

The Latham Eidoloscope: A Cautionary Tale in Primacy

The nature of early film development was, in many regards, one of chaos and confusion. As advances in still photography combined with the invention of celluloid film, a new medium was born, but one without immediately obvious mechanical applications. Many inventors, including the Lumière brothers, W.K.L. Dickson, Thomas Armat, Max Skladanowsky and Robert W. Paul,¹ rushed forward with the same goal: to project moving images using a series of still photos. Yet the actual technology used to accomplish that goal was far from established. Looking back now, after decades of fixed, standardized projection technology, it is tempting to search the late 19th-century and declare the “first” example of what we now know as a film projector; but in the rat race of early cinema, as engineers and businessmen from all over the world fought to attract larger and larger audiences, similar and even overlapping inventions make it nearly impossible to establish primacy. Often, one machine would contribute a single, lasting piece of the puzzle, even as the general format was lost to obscurity, indifference, or even a particularly vicious patent infringement suit. The eidoloscope, the first publicly displayed film projector in America, is a perfect example: short-lived and imperfect, this device embodies both the frustrations and lasting innovation of early cinema technology. Though it met with any number of difficulties - mechanical, economic, managerial – this invention made contributions both technological and philosophical to the advancement of film that assured a lasting impression.

To understand the rapid rise and fall of the eidoloscope, a brief background of its inventors and their business endeavors may help in contextualizing the format's innovations and flaws. In early 1894, Gray and Otway Latham, members of a respected Virginian family who had made their way to New York City to work at a pharmaceutical company², became fascinated with the kinetoscope parlors then

1 Ramsaye, *Movie Jargon*, 358-359.

2 Hendricks, 150.

being established in the area by the Edison Manufacturing Company.³ Forming the Kinetoscope Exhibition Company with their father Woodville and an old college friend and engineer named Enoch J. Rector, the inexperienced Latham brothers purchased a number of Edison's machines⁴ and set about filming unique content for their own parlor. They were particularly interested in filming prize fights, an idea Edison himself had presented but not realized because of the limited capacity of kinetoscopes from that time⁵ (the device could hold roughly fifty feet of film, equivalent to about twenty seconds of running time).⁶ At some point in the purchasing of their kinetoscopes, the Lathams had made the acquaintance of W.K.L. Dickson, Edison's chief photographer,⁷ and with his assistance the Kinetoscope Exhibition Company was given access to Edison's laboratory in West Orange, including the famed Black Maria studio.⁸ With Dickson, the Lathams and Rector made their first contribution to film history: an enlarged kinetoscope, capable of holding three times the amount of film and therefore providing fifty seconds to a minute of exhibition time per kinetoscope.⁹ This allowed the Lathams to film, in the Black Maria, a six-round bout between Michael Leonard and Jack Cushing on June 15, 1894, with each round corresponding to one reel of film.¹⁰ Once the Latham parlor at 83 Nassau Street, New York City, opened to great success, a second fight was filmed between James Corbett and Peter Courtney.¹¹ Boxing matches proved to be a Latham signature, the centerpiece content for both their kinetoscope and eidoloscope enterprises.

It was the popularity of the Lathams' kinetoscope parlor and the Leonard-Cushing, Corbett-Courtney fights that apparently inspired the family's next move. Frustrated by the fact that the kinetoscope apparatus only allowed one viewer at a time for each film, limiting the number of potential

3 Ibid., 88.

4 Musser, 82.

5 Ibid.

6 Enticknap, 134.

7 Hendricks., 89.

8 Ibid., 90-91.

9 Ibid., 90, 96. According to Hendricks, this enlargement was accomplished simply by adding more spools to the kinetoscope's spool bank.

10 Musser, 82.

11 Ibid., 83-84. Corbett signed an exclusive with the Kinetoscope Exhibition Company, stipulating that his image could not be recorded by any other kinetoscope company – making him essentially the first movie star in history (Ramsaye, 110).

customers, Woodville and his sons became interested in developing a device to project moving images on to a screen.¹² The commercial advantages of such a machine were obvious: start-up costs for a new parlor would be reduced, as only one machine would be necessary; exhibitors could become more mobile, allowing for the expansion of territorial rights; and a life-size image could allow viewers to see the image more clearly, and in a communal environment.¹³ Reforming their business venture as the Lambda Company, the Lathams hired Eugene Lauste, a former Edison engineer, on the recommendation of Dickson¹⁴ (who was becoming increasingly dissatisfied with his employer and would eventually leave the Edison company in April 1895, acting as an unofficial consultant for the Lathams).¹⁵ The group of Lauste, Dickson, Rector and Woodville Latham (Gray and Otway were primarily entrepreneurs with little scientific or mechanical expertise)¹⁶ eventually produced a machine they called the pantoptikon.¹⁷ Revealed to a private press screening at the Lambda Company workshop on the afternoon of April 21, 1895,¹⁸ the pantoptikon was mostly treated as a curiosity: an article in the *New York Sun* the following day described the film shown, brief footage of two boys playing while a few men looked on, including Woodville Latham smoking a pipe: “Even the puffs of smoke could be plainly seen, as could also a man's movements when he took a handkerchief from his pocket.”¹⁹ The article also included a reaction from Edison himself. Although the litigious inventor likely knew nothing of the pantoptikon's mechanical configuration, he claimed that the Latham device was simply a rearranged kinoscope, and threatened prosecution if it continued to be shown.²⁰ Perhaps because of this prominently publicized belittling, the Lambda Company quickly re-branded the pantoptikon,

12 Kattelle, 36.

13 Musser, 92.

14 Ibid.

15 De Angelis. Web.

16 Hendricks, 99.

17 Pratt, 20. There is some confusion in various sources regarding the correct spelling of this machine's name – it is alternately referred to as the “Panoptikon” and “Panopticon.”

