

FACTORS INFLUENCING THE NEGLECT OF COLOR PHOTOGRAPHY

1860 to 1970

by

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1976

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SCIENCE IN VISUAL STUDIES

AT THE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

JUNE, 1982

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Submitted to the Department of Architecture on May 7, 1982  
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Abstract

While the history of photographic color technology has been adequately discussed by E.J. Wall, Joseph Friedman, and Brian Coe, the relationship between complex tri-color systems and generalized use of color photography has not been addressed in the Literature. This investigation is a preliminary study, in survey form, of the wide variety of social, economic, technological, and aesthetic factors affecting the protracted acceptance of color as a means of depiction. In separate analyses covering, 1) 19th century color innovation and interest, 2) Specific impediments related to the delay of color, 3) The selling of color during the 1930's and 40's, 4) The biases against color, 5) The precedents set by black and white rendering, and 6) The problems of resolving an accessible negative/positive color technology, we will describe the sequence of events which contributed to the eventual adoption of color materials and outline the conditions tied to this adoption.

A fundamental aspect of this research acknowledges that, while photography was invented in 1839, large scale acceptance and use of color did not occur until 1965 - a full 126 years after the inception of black and white materials. The complex of factors related to this neglect of color has not been the subject of scholarly analysis in the Literature; there is no firm legacy of serious color photography and this couples with the absence of historical inquiry into the aesthetic and social aspects of color's evolution. The important invention of photography has provided us with a predominantly black and white record of things and events since 1839; this thesis, then, is an inquiry into the evolution of a technology and the complex of issues related to the cultural lags attached to most technological innovations.

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## INTRODUCTION

### AN OVERVIEW OF THE PROBLEM

The exchange that follows between George Herscher and Jacques Henri Lartigue introduces, in miniature, the material covered in this overview:

*G.H.: The choice of whether to photograph in black-and white or color is an ancient and recurring subject among people who talk about photography, and I don't mind to remind you of the obsessions about it. Our friend Henri Cartier-Bresson, among others, is a diehard and insists that color belongs to the painters. What do you think?*

*J.H. Lartigue: I think that monochrome photography is a form of interpreting reality, but as nature is full of color, color photography should be the norm. The black-and-white process can give very beautiful results, just as there are admirable black-and-white drawings, but color is the truth.*

*G.H.: But then how do you explain the fact that many people consider color a kind of anomaly and want it to remain the exception?*

*J.H.L.: There is undoubtedly a tradition that favors black-and-white. Besides, in certain instances and it is true for movies and television - monochrome images can have more impact in comparison with color<sup>1</sup> images, which might appear wish-washy or toned down.*

The nature of this thesis requires that a broad cross section of groups and commercial photographic markets be analyzed simultaneously. Commercial photographers, amateurs, snapshooters, and creative photographers do have common links, and when one discusses color photography in relation to them, the distinctions get added blurring. Carl Ackerman's remark that "George Eastman invented the amateur"<sup>2</sup> is entirely accurate and

ever since 1888 this Kodak-based market has had a powerful influence on product trends, buying habits, and visual sensibilities for all of photography;<sup>3</sup> throughout this thesis the word "photography" will be frequently used in a synergistic context.

In the case of color photography, innovations, or the lack of them, developed for the amateurs market inevitably had a lasting impact on the other photographic markets: the development of a flexible roll film material for amateur use had a continued impact upon emerging professional markets; the development of Kodachrome (which was aimed at the mass market) soon advanced to the point where an identical product had to be released in cut-sheet form for professionals. SX70 instant materials were designed for the snapshotter market, however, the material soon gained wide acceptance among the community of serious and creative photographers.<sup>4</sup>

In addition to the pervasive influence of the amateur market in photography, especially with color, a second premise of this thesis will demonstrate that, contrary to Sally Stein's contention that color photography evolved at a perfectly normal rate,<sup>5</sup> in fact color photography experienced exceptional delays, biases, and interruptions which collectively had a serious and detrimental impact upon our visual history in photography and current practice in photography. As Fred Dustin (an instructor and color historian at the London College of Printing) states: "Because of the long, slow development of color technology we have had to borrow heavily from other disciplines for the language we use in color photography."<sup>6</sup>

As a student (and practitioner) of color photography, I soon discovered the absence of color in the written histories of photography to be a disturbing fact—it simply has not occupied a prominent place in photography. Indeed there isn't much of a legacy in color photography — even barring the assumed biases of those who have re-traced the history of photography. During my research at the George Eastman House, I discovered that out of a total holdings count (of roughly 2 million images), less than five percent of these photographs are color images — much of this five percent coming in after World War II.<sup>7</sup> Of course, one can't misinterpret the above statistics: a collection's holdings will always reflect various curators tastes and biases, however, this (five percent) figure does indicate, in rough terms, the amount of color imagery that has received some level of serious attention.<sup>8</sup>

While photography may be one of the most thoroughly documented art form/technologies,<sup>9</sup> the documentation and history of color photography is a different matter: Joseph Friedman's History of Color Photography, E.J. Wall's History of Three Color Photography, and Louis Sipley's A Half Century of Color are all lengthy treatise' on (mostly) failed color processes/systems and technologies. In sheer volume, these books attest to the length and difficulty of photography's greatest roadblock: a simple, direct-color material that was negative based. According to Lloyd Varden (a long time contributor to technical journals and magazines), "by 1925, 400 different photographic color processes had been described, any of which was capable of producing satisfactory results when handled properly."<sup>10</sup> While the introductions of Kodachrome in 1935

and Agfacolor Negative in 1939 marked the first revolution (using integral tripack technology) in color use, we must defer this discussion for now.

A pivot point for this entire thesis is quite simple: in 1869. Ducos du Hauron outlined most theoretical bases for subtractive color technology (as it is now in practice with his small book, La Photographie des Couleurs (and later, Les Couleurs en Photographie: Solution du Probleme); yet color photography did not gain large scale acceptance until nearly a century later. Of all technologies remotely related to photography, there are, by far, the most patents granted in the area of color processes and systems design,<sup>11</sup> yet why was there such a delay in the acceptance of color by amateur and professional markets?

While this thesis will demonstrate that the amateur market was (and is) a central element in any analysis of color's evolution, it should also be understood that, prior to Eastman's putting photography in the hands of the everyman, most of the color processes available could have adequately served the working portraitists and view takers employed in photography. McDonough in Chicago, Joly in Dublin, Ives in Philadelphia and even Lippman in Paris (whose 1891 interference color process is still considered by many historians to have rendered the most accurate color of any process yet devised; foremost in its flaws was the difficulty in viewing the plates-exposures were also long and tedious to make.), all had systems, albeit emphasizing screen ruling and transparency bases, that were basically workable. This brings us to a second pivot point: with the exception of processes devised at the turn of the century, all later

color coupler technologies used by professionals were aimed at and devised for the amateur market.<sup>12</sup> (Present-day professional color materials, excluding dye transfer, are all struck from amateur derived protected coupler designs). While this fact startles many consumers (who have assumed that qualitative differences have always separated color film and print materials), the predominance of amateur-material technologies began with the introduction of Kodachrome and Kodacolor. While even the Autochrome was aimed at the expanding hobbyist (amatuer) market, it was, of course used by some professionals; we must remember then, contrary to many sources, the autochrome process was essentially a commerical failure. Reese Jenkins points out that "Lumière's autochrome process, marketed in 1907, did not receive wide commercial success due to low [illuminant] sensitivity."<sup>13</sup> While the autochrome did stay on the market (in limited fashion) for nearly twenty years it actually failed for a variety of reasons, including frilling, or peripheral emulsion erosion), general user dissatisfaction with color quality and graininess, as well as the common screen-process drawbacks of poor (if not absent) print options and the basic difficulty of exhibiting glass positive plates.

In summarizing the importance of the amateur market it should be noted that an expanded, lucrative, and truly viable market was the needed fuel for serious and concerted color research within the larger photographic companies. Could it be that we would not have a real growth in color use until the amateur market developed an established profitability? While initially concerned with Lumière announcements (regarding color) in 1904, George Eastman put his color research team on a ten year hold when he learned that the autochrome failed commercially.<sup>14</sup>



Of course, the serious research that preceded Kodachrome did pay off, and, amazingly, Kodachrome, Agfacolor, and Kodacolor should be regarded as wholly new coupler-based technologies - they had virtually no help, with the exception of Fisher and Siegrist's disclosures of 1912, from the 400 different systems Varden had documented while at Columbia; Mannes and Godowsky, for example, were unaware of most 19th century color proposals and learned of coupler disclosures by a chance reading of color history. In any event, all markets were small in photographic manufacturing prior to the growth of amateur practice, hence the fragmented nature of color innovation before Kodachrome; its worth noting that while tri-color carbro coupled with one-shot camera served the professional product photographers, i.e., Bruehl-Bourges, Muray, Keppler, Outerbridge, et al, well-they did, without hesitation, switch to sheet Kodachrome when it was introduced in 1938 (Carbro was extremely tedious and exacting involving some 90 separate steps, all of which could be negated by a single prior error.)

While the reader will be periodically reminded of the inter-relatedness of the amateur market and the evolution of a standardized color technology, we should now move on to a notable misconception that has been promoted in much of the historical literature: in her Doctoral dissertation, Photographic Technology and Visual Communication in the 19th Century American Book, Estelle Jussim states (in the section "Codes for the Transmission of Color"): "The western world was thoroughly accustomed to these black-and-white illusions and had no difficulty accepting the lack of natural color in either the daguerreotypes or in

paper photography."<sup>15</sup> In fact, the western world (and the east, notably China, Japan, and India) had great difficulty accepting the absence of color. Clearly, Jussim has skipped over one of the more thoroughly documented aspects of color history: The most frequently quoted remark was that of Niépce to his brother Claude, "But I must succeed in fixing the colors." Of course Niépce and Daguerre worked for years, unsuccessfully at developing a method for recording color on their plates; in 1867 Niépce de St. Victor, Nicephore Niépce's cousin, did succeed in making a direct color photograph on a silver chloride plate, unfortunately, the colors faded quickly when the plates were brought into ambient room light. In any event, the following year saw the disclosures of Cros and du Hauron which were far more workable theories of three-color photography. Nonetheless the continued disappointment with the Daguerreotypes lack of color was deep seated and far reaching: Chesnau remarked in 1859: "The picture was inverted, the tones were harsh, the masses of vegetation appeared only as silhouette; one saw nothing of the population; in short, color and life, the two kernels of everything poetic, were lacking."<sup>16</sup> Nineteen years earlier, the Societe d'Encouragement pour l'Industrie Nationale initiated a competition to improve the Daguerreotype and listed color research as part of the competition.

Of course the hand-tinting of Daguerreotypes began almost simultaneously with their introduction - the absence of color was a serious problem for portraitists. While photography may have been the great democratizer - (in the context of painted, expensive portraits) the working class suddenly had access to affordable portraits - it nonetheless was an

intolerable fault that flesh and clothing could only be rendered in tones of gray. One of the great rushes<sup>17</sup> in photography occurred with the scramble to develop and patent methods of coloring the daguerreotype; in fact, many patents were issued in France, England, and America just covering different methods of applying color to photographic surfaces.<sup>18</sup> (Because of the slick daguerreotype surface, and the special problems it presented to colorists, a practical, stable method was not immediately invented.)<sup>19</sup>

Reverend Levi Hill's 1850 announcement of a color system has been mentioned frequently in the literature, however, it is worth noting that because of the public's incessant demand for color, his announcement caused serious damage to most photographer's business; the public simply postponed their sittings with the logic that soon their pictures would be available in "nature colors," hence rendering their black-and-white portraits undesirable and unrealistic.<sup>20</sup> This slump in business caused chaos among the national photographic community, and soon a campaign was initiated to discredit Hill which in turn eventually brought customers back to the studios. Although Hill eventually did publish a book which explained his process—which was incredibly complex and arcane — the incident was never forgotten and fueled at least 30 years of color technology distrust and skepticism.

Finally, it should be stated that this thesis was prompted by a frustrating situation: in attempting to uncover and investigate the complex of factors which caused the absence of a legacy in color photography, I will hopefully explain some of the enigmas related to the predominance

of black-and-white rendering. While Max Kozloff's article "The Coming of Age of Color" provoked much of my initial research, the pivotal sources Kozloff cites proved to be more provocative: In reading and viewing Iran Dmitri's book Kodachrome and How to Use It one finds in real form (as could be found in books on color by Elisofon, Keppler, and Condé Nast) evidence of the 'genetic' link between commerce and color - a ghost of color photography. In Dmitri's book color history is never mentioned and the plethora of tips and methods offered promote a level of Kitsch and commerciality which would immediately prompt the connection of color to bathing beauties, postcards and The National Geographic - none of which could be accused of making substantive contributions to serious color photography. Nonetheless, Dmitri's book is worthy of serious scrutiny because it was an excellent barometer of the status of color during an emerging commercial period; it was a paradigm for 1930's, 40's and 50's color sensibilities in photography.<sup>21</sup>

Tied to this link of color and advertising is a subject which will permeate much of this thesis, namely the precedent of black-and-white materials and rendering. Many of the biases and reactions to color, its implementation and selling, its usefulness - all were influenced by our being accustomed to seeing the world, by pictures, in black-and-white. It was the limitations of black and white which caused an orgy of color in American and European advertising in the 1930's and 40's; out of that grew the notion that if you were to render or sell 'it' in four-color, 'it' better be opulent, saturated, highly 'colorful' - in short, about color with a capital "c".<sup>22</sup>

What has been ignored in many of the histories of color is what I will discuss: the introductions, announcements, and various color descriptions that have filled the vast periodical literature of photography. While I have concentrated on Wilsons Photographic Magazine, Photo Era, The Philadelphia Photographer, American Photography, The British Journal of Photography and The Penrose Annual, for much of the 19th century material, it should be understood that these journals contain an untapped source for further examinations of color-many of these accounts have received no scholarly attention and yet they trace the evolution of color in a unique, piece-meal way.

## COLOR INVENTION AND THE TURN OF THE CENTURY:

### FALSE STARTS AND FAILED TECHNOLOGIES

As we analyze the years roughly between 1880 and 1920, one could conclude that color photography was experiencing its peak of research, invention, and general activity; yet if we hold an objective distance from the many pronouncements in the literature (which frequently ranged from hailing a 'final solution' to the problem of photographing in 'natural colors', to emphatic statements which concluded that the problem could never be solved), it is hard to see anything but a virtual standstill. This was a period of intensive color analysis and work, however, all would-be inventors failed to orient their research towards a simple and practicable system. Two exceptions to this - the Lumière's Autochrome and Fisher's coupler development - will be discussed in a latter section of this chapter.

The absence of a single negative - positive system capable of widespread use was the foremost stumbling block during this period. As the historian Johann Willsberger states: "Until Kodak and Agfa put the modern three layer color film on the market in 1935-36, hundreds of experiments were undertaken, all of which led to the same dead end: the material was not suitable for the ordinary cameras."

In the November, 1871 issue of The Philadelphia Photographer we read:

*People do have a decided weakness for color.  
It crops out often in a form annoying to the  
photographer, when he is asked if it would not  
be an improvement just to 'flush the cheeks a little'  
or to paint that bow, or guild the chain.*

Later in the same article W.J. Baker writes:

*with many it is yet considered an open question  
whether photographs ought to be colored at all.  
Is photography a fine art? If so, why are not  
its productions entitled to consideration in  
their pure form as those of the other arts are  
conceded to be: who would flush the cheeks  
of a marble statue...?*

In December of 1872 J.C. Ensminger (in the same journal) thought it "strange" that writers and critics were not alluding to the coloring of photographs as a "degenerating, demoralizing, untruthful practice." Critics did find, according to the writer, negative retouching to be all those things and more.

In April of 1876 Professor E. Stebbing in first announcing that

*photographic news is rather dull at this time,  
[states that] Mons Leon Vidal has created great  
consternation with his "photochromic proofs":  
Some are of the opinion that the natural colors  
seen in the camera could now be fixed; others of  
a contrary opinion. This created such a war of  
words the other day, that in many other countries  
it would have degenerated into blows".<sup>1</sup>*

In November of 1887, George Rockwood tells us pointedly (explaining that the problem of photographing in color is not yet solved): "So far as the art of photography as now practiced, is concerned, I have no expectation that the development of color will be obtained direct from nature".<sup>2</sup>

In Wilson's of July 5, 1870, we're told that "Photographing in permanent colors is the achievement of an obscure Transylvanian artist named Franz Varess, of Klausenberg". Later on the writer notes: "It is now presumed that Herr Varess is the man to bring the final solution of the problem of permanent colors within reach..."(While many German color workers were pivotal to modern color materials, I have never found in the literature another mention of Mr. Varess; the above announcement does suggest the nature of color expectations during this time.)

In the October 4, 1890 Wilson's we're told:

*In all probability photography in natural colors as the phrase is commonly understood, will never be more than a beautiful dream, but the depicting of objects in their natural colors by means of photography has for some years been perfectly possible as a scientific experiment and has quite recently been made commercially practical.*

Mr. Snowden Ward goes on to summarize the work of Seebeck, Becquerel, Collen, du Hauron, and Ives; at the end of his article Snowden notes:

*In fact it is hardly extravagant to expect that in ten or fifteen years, photography in natural colors may be almost as simple and quite as near perfection, as photography in monochrome is today*

(This dream, of course, did not come true until 60 years later when a color negative positive system, was made available for the home darkroom.)

In 1891 and 1892 frequent mentions were made in Wilson's concerning Professor Lippman's elegant interference color process which was demonstrated at the Sorbonne; the process was often explained and cited as a breakthrough for color. In the January 2, 1892 issue of Wilson's an article



headline shouts: "Color Photography a Fact", however, we read nowhere of Lippman, but of Frederick Ives recent demonstration at the Franklin Institute, which showed color prints on paper and his Kromskop projector. Later in the March 5th issue a process analagous to Poitevin's is mentioned: Dr. Raphael Kopp has arrived at yet another color print method; Kopp was never mentioned again in the literature.

In the May 21st, 1892 issue we find further mentions of a process du Hauron intends to market and a letter from him concerning Ives. du Huron wished to inform Wilson's readers that the recent disclosures of Ives were based closely on the findings of both Cros and du Hauron; therefore the readers should not believe that Ives has accomplished anything that du Hauron did not already reveal.

This roller coaster of color continued into the 1920's with a similar level of anticipation as well as a marked avoidance of color products - many hobbyists and experimenters would occasionally try a given process only to find the overbearing complexity ridiculous in comparison to black-and-white. In the august 6th 1892 issue of Wilson's an anonymously written article entitled "Professor Lippman's Color Photographs" acknowledges the excitement the magazine first generated by describing Lippman's process, at the end, however, we're told, "so far, therefore as evidence is afforded by the examples I have described, it is apparent that the problem of direct photography in natural colors is not solved".

In a November 5th, 1892 Wilson's article Frderick Ives describes recent refinements in his Heliochromoscope, claiming that it is so simplified it can be "placed in the hands of the 'press-the-button' class of amateur photographers..." At this point Ives had arrived at a tri-color exposure attachment for conventional cameras making single exposures; his tri-color projector was also available at this point. At the end of his article Ives stated:

*I claim for this system of color photography that it is perfectly rational and scientific, and a true solution of the problem of re-producing the natural colors in a photographic picture".*

Indeed it was rational and in fact helped the progress of one-shot cameras and imbibition printing. Unfortunately, none of Ives important, albeit impeccably crafted and expensive, devices and processes ever met with even minor commercial success, including a 1920 color print system which was almost identical to Kodak's 1940 Dye Transfer process; Ives had earlier solved the problem of matrix relief production from separation negatives as well as quick transfer dyes for paper supports;<sup>3</sup> sadly, he died before this imbibition process could be marketed by his partner, H. Conroy.

In any event, by late 1892 Wilson's was regularly trumpeting exhibitions of color photographs including those frequently put on by R.D. Gray of New York City. Gray was, of course, using projected 3-color 'sandwiches' or transparencies, as were most processes of the time; in an 1894 review of Gray's color photographs of mountains, trees, and lakes the reviewer states: "all were rendered with that perfect coloring and gradation of light and tones which no hand could produce." (This remark alludes to the many systems which were sold as color processors, but were in fact complex, mechanical methods of applying color.)

In addition to promoting the work of McDonough and Joly, Wilson's was an early booster of the Lumière brother's research and in July of 1895 described "the brilliant colors [of their process] as a success", though the autochrome was quite refined by this year, it took a full 12 years to resolve manufacturing problems related to plate coating and mass production.

In September of 1896 the magazine again proclaimed "the papers are full of rumors to the effect that the great problem of photographing in colors has been accomplished." The article goes on to describe the opening of a production facility in Virginia for the McDonough screen process - the screened plates were analogous to the autochrome and the Joly process as well as many other line/pattern direct systems. This particular venture never got off the ground.

In the July, 1897 issue of Camera Notes Walter Woodbury states:

*great excitement has been caused in this city by the introduction by a firm of dealers in photographic supplies of several samples of MM. Chassagne and Dansac's process of photography in natural colors.*

This process was essentially fraudulent because it was indirect and involved applying red, green, and blue colors to a normal print after sensitizing separate areas; it was also quite dangerous and explosive due to certain required compounds. In a latter issue of Camera Notes Alfred Stieglitz wrote of the materials:

*the process is nothing more than a somewhat novel and simplified method of coloring prints by hand..., it is remarkable how gullible some scientists have been, not to mention the general public and press.<sup>4</sup>*

In July of 1900 Camera Notes did their duty in recognizing the latest efforts of Ives by citing further refinements with the Kromskop while (apparently feeling obliged to) attest to the credibility of his tri-color method of exposure and printing vs. the various screen processes.

Between 1900 and 1907 the journals collectively promoted the additive processes noting refinements in ruling methods with Joly's screen plates and Powrie/Warner's screen system (which was more expensive) - also noting the continuing problems of product repeatability in mass-production.

In the 1908, Volume 2 of American Photography, Tudor Cundall reviews "advances in Color Photography" complaining that

*pictures on glass...are difficult to exhibit in a satisfactory manner; whilst in the case of paper prints, those of us who have carried out the more strictly photographic processes can speak volumes about the tediousness and uncertainty of the method.*

As mentioned earlier, these problems remained for a number of decades. While Mr. Cundall later mistakenly cites the Lippman plate as the "only direct process" extant in 1908, R. Child Bailey more accurately touts color photography in his book The Complete Photographer. Citing the "wonderfully ingenious" autochrome plates, he states that "the process finally opened up the world to the possibilities inherent in a transparency system."

The Autochrome was a turning point of sorts - if the plates never did achieve any solid commercial success (for an extended period of time)- the process did, at least, receive the most attention to date from the popular press and trade journals.<sup>5</sup> The Lumière's plate was not unlike the many color systems that were vying for the small markets that existed before 1907 - most were glass-plate projectable transparencies - and this fact alone was the major source of commercial failure; it is true that the various screen processes were exceptionally slow, but much can be explained (about their failure) by the absence of workable distribution networks and sound promotion.

