

# Towards a natural history of film form: silver salts and the aesthetics of early studio-era Hollywood cinema

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In 1948, outspoken *émigré* director Erich von Stroheim offered a now-famous account of the troubled post-production history of his notorious 1924 exercise in naturalism, *Greed*. According to von Stroheim, a cadre of MGM studio executives, led by Irving Thalberg, had pressured him to cut his gritty, sprawling masterpiece – an attempt to ‘reproduce life as it actually was’ – from its eight-hour, 42-reel initial assembly down to a more studio-friendly 12 reels.<sup>1</sup> When he refused, the film was

given to a cutter at thirty dollars a week who [sic] had never read the book nor the script, and on whose mind was nothing but a hat [ ...] my picture was arbitrarily cut to nine or ten [reels]. The rest of the negative was burned to get the forty-three cents of silver out.<sup>2</sup>

In standard production histories of the film, this anecdote has served to reinforce a familiar narrative about the consolidation of classical Hollywood film aesthetics across the course of the 1920s.<sup>3</sup> For proponents of this narrative, these aesthetic changes were a function of industrial developments in Hollywood’s ‘mode of production’, which between 1914 and 1930 saw the will of the director increasingly subordinated to that of the producer within a newly integrated studio system.<sup>4</sup> Yet closer attention to von Stroheim’s anecdote demands a revision of this narrative. For by the end of the story it would appear that the director’s true object is neither the studio system at large, nor its functionary, the ‘cutter’, but the silver content of the photographic film

- 1 Erich von Stroheim Papers, ‘Writings Undated’, unpublished autobiographical manuscript ‘Hollywood – Then and Now (O Tempora, O Mores!)’, p. 132, box 13, folder 189, The Margaret Herrick Library, Los Angeles.
- 2 Erich von Stroheim, qtd in Peter Noble, *Hollywood Scapegoat: The Biography of Erich von Stroheim* (London: Fortune Press, 1950), p. 52.
- 3 For this reading of the film’s production history, see Ryan Bishop and Sean Cubitt, ‘Anti-humanist narratives: *Greed* and *Source Code*’, *Screen*, vol. 58, no. 1 (2017), pp. 1–17; Jared Gardner, ‘What blood will tell: hereditary determinism in *McTeague* and *Greed*’, *Texas Studies in Literature and Language*, vol. 36, no. 1 (1994), pp. 51–74; Lea Jacobs, *The Decline of Sentiment: American Film in the 1920s* (Berkeley, CA: University of California Press, 2009); Fredric Jameson, ‘The Shining’, *Social Text*, no. 4 (1981), p. 114; Richard Koszarski, *Von: The*

*Life and Films of Erich von Stroheim* (New York, NY: Limelight Press, 2001). For examples of this narrative more generally, see David Bordwell, Janet Staiger and Kristin Thompson, *The Classical Hollywood Cinema: Film Style and Mode of Production to 1960* (New York, NY: Routledge, 2003); Douglas Gomery, *The Hollywood Studio System* (St Martin's Press, 1986); Thomas Schatz, *The Genius of the System: Hollywood Filmmaking in the Studio Era* (New York, NY: Henry Holt, 2015).

- 4 Bordwell, Staiger and Thompson, *The Classical Hollywood Cinema*.
- 5 Sianne Ngai, *Our Aesthetic Categories: Zany, Cute, Interesting* (Cambridge, MA: Harvard University Press, 2012), p. 29.
- 6 Karl Marx, *Capital: A Critique of Political Economy, Volume I*, trans. Ben Fowkes, ed. Ernest Mandel (London: Penguin Books, 1999), p. 169 (my emphasis).
- 7 For foundational histories of early film aesthetics, see for example, Leo Charney and Vanessa R. Schwartz, *Cinema and the Invention of Modern Life* (Berkeley, CA: University of California Press, 1995); Anne Friedberg, *Window Shopping: Cinema and the Postmodern* (Berkeley, CA: University of California Press, 1994); Tom Gunning, 'The cinema of attractions: early film, its spectators and the avant-garde', in Wanda Strauven (ed.), *Cinema of Attractions Reloaded* (Amsterdam: Amsterdam University Press, 2005); Miriam Hansen, *Babel and Babylon* (Cambridge, MA: Harvard University Press, 2009). For histories of early film technology, see for example, Michel Chanan, *The Dream that Kicks: The Prehistory and Early Years of Cinema in Britain* (London: Routledge, 2003), pp. 68–77; Leo Enticknap, *Moving Image Technology* (New York, NY: Wallflower Press, 2005); Deac Rossell, *Living Pictures: The Origin of the Movies* (Albany, NY: SUNY Press, 1998); Barry Salt, *Film Style and Technology: History and Analysis*, 2nd edn (London: Starword, 1992); Anthony Slide, *Nitrate Won't Wait: A History of Film Preservation in the United*

stock itself – cast here as pettily desirable scrap metal, or, as von Stroheim puts it, 'forty-three cents [worth] of silver'. In this respect, the reminiscence obliquely suggests a relationship between two things we commonly keep apart. The first is an aesthetic outcome that has become a byword for the vicissitudes of the early studio system; the second is one of the key ingredients of early motion picture film stock – light-sensitive silver halide crystals.

What would it mean to probe this membrane between the motion picture industry's mineral substrate and the aesthetic logic of Hollywood's early studio years? As a constituent of cinema's technological and industrial register, did silver also touch its aesthetic register? Von Stroheim's acrimonious anecdote points to one of the effects this precious metal might have had on post-World War I Hollywood film aesthetics. His narrative directly ties the silver content of film stock to changes in the shape of his text, and indeed implicitly to the rise of the standardized mass cultural cinematic commodity. Yet as Sianne Ngai has usefully reminded us, the aesthetic is not just the realm of 'objective' textual properties such as style, genre and narrative, it is also the realm of our 'subjective, feeling-based judgments' about them.<sup>5</sup> By Ngai's lights, then, the claim that silver affected film aesthetics suggests not just that it shaped cinema at an objective level, but that it affected how we look at, respond to or evaluate cinema at a subjective and/or social level. There is evidence that this was indeed the case. That the lustrous, conductive metal made its way into film titles of the day – *Silver Treasure* (1927), *The Silver King* (T. Hayes Hunter, 1929), *The Silver Shield* (Thompson Meghan, 1927), *Silver Comes Through* (Lloyd Ingraham, 1927) – suggests a preoccupation among filmmakers in this era that may, in turn, be indexed to the presence of silver in the motion picture stock itself. And of course the very phrase 'silver screen', ubiquitous across the trade press during the 1920s, suggests that silver – itself an embodiment of what Marx calls the 'magic that surrounds the products of labour' – was routinely enlisted as a metonym for the 'magic' of film culture itself.<sup>6</sup>

Existing critical literature provides little purchase on the co-implication of raw material and aesthetics implied in these convergences between silver halide crystals and the aesthetics of early Hollywood cinema. Within canonical film-historical scholarship, histories of early film aesthetics, and histories of early film technology's raw ingredients, tend to run on parallel tracks – rarely if ever intersecting.<sup>7</sup> And emerging film-historical scholarship, perhaps most notably work appearing under the auspices of film history's so-called 'materialist' and 'eco-materialist' turns, is also unexpectedly limited in its affordances to this line of inquiry. On the one hand, newer 'materialist' film scholarship (working against Marxist theory's tendency to mortgage 'materialism' to political economy) has examined the constitutive effects of a range of material factors on cinema's evolving aesthetic regimes. These have ranged in kind from early studio architecture to early

States (Jefferson, NC: McFarland, 2013); Roger B. N. Smither, *This Film Is Dangerous: A Celebration of Nitrate Film* (Brussels: Federation Internationale des Archives du Film [FIAF], 2002).