18 Musser, 94.

19 Quoted in Musser, 94.

20 Ramsaye, 130.

referring to it thereon out as the eidoloscope.²¹

The eidoloscope debuted to the general public in a Broadway storefront theater in late May of 1895²² (several months before the Lumières publicly presented their *cinématographe* in Paris)²³; its first film was, unsurprisingly, a boxing match between Young Griffo and Charles Barnett, shot on the rooftop of Madison Square Garden on May 4.²⁴ The Lambda Company immediately launched a number of productions, taking advantage of the portability of their machines by filming horse racing at Sheepshead Bay and Atlantic City, whirlpool rapids at Niagara Falls, vaudeville acts, several young girls dancing to a popular song called “The Sidewalks of New York,” and wrestling bouts on the roof of the *Police Gazette* building.²⁵ Several more projectors were built, which the Lathams licensed to local exhibitors in other cities and states: from the summer of 1895 to the end of 1896, eidoloscope shows were presented in Chicago, Richmond, Atlanta, Philadelphia, Rochester, Syracuse, Detroit, Boston, Providence, Austin, and Bridgeport, Connecticut.²⁶ Like much of early film technology, the eidoloscope was shown as a sort of vaudeville act, in variety theaters and exposition showgrounds like the Cotton States Exposition;²⁷ in Chicago, the projector was presented alongside “Professor Sherman's school of educated goats.”²⁸

Despite these efforts to constantly present the eidoloscope to new paying customers, the Lambda Company was quickly running out of money.²⁹ To add to the Latham's woes, they were abandoned by most of their engineering team shortly after the eidoloscope's original New York debut, as Dickson, Lauste and Rector all left the company - Dickson to found the American Mutoscope &

21 See Appendix, Figure 3.

22 According to Ramsaye, *A Million and One Nights*, 136. Ramsaye's account is often exaggerated and not particularly reliable, but a *New York World* review of the eidoloscope show (quoted in Musser, 96), from May 28 of that year would appear to support him on this count.

23 Pratt, 20.

24 Musser, 94.

25 Musser, 99, and Witryol, 154.

26 Pratt, 21-22, Musser, 99, 133-134, and Dougherty, 224.

27 Musser, 99.

28 *Ibid.*

29 *Ibid.*

Biograph Company with Lauste in tow,³⁰ and Rector to develop his own short-lived projector, the veriscope.³¹ Though the Lathams reorganized as the Eidoloscope Company, they were soon also confronted by the emergence of the Edison Company's vitascope³² (a commercialized version of a projector called the phantoscope, developed by Thomas Armat and C. Francis Jenkins in late 1895).³³ The Edison machine, which featured an intermittent mechanism, as opposed to the Latham's continuous projection, had a vastly superior picture quality,³⁴ and without Dickson and Lauste's assistance, Woodville Latham was most likely technologically overmatched.³⁵ An improved eidoloscope, featuring intermittent motion, was displayed at Hammerstein's Olympia in New York City on May 11, 1896, but by then the vitascope was already a phenomenon, and the Latham machine struggled to receive attention.³⁶ The Lathams' last-ditch effort, a trip to Mexico to film a bullfight, proved fruitless when the Eidoloscope Company board voted to remove Woodville, Gray and Otway from the company in the fall of 1896.³⁷ The film *Bullfight* was shown alongside a production of the opera *Carmen* in Atlanta in November; a performance of that same production in Texas in December appears to have been the last major demonstration of the eidoloscope.³⁸ Woodville Latham had brief resurgences in the spotlight in 1897 and 1910 thanks to lawsuits involving his eidoloscope patent, but otherwise the family had no more involvement in the motion picture industry.³⁹

The Lathams' start as kinoscope exhibitors, their relationship with Dickson, and their familiarity with the vaudeville and sideshow presentations of late 19th-century Broadway are key to understanding the technologies they were hoping to improve upon when they designed the eidoloscope. In terms of film technology, the Edison kinoscope is the Latham device's quite obvious, immediate

30 De Angelis. Web. Ramsaye, in *A Million and One Nights*, also speculates that Dickson didn't approve of the Latham brothers' "Broadway lifestyle." (185).

31 Kattelle, 37.

32 Musser, 100.

33 Ibid., 109-110.

34 Ibid., 100.

35 "In the District Court...", *Film History* 1.3, 232.

36 Musser, 133.

37 Ibid., 134.

38 Ibid., 135.

39 Herbert, 77-78.

predecessor. Though not strictly a movie projector, this peephole viewing device basically set the standard for all of cinematic projection by running a strip of perforated film stock over a light source with a high-speed shutter.⁴⁰ Though the kinetoscope's camera equivalent, the kinetograph, featured an intermittent device, starting and stopping the filmstrip between 16 and 40 times per second to allow the individual frames to photograph, the kinetoscope itself moved the film continuously on a loop through a spool bank; the high-speed shutter between the light source and the viewer's eye provided the flicker effect necessary for the viewer to register continuous motion rather than a blurred mess.⁴¹ There were advantages to this system, mainly economic: because the film ran in a loop, there was no need for a projectionist to change the slides or reels – the machine could be controlled by the viewer, via a coin-operated motor.⁴² Furthermore the continuous motion through the spools placed relatively little strain on the strip itself, making it less likely that the celluloid base would break than with the jerky, stop-and-start motion of an intermittent device. However, as the Lathams discovered, placing films inside a peephole cabinet caused severe limitations. Every film required its own machine, making the acquisition of equipment an expensive proposition; the peephole construction allowed only one viewer at a time, restricting the potential number of paying customers; and the size of the image, which was perhaps only magnified a few times from the original filmstrip by the peephole lens, was highly unsatisfactory for those who yearned to see life-sized objects in motion. Screen projection offered a more profitable solution to these problems.⁴³

Precedent existed, of course, for the projection of still images. Magic lantern shows, featuring painted glass slides lit by candle or oil lamps, had already been in use for centuries – by the late 19th-

40 Enticknap, 133.

41 Enticknap, 134.

42 Ibid.

43 Edison vehemently denied this possibility for several years, convinced that letting in multiple viewers to see multiple films projected at the same time would be inferior to the kinetoscope's business model of individual viewers paying to see each individual film (Kattelle, 36). Had he not made this initial miscalculation, it seems likely Edison's company could've developed a working projector long before the Lathams.

century, these devices had advanced to photographic glass plates projected by arc lamp.⁴⁴ The stereopticon, a slide projector with two lenses (one above the other) was still popular in the vaudeville and variety shows the Lathams would've seen in New York City; the projectionist in this case acted as a performer/narrator, entertaining the audience with stories and commentary on the projected slides.⁴⁵ The limitation to this format, obviously, was that the pictures could not themselves move inside the frame: only the projectionist sliding the picture in and out of the projector could simulate any sort of activity. Rapidly advancing filmstrips, which have sampled motion through a quick succession of still photos, allow for the illusion of motion within the frame, and were the clear path forward in this respect.