Though Kodachrome was (28 years later) everything the Autochrome should have been, the Lumière's process did at least usher in the first decade of the 20th century for color technology- a time span which saw no other advance in color-print systems, with the exceptions of growing use of tri-color (primitive) one-shot cameras and imbibition printing.

Though most observers and manufacturers knew of the Autochrome as early as 1904 (or before), it was not until 1907 that the company was ready to release the plates and processing chemicals. In the August, 1907 issue of American Photography, Frank Fraprie glowingly greets the new plates, apparently prompted by the amount of international promotion the Lumière's encouraged; in fact he states:

*All this sounds like the excited accounts of color photography so often published in the sensational newspapers in the past decade, which have been the laughing stock of scientists...*

Later, in order to give credence to his own enthusiasm, the writer cites R. Child Bayley of London and Edward Steichen (living in Paris) among others: "all of these men speak of it from personal experience in terms of unbounded enthusiasm."

In the October , 1907 issue of Camera Work, Stieglitz could barely contain his excitement:

*Color photography is an accomplished fact the seemingly everlasting question whether color would ever be within reach of the photographer has been definitely answered.*

Stieglitz later admits that:

*I paid much good coin before I came to the conclusion that color, so far as practical purposes were concerned, would ever remain the 'perpetual motion' of photography.*

Finally, in a rather pompous tone he explains:

*as they [painters, art critics, doubting thomases]  
listen interestedly about what the process can do,  
you feel their cynical smile. Then showing them the  
transparencies, one and all faces look positively  
paralyzed, stunned.*

Certainly Stieglitz and his colleagues - Coburn, Steichen, Annan, and de Meyer - did much initially to promote the autochrome and photographing in color. Autochrome exhibits were reviewed in Camera Work<sup>6</sup> (though these reviews still pointed to the difficulty of exhibiting positives and the unfortunate technical and commercial failures of the Lumière's print system for autochromes) and Charles Holme, taken by the secessionists' new passion for the autochrome, published his lavish volume, Color Photography and Other Recent Developments of the Art of the Camera. Released in 1908, the book is exceptional with fine four-color reproductions of the autochromes of Frank Eugene, Heinrich Kuhn, Rawlins, Annan, Coburn, and de Meyer, among others. The book, however, is primarily filled with black and white reproductions which include Stieglitz, Demachy, and D.O. Hill as well as many others associated with Camera Work and Stieglitz; Weston Naef has mistakenly referred to this rare, limited edition book as the "first fully illustrated volume in color"<sup>7</sup> - it has yet to be determined which publication was the first to use nothing but color plates - nonetheless, it may be the first book which actively supported color photography. Dixon Scott's essay on color (in Holme's book) is filled with adjectives not unlike the following remarks from the November, 1911 Photo-Era:

*The invention of color photography by the Lumière's still marks the most important event in the history of photography since the advent of the Daguerreotype. A completely successful autochrome will always be a source of wonder and delight to the cultivated mind.*

It has been mentioned earlier that most sources agree the autochrome never gained true financial success - the Lumière's were likely to have made genuine profits from their motion picture materials - however, we will never know anything conclusive about the much debated success of their color plate: the brothers burned most of their corporate files and documents in 1905.<sup>8</sup>

The autochrome was, however, a rallying point for all color supporters and it did stay (barely) on the market until 1930, when it was re-introduced on a flexible support. By this time, however, it was a dead product due to a number of basic faults - all this in spite of a great deal of public attention: Photograms of the Year regularly reproduced autochromes by well known photographers throughout the duration of the material; nonetheless this free promotion did little to extend the popularity of the process.

Donato Pietro Dangelo's recent article 'Steiglitz and Autochrome: Beginnings of a Color Aesthetic' does little to support the premise that color photography has solid roots extending from Steiglitz and his colleagues. While trying to support the notion that color work in the first decade of the 20th century was a legitimate progenitor of serious attention to color, the writer concedes that in fact color (among most serious autochrome practitioners) was born and deceased within 3 years.<sup>9</sup>



While we know that the autochrome was poorly marketed and fraught with practical problems, the controversy surrounding the importance of the material continues: while it was similar to screened transparency systems by Joly, McDonough, Warner Powrie, Omnicolore, Paget, and Dufay, the Lumière's own processing method was considerably simplified and they were most successful, comparatively, in mass - producing the plates. A likely explanation of the autochrome failure is produced by examination of the many competing plates that followed it in 1907 - simply too much competition for a relatively small market which did not expand according to predictions. An interesting aside to the autochrome controversy is the recent disclosure by Jacqueline Millet that her great grandfather, Louis-Amadee Mante, may be the actual inventor of the autochrome: While it is well documented that the Lumière's were working on (and showing results from) their color process in the 1890's, Mante's transparencies, found by Millet, can be traced and dated-by subjects in the images (relevant to Mante) to the 1890's also.

The recent revelation and publication of the tri-color transparencies of Prokudin-Gorskii may be a more appropriate way of ending this discussion of the countless failures in color technology and the fevered pitch for color photography at the turn of the century. For example, Gorskii used a tri-color camera (which made three simultaneous exposures on filtered black-and-white negatives) which was the basis for much of color technology until just before the second world war. His photographs are significant for a number of reasons: they are unusual in that they are substantive and informative of much of pre-revolutionary Russia; his images were not

decorative and they employ almost none of the 'color for color's sake' sensibilities which will be described in latter sections. The straightforward appearance of his photographs may be the most important achievement of this unknown photographer. It is, however, Gorskii's crowning achievement to have produced such a large body of color images in spite of the repeated failures of (then) current color technologies that have thus far been discussed. Gorskii had to contend with a bulky camera which was far from fool-proof-registration of the three exposures was critical- and the photographer was mostly limited (due to the time required for 3 exposures) to immobile subjects; many of his portraits unfortunately, contain distracting movement or (simply) color out of register. Nonetheless, these photographs are startling because we are accustomed to the last 140-year period of black-and-white rendering. Contrary to the common subconscious reaction, our history was in color. For many individuals it is hard to imagine the color of things from the past - let alone the color of pre-revolutionary Russia.\*

As we move into the 1930's and 40's, discussed in the next section, it is important to remember a few facts and reflect on the nature of color invention and technology: Ives was probably the first to successfully demonstrate, on some level of practicability, three-color paper printing (in 1888 at the Franklin Institute). This method was analogous to tri-color carbro. In 1911 he was one of the first workers to introduce commercially a tri-pack camera and projector - instruments Gorskii patterned his own projector after. Similar in importance, because of

\* See Photographs for the Tsar Ed. by Robert H. Allshouse

quality and stability, was the Pinatype process. While nearly useless to current monopack technology, the process, patented by L. Didier in 1903, did help signal the modern use of dye-transfer, the only existing contribution left from the period under discussion.

While much innovation at this time indicated some exchange and relay of information, for the most part sound color inventions were most frequently arrived at in near-vacuums; the inventors commonly unaware of parallel and over-lapping research conducted elsewhere.

In 1912 the most pivotal development in color technology occurred: Dr. Rudolph Fisher's discovery of basic coupler development. With this in mind, I'll conclude with the following: Leopold Mannes and Leopold Godowsky were two trained musicians. Edwin Land came upon the idea of instant photographs by way of his daughter's demand to see pictures he had taken of her one afternoon on the spot! What has thus far been catalogued in this chapter was virtually useless to the discoveries necessary for Kodachrome, Agfa Color, and instant color materials.

Color innovation took a disjointed tack in the 1930's and 40's thanks to musicians and a young daughter; George Kubler's 'rule series' may or may not apply to technological innovation. Similarly, when Arthur Koestler states (in The Act of Creation): "the history of Art could be written in terms of the artist's struggle against the deadening cumulative effect of saturation," one wonders if this can't also be true of technical innovation. While Mannes and Godowsky maintained serious performing careers they were at play with their experiments in color photography - they didn't care about what had been accomplished before them. We also

know that much of scientific discovery grew from 'play'. In writing of the theory of probability LaPlace wrote: "It is remarkable that a science which began with considerations of play has risen to the most important objects of human knowledge." Koestler, himself, considered play to be a primary "leitmotif" in the history of science.

With the possible exception of Ives, most 19th Century color workers were looking to 'cash in' on what they saw as the real frontier of photography - full color. This obsession with invention proved to be a continued stumbling block; it seems a good portion of 'disinterest' or distance may often help the equation.

THE DELAY OF COLOR:  
A CHRONOLOGY OF CONTRIBUTING FACTORS

With the last chapter I attempted to present in miniature, an exemplary model of color technology as it had been unfolding while also describing attitudes (as underscored in popular journals) related to the use of color in photography. In this section I will attempt to specify precisely the various reasons which contributed to the delay of 1) an adequate negative/positive system and 2) widespread use of color materials in amateur and professional markets.

The reader should be warned that more questions than answers may appear in this section due to the highly secretive nature of corporate structures; In contacting employees at Kodak and Polaroid, for example, many questions (I asked) concerning the effect of instability on past products, color marketing, and corporate decisions concerning certain color products, were simply not answered, no comment. In any event, a large amount of information relevant to the delay of color is readily available in the literature - some of this will now be presented.

In a brief article summarizing the status of photographic technology in the 1917 Annual of American Photography, John Lewishon states:  
[referring to the continued popularity of hand coloring]

*These colored positive prints prove in my judgement, that the end of real color photography must be based on a reversed negative, but not as now with artificial color material, but with only the actual silver salt; or on a positive picture printed from a positive*

*colored transparency; or finally, if sensitive enough, on a positive directly produced in the camera from the original colored object.*

Indeed, the negative-based color technology was the answer but it did not arrive in stable form until the 1950's.<sup>1</sup>

In discussing the various delays in color technology and practice it is important to consider the following:

We can correctly characterize the expanding color technology, discussed earlier, as a time and sequence of reasonable, albeit slow, progress. The major innovators in color systems that have been discussed were without benefactors or corporate support; they were, rather, classic 'tinkerers', driven by the potential commercial profits of a new 'miracle' color system. Indeed, as Ives, Joly, McDonough, Warner/Powrie, and the Lumière's arrived at their final processes, these same individuals became the marketers of their materials and processes. History has shown that color experimenters do not make good businessmen, and even if these individuals had possessed any marketing prowess, a lucrative market had not yet formed for color photography.

While color postcards at the turn of the century were the most common form of mass-market color- and one of the first active selling ploys for color imagery - they were clearly inexact, struck frequently from hand-colored originals and reproduced poorly with little regard for accurate registration and believable color densities. And, while one can find conflicting evidence concerning the growth of four-color lithography, and its competition with color block printing and engraving, most sources consulted (in the photographic literature) suggest that

fine color printing was available as of 1908. If one could swallow the exorbitant costs of this printing, relatively accurate reproductions could be had: The Penrose Annual regularly touted various examples of fine color work from the first two decades of this century.

With color printing, however, came a 'Pandora's Box' of technical problems that have persisted up to the present: the major problem continues to be the expense of color reproduction. Though Camera Work was unique, bearing no similarity to mass-market magazines (which began to emerge between 1910 and 1920) of teens and 20's, it nevertheless had exemplary difficulties bringing color to its readership. In the January, 1908 issue, Stieglitz presents an apology for the delay in releasing what was to be an all color issue; citing problems with color blocks, Bruckman Printers of Munich found numerous problems in reaching any similarities between original autochromes and the printed reproductions.<sup>2</sup> In the following issue there appeared but three color reproductions printed by 'four-color half tone'. The issues of color printing and color lag will be discussed more thoroughly in latter sections.

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#### The Beginnings of Corporate Color Research

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As mentioned earlier, most 19th century color workers were their own financial backers; when we begin to consider the delays which beset color in the 20th century, the corporate structure becomes a significant factor. Prior to Eastman's introduction of the 'Kodak' in 1888 and the 'invention' of the snapshotter, the vast majority of photographers were serious practitioners earning a wage through portraiture or view-taking.

Certainly Eastman's innovations were based on his own lamentable experiences with bulky, cumbersome, and time consuming equipment; this plight turned into an obsession with simplification of photography - though Eastman was neither a chemist nor scientist, his interest in making photography accessible became the profit motive for the Kodak company. Certainly, the focus of simplification affected the company's growing research in color. While Eastman eventually set up a research lab at Kodak Park with Dr. Kenneth Mees (a British color experimenter) as its director, the priorities of the research facility were neither color nor process simplification, but rather pure research into the fundamentals of the silver halide crystal and general photographic/chemical principles. Of course, the autochrome taught many color workers that simplification of process was the key; they also knew, as Mees did, that the more complicated and strung out processes were often responsible for the most outstanding results. Carbro, Pinatype, and other precursors of the wash - off relief process were all examples of these results.

Unfortunately, color advances made by Eastman's company were directly related to his shifting attitudes about color: it has already been mentioned that he felt threatened by the impending introduction of the autochrome as early as 1904. In that same year Eastman acted and involved Joseph Clarke in the search for a color process. Clarke, in turn, invited J.H. Powrie, who had the Warner/Powrie screen plate, to work on improving the process at Kodak labs in Rochester. Powrie, under pressure, failed to demonstrate the commercial feasibility of the process.



Later, during the spring of 1910, a color research lab was set up at Kodak, but there is little evidence that much occurred there<sup>3</sup> -the Powrie failure may have had some bearing on this inactivity. After all, profits were enormous for the company at this time and once the autochrome proved to be a mild failure, the pressure to develop a color system had dissipated with Eastman. It was not until 1914 that Kodak introduced its first color material.

In 1911 Eastman remarked:

*These two processes of Lumière and du Hauron are the furthest advances up to the present date.*<sup>4</sup>

(Eastman was referring to the autochrome and a screen-layered process which du Hauron had unsuccessfully introduced in the late 1890's)<sup>5</sup>.

These processes did re-kindle Eastman's personal interest in color toward the latter years of his life, however it was not until 1935 that the company introduced a significant color product. What makes this lag more curious is the single known discovery of coupler development by Fisher and Siegrist and the delayed use of it by (later Kodak employees) Mannes and Godowsky. In his introduction to the History of Color Photography Friedman makes a startling remark:

*It is somewhat ironic to recall that monopacks and color development were fully disclosed by 1913. And yet while Mr. Wall [author of the History of Three Color Photography] was able to summarize the work done in this line up to 1925 in a few scattered paragraphs, it has since assumed such importance that these paragraphs are expanded to six chapters [in my volume].*

Clearly one of the greatest delays in color was the insufficient attention and subsequent refinement that should have been given to Fisher and Siegrist's discovery. With Eastman/Kodak being the single largest photographic manufacturer by 1910, one can safely classify the company's color research as cautious between 1904 and 1925; most of their "research" and color experimentation involved bringing in outside, formed processes or simply buying the rights to finished systems for possible marketing. (This was true with Beer's medically oriented color process and the Berthon Lenticular color material.)

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#### The Importance of Coupler Technology

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Fisher's basic discovery was first formulated by Homolka: Fisher found that when a developer reacts with silver bromide and forms silver, its oxidation product, as it is formed, reacts with other chemical substances in the solution and forms colored compounds; that is, dyes. Of course, all current technologies of color materials, with the exception of dye-transfer and silver dye - bleach, are based on the above principles. Kodachrome, Ektachrome, and the various negative/positive color systems are all dependent on the incorporated coupler as developed by Fisher and Siegrist. (Mannes and Godowsky simplified some of the problems of coupler processing during the processing of Kodachrome). This leads us to the two (and only) major improvements in coupler technology since 1913: 1) Kodak's innovation, that Agfa repeated, of designing non-wandering couplers - an innovation that was the key breakthrough for all coupler based systems - and one which prevented

Fisher and Siegrist from introducing a color process in 1913. (Non-wandering couplers became chemically anchored to their respective layers which prevented image and color degradation due to the mixing of colors.) 2) W.T. Hanson's discovery of using colored couplers - which greatly improved the color quality and accuracy of the formed image.

One factor which must have delayed the introduction of a workable color process was the first World War - most color research at this time was going on in Germany, and as Fisher and Siegrist's discovery was largely ignored, so was the invention of the silver-dye bleach process of Dr. Bela Gaspar. 'Gasparcolor' was a fully resolved process that was quite marketable by the late 1920's;<sup>6</sup> explanations of why it never gained widespread popularity are less nebulous. Gaspar attempted, like many 19th century inventors, to market the process himself (including a tandem motion picture material), and met with the now predictable disappointment; his process was transparency based (prints could only be made from positives), and widespread distribution of the print material required more capital than he could secure. Nonetheless, the importance of Gaspar's print material cannot be over-emphasized: In using dye-forming leuco-esters instead of incorporated couplers, Gaspar succeeded in designing a paper print system which met his goal of matching color to the simplicity of black-and-white. Had this process interested a large company during the early years of his 100 German patents, it may have succeeded on a limited scale. (It is ironic that the

silver-dye bleach process continues to be the most stable color technology; as companies refined their various couplers, adding precision to their functions, the coupler materials gained no significant color stability.)

While the period from Fisher and Gaspar's research (around 1913) to the introduction of Kodachrome (in 1935) should have been marked by the expanding use of color, it was instead marked by a conspicuous absence of color success. Those who increased the use of color (in publications) were the commercial product/fashion photographers who were slowly adopting the use of one-shot cameras and carbonyl techniques; this expanding use of color will be discussed in latter sections.

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#### The Impact of Kodachrome

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While Kodachrome, its invention, introduction, and history have been well documented in the literature, there remains a number of scattered responses that are appropriate to this discussion of the delays in color use: while the broken sequence of two world wars and the Depression did little to promote photographic innovation relevant to the average consumer, these events did have an effect on the use of color and the demands for it in a military and social context. 1) The aggressive use of color in advertising during the depression was simultaneously used as a (fundamentally) new sales device and a social flag to signal things upbeat in life. Life was opulent in color and from this period on, non-essential products were being sold effectively by the use of color. 2) While photography was not an important part of the first world war,

it did have a significant place in military strategy by the 1940's; color materials were of great interest to reconnaissance photographers and Kodak's Aero-Kodacolor was designed for exposure and processing in the field. (Color did not play the expected role in World War II, however; aerial photograph interpreters had not yet resolved the problems in interpreting color aerial work - they simply couldn't use color.)

With both of these examples Kodachrome was of no consequence, although in sheet form it was accepted by most commercial photographers in the early 1940's; this material did supplant the one-shot camera; however, carbro printing continued to be important in commercial work until the late 1940's.<sup>7</sup>

It seems beyond debate that Kodachrome was a revolutionary product for the photographic industry: the film was singularly responsible for the phenomenal growth in sales of 35mm cameras. While the film required no special lenses, filters, or attachments it did require these cameras - most people owned simple box cameras at this time. Additionally, it was both a plus and a minus to have manufacturer supplied processing; most consumers were pleased with this arrangement-hobbyists and professionals were not. (And for the first 3 years the film was, after processing, delivered unmounted-slide mounts were a small breakthrough for all transparencies at this time.)

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#### The Invention of Kodachrome

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Mannes and Godowsky arrived at the Kodachrome process almost by chance given their preoccupation with outmoded toning methods and two-color systems: when the team had finally been granted one of their

first patents, attention soon focussed on their work (by other peers) and drew mention in E.J. Wall's history volume. Neither man knew of Wall's book but both did eventually find it and read (with great interest) the section devoted to Fisher's disclosures of 1913; both men learned of Homolka's color dye development research and the fact that Fisher's work was not even that new: Alfred Watkins had worked with partial success in this area in 1896 and C. Russel had made valuable contributions with his work on reversal processing in 1862. Nonetheless, this brief history lesson was the key breakthrough for Kodachrome and coupler materials in general; while almost parallel results were being accomplished at Agfa in Germany, Kodak won out by a few months.

Two years before the introduction of Kodachrome, Dr. K. Jacobsohn, writing in the British Journal of Photography offered some rather sobering remarks:

*when the development of color photography during the past few years is calmly surveyed, the thoughts which are aroused give little satisfaction. We observe the immense amount of work which has been done and we note the very great number of patents which have been taken out. Yet out of it all nothing fundamentally new has come.<sup>8</sup>*

This prompts the renewed question: Was Kodachrome fundamentally new? Possibly not. If the film had been Kodacolor or Ektachrome or Agfa Color we would say yes - if it had been any incorporated coupler material, in fact, the answer would be obvious. Certainly a roll film material with a monopack technology was completely new, yet the film was still transparency based, using an effective ASA speed of 10; one would also guess that the added expense of a projector would delimit the film's use - this was

not the case. However, the print systems later introduced - Minicolor and Kotavachrome - did not succeed because of expense and complex processing identical to the 14 step film process.<sup>9</sup> Because of this complex processing (which involved 27 separate steps during the years of controlled diffusion). users have never been able to process their own slides; additionally the film had virtually no exposure latitude. In spite of all these drawbacks Kodachrome greatly boosted the use of color in many new, expanding, markets; Friedman asserted that the film put great pressure on the entire industry to come up with "cheap, simple, and available color films and prints for (all) consumers."

In spite of this apparent success, Kodachrome was nearly dropped from the research roster at least two different times; during the depression years pressure had increased for Mees, Mannes, and Godowsky to come up with something. The pair had been in Rochester for five years and the company executives were concerned with turning their research into a marketable product; because of this pressure, there was a two-color movie material released in 1933, but it was only a stop-gap material. Nervousness over the expense and seeming frivolity of these musician's research continued within Kodak until the introduction of 16mm Kodachrome in 1935; apparently hesitant and uncommitted to the material, the company packaged the film, along with 35mm roll film, in black-and-white boxes and employed ads using only monochrome images.

As Walter Clark stated in a recent interview at the Eastman House, "No one knew, including Kodak, what the public reaction to color was going to be."<sup>10</sup> Because of the fledgling economy and in spite of the continued demand and interest the public had in color, Kodak simply didn't have a clue as to whether Kodachrome would sell or not. (This is borne out by the fact that both Mannes and Godowsky received extremely excessive royalty/contracts which paid over a million dollars per year to each man at different points in time.)<sup>11</sup> The company did know that the film should receive aggressive promotion - a large advertising campaign was soon begun. (Though Clark was a research chemist with the company, he recalled that Kodak did begin market surveys regarding the popularity of color vs. black-and-white; evidence of these surveys or similar work done by J. Walter Thompson has yet to be confirmed.)<sup>12</sup>

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#### Further Delaying Factors

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In summarizing the various factors which held back large scale color use, we can cite the following: 1) The continued and prohibitive costs of color materials (Kodachrome was decidedly more expensive than black-and-white). 2) The industry's inability to standardize color materials- at this time no companies were making films that were process-compatible with other materials. 3) The inability of industry to successfully resolve a negative/positive system which would produce good quality, stable prints. (The connection the amateur market held with simple box cameras continued; this market could only adopt color if it came in the form of a negative



film with wide exposure latitude.) 4) Complex processing, largely controlled by the manufacturers, kept these procedures out of the 'home darkroom' well into the late 1960's. 5) The continuing plethora of slide films over negative, print-based materials.