- 8 For examples of this work, see Sheri Biesen, *Blackout: World War II and the Origins of Film Noir* (Baltimore MD: Johns Hopkins University Press, 2005), p. 63; Brian R. Jacobson, *Studios Before the System: Architecture, Technology and the Emergence of Cinematic Space* (New York, NY: Columbia University Press, 2015); Jocelyn Szczepaniak-Gillece and Stephen Groening, 'Afterword: Objects in the theatre', *Film History: An International Journal*, vol. 28, no. 3 (2016), pp. 139–42; the essays collected in a special issue of *Recherches Semiotiques*, vol. 31, nos 1/2/3 (2011), 'Cinéma & Technologie'.
- 9 For an excellent exception to this rule, see Alice Lovejoy, 'Celluloid geopolitics: film stock and the war economy, 1939–47', *Screen*, vol. 60, no. 2 (2019), pp. 224–41.
- 10 See, for example, Nadia Bozak, *The Cinematic Footprint: Lights, Camera, Natural Resources* (New Brunswick, NJ: Rutgers University Press, 2011); Sean Cubitt, *Finite Media* (Durham, NC: Duke University Press, 2016); Richard Maxwell and Toby Miller, *Greening the Media* (Oxford: Oxford University Press, 2012); Nicole Shukin, *Animal Capital: Rendering Life in Biopolitical Times* (Minneapolis, MN: Minnesota University Press, 2009); Hunter Vaughan, *Hollywood's Dirtiest Secret: The Hidden Environmental Costs of the Movies* (New York, NY: Columbia University Press, 2019).
- 11 Lee Grieveson, *Cinema and the Wealth of Nations: Media, Capital and the Liberal World System* (Berkeley, CA: University of California Press, 2017). See also Lovejoy, 'Celluloid geopolitics'; Maxwell and Miller, *Greening the Media*. For contemporary accounts, see H. E. Gausman, 'More silver used in films than in coins', *The Film Daily*, 6 March 1927, p. 9: 'A kind of magic', p. 26, box 39, folder

exhibition and projection techniques to the wartime rationing of motion picture film stock.<sup>8</sup> However, this body of literature relies on a model of materiality that tends not to scale down from the macro-level of the technology itself, for example, to the micro-level of the ingredients feeding that technology. As a result, it has not been in a position to entertain the possibility that ingredients like silver played a role in shaping early cinema's aesthetic logics.<sup>9</sup> On the other hand, the influence of developments taking place in the broader field of media studies has seen the rise of 'eco-materialist' approaches to film history.<sup>10</sup> These approaches pay close attention to the film industry's historical reliance on raw materials such as silver, gelatin and cellulose, and thus to its implication in extractive capitalism and environmental devastation. It is now well-established that by 1920 the consumption of silver at Eastman Kodak – the principal supplier to Hollywood for much of the 20th century – had reached three tons of silver bullion per week, far exceeding 'any manufacturer of silverware' and rivalling that of the US mint.<sup>11</sup> Yet with some significant exceptions, this body of scholarship has tended to focus on how these ingredients were extracted, applied, disposed of and circulated 'behind the scenes', and has not as a consequence engaged in any sustained way with their relationship to cinema's aesthetic or audiovisual dimension.<sup>12</sup> While it is now widely acknowledged that film technologies, industries and infrastructures relied on and continue to rely on what Jussi Parikka dubs 'dirty matter', the field of film *aesthetics* remains surprisingly 'clean'.<sup>13</sup>

In a bid to 'smear' the immaculate face of film aesthetics, then, this essay aims to tease out the implications of silver's seeming percolation from the plane of filmic matter to the plane of film aesthetics. To this end, I return to the early years of the studio system, an era of aesthetic instability in which efforts to consolidate classical Hollywood practices co-existed with the appearance of industrial and aesthetic alternatives.<sup>14</sup> Focusing in particular on the decade or so immediately following World War I (1918–30), I argue that silver did not just support the production of movies in Hollywood but shaped their aesthetic register – and that it did so in ways that by turns coordinated with and confounded the agency of human technologies, cultures and industrial formations. To sustain this argument, I briefly revisit a range of existing scholarship on classical Hollywood cinema in an effort to ground the claim that the 'classical Hollywood style' was essentially a commodity aesthetic that combined a fetishistic or 'magical' allure with standardized narrative and formal economies.<sup>15</sup> I then draw on original research across a wide variety of archival sources to intervene in debates on why this contradictory commodity aesthetic gained such stylistic dominance. More specifically, I contend that silver – thanks to its dual politico-material profile as both a 'sentimental commodity' and a 'money commodity' – also played a role in shaping classical Hollywood cinema's contradictory aesthetic character.<sup>16</sup> As a 'sentimental commodity' that embodied what Marx describes as the commodity's magic force, silver helped to support the

11. Kodak Historical Collection, Department of Rare Books, Special Collections and Preservations, University of Rochester River Campus Libraries (hereafter KHC).
- 12 In general, beyond simply ignoring the relationship between film aesthetics and cinema's raw material, eco-materialist accounts tend to operate according to logics of demystification that represent media's visible, audible and tangible surfaces as false fronts, 'hiding', 'concealing' or 'disavowing' the web of connections to the natural environment that sustains them. See Cubitt, *Finite Media*; Maxwell and Miller, *Greening the Media*; Hunter Vaughan, '500,000 kilowatts of stardust', in Janet Walker and Nicole Starosielski (eds), *Sustainable Media* (New York, NY: Routledge, 2016).
- 13 Jussi Parikka, 'New materialism as media theory: medianatures and dirty matter', *Communication and Critical/Cultural Studies*, vol. 9, no. 1 (2012), pp. 95–100.
- 14 Charlie Keil and Shelley Stamp, *American Cinema's Transitional Era: Audiences, Institutions, Practices* (Berkeley, CA: University of California Press, 2004).
- 15 In other words, it combined a fetishistic or magical allure that seemed to radiate from the cinematic object itself, with standardized narrative and formal economies that were clearly shaped by the cinematic object's conditions of production, circulation and consumption. Bordwell, Staiger and Thompson, *The Classical Hollywood Cinema*; Marx, *Capital*, p. 169.
- 16 See Douglas Gomery, *The Hollywood Studio System: A History* (London: Bloomsbury Academic, 2005); Tom Gunning 'Modernity and cinema: a culture of shocks and flows', in Murray Pomerance (ed.), *Cinema and Modernity* (New Brunswick, NJ: Rutgers University Press, 2005), pp. 297–315; Janet Wasko, *Movies and Money: Financing the American Film Industry* (Stamford, CT: ABLEX Publishing, 1982).
- 17 Marx, *Capital*, p. 169.

discourses of film magic by which classical Hollywood cinema of the 1920s laid claim to a mystical transcendence of market logic.<sup>17</sup> Acting as what Marx calls a 'money commodity', silver played a part in fostering these same cinematic practices' all too visible *adherence to* the logic of the market, helping shape the rise of classical Hollywood narrative economies.<sup>18</sup> As this account suggests, following Ngai, while some of the effects I claim silver had on the aesthetics of early Hollywood cinema are objective, in that they bear on the shape and form of the film, others are subjective, in that they bear on viewers' experiences, perceptions and evaluations of specific films, or of Hollywood film culture at large.