Also notable is the oddity of Ottomar Anschütz's electric tachyscope, an improvement on optical toys like the zoetrope and zoopraxinoscope developed by the German inventor in the late 1880's.⁴⁶ Anschütz placed twenty-four glass photographic slides along the edges of a large wheel – as the wheel was spun, metal pins next to each picture struck an electrical contact, briefly discharging a lamp called a Geissler tube, capable of being rapidly quenched and reignited.⁴⁷ The strobe effect this created allowed for the appearance of motion if the viewer was either looking directly at the picture, or at a small screen placed very close to the tachyscope; but the Geissler tube's throw was extremely limited, therefore incapable of lighting up a large screen.⁴⁸ The tachyscope's limit of only twenty-four frames and bulky, impractical use of glass slides were also far from ideal. Still, there is evidence that Dickson experimented with this projection format while employed by Edison in 1889,⁴⁹ and it is possible that a small Edison exhibition of moving pictures at the Lenox Lyceum in New York in early 1890 was in fact a demonstration of Dickson's improved tachyscope.⁵⁰ A correspondent from the

44 Theisen, 249-250.

45 Ibid., 251.

46 Hendricks, 84.

47 Ibid., 85

48 Ramsaye, *A Million and One Nights*, 54.

49 Hendricks, 86

50 Hendricks, trying to piece together conflicting first-hand accounts and circumstantial evidence, puts forward a fairly

Western Electrician described the mysterious projector at this event as “a magic lantern of almost unimaginable power,”⁵¹ suggesting that Dickson solved Anschütz's problem of illumination, most likely by simply using a carbon arc lamp instead of a Geissler tube.⁵² The issue of dim projection was one that constantly plagued the Lathams during construction of the eidoloscope, and given their device's peculiar initial design for illumination, it is entirely possible that they at some point looked back to Dickson's tachyscope for guidance.

The design of the eidoloscope thus emerged out of a few key needs that had to be addressed by any inventor hoping to make film projection possible and popular: proper illumination to light up a large screen some distance from the projector itself; a film capacity that would allow for longer, uninterrupted shows to trump the kinetoscope's one-minute shorts, without causing undue stress and breaking the strip; and a technical arrangement different enough from Edison's device so as to avoid that man's legal wrath. The latter was easily enough accomplished, despite Edison's threats in the *Sun*: the eidoloscope, as it debuted in May of 1895, bore almost no physical resemblance to the kinetoscope, with the cabinet-and-spool-bank design abandoned in favor of two reels mounted above and below, respectively, a table.⁵³ The filmstrip, drawn by a small motor, was moved continuously from one reel through a series of sprocketed rollers, past a glass condenser lens for illumination and enlargement, and on to the take-up reel, the same basic system for all of 20th-century film projection; counter-intuitively to today's standards though, the film was moved from the bottom reel to the top (again, an attempt to avoid infringing Edison's patents).⁵⁴ The use of reels, rather than a spool bank, allowed for the lengthier films that the Lathams hoped to exhibit.⁵⁵

The filmstrip itself used by the eidoloscope was also considerably different from Edison's

convincing case, 87-92.

51 Hendricks, 92.

52 Ibid.

53 Latham patent. Web.

54 Musser, 93-94.

55 “An Illustrated History...”, Cinematheque Francoise. Web.

standard 35mm. The Lathams made a special order to Eastman Kodak⁵⁶ for a clear-based film stock that was an unusual 51mm wide, with four perforations per frame;⁵⁷ the film ran through the exposure gate at a rate of 30 frames per second,⁵⁸ nearly double the rate of Edison's common 16fps kinetoscopes, and still significantly above the eventual Academy standard of 24fps (theoretically allowing for a more precise quality of motion, with the viewer receiving almost twice as much visual information per second). The photographed area (and corresponding lens aperture) measured 37mm wide by 20mm high.⁵⁹ Images filmed using this unique gauge therefore had an aspect ratio of 1.85:1, making the eidoloscope the first widescreen motion picture format in history.⁶⁰ The increased image size was surprisingly not, as with later widescreen formats, specifically intended to impress audiences (the very notion of projected movies was enough on that score), nor was it likely part of the efforts to step around Edison's patents.⁶¹ Rather, it was an attempt to combat the dimness of the picture caused by the film's continuous motion.⁶² The insistence of the Lathams and Lauste on a continuous movement is somewhat baffling; according to Woodville Latham, an intermittent mechanism was considered in 1895 but abandoned, because “the life of a film used in a machine where the film is moved continuously is greatly longer than in a machine where the movement is intermittent.”⁶³ While this was certainly true for the kinetoscope, the Lambda Company had already developed a solution (the famous Latham loop, discussed further shortly) to the issue of tense and breaking film when constructing the “eidolograph,” the camera used to film eidoloscope pictures.⁶⁴ Clinging to the precedent of projecting constantly moving filmstrips, the Lathams and their colleagues set themselves a far greater challenge for illumination. The wider filmstrip and increased image size, however, did theoretically allow for more

56 Ibid., 94.

57 Hiller, 373.

58 Latham patent. Web.

59 Hiller, 373.

60 Schubin, 472.

61 Ibid.

62 Musser, 94.

63 Quoted in Musser, 94.

64 Rossell, 133.

light to pass through the strip and reach the projection screen than one would have seen if showing an Edison film in equivalent fashion. The clear-based nitrate film stock (which differed from the frosted celluloid then seen in peephole kinetoscopes)⁶⁵ was another measure designed specifically for this purpose, as was the condensor lens, specially acquired to allow more light to reach the screen than the lenses used by Edison from J.B. Colt and Company.⁶⁶

