

Film Box Office Charts and the Metadata of Culture

Liam Cole Young

Counting culture is now commonplace. Areas of cultural and artistic production once thought distinct from numbers have in recent decades been reconfigured by myriad practices of quantification, data capture and analysis. Sales and streaming charts not only measure the circulation and reach of film, television, music, and podcast texts, but often rank their relative *impact* or *importance*. Meanwhile, algorithmically generated recommendation systems curate individual experiences of streaming and search platforms such that no two users' experiences are the same. In sports, new forms of data capture and analysis track athlete performance, predict game and event outcomes, enable new modes of corporate decision making, and intersect in powerful ways with gambling and financial markets. Closer to home, citation counts and *impact factors* create new incentive structures and transform standards by which academic research is judged relevant, successful, or even legitimate. Such data practices transform traditionally qualitative realms into an unending series of quantifiable units and forms – so many numbers, charts, lists, and spreadsheets to be parsed by ever more “innovative” metrics and analytical systems.

These changes seem novel, part of the wide-ranging consequences of ubiquitous computing and digitization, but in fact they have deeper genealogies. The application of large-scale quantitative methods to measuring and analyzing culture did not begin with the internet, even if Silicon Valley's championing of these methods has accelerated and intensified their normalization within discourses of innovation, growth, and disruption. Any question of digital culture's bias toward analytics must, in my view, situate its privileged techniques of quantification within a longer arc of modernity. Epistemologies associated with Western modernity have counted, compressed, classified, calculated, and circulated culture and much else for a lot longer than the internet has been around. These deeper histories remind us that cycles of struggle have long unfolded at the intersections of media-technologies and class, racialization, colonialism, and epistemology. Recent scholarship has focused on, for instance, cultural, as opposed to state, modes of counting through such topics as pop music charts (Huber 2010; Straw 2015), timing and imaging in sport (Finn 2016) credit bureaus and reporting (Lauer 2017), media and multi-

culturalism (Hayward 2019), files, filing cabinets, and filing hands (Vismann 2008; Robertson 2021), feminist histories of quantification (Wernimont 2019), payment systems (Swartz 2020), and “methodolatry” (Mattern 2013). Earlier examples include texts on charts by Parker (1991) and Hakanen (1998), on memos by Yates (1993) and Guillory (2004), or infrastructures of classification such as covered by Bowker and Star (2000). In spite of this vibrant interest in quantitative cultures and institutions, there is surprisingly little research on how such techniques structure activity within cultural industries.

This essay contributes to this growing body of critical literature by tracing the emergence and rise of Hollywood box office charts across the North American media landscape of the late 20th century. Over a roughly fifty-year period, from the late 1960s to today, box office charts and other informational forms, such as pop music charts, professional sports tables, and University rankings have played a major role in reconfiguring the epistemological ground of culture. These forms materialize certain *data practices* – modes of observing, measuring, visualizing, comparing, and ranking – and are an important part of the story of how realms historically thought separate, or at least insulated, from numbers and market-based pressures became subject to prevailing modes of quantification and financialization.

During this period, box office charts transformed from an afterthought on Hollywood’s margins into a dominant industrial and institutional form.¹ Today, such charts are perhaps the single most important metric by which film performance – whether of individual films, actors, filmmakers, or the industry as a whole – are discussed and assessed, from within Hollywood and without. Charts embody an ecosystem of tracking and analysis that is used not only in reactive ways, such as in decision-making contexts, but also for prediction and speculation. The small academic literature on the paper-based charts discussed in this essay does not typically question the nature of the informational form itself, i.e., how and why charts assemble the data they do in the ways they do. The typical view of paper-based box office charts accepts charts as “a concise and condensed representation of the audience’s behavior patterns” (Buckland and Long in Mathijs 2006, 92) and thus rests on an assumption that such forms simply gather and reflect “informa-

1 The most comprehensive account of this transformation, to my knowledge, is Hayes and Bing’s 2004 book, *Open Wide: How Hollywood Box Office Became a National Obsession*. Though a work of journalism that focuses on the *fin de siècle* corporate developments in Hollywood related to opening weekends, the authors are unusually attentive to systemic forces and historical processes that anticipate contemporary developments. “Box office, then, isn’t just a story of studios, market research, advertising and movie stars; it is the story of the architectural and retail infrastructure into which the studios plug their product” (Hayes and Bing 2004, 13). I am greatly indebted to their archival and interview-based research.

tion” that exists *a priori* in the world.² My goal here, following Latour’s “first rule of method,” is to disrupt such assumptions by “un-black boxing” box office charts (Latour 1987, 21), considering instead how they function as what John Durham Peters (2012; 2015) calls *logistical media*. The latter are forms and practices that abstract, order, organize, and compute “basic coordinates of time and space,” establishing the “central points around which culture rotates” (Peters 2012, 41–42). His examples are calendars, clocks, and towers, but others have pushed this definition to explore such case studies as radar (Case 2013), digital calendars (Wajcman 2019), thumbnail images (Thylstrup and Teilmann-Lock 2017), Amazon’s anticipatory shipping patent (Nyckel and Poehchacker 2020), as well as more general categories of software (Rossiter 2016), smart cities (Shapiro 2018), police media (Reeves and Packer 2013), and formats (Volmar 2020). Such studies show that logistical media do not simply record, represent, or reflect culture but actively produce the distinctions, categories, and concepts upon which its epistemological assumptions rest.

