrum and the musical scale was criticised by Goethe, who wrote in his *Theory of Colours*:

> Colour and sound do not admit of being directly compared together in any way, but both are referable to a higher formula, both are derivable, although each for itself, from this higher law. They are like two rivers which have their source in one and the same mountain, but subsequently pursue their way under totally different conditions in two totally different regions, so that throughout the whole course of both no two points can be compared. Both are general, elementary effects acting according to the general law of separation and tendency to union, of undulation and oscillation, yet acting thus in wholly different provinces, in different modes, on different elementary mediums, for different senses.[325]

Several colour-music theorists follow this line of thinking with regard to establishing connections between colour and sound in terms of being sensory qualities rather than completely analogous properties. Favre pointed out the impossibility of establishing emotional or expressive correspondences between specific notes and specific colours.[326] Others, like Eisenstein and Klein, refer specifically to Goethe: in the essay "Unity in the Image", Eisenstein interpreted Goethe's notion of a "higher formula" and "general

[322] E.G. Lind, "The Music of Colour and the Number Seven" (1900). See Klein (1926), 14f. See also Gage (1999), 263f.
[323] Klein (1926), 16.
[324] E.G. Lind quoted in ibid.
[325] Goethe, [748], 298f.
[326] Favre, 14f.

laws" as what he characterises as "an intellectual-emotional image which both sound and colour are capable of expressing in equal measure, uniquely and independently".[327]

Eisenstein argued that colour had been given more attention as a connection between the audible and the visual than any other phenomenon, and in "Vertical Montage" he presents a vast catalogue displaying numerous examples of ideas about correspondences between words and colours, music and colours, colours and emotions etc.[328] At the same time, Eisenstein strongly rejected what he characterised as an erroneous idea among Western theorists that the correspondences between sounds and colours can be *absolute*. Although this may be verified in physiological terms, it is meaningless as an artistic principle: "convergence between sound and colour can only take place through the visual image, i.e. through something psychologically specific but essentially changeable, subject as it is to the mutations imposed by its content and by the overall conceptual system. What is unique in an image and what can blend essentially with it are absolute only in the conditions of a *given* context, of a *given* iconography, of a *given* construct."[329] It is difficult to find absolute correspondences when not dealing with pure abstraction, since colour is connected to a huge number of objects, forms, and phenomena, as well as to objective and subjective associations, and it is impossible to find one musical note to serve as the equivalent of all these elements. Thus, it is the context the colour is a part of and the objects it embodies which affect the character of the music.

Theodor Adorno and Hanns Eisler echo Eisenstein's rejection of notions of pure abstraction and "absolute correspondences" in their criticism of the synaesthetical abstract film movement, which they describe as a "foundation of sects which dwell, let us say, on the affinity between certain colors and sounds and which mistake their obsessions for *avant-garde* ideas".[330] Adorno and Eisler argue that the structural unity between the two media of music and image "is achieved indirectly; it does not consist in the identity between any elements, be it that between tone and color or that of the 'rhythms' as a whole. The meaning or function of the element is intermediary; they never coincide *per se*."[331] The relation between image and sound "is not one of similarity" but, rather, "one of question and answer, affirmation and negation, appearance and essence". This is linked to the divergent specificities of the two media. Again music is connected with immateriality

[327] Eisenstein, "Unity in the Image" (1937), 268. See also Klein (1926), 67.
[328] Eisenstein, "Vertical Montage" (1940), 337-349.
[329] Eisenstein, "On Colour" (1937), 256.
[330] Theodor Adorno, Hanns Eisler, *Composing for the Films* [1947] (London: The Athlone Press, 1994), 64f. However, Adorno and Eisler criticise Eisenstein for adjusting to the same "formalistic type of thinking" in his readings of correspondence between image and sound in Disney cartoons. See ibid., 66f.
[331] Adorno, Eisler, 70.

and non-representation, as music "is never sharply defined with regard to any object outside itself to which it is related by imitation or expression". On the other hand, "no picture, not even an abstract painting, is completely emancipated from the world of objects".

Eisenstein pointed out that an audiovisual composition based on synchrony does not necessarily require absolute correspondence between sound and image; there should rather be an interaction between corresponding and non-corresponding movements, where the combinations, nevertheless, must always be compositionally controlled within the general structure of the film.[332] However, Eisenstein argued that there seems to be a recurrent desire to find absolute equivalents between colours and sounds, particularly during periods marked by mysticism.[333] This involves trying to *fix* relations that, in fact, are individual and arbitrary, evident through the divergences between different attempts to establish such correspondences. Eisenstein exemplifies this with how A.W. Schlegel and Arthur Rimbaud linked different groups of colours with different groups of vowels (and meanings), while an unnamed synaesthete acquaintance of Eisenstein's automatically and involuntarily associated colours with consonants. Moreover, Eisenstein argues, in an analysis of Rimbaud's "Voyelles" (1870-71), that Rimbaud never conveys 'absolute correspondences'; he is, rather, describing images based on personal colour concepts, originating from specific experiences in the poet's life.[334]

Klein also referred to the discrepancy in different individuals' colour-hearing (the note F# equalling a bright blue colour for Scriabin and a strawberry-red colour for Koussevitsky) to denounce the numerous analogies between colours and notes, certain colours with certain instruments, as nonsense which discredits "the whole proposal of colour music".[335] In fact, few of the various analogies between colour and pitch were alike: Olivia Mattis illustrates what she characterises as the "haphazard nature" of such analogies with a list presenting thirteen different colour scales from three centuries, including Newton (1704), Castel (1734), Rimington (1893) and Scriabin (1911), all involving separate colour-tone equivalences.[336] In a historical survey on analogies between sounds and colours from 1925, Alexander László, who developed and performed the colour organ, the sonchromatoscope, in 1925,[337] also lists a number of colour-music theorists and practitioners, including, among others, Castel, Rimington and Scriabin, and their disparate systems of note-colour correlations.[338] Thus, as Gage

[332] Eisenstein, "Vertical Montage" (1940), p. 336.
[333] Eisenstein, "On Colour" (1937), pp. 257-260.
[334] Eisenstein, "Vertical Montage" (1940), 364.
[335] Klein (1926), 42ff., 57ff.
[336] See Mattis, 213.
[337] See Peacock, 404.
[338] Lászlo, 45.

points out, the history of synaesthesia "suggests that the very senses themselves, which have generally been thought of as bodily functions, are not exempt from, or are by and large the products of cultural conditioning".[339] Lászlo concludes that the concept "musique chromatique", which is characterised as the union between painting and music, is based on the principle that each colour corresponds to *several* sounds, and that the relations between the colours are not fixed or permanent, but defined subjectively, case by case.[340]

According to Eisenstein, this absence of absolute correspondences is not a limitation, since "one of the aims of art is to blaze new trails in our awareness of reality, to create *new chains of association* on the basis of utilising those that already exist".[341] If absolute, physical, synaesthetical correspondences actually exist, art must nevertheless attempt to liberate itself from this kind of correspondence: "in its absolute form it can only be achieved, in lifeless abstraction, inside a physics laboratory, and not in the living organism of a work of art".[342]

Although he recognised the "emotive value" of specific colours distinguished in psychology, Klein also rejected the idea that the development of colour-music primarily should be based on "experimental data" from physics, physiology or psychology; Klein, too, stressed that art must be developed by artists, and be the result of what he called "æsthetic emotion".[343]

Klein claimed that "an art of light is unimaginable without *scales*, *intervals*, and *chords*", and distinguished two groups of advocates for the new medium.[344] The first, initiating colour-music as an independent art form, promotes the development of new scales based on hue, luminosity and purity, where the artistic experimentation is aided by scientific research.[345] The other, the "theory of colour-music based on the theory of sound-music", advocates the implementation of the already-existing scales in music (tonality, interval, chord, harmonic structure etc.) applied on light phenomena, based on physical, physiological and psychological analogies.[346] Predictably, Klein himself sympathised with the first group: "colour-music must evolve its own procedure, and its own order and method and principles, which will not *of necessity* be found to be identical to those of sound music".[347] In fact, he even questions the existence of "fundamental laws of music", proposing that these may be arbitrary systems or conventions.

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[339] Gage (1999), 268.
[340] Lászlo, 45.
[341] Eisenstein, "On Colour" (1937), 260.
[342] Ibid., 261. See also Eisenstein, "Vertical Montage" (1940), 366ff.
[343] Klein (1926), 48.
[344] Ibid., 118.
[345] Ibid., 118, 136ff.
[346] Ibid., 118-129.
[347] Ibid., 136.

Klein pointed out that Rimington systematically translated musical pieces into coloured light, and performed the parallel scales of light and sound in synchronisation with each other.[348] However, he remarked that no one who experienced Rimington's performances seemed to have commented that the coloured light was expressing the same artistic ideas as the music being performed simultaneously. The systematic translation did not produce any apparent relationship due to the lack of actual psychological relations between colour and note; such associations are purely individual. Klein, in the vein of Eisenstein's concept of organic audiovisual montage, or Wagner's notion of the *Gesamtkunstwerk*, or Adorno and Eisler's assertion that the image/sound relation should be one of question and answer rather than of similarity, understands the potential unity of colour and music not as translation but as a relation that should be "conceived simultaneously in the mind of the composer; so essential should the one be to the other as to make it entirely inconceivable that they could exist independently".[349]

At the beginning of this chapter I outlined three general questions concerning the relation between colour and sound. The first question, suggesting colour and sound as a specific historical relation, has been reflected in notions of the two elements as coinciding innovations and additions within film history (complementing or replacing silent and black-and-white cinema), in various teleological and essentialist notions of completion, which link conceptions of colour and sound in mainstream cinema to related conceptions in other media, in painting, in the development of "light art", in contemporary visual culture in general, and to a general trend of synaesthetical ideas within a number of fields. This trend is reflected in the second question, concerning notions of colour and sound as a more general theoretical problem or idea, suggesting that the one can be understood through comparisons with the other. Accordingly, colour in cinema has primarily been discussed and understood through comparisons with other media. Musical models for colour are connected to a search for harmony, non-representation, separation from objects, immateriality and visual-temporal dimensions. Correspondences between colour and sound have been given scientific, psychological and physiological justification, through concepts of waves, vibrations, specific affects etc. Efforts to utilise such correspondences as a montage effect in cinema do not only involve a conflict between the ideal of non-representation found in many musical models and the fact that colours in film images are anchored in objects and contexts; attempts to achieve synchronisation between colours and sound continually entail indeterminacy related to the third question or theme: the notion of colour and sound as metaphor or analogy. Such notions challenge

[348] Ibid., 170.
[349] Ibid., 171.

conceptions of pure, absolute, synaesthetical and physiological correspondences, but still make possible a number of creative strategies.

Thus, the search for a synthesis between music and image is usually first and foremost linked to the exploration of new expressive possibilities rather than to "literal" translations of any "absolute correspondences"[350] because, as Thomas Wilfred wrote:

> No special color has an especial meaning. Green is generally considered a restful color, but green has a thousand qualities. It may be stirring rather than restful. Blue may mean one thing when applied to a square and another thing when applied to a circle. The key of C major has no especial meaning, but can be made to mean anything that one wishes to make it mean.[351]

Here, the question about "absolute correspondences" between sounds and colours, in terms of *affect*, of specific emotional or physiological effects, is extended to a question which was met with much interest also within the domain of narrative cinema, the question of whether there exists similar correspondences between colours and their capability to create *meaning*. To what extent can specific colours express specific meanings, particularly in the temporal flow of a film, where colours usually are anchored in a variety of concrete objects, characters, actions, etc. which are constantly moving and changing?

The interrelated connections between colours and objects on the one hand, and colour and meaning on the other, will be examined in the next chapter.

[350] See Zilczer, 76.
[351] Thomas Wilfred quoted in Klein (1926), 17.

Meanings: Colour and Object

The question of the capability or incapability of colour to produce meaning, in terms of narrative or symbolic functions, recurs throughout most discourses on colour and cinema, comparing colour and sound (disclosing the ambition that colour should be able to produce meaning to the same extent as sound and speech does) or in comparison with other media (for example, Arnheim's remark on how the automatically produced colours in a photographic colour image lack meaning, as opposed to colours in painting), or in discourses about the necessity for narrative integration (found in 1930s Hollywood, or in Klein's writings on colour in cinema, involving ideas about how colour should not be noticed until it "means" something), or in Eisenstein's frequent claims that the *meaning* associated with a given colour is its most important function.[1] The whole *disegno / colore* opposition, as well as neoformalist notions of colour in terms of 'excess' with regard to narrative function,[2] to a certain extent also involve an incongruity between colour and meaning, as they entail the notion of colour as a supplement, a secondary quality which does not add anything substantial. Aumont points out how cinema always has been hesitant with regard to the values which potentially could be associated with colour:

> Can colour have an individual value, notably independent from the 'drama' (we could say: from the fiction)? Is it not on the contrary susceptible to reinforcing different narrative elements? Does one have to confine it to the role of a pleasing or defamiliarising visual supplement? Is it capable of structuring filmic form? Can one read any content from it?[3]

In this chapter I examine notions about colour and meaning in cinema. The argument includes a number of different approaches to colour and meaning, within a number of different types of colour film images taken from the

[1] Eisenstein, "Not Coloured, But In Colour" (1940), 116f. See also Eisenstein, "Vertical Montage" (1940), 349, and Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 322f.
[2] See Price, "General Introduction", 6f.
[3] ["La couleur peut-elle avoir une valeur propre, indépendante notamment du 'drame' (nous dirions: de la fiction)? n'est-elle susceptible au contraire que de renforcer tel ou tel élément narratif? doit-on la confiner au rôle de supplément visuel, plaisant ou défamiliarisant? est-elle capable de structurer la forme filmique? peut-on aller jusqu'à y lire un contenu?"]. Aumont (1994), 207.

period examined throughout this study. These different approaches, which represent different positions to colour rather than any historical shifts, disclose two main questions. The first question deals with notions about colour as being particularly suited for creating internal systems of meanings, symbols, colour codes, etc., as colours constitute visible, easily distinguishable, differentiated hues which can be applied to any surface; at the same time, colour is usually associated with *escaping* meaning, as most attempts to apply specific, stable, permanent meanings to specific colours usually become ambiguous over time because of the interaction between individual colours representing specific values or meanings, and the contexts, objects, and actions that they are part of.

This interaction is connected with the second question in terms of how colours produce meaning, which deals with the relation between colours and objects. The question of colour and meaning combines the two separate approaches of the relation between colour and object which informed the discourses presented in the two preceding chapters: on the one hand, notions of colour as being located in a specific context, and on the other, notions of colour as an autonomous quality.

While the discussion of Kinemacolor and discourses on "natural" colour photography in the first chapter, dealt with the consistent effort to accentuate the role of colour as originating from specific objects and bodies, of establishing and emphasising the connections between objects in the image and the objects in the 'pro-filmic' external reality, the discourses examined in the second chapter, on the other hand, involved the tendency of extracting colour, through sound metaphors, from its initial location in objects, to regarding colour as an independent quality. This was the case both in the Technicolor "colour scores", as an approach to control colour, and in abstract cinema or "light art", to "liberate" colour through abstraction.

Similarly, notions of colour as meaning involve a tension between notions of colour as an independent value and notions of colour as part of a specific context. In order to link colour to a specific theme, colour must to a certain degree be decontextualised and represent a separate, autonomous value in the film, but in order for this value to be put into effect, the same colour must be contextualised, and take part in the interaction between specific objects or characters, etc. This interaction between colour and object takes place in different types of colour film images, both monochrome and polychrome, photographic and non-photographic.

Separation: Polychrome Images

In cinema the relationship between colour and object, colour and "physical environment", is to a great extent structured around a notion of separation, not only in a visual or representational sense, but also on a material level.

The most obvious manifestation of such a division, which is not only between colours and objects, but also between colour and black and white, *disegno* and *colore*, is of course found in applied, non-photographic colours, especially in hand and stencil coloured films. Colours in these films compose exterior, non- photographic elements, and if seen independently, would constitute abstract animated films, produced through similar methods as the "synaesthetical" hand-painted films of Lye and Fischinger during the 1920s and 1930s. This entails a separation, an autonomous existence and separate material origins; thus colours can act independently from the black-and-white photographic base, as autonomous dramatic elements, augmenting or distracting from the black-and-white image underneath. Jacques Aumont describes the effect like this:

> Hand-painting or stencilling […] tends to produce patches of colour floating in front of objects and blurring their shape. This 'free-floating' colour becomes more or less independent of the objects 'behind' it, which is rather eery. If we think about this phenomenologically, abstracting from everything we know about the production of the image and so on, we might wonder how we can even identify the colourless objects behind these floating colours. We can make sense of such a world, but it remains very strange. [---] On a perceptual level, colour generally seems to possess an independent material existence, more or less detached from the objects represented in these films.[4]

Another condition that affects how hand or stencil colouring influences the photographic element is the fact that only a limited number of colours, seldom more than six, were used. In the hand-coloured Méliès film, *Le voyage à travers l'impossible*, from 1904, where most of the image and most of the objects are coloured, this entails that there are far more different objects than there are colour variations. This also affects the relationships between the different elements in the image. The same blue colour is used to absorb both metallic objects and clothes; the same yellow absorbs both fire and earth. This means that trying to apply one specific meaning to each colour may prove difficult, but it is not only the colour that is identical: the constant movement, the unevenness and the flickering bring the objects with the same colour closer to one another, regardless of whether they are originally solid or liquid. The movement makes them appear as if they are made from the same living, changing material: the metal is moving in the same way as the clothes, the earth is glowing in the same way as the fire.