The illumination system itself is somewhat mysterious, beyond the light source being simply an arc lamp aimed at the condensor lens.⁶⁷ Taking into account the eidoloscope's continuous movement, it would be reasonable to expect that the projector again followed the example of the kinetoscope and employed a high-speed shutter to achieve the flicker effect necessary for viewers to register motion. However, there is a photograph in Terry Ramsaye's book *A Million and One Nights* that suggests otherwise: Ramsaye gives a visual example of a 51mm eidoloscope filmstrip, which features large, alternating oval holes cut into the frame line, on the interior side of the perforations.⁶⁸ Neither Ramsaye nor any other film historian makes any mention of the purpose of these holes; seemingly the only source that talks about them is a 1930 article in the *Cinematographic Annual*, claiming about the ovals:

“[they] served to make electrical contact to light the arc each time the intermittent brought the picture to rest. This intermittent lighting of the arc served in place of a shutter but was not very successful as the electrical spring contacts scratched the film and the arc responded irregularly to the quick make and break.”⁶⁹

From descriptions of the eidoloscope in the Smithsonian Institute's National Museum of American History (probably the second machine built by the Lambda Company in the summer of 1895, for Woodville's cousin LeRoy Latham to take on tour in Virginia),⁷⁰ it is unclear whether the illumination system relied on a high-speed shutter or spring contacts (crucial pieces of the machine, including the

65 Musser, 94.

66 Ibid.

67 Latham patent. Web.

68 *A Million and One Nights*, 105; see Appendix, Figure 1.

69 Allen, 184. The author is apparently quite right about the danger of the spring contacts damaging the film – even in Ramsaye's small sample, one of the holes is clearly torn (see Appendix, Figure 1).

70 Hiller, 373.

condensor lens, and lamp-house cover, are missing completely from the Smithsonian's collection)⁷¹. At an educated guess, it seems likely that the oval hole-spring contact system was employed at the beginning of the eidoloscope's life, when Dickson was still consulting with the Lathams and perhaps taking the tachyscope arrangement as his inspiration. At some later point, maybe before they built their second machine, maybe only once they added an intermittent mechanism to the threading path, the eidoloscope team must have noticed the inconsistency and danger of the spring contacts, and switched to a shutter system. What is known for sure is that by the time Woodville Latham filed his U.S. patent for the eidoloscope in June of 1896, a high-speed shutter was in place.⁷²

The addition of an intermittent mechanism (a rudimentary Maltese cross system, in which a pin wheel, attached to a continually-running gear, alternately engages a star wheel, in turn rotating the shaft attached to the sprocketed roller that moves the filmstrip – but only while the star wheel is engaged)⁷³ to the eidoloscope the previous month was the source of undoubtedly the machine's most lasting contribution to cinematic projection: that is, the Latham loop. While their initial solution for projecting longer filmstrips without breaking the celluloid was to just keep the strip moving continuously, the Lathams did not have that option with their camera, which of course needed an intermittent movement in order to clearly register every individual frame on the emulsion. In order to achieve the longer reels they desired for their films, the Lambda Company developed the loop: a purposefully slack piece of filmstrip, thrown out both before and after the exposure window in the threading path.⁷⁴ When the intermittent apparatus temporarily stops the film, the continuously running rollers take up the slack from the loop following the exposure window, while simultaneously restoring the loop immediately preceding the window; after the moment of illumination and registration on the emulsion, the intermittent is then able to advance the strip forward by a frame by taking up the slack from the

71 Ibid.

72 Latham patent. Web.

73 Latham patent, Web; “An Illustrated History...”, Cinematheque Francois, Figure 1.32. Web.

74 Latham patent, Web.

preceding loop, while restoring the loop following the window.⁷⁵ As Woodville Latham wrote in his patent application, “this action is continuous and positive and independent of the other parts of the machine [...] There is therefore but little, if any additional strain on the film incident to the rapid interruption and resumption of its movement through the apparatus.”⁷⁶ Though this invention was dubbed the Latham loop, it is unclear which of the Lambda group in fact added the innovation to the eidolograph camera – various sources attribute the loop to Woodville Latham, Lauste, or Enoch Rector.⁷⁷ Given Lauste was the primary engineer at the company in mid-1895,⁷⁸ his claim seems the strongest. However, since Lauste, Dickson and Rector had all left the company by May of 1896, Latham was most likely the one who saw the necessity of adding the loop to the eidoloscope, once the projector had added its Maltese cross mechanism to improve illumination.⁷⁹ It is difficult to understate the importance of the loop to projection technology: acting as a shock absorber, the loop minimized contact between the filmstrip and any hard surfaces, and would be featured in essentially every projector ever built from that point on.⁸⁰

Despite this major and crucial innovation, it is obvious from its brief life in the marketplace that the eidoloscope was a generally flawed and inferior machine. The problem of illumination for instance, was never truly solved. During its first year, before it featured an intermittent mechanism, the eidoloscope had a dim, noticeably flickering picture often criticized in first-hand accounts;⁸¹ this was probably exacerbated by the inconsistent registration of the electrical spring contacts described earlier. Even once the more consistent Maltese cross and shutter system was added, the Lathams were still relying on carbon arc lamps, generally inefficient devices that required constant replacement of the bulb's carbon rods and even under the best circumstances would likely never be powerful enough to

75 Ibid.

76 Ibid.

77 See: Latham patent, Web; “Committee Reports,” *Journal of the Society of Motion Picture Engineers*, 107; Ramsaye, 125.

