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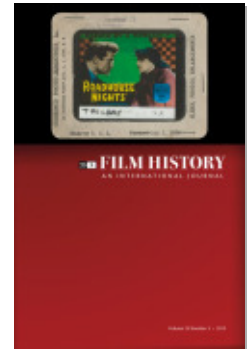
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## Lenticular Spectacles: Kodacolor's Fit in the Amateur Arsenal

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Film History: An International Journal, Volume 25, Number 4, 2013,  
pp. 36-61 (Article)

Published by Indiana University Press



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MARSHA GORDON

## Lenticular Spectacles: Kodacolor's Fit in the Amateur Arsenal

**ABSTRACT:** On the American marketplace for only a short period, and more precious and temperamental than black-and-white 16mm film stock, Kodacolor (in production from 1928 through 1935) is occasionally encountered in home movie collections but has not been examined in a scholarly context. This essay contextualizes the format and will make a case for its importance to screen studies, especially for amateur film history. Kodacolor provided the home moviemaker with something even Hollywood filmmakers did not have at the time: a relatively easy way to make and show color films. After establishing the history of Kodacolor, I explore one family's aesthetically and technically fascinating use of the format. This amateur film collection, on deposit at Northeast Historic Film, facilitates some pertinent observations about how and why this technology was employed and why it had such a short-lived existence.

**KEYWORDS:** home movies, Kodacolor, amateur film, travel movies, orphan films, 16mm film, Northeast Historic Film

With the exception of a 2009 *Film History* article by Kaveh Askari about amateur filmmaker Alexander Black, contemporary scholarship about 16mm Kodacolor motion picture film and its role in the history of amateur cinematography is nonexistent.<sup>1</sup> Perhaps this neglect is attributable to a combination of its brief time on the market from 1928 until 1935 or its idiosyncratic technical requirements (and relative rarity) along with its exclusively nontheatrical applications. Despite its short-lived and somewhat rarefied existence, Kodacolor played an important role in the serious home moviemaker's arsenal that deserves better understanding. The stock, as well as the procedures needed to properly utilize it, was innovative and sophisticated, arming the amateur filmmaker with something even Hollywood filmmakers did not have access to at the time—a relatively easy and effective way to film and project in color.<sup>2</sup> For this reason alone, scholars of both amateur and theatrical film of this period should be

knowledgeable about the phenomenon of Kodacolor. To that end, this essay provides a technological and cultural history of the format, in part to suggest Kodacolor's importance as a fairly radical deviation from the original black-and-white 16mm film stock with which the amateur cinematographer could capture the world. What follows includes a case study of Kodacolor's use in one family's home movies from the time period, which affords a clear example of ways the technology was employed by small-gauge enthusiasts, and which will allow future researchers in this area a point of comparison to other Kodacolor-inclusive home movie collections.

### **“AN EPOCHAL FORWARD STEP IN AMATEUR PICTURE-MAKING”<sup>3</sup>**

The *New York Times* reported that on July 20, 1928, in the presence of “a distinguished audience of scientists, inventors, educators, publishers and business leaders . . . Mr. Eastman gave the first public demonstration of his new ‘kodacolor’ process, casting incredibly gorgeous color tones on a moving picture screen less than half the size of an ordinary classroom blackboard.”<sup>4</sup> Included among the honored guests were Thomas Edison (who confessed his own past failures to develop color film technology); president of Radio Corporation of America Maj. Gen. James G. Harbord (who noted Kodacolor's potential applications for the military as well as for television); Amateur Cinema League president Hiram Percy Maxim; television pioneer Dr. E. F. W. Alexanderson, to whose New York home the first television broadcast had just been made in 1927; and US Commissioner of Education Dr. John Tigert (see figs. 1 and 2). The symbolic importance of these high-profile observers is worth noting since the demonstration very deliberately commingled figureheads of film history with the moving image's not-too-distant broadcast future; representatives of government and education; and advocates of commercial and nontheatrical interests. In other words, these eyewitnesses suggested ambitions about the widespread applicability and impact of Kodacolor. In an effusive article in *The Movie Makers* detailing this event, Maxim reported that these distinguished attendees were truly moved by the exhibition, explaining that he personally felt as if he was watching things that were “not at all a picture” but that were, because of their appearance in color, “real,” making him feel as if he was “really in the presence of the actuality.”<sup>5</sup> Though the author of the *New York Times* report on the demonstration does not appear to be unduly critical, his initial press coverage alludes to one of Kodacolor's drawbacks: the limited 16.5-by-22-inch size of the image that could be successfully projected, due to what the article termed “technical difficulties,” but which would more accurately have been described as a technical *limitation* of Kodacolor created by the high degree of absorption of light by the color filter attached to the Kodascope (Model A, Model B, or Series K) projector.<sup>6</sup>



**Figs. 1 and 2:** Frame grabs from the original Kodacolor demonstration film made by the Eastman Kodak Company for the 1928 public Kodacolor demonstration. George Eastman (left) and Thomas Edison (right) are shown shooting Kodacolor film during the day; the film was then developed and exhibited at the evening demonstration. (Although the print version of this article reproduces color images in black and white, the online version of the article will reproduce all color images in color.) Courtesy of George Eastman House International Museum of Photography and Film

Kodacolor must be considered alongside the camera with which it was marketed, the Ciné-Kodak, which debuted in 1923—the year 16mm film was introduced—well before Kodacolor was commercially viable.<sup>7</sup> All of the advertisements for the Ciné-Kodak outfit bragged of its user-friendly qualities, characterized by cameras and projectors that made films, as one 1928 *Los Angeles Times* advertisement put it, “as easy to take as snapshots and as easy to show as playing a record on the phonograph.”<sup>8</sup> As with so many other new technologies, the oft-used strategy being deployed here makes the “newest” technology seem exciting and worth paying for, but also unintimidating and familiar. Another advertisement from 1930 described the Ciné-Kodak camera as so “remarkably simple” that even “a child can operate [it]!” It goes on: “If you can look through a finder and press a lever, you can take successful movies with it . . . in black-and-white or, if you wish, in *Full Color*.”<sup>9</sup> It is worth noting that after just two years on the market, it is the camera and projector really being advertised here; color film is simply part of the marketing and no longer the exciting “new” feature being purveyed.

Eastman Kodak’s moving picture version of what was actually a French innovation in color photography was always marketed for exclusively amateur, 16mm applications. One of the most innovative aspects of Kodacolor was its adaptability to existing cameras and projectors (fig. 3). Users needed to obtain a Kodacolor filter attachment for the Ciné-Kodak, which had red, green, and blue-violet bands across its face, through which light in the appropriate spectrum passed and was registered on the film emulsion on the back side of the film (fig. 4). One of Kodacolor’s selling points was, in fact, its ability to capture and project color images without any color being present *on the film itself*; it was, technically speaking (and to the naked eye), black-and-white film. Inventor and Eastman Kodak Laboratories director Dr. C. E. K. Mees explained that the lenticular surface of the film was

embossed by running it through steel rollers with tiny cylindrical lenses composed of the film base material and extending lengthwise of the film. The lenses on the film are about seven times narrower than the dots making up the illustrations in a newspaper, and they are therefore invisible except under a microscope. They cover completely the surface of the side of the film opposite from the sensitive emulsion . . . The function of the lenses embossed on the film is to guide the rays of light falling upon each tiny area and lay them on the sensitive emulsion as three distinct impressions corresponding to the three filter areas, so that the three colors covering the lens are imaged behind each tiny cylindrical lens as

**KODACOLOR FILTER EQUIPMENT**

**KODACOLOR ASSEMBLY**  
for  
*Ciné-Kodak, Model B, f.1.9*  
or *Ciné-Kodak, Model BB, f.1.9*

**THE** Kodacolor Assembly for Ciné-Kodak, Model B, f.1.9, consists of the Kodacolor Filter, the .3 neutral density filter, a 50-foot aluminum reel and a cup receptacle which is screwed inside the camera to hold the filters when not in use. The Model BB Kodacolor Assembly includes only the filters.