Like pop music charts, we refer to box office figures as “charts” even though they are really just lists: a series of aggregated units ranked in descending order of performance, whatever the metric. Lists are powerful logistical media because they exist at the borderline between entropy and order, “etcetera” and “everything-included” (Eco 2009), processing sense from nonsense (Siegert 2015; Serres 2007 [1980]). Who or what draws these distinctions, how, and for what purposes are essential questions for understanding how human beings think and act, how we stitch things together across space and time, especially when considering lists of people, resources, or orders (Werbin 2017; Young 2017). As Jack Goody (1977) first showed, to make a list is to visualize words, things, events, or people into two-dimensional units that can be combined with others, classified, or otherwise manipulated in ways not possible in thought and oral speech. That box office charts are called “charts,” rather than lists, highlights this feature. Disaggregated units, films, are drawn together to form a document that allows people to do things; namely, to chart a course through increasingly noisy information environments. To conceive of charts as cartographic aids, however, is to ignore how they constitute the very ontology of a cultural field that they claim simply to represent or report. In the assembly of charts, data points are generated by practices of observation, measure,

-
- 2 Frohmann (2004a; 2004b) argues we should not understand “information” as an ontological substance to be sought, gathered, and translated into meaning (i.e. knowledge) by the human mind. Instead, “information” is a concept that arises only from documentary and data practices that do stabilizing and coordinating work that precedes abstract concepts like “information,” but also “objectivity,” “fact,” and even “knowledge.” Documents become informing or informational, he argues, only once they acquire the cache of the “social and pedagogical disciplines that maintai[n] them” (Frohmann 2004a, 400).

counting, and comparison. These are flattened, standardized, aggregated, and organized in such informational forms as box office charts before, finally, being operationalized as knowledge in various ways and by various communities.

Inspired by the praxeological approach of this volume, I seek to *follow the practices themselves*, to emphasize where and how box office data came to be aggregated and displayed, as well as some of the motivations that led people to *datafy* the production, distribution, and reception of cinema in the first place. I hope to show some of the ways such data was put to work, how it came to reconfigure chains of decision making and resource distribution within the film industry. In such uses, charts were pushed beyond functions of measure or comprehension and toward prediction. As such, box office charts offer a crucial step in the genealogy of contemporary cloud-based forms of tracking, prediction, and decision-making as found in recommendation and newsfeed algorithms. This genealogical approach involves illuminating a small segment of a much larger and more complex chain of actors, actions, events, texts, sites, and motivations that produced the data environment typified by box office charts. I thus look upon charts themselves, as crystallizations of particular data practices and imaginaries, but also actors who did the charting, most notably *Variety* critic A.D. “Art” Murphy. He plays a large role in these pages not because I seek to tell an origin story or emphasize Murphy’s individual genius or villainy, but because he occupied a privileged site and step in this genealogy. *Variety* played an outsized role in popularizing box office charts, and it was Murphy who developed the magazine’s original chart format.

My argument is not that counting culture is in all cases a bad thing, nor that box office charts “caused” the corporatization or financialization of art and culture. Rather, and more humbly, I seek to shine light on the epistemological work performed by informational forms and logistical media, and on the data practices and imaginaries that produce them. Such considerations rarely appear in histories of culture, while accounts of contemporary data analytics typically begin only with the digital computer. My aims are thus historical and deflationary, to show how deeper histories of counting culture prefigure and anticipate today’s Big Data, and to weave practices of accounting into stories about cultural industries so as to complement the usual emphasis on production and consumption.

Hollywood Datafication

The now-familiar form of box office charts, a ranked list of the top grossing films over a defined period (usually a week or weekend), took some time to settle into place. The recent proliferation of box office charts online followed a slower but no less robust propagation across so-called “legacy” media environments between about 1970 and 2000. Appearing first in *Variety* in the late 1960s, the charts proved

in subsequent decades to be a perfect morsel for content-hungry editors of increasingly specialized entertainment and business presses, whether at longstanding venues like *Variety* and *Forbes*, or newer outlets like *USA Today* (est. 1982), *Premiere* (est. 1987), and *Entertainment Weekly* (est. 1990). Television producers also mined value from charts, particularly those looking to fill airtime for niche entertainment programming that arose with cable and satellite, such as *Entertainment Tonight* (est. 1981), MTV (Music Television, est. 1981) and VH1 (Video Hits 1, est. 1985) (see Hayes and Bing 2004, 294–95). But the earliest box office reporting was much less conspicuous, more infrequent, and lacked any kind of systematic approach. Reports were linked to specific theatres or cities and were not aggregated into larger data sets that might provide insight into, for instance, regional or national trends (Hayes and Bing 2004, 290). These box office reports made few claims to objectivity, such as would later come to be associated with box office charts, and fit neatly alongside the qualitative content with which *Daily Variety* had made its name since launching in 1933³ such as film reviews, celebrity chatter, and interviews. As the 1960s drew to a close, what little profile box office figures had was in the service of Hollywood gossip rather than economic analysis or prediction.

This would change as Hollywood entered a new epoch characterized by the decline of the studio system that had been relatively stable over the first half of the 20th century. The system, in which five major studios controlled every moment and site along the chain of production, distribution, and exhibition of film commodities, was gradually dislodged by a series of economic, legal, technological, and cultural forces. Some of these were external to the industry, such as the rise of television, and some internal, such as the infamous Paramount anti-trust suit. The latter was settled by the United States Supreme Court in 1948 and required major studios to dismantle their vertically-integrated operations. With studios no longer able to enjoy an oligopoly over talent, financing, and distribution, an array of independent operators elbowed their way into the industry.