78 Musser, 92.

79 Latham patent. Web.

80 Enticknap, 135.

81 Musser, 99-100; Pratt, 21-22; Witryol, 154.

satisfactorily light a large screen.⁸² The very idea of back projection was something of an issue, since at the time, with projection generally limited to the occasional magic lantern show, very few theaters were even properly equipped to handle the eidoloscope: the device's pictures would increase in size in proportion to the distance of the lens from the screen, but without a projection booth or otherwise marked-off area in the audience, the projector had to be located on the same stage as the screen.⁸³ This shallow distance meant that eidoloscope pictures were often no more than a foot or so in height.⁸⁴ The projector's lamp and condensor lens were mounted on a metal rod so as to allow slight adjustments in focus and picture size,⁸⁵ but any attempt to alter the focal distance and increase the size of the image would likely dim the picture.⁸⁶ Furthermore, the eidoloscope's national tour is littered with announcements and advertisements for shows that seem to have never actually come to fruition, or were severely delayed from their originally posted date – suggesting that the device frequently often simply failed to operate properly, most likely because of any number of possible mechanical difficulties.⁸⁷ In the second week of the eidoloscope's engagement at the Olympia, the *New York Times* noted: “The machine seemed to be in an ill temper, and the exhibition was short and unsatisfactory.”⁸⁸

The quality of the image itself was also a concern. In order to accommodate their desired 30fps projection rate, the Lathams needed a very fast-developing emulsion for their negatives.⁸⁹ In practice this meant using emulsion with the coarsest silver particles possible, which may not have been noticeable in a small picture such as that of the peephole kinoscope, but when enlarged many times and projected on to a screen, became most obvious to the audience.⁹⁰ The limited movement of the eidolograph (which could not pan or tilt) meant that sometimes the projected images weren't even very

82 Pratt, 21.

83 Ibid.

84 Ibid.

85 Latham patent. Web.r

86 Pratt, 21.

87 Pratt, 21-22; Musser, 134.

88 Pratt., 22.

89 Ibid., 20.

90 Ibid.

interesting: with *Bullfight*, the Lathams' last-ditch effort to revive interest in their machine in 1896, one paper noted that "The bull was out of sight a good deal of the time."⁹¹ A disapproving *Boston Herald* review is even more revealing: "Here again there were disappointments and imperfect focussing [...] and the final slaughter of the creature, its spirit cowed and its energies wearied by the cruelties to which it had been subjected, was similarly dim and uncertain."⁹²

This problem of imperfect quality content was compounded by the a lack of quantity. Without the massive resources available to Edison, including the Black Maria studio, the Lathams were simply unable to keep up with the content production of competing devices. They were not helped by an ill-timed crackdown by the New Jersey state government on prize fighting,⁹³ which had been the most popular source of their films. When the improved eidoloscope re-debuted at the Olympia in 1896, the program included *Whirlpool Rapids*, *Niagara Falls* and a street scene called *Fifth Avenue, Easter Sunday Morning*⁹⁴ – pictures the Lathams had already premiered the previous year.⁹⁵ Whether just financially limited or stuck in the kinetoscope-parlor mindset that the same small batch of films would continue to appease viewers, the Lathams were unable to supply the eidoloscope with the proper content to hold an audience.

Indeed, regardless of its technical imperfections, the eidoloscope suffered greatly from its management. Hearsay suggests that Gray and Otway were never actually much interested in the device beyond an opportunity to ingratiate themselves in the Broadway show business social scene.⁹⁶ Meanwhile, Woodville himself, the only member of the Eidoloscope Company with the technical knowledge to perhaps keep up with his competitors, instead unwisely focused all of his attention on a series of lawsuits against Thomas Armat for supposedly infringing the few patents Latham had already

91 From the *New York Dramatic Mirror*, quoted in Musser, 134.

92 Quoted in Musser, 134.

93 Musser, 84.

94 *Ibid.*, 134.

95 Pratt, 21.

96 Ramsaye, 107.

developed.⁹⁷ When *Latham v. Armat* was finally decided in the defendant's favor in 1901⁹⁸, the Eidoloscope Company was long gone and Latham had only a dubious patent claim to the Latham loop left for assets. His attempt to create an all-in-one camera/projector based on the eidoloscope design (called the biopticon) failed miserably.⁹⁹

Any hope of reviving and adapting the technology had been lost in those interceding years, during which several superior machines had solved the eidoloscope's troubles, including the Lumière *cinématographe*, Edison's vitascope (the re-branded Armat phantoscope) and Dickson's biograph. The Lumière device, developed essentially concurrently with the eidoloscope, had its own issues: the lack of a Latham loop limited its capacity to a very brief 50 feet of film, and like the kinetoscope it was generally supposed to play back at 16fps, barely above the necessary threshold for the human eye not to perceive a distracting flicker.¹⁰⁰ However, the *cinématographe* was both a camera and projector in one machine, allowing filmmakers further savings on equipment, and, even more importantly, meant that the projection inherently included an intermittent mechanism.¹⁰¹ They therefore would not face the same kind of issues with dimness witnessed by the eidoloscope and its continuous projection.

The vitascope, meanwhile, had an ever further improvement on intermittent motion and illumination. Whereas the *cinématographe* and the eidolograph both featured a half-circle shutter, dividing the on/off periods of illumination into equal halves, the vitascope's shutter was much smaller, specifically designed to cover the lamp only during the time in which the filmstrip was being advanced by the intermittent mechanism.¹⁰² The period of rest was therefore equal to the period of illumination, and the two together were much greater than the interval of motion, allowing for a brighter, clearer

97 Latham claimed ownership of the patent for all intermittent mechanisms based on experiments he ran in 1895, but had never actually applied to the eidoloscope until the Armat-designed vitascope appeared (*Reports of Cases Adjudged*, 350). Unsurprisingly, the courts had none of this.

98 *Reports of cases adjudged*, 345.

99 Musser, 135. As a result, Woodville was forced to sell the Latham loop patent to E. & H.T. Anthony & Co. (later Anthony & Scovill, then Ansco).