For Kodacolor, merely slip the Kodacolor Filter into the Ciné-Kodak, and load with Kodacolor Film.

The price of the Kodacolor Assembly for either the Ciné-Kodak, Model B, f.1.9, or BB, f.1.9, is \$15.

**KODACOLOR ASSEMBLY**  
for *Kodascope, Model B*

**KODACOLOR LENS UNIT**  
for *Kodascope, Model A*

**THE** Kodacolor Lens Unit for Kodascope, Model A, replaces the standard lenses on that projector, and instantly adapts it for Kodacolor projection. The standard unit is lifted from its place and the Kodacolor Lens Unit substituted. Two catches secure it, and the projector is ready for Kodacolor.

The Kodacolor Lens Unit for Kodascope, Model A, is priced at \$20 complete.

Note: Some older models of Kodascope, Model A or B, require a change in the illumination system for Kodacolor projection. If you possess such a model, and wish to adapt it for Kodacolor, consult your dealer.

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**Fig. 3:** Page from a June 1929 Kodak catalog. Image courtesy of the Herbert E. Farmer Motion Picture Technology Collection, Hugh M. Hefner Moving Image Archive, University of Southern California

three parallel vertical strips, because the tiny cylindrical lenses are parallel to the stripes of color on the filter.<sup>10</sup> (See fig. 5.)

There were twenty-two such “cylindrical embossings” per linear millimeter of film.<sup>11</sup>



**Fig. 4:** Image of Kodacolor filter attachment. Courtesy of the Herbert E. Farmer Motion Picture Technology Collection, Hugh M. Hefner Moving Image Archive, University of Southern California

Mees continued to describe the Kodacolor process, noting that “a red ray from an object in front of the camera . . . reaches the sensitive material of the film at a spot related to the red area of the filter. The reversal process turns this affected spot into a transparent area, leaving opaque the adjoining unaffected areas related to the green and blue segments of the filter.”<sup>12</sup> A keyhole ratio diaphragm cap helped to control the exposure of the film, which varied in sensitivity from batch to batch: “These caps are chosen, after the emulsion has been tested, to correspond to the color sensitiveness of that particular batch of emulsion, and the cap is then placed on the end of the film in such a position that it cannot be missed by the user. All that is necessary is for him to take out his color filter from the camera when placing a new film in the camera, throw away the old cap, and replace it by a new one from the end of the fresh film. In this way, he can always be sure of getting the correct ratio of exposures.”<sup>13</sup> After the film was developed, a filter attachment for the projector was required, which was identical to that of the camera but in reverse, allowing the process to be replicated at the time of projection to produce the color effect.<sup>14</sup>

One contemporary commentator observed that this dye-free method of achieving color was especially valuable because “these new films never fade, and archives of historic films in colors can be preserved indefinitely.”<sup>15</sup> In point of fact, this is true, though Kodacolor may, of course, shrink or be damaged over time; however, the color should look as good today as it would have when it was first projected, assuming that one can find (or otherwise replicate) the appropriate lens attachment and special aluminum-sprayed silver screen. At Eastman’s

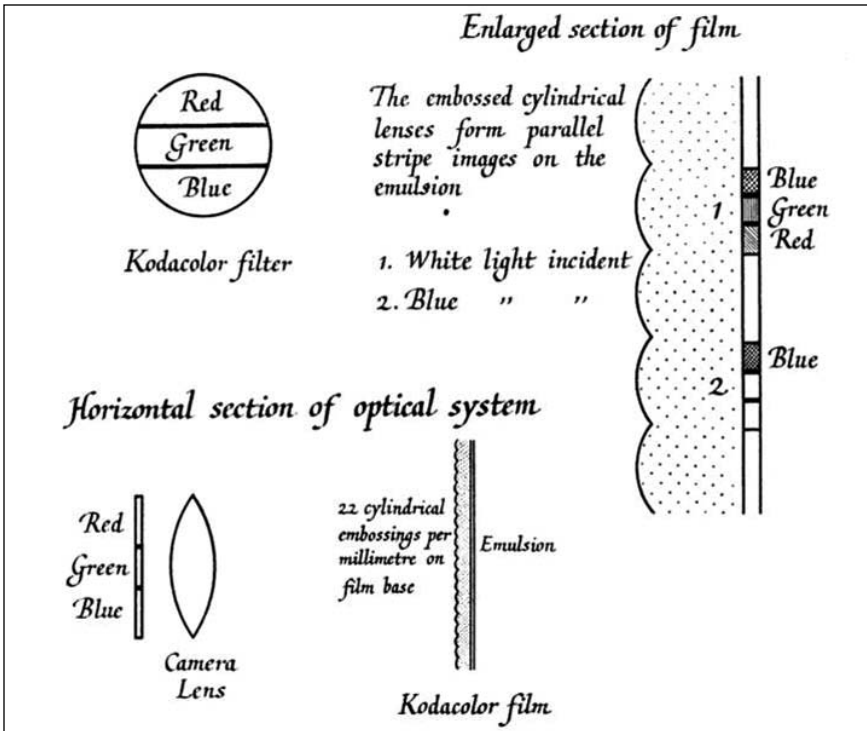


Fig. 5: Illustration from F. B. Phillips, "The Kodacolor Process," *The Geographical Journal* 80, no. 3 (September 1932)

public demonstration of the film in 1928, Dr. Edwin E. Slosson commented on Kodacolor's superiority over previous two-color processes, adding that it was also "devoid of the glaring effects of the old hand-colored moving pictures."<sup>16</sup> Advertisements repeatedly touted Kodacolor's ability to present "full, natural color."<sup>17</sup> In its debut Kodacolor advertisement in the *New York Times*, Eastman Kodak boasted of "color fidelity," the reproduction of "true colors," and the film's ability to reproduce "every color occurring in nature."<sup>18</sup>

Clearly, this was a novel and exciting capacity for the amateur cinematographer, one that put his or her craft ahead of even theatrical motion pictures, which still had limited color processes with which to work. As Askari has observed in relation to Alexander Black's 16mm career, "color processes seemed made for amateur experimentation," and Kodacolor was the latest in a line of methods of tinting, toning, and hand coloring with which the amateur could experiment.<sup>19</sup> Of course, considerable drawbacks offset these notable benefits. A technical limitation created by the light-thirsty three-color filter system was that films had to be shot with "direct, bright sunlight," as one



Kodacolor advertisement from 1928, and many others thereafter, put it.<sup>20</sup> Shooting outdoors in full sun guaranteed proper exposure with the required Ciné-Kodak camera (Models A, B, BB, and K) with an F-1.9 lens, a very wide aperture with a relatively shallow depth of field.<sup>21</sup> This meant no Christmas mornings by the fire, no baby frolicking in the bathtub, and no late-night cocktail parties.