In advancing this argument, my aim is twofold. First, I hope to complicate existing understandings of early studio-era film aesthetics: whereas established accounts ascribe changes in cinematic form and experience exclusively to industrial, cultural and/or economic forces, this essay underscores the role of this raw geological material. Second, I hope to extend eco-materialist accounts of film history: whereas this body of work has focused extensively on the role of natural resources in film infrastructure, technology, production and distribution, this essay reveals their unexpected significance for genealogies of film *aesthetics*. Methodologically, of course, achieving these aims means ascribing to this precious metal a greater quantum of 'agency' than is generally attributed to it across existing work in early film history and eco-materialist film studies. Despite their evident differences, these bodies of work share a tendency to treat silver as a passive, quiescent or instrumentalized supplement to the motion picture industry's representational agendas. This essay, by contrast, emphasizes what I have called silver's distinctive 'politico-material' agency, where agency refers to any entity that can 'make a difference, produce effects, alter the course of events'.<sup>19</sup> Casting silver as a uniquely modern fusion of 'natural' and 'human' history, I emphasize its capacity to act in ways that bypass or confound human design, while also revealing this agency as a function of socially binding practices of production, circulation and consumption.<sup>20</sup> Silver will emerge as what Bruno Latour might call a 'Gordian knot' – an 'imbroglio of science, politics, economy, law, religion, technology, fiction' that is, as he suggests, 'simultaneously real, like nature, narrated, like discourse, and collective, like society'.<sup>21</sup>

Yet the *degree* and *kind* of agency I propose to attribute to silver demands two further clarifications. First, in terms of *degree*, I do not wish to suggest that silver was the most significant material force shaping the aesthetics of early Hollywood narrative cinema. More modestly, I am hoping to show that it must be numbered among the host of different agencies that shaped this aesthetic conjuncture in Hollywood film history. Second, in terms of *kind*, the nature of the 'agency' I am ascribing to silver varies across the course of the essay. In some cases I am suggesting that silver functions as what Latour calls a 'mediator', in the sense that it directly 'transform[ed], translate[ed], and distort[ed]' the aesthetic fabric of Hollywood film output.<sup>22</sup> For example, as I will show

- 18 Michael Heinrich, *An Introduction to the Three Volumes of Karl Marx's Capital* (New York, NY: NYU Press, 2012), p. 67.
- 19 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham NC: Duke University Press, 2012), p. 28.
- 20 Dipesh Chakrabarty, 'The climate of history: four theses', *Critical Inquiry*, vol. 35, no. 2 (2009), pp. 197–222. For an exposition of this model of matter as conjunction of the physical, the political, the discursive and the industrial, see Bennett, *Vibrant Matter*.
- 21 Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 2012), pp. 2–3, 6.
- 22 Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford: Oxford University Press, 2007), p. 39.
- 23 Ibid.
- 24 Douglas Gomery, 'The Hollywood studio system', in Geoffrey Nowell-Smith (ed.), *The Oxford History of World Cinema* (Oxford: Oxford University Press, 2005), pp. 43–53; Laura Mulvey, *Fetishism and Curiosity* (Bloomington, IN: Indiana University Press, 2006), p. 8; Wasko, *Movies and Money*, p. 21.
- 25 Through, for example, the use of a goal-oriented protagonist, a rising curve of action and a naturalistic 'continuity' system of editing. See Bordwell, Staiger and Thompson, *The Classical Hollywood Cinema*, pp. 3–84; Gomery, 'The Hollywood studio system'; Schatz, *The Genius of the System*.
- 26 Robert Herring, 'A new cinema, magic and the avant-garde', *Close Up*, vol. 4, no. 4 (1929), p. 48.
- 27 Matthew Solomon, *Disappearing Tricks: Silent Film, Houdini and the New Magic of the Twentieth Century* (Chicago, IL: University of Illinois Press, 2010), p. 5. See also Karen Beckman, *Vanishing Women: Magic, Film and Feminism* (Durham, NC: Duke University Press, 2003); Colin Williamson, *Hidden in Plain Sight: An Archaeology of Magic*

later, as one of the biggest capital outlays in what was already an exceptionally capital-intensive process, silver prices helped shape the assembly-line practices of the new, 'central-producer' mode of production and its aesthetic correlates. In other cases, however, I am suggesting that silver functions as what Latour calls an 'intermediary', in the sense that it functioned as an instrument, if a crucial one, in an agenda that exceeded it in scope.<sup>23</sup> For example, Hollywood's PR machinery exploited the supposed magic of silver itself to fuel fantasies about 'film magic' that did not strictly depend upon silver, but that silver helped to facilitate.

By the 1920s, classical Hollywood narrative cinema was perhaps *the* premier entertainment commodity, a coordinated complex of studio branding, commercial tie-ins and an incipient star system supported by an ever-more 'finely-honed publicity machine'.<sup>24</sup> It should come as no surprise that the industry's dominant aesthetic practices exemplified the commodity's contradictory tendencies. At the textual level, films exemplifying the 'group style' of the early studio era visibly served a market agenda, working both to enable efficiencies of production (through practices of standardization) and to maximize box-office appeal (through practices designed to secure narrative legibility and spectatorial absorption).<sup>25</sup> At the level of reception, by contrast, these films sustained powerful fantasies of *transcending* market edicts – fantasies of 'movie magic' often articulated through the rubric of the 'silver screen'.<sup>26</sup> According to Matthew Solomon, discourses of 'movie magic' had gained traction in the very early years of the studio system, as 'the magical visual possibilities conjured up by the [early] cinema' of attractions were 'channelled into the "magic" of [narratively integrated] storytelling'.<sup>27</sup> Emphasizing film's spontaneous capacity to absorb and enchant, these discourses – promulgated by a phalanx of powerful trade and fan publications like *Photoplay*, *Picture-Play*, *Silver Screen* and *Motion Picture Magazine* – sought to ascribe to cinema what Max Horkheimer and Theodor Adorno have termed 'the magic of the incomprehensible'.<sup>28</sup> Classical Hollywood film aesthetics in the early studio era formed what Robert Ray calls a 'site of negotiation' between commerce and captivity, between 'the temptations of rationalization on the one hand, [and] the requirements of seduction on the other'.<sup>29</sup>

How did silver, a precious metal embedded in but not reducible to film history's shifting industrial, cultural and/or economic regimes, help to shape classical Hollywood cinema's peculiarly dual aesthetic character? To answer this question, we must first understand that silver, well before its application to film sensitization processes, had a powerful politico-material profile that gave it an agency all its own.<sup>30</sup> And if the aesthetic profile of the film industry was contradictory, so too was the politico-material constitution of silver, oscillating as it did between 'magic' and 'money'.

and the Cinema (New Brunswick, NJ: Rutgers University Press, 2015). Terry Ramsaye, 'The romantic history of the motion picture', *Photoplay*, vol. 21, no. 5 (1922), p. 20, for example, opens with an extended paean to the magic of the cinema as a 'world of make-believe, a magic land of Far and Away, where impossible hopes are broken and improbable dreams come true'.