Georges Sadoul also commented on the imperfections of hand colouring in Méliès films: "The patch of colour did not always cover exactly the square millimetres of a face or a piece of clothing, and no patch was identical to the one preceding it. Thus, during projection one saw a blurry cloud which did

[4] Jacques Aumont in *'Disorderly Order'*, 53f.

not coincide with the contours of the object which it illuminated."[5] But this 'imperfection' also entails the possibility for interaction, as an illustration of how the colour and the physical structure of the object operate and exist autonomously at the same time as they are inextricably connected to one another.

This division, however, also exists in photographic colour films, as in the Kinemacolor process, where the colour was not even visible on the (black-and-white) filmstrip, but was produced by rotating red and green filters during shooting as well as projection. One of the most serious shortcomings of that process was the problem of "fringing", producing similar "free-floating" colour effects which was found in hand and stencil coloured films.[6] About one thirtieth of a second elapsed between the red and green exposure in the camera, and when two consecutive exposures were not identical, in connection with rapid movement, coloured fringes were seen around the moving objects, which were due to variation in colour – as George Lindsay Johnson put it: "if a person suddenly raises his bared arm, it will appear at one moment red, at another moment pink, and again greenish; or else the arm will have a fringe of red or green."[7] A review of the first public Kinemacolor exhibition in February 1909 described the variety of colours as a departure from the assertion of "natural colour": "Sometimes Nature is caught napping. A white surface will suddenly be invaded by all the prismatic colours in turn. It probably lasts only the merest fraction of a second, but the eye is conscious of having been rushed through the whole seven."[8]

Even the subtractive colour processes by Technicolor involves separation, through its foundation in the principles of "trichromatic vision": three layers of black-and-white film record the amount of red, blue and green, which is subsequently replaced by dyes in these colours in the final print, causing, as William Johnson stated, "only the most indirect relationship between object colors and print colors."[9]

This material and representational "separation" can also be used structurally to produce meaning. When discussing the relation between colours and the objects that embody them and how this connection should be explored creatively, Eisenstein established notions of separation and isolation as fundamental principles. Once again, the functions of colour are

[5] ["La tache de couleur ne recouvrait toujours exactement les quelques millimètres carrés d'un visage ou d'un vêtement et aucune des taches n'était égale à la précédente. On voyait donc à la projection un nuage flou qui ne coïncidait pas avec les contours de l'objet qu'il enluminait."] Georges Sadoul, *Histoire générale du cinéma, II: Les pionniers du cinéma (De Méliès a Pathé), 1897-1909* (Paris: Les Éditions Denoël, 1947), 98.
[6] Thomas, 31.
[7] George Lindsay Johnson (1916), 210.
[8] "Palace Theatre", *Morning Post*, February 27, 1909.
[9] William Johnson, 219n13. See also Richard W. Haines, *Technicolor Movies: The History of Dye Transfer Printing* (Jefferson/London: McFarland & Company, Inc., 1993), 17ff.

linked to sound film montage. According to Eisenstein, "music in sound film begins at the point where the usual pairing of sound and image gives way to an arbitrary unity of sound and depiction; that is, when actual synchronisation ceases to exist" and when the combination between sound and image is based on creative intentions.[10] Eisenstein linked this to what he often characterised as an opposition between montage and the long take. Eisenstein repeatedly characterised practically all contemporary colour films as "colour catastrophes", films which reminded him of the lack of plastic expressiveness represented by early black-and-white Bioscope films.[11] The teleological aspect of Eisenstein's account of film history reflects a normative feature that can be found throughout his theoretical texts, which are based on essentialist (but nevertheless very complex) ideas about cinema as an art form based on the concept of (planned and deliberate) montage. He criticised the relativity of colour in contemporary films, which he claimed wass similar to the long take, "the pre-montage cinematograph of the 'one-point-of-view angle'"[12] typical of early actuality films, and overcome by "montage-photography", both by editing, and by deliberately destructing those elements which are "indefinite" and neutral within the image, and reconstructing them in accordance with a specific idea and a specific ideological outlook.[13] Passive representation and reproduction is overcome by conscious reflection and a living, dynamic image:

> Out of the "bunch of possible" elements the editing of a daring hand throws out everything that in the given place was not "necessary."
>
> Similarly, out of the multi-coloured carpet of unorganised color actuality, in the name of resolving our expressive task, we must throw out that part of the spectrum, that sector of the general color palette, which does not reverberate in tune with our objective.[14]

During the "development" of the method of montage, the long take was divided into separate units and subsequently reassembled according to the intentions of the director, and the same should happen within audiovisual montage when the director chooses connections between sound and image which reflect the essence of what is being depicted.[15] After a period where obvious connections have been reflected in sound/image combinations, the director gradually begins creating them independently. For example, this might involve separating the sound of a creaking boot from the image of the boot itself, and combining it with an image of a face. Thus the passive, quotidian connection between the boot and the sound it makes is broken, and

[10] Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 323.
[11] S.M. Eisenstein, "First Letter About Color" (1946), 183.
[12] Ibid.
[13] Eisenstein, "Colour Film" (1948), 124.
[14] Eisenstein, "First Letter About Color" (1946), 183.
[15] Eisenstein, "Colour Film" (1948), 125.

a new connection is established in accordance with the theme of the film.[16] This notion of separation, initially employed in montage constructions and audiovisual combinations, must also be used in order to develop colour as a cinematic element:

> What must be "separated" in the present instance are the colouring of an object and its "colour sound", which form an inseparable whole in our notion of colour. Just as the creaking of a boot had to be separated from the boot before it became an element of expressiveness, so must the notion of "orange colour" be separated from the colouring of an orange, before colour becomes part of a system of consciously controlled means of expression and impression. Before we can learn to distinguish between three oranges on a patch of lawn both as three objects in the grass *and* as three orange patches against a green background, we dare not think of colour composition.[17]

In so doing, colour will function on an autonomous plastic level, but also potentially as an expressive *sign*. A key principle is the *isolation* of a specific element: "separating colour from what necessarily lies beneath it, to draw it out into a general feeling and make this general feeling become a subject again".[18] The individual colours become thematic components, and the colour scale becomes an equivalent to the musical score by "colouring" the action emotionally.[19] According to Eisenstein, the principle of separation between colour and object is demonstrated most comprehensively in the cartoon.[20]

Eisenstein acknowledged that in a live-action film the process of separation is more difficult to achieve with colour than music, again since colour is inherent in the object and therefore cannot be separated from it in the same way as is possible with sound.[21] Colours are consequently not only inseparably connected to colours in terms on a compositional level, but also in relation to technical conditions: although colour is supposed to operate independently in relation to objects, it is necessarily, in photographic colour film, registered as a quality of specific concrete objects. This demonstrates the connection between the cartoon and the colourised film (through hand or stencil colouring, or digital means) and their opposition to the photographic live-action film in terms of the relationship between colour and object. This relationship entails both autonomy and affiliation, in terms of how the image is composed as well as produced, since the two independent components (the black-and-white photographic film image and the added colour element) are

[16] Ibid., 126.
[17] Ibid., 127.
[18] Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 335.
[19] Eisenstein, "Colour Film" (1948), 128.
[20] Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 335.
[21] Ibid., 324.

produced at different moments in time and with different methods and materials.

The separation between colour and object suggested by Eisenstein has similarities with Deleuze's notion of the 'colour-image' as 'affection-image', linking colour in cinema to the close-up and the production of "any-space-whatevers" examined in the previous chapter.[22] According to Deleuze, the movement of colour, which is specific to cinema, highlights the interplay between colours and objects, and more importantly the autonomy of colour as affect, because:

> the colour-image of the cinema seems to be defined by another characteristic, one which it shares with painting, but gives a different range and function. This is the *absorbent* characteristic. Godard's formula 'it's not blood, it's red' is *the* formula of colourism. In opposition to a simply coloured image, the colour-image does not refer to a particular object, but absorbs all that it can: it is the power which seizes all that happens within its range, or the quality common to completely different objects. There *is* a symbolism of colours, but it does not consist in a correspondence between a colour and an affect (green and hope…). Colour is on the contrary the affect itself, that is, the virtual conjunction of all the objects which it picks up.[23]

Aumont considers Deleuze's notion of the cinematic 'colour-image' as movement-image, as an affective 'any-space-whatever' with absorption as its main characteristic, as extremely fruitful, because it liberates colour from constantly being restrained by the symbolic or by inflexible formal structures.[24] The film image serves as a *space* for colours and their own actions. However, in Eisenstein's texts colour also functions on a representational level, colour as affect still refers to the objects or phenomena in which it takes part, and in addition usually also to a specific theme or a specific meaning. In Deleuze's (and Godard's) "formula" ('it's not blood, it's red') the function of colour as self-contained affect involves the suppression and negation of the object, while Eisenstein's notion of distinguishing between the oranges depicted in the image "as three objects in the grass *and* as three orange patches against a green background", and the italicisation of the word "*and*", instead accentuates the equality and affinity between the two properties (i.e. it is both red *and* blood). Jørholt points out how difficult it can be to apply Deleuze's notion of colour as pure affect in most narrative films precisely because colours originate from concrete objects and characters performing specific actions.[25]

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[22] See Deleuze, 102ff.
[23] Deleuze, 118. See also Edward Branigan's discussion of Godard's use of "non-referential" colours and objects changing colour in Branigan (1976), 28f.
[24] Aumont (1994), 218.
[25] Jørholt (1998), 108.

The importance of meaning in Eisenstein's discussion on colour in cinema is perhaps what separates his work on colour most significantly from that of other theorists who have emphasised the autonomy of cinematic colour, its potential as affect.[26] The colour scale of a film should not only be expressed within a plastic, expressive unity, but also in connection with a *thematic* unity, as the inner resonance and harmony between line, form and colour also correspond to meaning. Thus individual colours should constitute independent themes, with a specific emotional value connected to a particular idea.

In his unfinished book on colour, Eisenstein defined a process consisting of three "operations" or phases for the proper use of colour in a number of art forms, a general formula for solving colour problems and understanding colour as a structural element in an image.[27] The process involves: (1) a colour is extracted and separated from the object, from its original setting (2) the detachment of the colour involves the examination of its independent expressive possibilities, which subsequently entails the application of specific emotional and dramatic functions, and (3) the colour is 'reunited' with objects in accordance with these functions. Eisenstein compared this creative process with a kind of "controlled psychosis", illustrating this parallel with an analysis of Alfred Hitchcock's *Spellbound* (1945), where the trauma of the main character, played by Gregory Peck, is gradually explained through a series of images of objects appearing as black lines crossing a white surface (the marks of a fork on a tablecloth, a white coat with black stripes, etc.) or white objects (white furniture, snow, a glass of milk) which all produce a reaction in the character.[28] These graphic patterns refer to a concrete suppressed memory involving the visual impression of ski tracks in the snow, which has been abstracted and generalised, separated from the original context and given new meaning by being embodied in other objects and situations. The artist traverses a similar three-phase process (but in the artist's case, the process is, of course, controlled and intentional): "we have: an actual colour impression – an abstracted colour generalized to the degree of thematic significance – and a new embodiment in a series of new colour objects or vehicles".[29] Such a chromatic strategy for producing

[26] Cf. Aumont, 1994, 214ff.

[27] Sergei M. Eisenstein, "Aus der unvollendeten Untersuchung über die Farbe" [1946], *Information*, 2-3, 1975 ["Eisenstein zur Farbe im Film"], 30-35. See also Alan Upchurch's commentary in S.M. Eisenstein, *The Psychology of Composition*, ed., trans. Alan Upchurch (London/New York: Methuen, 1988), 108n2.

[28] S.M. Eisenstein, "The Psychology of Composition" (1947), *The Psychology of Composition*, 52ff.

[29] Ibid., 55. Hitchcock of course utilises a dramaturgy based upon the same form of abstraction in *Marnie* (1964), where the colour red is related to a similar trauma, and repeatedly through its origin in various objects, causes similar reactions in the main character (which furthermore is represented visually by immersing the whole film image in red). On the relation between *Spellbound* and *Marnie*, see Raymond Bellour, "La couleur Marnie – Alfred Hitchcock: *Marnie*", *La couleur en cinema*, 147.

meaning demands not only the control of colour, and of the objects in which colours are located, but is also a result of a limited palette. In fact, most of Eisenstein's examples of colour meanings are taken from the less differentiated, more easily controlled spectrum of black-and-white films. Most of the discourses on colour and meaning in silent cinema involve another form of monochrome image: tinted and toned images.

Singular Meanings?: Monochrome Images

The uniform, undifferentiated colour of tinted and toned film images suggest potential meanings which are not necessarily linked to any object at all. In this respect, despite the visual, sensual intensity of specific hues, tinted and toned images are often considered to be a variation on the black-and-white image rather than colour images. Aumont asks if a colour by itself really can be considered a colour, as colours need to be differentiated in order to be interesting.[30] Without ties to the world of objects, colours lose their power from being an integrated component in our experience of the world. In many respects, monochrome represents the negation of colour, attempting to negate this specific power by pushing colours towards a specific meaning or absence of meaning.[31]

But the monochrome image, in cinema as well as in painting, allows individual colours to become the theme of the image, or to function as narrative, structural factors.[32] In Émile Cohl's film *Le peintre néo-impressioniste* (Gaumont, 1910), which combines live-action sequences with tinted animated sequences, the individual colours constitute, as Dubois has pointed out, the premise of the narrative; they are diegetic in a textual as well as a visual sense.[33] The film functions as an examination of the dichotomy between the monochrome image and the visibility and invisibility of colour as connected to objects. In the film, we see the neo-impressionist painter demonstrating a number of, mostly, monochrome paintings to an art dealer. Each sequence involves a painting being shown, held by the painter, and seen as a small coloured rectangle in an otherwise black-and-white image. Then follows an intertitle describing the contents of the painting, and subsequently an animated sequence representing each painting. The monochrome character of the paintings is achieved or explained by the chameleonic strategy of including nothing but objects which all are of the same colour (by appearance, or sometimes through wordplay, or stereotypes about skin colour). The red painting is presented as representing "a cardinal

[30] Aumont (1994), 18f.
[31] Aumont in *'Disorderly Order'*, 61.
[32] See Aumont (1994), 170f.
[33] Dubois (1994), 77.

eating a lobster with tomatoes on the edges of the Red Sea" ["un cardinal mangeant une langouste aux tomates sur les bords de la Mer Rouge"], the yellow painting represents a "Chinese transporting corn on the Yellow River on a sunny summer day" ["Chinois transportant du maïs sur le Fleuve Jaune par un jour d'été ensoleillé"], the white painting displays "a clown and a miller drinking whey on a snowy day" ["Clown et farinier buvant du petit lait par un jour de neige"], and in the green painting "the Green Devil plays billiards with apples on the grass while drinking absinthe" ["Le Diable Vert joue au billard avec des pommes sur l'herbe en buvant une absinthe"]. The animated sequences representing each of the paintings begin with the painting filling the whole image, as 'pure' colour, as encompassing nothing but a specific colour. Gradually, as in the process of being painted, the coloured canvas is filled with lines and objects, which successively begin to move. The film also features a black painting: "Negroes extracting coal, at night in a tunnel of Périgord Noir." ["Nègres extrayant de la houille, de nuit dans un tunnel du Périgord Noir"]. Although the objects of the painting are described in the intertitles, they are not visible in the image – all we see is black, complete darkness. Here, the invisibility and chameleonic character of monochrome is taken to its extreme.

The most consistent convention associated with monochrome images is, in fact, linked to invisibility, as blue tinting often represented darkness (motivated by the difficulties in filming scenes at night with orthochromatic stock; with panchromatic stock night scenes could be rendered 'photographically', because this stock to a much greater extent allowed filming with less light, and generally produced images with a greater range of contrast).[34] The perhaps most famous and certainly most analysed instance of this stylistic device, takes place in D.W. Griffith's *The Lonedale Operator* from 1911. Here, Blanche Sweet's character, under attack by burglars, turns off the light and because of the darkness makes the burglars believe that the monkey wrench she is pointing towards them is a gun. The darkness is indicated by blue tinting appearing at the moment she turns off the light (and disappearing when she turns it on again). As Cherchi Usai has pointed out, most reference copies of the film have been in black-and-white and therefore miss the *trompe-l'oeil* effect of the blue tinting, which is necessary for the logic of the plot.[35] The blue tinting in *The Lonedale Operator* was referred to in a review in the *New York Dramatic Mirror* as "really looking like night".[36] This suggests that blue functions not only as metaphor, or as a representation of a specific meaning or affect, but also as a simulation of a realistic effect;

[34] See Fossati (1998), 128ff. See also Trond Lundemo, "The Colors of Haptic Space: Black, Blue and White in Moving Images", *Color, the Film Reader*, 92f.
[35] Paolo Cherchi Usai, "The Color of Nitrate: Some Factual Observations on Tinting and Toning Manuals for Silent Films" [1991], *Silent Film*, ed. Richard Abel (London: The Athlone Press, 1996), 21.
[36] *New York Dramatic Mirror*, 29 March 1911, 31, quoted in Gunning (2004), 21.

how darkness neutralises colours. Gunning points out how the blue tinting in *The Lonedale Operator* is connected to a theme of invisibility in opposition to visibility. As the heroine points a monkey wrench at the two burglars, fooling them to believe that she is holding a gun, the audience is tricked as well, partly through the blue tinting which "immediately suffuses the image, obscuring our vision", but also through filming the scene in long shot.[37] When the true nature of the object is revealed, after the light has been switched on again, this is displayed through the visual clarity of an untinted *close-up* of the wrench, as Raymond Bellour (quoted by Gunning) puts it: "The unseen or badly seen object appears in its true colors."[38]

The undeniable convention of blue for night, which enables an image of sunlight with a blue tint or tone to be presented (through intertitles) as "moonlight",[39] seems to have initiated attempts to establish general systems of colour meanings or codes in connection with tinted and toned film images. James L. Limbacher, for example, remarks how monochrome films developed stereotypical conventions: "Red represented fire, blue indicated night; green usually accompanied forest scenes and yellow was used when artificial light was represented."[40] Steve Neale writes: "The common practice was to tint each scene according to mood and to the specifics of the setting and action: a fire scene would be tinted red, a night scene blue, a sunlit scene yellow and so on."[41] Daan Hertogs and Nico de Klerk criticise texts which try to give the impression of rigid systems in terms of colour codes in tinted and toned images:

> One reads in such texts that blue indicated night and red indicated love. Besides the general failure to differentiate, in these associations, between referential and symbolic levels of meaning, apart from the fact that such casual observations apply only to monochromatic images, and aside from the fact that these two 'stereotypical' examples betray a bias toward fiction film, this sort of remark tends to suggest that other colours have equally straightforward meanings that the writer is unable – for reasons of space, in an introductory text, or whatever – to list in full. It would indeed be impossible to produce a comprehensive list, but not for such reasons. The two colours regularly cited are in fact the only ones that appear to have clearly identifiable associations – and these 'associations' may well be more statistical than semantic. A repeated exposure to identically coloured night and love scenes seems to trigger a desire for systematicity, even though this bare repetition may be the limit of any 'system of colour' in silent film. For

[37] Ibid., 32f.
[38] Raymond Bellour quoted in ibid., 33.
[39] See Daan Hertogs, Nico de Klerk (eds.), *Nonfiction from the Teens: The 1994 Amsterdam Workshop* (Amsterdam: Stichting Nederlands Filmmuseum, 1994), 45, 60.
[40] Limbacher, 4.
[41] Neale, 117.