But as some advertisements for Kodacolor pointed out, this also meant that the film was well suited for vacations, road trips, and outdoor scenes as long as the sun was adequate for proper exposure. Interestingly, a British Ciné-Kodak manual advises that if the camera “motor is run at half-speed, very good results can be obtained if the subject is in the *open shade* with a clear sky overhead, or in the open with *light* clouds over the sun. These conditions result in a softening of the shadows, and do away with the squinting and unpleasant expressions inevitable when the subject is in the full glare of the sun.”<sup>22</sup> The manual later points out that when the camera was operated at half-speed, subjects also needed to move “slowly and deliberately” in order to avoid “rapid” or “jerky” action onscreen.<sup>23</sup> This is all to say that these are demanding and somewhat risky workarounds, certainly better suited to an experienced amateur than to a novice.

The lighting issue was serious enough that Kodak addressed a worst-case scenario in its manual:

If the light should become too dark for making “Kodacolor” pictures, and the Ciné-“Kodak” is loaded with “Kodacolor” Film, exposures can be made after first replacing the “Kodacolor” Filter by the regular lens hood, and then setting the diaphragm lever at the next larger opening than that required for black and white film. The result will be a black and white picture. The minute film embossings (which are necessary for “Kodacolor”) will be slightly apparent upon the screen, but it is better to make pictures under these conditions than to miss some invaluable scene.<sup>24</sup>

This was surely a disappointing potentiality, especially given the more than “slightly apparent” lining effect of Kodacolor projected as black-and-white film, and the greater expense of the color film incurred in the midst of America’s Great Depression.

Besides the already-noted technical requirements, the Kodacolor enthusiast had to contend with other challenges as well. One was the careful care required of the cemented Kodacolor filter, which was “liable to damage if subjected to too much heat” and, if cleaned too aggressively, might develop air pockets that would distort the filmed image and therefore render the filter

unusable. One manual warned, “When making an extended tour, one or two extra ‘Kodacolor’ Filters should be carried as a matter of precaution.”<sup>25</sup> Furthermore, while black-and-white film could be endlessly duplicated by the Kodak lab, the manual warns that it was impossible to make Kodacolor duplicates, so users would have to settle for black-and-white copies of their Kodacolor films.<sup>26</sup> A color reel, then, was truly a unique item in any home movie library.

The Ciné-Kodak camera and Kodacolor film played an interesting role in Kodak’s Depression-era corporate strategy, falling at the top of the price spectrum of their consumer products (a Brownie still camera, for example, cost between three and four dollars and a Pocket Kodak Junior cost between ten and eleven dollars in December 1929).<sup>27</sup> Its impressive uniqueness was its main selling point, and the additional cost and effort afforded what we might consider a kind of showstopper for spectators unaccustomed to seeing moving images in color. In a 1930 *Los Angeles Times* column profiling Kodak stock, the author observes that the Ciné-Kodak and Kodacolor film stood alongside the Recordak (a device for photographing checks) and the Kadascope [*sic*] (a mobile projector being marketed to salesmen) as new products gaining acceptance in a market that was difficult, especially for “higher-priced lines.”<sup>28</sup>

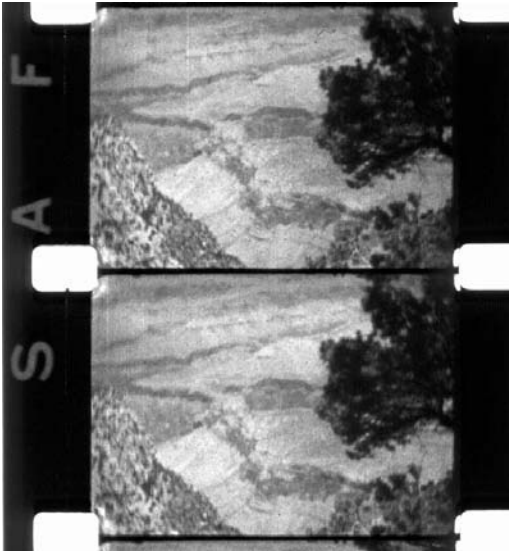
Cost was certainly a factor in terms of Kodacolor’s viability, especially when one considers the Depression-era timing of the product’s relatively brief existence. Kodacolor film cost twice as much as its black-and-white counterpart: six dollars for fifty feet (versus six dollars for one hundred feet of black-and-white stock). The cost of developing the film was included in the cost of buying the film; users needed only to send the film to “any Eastman processing station,” and they would receive it back in “a few days.”<sup>29</sup> The returned film was, of course, essentially black-and-white film, since the color actually resided in the lens attachments. Therefore, the film could be projected as black-and-white (with the visible lines created by the lenticular process) or in color. The real economic genius that facilitated Kodacolor’s adoption, even during these difficult times, was that it could be used with already existing Kodak equipment with relatively affordable and technically easy modifications to that equipment. Anyone who already owned a Ciné-Kodak camera needed only to purchase a fifteen-dollar color filter for the camera (the camera itself cost around \$150), an eighteen-dollar color filter for the projector (new projectors cost anywhere between \$180 and \$300), and (ideally, but not necessarily) a \$25 special screen, described by Kodak employee F. B. Phillips as a “specially prepared aluminum-sprayed screen.”<sup>30</sup> Kodacolor users could also order Kodak-produced custom titling “made with a special typewriter,” which could then be spliced into the cinematographer’s reel; Kodak threw in a tinted background for Kodacolor customers at no additional charge for the color.<sup>31</sup>

As press coverage from the late 1920s indicates, color and sound were the two great challenges “confronting scientists and engineers working in the moving picture field.” In fact, the arrival of Kodacolor was used by many to pontificate not about the future of amateur cinematography but the possibilities it implied for both theatrical motion pictures and for television. Writing in the *New York Times* about Eastman’s first 1928 public demonstration of Kodacolor, Russell Porter described a group of VIP spectators who were now looking “forward to a feat that would have appeared fantastic a generation ago—color television synchronized with radio.” Porter goes on to fantasize about watching Babe Ruth “knocking out a home run” that could be “seen and heard at home through color television,” or “a Yale-Harvard football game, with its contrasting reds and blues, both primary colors, and its college songs by radio.” Observers of that first public demonstration opined about the many possibilities opened up by Kodacolor: that feature films could one day effectively marry sound and color with action; that the military could use color film for accurate surveillance, especially “in showing up camouflaged objects”; and that educational uses of color motion pictures would allow “our increasingly city population and our millions of school children who never see a natural object” to encounter “nature in colors.”<sup>32</sup>

The question of Kodacolor’s potential theatrical applicability hinged on something that “Eastman experimenters have not yet touched,” one author pointed out in 1928: “whether enough additional lighting power can be put behind the film” for a screen that measures in feet and not inches.<sup>33</sup> In this way, the intentionally amateur format of Kodacolor had direct bearing on the theatrical film industry and its efforts to develop color-on-film processes during this period. In fact, Eastman Kodak entered into an agreement with Paramount Pictures in December 1930 to develop a lenticular process for 35mm film. In spite of the years of research put into it and the production of test batches, however, there was little professional enthusiasm for lenticular color’s commercial adoption. This was, in large part, due to the impossibility of producing duplicate color prints for theaters, which was beyond the technical capabilities of the time and therefore doomed the process for commercial applications.<sup>34</sup> In 1935, Kodak introduced 16mm Kodachrome—“true color on film”—which rendered Kodacolor, with all of its technical ingenuity and complexity, obsolete.<sup>35</sup> In fact, the Kodachrome process was so superior that it easily dominated the market for several years.