I am not treading new ground here. This story is often told by cultural historians and film scholars as context for the 1970s “golden age” of American cinema, during which, to borrow the title of Peter Biskand’s (1999) account, a few “Raging Bull” and “Easy Rider” artists, producers, and critics shook Hollywood out of complacency.⁴ These young filmmakers reimaged the form, content, and infrastructure of American film. They shot and edited their films differently, adopting

3 New York City-based *Variety* magazine was founded in 1905 as a weekly periodical focusing on vaudeville and theatre. *Daily Variety*, launched in 1933, was a Los Angeles-based subsidiary that focused on the motion picture industry. It ran until 2013.

4 See, for instance, the critical overview comprised by essays in Elsaesser, Horwath, and King (2004).

verité and direct cinema techniques from the French New Wave. They mined diverse source material for stories, exploring the streets and sweat of life in New York City and Detroit as often as high modern literary traditions or low cultural forms such as American vaudeville. By synthesizing arthouse and grindhouse, filmmakers associated with this golden age were beloved by film critics and ticket buyers alike. But it was not to last. The end of the golden age corresponds with the opening of a new period of corporate-commercial “blockbuster” cinema of the 1980s and beyond, after the studios had reclaimed autonomy over the film business. Depending on the storyteller, this transition is framed as one of artistic marginalization and corporate expansion, or as a return of fiscal responsibility in the wake of free spending. What is clear is that the end of the 1970s brought a prolonged and intense period of consolidation, convergence, and financialization (for a comprehensive overview, see deWaard 2020). These processes produced a new series of dominant forms and rituals in the industry, such as the blockbuster or “event” film (Acland 2020); hugely expanded promotional campaigns that included movie tie-in merchandizing, licensing, and soundtrack deals; the sale and renewal of TV broadcast rights; an industry calendar reformatted around various movie “seasons” (summer blockbuster season, awards season, low season, etc.); and, perhaps most important of all, a new emphasis on release dates and opening weekend grosses.

I am less interested in offering a moral argument about whether these changes were good or bad than in highlighting that accounts of this period typically overlook the corresponding changes to techniques of data collection, aggregation, and presentation employed by Hollywood insiders to track and analyze commodity circulation. Box offices charts were paradigmatic, but this period also saw a surge in interest in survey and focus group data, marketing white papers, metrics for tracking star image popularity, among others (Hayes and Bing 2004, 277–297). These media forms started on the margins, developed by relative outsiders, and operated quietly but powerfully in the background (as all functioning infrastructure does). They were either proprietary and hidden from public view or, as with box office charts, appeared to be straightforwardly reporting facts. They thus embody a strange contradiction in 1970s Hollywood: a flowering of artistry and auteur cinema accompanied by rather more mercenary ideas about how to reduce cinema to data points that could be tracked and analyzed by a consolidated suite of metrics.

What’s in a Chart?

Like all lists, box office charts are deceptively simple. Their clean borders and ordered appearance seem simply to collate and present “objective” data. The form seems to repel critiques of its logic and instead demands judgements about value or importance based solely on weekly grosses. Unlike a piece of narrative prose

or a scholarly essay, in which authorial voice, intent, or argumentation are discernable, a box office chart lacks such obvious traces. But as theorists of writing have shown, all acts of inscription, whether “administrative” or “literary,” are the product of choices – what to include, or not, and how – that have wide-ranging consequences.⁵ Though they appear simply to *gather* data, *read* trends, or *reflect* cultural activity that exists *a priori* in the world, such forms actually generate data or knowledge, give it material form, and grant it epistemological authority. Put another way, to measure a cultural field in a list or a chart makes concrete what had previously been abstract. It is to visualize data points, combine them into relations, attach metadata, and aggregate these into a standardized format.⁶ For readers, the threshold to understanding such forms is low. They are easy to access, easy to scan, and thus easy to circulate as knowledge. Popular music charts, for instance, as I argue elsewhere (Young 2017), render songs, artists, moments, and memories into collective archives and canons, track commodity circulation, structure processes of taste-making and gatekeeping, and, in self-authored charts, allow for the performance of knowledge or mastery of a field. Box office charts function similarly. They draw things together and place them in relation to one another, creating connections that did not exist prior to the act of listing. They congeal as knowledge various components: films, box office earnings, studios, number of weeks on the charts. They create a stable format that is the material basis for conceptions of value, success, or failure. Consider the 1972 chart from *Variety* magazine shown in figure 1.

The basic criterion for this list is the total number of box office dollars earned per film over a given period of time (one week). Financial gross is privileged. All other data become metadata of secondary importance, such as distributor (“Distr.”), last week’s gross and rank, number of cities in which each film is screened, type of theatre (first run, show case, roadshow), number of weeks on chart, and total grosses to date. When presented in this way, such forms achieve a veneer of objectivity. Mary Poovey (1998) traces this sense of authority and objectivity back to early modern practices of double-entry bookkeeping. This technique of accounting, she argues, made concrete, on the page, previously abstract notions of transparency, trust, and even virtue before God. Things, events, amounts, and accounts are transcoded from speech and embodied experience into entries and numbers for elegant and efficient presentation. It’s all there on the page, with

5 Many of these insights were derived during what are now referred to as the “orality-literacy” debates of the mid-20th century. Ong (1983) synthesizes much of this research, but earlier touchstone texts include Parry (1930), Parry and Parry (1987), Lord (2000 [1960]), Levi-Strauss (1966 [1962]), McLuhan (1962), Goody and Watt (1963), Havelock (1963), and Goody (1986).