- 28 Theodor Adorno and Max Horkheimer, *Dialectic of Enlightenment* (1947) (London: Verso, 2016), p. 135.
- 29 Robert Beverley Ray, *How a Film Theory Got Lost and Other Mysteries in Cultural Studies* (Bloomington, IN: Indiana University Press, 2001), p. 2.
- 30 William L. Silber, *The Story of Silver: How the White Metal Shaped America and the Modern World* (Princeton, NJ: Princeton University Press, 2019), p. 3.
- 31 Marx, *Capital*, p. 169.
- 32 Lynn Festa, *Sentimental Figures of Empire in Eighteenth-Century Britain and France* (Baltimore, MD: Johns Hopkins University Press, 2006), pp. 115.
- 33 Esther Forbes, *Paul Revere and the World He Lived In* (Boston, MA: Houghton Mifflin Harcourt, 1942), p. 67.
- 34 Lynn Dumenil and Eric Foner, *The Modern Temper: American Culture and Society in the 1920s* (London: Macmillan, 1995).
- 35 Festa, *Sentimental Figures*, p. 69.
- 36 Beth Carver Wees and Medill Higgins Harvey, *Early American Silver in The Metropolitan Museum of Art* (New York, NY: Metropolitan Museum of Art, 2013), p. 120.
- 37 *Motion Pictures News*, 22 April 1922, p. 2268; '3 Bad Men will carry forward work of thrilling film fans', *Fox Folks*, vol. 5, no. 8 (1923), p. 15; 'Production highlights', *Exhibitors' Trade Review*, 25 April 1925, p. 33. Interestingly, the fact that film was widely perceived as a 'silver' medium barely warrants a mention in recent revisionist histories of film colour. See, for example, Joshua Yumibe, *Moving Color: Early Film, Mass Culture, Modernism* (New Brunswick, NJ:

To address the first term in this binary, it is worth noting that across this decade there were few commodities that more fully embodied what Marx calls the 'magic [...] that surrounds the products of labour' than silver.<sup>31</sup> For Marx all commodities possess a certain 'magic or necromancy' that derives from the fact that their value on the market (their 'exchange value') is (mis)perceived not as a function of social relations of production, consumption and circulation but as a function of their essential characteristics. Yet the magic ascribed to silver was of a special kind. Indeed, during this period silver seemed to have achieved the doubly fetishized status of what Lynn Festa has dubbed the 'sentimental commodity' – a status that accrues to a subset of commodities that have the capacity to obscure not just the social relations that confer their exchange value, as in standard commodity fetishism, but their implication in systems of exchange in the first place.<sup>32</sup> Silver, in other words, routinely registered as a singular, unique and auratic metal, untouched by either the sweat of human labour or the bustle of exchange. This status had two dimensions. On the one hand, it had a deep history: like gold, silver was caught up in American national fantasies of liberty and plenty, fantasies tied to the country's long tradition of silver mining and processing, and dating back at least to the work of 18th-century silversmith and revolutionary Paul Revere.<sup>33</sup> On the other hand, it had a more recent genesis: a spike in disposable income in the prosperous years immediately after World War I had rendered silver increasingly accessible to middle- and working-class Americans.<sup>34</sup> For these groups it came to play a pivotal role in social practices such as gift-giving, inheritance and festivity – practices that involved an 'infusion of human particularity into the interchangeability of the commodity'.<sup>35</sup> The visions of silver's miraculous singularity sustained by these practices were cemented by personalization methods such as monograms or armorials.<sup>36</sup>

The presence of this 'sentimental commodity' in film stock helped to sustain a vision of cinema as a space of magical transcendence. It was arguably silver halides' allure as the imagined source and origin of movie magic that is crystallized in paeans to the 'silver screen', which became ubiquitous in the trade and fan press across the 1920s. Advertising copy from a 1922 issue of *Motion Picture News* extolled 'the play of light and shadows on the silver screen', while articles in *Film Folks* and *Exhibitors' Trade Review* made rhapsodic references to 'the magic of the silver-sheet' and 'silver sheet magic'.<sup>37</sup> In doing so they figured cinema's magical aura as a kind of numinous silvery halo, reminding us that, pre-colour, cinema was far from merely 'black and white'. Admittedly, expressions like the 'silver screen' or the 'silver sheet' are conventionally traced not to the silver content of film stock but to the silver or aluminium fibres embedded in the 'silver lenticular' projection screens used across the period. Yet there is some evidence that these expressions referred as often to the film itself as they did to the exhibition screen. In John L. Cass's account of what he calls 'painting the silver sheet', for example, the 'painting' in question refers not to painting a screen but to

Rutgers University Press, 2012), p. 4; Richard Misek, *Chromatic Cinema: A History of Screen Colour* (Malden, MA: Wiley-Blackwell, 2010), p. 14.

<sup>38</sup> John L. Cass, 'Painting the silver sheet', *Motion Picture Projectionist*, February 1932, p. 8.

<sup>39</sup> John Scotland, *The Talkies* (London: C. Lockwood and Son, 1930), p. 171; Herbert C. McKay, *Handbook of Motion Picture Photography* (London: Falk Publishing, 1927), p. 243.

<sup>40</sup> H. T. Cowling, 'India's new magic', *International Photographer*, May 1929, pp. 14–15.

<sup>41</sup> Terry Ramsaye, 'Chemists speed printing time of news pictures in colour', *Pathé Sun*, 5 April 1930, p. 10.

<sup>42</sup> Dwight R. Funes, 'Some secrets of screen magic', *Amateur Movie Makers*, 15 January 1927, p. 26.

<sup>43</sup> 'A kind of magic' p. 27; Franklin Courtney Ellis, 'Motion picture film in the making, Part II', *Motion Picture Projectionist*, June 1932, p. 12.

<sup>44</sup> *Ibid.*

colouring the *film* through toning processes.<sup>38</sup> And photographic and filmmaking handbooks of the day support the implication that the silver sheet in question was the photographic film rather than the lenticular screen. The extended accounts of colour toning in John Scotland's *The Talkies* and Herbert C. McKay's *The Handbook of Motion Picture Photography* repeatedly refer to the untuned or undyed positive image as the 'silver image'.<sup>39</sup> These accounts of the silver image, in turn, suggest that odes to the silver sheet may be just as readily traced to the silver salts in gelatin emulsions as to the silver thread in lenticular projection screens. In this sense, as the object of a 'double' fetishism that releases it not just from the taint of labour but from the very system of exchange, film stock's silver content may have helped to confer the aura of magic embodied in conventional anthems to the silver screen.

There is no doubt that, in perpetuating fantasies of movie magic, popular trade and fan journalism of the 1920s was quick to exploit the presence of this magical ingredient in photographic emulsions. Key to this process were accounts of the film production workflow that ascribed outsized agency to the soft, conductive metal, while downplaying the role of human labour. A 1929 article in *International Photographer*, celebrating the arrival in India of 'this new and latest magic, this jugglery of celluloid and light', traces what it dubs 'India's new magic' to 'the wonders of light-sensitive silver'.<sup>40</sup> In 1930, an article in the *Pathé Sun* discussing the rise of 'pictures in color' announces that 'the magic of the colour is effected largely by the character of the film', before narrowing down that character more specifically to silver, noting that 'the secrets here are again in the make-up of the emulsions which are coated on the raw film stock. Two layers of light-sensitive silver salts in gelatine are laid down on the nitro-cellulose base'.<sup>41</sup> An *Amateur Movie Makers* article from 1927, entitled 'Some secrets of film magic', meanwhile, identifies 'action' as the essence of drama before going on to claim that the aim of the producer must be to 'capture this elusive quality [action] and lock it safely in the dancing silver grains of cine film'.<sup>42</sup> In the process, the article does not simply afford the 'dancing silver grains' the capacity of animation, casting them as a vehicle for drama's magical or 'elusive quality'; rather it affords them the capacity to animate, ascribing to them a form of choreographed action (the capacity to 'dance') that appears to serve as the very source of film magic.

This fetishistic model of film production, which identifies silver as the root of film magic, reaches its zenith in an almost exactly contemporary article in *Motion Picture Projectionist*. Devoted to tracking what the author, Franklin Courtney Ellis – 'Kodak's debonair PR man in the '30s and '40s' – dubs 'the romance of a modern Industry',<sup>43</sup> the article casts silver as 'the one material without which there would be no motion picture industry and the absence of which would make it useless to employ thousands of persons and an enormously impressive array of machines in the manufacture of film'.<sup>44</sup> In exquisitely hyperbolic fashion, the prominent Kodak representative imputes the entire 'motion picture

industry’, consisting of ‘an enormously impressive array of machines’ and ‘thousands of persons’, to the agency of a precious metal that is present in film stock in microscopic quantities. Overwriting the labour of editors, actors and crew, the article recalls Jane Bennett’s suggestion that the animistic logic of commodity fetishism amounts to ‘a kind of perceptual disorder’, a malady of vision predicated on the skewed proportionality of capitalism itself.<sup>45</sup> Here, as elsewhere across the period, publicists and copywriters appropriated silver’s own doubly fetishized status to feed fantasies of cinematic magic.