## **A KODACOLOR CASE STUDY**

The Bigelow Family Film Collection at Northeast Historic Film in Bucksport, Maine, consists of fourteen 16mm reels spanning the late 1920s through the early 1930s.<sup>36</sup> Like many similar collections, this one is comprised primarily of



**Fig. 6:** This is a scan of a black-and-white copy of Kodacolor. Note the appearance of vertical lines from the embossing process. The right edge of the frame shows part of a perforation printed through from the original, with a frame line running through it, indicating that this was duplicated on an optical printer. Bigelow Family Collection, Northeast Historic Film, Bucksport, Maine

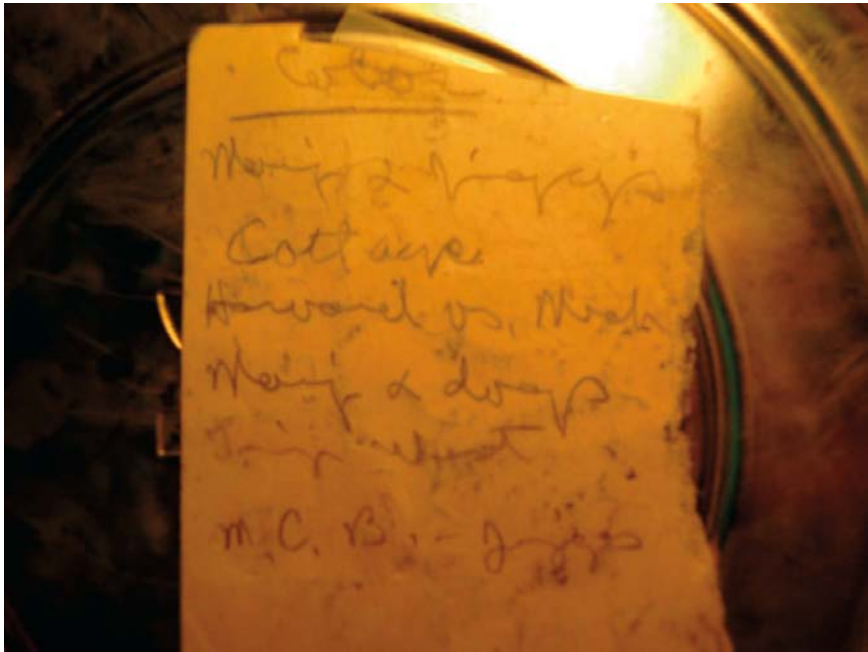


**Fig. 7:** This is a scan of an original Kodacolor film, featuring Marj Bigelow and the family dog, Jiggs. Though it is difficult to discern in this reproduction of the film frame, the easiest way to tell the difference between actual Kodacolor film and a black-and-white copy is that the lenticules extend beyond the frame to the edge of the film. Bigelow Family Collection, Northeast Historic Film, Bucksport, Maine

black-and-white amateur footage of the domestic and touristic variety, though tucked into the collection are several thematically relevant professional films (mostly from the Bell and Howell Film Library) on a variety of subjects and one Kodacolor reel. Robert Barry Bigelow (who went by the name Barry) was the principal photographer and editor. The Bigelows lived in Boston and Ann Arbor, where Barry studied psychiatry and where his father was a professor. Bolstered by family money, the Bigelows were not greatly impacted by the Depression, with a babysitter, maid, cook, and gardener working for the household during this time period. Barry was interested in photography at a very young age and carefully curated his photos in neatly annotated albums; he was also a tinkerer, an avid hobbyist, and had a keen interest in technological gadgetry. What appears to be Barry's fairly early adoption of lenticular color technology is a case in point.<sup>37</sup>

Three of the Bigelow home movie reels with predominantly black-and-white footage contain what appear at first to be occasional "lenticular interruptions," moments where the stock changes rather obviously, and the telltale vertical lines of Kodacolor are discernible. This is actually black-and-white duplicate footage of the original lenticular color (see figs. 6 and 7). These duplicates were clearly used in order to complete an otherwise black-and-white narrative of the family's adventures. Since it would have been impractical to intersperse color footage on an otherwise black-and-white reel (one would have needed to add the three-color filter any time the Kodacolor footage appeared in order to show it in color, and remove it any time black-and-white footage was being projected if one desired a brighter image due to the light-thirsty density of the color filter), a black-and-white copy allowed Barry to fill in footage that he shot only with Kodacolor, which he appears to have used very selectively and for color-appropriate subjects. Furthermore, Kodacolor film was *A* wind and all other reversal camera films were *B* wind, making splicing difficult (though not impossible) and requiring the refocusing of the projector every time there was a switch between black-and-white and color film, whether or not a Kodacolor projection lens was being used.<sup>38</sup> It is therefore not surprising that most of the original Kodacolor footage in the Bigelow collection is actually collected on a single edited reel, which is labeled with a handwritten note indicating its contents (fig. 8).

Family testimonials indicate that Barry was often behind a camera, both still and moving image. There are family memories of viewing a fair amount of color film footage, both from this era and much later, suggesting that many reels are likely missing from the extant collection. What remains of special interest here, then, is the singular lenticular reel. It is worth noting that career amateur Alexander Black (the subject of Kaveh Askari's study), like the Bigelow family, also kept his Kodacolor reel—five years' worth spliced together on a reel labeled



**Fig. 8:** Photograph of the label on the inside of the Bigelow family “Color” reel, which reads: “Marj & Jiggs; Cottage; Harvard vs. Mich; Marj & dogs; Trip West; M. C. B.—Jiggs.” Marj is Barry’s wife; Jiggs is their dog; and M. C. B. (Mary Crawford Bigelow) is one of Barry and Marj’s children. Bigelow Family Collection, Northeast Historic Film, Bucksport, Maine. Photograph by Marsha Gordon

“old color”—separate from his black-and-white films.<sup>39</sup> Askari describes Black’s Kodacolor reels as analogous to “test reels of color subjects,” with repetitive “landscape shots of flowers, autumn trees through windows, and sky. The shots of people appear to be composed either against a background of color interest like a garden in bloom, or the people are involved in an activity of particular color interest, like diving.”<sup>40</sup> It is, at least in Askari’s estimation, self-consciously “color material.” This organizational phenomenon and the, in many ways, pragmatic viewing logic that it seems to have promoted is directly attributable to Kodacolor’s peculiar technological requirements. A twentieth-century moving-image iteration of the cabinet of curiosity, which functioned differently than other reels in these collections, these discrete color reels speak both to the power of color and, perhaps more critically, to the promise but ultimate complexity of the lenticular process. As such, they should be considered a separate phenomenon within the category of the home movie. It seems likely that other home movie collections including reels of Kodacolor would function similarly, with the most color-worthy and likely outdoor footage placed in the distinct

container of the Kodacolor reel, reflecting the cinematographer's estimation of special, color-worthy subjects.