100 Musser, 135.

101 Ibid.

102 Ramsaye, 167.

image.¹⁰³ The vitascope also, of course, had the advantage of the full support of the Edison Company, complete with a superior marketing budget and a prolific content production system already in place.¹⁰⁴

W.K.L. Dickson's biograph projector, released in the summer of 1896, robbed the eidoloscope of whatever advantage it may have had left over its competitors by borrowing the notion of using a wider filmstrip to improve image quality. Combining essentially the same intermittent mechanism used by the vitascope with a 68mm gauge (projected at the eidoloscope's same 30fps),¹⁰⁵ the Biograph Company impressed with their larger, widescreen images. Like Edison, Dickson and his colleagues also had considerable economic resources at their disposal thanks to their earlier invention of the mutoscope, a hand-cranked flip-card peephole movie viewing device that had proved a profitable competitor to the kinoscope in nickelodeons and arcades.¹⁰⁶ Simply put, the Lathams were overwhelmed in terms of both intellectual and financial capital - the late 19th-century was a moment of incredibly rapid technological advancement in the areas of photography and cinematography, with a product like the eidoloscope capable of being replaced within even a few months. The marketplace was inundated with various projecting machines,¹⁰⁷ and by the end of 1896 the Latham machine was a clearly inferior option.

Today, there are any number of preservation difficulties one could associate with the eidoloscope, mostly to do with the time period of the manufacturing the materials in question, and the lack of preservation activities up until now. The projector was such an early, and short-lived, piece of equipment that it had already faded from the public consciousness by the time anyone became seriously concerned with the archiving of early film materials. Very few eidoloscope machines were likely even built by the Lathams in the first place, and other than the Smithsonian example (donated by LeRoy

103 This key difference was another major stumbling point for Latham in his lawsuit against Armat. *Reports of Cases Adjudged*, 350.

104 Musser, 118.

105 *Ibid.*, 145-146.

106 Musser, 145.

107 *Ibid.*, 167.

Latham in 1969),¹⁰⁸ all of them were almost certainly scrapped for parts or destroyed completely. Even the Smithsonian machine is missing pieces, and parts from an extremely rare 1895 projection machine are probably impossible to replace.

If the machine itself could be made to run again, perhaps by grafting on an entirely new lamp, motor, rollers, shutter, or whatever else is necessary, there would then remain the issue of finding anything to project with it. The Smithsonian does not have in its collection any examples of 51mm eidoloscope film;¹⁰⁹ searching the cataloged collections of similar archives has also so far been fruitless. Again, considering the age (and chemical composition) of the materials in question, any eidoloscope films have likely either decomposed through neglect or been destroyed, whether intentionally (to recycle the silver halide content in their emulsion) or unintentionally. Even if an intact eidoloscope film were discovered today, there would be little preservation work that could be done on it besides to be placed in cold storage – the unique 51mm gauge of the format would preclude the ability to scan the film on most, if not every current digitizing machine. Some sort of special adaptation would need to be made in order to create digital preservation or access copies. Unfortunately, none of this seems a very likely scenario; beyond keeping what is left of the Smithsonian machine intact, it appears to be too late to do anything to preserve the eidoloscope.

In terms of technical or mechanical innovation, the efforts of the Lathams and their eidoloscope produced one clearly identifiable, lasting contribution in the Latham loop. Given the delay it took even the Lathams in applying the loop to their projector, it was clearly difficult in those early, confused days to realize just what a critical step they had made, but by 1910, when the loop became the crux of a fierce patent suit between Edison's Motion Pictures Patents Company and the American Mutoscope and Biograph Company,¹¹⁰ its impact on the industry was unmistakable. But even beyond that, the Lathams

108 Hiller, 373.

109 Author's correspondence with Ryan Lintelman, Project Assistant, Division of Armed Forces History and Photographic History Collection, Smithsonian Institute, National Museum of American History.

110 "In the District Court...", *Film History* 1.3, 229.

were commendable in their focus to achieve projected images, keeping the technology pushing forward at a time when Edison was hesitant to pursue further developments. Furthermore they correctly determined that this was a product that audiences would respond to, in a significant way. A broadsheet for the eidoloscope's 1895 Broadway premiere boasted “the first practical exhibition of subjects showing Actual Life Movements on a screen ever made in the world”¹¹¹ - and that was no advertising exaggeration. For many people, the eidoloscope was their first impression of movies as we now know them, and reactions were generally prophetic: a newspaper reviewer in Rochester, upon seeing a projection of the Griffo-Barnett fight, declared “when the details of the Eidoloscope are perfected, the drama is going to have a formidable rival fifty years hence in the lifelike productions of the most startling events of present history that can be shown to posterity exactly how they occurred...”¹¹² As it turned out, it was not for the Lathams to perfect those details, but they had made a crucial step. In the scrum of inventors and inventions at the beginning of film technology, the eidoloscope earned a place of merit and mention.

111 See Appendix, Figure 3.

112 Pratt, 21.

Appendix: Visual Materials

Figure 1: An example of 51mm eidoloscope film, with oval holes for electrical spring contacts on the side. (Image credit: Ramsaye, A Million and One Nights,)

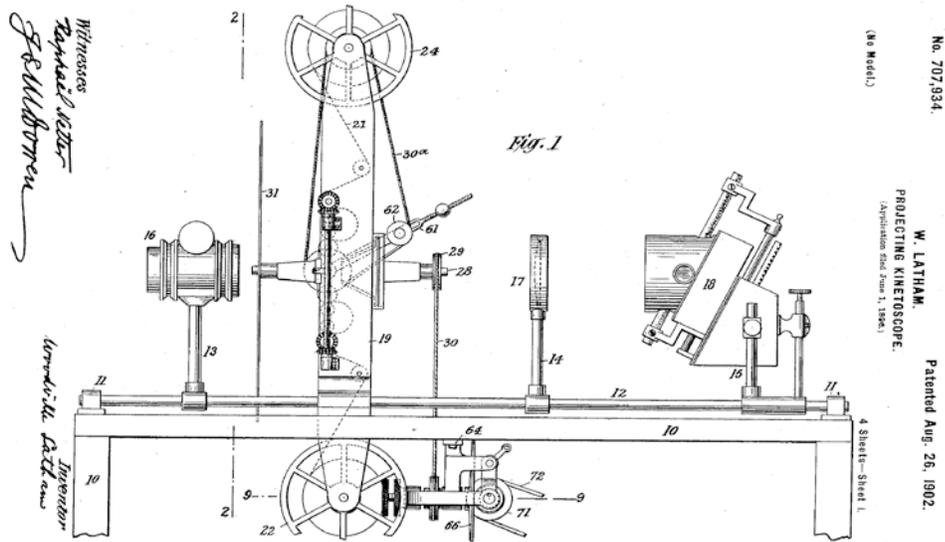


Figure 2: A diagram of the eidoloscope from Woodville Latham's 1896 patent application. (Image credit: Google Patent, <<http://patentimages.storage.googleapis.com/pages/US707934-0.png>>)

LATHAM'S EIDOLSCOPE
EXHIBITION OF
LIVING MOVING PICTURES,
(LIFE SIZE)
At 156 Broadway.