6 For an expansive consideration of “format” as a critical concept, see Jancovic, Volmar, and Schneider, eds. (2020)

nowhere to hide and thus no reason to doubt the trustworthiness of the merchant with well-kept books.

Figure 1: Variety Chart 1972

Wednesday, October 25, 1972									
VARIETY									
PICTURE GROSSES 17									
50 Top-Grossing Films									
[WEEK ENDING OCTOBER 18]									
Compiled by Standard Data Corp., N.Y.									
TITLE	DISTR	THIS WEEK \$	RANK	LAST WEEK \$	RANK	CITIES	WEEKS IN RANK	WEEKS ON HIT	TOTAL TO DATE \$
						THEATERS	WEEKS IN RANK	WEEKS ON HIT	TOTAL TO DATE \$
THE NEW CENTURIONS	COL	429,950	1	622,550	1	10 10 58	68	11	3,554,906
DELIVERANCE	WB	411,814	2	460,208	2	15 16 5	21	11	1,465,237
SUPER FLY	WB	299,200	3	421,500	3	16 18 4	22	11	4,509,174
FUNNY GIRL	COL	274,500	4	10,900	3	1 45	46	84	19,883,024
2001 SPACE ODYSSEY	MGM	187,300	5	37,625	24	5 4 30	34	135	15,944,342
COUNTESS DRacula/VAMPIRE CIRCUS	FOX	179,000	6	32,000	29	2 1 36	37	2	211,000
BORN BLACK	HAL	175,000	7			1 33	33	1	183,340
CANCEL NY RESERVATION	WB	155,150	8	191,400	6	5 3 10	13	4	642,442
CABARET	AA	147,900	9	236,000	4	5 3 27	1 31	34	10,020,873
THE CANDIDATE	WB	144,200	10	213,250	5	4 2 28	30	16	2,394,492
EVERYTHING TO KNOW ABOUT SEX	UA	117,043	11	136,441	9	13 15 2	17	10	2,992,650
FIDDLER ON THE ROOF	UA	95,650	12	99,300	13	12	12	50	15,356,817
WHERE DOES IT HURT	CRC	90,450	13	165,350	7	8 11 4	15	10	1,001,793
BUTTERFLIES ARE FREE	COL	80,800	14	63,400	16	9 7 8	15	15	4,787,285
SOUNDER	FOX	80,629	15	34,676	28	3 4		4	159,065
HEAT	L-P	80,500	16	28,000	31	3 4 2	6	2	104,149
YOUNG WINSTON	COL	77,000	17			3		3	99,035
LAST HOUSE ON LEFT	HAL	73,000	18			3 3 7	10	4	151,200
FAT CITY	COL	71,100	19	37,900	23	7 8 11	19	11	717,760
THE RULING CLASS	AVE	69,700	20	90,750	14	6 6 2	8	5	247,293
ASYLUM	CRC	68,834	21			2 1 5	6	1	68,834
DR ZHIVAGO	MGM	62,800	22	162,275	8	5 5 9	14	32	2,840,730
THE GODFATHER	PAR	60,950	23	83,475	15	7 6 16	22	31	42,988,242
SLAUGHTERHOUSE FIVE	U	54,900	24	50,300	19	10 6 8	14	30	2,031,864
AIRPORT	U	50,000	25			1 26	26	50	13,214,642
ANDROMEDA STRAIN	U	50,000	26			1 26	26	24	3,552,415
THE MAN	PAR	48,000	27			1 19	19	11	775,998
MELINDA	MGM	45,540	28	47,000	20	4 4 2	6	9	1,837,478
MARJOE	CS	44,000	29	55,100	18	10 10	10	11	602,261
SECRET LIVES OF ROMEO & JULIET	AQU	41,000	30			1 26	26	1	88,900
NOTORIOUS CLEOPATRA	BI	41,000	31			1 26	26	1	84,700
BLUEBEARD	CRC	39,500	32	4,750		3 4 3	7	8	1,275,111
THE VIRGIN WITCH	BRE	36,000	33	5,500		1 10	10	5	210,700
HAMMER	UA	34,000	34	38,500	22	5 5		5	187,708
HICKEY & BOGGS	UA	31,750	35	127,000	10	3 2 10	12	7	588,397
EASY VIRTUE	VOG	31,400	36			2 1 4	5	7	289,470
THE EMIGRANTS	WB	31,278	37	35,421	25	2 2		2	87,104
FAREWELL UNCLE TOM	RGU	25,000	38			1 1		1	25,000
DEEP THROAT	AQU	23,675	39	25,000	34	1 1		1	529,750
SLAUGHTER	AIP	22,000	40	43,600	21	2 2		2	9 1,816,113
CHLOE IN THE AFTERNOON	COL	22,000	41	25,000	35	1 1		1	3 70,330
SORROW AND THE PITY	CS	21,500	42	18,500	39	5 5		5	11 428,979
ALL ABOUT SEX OF ALL NATIONS	MIS	21,283	43	25,260	32	1 1		1	35 1,053,861
GONE WITH THE WIND	MGM	20,000	44	11,375	3	3 3		3	72 10,672,071
WHEN LEGENDS DIE	FOX	20,000	45	16,400	42	1 1 3		4	4 88,800
A SEPARATE PEACE	PAR	19,000	46	22,000	37	1 1		1	3 61,775
WHATS UP DOC	WB	18,300	47	20,300	38	4 5		5	32 8,606,777
THE THING WITH TWO HEADS	AIP	16,500	48	23,234	36	1 1		1	5 130,358
BARON BLOOD	AIP	16,500	49	18,500	40	1 1		1	2 35,000
THUNDERBALL / ONLY LIVE TWICE	UA	16,000	50	34,700	27	1 1		1	18 1,938,644
A L L O T H E R S		610,892		884,606		151 48	199	1,425,327,550	
G R A N D T O T A L		\$4,883,488		\$4,659,046		337 553	16	906	\$1,605,915,479