In an October 23, 1929, letter to a correspondent named "Arch," Barry Bigelow wrote:

The movies I took of Mark were rotten as I think I told you but I am nevertheless liable to have a sudden burst of activity and send them along to you together with some of Marj and Jiggs (dog) and also some quite good ones of the new zoo at Detroit for his delectation. All of which reminds me that I have not noticed anything resembling the continuous stream of movies of Mark, volcanoes in eruption, earthquakes, etc., which I expected to begin shortly after your arrival.<sup>41</sup>

This self-critical missive perhaps references some of the material on the Kodacolor reel under discussion here, as well as footage (of the zoo) that is no longer part of the collection. It also documents an important practice of film exchange between what we might deem serious hobbyists. Though wholly colloquial in its assessment, the letter indicates an awareness of the line that separates good from bad amateur filmmaking. This awareness was closely connected to a small but important industry that developed around the filmmaking hobbyist, perhaps embodied most visibly by the Amateur Cinema League, the institution represented by Hiram Percy Maxim at the 1928 Kodacolor demonstration.<sup>42</sup> Along with the manuals and guides packed with amateur movie equipment, an array of magazines (some of them short-lived) helped guide the home cinematographer. Kodak's lenticular process was certainly discussed in the pages of these publications, both from a practical and a technical standpoint.

In an October 1932 issue of *Personal Movies* (published in Canton, Ohio), an article from regular contributor George Hesse titled "King Kodacolor" offers the home filmmaker a bit of advice that is repeated in many articles on this subject.<sup>43</sup> Though Kodak's lenticular technology had been on the scene for a few years by 1932, the literature reflects and responds to a degree of lingering end-user bewilderment over how best to incorporate the stock into the amateur repertoire. Acknowledging the specific requirements of the technology, *Personal Movies* appeared to take seriously the task of familiarizing its readership and soothing any potential anxieties about Kodacolor, and then getting them to give shooting in color a try. Though published only briefly (from June 1932 to December 1934), *Personal Movies* began its run just as Kodak was introducing its more sensitive second generation of Kodacolor stock in 1932 and folded just before the rise of Kodachrome in 1935, which, as has already been noted, signaled the demise of Kodacolor.

While July was touted in a 1933 issue of the same publication as “The Season of Color”—and may well have been an obvious, full-sun month for Kodacolor shooting—the fall was perhaps a bit more intimidating, since favorable lighting conditions were a prerequisite for proper exposure of Kodacolor film.<sup>44</sup> Hesse’s piece pitches the season in a manner that forms a suitable entrée into the Bigelow family’s Kodacolor footage. He writes:

At a time like this when we have a thousand and one scenes to choose from we have no need for a story other than that presented by nature herself. It will be sufficient to produce an esthetically thrilling scene of one of the most glorious and ephemeral phases of the year. The beauty of nature in her “royal robes” should be the dominant note in any Kodacolor film made during the amazing month of October.<sup>45</sup>

The colorful displays of nature are privileged here as a worthy color subject, though Hesse goes on to discuss filmable scenes of human activity as well. Though “glorious” and begging to be shot in color, October, as the article also subtly suggests, presents a number of lighting challenges that would have to be overcome with practice and patience. And while it is impossible to precisely date the footage on the Kodacolor reel shot by Barry Bigelow, the October 1929 letter to Arch (wherein the filmmaker discusses shooting Marj and Jiggs) is a tempting clue. The date code for the footage Barry discusses in the just-quoted note is 1929. The Kodacolor reel includes a football game between Harvard and Michigan, which took place on November 9, 1929, at the Wolverines’ stadium in Ann Arbor.<sup>46</sup> The reel includes a close-up of the score board, at which point Michigan had fourteen points and Harvard was on its way to gaining its twelve. A program for the game explains or at least adds interest to a stylistic quirk in the footage. For several seasons, beautifully designed “two-way” college football programs were quite common: turned one way, they appeared to favor one team and turned the other, they favored the competing team, so that their contents were essentially printed twice. Barry Bigelow appears to be reflecting this tradition by shooting some of the more spectacular footage taken prior to the start of the game upside-down.

Regardless of the challenges or aesthetic riches brought by the fall (football!) season (remember that in his 1928 *New York Times* commentary on the Kodacolor demonstration, Porter fantasizes about being able to watch “a Yale-Harvard football game” in color), it seems reasonable to assume that much of Bigelow’s Kodacolor footage from this reel was shot in the fall of 1929, especially since other footage in the collection is easier to date. What the handwritten note on the can refers to as a “trip West” includes elaborate intertitles



indicating that the journey took place from April 28 to June 6, 1930. There is some lenticular footage of this journey as well (on the Kodacolor reel and duplicated in black-and-white on the trip reel), though the journey was, for the most part, shot in black and white. Based on the date codes, nothing in this portion of the Bigelow collection is shot after 1931.

For this reason, it is logical to assume that none of the color footage was shot using Kodak's supersensitive Kodacolor stock, which was not introduced until 1932. An improvement over the original stock and its significant lighting requirements, the supersensitive stock was highly touted. A June 1932 *Personal Movies* article in the What's New in Personal Movie Equipment section discusses the innovation in the following terms:

At no increase in price—twice as fast as in the past—permitting Kodacolor movies on dull or slightly cloudy days and in the shade. That's the substance of some of the outstanding features of the new super-sensitive Kodakolor [*sic*] film, recently made available to the trade by the Eastman Kodak Company of Rochester, New York.<sup>47</sup>

The piece goes on to discuss the practical advantages of the new Kodacolor film, attempting to win over potential users to the second generation of a stock whose reputation, it seems, preceded it:

This new film has the speed and latitude to make all the Kodakolor [*sic*] shots you want in good camera weather. It will not reproduce rich colorings on heavily overcast days when YOU cannot see rich coloring. That would be unnatural—and this film reproduces naturally, but over a far wider range than ever before.<sup>48</sup>

The gentle downplaying of the capabilities of the new Kodacolor material and simultaneous touting of its virtues—while also justifying its flaws—is hardly concealed here. The article deliberately avoids the creation of false expectations. Barry Bigelow, however, appears to have been undaunted by even phase-one Kodacolor's acknowledged limitations and managed to squeeze out passable-to-excellent results from it—results that, for the most part, mirror his non-Kodacolor skill level and also exhibit a savvy photo-cinematic aesthetic.

The Kodacolor reel in the Bigelow collection begins with shots of Barry's wife, Marj, and their dog, Jiggs, taken at Portage Lake in Michigan, which was within driving distance from the family home in Ann Arbor. Though the full sun certainly helps maintain an even quality to these images, this home moviemaker is also rather defiant and largely successful in his attempts at moving portraiture, a genre *Personal Movies* never recommends for Kodacolor and even subtly warns against in its recommendation to shoot human subjects from a



**Fig. 9:** Upside-down image of the Michigan vs. Harvard game, November 9, 1929, on the Bigelow Kodachrome reel. Bigelow Family Collection, Northeast Historic Film, Bucksport, Maine

distance to maintain even lighting. Because the lens needed to be at its widest aperture (F-1.8 or 1.9, depending on the make of the camera and lens used), depth of focus was shallow and a bit difficult to assess at the time of shooting. Barry captures some good images at a distance of ten feet or more, though he struggles a bit with some close-up shots of Jiggs (likely the combined result of the dog's color, his movement, and perhaps Barry's decision to set and leave his focus scale at infinity to try to conveniently preserve sharpness at a distance). The choice to shoot near—or, it seems, even from—the water was more than just playful. Hesse's article about shooting in October goes on to discuss the practical and pleasing effects of water in terms of helping to reflect and amplify light in less favorable conditions.<sup>49</sup> Exposure is most certainly not an issue in the Bigelow footage, and the focus is generally sharp.