BOXING CONTEST BETWEEN
YOUNG GRIFFO and CHARLEY BARNETT.

A Reproduction of the Four-Round Contest (Life Size), held May 4th, before the Eidolograph, on the Madison Square Roof Garden, can be seen at 156 Broadway, every day, at intervals of 15 minutes.

During the Exhibition the Audience will be Comfortably Seated.
The objects are shown in a Frame in a similar manner as the ordinary Living Pictures.

This is the first practical exhibition of subjects showing Actual Life Movements on a screen ever made in the world.

Description of the Bout.

In the first round Barnett led with his left, but Griffo stopped him and countered lightly with his right. They then sparred for an opening. Barnett swung his left, but was neatly stopped and driven to the ropes by a couple of straight punches at close quarters. In the second round, after a few exchanges, Griffo hit Barnett on the neck, and the latter returned the compliment with a body blow. The third round was the liveliest. Both went at it hammer and tongs, and a pretty exhibition of scientific fighting resulted. Griffo had the advantage, apparently, when time was called. The fighters were given two minutes to finish the bout, and in the rapid exchanges that followed Barnett put in two stiff punches on Griffo's stomach, and in return received a hot right swing on the left eye that discolored that optic and caused it to swell. Several clinches occurred during the round, and as soon as the men were separated each time they banged each other severely. No decision was given by the referee—*N. Y. World*, May 4.

Also a New Picture
"The Sidewalks of New York" with Music.

AHE2006q10001.jpg

Figure 3: Broadsheet for the Latham eidoloscope, dated May 1895. (Image and date courtesy of Ryan Lintelman and the Smithsonian Insitute's National Museum of American History)

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Abel, Richard. *Encyclopedia of Early Cinema*. Abingdon, Oxon [Eng.] ; New York, N.Y.: Routledge. Print.

Broad history/glossary of early film terms. Useful for context but not much specific information provided on the Lathams or eidoloscope.

Allen, Paul. "Wide Film Development." *Cinematographic Annual*, Vol. 1 (1930): 183-195. Internet Archive. Web. <<http://archive.org/stream/cinematographica00unse#page/184/mode/2up>>.

Article in the American Society of Cinematographers journal on the history of widescreen aspect ratios. Extremely helpful for offering the only possible explanation for the eidoloscope filmstrip's oval holes.

Coe, Brian. *The History of Movie Photography*. Westfield, NJ: Eastview Editions. Print.

A broad history without much well-researched material on the Lathams. Confuses the pantoptikon and eidoloscope, and makes no mention of the eidoloscope ever having an intermittent mechanism, finishing the Latham narrative with the introduction of the vitascope.

De Angelis, Gina. "Chapter One: W. K. L. Dickson and the Kinetograph and Kinetoscope." *Motion Pictures: Making Cinema Magic* (2004): 16-31. EBSCOHost. Web.

<<http://search.ebscohost.com/login.aspx?direct=true&db=f3h&AN=16757300&site=ehost-live>>.

Provided background information on Dickson's biography and the difficulties of his working relationship with Edison.

Dougherty, Lee. E. "Conditions and Features." *Moving Picture World*, Vol. 21 (1914): 224-226. Internet Archive. Web. <<http://www.archive.org/stream/movingpicturewor21newy#page/223/mode/1up>>.

Article by a curator of the Boston Museum regarding his interest in motion picture technology and some of his acquisitions. Useful first-hand description of the eidoloscope's picture quality.

Enticknap, Leo. *Moving Image Technology: From Zoetrope to Digital*. NY: Wallflower Press, 2005.

Enticknap's comprehensive history of cinematic technology includes a simple but very accessible explanation of the Latham loop and its impact on projection.

"Committee Reports: Report of the Journal Committee, October, 1930." *Journal of the Society of Motion Picture Engineers*, Vol. 16 (1931): 90-113. Web.

<<http://journal.smpte.org/content/16/1/90.full.pdf>>.

Reports on a variety of organizational topics; includes a biography from SMPE's Historical Committee of Eugene Lauste.

Hart, Martin. "The American Widescreen Museum: A Little Pre-History." 2000. Web.

<<http://www.widescreenmuseum.com/widescreen/intro.htm>>.

Very brief summary of Edison's work with 35mm and the Academy ratio; however, includes a photograph of the eidoloscope credited to John Hiller and the Smithsonian National Museum of

American History, which opened a fruitful new line of research.

Hendricks, Gordon. *Origins of the American Film*. New York: Arno Press. Print.

Hendricks specifically looks to correct the more romanticized version of the invention of cinema presented in Terry Ramsaye's *A Million and One Nights*, sticking to known facts and dismissing likely biased testimony. He is particularly thorough when it comes to Edison's company and the development of the kinoscope and vitascope, but he includes a good deal of information about the Lathams' early experiments with expanded kinoscopes and the emergence of the Latham loop. Includes a good deal of primary source quotes.

Herbert, Stephen. *Who's Who of Victorian Cinema : A Worldwide Survey*. London: BFI. Print.

Features a brief biography of Woodville Latham; includes a bibliography that led to several of the other resources used here.