> blue and red are to be found beyond the confines of night and love, and such 'divergent' occurrences are far from statistically insignificant."[42]

Cherchi Usai also refers to the returning assertion that colours usually were chosen for specific dramatic, atmospheric or psychological connotations, with 'blue for night' as the most frequent "colour code", and points out that although some of these conventions undeniably exist, symbolic meanings for specific colours were, in fact, "never codified or generally agreed upon by the public".[43] If tinted and toned images were to function in accordance with a system of specific colour associations, this would probably entail a limited palette rather than the huge variety of hues which were available, and tinting and toning would perhaps also have been used primarily in fiction films: "if red equates with fire and violence, blue with sea, with rain and darkness, and green with the natural world, what was done with purple, orange, mauve, and all the intermediary shades […]? And why was such a diversity of shades exploited in non-fiction subjects?"[44] With reference to the narrative role of colour, Gunning points out that "we rarely understand what is happening because of the colour. We more often get the meaning of the colour from the narrative. The colour can heighten or underscore what's happening in the story at some point, but very rarely creates it."[45]

The effort to understand tinting and toning in terms of predetermined conventional meanings is further complicated by the numerous appearances of combinations of tinting and toning within the same frame. The multitude of colour combinations, also demonstrated in manuals, like *Le film vierge Pathé*, published by Pathé in 1926, featuring cardboard tables with a number of nitrate frame samples of different types of black-and-white film stock, different kinds of tinting, pre-tinted stock, toning, various combinations of tinting and toning, various forms of stencil colour – all distinguishing one specific company – displays a complexity which would be difficult to incorporate in any systems of established narrative conventions.[46] Rather than referring to specific predetermined meanings, the choice of dyes in tinted and toned films often referred to economic factors (some dyes were more expensive than others), and also to other cultural practices. The same dyes which were used to colour films were also used to colour fabrics and clothes etc.; Read and Meyer point out that many dyes recommended for tinted films were originally used in dyeing wool (and many are still available today).[47] Again, there is a direct link between colour in cinema and colours

[42] Hertogs, de Klerk, "Editor's Preface", 5f. See also Fossati (1998), 127; Eric de Kuyper, "La couleur du muet", *La couleur en cinéma*, 140f.
[43] Cherchi Usai (2000), 26.
[44] Ibid.
[45] Tom Gunning, in *'Disorderly Order'*, 40.
[46] *Le film vierge Pathé* (Paris: Pathé-Cinéma, 1926), Tableau III-VI. See also Cherchi Usai (2000), 22f.
[47] See Read, Meyer, 272f. See also ibid., 180

in commodities, in the fashion industry, and in a multitude of industrial products. Thus, specific dyes might have been chosen for films not necessarily because of their specific narrative or aesthetic value, but because they were fashionable, or because they were *new*.

However, despite the difficulty in locating conventional colour 'codes' in tinting and toning practices, there certainly were discourses advocating the specific connections between colour and meaning, often ensuing the 'scientific' notions of connections between colours and affects, used for therapeutic purposes and in advertising, which were discussed briefly in the previous chapter. Again, Goethe is one of the basic references: his conceptions of the specific effects of specific colours produced a distinction between what he characterised as symbolical and allegorical meanings associated with colour (in addition to mystical applications). Symbolic meanings were, according to Goethe, "coinciding entirely with nature"; in these cases the colour is "employed in conformity with its effect, and would at once express its meaning".[48] Allegorical meanings are, on the other hand, conventional, they are applied "more of accident and caprice, inasmuch as the meaning of the sign must be first communicated to us before we know what it is to signify".[49]

The article, "Tinted Films for Sound Positives" from 1929, written by Loyd A. Jones, a physicist at the Kodak research laboratories, concerning pre-tinted positive stock suitable for sound film, demonstrates the affiliation between the disciplines of "aesthetics" and "science" in terms of examining the symbolic functions and emotional effects of specific colours: the scientific article begins with a methodical discussion about manufacturing dyes which, by wavelengths of radiation, do not interfere with the photoelectric cells of the optical soundtrack.[50] However, the article goes on to examine what is characterised as the "language of colour", in connection with suggesting the potential application of the various tints developed for this purpose, which is discussed in scientific terms; the difficulty of establishing such a language, i.e. "the more or less precise evaluation of the emotional value of the various hues, tints and shades" is primarily due to the fact that this field of study is "in a very rudimentary stage of evolution".[51] However, "careful study and experimentation may lead to the development of this language or symbolism into a powerful emotional tool in the hands of the master motion picture dramatist".[52] Jones also quoted Matthew Luckiesh,

[48] Goethe, [916], 350.
[49] Goethe, [917], 351.
[50] Loyd A. Jones, 223-229.
[51] Ibid., 223.
[52] Ibid. Similarly, with reference to "natural" colour in 1930, Pitkin and Marston remark that "if the indicated psycho-neural associations between primary colours and primary emotions can be substantiated, the emotional effects upon the audience might practically be dictated, throughout an entire film, merely by emphasizing the appropriate colours in each portion of the play." Pitkin, Marston, 260.

another physicist who wrote extensively on the physiological effects of colour during the 1910s and 1920s:

> It would be unscientific to deny the existence of a language of color because we do not understand it thoroughly at present, and quite unprogressive to reject the possibility of finally completing the dictionary of this language. Color experiences are indeed very intricate at present but it is likely that this is due to our scanty knowledge of the elements and processes involved in the emotional appeal of colors, and to our inability to interpret and to correlate properly the various factors. Much knowledge must be unearthed before a rudimentary dictionary of this language is available but first the scientific attitude should admit the possibility that the language of the group of experiences associated with color eventually will be understood.[53]

According to Jones, even the names of the tints are chosen "from a consideration of the probable associational and emotional value" and "potential psychological effects" of each individual colour.[54] He makes a distinction between "direct objective association" and "indirect subjective association"; the first category referring to the colours of specific objects, places or light sources (perhaps originally belonging to one specific element or part of the scene, but somehow 'extended' to absorb all the elements of the monochrome image), while the second refers to the relation between colours and emotional states.[55] In his attempt to describe the "visual and psychological characteristics" of the seventeen tints examined in the article, and especially their symbolic and emotional values, Jones admitted that the associations he suggested were "tinged by the author's own reactions and by the result of his own retrospective analysis", but he also points out that they are based "upon a careful summary and integration of data derived from the available literature".[56]

Thus, the "soft rich orange" colour of the tint "Afterglow" is suitable for "exterior scenes at dawn and sunset" through direct objective association, while its indirect subjective associations include mood reactions connected with "luxury, wealth, security and relatively strong affections" as well as suggesting "repose, ambitions attained, accomplishment, and similar psychological aspects of maturity".[57] The "pure green" of "Verdante" refers directly to "trees, grass and vernal landscapes" as well as suggesting "youth, freshness, unsophistication, innocence", while the deep violet-blue "Nocturne" is suitable for "night, shadows, gloom, coldness", and thereby also "depressive conditions, despair, failure, unattained ambitions, intrigue, the underworld". Since the red tint "Inferno" is "directly suggestive of fire",

[53] Matthew Luckiesh (1925), quoted in Jones, 230.
[54] Jones, 227.
[55] Ibid., 231f.
[56] Ibid., 232.
[57] Ibid., 233ff.

it can be used in scenes of "burning buildings, glowing furnaces, forest fires" as well as indicating "riot, panic, anarchy, mobs, turmoil, strife, war, battle, and unrestrained passion". The "delicate flesh pink" of "Peach Glow" is naturally customised for close-ups "where it is desired to do full justice to feminine beauty", as well as suggesting "the glow of life".

Thus Jones' system of "objective" and "subjective" colour associations alters between notions of colour of the monochrome image as originating in specific objects and notions of the same colours expressing specific affects. Readings of tinted and toned films can also alternate between these two understandings of colour. Gunning points out how the red tinting of scenes taking place in the engine cab in *The Lonedale Operator* are "realistically motivated" by the glow of the boiler, and adds that in the same way as most "red for fire" tints, "the monochrome carries as much abstraction as realism".[58] Monica Dall'Asta and Guglielmo Pescatore, on the other hand, construct an interpretation of the tinted images in the same film in terms of affect, following the system proposed by Jones, where blue is linked to a "depressing" effect, while red is linked to a "stimulating" effect; thus the film features "intercutting between the oppressive situation of the station where the operator finds herself threatened by bandits (in blue) and the desperate chase of the engineer who hurries to save her with his train (in red)".[59] William Uricchio also suggests a number of possible meanings for the colour red, and thus different approaches to what colours refer to: "the red train scenes could signify something external and material – the fire of the engine's furnace; or it could be something phisically [sic] experiential – the heat of the engine; or it could perhaps signify something more subjective – the boyfriend's passion or anger".[60]

Jones' article was written as tinting and toning was rapidly disappearing as an industrial practice, and Giovanna Fossati points out how the suggested codification found in handbooks and manuals cannot fully explain the film colouring practices of that period, the many dissimilar variations of blue, red, pink, etc., and the recurrent combinations of colouring techniques in the same film.[61] Similar attempts to establish codes for the relationship between

[58] Gunning (2004), 21.
[59] Dall'Asta, Pescatore, 244. See also Jones, 232.
[60] Uricchio, 270.
[61] Fossati (1998), 127ff. Elfriede Ledig has examined the difficulty to establish stringent systematisations of colour meanings in tinted and toned silent films, as what might appear to be coherent patterns in specific films often are broken by unexpected and "illogical" appearances of colours. With reference to among others Jones' distinction between 'objective' and 'subjective' colour associations, Ledig assembles a list of possible semiotic functions of tinting and toning, which she describes as tentative, based on a limited number of tinted copies, where the meanings of specific colours are divided into 'denotative' functions (reference to specific objects, phenomena or spaces) and connotative functions (symbolism and affect). The denotations for red are fire, and general interiors *and* exteriors, while the connotations include panic, passion, madness and genius. See Elfriede Ledig (with Gerhard Ullmann), "Rot wie Feuer, Leidenschaft, Genie und Wahnsinn: Zu einigen Aspekten der

colours and affect were made in connection with the introduction of Technicolor. In the 1934 article "The Language of Color", L.O. Huggins also emphasised the specific emotional associations carried by specific colours, presenting a catalogue of such associations: "Red, for instance literally shouts at us. It is an energetic and aggressive color, at times brutal and angry. Whenever we see a brilliant red color we are reminded, consciously or subconsciously, of fire, blood, war, passion. Orange is another active color, it is gay and jolly, suggesting ambition and progress."[62] Natalie Kalmus also pointed out that "each hue has its particular associations", listing a number of qualities associated with specific colours.[63] The colour red is associated with a number of different qualities, both emotional and concrete. Kalmus acknowledged the dissimilarities between the different associations, and pointed out that:

> yet in certain respects they are the same. Red may be the color of the revolutionist's flag, and streets may run red with the blood of rioters, yet red may be used in a church ritual for Pentecost as a symbol of sacrifice. Whether blood is spilled upon the battlefield in an approved cause or whether it drips from the assassin's dagger, blood still runs red.[64]

For, as Branigan points out: "To say that colour has no intrinsic meaning, however, is not to say it has no meaning."[65] Echoing his approach to the correspondences between colours and sounds, examined in the preceding chapter, Eisenstein emphasised the arbitrary in the connection between colour and meaning, pointing out that colours produce different associations in different individuals and cultures. Although several general associations exist (e.g. black is associated with night, blue with the sky etc.), this "does not mean that there is a catalogue of colours which invariably act in a certain way".[66] Eisenstein demonstrates this by an extensive account of the many symbolic properties, both positive and negative, and often contradictory, associated with the colour yellow, with examples from fields like religious symbolism, heraldry, painting, poetry, drama, and political symbols.[67] This diversity of significations proves, according to Eisenstein, that notions of absolute, innate meanings in the colour itself has more to do with mysticism than with aesthetics: "by separating the colour *from the concrete phenomenon which actually provides it with the accompanying set of*

Farbe im Stummfilm", *Der Stummfilm: Konstruktion und Rekonstruktion*, ed. Elfriede Ledig (Munich: Schaudig, Bauer, Ledig, 1988), 105ff.

[62] L.O. Huggins, "The Language of Color", *American Cinematographer*, July 1934, quoted in Higgins, "Demonstrating Three-Colour Technicolor", 363.

[63] Natalie Kalmus (1935), 143f.

[64] Ibid., 143.

[65] Branigan (1976), 21.

[66] Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 323.

[67] Eisenstein, "Vertical Montage" (1940), 355-362.

conceptions and associations; by seeking absolute correspondence between colour and sound, between colours and emotions; by abstracting the specificity of a colour as part of a system of supposedly 'perpetually valid' effects produced by colours *per se* – we will get nowhere",[68] because "[i]n art it is not *absolute* correspondences that are decisive", it is rather consciously organised arbitrary relations serving specific purposes.[69] Colour problems are not solved by a fixed catalogue or chart of colour symbols: "*the emotional interpretation and the efficacy of colour will always arise within the actual making of the chromatic imagery of a work, in the process itself of forming that imagery, in the vital movement of the work as a whole*".[70] Instead, one should "*prescribe to colours and sounds the task of serving the purposes and emotions that we find necessary*".[71]

Also within the limited black-and-white colour scale, colour tones in two different films can attain completely opposite connotations, and Eisenstein exemplifies by referring to the themes associated with the colours black and white in *The General Line* and *Alexander Nevsky*. In the first film, black is associated with the reactionary, the criminal and the outdated, while white signifies joy, life and new forms of agriculture; in the second film, however, white is associated with evil, oppression and death, while black is connected with heroism and patriotism.[72] Siegfried Kracauer refers to *Alexander Nevsky*, and how white, which often is associated with innocence, in this film is instead made to signify cruelty, as typical of what he characterises as "the indeterminate": the "unstructured" nature of natural objects of the physical reality with which film and photography primarily are concerned, entails that even elements which seem to have more or less fixed connotations, like specific colours, landscapes, and facial expressions are essentially indefinable and likely to change meaning within changing contexts.[73] According to Eisenstein, utilising 'conventional' colour symbols as a basis can be productive in terms of structuring the use of colour in a film, but the governing principle should even so not be a general notion of absolute correspondences, but rather a consistent "tonal-chromatic key", corresponding with the ideas and themes of the film as a whole.[74]

[68] Ibid., 363f.
[69] Ibid., 369f.
[70] Ibid., 369.
[71] Ibid., 370.
[72] Ibid., 369f. See also "Not Coloured, But In Colour" (1940), 117.
[73] Siegfried Kracauer, *Theory of Film: The Redemption of Physical Reality* [1960] (Princeton: Princeton University Press, 1997), 68.
[74] Eisenstein, "Vertical Montage" (1940), 370.

Eisenstein emphasised how colour has a fundamentally relative function, in terms of composition as well as meaning, just as the montage image also is relative on a basic level. Since no colour values are determined, the thematic content of colour combinations must be pronounced early in the film, similar to how characters are presented in the 'exposition' during the first act in traditional drama.[75] The functions of colours and their meanings are comparable to the montage element which Eisenstein in the essay "The Fourth Dimension in Cinema" published in 1929, called 'dominants', i.e. combinations of shots according to a governing theme or sign.[76] On a basic level these dominants are always relative and variable, and thus dependent on contextualisation. Eisenstein illustrated this with a 'colour example' (from the black-and-white colour spectrum):

> even if we have a *series* of montage shots:
> (1) A grey-haired old man,
> (2) a grey-haired old woman,
> (3) a white horse,
> (4) a snow covered roof,
> it is far from clear whether this series works on 'old age' or 'whiteness'.
> [---] The shot never becomes a letter but always remains an ambiguous hieroglyph. It can be read only in context, just like a hieroglyph, acquiring specific *meaning*, *sense* and even *pronunciation* (sometimes dramatically opposed to one another) only in *combination with* a separate reading or a small sign or reading indicator placed alongside it.[77]

Benjamin E. Mayer points out that since a montage element only can be read in connection with juxtaposition, in connection with a unified composition, an uncertainty in terms of meaning is always a probability.[78] Abstraction and separation in the relation between object and colour are necessary for the affective as well as thematic functions of colour. The fact that colours are inherent in objects in continuous movement makes it difficult to apply definite thematic functions to them. Eisenstein also pointed out that the temporal progression of a film, the fact that one take continually leads to another, entails that the same themes constantly are recreated and reorganised: "Colour is too mobile in film. You obtain a general sense of colour, but it is extraordinarily difficult to determine it unambiguously."[79]

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[75] Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible* (1946-47), 325.
[76] S.M. Eisenstein, "The Fourth Dimension in Cinema" (1929), *Selected Works, Volume I*, 181.
[77] Ibid., 182. Eisenstein refers to this article in connection to his discussion on colour and meaning in "Vertical Montage" (1940), 370.
[78] Benjamin E. Mayer: "Eisenstein: The Sound of the Image, the Colour of Black and White", *Fotogenia* 1, 1994, 332.
[79] Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 334.