The footage moves from Jiggs and company to the Harvard at Michigan game. This material is brief and begins, like the programs for the game itself, upside down at the entrance to the stadium, the result of what seems most likely to be some creative editing (fig. 9). The films in this collection are carefully edited, and there are a number of other playful cinematographic tricks, suggesting that Bigelow was disposed to this sort of inventive tactic. The tradition

of the upside-down program seems likely to have been the impetus, though it is doubtful that Barry would have been a Harvard fan, as he was a University of Michigan graduate who would not move his family (for work purposes) to the Boston area (Milton, Massachusetts, to be precise) for another year or so. The “Welcome” balloon-hopper contraption that this footage opens on is, in fact, precisely the sort of thing the literature would have advised users to film for its color and activity. Hesse specifically discusses the pleasures of shooting color films of college football:

The spectacle of a football game should not be overlooked; it is as typical of fall as is the flaming red of the trees or the luscious yellow of the pumpkins. The crowds pouring into the stadium . . . brightly dressed co-eds with their sartorially correct escorts and off to one side the itinerant and impartial vendor of brightly colored balloons, pennants, miniature footballs, feathers or whatever else happens to catch the public fancy. Don't forget the colorful bands as they parade the field with their instruments gleaming in the sun . . . the cheerleaders going through their antics . . . pennants waving in the brisk breeze and finally the teams trotting out on the field.<sup>50</sup>

Though the Bigelow footage predates the issue of *Personal Movies* in question, it predicts the printed advice nearly shot for shot in scene after scene. The footage moves from the game itself—a bit abruptly (the editorial logic here seems to be ruled by the segregation of all the Kodacolor footage onto one reel)—to scenes of what “King Kodacolor” refers to as “Jack Frost’s handiwork.” Kodacolor, the article assures us, is the only process that can do this seasonal miracle of cooler weather justice.<sup>51</sup> There are—and this is something of a Bigelow signature—dogs. In fact, there are many dogs as this footage progresses. Then the reel shifts to some extraordinarily compelling, though not particularly long in duration, images—plants and landscapes, primarily—from the aforementioned trip West, followed in turn by some prototypical “baby in the backyard” footage depicting their daughter, Mary (fig. 10). The baby footage goes on for what seems like an unusual amount of time, given the relative length of the more spectacular trip footage, but it is not unusual to encounter this particular way of using up the end of a reel in home movie collections (if this was, in fact, originally shot at the end of a reel).

The Bigelow collection is interesting, in part, because it traces in a fairly tangible way the rise and demise of Kodacolor film stock. Even prior to Kodak’s much-discussed 1932 improvements to their lenticular process, Barry Bigelow had established himself as a competent color cinematographer. He had an eye for composition and more than a basic notion of the film’s idiosyncrasies. In



**Fig. 10:** Marj and Barry’s daughter, Mary, with Jiggs. When this film is projected, the color of the dog’s tongue appears particularly vivid. Bigelow Family Collection, Northeast Historic Film, Bucksport, Maine

what the later literature determined were the unpredictable conditions of fall, he got the most out of existing lighting conditions and, even in his somewhat riskier footage, his images remain crisp, interesting, and (for the most part) in focus. His work in many ways predicts the advice doled out in the pages of *Personal Movies*, capturing on film and in “natural color” nearly every scene recommended in those pages.

Yet, save for a few beautiful scenes shot in Arizona—mostly of the floral and rock-formation variety, which closely resemble some of the footage in one of the professionally produced films he owned about Yosemite—Bigelow elected to shoot what was, one imagines, a quite colorful 8,201-mile trip across the country (with a dip into Mexico) in black and white. Perhaps this is not surprising, given the idiosyncrasies of Kodacolor and its fit within the amateur cinematographer’s arsenal. In the case of the Bigelow road trip, it was not for lack of potentially interesting color subjects that the bulk of this trip was shot in black and white. This journey was, in fact, so colorful that at one point the handmade intertitles fill in where the footage does not: a Mexican bullfighting scene cuts to an intertitle that reads “What happened to the gentleman whose

pants were *R E D?*,” a somewhat inexplicable linguistic replacement for what might have been demonstrated visually, but one that is revealing of Kodacolor’s technological drawbacks.

Travel, especially road travel, was one of the amateur’s favorite subjects. Oddly, however, for all of its ample advice on when and where to shoot Kodacolor, the literature and advertising for Kodacolor tends to keep its ambitions close to home.<sup>52</sup> In one article on the subject, *Personal Movies* contributor Ruth Valentine’s “Little Missy Blue Dress” suggests a handful of staged scenarios. The article, published in 1933 after the more sensitive Kodacolor stock had been on the market, begins thus: “Do you experience difficulty in finding suitable material for Kodacolor pictures? Most amateur movie photographers do. Those who have found it rather easy to arrange and film short stories and playlets in black and white become ‘stumped’ with Kodacolor.”<sup>53</sup> The piece goes on to quote, in its entirety, the Mother Goose poem “Little Missy Blue Dress,” suggesting a variety of opportunities for posing one’s daughter with bunnies, chickens, and ponies. Beyond the bizarre specificity of “Little Missy Blue Dress,” there is a tendency in the pages of this publication and elsewhere to recommend finding color-worthy subjects close to home: your neighborhood in winter; your neighborhood in the fall; children trick-or-treating; football games; and staged domestic scenarios.

There seems, in other words, to be a sort of veiled acknowledgment that, in spite of its ability to capture “natural” color, Kodacolor was not a perfect travel companion. Kodak’s own advertisements during these years are interesting in this respect: ads for the Ciné-Kodak, for example, often focused on travel and merely mention color, whereas other ads focus on more “local” activities and discuss Kodacolor at length. This, of course, had much to do with the fact that the process required both necessary, special, and potentially damageable equipment (though admittedly not much of it) and ideal lighting conditions. It also suggests an awareness that Kodacolor, for all of its novelty, was not a perfectly integrated process. Askari discusses this in his examination of Alexander Black’s Kodacolor work, which, like the Bigelow footage, was spliced together onto one “Kodacolor reel.”

The traveler, in other words, perhaps fearing that poor Kodacolor exposure might result in no images of a once-in-a-lifetime journey, would have had to seriously consider hedging his or her bets and shoot in black and white as well—perhaps even with a different camera—if he or she was not willing to shoot an entire reel of Kodacolor before moving on to black and white. This was seemingly Bigelow’s strategy. A patent granted on March 17, 1931, to Emil M. Mueller for an “auxiliary reel holder for movie cameras” (US Patent 1,797,175) attempted to solve this problem by acknowledging Kodacolor’s expense and exposure issues that created conditions “where a user may desire to expose only

a small amount of colored film in between complete reels of black and white pictures.” To solve this dilemma, Mueller invented a “removable magazine for special film which may be removed from or inserted in the camera without exposing but a small portion of the special film to the light.”<sup>54</sup> Without such an invention at hand, changing stocks would be impractical and wasteful for most amateur cinematographers.<sup>55</sup>

This also created additional challenges at the time of projection. The linear logic of travel, for example, would have been disrupted by the starting and stopping required to show black-and-white and lenticular color films edited together in sequence. One could leave the filter attachment on for the entire reel, but it would reduce the brightness of the image. Alternately, one could change lenses depending on whether or not a given scene was photographed in color or black and white, but finding the expected material on the reel would be challenging. Kodak tried to downplay this in its advertising, claiming that the removal of the Kodascope filter while projecting was a snap: “elapsed time, one second.”<sup>56</sup> Bigelow’s seemingly more practical solution was to make black-and-white duplicates of his lenticular films, and he edited these, visible lines and all, into his black-and-white reels.