These visions of silver as the magical source of an equally magical moving-image culture were also propagated in the very forums that might be expected to challenge them – the behind-the-scenes photo-gallery tours of raw stock manufacturing plants that were popular in the trade and fan press during this decade. A 1922 article in the *Exhibitors Herald*, about the ‘romance of filmmaking from the cotton grower to the motion picture studio’, is exemplary here.<sup>46</sup> Making a mockery of Marx’s suggestion that demystification merely requires eschewing the ‘noisy sphere’ of consumption in favour of ‘the hidden abode of production’, the article works to mystify the production process itself.<sup>47</sup> Once again silver plays a key role in this process of mystification. Reflecting what Sharon Corwin calls a fantasy of ‘autogenic production’,<sup>48</sup> it expunges workers altogether from the scene while elevating the role of ‘silver bullion, of which three tons are used weekly at Kodak park’ to the status of active producer, the ‘wellspring of movie magic’.<sup>49</sup> These documentary accounts of the film stock manufacturing process were not limited to the trade press, but often graced the fan periodicals; in this context, too, the presence of silver in film stock was often recruited to perpetuate notions of film magic. In an advertorial for *Photoplay* entitled ‘All that flickers isn’t gold’, for example, the Eastman Kodak Company describes the process of film manufacture for the benefit of a popular audience. While the copy implicitly promises to demystify the labour of film stock production – ‘We all realize the tremendous task of producing a movie [...] But few of us understand the process of manufacturing the film itself’ – its effect is quite the opposite. It treats silver as the primary or even sole ingredient of a complex process: ‘Maybe you didn’t know that the film is made largely of silver – pure silver’. And its reliance on the passive voice serves to evade the question of agency altogether, effectively downplaying the role of human labour and ascribing silver an outsize role the process: ‘Tons of pure silver are used each week in the manufacture of photoplay film [...] The picture above shows *the weighing of the white metal*’ (my emphasis). In the process, silver acquires an almost magical agency that seems aimed at feeding spectatorial fantasies of the silver screen.<sup>50</sup>

The 1921 Kodak Eastman industrial film, *A Trip Through Filmland* (Dolph Eastman), which would have been screened for the general public as a pre-feature reel, further exemplifies this popular representation of silver as the magical source of a magical moving-image culture. Opening

45 Jane Bennett, *The Enchantment of Modern Life* (Princeton, NJ: Princeton University Press, 2000), p. 113.

46 ‘Eastman Industrial takes public through big film plant’, *Exhibitors Herald*, 11 February 1922, p. 50.

47 Marx, *Capital*, pp. 279–80.

48 Sharon Corwin, ‘Picturing efficiency’, *Representations*, no. 94 (2004), p. 147.

49 ‘Eastman Industrial’, p. 50.

50 Kodak Film, The Eastman Kodak Company, ‘All that flickers isn’t gold!’, *Photoplay*, July 1918, p. 42. The three-part series on raw stock production by Franklin Courtney Ellis also represents silver bullion as the subject rather than the object of manufacturing processes in what the author tellingly calls the industry’s ‘modern alchemy’: ‘There, on our right, is a building in which silver [...] is turning into [...] motion picture film [...]’; ‘four tons a week [of silver ...] passes through the storage safe’. Courtney Ellis, ‘Motion picture film in the making, Part I’, *Motion Picture Projectionist*, May 1932, p. 7. When he mentions workers at all, they are magicians rather than labourers: ‘witches’ who ‘conjure up several hundred thousand miles of magical ribbon every year [without] conical caps [or] broomsticks’ (ibid., p. 6).

with the arrival of a series of marshmallow-like cotton bales, the film proceeds through the addition of a tray of gleaming silver bullion and, at the finish, 12,000,000 gallons of water. Eliding human labour almost entirely, the film's visualization of the production process stages a chiasmic exchange between person and thing that is deeply fetishistic. But it also situates this film as a limit-case of what Salomé Aguilera Skvirsky has recently and influentially dubbed the 'process genre', characterized by its capacity to confer 'an air of magic' on industrial manufacturing processes.<sup>51</sup> For Skvirsky, this 'air of magic' derives from the genre's attention to human labour, which the genre either mystifies (by way of extolling the finished product as a function of an artisanal process) or highlights (by way of extolling the Taylorist 'labor congealed' in the finished product).<sup>52</sup> In its focus on the materials' 'autogenetic' capacity to transform into products *in the absence of* human agency, *A Trip Through Filmland*, however, flies in the face of Skvirsky's model. At the same time, it reveals the limits of claims about the appeal of early cinema to the public's 'fascination with the way things worked', as seen in what Neil Harris calls the 'operational aesthetic' and Paul Young calls a 'presentational tradition'.<sup>53</sup> According to Harris's account of this tradition, these early cinematic modes catered to the investigative and information-seeking attitudes of Americans at the time, aiming less to sell illusions than to showcase the awe-inspiring technical, material and industrial accomplishments at play in the illusion's production.<sup>54</sup> Yet, delivering a miraculous rather than an actual vision of the production of photographic film stock, *A Trip Through Filmland* gives the lie to suggestions that early cinematic modes invested in the wonders of technology were truly invested in 'the way things worked'.

Indeed those accounts of silver's role in film production that affected a more scientific air only doubled down on claims about silver's miraculous properties. While, as Marx notes, the commodity-form bears 'absolutely no connection with the physical nature of the commodity',<sup>55</sup> these quasi-scientific discussions of the film stock manufacturing process sought to re-ground the commodity's exchange-value in its use-value as a set of sensuous, physical and biochemical properties. A pseudo-scientific paean to film magic in trade organ *Motion Picture News*, for example, tracks the 'multitudinous processes, repeated tests and unusual cleanliness' that makes the silver in film stock 'the purest that can be obtained', insisting that an 'everlasting search for purity', obtainable only through particular processes of combination, evaporation, redissolution and re-crystallization, is at the core of 'high-quality photographic material'.<sup>56</sup> An article for *Educational Film Magazine*, meanwhile, strains even further for scientific credibility. To the accompaniment of a series of glossy photographs, it offers a breathless account of how the 'boiling action of nitric acid on ingots of pure silver bullion' delivers an array of 'the liquid, brilliant crystals of silver nitrate'.<sup>57</sup> If, as Marx puts it, 'no chemist has ever discovered exchange-value in a pearl or diamond', these articles sought, somewhat

51 Salomé Aguilera Skvirsky, *The Process Genre: Cinema and the Aesthetic of Labour* (Durham, NC: Duke University Press, 2020), p. 117.

52 *Ibid.*, pp. 136, 141.

53 Tom Gunning, 'Crazy machines in the garden of forking paths', in Kristine Brunovska Karnick and Henry Jenkins (eds), *Classical Hollywood Comedy* (New York, NY: Routledge, 1998); Neil Harris, *Humbug: The Art of P. T. Barnum* (Chicago, IL: Chicago University Press, 1973), p. 57; Paul Young, 'Media on display: a telegraphic history of early American cinema', in Lisa Gitelman and Geoffrey B. Pingree (eds), *New Media: 1740–1915* (Cambridge, MA: MIT Press, 2003), pp. 229–64.

54 Harris, *Humbug*, p. 57.

55 Marx, *Capital*, p. 165.

56 'Sidelights on manufacture of motion picture film', *Motion Picture News*, 13 July 1918, pp. 271, 270, 272, 270.