In *Ivan the Terrible* the function of colours are comparable to musical *leitmotifs*; Eisenstein even refers to Wagner's use of *leitmotifs* in *Die Walküre*, where characters and elements are connected to specific musical themes, "music is 'affixed' to each element".[80] However, Eisenstein maintains that specific colours cannot function in the same way as fixed musical *leitmotifs* because such a static colour scheme tied to figures instead of themes, independent from the progression of the drama, would be too primitive in connection with the complex temporal and spatial aspects of cinematic colour.

Aumont claims that any supposed symbolic value connected to colour can only be produced "locally", as an extract from the temporal flux it always more or less is escaping, and since colour meanings are tendentiously non-temporal, does this not mean that they also are non-cinematic?[81] According to Aumont, there are no consistent meanings in colours found in a film, the symbolic values of colours, regardless of medium, are labile, transitory, and shifting; the attempt to extract meanings from colours rather entails driving colour towards the verbal.[82]

The banquet sequence in colour in *Ivan the Terrible* is composed around the colours red, gold, black, and blue, each connected to a specific theme (black = death, red = blood, gold = power, blue = heaven/God), but these functions are mobile, unstable and changeable as colours and motives interact throughout the sequence. Bordwell points out that "to see the film's motivic construction as a direct mapping of themes onto image complexes is probably too simple. Although many of the motifs start with a certain semantic weighting, the density of the film's stylistic development quickly gives them a chameleonic fluidity."[83] The thematic content is even expressed and changed through interaction with dialogue and music; Eisenstein described how the regal theme associated with gold is modified when Vladimir, Ivan's involuntary rival, is dressed in the czar's golden robe, because of the ironic music accompanying the scene: "the gold is stripped off musically, not visually".[84] Thereby, the thematic functions of colour interact with all the other expressive and semiotic elements that constitute the film as an organic unity.

Similarly, the image of Ivan's reluctant rival Vladimir's face suddenly turning blue at the end of the banquet sequence, a scene which Bordwell refers to as being "notoriously hard to understand while we are viewing the film", is also an exponent of how the significance of the blue colour suddenly departs from the initial celestial theme to a multitude of potential

[80] Ibid., 328. See also Eisenstein, "Colour Film" (1948), 128.
[81] Aumont (1994), 216.
[82] Ibid., 60.
[83] David Bordwell, *The Cinema of Eisenstein* (Cambridge/London: Harvard University Press, 1993), 236.
[84] Eisenstein, "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), 327.

meanings; with reference to Eisenstein, Bordwell points out that "the shift to a monochromatic shade prepares us for the upcoming return to black and white; the blueing is the tragic equivalent of a Disney character's turning bright red; and it expresses Vladimir's horror by suggesting the draining of blood from his face. [---] At this point, blue becomes metaphorical in an elusive, open-ended way."[85]

In addition to the obvious reference to Disney, the sudden appearance of coloured light absorbing a character without being diegetically motivated also echoes early "demonstration mode" Technicolor aesthetics in the films designed by Robert Edmond Jones, and more specifically the device of "coloured figure illumination" or "mood lights", absorbing characters in connection with specific emotional states. Higgins refers to an instance in *La Cucaracha* where the sadness of one of the characters is communicated by bathing her in blue light, and points out the ambiguity of the significance of the colour, as "this meaning is not repeated by other stylistic registers", and "an interpretative leap" is required in order to assign an emotional value to it.[86] According to Higgins, this ambiguity illustrates "the limits of constructing an independent signifying system from colour".

The device of "mood light" does not only replicate tinting and toning in the application of one single colour in order to potentially produce one singular meaning; in addition, echoing the practice of hand and stencil coloured films, the coloured light is independent from the object, and thereby also repositioned and absorbent, as well as making the object it absorbs change meaning.

This notion of change constitutes the sense of differentiation, the "context" for which colours can be perceived in a tinted or toned film: the differentiation of colours in these films is temporal rather than spatial, the montage effect is located in the relation between tinting and black and white, or between different individual colours. Tinting and toning are often discussed in terms of offering variation within the temporal progression of a film; occasional tinted reels function as "a relief to the eye", etc.[87] Jones also linked the appeal of tinting to the temporal flow of a film, to variation and the breaking of monotony.[88] His suggestions for the "proper" use of colour in a film, which predictably involves restraint, discretion, avoiding distraction and obtrusion, is also connected to the film's narrative progression, primarily employing "pastel tints which may be increased in subjective strength for a period of time by the action of a successional contrast or juxtaposition in time".[89]

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[85] Bordwell (1993), 236.
[86] Higgins, "Demonstrating Three-Colour Technicolor", 368f.
[87] "Toning and Tinting as an Adjunct to the Picture" (1911), 574.
[88] Jones, 223.
[89] Ibid., 235.

Uricchio remarks how the tinting in *The Lonedale Operator* disrupts the spatial continuity of the film: "Color seems to fragment, distinguish, and hold apart what the absence of color seems to bind together […]."[90] Gunning links the tinting pattern to a "system of repetition and variation". The frequent change of tints during the climactic parallel edited rescue sequence almost gives "the impression of an abstract color flicker film rhythmically moving between red, blue and black and white", [91] a "pure sensational interplay of color. [---] The replacement of one color with another creates a pure physiological excitement which equals (and supplements) the narrative suspense."[92] In most cases, the tinting changes on a cut, and in connection with a spatial relocation (for example, exterior to interior), except when the light is turned on and off: in these two instances, the colour of image changes within the same shot, indicating, according to Gunning, "tinting's relative independence from editing as a system of variation".[93]

Similar changes of tint between red, black and white, and blue are found in other films without referring to either spatial relocation or diegetic objects. *The Four Horsemen of the Apocalypse* (Rex Ingram, 1921) features the image of a woman singing the 'Marseillaise' tinted blue, then in black and white, and then tinted red. Of course, this is a reference to the basic colour composition of the red, white and blue French flag. Here, what is originally a "still image", a synchronous combination of colour, is disconnected into the temporal, sequential progression of one colour at the time.

Dubois describes tinting and toning as an internal figuration of the combination between black and white and colour. These images entail a "half-mixture" ("demi-mélange"), tinting involving the mixture of black and colour, toning the mixture of white and colour.[94] What typifies a tinted image is thus the absence of white rather than the presence of a given colour, and thereby a darker image, while toning inversely is defined by the absence of black, and thereby a brighter image. Dubois points out that the pairing of black and white, two units often considered to be inseparable, in fact is a mixture, is a "bichrome" image, since it can be fractured – black and white can be dissociated. The tinted or toned image leads to an awareness of the autonomy of black and white respectively. Thereby the colours in these images do not only constitute values in themselves, but also a relative value connected to their role associated with the black *or* the white.[95]

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[90] Uricchio, 271. See also *'Disorderly Order'*, 42f.
[91] Gunning (2004), 21.
[92] Gunning (1994), 254.
[93] Gunning (2004), 21. See also Gerwin van der Pol, Karel Dibbets, "The Logic of Colour in 'L'Inhumaine'", *Il colore nel cinema muto*, 155-163.
[94] Dubois (1994), 75.
[95] Ibid., 75f.

However, these two 'colours' do not originate from objects, but from light and shadow.[96] This is particularly evident in images which combine tinting and toning, where the differentiation of colours to some extent correlates with the boundaries between objects, and to some extent does not, as Terry Ramsaye described in 1919: "By the tinting and toning process we can have a green pasture, in tone, with a blue sky above, in tint, but the cream and red jersey cow in the foreground will also be reduced to greens and blues."[97]

Thus, the "bichromatic" nature of these images underlines that although colours usually are perceived through their location in specific objects, the *visibility* of these objects is a result of colour – as Goethe wrote, "the eye sees no form, inasmuch as light, shade, and colour together constitute that which to our vision distinguishes object from object, and the parts of an object from each other. From these three, light, shade and colour, we construct the visible world […]."[98]

The difficulties in terms of identifying any definite, stabile *functions* of colour in cinema (representation, abstraction, affect, symbol, etc.) also are linked to the difficulty to define similarly definite *origins* of colour: is it a quality of a specific object or context, a quality of light, a quality of perception, or a material quality of cinema?

[96] See e.g. Nowotny, 20f.
[97] Terry Ramsaye, "Color Photography and the Motion Picture", *Photoplay*, Vol. 15, March 1919, 86, quoted in ibid., 24.
[98] Goethe, lii-liii.

Conclusion

The indeterminacy and hesitation towards colour is a result of the difficulty in defining the interplay of factors behind the origins of colour in a film, or the functions colour can perform in a film, or questions brought about from comparisons to the black-and-white image, or the emergence of sound, of what qualities, what properties, what possible functions or meanings colour adds to the image.

The functions of colour in cinema are ambiguous and dependent on a number of various approaches; understanding the history of colour in cinema primarily in terms of realism obviously leave a number of questions unanswered, the same goes for conceptions of colour as "excess" or "distraction" (which should be 'controlled' or 'integrated'), and certainly for categorisations of colour as non-representation or affect in a general sense, as autonomy, or "a quality in itself", without further scrutiny. Colour in cinema is characterised by a tension and alternation between autonomy and integration, independence and connection. Colours can be imagined independently, and without borders, but can only be perceived and exist within a context; colour always represents a "matter of relationships".

This thesis represents an attempt to integrate a historically based examination of discourses and debates regarding colour in cinema between 1909 and 1935 with a number of general theoretical questions concerning various functions associated with colour. The notions and concepts of (actual as well as potential) functions and uses of colour in cinema found in these discourses express ideas on colour in a general sense, as well as being closely linked to the historical and industrial contexts in which they were written (and more or less essentialist notions of cinema in general established in these contexts). These ideas about colour are manifest despite the evident discrepancies between the functions of colour in the discourses compared to colour in contemporary industrial practices; extensive discussions deal with the promise and occasional exhibitions of various methods of "natural" colour, which was a quite marginal practice compared to the widespread practice of applied colour, which is seldom mentioned. Despite the variety of colour systems and methods, most discourses are informed by notions of colour film (at least in its ideal form) primarily as belonging to the future.

Black and white is commonly perceived as the origin of colour in cinema, the main reference or starting point for most discussions about colour. The comprehension of colour is to a great extent informed by a resistance, usually associated with comparisons to the black-and-white image, and furthered by preferences reflecting general essentialist notions about cinema, about what elements or qualities should be foregrounded or restrained, since colour as a stylistic element can be bound up in representations, and notions of realism, just as well as in conceptions of abstraction and non-representation.

The interest in colour, the discourses on "natural" colour processes also reflect the manifestation of a reluctance towards colour. This reluctance is usually located in comparisons between colour and sound, and the fact that colour was "naturalised" far later than sound, but the time period examined also involves a decrease in the importance of colour, and an increased interest in the properties of black-and-white cinematography, with colour predominantly located within the declining domains of non-fiction and an attractions-based aesthetic. Attempts to integrate colour in the film practices between 1909 and 1935 often involved attempts to substantiate the function of colour in narrative cinema (often associated with notions of subordination and control), found in discourses on both Kinemacolor and Technicolor.

Similarly, in efforts to promote the emergence of colour in narrative films, the qualities associated with colour are seldom linked to specific narrative features. The notion of conflict between story development and colour initiates various strategies to subordinate it, or to ignore it in descriptions or film reviews etc. Ideal functions of colour are thereby often associated with negating the powers of colour, despite the tremendous effort to produce it. This has entailed a paradoxical approach to colour: attempting to subordinate it, as well as requiring the addition of colour to represent something markedly different from the black-and-white image in order to justify the increased expense. This is also reflected in the ambivalent attitude towards colour in the Kinemacolor catalogue, the division between "normality" and "spectacle" (or the integration of colour in the promotion of nationalism), between colourlessness in "normal" culture in opposition to the excess of colour in other (particularly non-Western) cultures.

The topic of indexicality, of the physical and technical origins of colour, which is central to this study and to the delineation of the period examined, entails questions and problems derived from the coexistence between photographic and non-photographic colours. This is linked to the notion of colour as trace or index (comparable to similar notions of the soundtrack as trace), and the dichotomy between 'natural' and 'artificial' colour; early discourses on photographic colour not only emphasise the alleged mimetic or aesthetic superiority, and the immediacy of "natural" colours, but also the notion of a moral advantage, associating 'artificial' colour with 'deception'. These notions are also reflected in the lack of interest in non-photographic

colour which exists outside basic film technology and rather as a part of film as performance and social practice, in film historiography and archival practices until recently, as well as in the debate concerning the computerised colourisation of black-and-white films. The idea of colour disrupting cinema as an indexical technology is linked to notions of the authenticity of the film image, as historical truth as well as an aesthetic category, notions of films as texts.

Indexicality, the manifestation of 'natural' colour, also functions as an attraction and novelty. Kinemacolor was thus promoted as an innovation, in terms of a thematisation and demonstration of technology. The colour process was also notable for depicting news events typified by the visual and the theatrical, and thus combining actuality and spectacle. Similarly, Kinemacolor travelogues thematised the view, and colour represented both a trace of reality as well as a simulation of travel for the spectator. The emphasis on technology is, however, also found in discourses advocating non-photographic colour, both in the promotion of Pathé's stencil colouring system, as well as in discourses on more recent computerised colour, both as simulation and technology and as authenticity and reconstruction of history.

The notion of indexicality is linked to notions of colour enhancing the realism of cinema, regarded both as an improvement and as a deterioration (of the unique features of black and white, and linked to the indeterminate and unstructured nature of automatic reproduction). The emergence of 'natural' colour entailed a new-found emphasis on the *reproduction* of colour, of 'accuracy', and 'fidelity'.

This is reflected in the importance of 'recognition' in demonstrations and discourses on Kinemacolor, the display of *likeness* between the often ordinary, everyday coloured objects on the screen and their referents in reality. The accent on realism also highlighted the reproduction of so-called "neutral", subdued colours in 'natural' colour films. The emphasis on the 'scientific' origins of colour, and the interrelation between colour film technology and human perception of colour, however, also entail notions of the subjectivity and instability of colour vision, accentuating a disparity between colour as indexical and iconic sign, between physical connection and likeness, which produces the semantic ambiguity of whether the term "natural colour" should refer to how colours were produced or to how they look. The disparity between indexicality and iconicity is also the foundation for the ideological and cultural choices behind the manufacturing of film stocks, and linked to the reproduction of "flesh tones" as the principal reference for conceptions of "naturalness" in colour reproduction.

Obviously, the idea of colour in film as enhanced reality was challenged by this lack of 'fidelity', suggesting abstraction and affect, with colours changing and transcending objects. Echoing the advocates of black and white, the lack of "naturalness" in photographic colour processes like Kinemacolor and Technicolor was sometimes perceived and presented as an

aesthetic value comparable to colour in painting, but it can also be linked to the choice of genres for films produced, for example, in Technicolor. The idea of colour in film as enhanced reality or mimesis is moreover supplemented with other notions of "completion", often connected to a strong teleology and ideas of technological, scientific and aesthetic evolution and synthesis: the combination of colour and sound could be understood as a completion of both mimetic and synaesthetic models of "total cinema", entailing a unified representation of experience, and general notions of how colour produced sensory effects on the spectator. This is also linked to notions of colour as disturbance, as purely sensual addition without any essential purpose or function (in contrast to the depictive content or form already supplied by the black-and-white image). The relationship between colour and black and white is not in terms of an opposition between absence and presence; colour modifies and transforms what is already visible in the black-and-white image. The primary visual difference between colour and black and white involves the differentiation into hues, and consequently the revelation of the division between different objects, emphasising the matter of objects rather than transcending or obliterating it. Thus, the world reproduced in 'natural' colour is defined and described, in film reviews or a text like the Kinemacolor catalogue, as a world of objects. This focus on the reproduction of colour in objects can also be understood as a distraction, the highlighting (rather than negation) of the object distracting from the narrative, or from other contents or meanings in the image. Similarly, the (spatial as well as temporal) differentiation and fragmentation associated with colour in cinema entails the shattering of unity, of stability, of definite meanings.

Just as colour is understood in terms of reinforcing the object, several discourses and film practices involve the effort to liberate colour from objects and contexts. Notions of colour film are filled with discourses of liberation: the movement of colour is a liberation from the constraints of painting, visual abstraction is a liberation from representation and from the object; similarly visual media of abstract moving colours constitute a liberation from the constrictions of galleries, cinema theatres, etc.

However, discourses relating colour film to other intermedial practices also reveal essentialist conceptions of cinema, complicating these discourses of liberation. In notions of abstraction, for example, in experiments with "colour-music" involving film technology, film is primarily understood as a material or technological platform rather than a medium, as conceptions of cinema were sharply distinguished from conceptions of colour-music, and linked specifically to the photographic and the representational to colours being emanated from objects. Ideal notions of audiovisual equivalences in cinema, of colour as affect, are complicated by the depictive, representational content of live-action film: the expressive, affective movement of colours is situated in contexts, concrete objects and bodies.