Source: Variety, 25 October 1972, p. 17

Box office and other cultural charts participate in this long history, benefitting from long-held assumptions about the transparency and objectivity of numeracy and list. The material properties of the above chart defer questions about how this money is counted, who counts it, and whether these figures are reliable. The chart is instead suffused with a logic that privileges economic considerations. Its collation

and hierarchical presentation of data seem obvious and inevitable. But this chart could have been organized much differently. One could have listed the number of tickets sold, rather than dollar amounts. One could have ranked entries according to number of screenings, or theatres in which they appeared. Similarly, one could have listed these films alphabetically, rather than according to total gross amount, or chronologically based on date of release. There are innumerable ways of ordering and reordering such data (this is the power and pleasure of any list), and innumerable metadata that could be affixed to broaden or reduce the scope of the list. We do not see, for instance, the country of origin, name of director or lead actor, number of craftspeople who worked on the film, years since initial script development, and so on. These may today be considered irrelevant according to industry standards, but such judgements ignore the extent to which these industry standards are themselves established through informational forms such as box office charts. Because alternative data were excluded from early charts, or presented as contextual metadata, now they always will be.

These techniques of assembling data recall Bruno Latour's early science studies research, in which he describes the "captation" of readers who are beholden to a particular pathway charted by the assembler(s) of a document through an archive of almost infinite possible connections and pathways. Readers are held captive, their objections anticipated and neutralized, while the objects and relations assembled come to be dominated by sight. Words, things, people, and events are frozen in visual forms such as lists, tables, charts, or diagrams in order that they can better be controlled from a distance, as he writes, "when someone is said to 'master' a question or to 'dominate' a subject, you should normally look for the flat surface that enables mastery (a map, a list, a file, a census, the wall of a gallery, a card-index, a repertory) and you will find it" (Latour 1990, 45). Knowledge is formed via these slow and sedimentary processes by which many networks of observation, experimentation, commentary, citation, and classification are coordinated and stabilized. People do things with such knowledge. They use it to analyse situations and make decisions, distribute resources, and to otherwise coordinate action. Theories of historical rupture make for good headlines and citation counts, but the process of history is slow, layered, and messy.

Box office charts, for instance, establish particular rhythms of time over film production, circulation, and reception. As Hayes and Bing demonstrate, for at least the last thirty years, a film's opening weekend gross has stood as the gold standard of success (Hayes and Bing 2004, 9–15). Prior to the standardization of box office charts in the 1970s, Hollywood release and exhibition practices did not always pass through this temporal bottleneck. Early *Variety* box office reporting "didn't publish a single regular report on nationwide grosses. Instead, the paper ran a bewildering array of regional stories reporting ticket sales at particular houses" (Hayes and Bing 2004, 290). Eventually, in-house critic A.D. Murphy began to aggregate these data

to derive rudimentary national numbers based on averages from key regions in a column he began to author in 1968, “*Variety’s* Key City B.O. Sample.” As the 1970s unfolded, Murphy began to zero in on first week grosses and by the early 1970s, his charts had taken shape in the now-familiar “top weekend grosses” format (Murphy 1968, 290–291). More than mere “information,” box office charts became operational and logistical media, powerful switch points in the feedback loops between Hollywood film production, distribution, exhibition, and consumption. Hollywood executives lusted after total data awareness of film performance and audience tendencies, joining military commanders and 20th century Cold Warriors in search of seamless connectivity and real time data, or retail executives like Sam Walton, founder of Wal-Mart, who sought ever more granular data about logistics and distribution (LeCavalier 2016). The payload at the end of each data supply chain varies, but the goals are the same: speed, efficiency, and optimization. New intermediaries arrived in Hollywood to fill this niche, convinced that they could develop “a more scientific system for building a movie into a mass event, and a more scientific system for rapidly measuring its success” (Hayes and Bing 2004, 241).