57 Leona Block, 'Movie Trip through Filmland', *Educational Film Magazine*, vol. 8, no 6 (1922), p. 16.

disingenuously, to do just that, recasting the ‘social substance’ on which exchange value rests as a strictly ‘chemical substance’ that can be isolated and distilled.<sup>58</sup> In this respect, the trade press contributed directly to fantasies of silver’s magical agency that, in turn, sustained fantasies of the magic of the silver screen.

Yet if silver was a sentimental commodity that was integral to the early studio-era aesthetic of movie magic, it was also a costly metal that, until relatively recently, served as a formal store of monetary value – a ‘money commodity’ that wore its exchange value very much on the surface.<sup>59</sup> In this sense it remained tied, inextricably, to what Mary Ann Doane describes as the monetary system’s logic of ‘pure differentiation, quantifiability, and articulation into discrete units’.<sup>60</sup> And though never as valuable as gold, silver was still expensive. In part this was thanks to the work of extracting, processing and shaping the metal. Generally found in alloy or embedded in minerals, silver required extensive smelting and refining, a process largely accomplished, in the interwar years, in the USA.<sup>61</sup> Yet the cost of silver was also subject to more historically proximate pressures in the years immediately following the termination of hostilities in Europe. By the end of 1918 it had increased from US 55 cents per ounce to a dollar per ounce, in part thanks to the 1918 Pittman Act, which saw the USA loan 350 million silver dollars to India to assuage a crisis in the rupee that Britain worried would impair the war effort.<sup>62</sup> While never quite reaching the dizzying heights it had achieved in the aftermath of World War I, the price of silver remained high across the decade; in August 1926, for example, it fetched \$8.73 per ounce, in today’s money. A number of contemporary pundits, of course, particularly those with industrial interests in stock manufacturing, sought to downplay the cost added to the production of film stock by the ingredient.<sup>63</sup> Yet the 156 tons of silver bullion used each year by leading stock manufacturer Eastman Kodak was no small expense.<sup>64</sup> Each ton of silver would have set Kodak back about \$279,360 (again, in today’s terms), meaning that, at a rate of three tons per week, or about 156 tons per year, the company would have been spending approximately US \$43,580,160 per annum.

Certainly silver was never the only ingredient in stock that came with a significant price tag. According to one internal Eastman Kodak document, however, the price of silver remained ‘the controlling factor in the cost of Kodak’s prime product’.<sup>65</sup> And correspondence between Eastman and various Kodak personnel supports this claim. In a 1917 cable to the London office, as silver prices spiked due to wartime shortages, George Eastman, Kodak’s founder and CEO, announced in terse telegraphic form that due to a ‘big increase [in the] price [of] silver [he] recommend[ed] a price increase’.<sup>66</sup> In a 1920 letter to journalist B. C. Forbes, Eastman was again demanding ‘increases in the selling prices’ of film stock ‘to help meet the still rising cost of silver bullion’;<sup>67</sup> and in a

58 Marx, *Capital*, pp. 177, 128, 177.

59 A. Nelson, ‘Marx’s theory of the money commodity’, *History of Economics Review*, vol. 33, no 1 (2001), p. 45.

60 Mary Ann Doane, *The Emergence of Cinematic Time: Modernity, Contingency, the Archive* (Cambridge MA: Harvard University Press), p. 8.

61 Silber, *The Story of Silver*, p. 43

62 G. F. Shirras, ‘Some effects of the war on gold and silver’, *Journal of the Royal Statistical Society*, no. 83, vol. 4 (1920), pp. 572–627.

63 ‘Silver salts needed’, *The Film Daily*, 12 August 1926, p. 6.

64 G. A. Blair, ‘The development of the motion picture raw film industry’, *Annals of the American Academy of Political and Social Science*, vol. 128, no. 1 (1926), pp. 50–53.

65 ‘A kind of magic’, p. 26.

66 George Eastman outgoing correspondence, 13 September 1917, George Eastman House, Rochester, George Eastman Legacy Collection (henceforth GELC).

67 George Eastman outgoing correspondence, 10 June 1920, GELC.

68 George Eastman outgoing correspondence, 3 March 1920, GELC.

69 'Gelatin is simple stuff', p. 1, box 39, folder 11, KHC.

70 'A kind of magic', p. 26; George Eastman outgoing correspondence, 29 June 1918, GELC.

71 'Tariff on silver', *Variety*, 2 April 1930, p. 11. See also Francis L. Burt, 'Proposed silver duty saddles 10 millions cost on film trade', *Exhibitor's Herald-World*, 29 March 1930, p. 21.

72 Patricia Zimmermann, *Reel Families: A Social History of Amateur Film* (Bloomington, IN: Indiana University Press, 1995), p. 3.

1922 letter to Frank Mattison, the managing director of Kodak's British arm, he was proposing to 'take advantage of the evident swings in the level of sterling' by investing in silver stocks.<sup>68</sup> Indeed, the stock manufacturer's frustration with fluctuations in the price of silver was such that in 1918, the year of the Pittman Act, Eastman was considering diversifying into silver mining and refining (just as in 1930 he would diversify into animal rendering with the establishment of the Eastman Gelatine Corporation).<sup>69</sup> While these proposals never came to fruition, the Kodak Park papers and correspondence between Eastman and the head of the Alaska Mines Corporation suggest that they came remarkably close.<sup>70</sup>

Given Kodak's practice of passing on increases in the cost of silver to its studio clients in Hollywood, it should come as no surprise that Hollywood trade rags were in the habit of keeping a close watch on changes in silver prices across the decade. This habit culminated in reporting around Senator Pittman's proposed, and ultimately realized, 1930 tariff hike on silver imported into the USA – a proposal that, according to publications like *Variety*, *Motion Picture News* and *Exhibitors Herald-World*, would probably cost the industry '\$10,000,000 if remaining in bill'.<sup>71</sup> Yet much as the studios and their trade organs liked to complain about the expense of film stock's raw ingredients, the liability ultimately operated in their favour. As Patricia Zimmermann reminds us, capital-intensive technologies 'form a significant barrier to entry' in the industry, helping to restrict film production to those with access to ready financing.<sup>72</sup> To the extent that stock itself formed one of the biggest capital outlays in what was already an exceptionally capital-intensive process, it can only have consolidated the dominance of a few major studio players. Whatever the pros and cons of silver's presence in film stock, however, Hollywood's preoccupation with the ingredient suggests that silver must be situated alongside labour and technology as one of the key material resources that the assembly-line practices of the new, 'central-producer' mode of production emerged to manage profitably.

To the extent that this producer-centric mode of production served in turn to shape classical Hollywood's sleek, standardized aesthetic economies across the 1920s, the cost of silver must be counted as a factor in the rise of these economies. There is no doubt that the threat of wasted film was a preoccupation among studio executives as they shaped the 'quality' multi-reel film into a mass cultural commodity designed to maximize profit by offering spectatorial absorption and narrative integration. In the early 1920s, Warner Bros. – then still a minor studio player – began a regime of expansionism that involved the improvement of its studio lot and the engagement of new directing, writing and acting talent. As Sam Warner himself noted, in coverage of the proposed expansion, savings in film stock were central to the studio's expansionist agenda:

One of the big factors in the production of a feature is the elimination of waste motion and waste film [...] on the whole, the curtailment of wastage of both film and time, and by that I mean closely watching the production and its many phases, will make it possible for exhibitors to book films far cheaper.<sup>73</sup>

Trade journals of the period, meanwhile, are replete with cautions against the misuse of film stock during the production process. One instructional article prevailed upon the producer to ‘observe economy and not waste film, the actor’s time or the attention of his audience’; a 1928 industry survey exploring ‘the possibilities of economy’ expressed concern about ‘large rolls of film [being] thrown into the waste cans because of the fear of running out on an important scene’; while marketing material for the Cinephot ‘Exposure Meter’, an instrument designed to measure exposure on the job, warned readers ‘[not to] Waste Film and Opportunity’.<sup>74</sup> If, as Bordwell et al. have suggested, classical Hollywood cinema’s market-driven aesthetic practices received their logic in part from systems designed for efficient and profitable mass production, silver’s role in shaping these systems implicates it directly in the rise of the classical Hollywood style.