As colour film is usually understood through comparisons with sound, painting, music, the black-and-white image, as well as other media and phenomena, intermedial concerns probably constitute a productive approach to examining the history of colour in cinema, just as colour composes relationships, transcends objects in a general sense, and can be connected to specific industrial and cultural practices. Associations between colour and sound examined in this study represent the interaction between the art scene, popular culture and scientific discourses, and conceptions of colour as intermedial, interdisciplinary and cross modular. Despite the attempt to limit the focus in this study of colour as a cinematic element, in addition to the recurring comparisons to painting and music, this study has connected colour film to such diverse areas as print media, colour organs, clothing, and fabric dye, wallpaper, coloured electric lights and illumination of fountains, waterfalls and buildings, advertising, fireworks, colour in therapeutic practices, and various household goods.

Colour film has frequently been associated with consumption, and with commodities: this has to do with colour being anchored in objects (which can be bought or desired), films explicitly thematising commodities and industrial products, as well as with notions of colour and affect, linked to the superficial, the feminine, and thus a bodily culture of consumption and sensationalism. There are several striking associations between colour in early cinema and clothing, from the tendency to colour clothes in hand and stencil coloured films (sometimes constituting the only elements in the film being coloured), to the use of colour (both photographic and non-photographic) in the multitude of fashion films, and the emphasis on "picturesque costumes" in colour travelogues, to questions concerning to what extent the meaning of the colours in tinted copies can be comprehended through the practice of containing the same dyes being used for colouring textiles, and other products.

Colour in cinema took part in a broader cultural context, often presented as interacting areas for exploration and study, and often with scientific connotations. Notions of colour film as a scientific and educational instrument, beyond entertainment, with colour as a condition for access to the natural world, also emphasised how the interrelationship between body and apparatus could entail an exchangeability of knowledge.

In this study, the need for different approaches to colour to a large extent has been attained through employing different approaches to the discourses, to the texts which have been examined in the three chapters. In the first chapter, a limited historical phenomenon, the promotion of Kinemacolor, and one specific text in particular, the Kinemacolor catalogue, and its focus on "natural" colour, functioned as a point of departure for further contextualisation and problematisation. By positioning the catalogue within a context consisting of the reception of the colour process in the trade and daily press, descriptions of the process in contemporary books on film

technology, discourses on other contemporary colour processes, as well as contemporary discourses on colour perception in general, I have demonstrated how discourses on Kinemacolor to a great extent problematise notions of what "natural" colour entails, not only in terms of the conflict between indexicality and iconicity, but also by showing how notions of photographic colour in terms of science and physiological metaphors also involve definitions of colour as subjective and unstable. In addition, I placed the practice and discourses concerning natural colour represented by Kinemacolor within a broader film historical and industrial context, demonstrating not only how photographic colour was discussed in connection with contemporary notions of indexicality, the black-and-white image, film genres, the relationship between narrative and non-fiction films, but also how the Kinemacolor catalogue attempts to construct its own history through a discourse of evolution occasioned by tendencies in contemporary film practices. Furthermore, I demonstrated how discourses on colour reproduction also reflect general ideological notions about colour revealed through the representation of ethnic and cultural differences, and femininity. Throughout the argument, I have highlighted how the emphasis on colour reproduction usually entails an emphasis on specific objects, and the multiple roles and functions assigned to these specific objects: from a discourse of recognition as a demonstration of the capabilities of the process, as well as scientific discourse (where perhaps the most problematic proponent is the emphasis on reproduction of a variety of skin colours), to the representation of coloured objects as commodities, linking colour reproduction to a culture of consumption, and finally, the notion of the colour of objects as distraction, particularly in discourses on narrative film. Thus, the study demonstrates that a specific historical phenomenon like an early photographic colour process is not limited to matters of technology or to notions of realism, the search for a "full spectrum", but also refers to a number of other specific cultural, ideological and aesthetic issues.

In the second chapter, a survey of how colour was compared to sound in a wide collection of discourses, taken from different institutional contexts, representing different film genres, functioned as a point of departure for a number of different arguments. The discourses examined included books published by the film industry (yearbooks, technological and industrial surveys etc.), film reviews of early Technicolor sound films, advertisements, various examples of classical film theory, writings by avant-garde as well as Hollywood film directors, cinematographers, colour consultants and designers, as well as painters and "colour organ" inventors. By linking these various discourses together in terms of how they compare colour and sound, I demonstrated the similarities and interaction of ideas about colour between a variety of fields, serving as a context for each other, as well as connecting the various colour-sound practices to a broader visual and commercial cultural context. At the same time, the linkage between these various

discourses reveal similarly conflicting ideas about colour which, as I have shown, are motivated to a large extent by specific institutional contexts and essentialist notions about cinema within these contexts. Primarily, the chapter connects and compares the roles of colour and sound in two contemporary and different conceptions of total cinema, a mimetic and a synaesthetic model. As both conceptions represent ideal notions about colour, the comparison carried out in the chapter concerning the interrelation between the two models demonstrates how they problematise and relativise each other. The study demonstrates that just as the ideals of purely realistic, representational values of the first are challenged by the affective, sensory qualities of colour, the ideals of non-representation, pure affect etc. found in the second are similarly challenged by the obvious representational possibilities of colour, its contextualisation in objects and spaces.

The third chapter demonstrates how various attempts to define colour and meaning (in classical film theory, in manuals or guidelines for the use of colour, in analyses of the functions of tinting in a specific film) all seem to address the complex relation between colour and object, as the meaning of colour is produced both independently from the object as well as in incorporation with it. The chapter demonstrates how these notions of separation and incorporation exist on a material and representational level in all types of colour film images from this period: monochrome, bichrome, polychrome, photographic and non-photographic. However, these relations, in the same way as all the relations in which colour in cinema interacts, are specific, dissimilar, impossible to categorise or define unambiguously, as they are related to a multitude of material origins, a multitude of expressive functions, a multitude of possible meanings.

Acknowledgements

My supervisor, Astrid Söderbergh Widding, has offered indispensable comments and suggestions for numerous versions of the thesis, as well as encouragement, support and enthusiasm, for which I am very grateful. Anna Sofia Rossholm has offered inspiring discussions and valuable suggestions throughout the work with the dissertation, as well as assistance in research for material on several occasions. Karl Hansson, Therése Andersson, John Fullerton, Henrik Gustafsson, and Christer Mattsson have provided stimulating discussions, comments, suggestions, and readings, which have been important at different stages of the work. Bertil Friberg and Bart van der Gaag have provided various technical support, and Elaine King has copy edited the manuscript.

A number of archives and libraries have assisted my research: in particular, I would like to express my gratitude to the staff at Svenska Filminstitutets bibliotek, Stockholm, Régis Robert and the staff at Bibliothèque du Film, Paris, and Brian Liddy at the National Museum of Photography, Film & Televison, Bradford, as well as the staff at The British Film Institute National Library, London, Universitetsbiblioteket i Oslo (Biblioteket for humaniora og samfunnsvitenskap), and Bibliothèque Nationale de France, Paris.

Research for this dissertation has been financed through a doctoral position in the Department of Cinema Studies at Stockholm University, which has also generously provided me with grants for research travel. Holger and Thyra Lauritzens stiftelse för främjande av filmhistorisk verksamhet has generously provided a grant for the printing of the dissertation.

References

Bibliography

The 1930 Film Daily Year Book of Motion Pictures (New York: John W. Allicoate, 1930).

Abel, Richard, *The Red Rooster Scare: Making Cinema American, 1900-1910* (Berkeley/Los Angeles/London: University of California Press, 1999).

Abel, Richard (ed.), *Encyclopedia of Early Cinema* (London/New York: Routledge, 2005).

Acland, Charles R., "Tampering with the Inventory: Colorization and Popular Histories", *Wide Angle* 12:2 (April 1990), 12-20.

Adorno, Theodor; Eisler, Hanns, *Composing for the Films* [1947] (London: The Athlone Press, 1994).

Allbee, Burton H., "Impressions of Kinemacolor Films", *Moving Picture World*, December 25, 1909, 915-916.

The American Film Institute Catalog of Motion Pictures Produced in the United States: Feature Films 1921-1930 (New York: Bowker, 1971).

The American Film Institute Catalog of Motion Pictures Produced in the United States: Feature Films 1931-1940 (Berkeley: University of California Press, 1993).

"Animated Photography in Natural Colors", *Chamber of Commerce Journal*, June 1908.

Anthony, Barry, "Loïe Fuller and the Transformation of the Music-Hall", *Living Pictures*, 2:2, 2003, 34-45.

Apollinaire, "Colored Rhythm" (1914), *Experimental Animation: An Illustrated Anthology*, eds. Robert Russett, Cecile Starr (New York/London: Van Nostrand Reinhold Company, 1976), 38.

Arnheim, Rudolf, *Film as Art* [1932] (London: Faber and Faber, 1958).

Arnheim, Rudolf, "Remarks on Color Film" (1935), *Film Essays and Criticism* (Wisconsin: University of Wisconsin Press, 1997), 18-23.

Arvidson, Linda (Mrs. D.W. Griffith), *When the Movies Were Young* [1925] (New York: Dover Publications, 1969).

Aumont, Jacques, *The Image* [1990] (London: BFI Publishing, 1997).

Aumont, Jacques, *Introduction à la couleur: des discours aux images* (Paris: Armand Colin, 1994).

Aumont, Jacques (ed.), *La couleur en cinéma* (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995).

Aumont, Jacques, "Avertissement", *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995), 9.

Balász, Béla, *Theory of the Film: Character and Growth of a New Art* [1949] (London: Dennis Dobson, 1952).

Barthes, Roland, *Camera Lucida: Reflections on Photography* [1980] (London: Vintage, 2000).
Basten, Fred E., *Glorious Technicolor: The Movies' Magic Rainbow* (Camarillo: Technicolor, Inc., 2005).
Batchelor, David, *Chromophobia* (London: Reaktion Books, 2000).
Bazin, André, "The Myth of Total Cinema" [1946], *What Is Cinema? Volume I*, ed., trans., Hugh Gray (Berkeley/Los Angeles/London: University of California Press, 1967), 17-22.
Bedding, Thomas, "Moving Pictures in Natural Colors", *Moving Picture World*, January 9, 1909, 30-31.
Bedding, Thomas, "Moving Pictures in Natural Colors: Second Article", *Moving Picture World*, October 29, 1910, 981.
Bedding, Thomas, "The Modern Way in Moving Picture Making, Chapter X: Toning and Tinting", *Moving Picture World*, May 4, 1909, 626-628.
Bedding, Thomas [sign. Lux Graphicus], "On the Screen", *Moving Picture World*, December 25, 1909, 918-919.
Bellour, Raymond, "La couleur Marnie – Alfred Hitchcock: *Marnie*", *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995), 147-148.
Belton, John, "Introduction: *Colour Film*", *Film History*, 12:4, 2000, 339-340.
Belton, John "Cinecolor", *Film History*, 12:4, 2000, 344-357.
Benjamin, Walter, "The Work of Art in the Age of Mechanical Reproduction" (1936), *Illuminations*, ed. Hannah Arendt (London: Fontana Press, 1973), 217-252.
Berriatúa, Luciano, "Regarding a Catalogue of the Tints Used on the Silent Screen", *Tutti i colori del mondo: Il colore nei mass media tra 1900 e 1930 / All the Colours of the World: Colours in Early Mass Media, 1900-1930* (Reggio Emilia: Edizioni Diabasis, 1998), 135-139.
"Bioschemes, Limited, v. Natural Color Kinematograph Company, Limited", *The Bioscope*, April 9, 1914, 141.
"Black and White Pictures: Do the Public Prefer Them?" *Moving Picture World*, February 19, 1910, 245.
"A Boom in Kinemacolor: Big Changes and Additional Attractions", *The Kinematograph & Lantern Weekly*, December 9, 1909, 274.
Bordwell, David, "Technicolor", in David Bordwell, Janet Staiger, Kristin Thompson, *The Classical Hollywood Cinema: Film Style & Mode of Production to 1960* (London: Routledge, 1985), 353-357.
Bordwell, David, *Narration in the Fiction Film* (London: Routledge, 1987).
Bordwell, David, *The Cinema of Eisenstein* (Cambridge/London: Harvard University Press, 1993).
Bourget, Jean-Loup, "Esthétiques du Technicolor", *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995),110-119.
Bowser, Eileen, *History of the American Cinema, Volume 2: The Transformation of Cinema*, 1907-1915 (New York/Toronto: Charles Scribner's Sons/Collier Macmillan Canada, 1990).
Branigan, Edward, "The Articulation of Color in a Filmic System: *Deux ou trois choses que je sais d'elle*", *Wide Angle* 1:3, 1976, 20-31.
Branigan, Edward, "Color and Cinema: Problems in the Writing of History" (1979), *Movies and Methods Volume II*, ed. Bill Nichols (London/Berkeley: University of California Press, 1985), 121-143.

Brewster, Ben, "Periodization of Early Cinema", *American Cinema's Transitional Era: Audiences, Institutions, Practices*, eds. Charlie Keil, Shelley Stamp (Berkeley/Los Angeles/London: University of California Press, 2004), 66-75.
The British Film Catalogue, Volume 1: Fiction Film, 1895-1994, 3rd edition, ed. Denis Gifford (London/Chicago: Fitzroy Dearborn Publishers, 2001).
The British Film Catalogue, Volume 2: Non-Fiction Films, 1888-1994, ed. Denis Gifford (London/Chicago: Fitzroy Dearborn Publishers, 2001).
Brougher, Kerry, "Visual-Music Culture", *Visual Music: Synaesthesia in Art and Music Since 1900*, eds. Kerry Brougher, Jeremy Strick, Ari Wiseman, Judith Zilczer (New York/London: Thames & Hudson, 2005), 88-178.
Brown, Simon, "Dufaycolor: The Spectacle of Reality and British National Cinema" (2002): http://www.bftv.ac.uk/projects/dufaycolor.htm
Brown, Theodore, "My Impressions of Kinemacolor", repr. from *Kinematograph and Lantern Weekly* in *Moving Picture World*, May 28, 1910, 886.
Bull, Lucien, *La Cinématographie* (Paris: Librairie Armand Colin, 1928).
Buscombe, Edward, "Sound and Color" (1978), *Movies and Methods, Volume II: An Anthology*, ed. Bill Nichols (Berkeley/Los Angeles/London: University of California Press, 1985), 83-91.
Canudo, Ricciotto, "Reflections on the Seventh Art" (1923), *French Film Theory and Criticism: A History/Anthology, Volume I: 1907-1929*, ed. Richard Abel (Princeton: Princeton University Press, 1988), 291-303.
Castel, Louis Bertrand, "L'optique des couleurs" (1740), *Poétique de la couleur: une histoire du cinéma expérimental*, ed. Nicole Brenez and Miles McKane (Paris: 1995), 29-35.
Catalogue of Kinemacolor Film Subjects: Animated Scenes in Their Actual Colors (London: The Natural Color Kinematograph Co., Ltd., 1912).
Chardère, Bernard; Borgé, Guy; Borgé, Marjorie, *Les Lumières* (Lausanne/Paris: Éditions Payot/Bibliothèques des arts, 1985).
Cherchi Usai, Paolo, "The Color of Nitrate: Some Factual Observations on Tinting and Toning Manuals for Silent Films" [1991], *Silent Film*, ed. Richard Abel (London: The Athlone Press, 1996), 21-30.
Cherchi Usai, Paolo, *Silent Cinema: An Introduction* (London: BFI Publishing, 2000).
Cherchi Usai, Paolo, *The Death of Cinema: History, Cultural Memory and the Digital Dark Age* (London: BFI Publishing, 2001).
Chion, Michel, "Colorisations", *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995), 63-69.
Christie, Ian, "Colour, Music, Dance, Motion: Len Lye in England, 1927-1944", *Len Lye*, eds. Jean-Michel Bouhors, Roger Horrocks (Paris: Éditions du Centre Pompidou, 2000), 186-191.
"Cinematography Honored", *The Moving Picture News*, July 31, 1909.
"Cinematography in Colour", *Sheffield Evening Telegraph*, February 27, 1909.
"Color and the Picture", *Moving Picture World*, July 23, 1910, 182.
"Color in Industry", *Fortune*, February 1930, 85-94.
"The Coronation in Kinemacolor" [review], *Moving Picture World*, August 5, 1911, 274.
Corra, Bruno, "Musique chromatique" (1912), *Poétique de la couleur: une histoire du cinéma expérimental*, ed. Nicole Brenez and Miles McKane (Paris: 1995), 52-60.