One of the key factors which influenced the cost of color films and papers was machine time used in coating them. Up until the Kodak innovation of multiple coating, materials were coated one layer at a time in a very time consuming, expensive process. T.E. Russell re-designed existing coating equipment which allowed multiple coatings to be carried out with one pass of the machine; previous systems often required eight separate passes.<sup>13</sup>

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#### Azo-Chrome and the Cost of Color

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While Russels' innovation may have helped cut costs of color manufacturing, the acceleration of coating methods did not help the fate of Kodak's only silver dye bleach material, Azo-Chrome. While set to introduce the (highly stable) print material in 1941, Clark explained that, due to difficulties in manufacturing - namely the extreme sensitivity to fluctuations in coating thickness, Kodak later decided to hold back the print material for a later release; the company seemed eager to drop a material that was expensive to produce, and which provided low yields in production. While the company would have soon been able to release a tandem printing paper that was negative printing, it nonetheless saw the potential market for Azo-Chrome as limited. Finally, the increased

demand for war related film materials coupled with the fact that Kodak was forced to buy patent rights for certain aspects of the process from Gaspar (which was an undesirable position for the company, according to Clark) - all combined to stop the introduction of Azo-Chrome.

World War II was a mixed blessing for color: while there is evidence that chemicals required for Kodachrome processing were rare or scarce during the mid 40's, there is also evidence which suggests that because of the naturally limited demand by consumers for the film during the war, there was never a problem or shortage of Kodachrome; chemical scarcity and a shrinking market simply canceled each other out. The war did, however, delay Kodak's introduction of their version of Agfa's incorporated coupler film and print material. This material, called Aero-Kodacolor during the war, could be processed as a negative or transparency; two years after the war the technology became two products: Ektachrome and Ektacolor.

Unfortunately, what Tom Maloney says of color in the 1941 U.S. Camera Annual remained true long after World War II:

*The one thing holding color back is color costs. You can get a print made from your Kodachrome but it costs too much and of course you can get color plates made for reproduction, but they are almost worth their weight in precious metal instead of the copper that becomes the printing surface...*

*Today it's only the magazines with millions of circulation that can give their readers regular color work. Exceptions are Fortune and U.S. Camera, but the price of one is \$1.00 per copy, the other fifty cents. The future always looks hopeful. But 1940, on the surface at least, advanced slowly in color.*

And, while Brian Coe (a british color historian) calls "color snapshot photography essentially a post war development", he fails to cite the extended lag that occurred with it- 1964 was the year that signalled strong color use in the snapshot market. It seems color would take forever for those boosters (like Maloney and Victor Keppler) eager to see it succeed; we may have been entirely too accustomed to the utter cheapness of black-and-white - in comparison all other means seemed expensive and difficult.

In the 1949 U.S. Camera Annual Jacob Lofman States:

*The amateur photographer can use color with such ease and with such pleasing results that cost is the only factor that keeps color from assuming the dominance black-and-white film has today But the reproduction of color in books and magazines is such a different story. Costs have reached the realm of fantasy. You would naturally expect photographic magazines to be leaders in the use of color reproduction... Yet the plate cost alone for a 16 page color form is close to sixteen thousand dollars. Color cannot be the universal medium of printed expression it should be until newer processes, prices, and times take it out of the luxury class it inhabits today.*

Lofman's remarks could also describe the status of color reproduction in the 60's, 70's and 80's.

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#### Summary

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In assessing the many assorted factors related to the delay of color discussed thus far, a few ideas bear added scrutiny: In D.A. Spencer's book Color Photography in Practice, a similar listing to Lloyd Varden's

documentation of 400 color systems is presented. This time the list shows 136 color processes/materials devised since Fishers' coupler patents of 1914. The vast majority (95%) of these processes no longer exist! The question then arises, 'How protracted was the use of color?' If we are to use the amateur market as a rough barometer indicating the public's demand for color, then our date of color monopolization would be, as mentioned, 1964. In that year, however, color sales in film, prints and/or photo finishing exceeded black-and-white by only four percent - Color held a 52% share, black-and-white 48% of total sales. (According to Carlos Clarens, a color film historian, the same change-over occurred in movies in 1965, with 51% of all commercial movies being shot in color; home movies had switched to color nearly 25 years earlier). The above figures were provided by Lydia Wolfman, now head of The Wolfman Report; in a recent interview<sup>14</sup> Ms. Wolfman pulled these figures from the category, "Still Pictures Taken Yearly by Amateurs" which continues to be a vital statistic in current Wolfman Reports.

In looking at 1960 figures from the category "Pictures Taken Yearly per Household," we find that out of a total of 43 pictures, 17 were color and 26 in black-and-white, the changeover was slow in coming. If one studies past issues of the Wolfman Report, which began in 1951, one glaring fact repeats itself: Photography, in general, has always used the film negative and paper print as its foundation. If there can ever be a definitive answer to the question of delay in color use it would have to

include the industry's snails-pace in developing a workable negative/postive color print material; the failure of Kodacolor and Agfa Color Negative in the 40's and early 50's is indicated by the color change-over date.

One hundred and two years elapsed between the first photograph and the introduction of the first commercial color motion picture stock; Ninety Eight years elapsed between the introduction of the Daguerreotype and the marketing of Kodachrome.<sup>15</sup> A simple, cheap, and accessible color film and print material may prove to be one of the great impasses of modern chemical engineering and technology; we have wanted this since 1839 and yet the problems continue. With the exception of instant color materials, no color process is yet as simple as black-and-white. Furthermore, no color process is as stable as black-and-white.

It was probably coincidence that amateurs avoided color almost as long as serious photographers, but questions must continue to be raised: Sally Stein wonders if there is any kind of cultural lag for a given invention. Certainly there is and this will be addressed in the next section. Nevertheless, color must have appeared suspect to the uninitiated pedestrian in the 1940's and 50's; black-and-white pictures were reliable and consistent-the materials had served the populace well for many decades. It seems clear that amateurs, on the other hand, were vaguely aware of the many problems related to color: articles regularly appeared in the 40's and 50's which offered advice on preventing yellowing color<sup>16</sup> prints - coupler printout couldn't be

stopped without refrigeration - and the fading of Kodachrome.<sup>17</sup> Color materials during these two decades exhibited bizarre color shifts and were often capable of unreal, incorrect color rendering<sup>18</sup>; in most cases looking at your neighbors color snapshots would reveal one or two of these problems. While there is no firm evidence of this, it seems clear that the average snapshooter has always observed that color prints fade - we have come to tolerate this fact based on our experience with color from the 1950's.<sup>19</sup>

COLOR ADVERTISING AND THE SELLING OF  
COLOR AS A MEANS OF DEPICTION

With this section I hope to provide an insight into a twenty year period ranging roughly from 1930 to 1950; the decades of the 30's and 40's saw an unrestrained leap towards all things colorful and bright. Color photography was the chief means to put color in everyones living room.<sup>1</sup> Though Leicester Hemmingway was talking about the colorful art deco buildings of Depression-era Miami Beach, these remarks explain much of color photography during this period:

*During the Depression, people needed to let go...  
they became wild on Miami Beach...they didn't watch  
their nickels. You would think nothing of ordering  
something you couldn't pay for because you'd figure,  
maybe they'll carry me or maybe I'll wash dishes.<sup>2</sup>*

It should be pointed out that because color photography has no firm legacy<sup>3</sup>, the commercial work of these two decades has become, almost by default, our history of color practice. The photographers most frequently discussed in this view, i.e., Outerbridge, Keppler, Muray, Bruehl-Bourges, and Steichen, generally held no pretensions about their work in color: it was simply meant to sell goods. Though Louis Sipley was the first to champion their work - solely on the basis of stunning technical/commercial rendering - contemporary writers and historians, in keeping with the academic tendency to create historical lineages and connections (in this case, to glorify and scrutinize camp and/or Kitsch), have told us that this work has had an effect on current color practice and is, in fact, pivotal to discussions of color photography. This

may be true; unfortunately this work may be worth discussing only because of the debilitating effect it had on the serious use of photography in reportage and creative photography.

There are two important points here: 1) Color photography became synonymous with commerce and selling products. 2) Putting color in advertising revolutionized this industry and created a powerful hegemony in both the competitive corporate structure and advertising practice; The larger companies who could afford color immediately held an edge over smaller competitors who could not - those who had more color had more power and greater margins of profit - advertisers agreed that color simply made things look better, newer, and more saleable.<sup>4</sup> Though these assertions may seem to be common knowledge, the extensive evidence that documents them will greatly illuminate the entire changeover to color in photography and advertising.

What effects did the mating of color photography and advertising have on photography in general? We now know that this select group of influential cameramen and women had little effect on bringing new technology to color image systems. Conversely, the sudden increase of four color advertising in mass-market magazines had an immediate impact upon the printing trades: Various scanners were developed for plate-making and separation production; refinements in ink making and paper production were implemented, and with these advances related to four color work presses were improving with added speed and impression accuracy and registration. The only factor that did not improve was the cost of color reproduction - as technology improved



costs seemed to escalate, making the gulf between color advertisers and would-be users still greater.

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#### Profits, Color vs. Black and White, and Conde Nast

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With this expense, magazines and their clients wanted their money's worth: D.A. Spencer states:

*The advertiser who is paying at least three times as much as usual to fill his expensive white space [with color] in a magazine or on a hoarding, usually wants it filled as clamorously as possible.<sup>5</sup>*

Hence, they not only wanted 'lots of color' but they wanted it loud and grabby. Two publications, More Business (a printers trade journal) and Color Sells (a Condé Nast color manual), functioned as beacons for color use in the 1930's and 40's. In one of the earliest issues of More Business we're told:

*[Beacuse of color] printed advertising must be re-designed and revised to match new and improved products and keep pace with them. It's a far cry from the old woodcut showing a calculating machine floating in space to the realistic colorful picture of the machine in actual everyday use in its natural surroundings. Which do you think tells the more interesting and appealing Story?*

*Direct natural color photography is now available practically everywhere and the complete reproduction of a subject in its natural colors printed on paper in any quality desired can be achieved in much less time and at a lower cost than heretofore. The added charm and conviction of color makes this form of photography perhaps the most flexible and powerful aid to printed salesmanship. Color's power to*

*attract, instruct, and dramatize is without limit. In the illustration below attention is focussed on the child and dog. Human interest and heart appeal are aroused to stop the reader and give him time to see and consider the blankets offered for sale. Color makes the scene realistic and the reader thinks of comfort and protection.<sup>6</sup>*

More Business sold color and told its readers that color would create new markets, attract attention, and display the merchandise better. The editors resorted to quoting polls which monitored whether audiences preferred movies in color or black-and-white; color was always preferred in every poll quoted. Skeptics were told that

*The significance of color photography is its ability to reproduce mechanically light and shadow effects in color which cannot be represented with the same exactness and true quality by the manual worker.<sup>7</sup>*

Certainly, the American Photo-Engravers Association had a vested interest in publishing More Business; having wide distribution and frequent, Kodak - supplied plates, the magazine pushed and shoved color into all forms of printed material. Bolstered by these campaigns, Roy Sheldon (in the February, 1938 issue of Advertising and Selling) wrote:

*Specific cases in which half a campaign was run in color and the other half without color are analyzed [regularly] to prove the tremendous effectiveness of color over black-and-white... Color is on the up and up in current advertising. Magazines are again approaching their peak of \$85,000,000.00 for advertisements in color. Newspapers alone printed 55,000,000 lines in color last year, adding 40% to 1935 totals and 60% to the 1934 mark. Half the nations's 2000 newspapers now offer some form of color insertions and 500 accept color for run of the paper.*

More Business regularly touted color photography as the key to commercial success; in the February 1939 issue we're told:

*Color in advertising - salesmanship in print - has numerous uses and performs various functions. Its first use is always to attract attention and arouse interest, for without attention and interest, there can be no results; but color also presents the merchandise as it actually appears, thus virtually displaying merchandise for inspection and examination.*

If we were to believe the editors of this journal, color could improve any sales figures:

*Recently in presenting womens fashions, full color pages produced sales of almost \$250,000.00 as compared with 80,000.00 for black-and-white. Flower illustrations in full color used by a seed company out pulled black and white by 9 to 1. A public utility proved that two colors employed in one of their regular mailing pieces was 60% more effective than one color.<sup>8</sup>*

Indeed one or two colors (run as flats over black and white photographs) were "infinitely" better than no color at all:

*Advertisers who have experimented with the use of the second color cheerfully testify to its selling power. Examples show the ability of the second color to lift the product from the background. Two color ads depart from the ordinary; they are attractive and attention compelling on that account and they use a second color in either the object or its background to focus attention on telling and selling points. After all, the more you tell the more you are apt to sell. And it's sales you are after.<sup>9</sup>*

In assaulting the soon to fade method of overloading an ad with text, More Business presented this logic:

*Printed text consisting of nothing but type quickly tires the eyes and becomes monotonous in appearance, demanding unusual concentration and determination to pursue it to the end...*

*when the second color is added along with "ornamental" pictures , attention is stepped up tremendously and all out of proportion to its cost...The second color can also be successfully employed to emphasize the product advertised, thus 'spot-lighting' it in a most effective manner just as the star on the stage is brought into prominence.<sup>10</sup>*

In Condé Nast's Color Sells we are shown an incredible barrage of photographs and text tastefully designed to illustrate the following 'facts'

1. Color creates glamour.
2. Color portrays jewels to justify costs.
3. Color shows design and texture.
4. Color displays the product and the package
5. Color makes white exciting.
6. Color is arresting.
7. Color is a dream supreme.
8. Color whets the appetite
9. Color is a challenge.
10. Color sings and dances.
11. Color opens the pocketbook.
12. Color is glamour set to music.
13. Color dresses the smart kitchen.
14. Color captures the hostess.
15. Hollywood surrenders to color.
16. Color sets a modern pallette
17. Color sets a 3-dimensional stage.
18. Color gives life to puppets.
19. Color exalts the lowly pan
20. Color photography sells goods.
21. Color sells an educational idea.
22. Color makes type believable.
23. Color says volumes at a single glance.
24. Color gives food for ideas.
25. Color makes life romantic.
26. Color convinces.
27. Color is unforgettable.

For Condé Nast, its prestigious photographers, and its many advertisers (which included Chrysler, Coke, Arrow, Cannon Towels, Dupont, General Mills, General Motors, Proctor and Gamble, R.J. Reynolds, Seagram Distillers, Kelloggs, and Lever Brothers), all of the above bizarre claims probably worked (one would guess that black and white was blatant bondage for a young advertising sales person working for Condé Nast). In a two year period, ranging from 1932 to 1934, the team of Anton Bruehl and Ferdinand Bourges turned out 479 color photographs for advertisers primarily with Condé Nast and photographed them all with a one-shot camera, producing carbro prints from negatives; the ads appeared primarily in Vogue, Vanity Fair and House and Garden.

Clearly, the very color sold in Condé Nast Magazine ads was viewed by the parent company to be just the tonic for a Depression ravaged populace. The team of Bruehl-Bourges made color exotic in their photographs and carried their sensibilities later to portraits of Hollywood stars; their color, in ads and portraits, was overly saturated and unbelievable; if nothing else, one could be impressed by their constant precision of layout and lighting as well as the use of opulent backdrops and settings/atmospheres. Unfortunately, their work probably helped to further distance the 'haves' from the 'have-nots'. It may be an open question as to the effect this work had on keeping color photography low in profits; one would be awed with the difficulty and complexity of photographing in colors; almost every article appearing on color at this time had to explain the technical virtuosity of color carbro printing and color lighting as practiced by these masters.<sup>11</sup>

In any event commercial color was sold to advertisers in large part by one-shot cameras, carbro printing, and the sheer newness of color imagery; the cost did not sell color. Producing one tri-color carbro print, without separation work, cost approximately \$400.00 during the Depression<sup>12</sup> and a National Photocolor or Devin one-shot camera would cost nearly \$2000.00.<sup>13</sup> (Towards the end of the 1930's these cameras decreased in cost due to the rising popularity of dye-coupler films.)

While Condé Nast publications have received a great deal of attention for what can ostensibly be called (comparatively) high quality advertising, many other magazines embraced color much earlier than the Condé Nast stable and promoted with a similarly fluctuating level of garishness clashing color; European picture magazines and American pulp 'fanzines' all experimented with color during this time. This collective flirting with color only helped to heighten the trend of attracting more prestigious advertisers and larger revenues - this large increase in color advertising did little to equalize the status of color, in fact marginal accounts were steadily losing the option of color.

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#### Color and the General Interest Magazines

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The National Geographic, beginning in 1909, was possibly the most prominent patron of color photography; indeed, the magazine has the distinction of reproducing at least one example of every major 20th century color process.<sup>14</sup> Their first color reproduction was a hand colored image which was later,

in 1914, followed by the first autochrome; the following twenty years saw an accelerated use of autochromes mixed with primarily hand-colored images.

After a physical survey of past issues of the National Geographic, the following thumbnail sketch indicates, in rough terms, the growth of their color use:

<u>Time Period</u>	<u>Color reproductions</u>	<u>Black and White</u>
1910 to 1925	5% (3 color)	95%
1926 to 1937	25%	75%
1937 to 1940	40%	60%
1940 to 1946	50%	50%
1946 to 1950	65%	35%
1950 to 1959	70% to 85% color	20% (avg.)
1959 to present	95%	5%

Physical surveys of other popular magazines indicate very different trends: In Time magazine during the 1930's one would find virtually no color covers, occasional two-color ads, and rare (one per issue) four color ads, usually being illustrations, not photographs.

In the 1940's Time ran occasional (one per month) color 'illustration' covers, frequent 2 color ads in every issue, and 2 or 3 four-color photographic ads every issue. By the 1950's four-color covers were suddenly used with nearly every other issue and four color ads were found to number between 4 and 5 with every issue; editorial (text based) color was still non-existent.

With Newsweek we find nearly identical trends in color adaptation with two exceptions: In the 1930's the magazine ran more frequent four-color ads on the back cover, usually every other week. With the 1950's they ran regular four-color ads (for car companies), usually averaging between 2 and 3 every issue. Like Time, Newsweek ran virtually no editorial color until the mid-1960's.

Both Colliers and The Saturday Evening Post were early users of color, yet only in advertising; Collier's printed its first three-color ad in December of 1900, using British-made plates, and increased its color use regularly until the magazine's demise in the 1950's. The Saturday Evening Post used its first color images (in both advertising and text) in 1899, including a three-color cover. While the years between 1905 and 1930's saw erratic color use, the 1930's marked significant trends: the Post ran occasional (one or two per issue) four-color ads but no editorial color. In the 1940's they ran frequent two-color ads, occasional four-color ads, and still no editorial color. With the 1950's, 35% of their ads were in color and 10% of their editorial images were color.

With Life Magazine color grew at a rate parallel to their increase in circulation tallies. While Luce publishing was essentially conservative with their use of color, they were perceptive enough to recognize the kinship of color photography and advertising, and the potential profits from America's discovery of color. When Life began publishing in 1936 the magazine ran virtually no color covers nor editorial color; there were, however, regular color ads averaging between 3 and 6 every issue.



From 1940 to 1945 one could find one or two color covers per year; though 50% of its advertising was in color only 40% of this was photographic color; additionally, there was still no editorial use of color. From 1945 to 1950 there were at least 12 color covers run per year; however, editorial color, though used for the first time, was sporadic - usually one or two images per issue; 60% of the advertising was four-color during these years.

Though the period between 1950 and 1955 was almost identical to the preceeding 5 year span, there were slight increases in color in all three categories. By 1955 nearly 65% of Life's covers were in color and 25% of their editorial images; color ads still held a 65% share. In the 1960's nearly all of Life's covers were four-color and 75% of its ads were color; by the mid 1960's nearly 65% of the editorial images were in color.<sup>15</sup>

It is of interest to note that in Life's war coverage during World War II, there were rarely combat pictures reproduced and the few that were would only be black-and-white. During this same period 'patriotic' photographs were frequently run and often in color. With the Korean War, combat pictures appeared occasionally but they were rarely in color. During the Vietnam War, Life ran frequent combat pictures and most, if not all, were in color.<sup>16</sup>

With the magazines which targeted women and 'homemakers' the color trends were more interesting and accelerated: House and Garden, American Home ; Better Homes and Gardens all evidenced similar trends in color use. Though American Home was running 30% of its ads in four-color by the mid 1930's, with the 1940's this figure jumped to 60%; with the other two magazines,

the color percentage was nearly as high. Editorial use of color was almost non-existent in the 1930's and 40's. By the 1950's nearly 75% of all three publications ads were in color, while 50% of their editorial images were color.<sup>17</sup>

While these sketches are in no way scientific, they do allow us to draw credible conclusions about color in advertising and its impact upon the public appetite for color photography. Clearly color was used more daringly and earlier by those periodicals more directly involved with consumerism; magazines which were closer to pure journalism tended to avoid color until 'the competition' prodded them by lost advertising accounts- these magazines were the slowest in learning 'color sells'. Many periodicals avoided editorial color because of the costs involved, yet these same magazines employed color covers to provide the illusion of color contents inside. Though these statistics provide illumination of a journalistic bias against color as well, we will defer this discussion. Finally, we can note an interesting trend found with these surveys: as Time, Life, and Newsweek (as well as some consumer oriented magazines) began to adopt more color, there grew an expanded interest in 'readable' graphic design with added attention to clean graphics and integration of color to text.

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#### Marketing Theory and Color

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In spite of the snail's-pace in color photographic technology, advances in color printing technology from 1940 to 1965 greatly helped color's expansion and revolution of the mass-market magazines. American marketing

theory during the post - Deparession years, as well as after World War II, rested on the equation of 'Color = Sales.' Color was going to brighten the homes and lives of consumers; color was something that would be used, in theory, to enchant and mystify; the most common household products would be lit with elegance and placed in unrealistically 'colorful' settings. Advertisers knew the buying public was ready and primed for color: cars were sold by color after the war, movies were adopting color on the heels of Gone With The Wind and The Wizard of Oz ; paint companies were suddenly pushing their products; consumers were suddenly forced to consider the factor of color more seriously when buying clothing and home furnishings- it was as if color did not exist before 1935.

All of this boils down to the fact that color became a new way of selling something, and in an economy where most of our printed advertising materials were largely 'type-heavy' and 'illustration-short,' the change to color caused a second minor revolution: not only was color becoming common place, it also helped the growth of photography-based ads. Color finally gave pictures a dimension of reality that was missing in common black-and-white picture ads. (The explosive growth in the 1950's and 60's of television advertising completes this logic: the addition of motion and sound - and then slowly color - completed the change.)