Hiller, John. "Film History for the Public: the First National Movie Machine Collection." *Film History*, Vol. 11 (1999): 371-386. JSTOR. Web. <<http://www.jstor.org/stable/3815208>>.

An article with physical descriptions of various artifacts in the Smithsonian Photo History Collection, including LeRoy Latham's eidoloscope.

"An Illustrated History of the Early Cinema: Chapter 1, Part 2 – From the Magic Lantern to the Projected Motion Picture." Cinematheque Francaise. 2012. Web. <http://cinemathequefrancaise.com/Chapter1-2/CHAPTER_01_PART_02.html#F1.28>.

A summary of more detailed accounts, particularly drawing on Musser's *Emergence of Cinema*. Too brief to be of much use, but provided some images.

"In the District Court of the United States for the Eastern District of Pennsylvania. the United States of America, Petitioner v. Motion Picture Patents Company and Others, Defendants. Brief for the United States." *Film History* 1.3, United States of America v. Motion Picture Patents Company and Others (1987): 187-304. JSTOR. Web. <<http://www.jstor.org/stable/3815103>>.

Testimony by an Edison employee in 1908 regarding the validity of the Latham patent. Not entirely relevant to the eidoloscope itself, but sets the tone for the confused state of early cinema and provides historical context for the Latham patent.

Kattelle, Alan. *Home Movies : A History of the American Industry, 1897-1979*. Nashua, NH: Transition Publishing. Print.

Not much information on the eidoloscope, as the focus of the book is post-1897. An incomplete and unsatisfactory account when it comes to the Lathams, but gives a decent summary of the developments of the time.

Latham, Woodville. Projecting Kinoscope. E. & H.T. Anthony & Co., assignee. Google Patents. Web. <<http://www.google.com/patents/US707934?printsec=description>>.

The U.S. Patent filed for the device known as the eidoloscope. A difficult read for its highly technical language, but invaluable for deciphering how exactly the projector functioned, the

“Latham loop” in particular. Notably missing almost any description of the projector's system for illumination.

Munsey, Jack T. "From a Toy to a Necessity: A Study of Some Early Reactions to the Motion Picture." *The Journal of the Society of Cinematologists* 4/5 (1964): 96-122. JSTOR. Web. <<http://www.jstor.org/stable/1224808>>.

A monograph studying primary sources for reactions to Edison's vitascope, Dickson's biograph and other early devices. Does not include the eidoloscope.

Musser, Charles. *The Emergence of Cinema : The American Screen to 1907*. Toronto : New York: Collier Macmillan Canada ; Maxwell Macmillan International. Print.

A well-researched, well-cited, thorough, balanced history of early cinema and clearly the most reliable source available on the eidoloscope and the Lathams. Places the rise and fall of the device in great context against the vitascope and other contemporary inventions. Balanced between technical description and historical background. Usefully includes quotes from Woodville Latham's patent infringement case testimony.

Pratt, George. “Firsting the Firsts.” Featured in Deutelbaum, Marshall, *"Image" on the Art and Evolution of the Film : Photographs and Articles from the Magazine of the International Museum of Photography*. New York: Dover Publications. Print.

A short article attempting to give the Lathams the credit they are due as the first film projectionists by establishing the timeline of the eidoloscope through newspaper accounts of the time. Very useful for its primary source quotes, and evidence of the eidoloscope's national tour.

Ramsaye, Terry. *A Million and One Nights; a History of the Motion Picture*. New York: Simon and Schuster. Print.

A conversational, probably semi-fictionalized account of the invention of cinema, as recorded by Ramsaye in the 1920s. The writer had the advantage of still being able to interview several of the actual major figures involved, but his clear tendency for exaggeration and romanticization makes it unwise to trust many of his “facts.” Still, highly entertaining and the most thorough account of the Lathams' biography available. The critical photo of 51mm eidoloscope film also came from Ramsaye.

---. "Movie Jargon." *American Speech* 1.7 (1926): 357-62. Print.

A sort of narrative glossary, stringing together the highlights of *A Million and One Nights* as a series of definitions and biographies of film terms and inventors.

Reports of Cases Adjudged in the Court of Appeals of the District of Columbia, 1901. Google Books. Web. <http://books.google.com/books?id=k9ZIAQAAIAAJ&lpg=PA346&ots=A_q9SRJ104&dq=latham%20v.%20armat&pg=PA345#v=onepage&q=latham%20v.%20armat&f=false>.

The full decision for the Latham v. Armat patent interference case, in which intermittent motion was the key factor. Used to confirm certain technical aspects of the eidoloscope, including its use of a shutter once an intermittent mechanism was added.

Rossell, Deac. "A Chronology of Cinema, 1889-1896." *Film History*, 7.2 (1995): 115-178. JSTOR. Web. <<http://www.jstor.org/stable/3815166>>.

A very technical chronology, based entirely on specific dates either listed in advertisements, business records or patents. Helpful for establishing a consistent timeline in the confused days of early film development.

Schubin, Mark. "Searching for the Perfect Aspect Ratio." *SMPTE Motion Imaging Journal* 105.8 (1996): 460-478. Web. <<http://journal.smpte.org/content/105/8/460>>.

A discussion of the history and technical advantage of aspect ratios used by moving images in various formats. Briefly discusses the eidoloscope and Dickson's experiments with aspect ratio.

Theisen, Earl. "The Depicting of Motion Prior to the Advent of the Screen." *Journal of the Society of Motion Picture Engineers*, Vol. 20 (1933). Internet Archive. Web. <<http://archive.org/stream/journalofsociety20socirich#page/248/mode/2up>>.

Chronology of the history of moving image and projection technology, 25,000 B.C. -1895. Barely mentions eidoloscope, but good summary on magic lanterns and pre-film technology.

Witryol, Sam W., and W. Freeman Galpin. "The Movies Come to Syracuse." *New York History* 36.2 (1955): 154-63. JSTOR. Web. <<http://www.jstor.org/stable/23153612>>.

A summary of the first movie showings in Syracuse, NY, using newspaper accounts and advertisements of the time. Confirms and describes some of the films shown in the touring eidoloscope program.