Crafton, Donald, *History of the American Cinema, Volume 4: The Talkies: American Cinema's Transition to Sound, 1926-1931* (Berkeley/Los Angeles/London: University of California Press, 1999).
Crary, Jonathan, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge/London: MIT Press, 1990).
Croy, Homer, *How Motion Pictures Are Made* (New York/London: Harper & Brothers Publishers, 1918).
Culhane, John, *Walt Disney's Fantasia* (New York: Harry N. Abrams, Inc., 1983).
Dahlquist, Marina, *The Invisible Seen in French Cinema before 1917* (Stockholm: Aura förlag, 2001).
The Daily Telegraph, July 12, 1913.
Dall'Asta, Monica; Pescatore, Guglielmo; Quaresima, Leonardo (eds.), *Il colore nel cinema muto* (Bologna: Mano Edizioni, 1996).
Dall'Asta, Monica; Pescatore, Guglielmo, "Colour in Motion", *Fotogenia* 1, 1994, 240-248.
Dalle Vacche, Angela; Price, Brian (eds.), *Color, the Film Reader* (New York/London: Routledge, 2006).
Degenhart, Inge, "On the Absence and Presence of Colour", *Fotogenia*, 1, 1994, 273-281.
Deleuze, Gilles, *Cinema 1: The Movement-Image* [1983] (Minneapolis: University of Minnesota Press, 1997).
Delluc, Louis, "Photogénie en couleurs" (1920), *Écrits cinématographiques. II.2: Le cinéma au quotidien* (Paris: Cinémathèque française/Ed. de l'étoile/Cahiers du cinéma, 1990), 178.
"The Demonstration in New York", *The Kinematograph & Lantern Weekly*, December 30, 1909.
Dennis, Jonathan, "A Colour Box", *Len Lye*, eds. Jean-Michel Bouhors, Roger Horrocks (Paris: Éditions du Centre Pompidou, 2000), 191-193.
Diebold, Bernhard, "A New Art: The Visual Music of Film"(1921), *Der deutsche Avant-Garde Film der 20er Jahre / The German Avant-Garde Film of the 1920's*, eds. Angelika Leitner, Uwe Nitschke (München: Goethe-Institut, 1989), 98-101.
Doane, Mary Ann, *The Emergence of Cinematic Time: Modernity, Contingency, the Archive* (Cambridge/London: Harvard University Press, 2002).
Doppenberg, Eleanore; Dibbets, Karel, "Abstract Films and Color", *Il colore nel cinema muto*, eds. Monica Dall'Asta, Guglielmo Pescatore, Leonardo Quaresima (Bologna: Mano Edizioni, 1996), 216-223.
Dubois, Philippe, "Hybridations et métissages: Les mélanges du noir-et-blanc et de la couleur", *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995), 74-92.
Duplaix, Sophie; Lista, Marcella (eds.), *Sons & lumières: Une histoire du son dans l'art du XXe siècle* (Paris: Éditions du Centre Pompidou, 2004).
Dyer, Richard, *White* (London/New York: Routledge, 1997).
Eisenstein, S.M.; Pudovkin, Vselovod; Alexandrov, Grigori, "Statement on Sound" (1928), S.M. Eisenstein, *Selected Works, Volume I: Writings 1922-34*, ed., trans., Richard Taylor (London/Bloomington/Indianapolis: BFI Publishing/Indiana University Press, 1988), 113-114.
Eisenstein, S.M., "The Dramaturgy of Film Form (The Dialectical Approach to Film Form)" (1929), *Selected Works, Volume I: Writings 1922-34*, ed., trans., Richard Taylor (London/Bloomington/Indianapolis: BFI Publishing/Indiana University Press, 1988), 161-180.

Eisenstein, S.M., "The Fourth Dimension in Cinema" (1929), *Selected Works, Volume I: Writings 1922-34*, ed., trans., Richard Taylor (London/Bloomington/Indianapolis: BFI Publishing/Indiana University Press, 1988), 181-194.
Eisenstein, S.M., "Montage 1937" (1937), S.M. Eisenstein, *Selected Works, Volume 2: Towards a Theory of Montage*, eds. Michael Glenny, Richard Taylor (London: BFI Publishing, 1991), 11-58.
Eisenstein, S.M., "On Colour" (1937), S.M. Eisenstein, *Selected Works, Volume 2: Towards a Theory of Montage*, eds. Michael Glenny, Richard Taylor (London: BFI Publishing, 1991), 254-267.
Eisenstein, S.M., "Unity in the Image" (1937), S.M. Eisenstein, *Selected Works, Volume 2: Towards a Theory of Montage*, eds. Michael Glenny, Richard Taylor (London: BFI Publishing, 1991), 268-280.
Eisenstein, S.M., "Not Coloured, But In Colour" (1940), *Notes of a Film Director*, ed. R. Yurenev (New York: Dover Publications, 1970), 114-119.
Eisenstein, S.M., "Vertical Montage" (1940), S.M. Eisenstein, *Selected Works, Volume 2: Towards a Theory of Montage*, eds. Michael Glenny, Richard Taylor (London: BFI Publishing, 1991), 327-399.
Eisenstein, S.M., *Eisenstein on Disney* [1940-41], ed. Jay Leyda (Calcutta: Seagull, 1986).
Eisenstein, S.M., *Nonindifferent Nature: Film and the Structure of Things* [1945] (Cambridge/New York/Melbourne: Cambridge University Press, 1987).
Eisenstein, S.M., "First Letter About Color" (1946), *Film Reader*, 2, 1977, 181-184.
Eisenstein, S.M., "From Lectures on Music and Colour in *Ivan the Terrible*" (1946-47), S.M. Eisenstein, *Selected Works, Volume III: Writings, 1934-47*, ed. Richard Taylor (London: BFI Publishing, 1996), 317-338
Eisenstein, S.M., "Color (2)" (1947), S.M. Eisenstein, *Immoral Memories: An Autobiography*, trans. Herbert Marshall (London: Peter Owen Ltd., 1985), 249-258.
Eisenstein, Sergei M., "Aus der unvollendeten Untersuchung über die Farbe" [1946], *Information*, 2-3, 1975 ["Eisenstein zur Farbe im Film"], 24-118.
Eisenstein, S.M., "The Psychology of Composition" (1947), S.M. Eisenstein, *The Psychology of Composition*, ed., trans., Alan Upchurch (London/New York: Methuen, 1988), 26-56.
Eisenstein, S.M., "Colour Film" (1948), *Notes of a Film Director*, ed. R. Yurenev (New York: Dover Publications, 1970), 119-128.
Elements of Color in Professional Motion Pictures (New York: Society of Motion Picture and Television Engineers, 1957).
Elsaesser, Thomas, "Early Cinema: From Linear History to Mass Media Archeology", *Early Cinema: Space, Frame, Narrative*, eds. Thomas Elsaesser, Adam Barker (London: BFI Publishing, 1990), 1-8.
"Exhibitions of Kinemacolor in Chicago", *Moving Picture World*, July 15, 1911, 23.
"The Evolution of Film", *Cinematographic Annual 1930, Volume One*, ed. Hal Hall (Hollywood: The American Society of Cinematographers, Inc. / The Hartwell Publishing Corporation, 1930, repr. New York: Arno Press Inc., 1972), 35-40.
"Fashions of To-Morrow: Dresses Photographed for Kinemacolor", *Pall Mall Gazette*, September 5, 1913.
"Fashions on Film: A Chat with the Creator of the 'Kinemacolor Fashion Gazette'", *The Picture Theatre Magazine*, November 22, 1913, 211-213.
Favre, Louis, *La musique des couleurs et le cinéma* (Paris: Les presses universitaires de France, 1927).

Fejos, Paul, "Illusion on the Screen" [1929], *Hollywood Directors 1914-1940*, ed. Richard Kozarski, (London/Oxford/New York: Oxford University Press, 1976), 223-226.
Fihman, Guy, "De la 'Musique chromatiques' et des 'Rythmes colorés' au mouvement des couleurs", *Fotogenia*, 1, 1994, 319-323.
Film History, 12:4, 2000 [special issue: "Colour Film"].
Le film vierge Pathé (Paris: Pathé-Cinéma, 1926).
"The First Kinemacolor Dramatic Picture", *The Kinematograph and Lantern Weekly*, November 24, 1910, repr. in *Moving Picture World*, December 17, 1910, 1413.
Fischinger, Oskar, "The Problem of Color and Sound in Film"(1930), *Der deutsche Avant-Garde Film der 20er Jahre / The German Avant-Garde Film of the 1920's*, eds. Angelika Leitner, Uwe Nitschke (München: Goethe-Institut, 1989), 120-123.
Fleming, Anne, "*A Colour Box* (Len Lye Recovered)", *This Film Is Dangerous: A Celebration of Nitrate Film*, ed. Roger Smither (Brussels: FIAF, 2002), 126-127.
Fossati, Giovanna, "Coloured Images Today: How to Live with Simulated Colours (and Be Happy)", '*Disorderly Order': Colours in Silent Film; The 1995 Amsterdam Workshop*, ed. Daan Hertogs, Nico de Klerk (Amsterdam: Stichting Nederlands Filmmuseum, 1996), 83-89.
Fossati, Giovanna, "When Cinema Was Coloured", *Tutti i colori del mondo: Il colore nei mass media tra 1900 e 1930 / All the Colours of the World: Colours in Early Mass Media, 1900-1930* (Reggio Emilia: Edizioni Diabasis, 1998), 121-132.
Fotogenia, 1, 1994 [special issue: "Il colore nel cinema"].
Frampton, Daniel, "Filmosophy: Colour", *New Scholarship from BFI Research*, eds. Colin MacCabe, Duncan Petrie (London: British Film Institute, 1996), 86-108.
"The Friese-Greene Color Process", *The Kinematograph Weekly*, November 24, 1910, repr. in *Moving Picture World*, December 17, 1910, 1413.
"The Friese-Greene Color Process", *Moving Picture World*, January 21, 1911, 146.
Frisvold Hanssen, Eirik, "Eisenstein in Colour", *Konsthistorisk tidskrift / Journal of Art History*, Vol. 73, No. 4, 2004, 212-227.
Gage, John, *Colour and Culture: Practice and Meaning from Antiquity to Abstraction* (London: Thames & Hudson, 1993).
Gage, John, *Colour and Meaning: Art, Science and Symbolism* (London: Thames & Hudson, Ltd.,1999).
Gaudreault, André; Sirois-Trahan, Jean-Pierre, "Des sujets hauts en couleur, dès les premiers temps du cinéma", *Il colore nel cinema muto*, eds. Monica Dall'Asta, Guglielmo Pescatore, Leonardo Quaresima (Bologna: Mano Edizioni, 1996), 77-84.
Le Gaulois, July 10, 1908.
Gaumont, Léon, "Gaumont Chronochrome Process Described by the Inventor", *A Technological History of Motion Pictures and Television: An Anthology from the Pages of The Journal of the Society of Motion Picture and Television Engineers*, ed. Raymond Fielding (Berkeley/Los Angeles: University of California Press, 1967), 65-67.
"The Gaumont Chronochrome", *Moving Picture World*, June 28, 1913, 1346.
Goethe, Johann Wolfgang von, *Theory of Colours* [1810], trans. Charles Lock Eastlake [1840] (Cambridge/London: MIT Press, 1970).

Goudal, Jean, “Surrealism and Cinema” (1925), *French Film Theory and Criticism: A History/Anthology, Volume I: 1907-1929*, ed. Richard Abel (Princeton: Princeton University Press, 1988), 353-362.
Grainge, Paul, “Reclaiming Heritage: Colourization, Culture Wars and the Politics of Nostalgia”, *Cultural Studies*, 13:4, 1999, 621-638.
Grazia, Victoria de; Furlough, Ellen (eds.), *The Sex of Things: Gender and Consumption in Historical Perspective* (Berkeley/Los Angeles/London: University of California Press, 1996).
Gregory, Carl Louis (ed.), *A Condensed Course in Motion Picture Photography* (New York: New York Institute of Photography, 1920).
Griffith, David Wark, “The Movies 100 Years from Now”, *Collier’s Weekly*, May 3, 1924, 7-8.
Griffiths, Alison, *Wondrous Difference: Cinema, Anthropology & Turn-of-the-Century Visual Culture* (New York: Columbia University Press, 2002).
Gunning, Tom, “The Cinema of Attractions: Early Film, Its Spectator and the Avant-Garde”, *Early Cinema: Space, Frame, Narrative*, eds. Thomas Elsaesser, Adam Barker (London: BFI Publishing, 1990), 56-62.
Gunning, Tom, “Colorful Metaphors: the Attraction of Color in Early Silent Cinema”, *Fotogenia*, 1, 1994, 249-255.
Gunning, Tom, “Systematizing the Electric Message: Narrative Form, Gender, and Modernity in *The Lonedale Operator*”, *American Cinema’s Transitional Era: Audiences, Institutions, Practices*, eds. Charlie Keil, Shelley Stamp (Berkeley/Los Angeles/London: University of California Press, 2004), 15-50.
Haines, Richard W., *Technicolor Movies: The History of Dye Transfer Printing* (Jefferson/London: McFarland & Company, Inc., 1993).
Hall, Hal; Stull, William; “Motion Pictures in Natural Colors”, *Cinematographic Annual 1930, Volume One*, ed. Hal Hall (Hollywood: The American Society of Cinematographers, Inc. / The Hartwell Publishing Corporation, 1930, repr. New York: Arno Press Inc., 1972), 273-281.
Hall, Mordaunt, “Dialogue and Color”, *The New York Times*, May 29, 1929, 28:6.
Hall, Mordaunt, “Fun and Catchy Music”, *The New York Times*, August 15, 1929, 20:5.
Hall, Mordaunt, “Fair Forty-Niners”, *The New York Times*, August 31, 1929, 13:4.
Hall, Mordaunt, “Irene Bordoni and Jack Buchanan”, *The New York Times*, November 8, 1929, 31:2.
Hall, Mordaunt, “A Romantic Villon”, *The New York Times*, February 20, 1930, 22:4.
Hall, Mordaunt, “Marilyn Miller”, *The New York Times*, December 24, 1929, 14:4.
Hall, Mordaunt, “A Hollywood Studio Frolic”, *The New York Times*, April 21, 1930, 20:4.
Hall, Mordaunt, “Lionel Atwill and Fay Wray in Gruesome Narrative About a Mad Modeler of Wax Figures, *New York Times*, February 18, 1933, 13:3.
Hall, Mordaunt, “The Duncan Sisters”, *The New York Times*, January 18, 1930, 21:1.
Harding, Colin, “‘The World Will Be Color-Mad’: The Autochrome Process and the Birth of Colour Photography”, *Living Pictures*, 2:2, 2003, 26-33.
Harmon, W.W., “The Optical Desirability of Color in Moving Pictures”, *Moving Picture World*, December 25, 1909, 916.
Harris, Neil, *Cultural Excursions: Marketing Appetites and Cultural Tastes in Modern America* (Chicago/London: Chicago University Press, 1990).

Harrison, John E.; Baron-Cohen, Simon, "Synaesthesia: an Introduction", *Synaesthesia: Classic and Contemporary Readings*, eds. Simon Baron-Cohen, John E. Harrison (Oxford/Cambridge: Blackwell Publishers, 1997), 3-16.
Harrison, Louis Reeves, "Sauntering with Kinemacolor: Critical Review of the Work in Progress for Popularizing a Unique Idea in the Photoplay", *Moving Picture World*, February 15, 1913, 661-662.
Hastings, Charles Edward, "Natural Color Moving Pictures: Their History and Advancement", *Moving Picture World*, March 26, 1927, 346.
Heal, W.C., "Keep Your Eye on the Colored Pictures", *New York Dramatic Mirror*, January 29, 1916, 36.
Hediger, Vinzenz; Schneider, Alexandra, "The Deferral of Smell: Cinema, Modernity and the Reconfiguration of the Olfactory Experience", *I cinque sensi del cinema / The Five Senses of Cinema*, eds. Alice Autelitano, Veronica Innocenti, Valentina Re (Udine: Forum, 2005), 243-252.
Henry [signature], "Kinemacolor Demonstration in Boston", *Moving Picture World*, December 31, 1910, 1533.
Henry [signature], "Colored Motion Pictures", *Moving Picture World*, April 1, 1911, 721.
Hertogs, Daan; de Klerk, Nico (eds.), *Nonfiction from the Teens: The 1994 Amsterdam Workshop* (Amsterdam: Stichting Nederlands Filmmuseum, 1994).
Hertogs, Daan; de Klerk, Nico (eds.), '*Disorderly Order': Colours in Silent Film; The 1995 Amsterdam Workshop* (Amsterdam: Stichting Nederlands Filmmuseum, 1996).
Herzogenrath, Wulf, "Light-Play and Kinetic Theatre as Parallels to Absolute Film", *Film as Film: Formal Experiment in Film 1910-1975* [exhibition catalogue, The Hayward Gallery] (London: The Arts Council of Great Britain, 1979), 22-26.
H.F.H.[signature], "The Durbar in Kinemacolor", *Moving Picture World*, March 2, 1912, 774.
Higgins, Scott P., *Harnessing the Rainbow: Technicolor Aesthetics in the 1930s* (unpublished dissertation, University of Wisconsin-Madison, 2000).
Higgins, Scott, "Demonstrating Three-Colour Technicolor: Early Three-Colour Aesthetics and Design", *Film History*, 12:4, 2000, 358-383.
Hirschfeld-Mack, Ludwig, "À propos de la partition de 'Reflektorische Farbenspiele'" (1925), *Poétique de la couleur: une histoire du cinéma expérimental*, ed. Nicole Brenez and Miles McKane (Paris: 1995), 64-65.
Hitchcock, Alfred, "Direction", *Footnotes to the Film*, ed. Charles Davy (London: Lovat Dickson, 1937), 3-15.
Iampolski, Mikhail, "Color as a Language", *Re: The Rainbow*, ed. Aris Fioretos (Stockholm/Lund: IASPIS/Propexus, 2004), 15-33.
Ihering, Herbert, [review of] *Lichtspiel Opus 1*, *Berliner Börsen-Courier*, May 6, 1921, repr. *Der deutsche Avant-Garde Film der 20er Jahre / The German Avant-Garde Film of the 1920's*, eds. Annika Leitner, Uwe Nischke (Munich: Goethe-Institut, 1989), 80.
Jay, Martin, *Downcast Eyes: The Denigration of Vision in Twentieth-Century French Thought* (Berkeley: University of California Press, 1994).
Johnson, George Lindsay, *Photographic Optics and Colour Photography: Including the Camera, Kinematograph, Optical Lantern, and the Theory and Practice of Image Formation* (London: Ward & Co., 1909).
Johnson, George Lindsay, *Photography in Colours*, 3rd edition (London/New York: George Routledge & Sons, Ltd./E.P. Dutton & Co., 1916).
Johnson, William, "Coming to Terms with Color" (1966), *The Movies as Medium*, red. Lewis Jacobs (New York: Farrar, Straus & Giroux, 1970), 210-242.