While it should be clear that popular magazines contributed, almost solely, to the marriage of color photography and commerce, some other factors are worth noting: If we can classify the Depression years of 1930 to 1938 as times of high unprecedented unemployment, widespread poverty, pain, and deprivation, one can then see that color was used

as a general cathartic in nearly every application - from advertising to kitchen interiors. Color ads would startle us with realism and feed our fantasies and dreams of owning fine things, and living the rich life portrayed in colorful back drops.

With the emergence from World War II, a similar climate prevailed. Color was all things happy and full of life; color would be used to rejuvenate our desires for material goods and remind us that the world could be in color again. During the years following the Depression and the second World War it was clear that the public would be receptive, almost vulnerable to color; optimism was the propaganda and the buying and selling of goods was the proper, patriotic affirmation of this 'looking forward.' As we will see later, color became tied to patriotism, unfortunately color continued to be a powerful element in making the rich, richer. This hegemony became the basis for a bias against color among photographers who believed the 'orgy' of commerce and color only helped to alienate the poor and under-privileged.

The question arises: If this color 'sell-job' was in fact harmful to serious color photography, what effects did it have on amateur, snapshot, and commercial photography? If we believe the manufacturers, it was a boon to all arenas. Color meant an added or at least renewed interest in buying cameras, film, etc. for the amateur; the equation meant that snapshooters would be buying more film, ordering more prints, and eventually using the services of the emerging photo finishing field.<sup>18</sup> It has already been mentioned that the introductions of Kodachrome and Ektachrome were the prime movers in making the 35mm camera the basic

currency of photography - sales of these cameras exploded in the late 1930's. For the professionals who shot commercial work, the advent of color meant very little; most color work during the 1930's and 40's was held and controlled by the New York firms such as Condé Nast - a great deal of commercial work by the independent 'small business' worker was still black-and-white. In larger cities the use of color began a trend towards more assignments, longer work weeks and higher fees due to added equipment needed for studio color shooting.

A second question arises: How calculated was the adoption of color for commercial advertising? If we are to believe Louis Cheskin, the director of the short-lived 'Color Research Institute of America' and his books Color Guide for Marketing Media (1953) and Color for Profit, the use of color photography was a carefully planned advance for all of the advertising media. In the former volume, through chapters on 'The Semantics of Color,' 'The Visibility and Retention Power of Color,' 'Color Preference', and 'Physiological and Psychological Aspects of Color', we are told that

*The promoters of color photography entered the graphic arts field not in the spirit of introducing a new art medium but of competition to art. Because it developed independently from art, color photography created an independent color language unrelated to that of art.<sup>19</sup>*

Cheskin's books, written as manuals for commercial color photographers and graphic designers, update the color sensibilities Condé Nast publications pushed in the 1930's and 40's; As if further statistics on color effectiveness are needed he states:

*Distributors of detergents, baking flour, and meat products buy [70,000.00] double page spreads in full color because the investment [based on 1953 Life rates] is profitable... A cosmetics company which was a modest business for years, became one of the biggest in its field soon after it began to advertise in full color.<sup>20</sup>*

Further (and near endless) examples tout the increased mail order sales due to color catalogue images in Montgomery Ward circulars and numerous other mail order catalogues. By means of extensive statistical data, Cheskin belabors the point that magazines are making switches to four-color copy and that a firm base of color theory is required for those intent on "profitable" use of color. In what may be likened to a guideline for much of commercial photographic color Cheskin notes:

*Color attracts in accordance with its degree of visibility. In other words, the color that can be seen at the greatest distance is also the color that attracts the eye the quickest; this is true even when the color is seen at close range... Colors with great visibility should not be used when sustained attention is necessary, as is the case with reading matter. They are vital, however, in all magazine advertising, etc.<sup>21</sup>*

In promoting the idea that through color "a magazine ad must first catch the reader's attention before it can get its typeset message across", he sets forth what was (and is) a foundation for much of 1930's, 40's and 50's commercial color.

While typical of the many dated and non-substantive how-to manuals and books that flourished in the 1940's and 50's, this book is discussed because the author has described so many of the working rubrics of unknown, 'journeymen' color workers/photographers - who produced the vast majority of commercial color photographs.

While one cannot classify Muray, Keppler, Bruehl-Bourges, and Outerbridge as 'hacks', we can describe their imitators as such and much of Cheskin's color ideas as 'hack' fundamentals. The only factor which saved the small, prestigious Condé Nast group from this same status was their un-bending sense of craft and technical virtuosity; selling everyday products with sumptuous color, complex lighting, and immaculate compositions is analogous to working on the set of a television game show; to separate the commercial color images of the 1930's and 40's from the 'selling' context does not improve its status - it's still just a beautiful picture of a vacuum cleaner.

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#### Color Photography Books

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Unlike Cheskin's books, a series of volumes began to surface in the late 1930's which were more direct in their celebrations of color and the prescribed means of selling with color. John Everard's book Living Color claims to be "the first book of direct color photographs of the human body to be published." In fact it intended to hype the emerging field of color nude photography; of course, the volume contains no male nudes and was obviously a precursor to possibly the most popular

aspect of color photography in the 40's and 50's 'girlie' pinups and full color 'studies' of female nudes. Everard's claim concerning his "first" may be correct - he used Dufaycolor 8X10 transparencies and the book is, according to its emphatic claims, exclusively color - there are no black and white 'filler' images. While well printed, prior to Kodachrome, the book (undated, probably released in 1934) is interesting because it appears to be the first total color publication-and is nothing but Kitsch-laden female nudes.

Victor Keppler's 1938 book The Eighth Art: A life of Color Photography is a more tasteful, yet equally 'hard-sell' volume on the use of color. With most of the volume devoted to color reproductions of photographic ads, the reader is confusingly told the names of the account, art director, and agency involved with each product shot. While Keppler's book was limited to a printing of 3000, it was influential with the small community of photographers who produced the commercial color of the 1930's and 40's. And, while bemoaning the "frightfully expensive" cost of making quality color prints in the late 30's, Keppler proceeds with a thorough 'how-to' manual on Carbro and wash-off relief printing for the "commercial color worker"; attached sections deal with proper methods of makeup coloring for the color photographer, and tailoring set color for the palettes of current printing methods. Like Outerbridge, Keppler attempts to reinforce the idea that color photography is often more than just selling goods; in the chapters "Art vs. Color Photography" and "The Fathers of Color", he attempts to show a legacy in color work and the



legitimacy of current color practice. Keppler shows his leanings, however, by reproducing one du Huron cityscape amidst nothing but product color.<sup>22</sup>

Following Keppler's book, Ivan Dmitri's Kodachrome and How to Use It (1940) was a flagship for Condé Nast aesthetics in color use; it hails the new sphere of color photography with glowing adjectives and large doses of commercial manipulation and slick color as practiced by his associates Edward Steichen, Anton Bruehl, Toni Frissell, George Hurrell, et al. The book, which Max Kozloff calls "influential" sells a package of saturated colors, bathing beauties, exotic landscapes (with local inhabitants), and plenty of outdoor sporting shots, as well as flowers, giraffes, and breathtaking gardens - imagery far removed from the pictures generated by the snapshooting public (It's worth noting that Dmitri's book was a prime example of the common practice of tampering with reproduced color; the platemakers and photographers were frequently dissatisfied with straight reproductions of the original transparencies, hence extensive color masking, correction, retouching, and coloring with heavy airbrush overlays were frequently used to embellish, enhance and aid the heightened sense of perfect dream-world color.)

Color retouching and embellishment permeated Everard's book and most color work in advertising pages from then on. 'Straight' color was 'too' natural when it held normal densities and contrast ratios with adjacent colors. While early Kodachromes and Ektachromes periodically provided

distorting color shifts and crossover, the color correction and masking was never done with subtlety or a light hand.<sup>23</sup> Primarily a how-to book, Dmitri's volume is perversely aimed at the amateur and the professional, containing loads of 'f-stops and shutter speeds'; quite typical of Condé Nast color, skies were always a deep blue, cheeks and lips always bright red, and white areas seldom printing clean, instead taking on purple or magenta casts.

Paul Outerbridge's Photographing in Color, also released in 1940, has been widely discussed in the literature, recently including books by Graham Howe and Elaine Dines.<sup>24</sup> Like Dmitri's manual, this book had a small printing but is widely known and considered influential by past experts at Time/Life and U.S. Camera. Outerbridge's text was largely 'how-to' with rather generalized remarks about his own biases of still life and female nudes; when he was specific and pedantic, the instruction only led to producing imitations of his own work, including lighting, shooting, and Carbro printing techniques. Also included was one of the best manuals on tri-color carbro printing extant; additionally there was an extensive discussion of the unique qualities of color work and the complexities of harmonizing color in photographs.

In photographing female nudes Outerbridge was shooting the 'right' imagery at the right time. Unfortunately, he pushed his own sense of eroticism too far, which due to the fetishism, eventually signalled the photographer's decline.<sup>25</sup>

Outerbridge's U.S. Camera column "About Color" was written after his commercial color career was over,<sup>26</sup> however, it was helpful to the long term selling of color to amateurs and the mass-market. Nevertheless, he was unique in his continued application of artistic sensibilities to color-it is true that Keppler, Muray, Steichen, and Bruehl were mostly trained painters - yet one can trace a consistent thread of personal creative color work with Outerbridge that has no other corollary

Bernard Barryte states:

*[Outerbridge was] a pioneer in the advocacy of photography as art...and was the first to establish an artistic language for the new genre [of color]*<sup>27</sup>

Clearly, Outerbridge was a major figure in the selling of color and contributed heavily to a series of color conventions such as generalized even lighting<sup>28</sup> (away from the dramatic contrasts employed by his black-and white commercial contemporaries), and arranged color groupings designed around opposing bright colors and subdued highlights; reds, greens and yellows were used as key colors to offset surrounding colors while softer whites, pinks, and blues were controlled and delivered with subtlety and precision.

This discussion of Outerbridge leads us to an examination of his predecessors in color, William Ellis and Jeffery White<sup>29</sup> as well as his contemporaries: Cecil Beaton, Anton Bruehl, Ferdinand Bourges, Paul Hess, Nicholas Muray, Victor Keppler, Edward Steichen, and Lejaren Hiller.

While Condé Nast publishers functioned as progenitors for much of commercial color (aimed primarily at affluent segments) the publishers relationships with the above photographers has been well documented.<sup>30</sup> Louise Dahl Wolfe may provide one of the more accurate insights into this group and their work:

*Color photography in fashion [which, for her included accessories and some products] in the early thirties, was not very inspiring. One has to have a sense of putting color together in harmonious arrangements, planning backgrounds carefully, with an eye responsive to color. Most of the photographers working in fashion [and commercial work for Condé Nast] were geniuses in black and white.*<sup>31</sup>

Indeed the work wasn't terribly inspiring and often the color adventurousness was simply tasteless. In his article on Bruehl Joe Deal states:

*The constant flow through [Bruehl's] studio of star personalities and products of the depressed but forward looking economy may have occasionally resulted, as Bruehl feels, in somewhat less than enduring photographs.*<sup>32</sup>

In her article on this group of photographers Diana Edkins may describe much of commercial color during this 'selling' period as a "medium of inherent artificiality."<sup>33</sup>

Indeed much of the 'color look' developed by these photographers was directly related to the growing use of Technicolor cameras and film in Hollywood as of 1935. Edkins characterizes much of this Hollywood - influenced color as "garish, unreal creations that reflected generally unattainable dreams of splendor."<sup>34</sup> (Edkins is now curator of the Condé Nast picture collection.)

Much has already been written on the technical skills of these photographers as well as their diligence with one-shot cameras and the intensely demanding process of tri-color carbonyl printing. The facts remain, however, that they were paid exorbitant salaries and were after nothing more than mass-market success. Steichen remarked that he was "determined to reach a large audience"; If we now look at these images and attempt to be fair with considerations of context and intent, it is hard to see them as anything but patently surrealistic dated Kitsch - intent on selling goods, color, and hope for a dreary life. Millions of dollars were spent on color advertising during this birthing era and most of it seems to represent American salesmanship at its worst; Bourges would spend 3500.00 on an ounce of extremely concentrated and rare dyes for his color printing;<sup>35</sup> Murray, and Outerbridge would charge in excess of 400.00 for a single carbonyl print, exclusive of shooting costs.

The question arises, what does the growth of color, spawned by the previously mentioned photographers, have to do with the factors influencing the neglect of color? Through this extensive discussion I have attempted to show that the look of color photography in advertising was controlled by a relatively small group of men and women who helped to confine color to commercial use<sup>36</sup>; to them it was the perfect vehicle for splashy new techniques of selling; all of this did little to advance the respectability or credibility of color as a serious communication medium.

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## Color Photography and Portraitists

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The boom in commercial color during the 1930's, 40's, and 50's did not carry over to other sectors of professional photography; this was especially true in much of the portrait business. One aspect of the work of the photographers just discussed, however, was their color portraiture in Hollywood. Clarence Sinclair Bull and George Hurrell were two early examples of portraitists who were quick to adapt their black and white styles to color; Muray, Bruehl, Keppler, Dahl-Wolfe, Bachrach, and many others all shot extensive sets of color (Hollywood) portraits, first using the one-shot cameras and later 8X10 Kodachrome. In fact, after 1936 most of the major studios opened color galleries that were independent of the black and white stills departments.<sup>37</sup> All of this portraiture, however, helped the idea that color was only for the rich.

Really, none of this flamboyant work could translate over to the picture methods of working portraitists; both sheet Kodachrome (with its Kodachrome prints) and one-shot cameras were too costly to introduce to the portrait market. Professionals in the 'small-studio' portrait business were slow in accepting color - the lack of a professional negative/positive system being the chief reason. In fact, their customers who were accustomed to relatively cheap prices were continuing their preference for black and white or hand-colored portraits up until the late 1960's.<sup>38</sup> Studio owners contributed to this situation by their unwillingness to use complicated and expensive color processing equipment, temperature control devices, and color

enlargers - all of which would help drive up prices for their customers; these coupled with the difficulties of retouching color prints and the absence of a color material mated to portrait demands, i.e, low contrast film and print materials with workable color scales, fueled the popularity of black and white - based portraits.

Two ironic exceptions to this delayed use of color in portraiture were the Gittings studios in Texas and Maurice La Claire's studio in Michigan. Both studios (along with Bachrach in Boston) catered primarily to affluent clients (who were eager for color because they could afford it.) One could cite LaClaire as the first photographer to switch an entire portrait operation to color; in 1936 this changeover occurred, first with Kodak's wash-off relief materials; after testing aspects of the dye transfer process for Kodak before it was released, LaClaire soon switched to the new improved dye materials. His studio is still in business offering dye-transfer portraits to a largely affluent/corporate clientele.<sup>39</sup> Gittings and Bachrach studios have offered dye-transfer portraits to their affluent clientele for over thirty five years, although LaClaire's work preceeded their color options.

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#### The 1950's and 1960's

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The two decades of enormous color growth, the 1930's and 40's, continued their influence into the following decades and we will end this discussion with an analysis of color use during the 'cold war' years. As Julia Scully noted:

*Life* magazine, *The National Geographic*, and various fashion publications set the standards for color photography during the 50's and 60's, both editorially and through their advertising.<sup>40</sup>

The tradition, in fact, of the Geographic's formula essay, i.e., colorfully dressed, smiling natives, sunset over a body of water, majestic landscapes, earnest factory workers, carried directly over to magazines such as Holiday, Look, etc.

The selling of color continued ever stronger into the 50's and 60's because of the ever increasing use of color in advertising and the very real affluence that permeated these times. One book which was influential in carrying the commercial color sensibility was Alexander Lieberman's The Art and Technique of Color Photography which, by numerous color plates, sold the modern commercial color aesthetics of the emerging colorists, including Balkin, Blumenfeld, Coffin, Horst, Mili, Penn and Rawlins, (among others). Released in 1951, this book carried the indelible mark of expensive Condé Nast printing while still trying to sell the legitimacy of reproducing already familiar color images first seen in 'upper echelon' magazines (sans copy). Like Irving Penn's Moments Preserved it is well designed with uncluttered graphics and a reasonable display sense. Lieberman later wrote an introduction for Penn's book and defined new areas of commercial color:

*A pioneer in the use of color, [Penn] broke away from the salon photographers who for too long had been imitating the chiaroscuro of painters. He brought to color photography the use of pure color unsoiled by shadows. Penn's 'high key' or pure color has become an affirmation that creative photographers have at their disposal a new means of expression. He also*



*pioneered in utilizing the color grain of the emulsion itself to achieve an optical color sensation akin to the pointillistic search of Seurat.*<sup>41</sup>

Penn's color from the 1950's may have broken ground, unfortunately that ground was unimportant; his colors were not the saturated unbelievable hues of Muray or Steichen. Rather, they deviated by being more abstract, washed-out, modern. Penn and Horst were far more adventurous than their predecessors: their still life did not look carved in stone as did earlier Condé Nast house work. Both of these photographers fortified commercial color because they were more daring and less concerned with technical color quality - as was Avedon in the 1960's.<sup>42</sup>

In spite of the continued selling of color by Condé Nast and other publishers, there were problems, notably the cost of color: In the 1953 U.S. Camera Annual, Life magazine is cited for excellence in editorial color use and its demand that "a color picture must have its own inherent value in order to be printed." On the same page, in sympathy with Life's plight with printing costs, the editors lament the irreversible, escalating costs of color reproduction and the great problems of large scale four-color printing as found in Post, Look and Life.<sup>43</sup> In an exhibition of color work (with catalogue) organized by Louis Siple, the continued problems with manufacturers inability to standardize color processes seemed to be a raw nerve with color workers; "Chroma Relief", "Ives Color", "Pan Chroma Relief", "Gasparcolor", as well as Minicolor and Kotavachrome were all recent casualties in this phenomena which would continue into the 1960's.<sup>44</sup>

Presently, we still seem to be feeling the effects of the 'color sell' from the 30's and 40's: in 1979 Newsweek's Jim Kenney stated: "with color, the trend is to make more assignments than we did in black-and-white, to run more pictures and to run them larger."<sup>45</sup> Later we're told that:

*Color in effect has transformed a number of word magazines into picture magazines. Alice George, former assistant picture editor of Time says the magazine's willingness to spend more money for pictures, to purchase higher quality printing, to devote more space to photographs in general was a response to the public's thirst for informative [color] images.<sup>46</sup>*

Readers seem to want more color pictures and less text: prior to 1977 Time and Newsweek ran no more than 4 pages of editorial color per week. Time now runs 8 to 10 pages of color and Newsweek, 13 pages. Where color was originally used to supplement black-and-white and improve sales, it is now used to compete with television. Color hegemony has remained a constant: those companies who can afford color have a competitive edge over those who cannot. Black and white ads still 'look' insignificant and are usually set in the back pages - a black-and-white advertiser can seldom afford prime display space. Of course, the selling of color continues; however, for those who can afford television air time, they have found that color has been democratized in shooting cost and production charges. Businesses now must succeed in getting color televisions in every home.

Unlike television, record album covers have been prone to the dictates of color costs. Although photographs did not appear on album covers until 1939, the rage for color did not occur until the mid- 1950's, even so, classical recordings were predominant until teenagers switched from 45's to

long players; with classical L.P.'s, black-and-white covers predominated until the mid-1960's. A color hegemony did not exist until popular albums soared in sales beginning with Elvis Presley. From the late 1950's to the present, budgetary considerations always determined the use of color: if you were a 'marginal' artist your covers would likely be in monochrome; if you made records that sold well your covers would naturally be color.<sup>47</sup>

## THE BIASES AGAINST COLOR

Though it is anathema to quote Susan Sontag in relation to photography, I will take the risk:

*Many photographers continue to prefer black-and-white images, which are felt to be more tactful, more decorous than color-or less voyeuristic and less sentimental or crudely lifelike. But the real basis for this preference is, once again, an implicit comparison with painting...In Cartier Bresson's version of that persistent myth according to which - following the camera's invention - a division of territory took place between photography and painting, color belongs to painting. He enjoins photographers to resist temptation and keep up their side of the bargain.<sup>1</sup>*

With this section I hope to demonstrate what many writers, in their opening remarks on color, have meant when referring to the 'bastard child' status of color - the 'unwanted guest' of photography. This section will also serve as a chronology and catalogue of the many expressed biases and tirades against color; (the preceeding chapter was important because now we will know what these forthcoming diatribes refer to). I will show that the cumulative effect of these continued biases had a real and insurgent impact upon the use of color materials; these biases are directly related to the factors influencing the neglect of color photography in serious and creative applications.

It is difficult to pinpoint the beginnings of a color bias in photography, but we know that it seems to have come from all quarters and probably started with initial biases against photography per se. John Ruskin remarked in the mid 1800's that "photographers made such terrible mistakes in

monochrome[that he shuddered to think] what they would do if they had all the color in the rainbow to manage."<sup>2</sup>

In the July, 1900 issue of Camera Notes, Sadakichi Hartman, in reviewing Stieglitz's photographs noted:

*Everything in his treatment is subordinated to a certain uniformity of conception, without giving any undue share of attention to any special quality. Mr. Stieglitz knows that color belongs to the art of painting and not to photography, and is satisfied in realizing it only when it suggests itself by its own effort, for instance in the yellowish murkiness of the atmosphere in his 'Winter, Fifth Avenue.'*

The ideas that both Ruskin and Hartman present are quite clearly boosting the notion that if photography were not simply a technocrat's painting, we had better look for signifying birth marks in photography (at its inception); this is probably the oldest skeleton of a fundamental color bias: part of the syntax of painting is color; photography has a different syntax and color has never been part of that. Of course, one of the unique 'birth marks' of photography was that it could only render in monochrome (and variant middle tones). B&W/sepia or single color imagery were the roots and parentage of Photography; this idea was mentioned by Sontag and will be reiterated frequently by other photographers in this section.

Max Kozloff once remarked that "a scholar would have to look far on the horizon to uncover even casual animus against color in the literature."<sup>3</sup> This is simply untrue; nearly every writer, historian, and photographer who has written about color has made some reference acknowledging the delays in color use and the biases against color. Unfortunately, most of these writers have accounted for the problems in color by repeating simplistic reasons posited by someone before them. These reasons included:

1) Color was too expensive. 2) Color was too complicated. 3) Color was gaudy. (This thesis grew out of the fact that many individuals and observers readily admitted the biases and delays in color, but none did any serious research towards explaining the neglect of color)

Of course color's acceptance was littered with problems, and critics of color were not limited to those who thought it had no proper place in photography: Many scientists and amateur inventors simply did not believe color photography was attainable. When Ives demonstrated his photochromoscope camera (and projector) in 1892 at the Society of Arts, many photography experts and scientists were reluctant to accept his color discoveries. Louis Siple has suggested (in his book about Ives) that it may have been the memory of Levi Hill's premature announcement, promising a direct color technology that never came to fruition, or just a hesitance to accept anything radically new.<sup>4</sup> Siple states:

*Sir William Abney, then president of the Camera Club of London, refused to meet Ives until he was personally convinced there was no fraud. Professor Herman Vogel, the great German savant was very skeptical of the photochromoscope and when first he looked at the pictures in the instrument refused to accept the results as anything other than some optical trick by which he was seeing nature itself instead of photographs. As late as the Pan-American Exposition in Buffalo, a protest was made that the Kromskop should not be included among the photographic devices.*<sup>5</sup>

In what may be a most telling remark about the delays and biases attached to color Ives wrote:

*In trying to give away a valuable invention in color photography [a reference to his polychrome color print process which he purposely did not patent, and in fact freely disclosed so as to encourage experimentation and development of positive/negative processes] I have found myself facing a dense cloud of mental fog*

*and prejudice and incompetence and the usual demand for impossibilities, and the active opposition from people exploiting for profit older methods (mostly pirated inventions of my own).*<sup>6</sup>

So here we have a powerful revelation: one of the foremost inventors in color photography openly citing that even he found biases, distrust, and use of retrograde systems.