Data Imaginaries

Murphy was not the only quantitative game in town. As Hayes and Bing (2004, 283–296) recount, other groups like National Research Group (NRG) and Centralized Grosses were attempting to streamline and aggregate data about the business of Hollywood. NRG was founded in 1979 by two former political pollsters, Catherine Paura and Joe Farrell, to provide Hollywood studio executives with market research and other curated data sets that, they argued, offered unique insights into what was popular, how, and why. A few years earlier, in 1976, Marcie Polier, then a part-time secretary for Mann Theatres in Los Angeles, founded Centralized Grosses. At Mann, Polier canvassed individual theatre owners about ticket sales and collated their data into a report for distribution to industry executives. Centralized Grosses systematized what had been an *ad hoc* and relatively unreliable process of data collection (based on a complex of voice – telephone – pencil – typewriter – binder). It also transformed Polier’s early local data sets into a nationwide database that enjoyed privileged access to proprietary studio data for over two decades. The successes of NRG and Centralized Grosses exemplify the datafication of culture that Murphy’s charts similarly embody. They also stand as early examples of broader transformations in Hollywood arising from ownership concentration and the logic of financialization, which Andrew deWaard describes as an “accelerated growth of the financial sector and its extractive logic, which relies on financial engineering rather than commodity production” (deWaard 2020, 54–55). Polier sold her company, for instance, to AC Nielson, the notorious global market research and televi-

sion rating system corporation, before it was merged, acquired, and stripped for parts by a series of media companies and private equity firms. The initial sale of Centralized Grosses (by-then rebranded as Entertainment Data, Inc.) to Nielson resulted in a new company, Nielson EDI. The latter was purchased in 2002 by Dutch publishing company VNU, which then owned iconic trade papers *Adweek*, *Billboard*, and *Hollywood Reporter*. In 2006, a consortium of private equity firms purchased VNU, installed the former CEO of General Electric, and rebranded the entity as The Nielson Company. As deWaard shows, the consortium saddled the company with excessive debt, stripped its assets for capital extraction and slashed its workforce before exiting the investment with a handsome profit “achieved through financial engineering” (deWaard 2020, 67). The journey of Polier’s Centralized Grosses shows how data practices become capitalized and financialized, but it also reminds us that the roots of the data economy lay in clerical labor and bookkeeping, areas of work often feminized, racialized, and ignored in business and cultural histories.

Murphy’s chart operations at *Variety* are of particular note for our purposes given their origins in the military-industrial complex (the connection to military-style systems thinking I suggested above is more than a provocative analogy). Before landing at *Daily Variety* in 1965, he had trained as a navigator and transporter in the United States Navy and written a Master of Science thesis at the United States Naval Postgraduate School on “A Queueing Model of Information Flow in a Command and Control System” (Murphy 1962). These intellectual leanings in fact played a role in his ability to secure a job as a conventional film critic at the magazine. He wrote a letter in 1965 to editor Tom Pryor that modeled a mathematical, seemingly objective analysis of the economics of Hollywood that caused Pryor to hire him immediately (Hayes and Bing 2004, 289–290). Murphy’s peculiar background is often mentioned in histories of *Variety* and the box office charts, yet rarely analyzed in depth. His Master’s thesis, publicly available, offers clear insight into the types of knowledge that would shape his approach to working with data and systematizing the charts. Though much of the analysis is highly technical, Murphy’s opening and concluding chapters lucidly lay out the argument and its epistemological commitments. He explores the speed, volume, and processes by which information moves in military chains of command, seeking to address the problem of military commanders having to process too much information. In his own words, the thesis seeks to “provide a methodology yielding quantitative results which may assist a commander” in addressing “the problem of the volume of information flow” (Murphy 1962, ii). “Does a military commander actually need all the information he receives? Can he afford to spend more and more time absorbing all the subtleties of increasingly complex matters, matters on which he must make positive decisions and decisions for which he alone is responsible? Can he afford NOT to?” (Murphy 1962, iii). The basic premise of the thesis is that decision making can be optimized by streamlining and standardizing the movement of information from one com-

mand post or “service stand” to the next (Murphy 1962, v). It is unclear why Murphy adopts the term *information*, as opposed to *knowledge* or *data*, but it likely had something to do with the spread through the 1950s and 60s of Claude Shannon’s so-called *information theory*. Though he does not cite or comment upon Shannon directly, nor on Norbert Wiener’s cybernetics, the influence of both is clearly evident in Murphy’s use of the *information* and *command and control* concepts throughout.

These nascent fields offered modes of analysis and reasoning employed by Murphy in suggesting that there are informational thresholds beyond which any given command post ceases to be functional, and that these thresholds can be quantified. Short of such a threshold, he argued, any actor’s capacity for reasoning remains optimal and she or he can devote maximum cognitive capacity toward complex reasoning, analysis, and decision making that is required in a given situation. Murphy pointed to protocols such as Standard Operating Procedures (SOP) as evidence of how such practices were already in place. Whether in military or institutional settings, SOPs are systems designed with the goals of reducing uncertainty, increasing redundancy, and lowering the threshold to participation in any chain of decision, command, or data transfer. SOPs program action according to anticipated parameters and scenarios and thus reduce the cognitive load on decision makers and accelerate their ability to act. One need not reason nor analyze one’s way toward a decision or action, one must simply adopt the SOP. The critique of instrumentalizing and rationalizing decisions involving, for instance, weaponry and human life is obvious. But one can also understand the desire, in situations that demand speed and “decisiveness,” to outsource some of the cognitive load.