Jones, Loyd A., "Tinted Films for Sound Positives" [1929], *Abridged Scientific Publications from the Kodak Research Laboratories,* Volume XIII, 1929 (Rochester: The Eastman Kodak Company, 1930), 223-234.
Jones, Robert Edmond, "Color Should Be 'Organised' on the Screen" (1935), *Celebrity Articles from* The Screen Guild Magazine, ed. Anna Kate Sterling (Metuchen/London: The Scarecrow Press, Inc., 1987), 77-79.
Jones, Robert Edmond, "The Problem of Color" (1938) *The Emergence of Film Art*, ed. Lewis Jacobs (New York: Hopkinson and Blake, 1969), 206-209.
Joy, Henry W., *Book of Instruction for Operators of Kinemacolor Appliances* (London: The Natural Color Kinematograph Co., Ltd, 1910).
Jørholt, Eva, "Deleuze i farver", *Kosmorama*, 221, 1998, 96-115.
Jørholt, Eva, "Filmens farver: En hvid plet på filmvidenskabens landkort", *Kosmorama*, 222, 1998, 6-33.
Kalmus, H.T., "Technicolor Adventures in Cinemaland" (1938), *A Technological History of Motion Pictures and Television: An Anthology from the Pages of The Journal of the Society of Motion Picture and Television Engineers*, ed. Raymond Fielding (Berkeley/Los Angeles: University of California Press, 1967), 52-59.
Kalmus, Herbert T., *Mr. Technicolor* [with Eleanore King Kalmus] (Absecon: MagicImage Filmbooks, 1993).
Kalmus, Natalie M., "Color Consciousness", *Journal of the Society of Motion Picture Engineers*, 25:2, 1935, 139-147.
Keil, Charlie; Stamp, Shelley, "Introduction", *American Cinema's Transitional Era: Audiences, Institutions, Practices*, eds. Charlie Keil, Shelley Stamp (Berkeley/Los Angeles/London: University of California Press, 2004), 1-11.
Keil, Charlie, "To Here from Modernity: Style, Historiography, and Transitional Cinema", *American Cinema's Transitional Era: Audiences, Institutions, Practices*, eds. Charlie Keil, Shelley Stamp (Berkeley/Los Angeles/London: University of California Press, 2004), 51-65.
Kindem, Gorham, "The Demise of Kinemacolor" (1981), *The American Movie Industry: The Business of Motion Pictures*, ed. Gorham Kindem (Carbondale/Edwardsville: Southern Illinois University Press, 1982), 136-145.
Kindem, Gorham, "Hollywood's Conversion to Color: The Technological, Economic and Aesthetic Factors", *The American Movie Industry: The Business of Motion Pictures*, ed. Gorham Kindem (Carbondale/Edwardsville: Southern Illinois University Press, 1982), 146-158.
"Kinemacolor", *Moving Picture World*, February 8, 1913, 574.
Kinemacolor and Some American Criticisms (pamphlet) (London: Natural Color Kinematograph Co., 1910).
"Kinemacolor Arranged for Ladies Only", *New York Reviews*, May 10, 1913.
"Kinemacolor Company Now Releasing", *Moving Picture World*, October 19, 1912, 231.
"Kinemacolor: Demonstration of Moving Pictures in Natural Colors in New York" [editorial], *Moving Picture World*, December 11, 1909, 831.
"The Kinemacolor Demonstration", *Moving Picture World*, December 25, 1909, 912-913.
Kinemacolor Films, 1915-1916 (London: Kinemacolor Limited, 1916).
"Kinemacolor: First American Exhibition of Moving Pictures in Natural Colors; Madison Square Garden Concert Hall, New York, December 1911, 1909: Special Criticism of the Process", *Moving Picture World*, December 18, 1909, 873-874.
"Kinemacolor in America", *Moving Picture World*, April 16, 1910, 605.

"Kinemacolor in London: Important Installation in the Beautiful Scala Theater", *Moving Picture World*, May 6, 1911, 1002-1003.
"Kinemacolor in Travel Field", *Moving Picture World*, October 26, 1912, 354.
"Kinemacolor Makes a Hit", *Moving Picture World*, August 12, 1911, 362.
"Kinemacolor: Some Practical Aspects of the Process", *Moving Picture World*, December 31, 1909, 959.
"Kinemacolor Sound Effects", *Moving Picture World*, August 26, 1911, 548.
Kinemacolor: Supplementary List of Film Subjects to Catalogue, 1912-13 (London: The Natural Color Kinematograph Co., 1913) [November].
"Kinemacolor vs. Hand-Color", *Film Index*, January 8, 1910, 3.
"The King and Kinemacolor: Royalty Sees Itself Upon the Screen", *The Cinema*, June 1912, 14.
"Kin Starts New Series", *Variety*, October 17, 1913, 14.
Klein, Adrian Bernard, *Colour-Music: The Art of Light* (First Edition) (London:
Crosby Lockwood and Son, 1926).
Klein, Adrian Bernard, *Colour-Music: The Art of Light* (London: Crosby Lockwood & Son, 1930).
Klein, Adrian Bernard, *Colour Cinematography* (London: Chapman & Hall, Ltd., 1936).
Klein, Adrian Bernard, *Coloured Light: An Art Medium: Being the Third Enlarged Edition of "Colour Music"* (London: The Technical Press Ltd., 1937).
Klein, Adrian Bernard, *Colour Cinematography*, second edition, revised and enlarged (London: Chapman & Hall, Ltd., 1939).
Klein, Adrian Bernard [as Adrian Cornwell-Clyne], *Colour Cinematography*, 3rd edition, revised and enlarged (London: Chapman & Hall, Ltd., 1951).
Koshofer, Gert, *Color: Die Farben des Films* (Berlin: Wissenschaftverlag Volker Spiess GmbH, 1988).
Koshofer, Gert, "Early Colorfilm Processes for the Cinema", *Il colore nel cinema muto*, eds. Monica Dall'Asta, Guglielmo Pescatore, Leonardo Quaresima (Bologna: Mano Edizioni, 1996), 39-44.
Kracauer, Siegfried, *Theory of Film: The Redemption of Physical Reality* [1960] (Princeton: Princeton University Press, 1997).
Kuyper, Eric de, "La couleur du muet", ", *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995), 139-146.
Lameris, Bregtje, "Pathécolor: 'Perfect in Their Rendition of the Colours of Nature'", *Living Pictures: The Journal of the Popular and Projected Images Before 1914*, 2:2, 2003, 46-58.
Langlois, Philippe, "Les pionniers de la synthèse optique", *Musiques et images au cinéma*, eds. Marie-Noëlle Masson, Gilles Mouëllic (Rennes: Presses Universitaires de Rennes, 2003), 147-158.
"Lasky Chiefs Working on Color Process", *Moving Picture World*, February 9, 1918, 832.
Lastra, James, *Sound Technology and the American Cinema: Perception, Representation, Modernity* (New York: Columbia University Press, 2000).
László, Alexander, "Préhistoire du parallèle entre les sons et les couleurs" (1925), *Poétique de la couleur: une histoire du cinéma expérimental*, eds. Nicole Brenez and Miles McKane (Paris: 1995), 36-45.
Ledig, Elfriede, "Rot wie Feuer, Leidenschaft, Genie und Wahnsinn: Zu einigen Aspekten der Farbe im Stummfilm" [with Gerhard Ullmann], *Der Stummfilm:*

Konstruktion und Rekonstruktion, ed. Elfriede Ledig (Munich: Schaudig, Bauer, Ledig, 1988).
Lee, Norman, *Money for Film Stories* (London: Sir Isaac Pitman & Sons, 1937).
Le Grice, Malcolm, "Colour Abstraction – Painting – Film – Video – Digital Media" (1995), Malcolm Le Grice, *Experimental Cinema in the Digital Age* (London: BFI Publishing, 2001), 259-272.
Lemoine, Serge; Rousseau, Pascal (eds.), *Aux origins de l'abstraction, 1800-1914*, (Paris: Éditions de la Réunion des musées nationaux, 2003).
Lescarboura, Austin C., *Behind the Motion-Picture Screen* (New York: Scientific American Publishing Company/Munn & Company, 1921).
Leslie, Esther, *Hollywood Flatlands: Animation, Critical Theory and the Avant-Garde* (London/New York: Verso, 2002).
Levin, Thomas Y., "'Tones from Out of Nowhere': Rudolf Pfenniger and the Archeology of Synthetic Sound", *Grey Room*, 12, Summer 2003, 32-79.
Leyda, Jay, *Kino: A History of the Russian and Soviet Film* (London: George Allen & Unwin, 1960).
Limbacher, James L., *Four Aspects of the Film* (New York: Brussel & Brussel, 1968).
Living Pictures: The Journal of the Popular and Projected Image before 1914, 2:2, 2003 [special issue: "Colour"].
Londoño, Esperanza, "Pour une histoire de la couleur au cinéma" (unpublished dissertation, Paris, 1985).
Low, Rachael, *The History of the British Film 1929-1939: Documentary and Educational Films of the 1930s* (London: George Allen & Unwin, 1979).
Lundemo, Trond, "The Colors of Haptic Space: Black, Blue and White in Moving Images", *Color, the Film Reader*, eds. Angela Dalle Vacche, Brian Prices (New York/London: Routledge, 2006), 88-101.
Lye, Len, "Voix et couleur" (1936), *Poétique de la couleur: une histoire du cinéma expérimental*, eds. Nicole Brenez and Miles McKane (Paris: 1995), 89-93.
Lye, Len, "Experiment in Colour" (1936), *Len Lye*, eds. Jean-Michel Bouhors, Roger Horrocks (Paris: Éditions du Centre Pompidou, 2000), 225-226.
Lye, Len, "Notes on a Short Colour Film", *Life and Letters Today*, 15:6,1936, 162-164.
Lye, Len, "Compte-rendu de 'Coloured Light', un livre du Major Adrian B. Klein" (1937), *Poétique de la couleur: une histoire du cinéma expérimental*, eds. Nicole Brenez and Miles McKane (Paris: 1995), 96-97.
McKernan, Luke (ed.), *A Yank in Britain: The Lost Memoirs of Charles Urban, Film Pioneer* (Hastings: The Projection Box, 1999).
Mamoulian, Rouben, "Some Problems in Directing Color Pictures", *Journal of the Society of Motion Picture Engineers*, 25:2, 1935, 148-153.
Marks, Laura U., *Touch: Sensuous Theory and Multisensory Media* (Minneapolis/London: University of Minnesota Press, 2002).
Mattis, Olivia, "Scriabin to Gershwin: Color Music from a Musical Perspective", *Visual Music: Synaesthesia in Art and Music Since 1900*, eds. Kerry Brougher, Jeremy Strick, Ari Wiseman, Judith Zilczer (New York/London: Thames & Hudson, 2005), 211-227.
Maur, Karin von, "Bach et l'art de la fugue: Modèle structurel musical pour la création d'un langage pictural abstrait", *Sons & lumières: Une histoire du son dans l'art du XXe siècle*, eds. Sophie Duplaix, Marcella Lista (Paris: Éditions du Centre Pompidou, 2004), 17-27.
Mayer, Benjamin E., "Eisenstein: The Sound of the Image, the Colour of Black and White", *Fotogenia* 1, 1994, 331-337.

Mazzanti, Nicola, "Raising the Colours (Restoring Kinemacolor)", *This Film Is Dangerous: A Celebration of Nitrate Film*, ed. Roger Smither (Brussels: FIAF, 2002), 123-125.
Méliès, Georges, "Cinematographic Views", *French Film Theory and Criticism: A History/Anthology, Volume I: 1907-1929*, ed. Richard Abel (Princeton: Princeton University Press, 1988), 35-47.
"'Mephisto': Next Week's Great Kinemacolor Production at the Scala Theatre", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, August 29, 1912.
Merijan, Ara H., "Middlebrow Modernism: Rudolf Arnheim at the Crossroads of Film Theory and the Psychology of Art", *The Visual Turn: Classical Film Theory and Art History*, ed. Angela Dalle Vacche (New Brunswick/London: Rutgers University Press, 2003), 154-192.
Merritt, Russell, "Recharching *Alexander Nevsky*: Tracking the Eisenstein-Prokofiev War Horse", *Film Quarterly*, 2, 1994-95, 34-47.
Mitry, Jean, *The Aesthetics and Psychology of Cinema* [1963] (Bloomington/Indianapolis: Indiana University Press, 1997).
Moritz, William, "Musique de la couleur – cinema intégral", *Poétique de la couleur: une histoire du cinéma expérimental*, ed. Nicole Brenez and Miles McKane (Paris: 1995), 9-13.
Moritz, William, *Optical Poetry: The Life and Work of Oskar Fischinger* (Bloomington/Indianapolis: Indiana University Press, 2004).
Münsterberg, Hugo, "Why We Go to the Movies" (1915), *Hugo Münsterberg on Film: The Photoplay: A Psychological Study and Other Writings*, ed. Allan Langdale (New York/London: Routledge, 2002), 171-182.
Münsterberg, Hugo, "The Photoplay: A Psychological Study" (1916), *Hugo Münsterberg on Film: The Photoplay: A Psychological Study and Other Writings*, ed. Allan Langdale (New York/London: Routledge, 2002), 45-162.
Nash, Paul, "The Colour Film", *Footnotes to the Film*, ed. Charles Davy (London: Lovat Dickson, 1937), 116-134.
Natural Color Kinematograph Co. advertisement, *The Kinematograph & Lantern Weekly*, November 11, 1909, 26.
Natural Color Kinematograph Co. advertisement, *The Kinematograph & Lantern Weekly*, December 9, 1909, 274.
"The Natural Color Quest" [editorial], *Moving Picture World*, August 14, 1909, 217-218.
Neale, Steve, *Cinema and Technology: Image, Sound, Colour* (London/Basingstoke: Macmillan Education Ltd., 1985).
Neupert, Richard, "Technicolor and Hollywood: Exercising Color Restraint", *Post Script*, 10:1, 1990, 21-29.
Neupert, Richard, "Painting a Plausible World: Disney's Color Prototypes", *Disney Discourse: Producing the Magic Kingdom*, ed. Eric Smoodin (New York/London: Routledge, 1994), 106-117.
The New York Times Film Reviews, Volume I/1913-1931 (New York: The New York Times & Arno Press, 1970).
The New York Times Film Reviews, Volume II/1932-1938 (New York: The New York Times & Arno Press, 1970).
"Norma Talmadge on Colors", *Motography*, January 27, 1917, 200.
Nowotny, Robert A., *The Way of All Flesh Tones: A History of Color Motion Picture Processes 1895-1929* (New York/London: Garland Publishing, Inc., 1983).

"Our Policy", Kinemacolor Supplement to *The Kinematograph & Lantern Weekly*, August 15, 1912.
"Our Policy – II", Kinemacolor Supplement to *The Kinematograph & Lantern Weekly*, August 22, 1912.
"Our Policy – III", Kinemacolor Supplement to *The Kinematograph & Lantern Weekly*, August 29, 1912.
Our Policy – IV", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, September 5, 1912.
"Palace Theatre", *Morning Post*, February 27, 1909.
Pastoureau, Michel, *Dictionnaire des couleurs de notre temps: Symbolique et société* (Paris: Éditions Bonneton, 1992).
Patalas, Enno, "On 'Wild' Film Restoration, Or Running a Minor Cinematheque", *Journal of Film Preservation*, 56, 1998, 28-38.
Pater, Walter, *The Renaissance: Studies in Art and Poetry* [1868] (Oxford University Press, 1998).
Pathé Frères London advertisement, *The Kinematograph & Lantern Weekly*, October 28, 1909, 1229.
Peacock, Kenneth, "Instruments to Perform Color-Music: Two Centuries of Technological Experimentation", *Leonardo*, 21:4, 1988, 397-406.
Peirce, Charles Sanders, *Peirce on Signs: Writings on Semiotics by Charles Sanders Peirce*, ed. James Hoopes (University of North Carolina Press, 1991).
Peirce, Charles Sanders, "What Is a Sign?" (1894), *The Essential Peirce: Selected Philosophical Writings, Vol. 2 (1893-1913)* (Bloomington: Indiana University Press, 1998), 4-10.
Peterson, Jennifer Lynn, "Travelogues and Early Nonfiction Film: Education in the School of Dreams", *American Cinema's Transitional Era: Audiences, Institutions, Practices*, eds. Charlie Keil, Shelley Stamp (Berkeley/Los Angeles/London: University of California Press, 2004), 191-213.
Physioc, Lewis W., "Color Photography and Some of Its Faults", *Cinema News*, July 1, 1917, 1.
Pierantoni, Ruggero, "One Colour for All Seaons: Knowledge, Measures and Myths at the Beginning of Cinema", *Tutti i colori del mondo: Il colore nei mass media tra 1900 e 1930 / All the Colours of the World: Colours in Early Mass Media, 1900-1930* (Reggio Emilia: Edizioni Diabasis, 1998), 95-103.
Pitkin, Walter B.; Marston, William, *The Art of Sound Pictures* (New York/London: D. Appleton and Company, 1930).
Pol, Gerwin van der; Dibbets, Karel, "The Logic of Colour in 'L'Inhumaine'", *Il colore nel cinema muto*, eds. Monica Dall'Asta, Guglielmo Pescatore, Leonardo Quaresima (Bologna: Mano Edizioni, 1996), 155-163.
"A Popular Explanation of the Kinemacolor Process", extract from "How Kinemacolor Is Produced", *Dundee Evening Telegraph*, 1912, Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, October 10, 1912.
Price, Brian, "Color, the Formless, and Cinematic Eros", *Color, the Film Reader*, eds. Angela Dalle Vacche, Brian Price (New York/London: Routledge, 2006), 76-87.
Price, Brian, "General Introduction", *Color, the Film Reader*, eds. Angela Dalle Vacche, Brian Price (New York/London: Routledge, 2006), 1-9.
Pudovkin, Vselevod, *Film Technique and Film Acting* (London: Vision Press, 1954).
Raimondi, Ezio; Bertolucci, Giuseppe, "When the World Stopped Being Black and White", *Tutti i colori del mondo: Il colore nei mass media tra 1900 e 1930 / All the Colours of the World: Colours in Early Mass Media, 1900-1930* (Reggio Emilia: Edizioni Diabasis, 1998), 91.