In 1907 John Tennant noted in the popular serialized Photo-Miniature that "[to most people] a good plain or un-colored slide....was preferable."<sup>7</sup> Two years later, in a brief discussion of color use, Frederick Evans thought it likely that many new color processes would prove to be "disastrously disappointing" and noted that because photographers have trained in black-and white most of them will be compelled "to very dreadful failures."

He states:

*I foresee endless difficulties and failures... though, alas! to those who are imperfect in their color sense and training, the sense of failure will not be apparent; what they will get will be so novel and exciting as to make it difficult to regard it with cold criticality.*<sup>8</sup>

In writing of the Hess-Ives process in the 1918 American Photography Annual, Paul Anderson noted:

*Personally, I feel that it is a mistake to introduce the element of color into pictorial photography for the appeal of color differs widely from that of monochrome. In a monochrome art the appeal is mainly intellectual; that is the effect of line, mass, and gradation is on the intellectual faculties rather than on the senses, whereas the appeal of color is purely sensuous. Inasmuch as photography is preeminently fitted to render line, mass, and gradation more finely than any other graphic art, it would seem that it is*

*peculiarly adapted to the expression of intellectual qualities - to the expression of ideas rather than to a mere sensuous appeal...Further, the proper use of color demands long and careful study, beyond what most photographers are willing to give, with the result that most color photographs are anything but satisfactory from an artistic point of view.<sup>9</sup>*

It seems not only that photography in color was base and overly sensual in appeal, but photographers also lacked raw discipline to deal with such a complex entity as color.

In the 1929 Annual of American Photography, Lyman Chalkey bemoans many of the problems related to...(then) current biases:

*As a pictorial medium, color photography is viewed askance by most photographic workers. Very little truly pictorial work is yet done in color, and many exhibitions exclude color prints, apparently with the feeling that color photography is something foreign to artistic behaviour. [Later he states] Most color methods are inflexible and are not subject to control.*

Finally, lamenting the "great difficulties of technique" required for color work Chalkey states:

*in order to use color intelligently, there are two prerequisites; one, a facile method of producing results in color; and the other, the ability to think in terms of color. Both of these requisites are foreign to most photographers of today.*

Chalkey also cites the countless color processes which "suffer from having been developed as technical or experimental curiosities and never to the point of perfection which would make them easy to use", possibly reminded of Niepce de St. Victor's 1850 color prints which faded upon exposure to room light, Chalkey sadly noted "when one makes a color print, his



natural intention is to hang it on the wall and it is discouraging to see it fade."<sup>10</sup> Indeed, the contemporary biases related to color stability date back further than 1929; Chalkley's remarks were posited with (his) full knowledge of the imbibition processes, including the Pinatype.

Into the following decades we find D.A Spencer, in his Colour Photography in Practice, supporting much of what had been said about color in the 19th century:

- 1) *All valid arguments which have been put forward to show that a photograph can never be a work of art apply with even greater force to colour photography.*
- 2) *The aesthetic growth of colour photography as an art form has been slow, since advertisers, who are largely financing its development are not introspective where their own products are concerned, rarely encourage the foremost workers to do more than mirror reality upon paper.*<sup>11</sup>

In 1934, Moholy-Nagy wrote against color from an entirely different perspective: "The language we've finally mastered in black and white is totally invalidated [by color]. We're back where realistic painters started in the renaissance - the imitation of nature with inadequate means." In showing what he perceived as the growing "indiscriminate" use of color Nagy said, "it's not that there's too little use of color, there's too much." Not only feeling that color was "photography made complicated", Moholy-Nagy believed that color could only progress if it took its cues from "the recognized principles of black-and-white photography"; later he predicted that the foundation for development in color rested with principles based on Cezanne's artistic development. So, as Cezanne had (in order) a

1) Narrative psychological state. 2) A naturalistic stage and 3) An abstract period, color photography would follow. Ultimately, Moholy-Nagy seemed pessimistic about color use:

*Color photography is still grappling, as it has been for forty years, with the problem of providing a colored reproduction of nature which should be satisfactory in every respect.<sup>2</sup>*

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#### Color and Photographic History Books

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In his Picture History of Photography, Peter Pollock describes the same predicament:

*For three quarters of a century before the advent of Kodacolor in 1942, color processing was specialized and laborious....the bewildering mass of chemicals and methods kept the great masters of black-and-white photography from turning their talents towards color...Color photographs, accordingly, belonged almost entirely to the realm of technical and applied photography. They were used in scientific work, advertising, and color reproduction.<sup>13</sup>*

Pollock later cites the new impact color "brought to advertising" and the dubious fact that "the national picture magazines have provided an excellent training ground for color photographers", earlier citing Ernst Haas, Arthur Siegel, Yale Joel, Irving Penn and Nina Leen. Though Pollack is not really telling us anything new about the 'legacy' of color, we should not be misled by his remark which implied that color finally took off after the introduction of negative/positive Kodacolor in 1942; as mentioned earlier this material had continuing problems with coupler printout and was even withdrawn from the commercial market (entirely) for a few years - it did

not signal or cause any immediate breakthrough for generalized color use.

It was not until 1964 that such a change became reality.

While Pollock showed a small interest in explaining the delays of color, the authors of the popular histories of photography indirectly helped the predominant biases against color by their curt and abbreviated accounts of the evolution of color. While Joseph Eder and Helmut Gernsheim both appropriately confined themselves to technical, invention-based accounts (highlighting the key aspects of the work of Clerk-Maxwell, du Hauron, Cros, Vogel, Ives, Joly, McDonough, and Lippman), it should be pointed out that in Gernsheim's 600 page opus, an incredibly brief 5 page section is used to tell the story of color up to 1914. With Beaumont Newhall's 216 page history, a mere four pages covers all of color history.

The primary fault of these accounts is that they, without exception, tell a story of color which was one long series of failed systems and technologies. Clearly there is much more to the history of color than the documentation of countless 19th and 20th century color systems, nearly all of which - the historians tell us - did not take hold commercially. Of course, the separate accounts of color history function in much the same way: Wall, Friedman, Coe and Spencer all describe in detail, the littered path of aborted screen processes, Dispersion material, Interference systems, and pigment transfer systems. Most accounts of color history are descriptions of the technological evolution of process refinement; all of them are affected by the belief that serious photographers didn't use color, hence the paucity of aesthetic and theoretical ruminations on color. Beginning

with his (1938) Photography - A Short Critical History, Beaumont Newhall has, over the years, slightly expanded his color discussions to include dye-coupler materials, though never altering the basic four page length of his color chapter - through various editions of the History of Photography. In the most recent printing of this history Newhall ends his color section with the subtle color bias of Edward Weston:

*So many photographs and paintings are just tinted black and whites. The prejudice many photographers have against color photography comes from not thinking of color as form. You can say things with color that can't be said in black and white...Those who say that color will eventually replace black and white are talking nonsense. The two do not compete with each other. They are different means to different ends.*<sup>14</sup>

In his On Photography - A Source Book of Photo History in Facsimile Newhall does reprint the 1853 Charles Dickens article containing a discussion of Levi Hill, however in the recent Photography: Essays and Images, Newhall fails to re-print a single article (from the few hundred) which were written in the late 19th and 20th centuries on color use and aesthetics.

Though Newhall's history text has sold well most photographic history volumes and journals<sup>15</sup> have had little, if any, effect on the general populace's receptiveness to color and the use of it. These volumes are, however, examples of the neglect of color - the historians mentioned, obviously indicate, by their slim writings, that color did not merit serious ongoing research. The color histories written by Wall and Friedman cater directly to chemists and technicians who would be interested in highly specific accounts of a technological evolution and history; these two

volumes are important to our general store of the history of technology and chemical engineering because they describe one of the most challenging struggles for 19th and 20th century science.

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#### Museums and the Exhibiting of Color

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While historians and curators influence on the direction of color may be open to debate, it is worth discussing the levels of color interest at the major centers of photographic exhibition, which with the exception of the International Museum of Photography at George Eastman House, are usually located near or in America's major population centers. Though the Eastman House has had a slightly larger number of color exhibitions over the years (than other American Museums), Mr. Ron Emerson, a color history researcher at the 'House' for the last three years, estimates that color images occupy less than 5% of the total Eastman House still photography collection. And, while the Museum of Modern Art has been a singularly important supporter of Art and Documentary photography since its construction in the late 1930's, it should be noted that the museum has had only five color exhibitions between its beginning days and the controversial 1976 William Eggleston show; in 1943 Eliot Porter and Helen Levitt showed color work; these shows were followed by Ernst Haas in 1962, Marie Cosindas in 1966, and then Eggleston. In what was probably the most influential and widely seen exhibition of photography for the public at large, Edward Steichen's "The Family of Man", (sponsored by MOMA and printed in book form) did not contain a single color photograph.<sup>16</sup>

In the most recent edition of the Time/Life volume Color, the editors point out that

*[during the selling era of color in the 30's and 40's] most influential critics and museum curators persisted in regarding color photographs as calender art. Color, they felt, was at best merely decorative, suitable perhaps, for exotic or picturesque subjects but a gaudy distraction in work with serious artistic goals.*<sup>17</sup>

Steichen's interest in color, during his tenure as director of the MOMA photography department, was said to have peaked between 1947 and 1952; however his enthusiasm dropped radically when the expense of making high quality - presumably dye transfer - prints for exhibitions exceeded the photographer's and museum's budget. From then on, Steichen (only on occasion) would present color slide lectures or seminars sporadically related to color photography.

In jumping to 1976, it is then startling to read Sean Callahan's "MOMA Lowers the Color Bar" where he tells us (at this late date) that "color photography has largely been considered a commercial medium, best suited for advertising and publishing...the very fact that John Szarkowski is exhibiting color photographs [by William Eggleston] will spur dealers, collectors, curators, and photographers to reconsider color photography as a medium of salable and collectible merit."<sup>18</sup> Does this mean to imply that color photography did not receive serious attention until MOMA exerted its powerful influence in 1976? Considering the high profile this museum holds and the extensive press attention it generates, the answer is probably 'yes'.

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## The Photographers Bias

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While museums and curators helped the neglect of color, the factors which caused a color bias among serious photographers is now our focus. In discussing the "failures" of color John Szarkowski<sup>19</sup> calls much of the color (discussed thus far in this paper) "puerile" and cites two key problems:

*The more interesting of these might be described as black and white photographs made with color film, in which the problem of color is solved by inattention. The better photographs of the old National Geographic were often of this sort: No matter how cobalt the blue skies and how crimson the red shirts, the color in such pictures is extraneous - a failure of form. The second category...comprises photographs of beautiful colors in pleasing relationships. The nominal subject matter of these pictures is often the walls of old buildings, or the prows of sailboats reflected in rippled water. [Reminiscent of synthetic cubism or Abstract Expressionism] it is their unhappy fate to remind us of something similar but better.<sup>20</sup>*

Related to these "failures" of color Joe Deal tells us that Anton Bruehl's best color work was "deliberate, non-anecdotal and carefully composed graphic representation;" clearly much of commercial work in color was indirect and anecdotal.

This problem of what individuals, curators, photographers, and the public associated with color, what was (properly) the province of color and what was not, all leads us to consider the greatest source of color angst and bias - documentary photography. Eugenia Janis states:

*American devotion to documentary, the very mastery of its particular catechism and the stunning success of its adherents past and present, as they continue to be celebrated in museums and publications throughout the world contributes to the difficulty the American Photographer has in [using color photography well.]*<sup>21</sup>

Documentary and color never did mix well and John Upton (Curator of the 1982 History of Color Photography show, sponsored by the Eastman House) may provide an unusual insight here:

*color photography in magazines and advertisements became synonymous with post World War II prosperity of America - home decorating especially in the kitchen began to emphasize color as never before.*<sup>22</sup>

This may be stating the obvious but Upton's key word was prosperity; documentary practice in America has rarely veered towards those who prospered. Color was opulent, excessive, affluent, and all things harmonious - documentary was concerned with all aspects of life on the other side of wealth, achievement, and prosperity. Moholy-Nagy showed a prescience for this in his 1927 article "The Future of the Photographic Process": "There will be no trace of the trashy color sentimentality of this subjection to nature."<sup>23</sup>

The roots of this problem between color and documentary go back to at least the late 19th century (Is it even possible to imagine the color contained in images by Thompson, Riis, or Hine?), however, for our purposes we will begin with Lincoln Kirstein's essay for Walker Evan's American Photographs in 1938; in praising the clarity and precise descriptiveness of Evans' photographs Kirstein tells us that "By way of uncolored engravings, similar in spirit to Evans' hard uncolored prints, we accommodated



European stone to the provincial delicacy of our pine and stucco."<sup>24</sup>

To Kirstein, Evans' photographs 'worked' because they were not in color.

While Walker Evans and his thinking about photography probably had little, if any impact on the photographic industry, it's clear his images did have an impact upon many documentary photographers, readers of Fortune magazine, and later, college trained creative photographers. His remarks about color have been quoted more in recent times and yet, they are worth added scrutiny. In Louis Kronenberger's Quality - Its Image in the Arts (1969), the chapter on photography is edited and written by Walker Evans whereupon he reproduces the work of Friedlander, Szarkowski, Frank, Arbus, Brandt, Brassai, Smith, as well as many other pivotal, well publicized black and white photographers - with short remarks concerning the quality of their work. In his remarks preceeding a color image by Marie Cosindas, Evans states:

*Color tends to corrupt photogrpahy and absolute color corrupts it absolutely. Consider the way color film ususally renders blue sky, green foliage, lip-stick red, and the kiddies playsuit. There are four simple words which must be whispered: color photography is vulgar. When the point of a picture subject is precisely its vulgarity or its color accident through mans hand, not God's, then only can color be used validly.*

Evans still seems (even in his last sentence) to be telling us that color photographs will eventually be about vulgarity; finally he states: "It is a consoling thought that in about fifty years both color transparencies and paper prints in color - all the color photography done in this period - will very probably have faded away."<sup>25</sup> Earlier in his essays, having paid homage to the black and white photographers who were repelled by Stieglitz's

"screaming aestheticism" - and who later veered towards "the straight documentary style" - Evans back handedly tells us color would have no place in this domain. Evans is of interest in this discussion because on one hand he expressed for many photographers (their unstated) disdain for color; on the other he was a picture maker who produced hundreds of color photographs.

Walker Evans worked in a rather loose 'unstructured' position for Fortune magazine from 1945 to 1965. During those years he produced nearly a third of his pictorial essays in color. According to Lesley Baier, after 1950, 14 of his 27 portfolios were all mostly color. In the 1954 "Test Exposures" color portfolio in Fortune (edited by Evans) he states:

*Many photographers are apt to confuse color with noise,  
and then congratulate themselves when they have almost  
blown you down with screeching hues alone - a bebop  
of electric blues, furious reds, and poison greens*

This portfolio included the color images of Edward Weston, Sheeler, Adams and others - a project sponsored by Kodak which included free film. After a physical survey of all of Evans published color work in Fortune,<sup>26</sup> one soon finds that Evans made color images quite to the contrary of the "bebop" others were performing: In an amazing color homage to the game of Golf, "Octobers Game", another story on New England Mills ("These Dark Satanic Mills") as well as "The Auto Junkyard", "American Masonry", "The U.S. Depot", "Clay" and the "Stones of DuPont", Evans' color is totally consistent in its restraint and sobriety - the color is just a matter of fact. Evans never delivers the traditional 'high key' contrast of reds and blues, nor the small touches of yellow for color 'dynamics.' And, while Evans even claimed

to Paul Grotz that he did not begin to photograph in color until his mid 1970's use of the SX70, we know better. After scanning most of his published color work it becomes difficult to believe his remark (in reference to the color in an eggplant) that it was "the most voluptuous and assuredly wicked color in the world."<sup>27</sup>

Evans did not like color - that must be clear. And his remarks on color did not need the exposure of publication to get the message out. It was his example that was enough to help the bias against color and the association of black and white with serious photography; Dougals Davis, Mary Rourke, and Eugenia Janis all expressed "shock" when they discovered that Evans had, in the early 1970's, "switched to color...and his new tool was the self-printing SX70 Polaroid Camera - the amateurs delight."<sup>28</sup> Davis felt that "Evans move signaled that the age of serious color photography is here." In 1974 Evans said "a year ago I would have said that color is vulgar and should never be tried under any circumstances, but I intend to come out with it seriously."<sup>29</sup> (Of course he had already called color vulgar twice in the 1960's.) We should remember that although Evans recanted, many, albeit most, of his colleagues, including the high profile documentarians with frequently published images in mass-circulation magazines, never took the cue; the photography program Evans founded at Yale is still firmly committed to black and white under the tutelage of Tod Papageorge.

While Evans and his disdain for color may have had a lasting influence on documentary practice - Carol Squiers, in her article, "The Walker Evans Legacy and the Commercial Tradition" argues that Evans had a greater influence on Photography than all of commercial practice<sup>30</sup> - we can now look to less eccentric examples of a color bias. Sally Stein's recent writing about the color work produced by the Farm Security Administration Photographers is a case in point; out of a pool of over 100,000 images, less than 700 were shot in color. Stein's research came about because of Kozloff's question, "Is there even one photograph of the Depression in Color?" Stein admits that, in spite of this color experiment conducted by Roy Stryker,

*advocates of the emerging documentary mode developed an aesthetic that disdained color and decorative appeal...The moral values attached to the use of black and white grew more weighty in succeeding years and continue to some extent today.*<sup>31</sup>

In fact three F.S.A. photographers who shot color for Stryker - Russel, Lee, Marion Post Walcott, and Jack Delano - could barely remember doing so. It is also clear that Stryker was cued by the "popular appeal" of magazines such as Life, Look, Ken and Pic - Stryker, in fact, offered "scoops" of F.S.A. pictures to gain a wider audience. Stein tells us that Stryker had "natural talent as a publicist" and must have been impressed by the explosive growth of Kodachrome as well as the expanding use of color in mass-market publications; color was Stryker's method of "anticipating the future requests that would be made upon the F.S.A. file."

Nonetheless, he was very restrictive with the distribution of Kodachrome to his photographers - the earlier numbers indicate this: Certainly, Stryker knew there was but a "little market" for the F.S.A. style of color; he also knew that engravers and printers were rarely equipped to make four color separations from originals as small as 35mm frames. Stein summarizes the Stryker color experiment:

*in response to the further coding of color as a commercial medium, black and white photography had become increasingly associated with the documentary tradition to which the F.S.A. contributed significantly. What had once been a defense of monochrome photography based on aesthetic coherence and great practicability had developed into blind prejudices against newer materials (and expanded visual possibilities). Given that context, it was probably difficult to remember a time when color images had been made which were direct, descriptive, and in the best sense, quite simple.<sup>32</sup>*

Of course documentarians continued to avoid color (as did documentary filmmakers) materials and, in fact, frequently became more adamant about black and white as color gained in popular appeal. David Duncan wrote:

*To this day I've never made a combat picture in color-ever. And I never will. It violates too many of the human decencies and the great privacy of the battlefield. in the photography of War I can, in a way, dominate you through control of black and white. I can take the mood down to something so terrible that you don't realize the work isn't in color. It is color in your heart but not in your eye.<sup>33</sup>*

This nonsensical bias is reiterated in another way by Eugenia Janis and Sally Eaucloire in their readings of contemporary color documentary pictures.

Both writers, apparently through their uncontrolled associations with commercial color, found the David Kennerly color pictures of the Guyanna suicides to be "peculiarly festive." Eaucloire writes:

*the jaunty abstraction in pinks, purples, and other pastels that graced Time magazine's cover December 4, 1978 was Kennerly's unintentionally joyful translation of the Guyanna tragedy."*<sup>34</sup>

This is simply nonsense; colors in news photographs give us more information, that is all.

Of course, the above logic and bias continues: Consider the work of Robert Capa, Bruce Davidson, Don McCullin, Bresson, Eugene Richards, et al. One could further this evidence by viewing the various editions of the influential Time/Life publication, Documentary Photography. A color photograph has never been included in this volume - including the current 1981 version. Time/Life editors do acknowledge this in their 1981 Yearbook :

*When Larry Burrows went to Vietnam in 1961 for Life, he had an assignment no other photo journalist had ever been given: to photograph a war in color Up to this time, color was considered too pretty for pictures of tragedy and misery.*

Of course few photojournalists were (or are) experienced in color but

*Burrows sober, understated pictures stuck close to the real colors of war: the drab green of combat fatigues and tropical forests, against which pink, ivory, and ebony skin and red blood and white bandage stood out pathetically and horribly.*<sup>35</sup>

The common bias against documentary color, which has been a great factor in the neglect of color, is stated by Cindy Polemis: "Color photographs of this nature tend to be subjected to Hollywood gore or alternatively to a perverse beautification of violence; they can lack subtlety because of the explicit quality of color itself."<sup>36</sup> The recent color documentary work of Susan Mieselas\*, Ross Baughman, Gerald Williams, Andy Levin, and Mary Ellen Mark\* discounts this logic in every respect. Eve Arnold probably

\* See: Nicaragua by Susan Mieselas and Falkland Road by Mary Ellen Mark

describes best the attitudes of current color documentarians: "I felt from the start that color photographs would best serve my purpose of conveying information. The eyes see in color; black and white, beautiful though it is, is an abstraction. I wanted the reality."<sup>37</sup>

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### Color Bias in the 1950's and 1960's

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This section will be a brief analysis of the evolving ideas and debate about the place of color during the 1950's. In the Time/Life Color volume we're told that

*Not surprisingly, photographers whose pictures reached the public through museum and gallery shows, rather than books and magazines, generally stuck to black and white during the 1950's and 1960's. It was left again to the men who made their living taking pictures for publications - which welcomed and even required color - to develop the art of color photography.*<sup>38</sup>

Unfortunately these commercial colorists only helped to excite art directors and amateurs about color. (During the research for this thesis I have not yet found a professional photographer who cites the influence of colorists Art Kane, Pete Turner, Ernst Haas, Eisenstadt, or the earlier color work of Muray, Keppler, Outerbridge, etc.) Nonetheless, popular belief tells us that 'color innovators' like Eliot Porter, Haas, Penn, and Burrows were needed to get popular acceptance of color. Helen Gee cites Eliot Porter as someone who brought a much needed and "rare sensibility to color, [when in the 1950's] the use of color and its aesthetic application lagged far behind black and white photography."<sup>39</sup> Gee also cites the important influence of Alexy Brodovitch, art director for Harpers Bazaar; interestingly

while Harpers printed a great deal of color, Brodovitch's understudies were a powerful group of committed black and white photographers, including Avedon, Lisette Model, Frank,\* Brandt, Kertesz, Bresson, Brassai, and Munkacsi. Munkacsi later regretted ever doing any color and cited his commercial color as the beginning of his decline. Bresson, Brassai, Kertesz, and Brandt were, of course, not understudies of Brodovitch but did receive the most active encouragement from him (through assignments and publishing), and their black and white sensibilities were the major influence on 50's photography, according to Gee.