This inconvenience and aesthetic disruption might seem significant today, but for an experienced amateur, Kodacolor provided an alluring way to shoot and project in color. Clearly, the challenges and risks were worth the spectacular nature of the results, and an examination of Kodacolor reels across many amateur collections might yield further evidence about how—as well as how well or how poorly—the film stock was used. What Bigelow left behind—and I suspect what remains of Kodacolor in many other home movie collections—is a mix of interesting curiosities: a reel whose internal logic is personal and predicated on what was deemed worthy of this special color technology.<sup>57</sup> The evidence of how one amateur used Kodacolor, discerned from the Bigelow road trip footage as well as the single Kodacolor reel, allows us a glimpse into this pioneering color process. Surely, other collections that include Kodacolor footage could allow scholars to determine if the pattern we see in the Bigelow collection was indeed the prevailing method, or merely one hobbyist’s coping mechanism for a desirable but complicated format.

Because Kodacolor was, in the greater scheme of amateur film technology, so short-lived and so special in its function, it affords us an opportunity to better understand how color appealed to end users of the technology, as well as how it was conceived and pitched by the industry. Kodacolor is important precisely because, in the realm of amateur image-making, it provided a truly extraordinary added value, at significant cost during economically challenging times, which put the amateur ahead (in this one respect, at least) of the

professional filmmaker of the time. Film history is littered with short-lived cameras and film formats, each of which reflects the efforts of inventors perpetually trying to figure out the next best thing. In this case, Kodacolor reflects industry efforts to enable people to capture the world the way they saw and experienced it. While there are surely many reels of Kodacolor in archival collections, an institution would need to be committed to either properly digitizing these reels to reflect the color content (at significant additional expense) or to projecting them for researchers with the proper equipment (an effort impractical and unlikely at most archives) for this epiphenomenon of home movie making to be fully understood.

### Notes

This essay has benefitted from the generosity of many kind souls. My deepest gratitude goes to the Bigelow family—especially Lew and Deborah Bigelow, and their daughter, Anna Bigelow, as well as Mary McBride—who allowed me to work with their family films and were willing to share their family history. The incredible Skip Elsheimer, a.k.a. the A/V Geek, first identified this Kodacolor reel at a Home Movie Day event in Raleigh, North Carolina, and he did DVD transfers that allowed me to work closely with the material. While he was working at Northeast Historic Film (NHF) in Bucksport, Maine, Brian Graney made the technical arrangements necessary to project this Kodacolor reel at the 2011 NHF Summer Symposium so that most of us could see for the first time this kind of film projected the way it was meant to be. Brian liberally shared his substantial knowledge of the format, as did Dino Everett, archivist at the Hugh M. Hefner Moving Image Archive at the University of Southern California. Dino also projected this same Kodacolor reel at the 2011 Association of Moving Image Archivists conference, this time with an original, silvered Kodacolor screen that he hauled on the flight from Los Angeles to Austin, Texas. Snowden Becker shared some useful resources about the technology and her insights into the format, and Ralph Sargent of Film Technology Company read a draft of this article and provided valuable technical information based on his extensive experience handling Kodacolor material.

1. Kaveh Askari, "Early 16mm Colour by a Career Amateur," *Film History* 21, no. 2 (2009): 150–63.
2. Two-color 35mm Technicolor was first developed in 1915 through an additive process not dissimilar in conceptualization—though significantly different in execution—from Kodacolor. It and its consequent two-color Technicolor descendants had significant flaws that kept it from being widely adopted. It was not until 1932, with the introduction of three-strip Technicolor and the release of Disney's *Flowers and Trees*, that color film became a significant contender in theatrical film production, though Disney's exclusive contract with Technicolor kept it out of general production for several years. For more on Technicolor processes and this transitional period, see Scott Higgins, "Demonstrating Three-Colour Technicolor: Early Three-Colour Aesthetics and Design," *Film History* 12, no. 4 (2000): 358–83. On the history of color film, see C. E. Kenneth Mees, "Amateur Cinematography and the Kodacolor Process," *Journal of the Franklin Institute* 207, no. 1 (January 1929): 1–17. It should also be noted that there were professional, nontheatrical applications for Kodacolor, including in the medical profession. See, for example, H. B. Tuttle and R. Plato Schwartz, "The New Cine-Kodak Special in Medicine," *Journal of the Society for Motion Picture Engineers* 11, no. 1 (July 1933): 3–8.
3. The quote is from an Eastman Kodak Stores advertisement, "You are invited to see Kodacolor Home Movies in Full Color," *New York Times*, August 21, 1928, 4.

4. Russell Porter, "Home Movies in Colors, Long an Eastman Dream, Are Shown to Notables," *New York Times*, July 31, 1928.
5. Hiram Percy Maxim, "Color Comes to the Amateur," *The Movie Makers*, September 1928, 614, 615. *The Movie Makers* was the magazine of the Amateur Cinema League.
6. *Ibid.* Slip-on projection filters converted preexisting projectors to exhibit Kodacolor in color; later projector lenses had the filters built in.
7. "Gets Entire Credit for Color Movies," *New York Times*, August 3, 1928, 17.
8. Eastman Kodak Stores advertisement, *Los Angeles Times*, December 16, 1928, H32.
9. Eastman Kodak Stores advertisement, *Los Angeles Times*, April 6, 1930, J32 (original italics).
10. C. E. K. Mees, quoted in Porter, "Home Movies in Colors."
11. F. B. Phillips, "The Kodacolor Process," *The Geographical Journal* 80, no. 3 (September 1932): 240.
12. Mees, quoted in Porter, "Home Movies in Colors."
13. Mees, "Amateur Cinematography and the Kodacolor Process," 15–16.
14. Mees also noted that a supplementary lens called a "compensator . . . places images of the color filters at the right point in the optical system," thereby replicating the filmed color more precisely at the time of exhibition. This was, in fact, an optical field flattener (*ibid.*, 17).
15. Porter, "Home Movies in Colors."
16. *Ibid.*
17. See, for example, advertisements in the *Los Angeles Times* on December 16, 1928, and August 17, 1930; and in the *New York Times* on June 4, 1929.
18. Eastman Kodak Company Kodacolor advertisement, *New York Times*, August 6, 1928, 11 (original italics).
19. Askari, "Early 16mm Colour," 157.
20. Eastman Kodak Company Kodacolor advertisement, *New York Times*, August 6, 1928, 11.
21. "Color Movies Shown Here," *New York Times*, August 2, 1928, 25.
22. *How to Use the Ciné-"Kodak" Model K* [user manual] (London: Kodak Ltd., n.d.), 20 (original italics), accessed October 2, 2013, from CineInformation, <http://static.cineinformation.org/wp-content/uploads/2010/08/Kodak-Camera-Cine-Kodak-Model-K-User-Manual-Digital-Reproduction.pdf>.
23. *Ibid.*, 32.
24. *Ibid.*, 34.
25. *Ibid.*, 35.
26. *Ibid.*, 48.
27. Eastman Kodak Company advertisement, *Los Angeles Times*, December 8, 1929, 17.
28. "What's Behind Your Stock," *Los Angeles Times*, November 18, 1930, 14.
29. Eastman Kodak Stores advertisement, *Los Angeles Times*, April 6, 1930, J32.