Silver’s presence in film stock helped mould early studio-era Hollywood film aesthetics at the production end, then, but it was also a consideration at the point of post-production. While tales of silver salts being converted back into raw material are often dismissed as apocryphal, the reclamation of silver – whether from the fixing bath after the emulsion had set, or from melting down the finished film stock – was standard practice in the 1920s. Even across the early 1920s, most film processing laboratories featured a pair of large tanks for receiving waste fixing bath, which used chemical reactions such as sodium sulphide or zinc dust to precipitate the silver as sulphide or metal.<sup>75</sup> Investment in this process ramped up after 1925, once a leading Kodak chemist, K. C. D. Hickman, had introduced a means of determining the amount of silver in a fixing bath via an ‘argentometer’, a device he had ‘pil[ed ...] in the back of a car’, driven to Hollywood ‘and installed in some of the major motion picture studios’.<sup>76</sup> Moreover – von Stroheim’s ‘forty-three cents’ jeer aside – the sale of extracted silver could be profitable. By 1921 some studios were recovering anywhere between \$500 and \$1000 per annum from fixing solutions, scrap paper and spoiled prints; by 1934, when President Franklin D. Roosevelt’s ‘silver nationalization order’ set 500 ounces as the maximum amount of silver that could be held by any one person for industrial purposes, an estimated \$200,000 worth of silver was found to be ‘on hand among th[ose] large studios operating their own laboratories’.<sup>77</sup> Evidence also suggests that the recovery of silver was seen as a reliable means of offsetting box-office losses.<sup>78</sup> A 1926 edition of *Motion Picture Magazine*, for example, described silver recovery as a process by which the filmmaker could ‘extract therefrom

73 ‘Warners enlarge studio for increased production schedule’, *Moving Picture World*, March 1923, p. 198.

74 R. W. Winton, ‘Why films go wrong’, *Movie Makers*, May 1929, pp. 287–89, 328; L. Physioc, ‘Economy of production’, *American Cinematographer*, vol. 8, no. 12 (1928), pp. 9–10; Cinephot advertisement, *Movie Makers*, March 1929, p. 183.

75 Hickman and Hyndman, ‘Automatic silver recovery from hypo’, *Transactions of the Society of Motion Picture Engineers*, vol. 11, no. 32 (1927), p. 699.

76 ‘K. C. D. Hickman and distillation products’, p. 5, box 96, folder 11, KHC.

77 Pell Mitchell, ‘Cameraman’s question box’, *Exhibitor’s Trade Review*, vol. 10, no. 21 (1921), p. 1479; ‘Silver order no bar to industrial users’, *Motion Picture Herald*, 18 August 1934, p. 10. Industrial users of silver, like Kodak, were exceptions to this edict.

78 I. Crabtree and J. F. Ross, ‘Silver recovery from exhausted fixing bath’, *Transactions of the Society of Motion Picture Engineers*, May 1926, p. 71.

the silver, in a different form, which the unfortunate producer has failed to get at the box-offices of the country's movie houses, and to melt down the celluloid', indicating an established equivalence between box-office revenue and scrap silver yield.<sup>79</sup>

While studio practices organized around the silver reclamation process appear *post hoc* in relation to the aesthetics of the finished filmic commodity, they had significant ramifications for the ways in which Hollywood aesthetics have taken shape in historical memory. The well-rehearsed drama of the 'mutilation' and subsequent 'reconstruction' of the original eight-hour cut of *Greed* (1924) provides a case in point here. As detailed in the introduction to this essay, when the film's director von Stroheim refused to reduce its length below 24 reels, it was not only taken out of his hands and trimmed to just ten reels, but the original 'waste footage' was melted down to extract the silver content. This is not, of course, to say that MGM's radical editing process was *motivated* by the desire to extract silver from the stock; on the contrary, it was driven by a concern with the expectations of exhibitors, audiences and, ultimately, the censorship board.<sup>80</sup> Yet in combination with other examples of the silver recovery process in action, the effective destruction of *Greed*'s negatives has directly shaped our understanding of Hollywood film aesthetics by leaving its mark on the archive. When in later decades *Greed* secured a reputation as a unique masterpiece of 'Hollywood naturalism',<sup>81</sup> efforts to fully reconstruct the 42-reel original were unsuccessful: the cut footage had been destroyed during the silver reclamation process, and the 'restored' version released by MGM merely combines the surviving footage with some 650 still photographs of the lost scenes, in accordance with von Stroheim's original continuity script. While critics and archivists celebrate *Greed* as one of the rare 'moments in which the normative humanism of Hollywood [was] penetrated' by alternative narrative possibilities, this experiment in naturalism, like many other examples of alternatives to mainstream Hollywood style, has been struck from Hollywood's aesthetic record.<sup>82</sup> Silver played no insignificant part in bringing us to this pass.

Silver's presence in photographic film stock was not, of course, inevitable, nor were its presence and effects unmediated by socio-political forces. Alternatives to the use of silver salts were available as far back as 1926, when Alfred Weingarten, a professor in Berlin, hit upon a satisfactory substitute.<sup>83</sup> Weingarten's patent promised 'a new and apparently quite practical process for the production of motion picture positives in quantity', involving 'no silver compounds' and 'resulting in a considerable saving in the cost of raw stock'.<sup>84</sup> According to motion picture engineer J. W. Coffman, this industrial innovation offered a number of aesthetic and practical benefits: not only did it 'reduce print cost', it was also able to 'increase durability of prints; reduce graininess [... and] minimize distortion'.<sup>85</sup> Despite its host of advantages, the technology for silverless film did not gain traction with manufacturers, and would continue to be floated as an as-yet-undeveloped novelty

79 B. Ennis, 'The place of missing films', *Motion Picture Magazine*, vol. 31, no. 5 (1926), pp. 22, 98.

80 Koszarski, *Von*, p. 168.

81 Lea Jacobs, *The Decline of Sentiment: American Film in the 1920s* (Berkeley, CA: University of California Press, 2009), p. 25.

82 Bishop and Cubitt, 'Anti-humanist narratives', p. 1.

83 Joe W. Coffman, 'Silverless motion picture positive film', in *Transactions of the Society of Motion Picture Engineers*, vol. 12, no. 34 (1928), p. 370.

84 *Ibid.*, pp. 370, 371, 370.

85 *Ibid.*, pp. 379, 381.

- 86** This resistance on the part of film manufacturers to industrial change had precedents, for example, in Kodak's resistance to the development of panchromatic film stock due to 'its problematic production'. Luci Marzola 'Better pictures through chemistry: DuPont and the fight for the Hollywood film stock market', *The Velvet Light Trap*, no. 76 (2015), p. 18.
- 87** 'Silverless film', *The Film Daily*, 11 August 1926, p. 1.
- 88** 'Silver salts needed', p. 6.
- 89** 'Speed essential', *The Film Daily*, 13 August 1926, pp. 1, 5.

across trade journals in the 1940s, 1960s and 1980s. One explanation for this is the resistance from manufacturers like Eastman Kodak and the emerging DuPont-Pathé to the radical transformations to their supply chain and manufacturing flow that would be required to deliver a new kind of stock.<sup>86</sup> This hypothesis is supported, in part, by the shifting position of the daily trade press on this novel film stock recipe. On 11 August 1926, *Film Daily* ran a short, euphoric note on its front page. Entitled 'Silverless film', it cited a 'report from Berlin' about the development of a silverless stock, the effect of which was 'most satisfactory', and which could result in the 'manufacturing cost [... being] reduced by fifty percent'.<sup>87</sup> The very next day, however, the magazine released a second article, 'Silver salts needed', that backpedalled on the previous day's claims and included derisory quotes from representatives of Eastman Kodak.<sup>88</sup> These criticisms of Weingarten's innovation, meanwhile, were recapitulated in the same paper the day after that, with a second article devoted to its apparent inadequacy.<sup>89</sup> This quickly changing story suggests that some agency – again, most likely those in the business of manufacturing and marketing motion picture film stock – had intervened to shut down positive publicity for the novel technology.