The alternate influence was Life magazine and its photo-essay: W. Eugene Smith was pivotal here and his commitment to black and white was as solid as those listed above. Smith, as the others, did occasional color work for Life, but his remembered, 'important' essays were exclusively black and white.<sup>40</sup>

Another early influence on color use was the Photo League and their Newsletter, Photo Notes. Elizabeth McCausland wrote, in a discussion of painting vs. photography, (from the newsletter): "To be sure, the quality of color is still superior in painting. Color photography is both artificial and fugitive, the dyes and stains used for color transparencies not yet being wholly permanent."<sup>41</sup> In 1950, Ansel Adams wrote for the same newsletter that

*the limitations of Ektachrome, Ansco Color, and Kodachrome...force our hand [the key to good color is] understatement...most color photographers... Know little about expressive color.*

\* Robert Frank once remarked that "the colors of photography are black and white."



Later, Adams explains the absence of color in documentary work by citing "the difficulties and expense of reproduction." Also noting his "many strong reservations about color," Adams goes on to point out that one of the most important avenues of color would be "planned, projected sequences, using sound track for comment or music."<sup>42</sup> In another Photo Notes article Adams tells us that he avoids color because of "the many technical problems" associated with color printing and processing - while later admitting that he has yet to make a color print; he also notes that "a fine 4-color letter press job on fine paper" was (much more) preferable to any color prints - citing reproductions of Anton Bruehl's Condé Nast work.

In the Color Photography Annual of 1955 we're told that "color photography is irksome, elusive, complex, beautiful, exciting, and frustrating." In this Ziff/Davis publication Beaumont Newhall cites the critics disappointment in the first daguerreotypes inability to record color while emphasizing that "No field of photography has cost more effort." These assorted remarks are taken from a printed symposium this annual presented; along with other experts, Cartier-Bresson's Introduction from the Decisive Moment is re-printed. Like Walker Evans' remarks on color, Bresson's have had an equal impact - they are so permeated with reservations and distrust of color that it becomes hard to fathom the minimal color output of Magnum photographers. Noting the limitations of "slow" color emulsions as well as the unpredictable state of "color engraving" (and inks and papers) Bresson states: "I am afraid that this complex new element [of color]

may tend to prejudice the achievement of the life and movement which is often caught by black and white," Later, he notes the "extremely complex problems" of "bringing the color of nature in space to a printed surface" - also (further) implying that color is just too "difficult" for the viewer and photographer to comprehend.

In a similar symposium on color, U.S. Camera, in October, 1956 published the views of Dan Weiner, Roman Vishniac, Joseph Costa, Doris Pinney, and other color photographers. While most of these photographers take the occasion to sell color and encourage the excitement that was growing among hobbyists, Dan Weiner exposes his bias:

*In the area of photo-journalism with which I am concerned, I have long taken a dim view of color photography, mainly because of its indiscriminate use...Most subjects seem more pleasing in color rather than in black and white and for years we have been deluged with photographs in color that have no reason for being except that the subject is deemed more important and in need of a lush treatment by the publication. Color photography must be more than a tinted black and white. Color has an emotional intensity of its own which is too often at variance with the content of the photograph. (I have seen harsh subjects turn candy sweet and sweetsubjects turn garish.)<sup>43</sup>*

Weiner is, of course, repeating axioms that had already been used. In predicting that black and white would "never go over," Cecil B. DeMille noted that color films would not be workable because people did not want to look at many things in full color, but rather they wished to make their own interpretations of the world by means of black and white materials.<sup>44</sup>

In that context, it's worth noting Goethe believed that nations and

paces afraid of color retreat into black-and-white; he also believed (because of his extensive research into color theory) that the British and Germans--and other 'people of refinement' - preferred "absolute negation" of color, "owing partly to weakness of sight, partly to the uncertainty of taste."<sup>45</sup>

In his article on "Color" in the April, 1956 U.S. Camera, Elliot Elisofon tells us that "on the production side [of color] we have been caught in a flood of postcards and calendars - in which color has not even portrayed nature faithfully, much less interpreted it." Like Dmitri, Elisofon was an influential color worker and writer (mostly in the late 1950's and early 1960's.) Most of his scattered remarks on color have been collected in (his) Color Photography; in this book Elisofon bemoans, as others have, "the plethora of uniform, clean, well exposed pictures with bright blue skies [which] has reached a monotony of millions." In a section pitting black and white against color, Elisofon even agrees with the common sensibility which finds "the mere presence of color often so romantic that the strong impact of a tense or violent scene is lost through prettiness;" he goes on, in discussing films, to say that "most movie color is simply decoration; black and white photography has a built in power because of the simplicity of its image [which can] produce psychological effects without the complications of color".

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## Contemporary Photographers and the Color Bias

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Obviously, color eventually came into its own - in spite of the biases previously mentioned. Though Ansel Adams frequently said that color photography was "dissonant", he did steer Marie Cosindas towards color stating that "you're shooting in black and white, but you're thinking in color".<sup>46</sup> (Adams was always proud of the fact that he could look through the viewfinder and envision the entire landscape in black and white.)

George Tice may sum up what many black and white photographers, including Nicholas Nixon, Lee Friedlander, Garry Winnogrand, Yosuf Karsh, Arnold Newman, Avedon, Weston, Baltz and Papageorge, feel: "I don't especially like color photographs and my vision is of a monochromatic harmony that can't be done in color."<sup>47</sup> (It's interesting to note that the world's most famous living photographers - and best publicized - i.e., Adams, Karsh, Avedon, Hiro, still firmly adhere to black and white for their "serious" personal work; Avedon, Karsh, and Hiro also do much of their commercial work in black and white.) Irving Penn once said that he thinks of great photography only in terms of black and white.<sup>48</sup> And though Hugh Edwards (long time curator of Photography at the Art Institute of Chicago) once told Danny Lyon that "Color pictures are what you get when you put color film in the camera", it could never be that simple for most photographers until the late 1970's. After William Eggleston's color show at MOMA in 1976, Jane Livingston (a curator at the Corcoran Gallery) noted that "[Eggleston's color] uncapped stores of discomfiture about color photography".<sup>49</sup> This was true<sup>50</sup> and one could mistake these biases with

outcries from previous decades (and the 19th century). While many critics echoed Tony Hiss's 1979 notion that "color photography is such a new art form that it hasn't yet developed an art history of its own",<sup>51</sup> others naively dealt with color as a direct descendant of the commercial work of Muray and Outerbridge.

When asked in 1977 why he was using color materials Joel Meyerowitz replied "Because it describes more things." Later he explained that

*Color plays itself out along a richer band of feelings - more wavelengths, more radiance, more sensation. I wanted to see more and experience more feelings from a photograph, and I wanted bigger images that would describe things more fully, more cohesively.*<sup>52</sup>

Meyerowitz probably speaks for the dozens of photographers who slowly dropped many of the built in biases against color. In reviewing The New Color Douglas Davis states that

*color photographers no longer strive to justify their efforts by being 'colorful'. They are concerned instead with the meaning of the image, with perception. Color, now, is simply a means to an end.*<sup>53</sup>

It really is hard to believe the dust has settled so quickly; after all, Szarkowski said (in reference to the Eggleston show) "I think he is inventing color photography."<sup>54</sup> Jane Livingston said that, "[after Eggleston] color photography will not be what it was before".

If we believe Szarkowski, color photography is now six years old - as they say: 'the more things change the more they stay the same': we seem to come

full circle with Pepe Karmel's remark (about the New Color that, "Color, paradoxically has always seemed less real than black and white. It's tendency toward exaggeration threatens the sincere decorum of 'realist art photography'...color's very unreality may hold the key to the exposure of our realest inner lives."<sup>55</sup>

Where do these confusing statements leave this discussion of delaying biases? As recently as 1971 A.D. Coleman admitted that "few [color photographs] achieve anything beyond a momentary gratification of the retinal synapses"; he also believed that due to our continued ignorance of the effects of color on perception, it was nearly impossible to make a good color photograph - most photographers were just "making pretty pictures". In reasoning the difficulties of color Coleman noted:

*The abstraction inherent in black and white (which is actually not an abstraction at all, since we perceive in tones and not in colors, but we sense it as much) makes possible layers of meaning which are beyond the reach of color photography - or in other words, color photography is too damn "realistic" for its own good.*<sup>56</sup>

(In a note to himself Edward Weston said much the same: "As a creative medium, black and white photography has, at the start, an advantage over color in that it is already a step removed from a factual rendering of the scene".)<sup>57</sup>

Now we have heard nearly every reason why color should stay in the hands of snapshooters and commercial photographers - where it has always been; nonetheless, it is ironic (and not fully explained) why amateurs and hobbyists were so slow in wholly switching to color. In any event, the reader should not be confused by the recent emphasis on creative photography

this section has taken; I do not wish to imply that the small relatively ineffectual community of color art - photographers (or their black and white counterparts) have had any impact on mass sensibilities about color. Those who expressed biases have contributed to the delay and neglect of color in a more direct manner: all have contributed to the extended pigeonholing of black and white with serious intent, and color with frivolity, prettiness, or commerce. Of course, much of what has been said about advertising and color is still true: color is yet the pivotal factor in selling cars, clothing, liquor, aspirin, and sex. Hugh Hefner (or any other erotic publisher) would laugh a photographer out of his office if he proposed shooting a centerfold in black and white. The same would happen to any art director proposing a beer, jeans, cigarette, or magazine (such as the color laden Life) advertisement without color shouting at the viewer.

It seems one can still make a strong case for the fact that color is irreparably tied to selling<sup>58</sup> and that black and white is almost dead with the advertising pages, television, and the snapshooter.<sup>59</sup>

## THE PRECEDENT OF BLACK AND WHITE RENDERING

### AND ITS INFLUENCE UPON COLOR USE

With such a lengthy heading, it becomes risky to offer up a series of remarks on black and white vs. color-especially when we have already read many remarks pitting the two against each other. Nonetheless this chapter will discuss a very different topic: black and white is much like the very first dictionary for language - it is the first dictionary of photography.

Color has always been out of place in historical or theoretical discussions of photography; the history of photography (whether in our minds or in written form) to most individuals is black and white. In 1976 Mary Rourke wrote that "color has always been the unwanted guest of photography."<sup>1</sup>

Much can be said about the spectre of black and white materials and their use: black and white became the yardstick by which we would measure color. This yardstick was used in every evaluation and comparison, whether it regarded the economic, aesthetic, or practical feasibility of color. What follows is a series of examples of this monochrome 'yardstick' sensibility.

While we have already discussed Walker Evans at length, his remark on this topic is a paradigm for the entire section: He stated that the test of a good color photograph was "whether it would make its point in black and white."<sup>2</sup> Max Kozloff finds this and the dominance of black and white perverse:



*viewed from the perspective of all the other full-blooded camera media, serious still photography in black and white offers a very archaic spectacle. How fascinating and peculiar that it has dominated its field even to such a far-fetched moment as today.*<sup>3</sup>

Clearly black and white has dominated because photography was invented (or 'born') in monochrome - it is the birth right of the technology; no matter that we had the impulse to color the first deguerreotypes.

John Upton has pointed out that the continuing debate over whether photography was art helped to stifle the growth of color photography.

He explains:

*When color photography was first successfully accomplished it seemed even less acceptable as an art form than the black and white photograph, for the color made the image seem too concrete, too everyday...If the early photographers had their hands full trying to justify the black and white photograph as fine art they were hardly up to defending the color photograph from the critics' claim that the mode of reproduction, being so mechanical and offering so little opportunity to modify the result, obviated its aesthetic standing.*<sup>4</sup>

An example of this attitude was expressed by T.F. Goodall (a 19th century landscape painter and photographer) in the 1886 A Painter's Philosophy:

"when photographs can be taken in natural color, then will be the time to discuss the probable dying groans of painting." Alfred Stevens was convinced that color photography would replace painting: "The wonderful invention of photography is far below the level of art, even if it were possible to reproduce colour, photography would still be inferior to painting."<sup>5</sup> In the late 1800's Edward Burne-Jones remarked: "I suppose by the time the 'photographic artist' can give all the colors as correctly

as the shapes, people will begin to find out that the realism they talk about isn't art at all but science."<sup>6</sup>

In the January , 1908 issue of the Century Magazine, J. Nilsen Laurvik summarized the painter's near tolerance for monochrome and intolerance for color:

*though art bodies and even painters were willing to accord monochrome pictorial photography a place among the arts and even to admit that in some of this work there was a beauty, a grace, and a truth different from what had been presented in all the realm of chiaroscuro they still postulated that color would always remain solely the sphere of the painter. The crude attempts at color photography that appeared from time to time only served to discredit the possibility of anything worthy ever being achieved in this field by photography.*

In the April, 1903 issue of Camera Work, R. Child Bayley felt compelled to assure the readers who were fearful - because of color- of a new neglect of black and white, that "photography in natural colors... is simply impossible in the present state of our knowledge." Also noting the occasional color photographs that were appearing in various exhibitions, Bayley then allayed fears that "photographs in natural color" will soon "cover the walls" saying this could never happen to the "complete exclusion of the old monochrome pictures".

In the 1917 American Annual of Photography, Wayne Morris asked:

*Has the photographer-amateur or professional-ever lived who has not dreamed of reproducing on the sensitive plate the colors of nature as they appear on the ground glass....? Color is so much more interesting than black and white that one does not mind the extra pains required. And besides it has many advantages. Little attention need be paid to composition.<sup>7</sup> The colors have a way of their own of balancing a picture that is surprising. Besides this, black and white prints made from*

*[Paget negatives] show a color value rendering that is simply impossible to get any other way.*

Color can even give us the best black and white prints (if we get bored with color)? All this must have been utter blasphemy to the monochrome aficionados of the day. In the same issue of the Annual, David Sheahan adds more fuel to the fire; in describing various offbeat uses of the autochrome, including the soft focus lens, he states:

*By use of this lens the most wonderful blendings of color can be obtained. Pictures can be made which resemble Corots or Turners, and the colors, instead of being sharp look more as if they had been laid on with a painters brush. It is this class of picture which appeals most to artists and go a long way towards showing them that the camera is just as legitimate a means of making pictures as is the painters brush.*

(Of course it was that kind of logic which encouraged Lewis Hine, Paul Strand, and Walker Evans (to name but three) to turn 180 degrees and look for the basic grammar of photography in black and white.)

The black and white tradition has always begged the question, 'why does this picture need to be in color? The obvious answer- that color shows more - was not sufficient for monochrome workers. Hence, when we turn to the color Hollywood portraits from the 1920's, 30's, and 40's that John Kobal recently resurrected, we find that there is no room for the question. The images scream with color, to make color photographs - of any type - shout with color was a knee-jerk reaction to the established restraint and dullness of black and white. And, that knee-jerk response continues, unharmed up to the present: It has been frequently mentioned in the Penrose Annual, for example, that color advertisers always wanted

"a lot of color for their money" - meaning that expensive color printing had best avoid subtle or quiet color, the color should be soaked into the page with saturation and richness.<sup>8</sup>

This obsession with thick, boldly stated color helped to distance black and white theory from its color counterpart: In Carlos Clarens' introduction to Hollywood Color Portraits, he ties the commercial goals of saturated, albeit unbelievable color, to the emerging color attitudes of the Technicolor corporation. While Clarens did not pursue this tangent, I will.

Of course, Technicolor materials, while being the first successful color stock used professionally, met with black and white - based resistance as did still color materials (Cecil B. DeMille's remark was somewhat typical of the limited resistance). In an article dated July 6, 1929 from the Exhibitors World Herald, some of Dr. Herbert Kalmus's (the M.I.T. instructor who, with a consortium of Institute colleagues set up Technicolor<sup>9</sup> in Boston) more unusual 'color vs. monochrome' tests are documented. Kalmus found that, after a retinal examination by an oculist, audience members (and whole groups) who had viewed a black and white movie, and then a color sequence, were having less eye fatigue with color. Kalmus was interested in discounting the ideas that "black and white film is accepted by audiences because they are trained to expect it - and that the subconscious mind has learned to focus on story and forget absence of color."<sup>10</sup>

In the same article Terry Ramsaye of Pathe states: "Who wants natural color- we want color for the emotional effect...if people wanted what was natural they would live their own lives without going to the theatre for synthetic experience."

While Kalmus admitted that in the first year of Technicolor "color was used to bolster weak films or lame ducks", (and that this damaged the credibility of color use) nonetheless, it was an unstoppable requirement for added realism. In predicting color's future Kalmus noted:

*While color photography, as it is now, is not tiring to the eye, the eye loses consciousness of the fact that it is watching color after the first few hundred feet. Therefore it is believed color in the future will be used largely in inserts to emphasize an emotional effect, rather than be carried all the way through a picture.*

This use of inserts was popular for a while - most notably in the Wizard of Oz, however Hollywood soon wanted feature length Technicolor movies and Kalmus's company quickly experienced rapid growth and technical expansion, including the naming of his wife Natalie as a key 'color consultant.' Mrs. Kalmus was put in charge of the already overbearing Technicolor crews of consultants and supervisors who controlled the color cameras, lighting, processing, etc. Technicolor was soon obsessed with "giving all the color a studio could pay for;" Mrs. Kalmus oversaw the process of 'designing color' and sets for the narrow palette of technicolor materials - often prescribing color schemes, vetoing 'clashing' costumes, and resorting to dyeing entire project costumes to meet her demands of proper color. Of course, this intolerance for natural, un-retouched color paralleled the use of heightened exaggerated color schemes in still advertising work as well as the gaudy portraits in Kobal's book.

The color fussing and enhancement practiced by Kalmus and the still commercial photographers helped to set apart black and white from color even further. Color was devoid of content, being all that was gaudy, loud, garish and overbearing to the black and white workers.

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#### Color Reproduction vs. Monochrome

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The precedent of black and white materials also greatly affected printers ability to reproduce color. In comparison to half-tone monochrome printing, the cost of changeover and re-tooling for color seemed incredible. All printing technologies in place prior to the rise of color reproduction centered on black and white and were priced accordingly. Color instantly meant 3 more passes on the press, refined registration systems for four colors, and the invention of compatible color separation techniques. In a black and white context, these changes meant more man-hours in printing and pre-press work, higher costs, and frequently poor or disappointing results.

Clearly, using black and white - in many applications - was easier and more direct; for many, color meant the intervention of too many hands, whether in processing, manufacture, or reproduction. Although Paul Outerbridge, one of the great sellers of color, was willing to admit in 1940 that

*Color photography in the present state of development, even with the easiest processes known, is not quite as easy as black and white nor is it as fast, and furthermore it costs more.*

His one consolation for color was direct, "In black and white you suggest; in color you state."<sup>11</sup> Outerbridge was sure, in 1940, that the 'monochrome vs. color' debate would have a simple fate: "Black and white will [eventually] occupy the same place in relation to color as it does in an art exhibition - one small room off the entrance for the etchings and lithographs." He also, paradoxically, supported monochrome purists by acknowledging that "the general mass of not-specially-intellectual people react more quickly and strongly to color than to most subtly contrived and balanced schemes of black and white tones."<sup>12</sup>

In his popular 1955 book The Creative Photographer, Andreas Feininger also fueled the attitudes that color was less "intellectual" than black and white and that it was uniquely suited to commercial ends. Denying the abstractions of monochrome, he notes:

*If color were important to the comprehension of the subject, its absence would tend to make the subject - a face, for example - difficult to recognize. But I've never heard of anyone having trouble recognizing a face merely because it was rendered in black and white instead of color.*

Feininger believed that color only affected the "impression" conveyed by a picture, not its "readability." In outlining the values of monochrome over color he explained.

*Black provides strength; white provides radiance and luminosity. Together black and white are more than a substitute for color. Their combined effect is equivalent to the creation of new values - graphic values which in this form do not exist in nature -*

*which more than compensate for the loss of color...  
[because of the many shades of gray attainable]  
black and white photographs can give impressions  
of roundness, volume, and depth that are difficult  
to accomplish in any other medium and impossible to  
surpass [with color] ... Since human color perception  
is highly subjective, even slight deviations from  
the color rendition considered to be correct are  
usually sufficient to make certain photographs actually  
appear less naturalistic than photographs in black  
and white.*

Feininger later describes an attitude about black and white which exemplifies the odd mystique related to these materials:

*a black and white photograph is often preferable to a color shot because it offers the photographer greater freedom for creative symbolization of some of those subject qualities which have to be interpreted because they cannot be depicted directly: strength, power, sadness, tragedy - qualities which can be suggested best with the aid of stark and graphic black and white, contrast, and darkness.<sup>13</sup>*

While not a prominent intellect in photographic theory, Feininger's plight may rest with reiterating cliché's about color and monochrome; certainly, the above remarks will display prevailing sentiments about black and white in the 1940's and 50's. Barbara Bullock contradicts many of Feininger's remarks in discussing the color and black and white work of Wynn Bullock:

*For [Wynn] color helped express the beauty, richness, and potency of light as a living force. Abstract [color], images enabled him to get close to the essence of universal qualities.<sup>14</sup>*



Bullock was, however, disturbed by the common reaction to these images as "pretty" - this, plus his lack of room for home color processing, eventually caused him to drop color.

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## Conclusion

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I have attempted to demonstrate that black and white was the constant rubric by which we measured the relative worth and value of color rendering. This yardstick is still in use and we find a contemporary example in Ben Lifson's remarks on The New Color; because he sees much of this work tied to the "long tradition of serious photography and the longer tradition of painting" Lifson asks "Why are these pictures in color?" He explains:

*One would expect a color photography [sic] to be about colors as meaningful aspects of what's described and as meaningful parts of color pictures made with a camera - an idiom of photography, about color, about photography and of color...There are a number of black and white photographs made with color materials<sup>15</sup> that is photographs whose vocabulary is mostly tonal.*

Later, referring to this type of picture he remarks "None of this would lose anything essential if translated into black and white." All of this, needless to say, sounds like old, familiar saws. In citing the "most successful" color photography - that work produced by Stephen Shore and William Eggleston - Lifson proclaims more familiarities: "[both] have discovered the counterparts in color to the great black and white tradition's illusions of stripped down camera vision. Anyone who has photographed in black and white knows that to do this and also make beautiful pictures means standing where the black and white photographer seldom does [sic]."