30. Porter, "Home Movies in Colors"; and Phillips, "The Kodacolor Process," 242. Equipment costs appear in numerous places, including "The Eastman Kodak Company presents Kodacolor" advertisement from *The Movie Makers*, August 1928, 522ff.; and "Color Movies Shown Here," 25.
31. *How to Use the Ciné-"Kodak" Model K*, 46.
32. Porter, "Home Movies in Colors."
33. Ibid.
34. Roderick T. Ryan, *A History of Motion Picture Color Technology* (New York: Focal Press, 1977), 51. Ryan also discusses a failed 1951 attempt by Kodak and Twentieth Century-Fox to utilize lenticular color film for commercial theaters (Eastman Embossed Print Film), which was revisited again with limited commercial success in 1956 with Eastman Embossed Color Kinescope Recording Film for color television. A *New York Times* article from February 16, 1930, "New Color Film Process," intriguingly reports that Karl Freund was coming to the United States to "work on a new process for developing colored films . . . similar to the Kodacolor method used by Eastman . . . This camera technician's method, as yet unrevealed, permits the duplication of any number of color prints employing all three primary colors." According to Ralph Sargent, "Eastman embossed color kinescope film was a 35mm film in which the lenticules ran perpendicular to the running direction of the film. It used a different filter layout and a different approach to reconstructing the color image. Used by NBC prior to the development of color videotape, this lenticular film was the dominant system for program time-delay for color programs produced on the East Coast and shown three hours later on the West Coast. More than nine million feet of this film was used by NBC for this purpose . . . Unfortunately, very little of this material still exists as NBC ordered its destruction to allow their vault space for videotape." Ralph Sargent, e-mail to the author, January 13, 2013.
35. See, for example, an advertisement for Davega Camera Stores announcing "News for Movie Amateurs" regarding Kodachrome color film (*New York Times*, May 28, 1935).
36. The accession number for the Bigelow Family Collection is Acc. 2662. The collection contains fourteen reels of silent, black-and-white and color 16mm film totaling approximately 5,050 feet. I first encountered the collection at the annual Home Movie Day in Raleigh, North Carolina, an event that I coorganize. Family members believe that many reels of film have been lost over the years, so this cannot be considered a complete collection of family films.
37. All of the information about the Bigelow family was acquired through a series of interviews conducted in 2011 and 2012, in person, via e-mail, and on the phone, with Mary McBride, Lew and Deborah Bigelow, and Anna Bigelow.
38. A and B wind indicates the position of the emulsion, which contains the image, in the camera. B wind is the normal position with the emulsion facing the camera lens. A wind is the reverse, with the emulsion facing away from the lens. Typically, A wind is the position for a contact print or duplicate from the camera original. The Kodacolor process required that the film be exposed through the base so that the lenticules come into play; thus, the camera original is A wind. Since acetate film base is 5/1000 of an inch thick, a focus shift in projection occurs if the two different types of film (standard black-and-white or color film vs. Kodacolor film) are spliced together on the same reel for projection. Thanks to Ralph Sargent of Film Technology Company for explaining these technical specifications to me.
39. Askari, "Early 16mm Colour," 158.

40. *Ibid.*, 157.
41. Barry Bigelow to "Arch," 23 October 1929, Bigelow family personal collection.
42. For more on the Amateur Cinema League, see Alan D. Kattelle, "The Amateur Cinema League and Its Films," *Film History* 15, no. 2 (2003): 238–51.
43. George Hesse, "King Kodacolor," *Personal Movies*, October 1932, 11–13.
44. "The Season of Color," *Personal Movies*, July 1933, 154–55.
45. Hesse, "King Kodacolor," 11.
46. See the University of Michigan Athletics History website entries for football in 1929, accessed October 2, 2013, <http://bentley.umich.edu/athdept/football/fbteam/1929fbt.htm>. Part of the Bentley Historical Library at the University of Michigan in Ann Arbor, the Athletics History project chronicles everything Wolverines-related, from the building of the stadium in 1927, to the dates, scores, and attendance records of games played both away and at home. They also archive and make accessible (in a section called "The Art of Football") the team's many colorful game-day programs: <http://bentley.umich.edu/athdept/football/fbart/index.html>. Michigan won this particular game, by the way—fourteen to twelve.
47. What's New in Personal Movie Equipment?, *Personal Movies*, June 1932, 9. See also A. L. Gilks, "Kodacolor Comes Indoors," *American Cinematographer*, May 1933, 23ff.
48. What's New in Personal Movie Equipment?, 9.
49. Hesse, "King Kodacolor," 13.
50. *Ibid.*
51. *Ibid.*, 11.
52. There are exceptions to this domestic orientation, such as a Ciné-Kodak and Kodacolor advertisement from Willoughbys camera shop in New York City, which reads: "MOVIES of your Southern trip in natural COLORS As easy as taking snapshots. The gorgeous foliage of a Miami Landscape—the brilliant colorings of a Southern Beach Scene . . . are now easily obtainable" (*New York Times*, February 28, 1929). There are other advertisements that promote using the Ciné-Kodak to film vacations, but the use of Kodacolor in such applications is minimized. See, for example, advertisement for Abe Cohen's Exchange camera store, *New York Times*, May 29, 1929; and advertisement for the Trinity Talking Machine Co., *New York Times*, June 12, 1929.
53. Ruth Valentine, "Little Missy Blue Dress," *Personal Movies*, March 1933, 52. Note the reference to playlets also appears in an advertisement from Willoughbys camera shop: "Scenes, people, playlets, anything that moves can be taken in COLORED MOVIES with your Cine Kodak Equipped for Kodacolor" (*New York Times*, February 26, 1929).
54. Thanks to Snowden Becker for sharing this US Patent Office document with me.
55. According to Ralph Sargent, "The Simplex Corporation, well known for its 35mm theatrical projectors, manufactured a 16mm magazine camera built to shoot Kodacolor and may have been licensed to use Mueller's patent." Ralph Sargent, e-mail to the author, January 13, 2013.
56. "The Eastman Kodak Company presents Kodacolor," *The Movie Makers*, 522.
57. According to Ralph Sargent, who has done preservation work on many thousands of feet of Kodacolor film, Kodacolor was adopted and used by many amateurs with some

excellent results: “The very first winner of the Amateur League’s annual contest for best film (after the introduction of Kodacolor) was a Kodacolor film exclusively about stained glass in a major Cathedral in France and is quite beautiful. The National Parks Service of the U[nited] S[tates] has a number of Kodacolor collections (meaning several thousand feet or more each) covering subjects such as the American Southwest and elsewhere, which were very methodically shot by amateurs on Kodacolor. The Dupont family kids shot whole fiction films in Kodacolor. A number of films were made in England, Scotland, and Ireland and the rest of the world documenting various countries. To assume that most users of Kodacolor were sporadic in its use is belied by what I’ve seen.” Ralph Sargent, e-mail to the author, January 13, 2013.