Murphy was a fan of SOPs but pointed out that even most military SOPs remained *ad hoc* and without an important quantitative dimension that could make them even more efficient, functional, and standardizable. His hunch was that a synthesis of cybernetics’ command and control systems analysis with the hard mathematics of queuing theory could address these limitations. Ultimately, Murphy’s solution to the problem of information overload in decision-making is to call for comprehensive analyses of chains of command and information transfer “with a view to automating, consolidating, or even eliminating some of the information generated” (Murphy 1962, 34) so as to lessen the cognitive load of commanders. In other words, to streamline, optimize, and eliminate redundancy should be, according to Murphy, the primary goals for any such system.

Though Murphy aspires to general applicability with his analysis, he lacks any theory of what the analysis models, namely, *communication* and *information*. There is no conception of the devices, agents, or practices that perform the work of communication, that mediate the flows of information he is so concerned with. Murphy instead relies on a concept of information, common since the mid-19th century but popularized through misreadings of Claude Shannon and Norbert Wiener, that mistakes their entropy measure, information, for a universal and ahistorical sub-

stance “out there” in the world to be discovered, captured, nurtured, saved, protected, or otherwise utilized. Such a conception ignores how practices, techniques, models, mechanisms, and media do not simply reflect or gather but actively generate data points, processing them into *information* to be disseminated as *knowledge* for various purposes. As Gitelman et al. (2013) show, following Bowker (2005), “raw data is an oxymoron.” In attempting to derive general principles that can be used in any number of different communicative environments, Murphy’s model assumes (or dreams) of a frictionless set of processes by which data are discovered or pulled from “the field,” passed to a decision maker, processed cognitively into a set of decisions, conveyed as orders to actors downstream, and implemented in the field.

Murphy’s thesis is yet another instance in which *information* takes on almost magical properties, as Nunberg writes, “a noble substance [...] indifferent to the transformation of its vehicles” and to the techniques of assembly, movement, and operationalization associated with information work (Nunberg 1996, 107). This way of observing a communicative and logistical field describes, more or less, Murphy’s eventual approach to charting and analyzing the contours of Hollywood’s film industry. Once established at *Variety*, he began to ask: how could this noisy information environment – riven with rumors, innuendo, gut feelings, and the uncritical acceptance of conventional wisdom – be made more efficient for decision makers? How could flows of information, capital, and labor be optimized for expansion and growth? Could quantitative methods and mathematics be used to clear Hollywood of its emphasis on aesthetic and unscientific concerns? His *Variety* charts comprise a longitudinal and consequential answer to such questions. Box office charts should be thus read as a remediation of data practices that were central to military imaginaries of the 20th century.

Hollywood Time

One of the primary avenues by which box office charts standardized and optimized the business of Hollywood was in establishing particular temporal rhythms. As mentioned above, before it was systematized into a formal chart system, box office reporting was organized primarily around spatial considerations – region, city, district, or theatre. But as “this week,” “previous week,” and “weeks on chart” became increasingly ubiquitous in trade and newspapers, a new set of temporal desires began to emerge among industry executives and financiers. Charts satisfied these desires, which they had helped create. Long-standing head of Universal, Lev Wasserman, for instance, became throughout the 1970s obsessed with obtaining real time updates on as many aspects of Universal’s operations as possible, demanding, according to biographer Connie Bruck, “slips of paper [delivered] throughout the day with updated box office figures, the Universal [Studios] Tour head count, and stock

market closing numbers” (quoted in Hayes and Bing 2004, 293). The charts helped quench the thirst for the latest figures. Their formal emphasis on the week and weekend eventually consolidated almost all industry attention and resources toward these as the primary units of a film’s lifecycle. But their formal attributes had subtler implications on “Hollywood time.” Charts function as shared archives that freeze for posterity a snapshot of what is popular in a given moment, inscribing a perpetual forward momentum on a cultural field. The “previous position” column frames the present week as part of a longer trajectory, either rising or falling, and the reader – whether industry insider or casual film fan – always has the next week and future chart performance in mind.

Such functions are an example of what Volmar and Stine (2021) describe as “hardwired temporalities.” This concept accounts for enduring temporal patterns that are produced and sustained through infrastructures consisting of material artifacts or technologies, on the one hand, and different labor and other practices, on the other. Box office charts are “paper machines” (Krajewski 2011) that hardwire particular temporal rhythms through the slow and often painstaking work of assembling, organizing, and displaying data. In such ways, box office charts function similarly to pop music charts, which, according to Straw (2015), “transform the often erratic commercial life of a musical commodity into a curve of ascendant and descendant popularity, so as to endow that life with the legibility of both narrative and tabular form” (129). This curve informs the reader’s judgement of an entry’s performance (successful or not), relevance (popular or not), or value (good or bad), eliciting speculation about its future – is it headed toward #1, or will it be pushed off the chart’s bottom edge? Many times converge and become standardized according to such a chart’s logic of competition: collated pasts, anticipated futures, and present popularity. Charts freeze the present as part of an ongoing archiving of cultural history, creating what Hakanen calls a “stockpile” of information that can be used for analysis, prediction, and narrativization (Hakanen 1998, 106). According to Straw, the curve of an entry’s “rise and fall endows its lifecycle with the romance of individual success and ultimate exhaustion, while the hierarchical verticality of the chart conveys the sense of all songs sitting in momentarily stable relationships within a homogenous historical moment” (Straw 2015, 132). Time is rendered spatial, materialized as data points and displayed on paper. Insiders can base marketing decisions that affect future film performance on such data, while fans can rely on the charts to provide knowledge about films they have not yet seen. The bias of charts is toward organizing past events hierarchically and predicting future results for the purposes of modelling and decision making. These logistical functions are in constant tension with the appearance of charts as a finite and disposable form. The momentary order of a chart will dissolve and be replaced by the next chart, which is always on the horizon. “The charts” go on, but this chart will

not. Charts fetishize newness because they never allow consumers to stop looking at the present in terms of the future.