## THE SINGLE PROBLEM:

### A SIMPLE NEGATIVE/POSITIVE COLOR TECHNOLOGY

If we accept the previously established importance of the amateur market within the general photographic industry, we can then proceed to analyze one of the most crucial factors in expanding the use of color materials as well as a pivotal issue related to the neglect of color: the protracted search for a workable negative/positive color material that was conducive to standardization. This section will discuss the history of that requirement, experts remarks related to it, as well as the effects of the absence of such a system and some of the materials/processes which were proposed during the years ranging from 1890 to 1942.

By this point it may be laboring the point to discuss the importance of a negative/positive system to color's acceptance - it has already been mentioned a number of times in this paper. However, the question remains 'why did it take so long?' As Dr. Kenneth Mees (of Kodak) explained: "most people want pictures either as prints to put on the walls of their rooms or in such a form that they can hold them in their hands and examine them".<sup>1</sup> If this only implies that the color market needed a viable print technology then we are misled; a key to widespread use of color was the introduction of a color negative material. Like its black and white counterpart, it must have wide exposure latitude (unlike the countless transparency-based systems which have overshadowed the history of color developments); the shortcomings of transparency materials are well known: in addition to having no exposure latitude, they are difficult to view

without the required purchase of a projector, and until the 1960's, there was no workable print material devised for transparencies that could serve a large market. (Cibachrome, the first successful print material for positives, was thought to be sub-standard and expensive for many years. Although introduced in the 1950's, it had poor color and contrast range not unlike Kodak's reversal print material, "Type R".) Nonetheless, throughout the years companies persisted in trying to sell transparency based systems to professionals and amateurs as the standard working base. Kodak's 1915 two-color Kodachrome was just such an attempt which met with utter failure due to its positive orientation and limited color range.<sup>2</sup>

If we examine Gert Koshofer's (a German color historian)<sup>3</sup> catalogue of key color products-which ranges from 1890 to the present and includes only materials marketed at one time or another - we find the tally numbers roughly 200; we also see that negative films and color negative printing papers were virtually non-existent - with the exception of obscure negative/positive materials like the Piller process of 1928. Transparency materials abounded. Koshofer's compilation is evidence of one key fact: with the advent of chromogenic coupler-based materials in the mid-1930's, it is clear that a film negative material was not a major technological impediment; the overwhelming impediment was the development and refinement of a compatible paper print material. This will be discussed in later sections.

Another key aspect is the pigeon-holing of color photography: Color invention and innovation has always been bound by current markets (of the time) and manufacturer's interpretations of the commercial climate.

Therefore, if color continued (as it did) to be primarily used for commercial advertising and reproduction, then transparency or positive-based technologies would, in most cases, serve this narrow-scope market. In other words, evidence indicates that a color negative and print material could only surface when commercial (established) markets indicated demand. Evidence from Agfa<sup>4</sup> and Kodak can also contradict this idea: a workable, negative generated print technology simply wasn't available until the early 1940's, and this technology was so wrought with problems that it really didn't reach a proper level of repeatability and quality until the early 1960's.

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#### Calls for a Color Negative and Print

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In order to gain a better view of the demands for a color negative and print, we should back track. While The Philadelphia Photographer and Photo-Era regularly ran articles in the 1860's on some aspect of color photography, the key issues were clear: 1) All workers were bemoaning the absence of a "direct method" of photographing in "natural colors"; most believed this could never be accomplished. 2) Many others simply adapted the monochrome system to hand coloring with aniline colors. A strong factor, however, in increasing the demand for a direct color technology was the continuing problem of color stability. In the May, 1865 Philadelphia Photographer Albert Leeds remarked on this problem and the instability of aniline colors: "It is hard to speak with certainly about [aniline] permanency, for, when used as dyes, they vary greatly in this respect.

Hand coloring did continue to thrive and inventors and colorists tried an enormous range of colors before the most workable, stable solution was found - the use of painters pigments on paper prints.

Thirty years later, in the May 1893 Wilson's Magazine we find a rather perverse suggestion for those demanding a color print. In hailing their first 3-color photo-engraving in the magazine, Edward Wilson excitedly states: "The proof [of color's advent] is before us. It is a great deal done when the many thousands required for our magazine were printed in less time that it would require the lithographer to make ready his stones, and at a price which no gelatin process can afford". Apparently believing that the reproduced color image could be more valuable than an original color print he notes:

*[this is] no tenderly manipulated glass picture requiring the cooperation of a double and a triple, with a lantern or an optical machine to make it give up its color, that we now offer as proof of the very highest reach to which photography in natural colors has attained.*

(The image reproduced was a photograph by William Kurtz who collaborated with Dr. Vogel and Herr Ulrich.)

As has already been demonstrated, the literature is filled with excited announcements about new solutions to the old problem of color prints. In the October, 1905 Photo-Era, Dr. E. Koenig directly addresses the absence of a color print process:

*the principle reason why three-color photography, which is of the greatest importance in the graphic arts, has not yet been commercially applied, is to be looked for in the want of a suitable printing process*

Later, in citing Gros's testing of leuco-compounds at Ostwald's lab,

Koenig notes the several limitations of color printing:

*the production of the pictures is so extremely difficult that few are able to produce acceptable colored prints. Not the least difficulty of the old methods is the impossibility of following the progress of the printing process with the eye [total darkness was required.]*

In spite of the color research efforts that both Agfa and Kodak mounted in the first decade of the 20th century, there remained a critical obstacle in resolving a color print technology; the nature of color innovation. In comparing color progress to that of work on the airplane and automobile, Marcus Lovelace, in the 1918 American Annual of Photography noted the many "arrant imposters", and fraudulent inventors who were regularly trumpeted in the photographic journals: "The strange part of color photography... is that it is the work of amateurs, tinkerers, and handymen".

From many quarters, during the first three decades of this century, there simply wasn't enough interest in bringing color to the general photographic market (in the form popular with monochrome materials). In the 1930 Penrose Annual we find this remark: "To imagine that dividends can be paid to shareholders in a process that seeks to supply the public with snapshots or portraits in color is extreme foolishness". In fact, according to Kodak chemist W.T. Hanson, "Things were going well without color [at Kodak]. In 1929 at the height of the business boom, [black and white] sales reached 100 million dollars".<sup>5</sup> Hanson also affirms what has been mentioned earlier; while citing the common fact that in 1935 the basic principles of additive and subtractive color had been known for 70 years, he also

concedes that "still color photography was largely limited to graphic arts [magazine] applications".

In the 1938 Penrose Annual R.B. Fishendon notes the surprising popularity of the Vivex color print system and the effects of "grainless" Kodachrome and Agfacolor upon four-color printing/reproduction. Fishendon's key point, however, rested with expressing his 'greatest' hope that "[there would be] a process devised along the lines of Kodachrome and Agfacolor for paper printing; colour photography would indeed have [then] reached a stage to satisfy the lay mind".

Indeed one of the great faults of all color print technologies up until the late 1950's (with the excepted, simplified Ektacolor system) was their complexity: The simplicity of black and white always provided immediacy to the photographer. As many 1920's, 30's, and 40's writers noted, "one could nearly make a painting in the time it took to produce a decent color print".<sup>6</sup> This was true of the autochrome print process (and most screen processes which had tandem print materials), Uto-Color, Sanger-Shepherd, Wash-off relief, Carbro and the Kodak-processed Minicolor and Kotavachrome. The industry did not have the immediate response of altering these complicated print systems; rather, they chose to put color processing in the hands of commercial (processing) labs.<sup>7</sup> (It was the complexity of making color prints which frustrated Steichen and Callahan,<sup>8</sup> for example, to the point of dropping color or resorting to outside processors.)

Of course, the snapshotter never wanted to do his own processing, but complex print systems (with the exception of the 1950's Ansco Printon) greatly deterred the amateur from 'returning to the darkroom' after the advent of color; amateurs were the basis of a lucrative market when black and white was photography's mainstay, and home processing was simple and enjoyable.

In Joseph Friedman's review of color materials in 1941, he continued to echo what every writer seemed to be singing in unison: "even colored transparencies, as made by Dufaycolor or Kodachrome, have only very limited uses. Colored prints on paper are what are really desired".<sup>9</sup>

In Jack Wright's 1947 article "The Story of the Color Slides Salons", he accounts for the explosive popularity of color slides (and clubs) by the absence of prints and the difficulties amateurs had in striking them from film positives. Slide clubs and salons grew at a phenomenal rate in the late 1940's due to the improvements of Kodachrome and Agfa Color New, as well as the simplicity of slide exhibiting - one projector could serve a large audience quite adequately; Had they been available, however, color prints would have served these clubs well. Most members did not enjoy subjecting their valued originals to mailing and handling. And, as mentioned earlier, manufacturer-printed prints were not looked upon favorably - most companies took 4 to 5 weeks to process a roll of color prints.<sup>10</sup>

The control of processing for color materials by the manufacturers (through the ploy of selling processing with the film) limited competition and retarded the development of local, faster photofinishing services. Hence, even in the late 1940's, when both Agfa and Kodak had negative and



print materials on the market, this factor along with the obvious cost differences between (cheap) monochrome and (expensive) color, helped to stifle the public's impulse to switch to color.

A color negative material - in spite of the firm popularity of color slides in the 1950's - coupled with a chromogenic paper print system was the key to monochrome - like simplicity; by the early 1950's all manufacturers knew that color could only surpass black and white if the two were equally foolproof - the latitude of the negative/positive system was only part of the solution. Chemical processing steps had to be reduced as well as layer coating problems. In the 1947 American Annual of Photography, Lloyd Varden explained, "the public is not sufficiently educated photographically to obtain under various conditions as consistent results with color materials as with black and white materials. Results are therefore frequently dissatisfying, which discourages the continued use of color materials for picture taking." In noting the many individuals who had predicted, like Outerbridge, that color materials would soon replace black and white, Varden pointed to all of the above problems as significant factors which would help to keep black and white on top for at least two more decades.<sup>11</sup>

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#### Refinement of Coupler Technology

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The obstacles tied to simplified color photography now lead us to a discussion of integral tri-pack films and the difficulties involved in manufacturing a print material that was repeatable and conducive to high-speed photofinishing. Early on, both Kodak and Agfa realized that incorporated protected coupler materials were strong candidates for a

standardized color product - basic coupler technology was integral to the first subtractive tri-pack color material that was negative/positive. That product, Agfa Color Negative, introduced in 1939, was slightly different (by not employing the protected coupler) from the Kodak Kodacolor system of 1942 and Ektacolor -introduced five years later in 1947. Standardizing on coupler systems was convenient and profitable for manufacturers. World photographic markets have now (uniformly adhered) and standardized on protected coupler materials for the key color product, color negative films and compatible print materials. There are not separate materials (that are chemically different) for the professional, portrait, amateur, and snapshot/candid markets; all of them use films and papers that employ the same basic coupler technology - and the same processing requirements. Eastman Kodak succeeded in creating this standardization with their negative based materials; other major manufacturers soon learned that their materials could only succeed if they were process compatible with Kodak's. Unfortunately the technical problems which were responsible for the protracted acceptance of the negative-based materials in the 1940's are quite similar to the reasons why Kodak and other manufacturers now want to drop the outdated and problematic coupler technology. Dropping coupler based, chromogenically developed materials becomes an insurmountable task, however, when one realizes that, beginning in the late 1950's, expensive processing equipment all centered on this material, and equipment in place today - world wide - is all built for chromogenic materials. Changing basic coupler technology would instantly render all world processing machinery obsolete. (Kodak's recent introduction of the film-disc camera sent ripples

of fear throughout the world film processing industry. The new discs require processing systems that would demand 're-tooling' for all current machinery; Kodak could only allay fears and protests by offering to underwrite this changeover.)

Though this discussion has had an eclectic scope - in explaining the issues related to product refinements - we must back-track now to assess one of the earliest impediments to prints from color negatives - the problem of paper itself. It has always been difficult to manufacture thin paper stocks which will conform to various coating substances over a long period of time. Indeed multiple layer coating on paper proved far more difficult than the complexities of coating acetate film bases. In addition to cyan, magenta, and yellow coupler layers there is a gel overcoat, gel inter-layer (or UV absorber), another gel inter-layer and a reflecting base. With most positive based print materials, paper simply couldn't be used due to the caustic nature of the bleaching process. In the case of Kodachrome prints Mees points out that "When paper was first tried as the base, difficulty was encountered with stain and mottle. It was overcome by the use of white pigmented film base.." <sup>12</sup> With Kodacolor, Ansco, and Agfa the prints chief problems were the absorbency of the paper base and the tendency of processed, slightly aged emulsions to crack and chip. The basic problem of cracking emulsions on color paper was not solved until the introduction of resin coated materials in 1968.

In addition to cracking emulsions, paper prints exhibited problems which were well known to snapshotters and amateurs - namely coupler print-out, and color fading; print-out, as explained earlier, was extreme yellowing due to non-reacted couplers

acting upon the formed image. Regarding fading colors, Kodacolor prints as an example - between 1942 and 1953, have proven to be extremely unstable and it has become impossible to locate a single print from this era that has survived in normal condition - most have faded to monochrome.<sup>13</sup>

Snapshooters have probably been aware of these problems of color stability, yet they seem to quickly equate them with the fading of newsprint, fabrics, wallpapers, and carpeting; stability problems have never halted or slowed the use of color materials in the last 30 years. In fact, the only expressed demand by this market has been for improved, more realistic color rendering. The absence of effective integral masks caused many of the problems related to inaccurate or shifted colors in the 1950's; developer dependent masking systems quickly improved, and by the late 1960's most negative films could boast good color fidelity and saturation. (It was because of poor color quality that amateurs and snapshooters - from the late 1940's to mid-60's - experimented with color while shooting personal and family images with black and white.)

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#### Portraiture and The Negative/Positive System

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With the small scale portrait business - which was usually family owned - these problems in adopting color were also predominant. By the 1940's the portrait business was a key market in the photographic industry, yet it was as slow to adopt color as the amateur sector. The black and white portrait, embellished with color by hand, was their primary product until the mid-1960's. This is explained by a series of reasons: most studio owners were not financially able to purchase in-house color processing and

printing equipment; they were also reluctant to 'farm-out' this processing work because of the 'built-in' requirement of retouching and enhancement - which was preferably done in-house. A final factor was influenced by the cost of color. Hand colored portraits (which were, as a rule, competently and subtly colored) on monochrome paper were much cheaper than their color counterparts and much more stable; and, until the improvements in professional color negative films - especially with Vericolor - most portrait photographers were hesitant to hinge their work on new, untested materials. After all, the negative is all important in portraiture - it must be preserved for possible future re-printings; as an original it is central to their operations.

When Ektacolor film materials<sup>14</sup> were introduced in 1947, they were aimed directly at this market. In the Penrose Annual this material was heralded not unlike color innovations of 70 years earlier:

*The dream of photographic research men for many, many years has been a negative/positive full color process which would reduce color photography to much the same simplicity that exists in black and white...a long step in this direction has been the introduction of Kodak Ektacolor negative film.*<sup>15</sup>

Employing a residual coupler dependent orange mask and DIR (developer inhibiting reaction) water-insoluble couplers, Ektacolor was a genuine advance over Kodacolor negative materials of the previous decade and it singly advanced the use of color in commercial portraiture.

In the 1956 Penrose Annual, however, we still find strong lobbying for a professional negative and print material:

*there are many new fields yet to be conquered  
however, and the ultimate aim [of the professional]  
is a facsimile negative and positive colour print  
process on paper...in advertising for obvious  
reasons we must be able to guarantee [accurate  
reference]colour prints on paper.<sup>16</sup>*

In spite of the changeover to sheet transparencies in the late 1930's and previous evidence indicating the viability of film positives, it is a fact that the negative/positive system was as important to the commercial product photographer as it was to the portraitist. Muray, Keppler, and Outerbridge were all masters of the carbonyl process because it not only offered the best camera-ready original, but it was the source of the crucial reference print which was used as the printers guide. While it is mistaken to believe that the negative/positive system was only vital to the amateur/snapshot markets, it is also true that in current practice transparencies are the primary materials for fine four-color reproduction; color reference prints continue to play an important role in this structure, nonetheless.

## CONCLUSION

It should be understood from the outset that this thesis has not been an attempt to reach conclusive determinations through traditional statistical samplings. I did, however, conduct extensive physical surveys of the literature at both the Polaroid Research Library and the George Eastman House Library/Archive. My methods in analyzing and using these materials were not scientific - I did a good job of scratching the extensive surface of color's neglect.

I have attempted to demonstrate a number of key considerations:

1) Until recently, there has been only one way to write the history of color - to describe the series of failures and chemical engineering breakthroughs while highlighting the few proposed systems capable of wide market application and standardization. Color History is one-dimensional in comparison to black and white history because color did not see widespread use until the late 1950's and 60's. 2) Most aspects and factions of color photography are inter-related; viewed in the context of color technology, marketing, and general use - color must be assessed and discussed synergistically.

Another aspect in the neglect of color may be quite elementary: accessible color print processes that were not time consuming have never been viewed as a singularly viable commercial market when compared to other markets of color use which represent large sales volume and excellent profit margins, i.e. color paper and chemical sales to the photofinishing industry. Hence, the regrettable absence of a color legacy is largely tied to the search for a single lucrative market of color - the amateur sector.

Color will probably continue to always be viewed as a separate phenomenon-something to take special notice of. This is not the case with motion pictures: we matter-of-factly assume all movies will now be in color and the 'color scheme' of a movie is rarely discussed anymore - the same is true of television. (Ironically, separate "color" credits continue to receive prominent billing in screen credits for all commercial and non-commercial movies.)

Silly as it may sound, this paper has been a lament over the lack of a serious picture history of color photography; it has been designed to ask questions about limited color use and the factors which kept color primarily in commercial avenues. Articles about the F.S.A. color experiment only inflame the question of why more color work wasn't produced. Did the absence of color in still photography help to diminish its place along side motion pictures? Did the predominance of black and white help to pigeon-hole still photography as an unrealistic, curious artifact in comparison to movies? Certainly, the foremost art form in most developed countries is now film - that predominance can only continue. Film is the most believable and realistic art form we know of; conversely, still photography seems to be losing its place in our questionable visual literacy. It is becoming increasingly arcane and eccentric, in part practiced by a shrinking group of individuals who speak a coded, esoteric language - still grappling with the elementary powers and accomplishments of photography in its heyday. Had color come into still practice sooner - without the many delays and ties to commerce - it may have helped photography hold a more stable, respected



position among serious visual arts. Can we construe the allegiance most serious photographers and photojournalists held with black and white as a failure to establish a true photographic vocabulary and syntax?

Clearly, this thesis may be a rather helpless statement of regret over what might have been and what was. Yet when Louis Stoumen writes (in Photo Notes) of Edward Weston's color work that "Here was no candy-counter color, no advertisers dream of a rainbow...Weston's color functions and lives...it is not something added to his monochrome vision...it is a new vision",<sup>1</sup> we should collectively wonder why color is not a greater portion of our visual history. And, when Ben Lifson notes of the F.S.A. color workers that "the power of their [color] images comes from what they discovered it could add to their formidable command of [photography's] vocabulary of draughtsmanship, timing, and graphic and tonal structure", we should then also wonder about the latent possibilities of color. Lifson went on to describe, at length, the eerie effect of seeing a world in color which was belived to be black and white - then prompting the questions, 'what did the world really look like?' What would our photographic history show us if all the images could be converted to color values? Lifson remarked,

*as color brings us one step closer to what the photographers saw, the familiar details of the more abstract black and white photography's Depression are suddenly not so familiar, nor are the conditions of the poor so easily summarized.*<sup>2</sup>

Finally, it should be emphasized that this thesis was not predicated on the belief that there wasn't enough color produced during its brief history.

Rather, it is a consideration of what has been found and what will be found; we will continue to be assaulted with color materials culled from dusty regional archives, basements, and attics. The problematic part is that so much of this will be of little consequence, and yet, will meet with ascribed significance due to its 'rarity'. Color was the unwanted guest in photography and that cannot be changed.

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## Introduction

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1. Georges Herscher, The Autochromes of J.H. Lartique 1912-1927 (New York: The Viking Press, 1981); p.3
2. Both Reese Jenkins and Carl Ackerman have stated that Eastman conceived the idea of the amateur photographer.  
  
Carl Ackerman, George Eastman (Clifton: Kelly Publishers, 1973); p. 72.  
  
Reese Jenkins, Images and Enterprise (Baltimore: The Johns Hopkins University Press, 1975); p. 300.
3. The Columbia University chemist, Lloyd Varden, in both his 1947 article, "The Status of Color Photography for the Mass Market" (from The American Annual of Photography) and his latter introduction to Friedman's Color History volume, extensively discussed the inter-relatedness of the amateur markets to Photography as a whole; he has consistently emphasized the importance of amateur markets in relation to color innovation.
4. For a further discussion of this see the following:  
  
Douglas Davis "Photography", (Newsweek, October 21, 1974); p.68  
  
Douglas Davis "Color", (House and Garden, September, 1976); p.193  
  
Mary Rourke "New Frontiers in Color" (Newsweek, April 19, 1976); p.56
5. Personal Correspondence from Sally Stein, Columbus, Ohio; March 15, 1982
6. Fred Dustin "The Study of Color", (The British Journal of Photography, May 6, 1977); p.560
7. Interview with Mr. Ron Emerson (on tape), March 26, 1982; Rochester, New York/IMP/GEH.
8. Andy Eskind and Robert Sobieszek (of the Eastman House) have both emphasized that the picture collection is exceptionally diverse and does not exclusively represent 'Fine Art'/'Creative' photography; there is a full range representing many unknown documentarians, Hollywood stills, anonymous color snapshots, etc.

9. This documentation is discussed at length in the following article:  
A.S. Godeau "The Great Autochrome Controversy" (Portfolio, January-February, 1981); p.52
  
10. Lloyd Varden, The Theory and Practice of Photography-Color Photography (New York Institute of Photography, 1940); p.5
  
11. Louis Walton Siple, Margaret L. Brady Memorial Exhibition of Color Photography (New York, 1944); p.5  
  
See Also: Louis Walton Siple, A Half Century of Color (New York: the MacMillan Company, 1951); p.42
  
12. The most extensive documentation of color processes which eventually surfaced in amateur markets comes from Gert Koshofer's History of Color (in German) and the following:  
  
Gert Koshofer "System of Principles and Processes in Colour Photography", (Camera, July, 1977); p.34-44
  
13. Reese Jenkins, Images and Enterprise; p.303  
  
In his afterword to Eliot Porter's Intimate Landscapes, Weston Naef also discusses the failure of Autochromes (on p. 129).
  