Whatever the basis of its ongoing use, silver remained a central ingredient in standard filmic emulsions, and given its expense it must be numbered amongst the various capital costs that helped shape the early Hollywood studio system's 'central producer' schema and its various aesthetic corollaries. Indeed, while trade journals of the period were conspicuously silent on the aesthetic implications of film stock's silver content, contemporary commentators associated with the thriving 1920s filmic avant garde, such as Jean Epstein and Fernand Léger, elucidated these implications all too clearly. For Epstein and Léger, silver's use as a raw material in motion picture film stock registers only obliquely in what are ultimately allegorical rather than documentary accounts of commercial cinema. However, the use of silver in the context of Epstein and Léger's critiques of the commercial logic of filmmaking supports my effort to establish a link between the silver salts in film stock and the rise of a standardized classical Hollywood style. Pioneering experimental filmmaker and theorist Epstein is exemplary here. In his 1922 essay 'Langue D'Or', he sought to complicate the 'dream[s] of a prodigious universal tongue', a visual Esperanto that, at that point in history, animated a great deal of commentary on the new medium's aesthetic possibilities. His means of doing so, however, did not involve emphasizing the arbitrariness of the signifier or its contingent relation to the signified. Rather it underscored the signifier's materiality, and in particular its reliance on precious metals. Film is, according to Epstein,

A golden language, much more expensive than was silence in a time long ago when speech was silvery. Each celluloid word consumes dollars, marks, francs. And it cannot be pronounced except upon the

90 Jean Epstein, 'Langue D'Or', in Sarah Keller and Jason N. Paul (eds), *Jean Epstein: Critical Essays and New Translations* (Amsterdam: Amsterdam University Press, 2012), p. 297.

say-so of bankers, pregnant with capital, after signing contracts in which hundreds of thousands are pledged, exchanged, won, promised, lost, divided, and multiplied. Each word must pay for insurance and customs duty, be amortized and rake in a lot.<sup>90</sup>

While this passage casts the language of cinema as golden, the silver at the end of the first sentence 'rubs off', figuratively speaking, onto the gold that opens it. And both metals, in turn, are ultimately absorbed into a broader rhetorical agenda, that of setting the weight and grain of film as a medium against the utopian capacities often ascribed to 'the movies'. Film, Epstein reminds us, is a form of speech in which every utterance 'consumes dollars, marks, francs', implying that far from being 'free' or universal, it is a language mortgaged to the 'say-so of bankers', a language predicated on mercenary calculation. For many theorists, film is a medium appropriated by Hollywood capital, especially across the 1920s with the consolidation of the studio system. For Epstein, however, the medium has capital baked into its very essence. In other words, it is the medium's status as a 'golden language' that accounts for the marginalization of independent, free-form artistic experimentation and the ascendance of Hollywood's Fordist mode of production across the early 20th century.

In his 1923 essay 'Ballet Mécanique', meanwhile, French painter, filmmaker and sculptor Léger further unpacks some of the aesthetic implications of photographic film stock's silver content:

To know how to deal with constraints in the midst of abundance is a rare talent. It's difficult to be rich. The cinema is in danger of dying from it. In its gilded theaters with its silver stars, it doesn't even take the trouble to think up its own stories; it pirates from the theater, it copies plays. Then you can imagine for yourself that the recruitment of the human material necessary for these enterprises isn't difficult. Anybody will do. I take a well-known play. I add a well-known star. I mix ...<sup>91</sup>

91 Fernand Léger, 'Ballet Mécanique', in Edward F. Fry (ed.), *Functions of Painting*, trans. Alexandra Anderson (New York, NY: Viking Press, 1973), p. 50.

92 Adorno and Horkheimer, *Dialectic of Enlightenment*, p. 128.

For Léger, cinema's reliance on this expensive store of value at the level both of exhibition ('gilded theatres') and of production ('silver stars') forces the industry's aesthetic hand in directions most clearly captured by what Horkheimer and Adorno pejoratively called 'mass culture': the standardized products of a benighted 'culture industry' in which the commercial imperative of providing 'entertainment and relaxation' has overtaken the artistic imperative of 'purposiveness without purpose'.<sup>92</sup> In keeping with the quantitative logic of the 'currency' at its core, then, filmmakers turn to artistic practices that rest on banal, recipe-like formulae ('I take a well-known play. I add a well-known star. I mix ...') – a mercenary calculus that readily devolves into theft and appropriation, or what Léger calls 'pirat[ing] or copy[ing]'. For both Léger and Epstein, then, film stock's inherent expense, one articulated in and through the rubric of precious metal, constrained the emerging

industry's stylistic choices, pointing away from oppositional or experimental modes. While for many theorists film is either functionally *like* capital,<sup>93</sup> or was historically appropriated *by* capital, in this vision, thanks to silver, film technology simply *is* capital – making the turn to the classical Hollywood style something of a *fait accompli*.

The aesthetics of the classical Hollywood narrative film in the early studio era were profoundly contradictory. At a textual level, examples of what Bordwell et al. call Hollywood cinema's 'distinct and homogeneous style' are standardized narratives designed to maximize appeal to audiences and to ensure efficiencies of production.<sup>94</sup> At the level of reception aesthetics, however, these films sustain spectatorial fantasies of transcending market logics – fantasies of film magic that elide the social labour of film's production, distribution and consumption. While the emergence of this distinctive 'commodity aesthetic' is conventionally traced to industrial, economic and cultural developments, I have sought to trace its debts to a more local and more proximate cause: that of the silver content of cellulose nitrate film stock. Using Marxist theories of the commodity, I have unpacked silver's dual politico-material profile, characterizing the soft, lustrous metal as at once a 'sentimental commodity' and a 'money commodity'. I tracked silver's remarkably dual, if complementary, aesthetic effects on both the subjective experience and the objective form of classical Hollywood cinema across the 1920s. More specifically I have shown how the silver content in photographic emulsions served at once to reinforce fetishistic hyperbole about a cinematic magic untouched by the market, and to constrain film production to observe aesthetic economies that were a direct function of market edicts. I hope thereby to have contributed to two lines of inquiry in particular. First, to complicate standard histories of film aesthetics by ascribing the aesthetic characteristics of Hollywood narrative cinema in the early studio era not to the force of cultural, industrial or technological formations, but to the unpredictable social, economic, discursive and material agency of this raw geological material in which these formations converge in often surprising ways. Second, to extend contemporary eco-material approaches by showing that beyond its significance to industrial, material and ecological histories of Hollywood, this not-so-humble mineral, silver, played a role in moulding the classical Hollywood style across the early years of the studio system.

93 Guy Debord, *Society of the Spectacle* (London: Bread and Circuses, nd), p. 8; Jonathan Beller, *The Cinematic Mode of Production: Attention Economy and the Society of the Spectacle* (Lebanon, NH: University Press of New England, 2006), pp. 45, 46.

94 Bordwell, Staiger and Thompson, *The Classical Hollywood Cinema*, p. 3.