Ramsaye, Terry, "The Romantic History of the Motion Picture: The Hitherto Untold Story of Colored Motion Pictures" (Chapter XX), *Photoplay*, November 1923, 64-65, 127.
Ramsaye, Terry, *A Million and One Nights: A History of the Motion Picture Through 1925* (New York: Simon and Schuster, 1926).
Rand, Paul, *A Designer's Art* (Yale University Press, 2000).
Rappaport, Erika D., "'A New Era of Shopping': The Promotion of Women's Pleasure in London's West End, 1909-1914, *Cinema and the Invention of Modern Life*, eds. Leo Charney, Vanessa R. Schwartz (Berkeley/Los Angeles/London: University of California Press, 1995), 130-155.
Read, Paul; Meyer, Mark-Paul, *Restoration of Motion Picture Film* (Oxford: Butterworth-Heinemann, 2000).
Riley II, Charles A., *Color Codes: Modern Theories of Color in Philosophy, Painting and Architecture, Literature, Music, and Psychology* (Hanover: University Press of New England, 1995).
Rimington, Alexander Wallace, "A New Art: Colour Music" (1895), *Living Pictures: The Journal of the Popular and Projected Image Before 1914*, 2:2, 2003, 69-76.
Rimington, Alexander Wallace, *Colour-Music: The Art of Mobile Colour* (London: Hutchinson & Co., 1912, repr. Elibron Classics, 2004).
"'The Rivals' (Kinemacolor)" [review], *Moving Picture World*, September 27, 1913, 1373.
Roberts, J.Q., "How the Colors of Nature Are Reproduced in Moving Pictures", *Popular Mechanics*, June 1912.
Rony, Fatimah Tobing, *The Third Eye: Race, Cinema, and Ethnographic Spectacle* (Durham/London: Duke University Press, 1996).
Roque, Georges, "'Ce grand monde des vibrations qui est à la base de l'univers'", *Aux origins de l'abstraction, 1800-1914*, eds. Serge Lemoine, Pascal Rousseau (Paris: Éditions de la Réunion des musées nationaux, 2003), 51-67.
Rosen, Philip E., "Believes Color Will Not Aid Dramatic Cinematography", *American Cinematographer*, 3:10, 1923, 4.
Russett, Robert; Starr, Cecile (eds.), *Experimental Animation: An Illustrated Anthology* (New York/London: Van Nostrand Reinhold Company, 1976).
Ryan, Roderick T., *A History of Motion Picture Color Technology* (London/New York: The Focal Press, 1977).
Sadoul, Georges, *Histoire générale du cinéma, II: Les pionniers du cinéma (De Méliès a Pathé), 1897-1909* (Paris: Les Éditions Denoël, 1947).
Salmi, Hannu, "Color, Spectacle and History in Epic Film", *Fotogenia*, 1, 1994, 297-301.
"The Scala Theatre", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, September 26, 1912.
Schefer, Jean-Louis, "Matière du sujet", *La couleur en cinéma*, ed. Jacques Aumont (Milan/Paris: Edizioni Gabriele Mazzotta/Cinémathèque française, 1995), 13-19.
Schobert, Walther, "The German Film Avant-Garde of the 1920's: A Short Survey of Its Three Periods", *Der deutsche Avant-Garde Film der 20er Jahre / The German Avant-Garde Film of the 1920's*, eds. Annika Leitner, Uwe Nischke (Munich: Goethe-Institut, 1989), 10-21.
Seitz, John, "Introduction", *Cinematographic Annual 1930, Volume One*, ed. Hal Hall (Hollywood: The American Society of Cinematographers, Inc. / The Hartwell Publishing Corporation, 1930, repr. New York: Arno Press Inc., 1972), 13-19.

Sewell, C.S., "*The Toll of the Sea*" [review], *Moving Picture World*, December 9, 1922, 573-574.
Smith, George Albert, "Animated Photographs in Natural Colors: A Paper Read Before the Society of Arts, London, December 9, 1908" [repr. from *Journal of the Royal Society of Arts*, Vol. LVII, No. 2925, December 11, 1908, 70-75], *Moving Picture World*, January 2, 1909, 6-9.
Strick, Jeremy, "Visual Music", *Visual Music: Synaesthesia in Art and Music Since 1900*, eds. Kerry Brougher, Jeremy Strick, Ari Wiseman, Judith Zilczer (New York/London: Thames & Hudson, 2005), 15-20.
"A Study of Comparative Values", Kinemacolor supplement to *The Kinematograph & Lantern Weekly*, October 3, 1912.
Survage, Léopold, "Colored Rhythm"(1914), *French Film Theory and Criticism: A History/Anthology, Volume I: 1907-1929*, ed. Richard Abel (Princeton: Princeton University Press, 1988), 90-92.
Survage, Léopold, "Color, Movement, Rhythm"(1914), *Experimental Animation: An Illustrated Anthology*, eds. Robert Russett, Cecile Starr (New York/London: Van Nostrand Reinhold Company, 1976), 36.
Szaloky, Melinda, "Sounding Images in Silent Film: Visual Acoustics in Murnau's *Sunrise*", *Cinema Journal*, 41:2, 2002, 109-131.
Talbot, Frederick A., *Moving Pictures: How They Are Made and Worked* (Philadelphia/London: J.B. Lippincott Company/William Heinemann, 1912; repr. New York: Arno Press/The New York Times, 1970).
Taylor, Richard, "Introduction – Eisenstein: On Socialism, Soviet Cinema and Reel Life", *Selected Works, Volume I: Writings 1922-34*, ed., trans., Richard Taylor (London/Bloomington/Indianapolis: BFI Publishing/Indiana University Press, 1988), 1-24.
Telotte, J.P., "Minor Hazards: Disney and the Color Adventure" (2004), *Color, the Film Reader*, eds. Angela Dalle Vacche, Brian Prices (New York/London: Routledge, 2006), 30-39.
Thomas, D.B., *The First Colour Motion Pictures* (London: Her Majesty's Stationery Office, 1969).
Thomasson, Martin, "Här, nu eller 'här', 'nu'", *Aura: Filmvetenskaplig tidskrift*, 3:3-4, 1997, 21-39.
Thompson, Kristin, *Breaking the Glass Armor: Neoformalist Film Analysis* (Princeton: Princeton University Press, 1988).
"Toning and Tinting as an Adjunct to the Picture", *Moving Picture World*, March 18, 1911, 574.
Tynianov, Yuri, "Des fondements du cinéma", *Cahiers du cinéma,* 220-221,1970, 59-68.
Underhill, Harriette, "On the Screen", *New York Herald Tribune*, July 7, 1924.
"Unfair Advertising", *Moving Picture World*, November 27, 1909, 756.
Urban, Charles, "Terse History of Natural Colour Kinematography" (1921), *Living Pictures*, 2:2, 2003, 59-68.
"Urban to Introduce Color Photography on This Side", *Variety*, June 24, 1909, 13.
Uricchio, William, "Color and Dramatic Articulation in 'The Lonedale Operator'", *Fotogenia*, 1, 1994, 268-272.
Variety's Film Reviews 1907-1920, Vol. 1 (New York: R.R. Bowker, 1983).
Variety's Film Reviews 1926-1929, Vol. 3 (New York/London: Garland Publishing, 1983).
Variety's Film Reviews 1930-1933, Vol. 4 (New York/London: Garland Publishing, 1983).

Watts, Stephen, "Editor's Note" [to Natalie M. Kalmus, "Colour", 116-127 (adapted from "Colour Consciousness", 1935)], *Behind the Screen: How Films Are Made*, ed. Stephen Watts (London: Arthur Barker Ltd., 1938), 114-115.
"What? Color in the Movies Again?", *Fortune* 10, October 1934, 92-97, 161-171.
Wilfred, Thomas, "Light and the Artist" (1947), *Thomas Wilfred's Clavilux*, ed. Michael Betancourt (Borgo Press, 2006), 9-21.
Winston, Brian, *Technologies of Seeing: Photography, Cinematography and Television* (London: BFI Publishing, 1996).
Wittgenstein, Ludwig, *Bemerkungen über die Farbe/Remarks on Colour* (Oxford: Basil Blackwell, 1977).
Zilczer, Judith, "Music for the Eyes: Abstract Painting and Light Art", *Visual Music: Synaesthesia in Art and Music Since 1900*, eds. Kerry Brougher, Jeremy Strick, Ari Wiseman, Judith Zilczer (New York/London: Thames & Hudson, 2005), 25-82.

Film Titles

(In chronological order)

Waves and Spray (George Albert Smith, 1897)
Le voyage à travers l'impossible (Georges Méliès, Star Film, 1904)
Farmyard Friends (Natural Color Kinematograph Co., 1908)
A Visit to the Seaside (Natural Color Kinematograph Co., 1908)
Choosing the Wallpaper (Natural Color Kinematograph Co., 1909)
Floral Friends (Natural Color Kinematograph Co., 1909)
Kinemacolor Puzzle (Natural Color Kinematograph Co., 1909)
Natural Colour Portraiture (Natural Color Kinematograph Co., 1909)
Waves and Spray (Natural Color Kinematograph Co., 1909)
Barnyard Pets (Natural Color Kinematograph Co., 1910)
By Order of Napoleon (Theo Bouwmeester, Natural Color Kinematograph Co., 1910)
Chasse à la giraffe dans l'Ouganda (Pathé Frères, 1910)
The Chef's Preparation (Natural Color Kinematograph Co., 1910)
Choice Bouquets (Natural Color Kinematograph Co., 1910)
From Bud to Blossom (Natural Color Kinematograph Co., 1910)
Liqueurs and Cigars (Natural Color Kinematograph Co., 1910)
Our Gem of a Cook (Natural Color Kinematograph Co., 1910)
Le peintre néo-impressioniste (Émile Cohl, Gaumont, 1910)
Refreshments (Natural Color Kinematograph Co., 1910)
A Run with the Exmoor Staghounds (Natural Color Kinematograph Co., 1910)
Scenes in Cornwall (Natural Color Kinematograph Co., 1910)
Beads of the World (Natural Color Kinematograph Co., 1911)
Cæsar's Prisoners (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
A Devoted Friend (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
Esther: A Biblical Episode (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
The Fall of Babylon (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
The Freshwater Aquarium (Natural Color Kinematograph Co., 1911)
Galileo (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)

Gems and Jewels (Natural Color Kinematograph Co., 1911)
Gerald's Butterfly (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
The King of Indigo (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
The Lonedale Operator (D.W. Griffith, Biograph Co., 1911)
Œdipus Rex (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
The Passions of an Egyptian Princess (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
Samson and Delilah (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
Telemachus (Theo Bouwmeester, Natural Color Kinematograph Co., 1911)
Varieties of Sweet Peas (Natural Color Kinematograph Co., 1911)
Fleurs: Bouquets dans des vases (Gaumont, 1912)
Mephisto (Alfred de Manby, F. Martin Thornton, Natural Color Kinematograph Co., 1912)
New York Autumn Fashions, 1912 (Natural Color Kinematograph Co., 1912)
Venise, Reine de l'Adriatique (Gaumont, 1912)
With Our King and Queen Through India (Natural Color Kinematograph Co., 1912)
Butterflies (Natural Color Kinematograph Co., 1913)
Call of the Blood (Natural Color Kinematograph Co., 1913)
In the Days of Robin Hood (F. Martin Thornton, Natural Color Kinematograph Co., 1913)
Kinemacolor Fashion Gazette [cinemagazine] (Natural Color Kinematograph Co., 1913)
La mode de Paris (Gaumont, 1913)
Paris Fashions (Natural Color Kinematograph Co., 1913)
With the Fighting Forces of Europe [compilation] (Charles Urban Trading Co., 1914)
The Birth of a Nation (D.W. Griffith, 1915)
Britain Prepared [compilation] (Urban/Joy/Kineto/Gaumont; Charles Urban Trading Co., 1915)
Une fabrique de chapeaux de papier au Japon (Pathé Frères, 1916)
The Devil-Stone (Cecil B. DeMille, Famous Players-Lasky Corp., 1917)
Joan the Woman (Cecil B. DeMille, Paramount Pictures, 1917)
The Woman God Forgot (Cecil B. DeMille, Artcraft Pictures Corp., 1917)
Costumes de bains de mer et costumes de bain de soleil (Pathé Revue, 1920)
Fantaisies parisiennes (Pathé Revue, 1920)
Pour le soir (Pathé Revue, 1920)
The Four Horsemen of the Apocalypse (Rex Ingram, Metro Pictures Corp., 1921)
Lichtspiel Opus I (Walther Ruttmann, 1919-21)
Rythmus 21 (Hans Richter, 1921)
The Toll of the Sea (Chester M. Franklin, Technicolor Motion Picture Corp., 1922)
The Ten Commandments (Cecil B. DeMille, Famous Players-Lasky Corp., 1923)
Chapeaux et coiffures (Pathé Revue, 1924)
Élegants ensembles d'après-midi (Pathé Revue, 1924)
Fantaisies féminines (Pathé Revue, 1924)
Symphonie diagonale (Viking Eggeling, 1924)
Wanderer of the Wasteland (Irwin Willat, Famous Players-Lasky Corp., 1924)
Ben-Hur: A Tale of the Christ (Fred Niblo, MGM, 1925)
Bronenosets Potyomkin (Sergei M. Eisenstein, 1925)
Rythmus 25 (Hans Richter, 1925)
En Italie: Les costumes de Sarrentino (Pathé Revue, 1926)
La moisson de Bosnie (Pathé Revue, 1926)
The Jazz Singer (Alan Crosland, The Vitaphone Corp [Warner Bros.], 1927)

Steamboat Willie (Walt Disney Productions, 1928)
Broadway (Paul Fejos, Universal Pictures, 1929)
The Broadway Melody (Harry Beaumont, Loew's [MGM], 1929)
The Dance of Life (John Cromwell, A. Edward Sullivan, Paramount Famous-Lasky Corp., 1929)
Footlights and Fools (William A. Seiter, First National Pictures, 1929)
General'naya liniya (Sergei M. Eisenstein, Grigori Alexandrov, 1929)
Glorifying the American Girl (John W. Harkrider, Millard Webb, Paramount Pictures, 1929)
Gold Diggers of Broadway (Roy Del Ruth, Warner Bros., 1929)
The Hollywood Revue of 1929 (Charles Reisner, MGM, 1929)
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Rio Rita (Luther Reed, RKO, 1929)
The Show of Shows (John G. Adolfi, Warner Bros., 1929)
The Skeleton Dance (Walt Disney Productions, 1929)
Chasing Rainbows (Charles Reisner, MGM, 1930)
Dixiana (Luther Reed, RKO, 1930)
Hell's Angels (Howard Hughes, Caddo/United Artists, 1930)
No, No, Nanette (Clarence G. Badger, First National Pictures, 1930)
Paramount on Parade (Dorothy Arzner, Otto Brower, Edmund Goulding, Victor Heerman, Edwin H. Knopf, Rowland V. Lee, Ernst Lubitsch, Lothar Mendes, Victor Schertzinger, A. Edward Sutherland, Frank Tuttle, Paramount Pictures, 1930)
R.5 (Oskar Fischinger, 1930)
The Vagabond King (Ludwig Berger, Paramount Pictures, 1930)
Flowers and Trees (Burt Gillett, Walt Disney Pictures, 1931)
Doctor X (Michael Curtiz, First National Pictures, 1932)
Mystery of the Wax Museum (Michael Curtiz, Warner Bros., 1933)
La Cucaracha (Lloyd Corrigan, Pioneer Pictures Corp., 1934)
Becky Sharp (Rouben Mamoulian, Pioneer Pictures Corp., 1935)
A Colour Box (Len Lye, GPO Film Unit, 1935)
Rainbow Dance (Len Lye, GPO Film Unit, 1936)
The Trail of the Lonesome Pine (Henry Hathaway, Paramount Pictures, 1936)
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The Wizard of Oz (Victor Fleming, Loew's [MGM], 1939)
The Blue Bird (Walter Lang, Twentieth Century-Fox Film Corporation, 1940)
Fantasia (James Algar, Samuel Armstrong, Ford Beebe, Norman Ferguson, Jim Handley, T. Hee, Wilfred Jackson, Hamilton Luske, Bill Roberts, Paul Satterfield, Walt Disney Pictures, 1940)
The Maltese Falcon (John Huston, Warner Bros., 1941)

Bambi (David Hand, Walt Disney Productions, 1942)
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Stockholm Cinema Studies
Published by Stockholm University
Editor: Astrid Söderbergh Widding

1. *Karl Hansson*. Det figurala och den rörliga bilden – Om estetik, materialitet och medieteknologi hos Jean Epstein, Bill Viola och *Artintact* (The Figural and the Moving Image – On Aesthetics, Materiality and Media Technology in the Work of Jean Epstein, Bill Viola and *Artintact*). Stockholm 2006. 214 pp.
2. *Eirik Frisvold Hanssen*. Early Discourses on Colour and Cinema: Origins, Functions, Meanings. Stockholm 2006. 208 pp.

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