14. Reese Jenkins, Images and Enterprise; p. 303-304
  
15. Estelle Jussim, Photographic Technology and Visual Communication In the 19th-Century American Book (Columbia University, D.L.S., 1970; University Microfilms); p. 161-162
  
16. William F. Stapp "Early attempts to Improve the Daguerreotype," (Image Volume 19, Number 1, IMP/GEH); p.8-9
  
17. Frequent mentions are made in the literature of Antoine Claudet's studio and the fierce competition that was fostered between competing studios for practical hand coloring methods; these studios were all after the best hand colorists, and would offer lucrative positions to lure colorists away from competing studios.
  
18. This onslaught of hand coloring patents is thoroughly described in the following:  
  
N.P. Lerebours, A Treatise on Photography (Paris: 1842)  
  
Alfred H. Wall, A Manual of Artistic Coloring as Applied to Photographs (London: 1861)

19. The slick, metallic surface of the Daguerreotype plate was the chief problem in devising adequate coloring methods which were stable and adequate in surface adherence; this is discussed at length in the 1842 Lerebours volume, and the 1861 Wall Manual.
20. An extensive discussion of Hill's damaging announcement can be found in the following facsimile edition by William Becker:  
  
L.L. Hill, A Treatise on Heliochromy (New York: 1856; State College Pennsylvania: 1972 Carnation Press)
21. In his book Color Photography, Eliot Elisofon - apparently speaking for many color workers of the 1960's - bemoaned the plethora of colorcalendars, postcards, and travel brochures which have become the legacy of color practice.
22. The following articles all mentioned the fact that color advertisers wanted "a lot of color for their money"; this meant that they equated rich, saturated color with the expense of color advertising.  
  
R.B. Fishendon, "Progress in Color Photography", (The Penrose Annual, Volume 40, 1938)  
  
W.A. Reedy, "The Ektacolor Process", (The Penrose Annual, Volume 45, 1951)  
  
Gilbert Cousland, "Thoughts on Color Photography for Industry", (The Penrose Annual, Volume 50, 1956)  
  
D.A. Spencer, Colour Photography in Practice (London: 1951, Focal Library); p.364

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Color Invention and the Turn of the Century: False starts and Failed Technologies

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1. Professor E. Stebbing "French Correspondence", (The Philadelphia Photographer, April 1876, Volume 13, Number 148); p.117
2. George Rockwood "Photography in Natural Colors. The Problem Not Yet Solved", (The Philadelphia Photographer, November 5, 1887, Volume 24, Number 309); p.645
3. Louis Walton Sipley, A Half Century of Color; p.105

4. Alfred Stieglitz "The Chassagne-Dansac Natural Color Photography," (Camera Notes, January 1898, Volume 1, Number 3); p.70

5. Though many excited, boastful notices appeared in the international press trumpeting the Autochrome, what follows is a brief listing of related (random announcements):

Frank Fraprie "Simple Color Photography Achieved", (American Photography, August 1907, Volume 1, Number 2); p.59

Alfred Stieglitz "The New Color Photography - A Bit of History", (Camera Work, Number 20, October, 1907); p.20

Charles Belden "Making Autochromes by Artificial Light", (American Annual of Photography, 1918); p.88

Anonymous "Color Photography," (Photo-Era, November, 1911)

W.C. South "The Advance in Home Portraiture", (American Annual of Photography 1915); p.58

6. Anonymous "The Autochrome Exhibits", (Camera Work Number 25, January, 1909); p.31
7. Eliot Porter Intimate Landscapes (New York: 1980); p.129
8. Telephone Interview with Sally Stein, March 7, 1982; audio tape.
9. Donato Pietro Dangelo "Stieglitz and Autochrome: Beginnings of a Color Aesthetic", (Exposure, 19:4, 1981); p.17

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#### The Delay of Color: A Chronology of Contributing Factors

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1. 1950 is cited as a beginning date because although Afga Negative was released in 1939 and Kodacolor in 1942 both materials were plagued with problems including short term instability of formed dyes, coupler printout, and poor color quality.
2. Edward Steichen "Color Photography", (Camera Work, Number 22, April, 1908); p.13
3. The relative inactivity at Kodak's first color research laboratory was discussed by Reese Jenkins:  
  
Reese Jenkins Images and Enterprise, p.303
4. Carl Ackerman George Eastman, p.231

5. Eastman made no mention of the fact that the Lumière's process was simply an improved version of the already patented McDonough process; he also failed to mention Dufay's Dioptrichrome - the process proved to be the best of all screen processes by 1911. If coupler materials had not been invented the process (and plates) would have likely succeeded with the introduction of cut-sheet Dufaycolor.  
  
See Also:  
Louis Walton Siple A Half Century of Color, p.117
6. Gasparcolor was fully resolved by the late 1920's; see also:  
  
Joseph Friedman, History of Color Photography (Boston: American Photographic Publishing, 1944); p.409.  
  
Louis Walton Siple, A Half Century of Color, p.141.
7. Most consumers were tolerant of the first two-year period of Kodachrome; because of controlled diffusion processing the processed positives were highly unstable, and exhibited radical color shifts. Kodak quickly put out articles (after the problem had been solved) assuring vast numbers of doubting users that Kodachrome was now 'bug free'.
8. Anonymous, The British Journal of Photography, August 4, 1933.
9. Interview with Walter Clark, IMP/GEH, March 25, 1982.
10. Further evidence of Kodak's uncertainty about the potential popularity of color was revealed by Ron Emerson during my taped interview of March 25, 1982: In a story originally told by Phillip Condax of IMP/GEH (The son of Louis Condax, a Kodak dye transfer researcher), the following information surfaced during a chance meeting between Condax and Leopold Godowsky while both were vacationing in the Bahamas. Godowsky revealed that Kodak had signed an agreement and contract with Mannes (and himself) which gave the pair a percentage royalty of every foot of Kodachrome manufactured, not sold; the contract also allowed a suspension of the agreement during war-time. Godowsky, who is still living in northern New Jersey, remarked that the contract was especially foolish for Kodak because Mannes and Godowsky did not have to rely on high sales to realize large royalties from Kodachrome. Apparently believing that color sales would be marginal, Kodak allowed a very lucrative arrangement for the pair; Godowsky stated that Kodachrome royalties netted each of the men an average of one million dollars per year during the 1950's.

11. While it was not possible to confirm current royalty levels paid to Godowsky and the Mannes Estate, we can nonetheless estimate that royalties, based on increased Kodachrome sales in the 1960's and 1970's, have proportionately risen-based on Godowsky's one million dollar figure of the 1950's.
12. Taped Interview with Walter Clark, March 25, 1982 IMP/GEH.
13. Ibid
14. Taped telephone interview with Lydia Wolfman, March 31, 1982, New York City.
15. Anonymous Studio Light, (Centennial Issue, Eastman Kodak); p.78.
16. A further discussion of this phenomena can be found in the following:  
  
Stephen Milanowski, "Notes on the Stability of Color Materials", (Positive Issue #2, Fall 1981, M.I.T.); p.29-30.
17. When Kodak altered their Kodachrome processing from controlled diffusion to selective re-exposure (during reversal development) in 1939, the film became much more stable.
18. This fact has been extensively discussed and documented by Friedman, Sipley, and Brian Coe.
19. An extensive documentation of how the amateur market is currently reacting to unstable color products can be found in:  
  
Stephen Milanowski, "Notes on the Stability of Color Materials", (Positive) Issue #2, Fall 1981, M.I.T.; p.31-34.

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#### Color Advertising and the Selling of Color as a Means of Depiction

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1. William Gamble "On Color", (Penrose Annual, 1925); p.66.
2. Leicester Hemmingway, Miami Beach. See Also:  
  
Alexander Cockburn, "Miami Beach", (Village Voice, April 27, 1982); p.42.
3. Tony Hiss "The Framing of Stephen Shore", (American Photographer, February 1979); p.28.



4. Taped interview with Ron Emerson, March 26, 1982 - IMP/GEH
5. D.A. Spencer Colour Photography in Practice (London: 1951, Focal Library); p.364.
6. Anonymous (More Business, Volume 4, Number 5) American Photo Engravers Association.
7. Anonymous (More Business, Volume 3, Number 11) un-paginated
8. Anonymous (More Business, February 1, 1937); p.13.
9. Anonymous (More Business, January 5, 1939); p.13.
10. Ibid., p.14
11. During the 1940's many periodicals including Mini Cam, Popular Photography, U.S. Camera, and Condé Nast publications, regularly touted these colorists considerable skills-which were far and away more complex than those needed for black and white practice.
12. Anonymous (Studio Light, Centennial Issue, Eastman Kodak); p.77.
13. Louis Walton Sipley, A Half Century of Color, p.105
14. Ibid., p.57
15. These inventories were conducted at the Boston Public Library from both open and closed stacks during February, 1982.
16. Taped interview with Ron Emerson, March 25, 1982 - Rochester, New York.
17. These inventories were conducted at the Rochester Institute of Technology Library from open and closed stacks during March, 1982.
18. This changeover did not occur until the Consent Decree of 1955, which required manufacturers to stop the practice of selling all films with processing included.
19. Louis Cheskin, Color Guide for Marketing Media (New York: MacMillan, 1952); p.21
20. Ibid., p.29
21. Ibid., p.31
22. Victor Keppler, The EighthArt-A Life of Color Photography (New York 1938 - signed by Keppler, #844, IMP/GEH rare book).

23. Margaretta Mitchell, Recollections (New York: 1979 Viking Press); p.68.
24. See: Elaine Dines, Paul Outerbridge A Singular Aesthetic (Laguna Beach: 1981)  
  
Graham Howe, Paul Outerbridge Jr. Photographs (New York: 1980 Rizzoli)
25. For a more thorough discussion of Outerbridge's color career see above volumes by Graham Howe and Elaine Dines.
26. Paul Outerbridge's commercial color assignments began in 1931 and ended (more or less) in the late 1940's.
27. See Bernard Barryte Essay:  
  
Elaine Dines, Paul Outerbridge A Singular Aesthetic; p.30-34.
28. Nicolas Muray's use of "generalized lighting" was most recently mentioned in the Time/Life Photography Year 1975, p.176.
29. Louis Walton Sipley, A Half Century of Color, p.73-74.
30. Diana Edkins, "Pioneers of Commercial Color", (Modern Photography, September, 1978); p.104.  
  
Joe Deal, "Anton Bruehl", (Image, Volume 19, Number 2); p.1  
  
Julia Scully, "100 Years of Color", (Modern Photography, December, 1976); p. 96.  
  
Louis Walton Sipley, A Half Century of Color ("Color Grows During the Depression"); p. 86.
31. Margaretta Mitchell, Recollections, p.68.
32. Joe Deal, "Anton Bruehl", (Image, Volume 19, Number 2); p.3.
33. Diana Edkins, "Pioneers of Commercial Color", (Modern Photography, September 1978); p.107.
34. Ibid., p.104.
35. Louis Walton Sipley, A Half Century of Color, p.97.
36. It was the productivity and volume of known color workers, i.e. Keppler, Muray , Bruehl/Bourges, as well as unknown regional photographers, which allowed the Devin Corporation to monopolize the sales of one-shot cameras and Carbro tissue.

37. John Kobal, Hollywood Color Portraits (New York: 1981 William Morrow); p.16.
38. See various issues of The Professional Photographer, 1955-1965.
39. Ann Perry, The LaClaire Tradition (Grand Rapids: 1975 Grand Rapids Art Museum); p.3-4.
40. Julia Scully and Andy Grundberg, "Currents: American Photography Today", (Modern Photography, June 1980); p.85.
41. Irving Penn Moments Preserved, (New York: 1960, Simon and Shuster); p.8.
42. Penn produced his first color work for Condé Nast in the mid-1940's; Avedon produced his first color in the mid-1950's for Condé Nast.
43. Robert Kelley U.S. Camera Annual 1953 (New York: 1952-1953); p.111
44. Louis Walton Sipley, Color Photography and Reproduction (Philadelphia: 1948); p.2.
45. Photography Year 1979 (New York: Time/Life, 1978-79); p.28.
46. Ibid., p.29
47. Hipgnosis, Dean, Hamilton Album Cover Album (1977: New York, A and W Visual Library); p.9.

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#### The Biases Against Color

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1. Susan Sontag, On Photography (New York: 1978, Farrar, Straus, and Giroux); p. 129.
2. Douglas Davis, "Photography". (Newsweek, April 19, 1976); p.68
3. Max Kozloff, "The Coming of Age of color", (Artforum, January, 1975)
4. Louis Walton Sipley, Frederic E. Ives (Philadelphia: 1954, American Museum of Photography); p.15.
5. Ibid., p. 16.

6. Correspondence from Frederick Ives to 1933 editor of Camera Magazine, C.E. Anderson. This letter was originally housed at the American Museum of Photography- it is now held by the George Eastman House; The letter was dated July 26, 1933.
7. John A Tennant, "Coloring Lantern Slides", (The Photo-Miniature, November, 1907), p.501.
8. Frederick Evans, "Personality in Photography With a Word on Color", (Camera Work, January, 1909); p.38
9. Paul Anderson, "The Hess-Ives Process of Color Photography", (American Annual of Photography, 1918); p.62.
10. Lyman Chalkley, "Two-Color Transparencies", (American Annual of Photography, 1929), p.22-23.
11. D.A. Spencer, Colour Photography in Practice (London: 1951, Focal Library); p.367.
12. Richard Kostelanetz Moholy Nagy (New York: 1965, Praeger); p.66-67.
13. Peter Pollock, The Picture History of Photography (London: 1960, Thames and Hudson); p.510-511.
14. Edward Weston, "On Color" (Modern Photography, December, 1953); p.54
15. The journal History of Photography has never run an article on hand-coloring or color photography; it has been in existence since 1977 and has contributed hundreds of pages to the written history of black and white photography.
16. According to Grace Mare and Donna Gelb (in a taped interview on March 3, 1982), there was a single color photograph in the exhibition which was a U.S. Government photograph of an atomic explosion, however, this image was not included in the traveling exhibition nor the book.
17. Color (New York: 1981, Time/Life), p.138-139.
18. Sean Callahan "MOMA Lowers the Color Bar", (New York June 28, 1976); p.14.
19. Director of the Photography Department at the Museum of Modern Art since 1962, Szarkowski can fairly be pigeonholed as an arch, albeit passionate, crusader for one sensibility: straight black and white photography.
20. John Szarkowski, William Eggleston's Guide (New York: M.I.T., 1976); p.8-9.
21. Eugenia Parry Janis, One of a Kind (Boston: Godine, 1978); p.12

22. John Upton and Donna Nakao, Spectrum (Honolulu: 1979); p.4.
23. Beaumont Newhall, Essays and Images (New York: M.O.M.A., 1980); p.240.
24. Walker Evans, American Photographs (New York: M.O.M.A., 1938); p.195.
25. Louis Kronenberger, Quality (New York: Balance House, 1969); p.208.
26. Inventory conducted at the Boston Public Library from open and closed stacks during February, 1982.
27. Lesley K. Baier, Walker Evans at Fortune (Wellesley: 1977); p.20.
28. Douglas Davis "New Frontiers in Photography", (Newsweek, April 19, 1976); p.56.
29. Douglas Davis "Photography", (Newsweek, October 21, 1974); p.68.
30. In her November, 1978 Artforum article "Color Photography: The Walker Evans Legacy and the Commercial Tradition", Carol Squiers stated: "Between Evans and the commercial world, it is Evans who has had the more pervasive effect. He began a tradition of visual social critique that has affected photography for the last 40 years and that has received tremendous institutional support (especially from the MOMA), generating a school that extends into the "new topographers" as well as the "new" color photographers. The idea of social commentary has been absorbed, digested, and reduced to pure formalism. Visual critiques of the American scene are now natural photographic pastimes". (p. 64)
31. Sally Stein, "FSA Color: The Forgotten Document", (Modern Photography, January, 1979); p.92.
32. Ibid., p.166.
33. R. Smith Shunneman, Photographic Communication (New York: 1972); p.88.
34. Sally Eauclore, The New Color Photography (New York: Abbeville, 1981); p.11.
35. Photography Year 1981 (New York: Time/Life, 1980-1981); p.164.
36. Cindy Polemis "The Colour of War", (Creative Camera, January, 1982); p.357.
37. Eve Arnold In China (New York: Knopf, 1980); p.4.

38. Color (New York: Time/Life, 1981); p.139.
39. Helen Gee Photography of the Fifties (Arizona: 1980); p.21.
40. Ibid., p.18-20.
41. Elizabeth McCausland "Camera and Brush in Service of Humanity", (Photo-Notes, May/June, 1947); p.7.
42. Ansel Adams "Some Thoughts on Color Photography", (Photo-Notes, Spring 1949, parts 1 and 2 ); p.10-11.
43. "Six Experts Discuss Color", (U.S. Camera, Volume 19, Number 10, October, 1956); p.53.
44. Taped Interview with Walter Clark, March 26, 1982 ; IMP/GEH.
45. Douglas Davis, "Color Shock", (House and Garden, September, 1976); p.68.
46. Marie Cosindas, Color Photographs (Boston: Godine, 1979); p.10.
47. Robin Holland "Magic and The Fine Print", (Darkroom, Vol. 2, Number 4); p.34.
48. Owen Edwards, "The Eighties: Decade of Another Color", (Saturday Review, May 12, 1979); p.24.
49. William Eggleston, Election Eve (Washington: Corcoran, 1977-1978); p.3.
50. Ibid., see Eggleston Bibliography for a complete listing of articles which, in almost every instance, elicited this "discomfort".
51. Tony Hiss, "The Framing of Stephen Shore", (American Photographer, February, 1979); p.28-29.
52. Joel Meyerowitz, Cape Light (Boston: New York Graphic Society, 1979); p.6.
53. Douglas Davis, "A Call to the Colors", (Newsweek, November 23, 1981); p. 115.
54. Ibid, p.116.
55. Pepe Karmel, "Raising a New Hue", (Art in America, January, 1982); p.37.
56. A.D. Coleman, Light Readings (New York: Oxford, 1979); p.79.
57. James Enyeart, "Introduction", (Archive, Number 14); p.3.

58. Although one can still find a large number of print advertisements in black and white, the original ad photographs are usually shot on color films; this clearly indicates the continued high cost of color printing and reproduction.
59. The 1980-1981 Wolfman Report indicates the steady decline of black and white materials use; the exception being commercial photographers usage: their black and white use has leveled out at 20%, while color materials are used in 80% of the shooting. In amateur use color holds 95% of all materials sold while black and white holds 5%.

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The Precedent of Black and White Rendering and its Influence Upon Color Use.

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1. Douglas Davis, "New Frontiers in Color", (Newsweek, April 19, 1976); p.57.
2. Lesley K. Baier, Walker Evans at Fortune (Wellesley: 1977); p.21.  
Eugenia Parry Janis, One of a Kind (Boston: Godine, 1978); p.14
3. Max Kozloff, Photography and Fascination (New Hampshire: Addison House, 1979); p.184.
4. John Upton and Donna Nakao, Spectrum (Honolulu: 1979); p.5.
5. Alfred Stevens, A Painter's Philosophy.
6. Georgianne Burne-Jones, Memorials of Edward Burne-Jones (London: 1904).
7. In the Complete Photographer 1942 (p.883) this same idea is repeated: because of color, amateur movie makers were advised that there was "no need to worry over composition".
8. W.A. Reedy, "The Ektacolor Process", (The Penrose Annual, Volume 45, 1951).  
Gilbert Cousland, "Thoughts on Color Photography for Industry", (The Penrose Annual, Volume 50, 1956).  
D.A. Spencer, Colour Photography in Practice (London: Focal Library, 1951); p.364.

9. The prefix "tech" was grafted from the M.I.T. name and used to name the Technicolor corporation because of the company's nucleus of M.I.T. graduates.
10. This was a commonly held belief of Hollywood directors and producers.  
See also:  
  
Anonymous "Color Camera Making Rushed to Get Set For Increased Use Next Season", (Exhibitors Herald World, July 6, 1929); p.18.
11. Paul Outerbridge, Photographing in Color (New York: 1940); p.XII.
12. Paul Outerbridge, "Color Esthetics", (The Complete Photographer, Volume 3 and 4, 1942); p.873.
13. Andreas Feininger, The Creative Photographer (Englewood Cliffs: Prentice-Hall, 1955); p.p. 57, 143, 52, 54.
14. Wynn Bullock, Photography: A Way of Life (New York: Morgan and Morgan, 1973); p.31.
15. Ben Lifson, "The Wonderful World of Color", (The Village Voice, November 11-17, 1981); p.78.

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The Singular Problem: A Simple Negative/Positive Color Technology

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1. C.E. Kenneth Mees, From Dry Plates to Ektachrome Film (New York: Ziff Davis, 1961); p.203.
2. Ibid., p.210 (Mees acknowledges the unacceptable quality of 2 color Kodachrome.)
3. Gert Koshofer, "System of Principles and Processes in Colour Photography", (Camera, July 1977); p.37.
4. During World War Two, German Agfa plants (and corporate secrets) were captured by U.S. soldiers and many aspects of their incorporated coupler negative/positive process were released to U.S. manufacturers.
5. W.T. Hanson, "Forty Years of Color Photography", (Photographic Science and Engineering, Volume 21, Number 6, November/December, 1977); p.293.



6. Sally Stein, Harry Callahan (Arizona: 1980); p.6.
7. As mentioned earlier, the Consent Decree of 1955 opened up color processing to commercial processing labs.
8. Sally Stein, Harry Callahan (Arizona: 1980); p.13.  
Color(New York: Time/Life, 1981), p.138.
9. Joseph Friedman, "Color Photography", (1941 American Annual of Photography); p.228.
10. Lloyd Varden, "The Status of Color Photography For the Mass Market", (1947 American Annual of Photography, Volume 61); p.79.
11. Ibid., p.78.
12. C.E. Kenneth Mees, From Dry Plates to Ektachrome Film;p.223.
13. The nature of chromogenic development is the basis of dye instability; oxidized developer as a progenitor for image dyes is, in a context of stability, unsound-oxidation by-product development is innately faulty in this regard. Color development in any other mode, i.e. Kodachrome, Cibachrome, etc., is almost always more stable.
14. The original Kodak Type C material was introduced in 1955; The second version, called Ektacolor was released in 1958.
15. W.A. Reedy, "The Ektacolor Process", (The Penrose Annual, Volume 45, 1951); p.84.
16. Gilbert Cousland, "Thoughts on Color Photography for Industry", (The Penrose Annual, Volume 50, 1956); p.88.

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## Conclusion

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1. Louis Stoumen, "Week-End With Weston", (Photo-Notes, June, 1948); p.11.
2. Ben Lifson, "Recovering From the Depression", (The Village Voice, January 13-19, 1982), p.100.