Charts render time spatial, flattening the rhythms of commodity circulation and consumer desire into pre-formatted categories in two dimensions (last week, this week, next week). This process is mirrored in the ways charts flatten difference and aesthetic form. In a box office chart, the film-as-artwork becomes datafied, rendered into units that can be sorted and recombined in various ways. When abstracted and fitted to the templates of a chart, films become standardized and thus more suitable for direct competition. More traditional criteria used to differentiate films, such as genre, geographical provenance, style, or audience disappear on the charts. This flattening of difference ensures films and artists must compete with one another for chart, and thus market, supremacy. As with pop music charts, “[w]ithin the market-place there is only competition on the basis of assumed equivalence; any differences are reduced to differential calculations about exchange value” (Parker 1991, 211). The logic and values of capital are encoded in the structural attributes of box office charts. *Art Murphy’s Box Office Register* exemplifies this market-based logic. In the introduction to 1985’s edition, he writes,

Box office grosses must be looked at constantly – on almost EVERY film, on almost EVERY day. Far from being mere numbers, box office grosses represent the responses of PEOPLE to films. To ignore those numbers – and those people – is to risk business failure and – worse – to inhabit the catatonic world of the compulsive aesthete (quoted in Hayes and Bing 2004, 291).

Murphy’s charts were clearly suffused with a logic of efficiency and optimization, begging the question of whom or what this optimization serves. In this case, the question of politics is straightforward. Murphy was virulently anti-studio and anti-labor. He viewed Hollywood’s unions as part of the system rather than an oppositional force. He railed against the combined hegemony of the studios and unions, such as in a 1968 op-ed in *The New York Times* that warned young American creative talent about “inbred, protective unionism [that] has erected a formidable barrier to your entry into Hollywood movie making.” Studio management, he continued, was only too happy to go along with the current state of affairs given its “congenital” fear of labor unrest. Not only this, he lamented, but “[a]stonishingly, an agency of the United States Government actually is helping to perpetuate closed union ranks, and thereby suppress any professional competition for work” (Murphy 1968, 7). Murphy continued to wear these conservative inclinations on his sleeve until the end of his life. As John Welles, a highly successful Hollywood producer and former student of Murphy’s, wrote upon the latter’s death, “I’ll miss him calling me every Thursday morning to [gripe] about the liberal politics of *The West Wing*” (quoted in Lapriore 2003). Though critical of studio oligopolies, it’s clear that Murphy’s notion of optimizing the business of Hollywood was in the service of capital, not labor. It

is in this context that we should situate his *Box Office Register*. Though he claimed it was not more than a compendium of “numbers which represent the collective and comparative decisions of paying customers,” a “convenient [and] cohesive understanding what makes moving pictures move” (quoted in Hayes and Bing 2004, 291), the *Registry* was much more. It was a moral argument about efficiency and value extraction, an attempt to rescue the business of Hollywood from the whims of the artists and what he called “compulsive aesthetes” (quoted in Hayes and Bing 2004, 291). Such rhetoric would have been familiar to readers amid the rising neoliberal tide of Reagan and Thatcher in 1980s, and well into the deregulation and globalization of the 1990s.

Murphy’s influence on Hollywood as a cultural industry went still further. As the charts continued to spread throughout the culture, he turned his eye to teaching, developing a graduate seminar on the business of film in 1974 for the University of Southern California’s film school, which he taught until 1997. The success of this course allowed Murphy to play an active role in designing USC’s Peter Stark Program, for which he served as director from its inception in 1979 until 1990, and in which he taught until 1997. This began as a general program in film business but evolved to become focused on the role of film Producer. Through the 1980s and 90s, this figure, an intermediary between studio management, financiers, and creative talent, would help erode the power and influence of the auteur-director and even the star performer, many of whom don’t truly “arrive” as Hollywood megastars until they establish their own production companies. In his role at USC, Murphy mentored a generation of students that would move into film production with an eye for his modes of measuring performance and assessing value, typified by his charts and the *Register*, that could be fed back into the production process to inform decisions about marketing and resource distribution. Given the centrality of Murphy to the Stark program’s development and delivery, particularly in its early years, it seems likely that many of these epistemological assumptions would have found their way into the program’s curriculum. This remains an open question as any such records have either been lost or remain inaccessible to outside researchers.⁷ In any case, the Stark program was emblematic of a shift within Hollywood, away from aesthetics and toward corporate logics, that corresponded with the changing epistemological ground as box office charts and other informational forms took hold over the industry’s collective imagination.

This shift, the datafication of culture in the name of market analysis, merges ideas of artistic or creative “quality” with the rate and speed of financial performance. Assessment of Hollywood films now almost always passes through the bot-

7 I was told in personal correspondence by the current director of the program that the program has not kept records of past syllabi or other documentation related to curriculum development, at least none that are accessible to outside researchers.

tleneck of chart performance. The days of films slowly building up momentum through word of mouth, favorable reviews from critics, or redemptive readings from “cult” audiences, such as were commonplace even into the 1990s, have been steadily eroded by financial and other performance-based metrics. As Hayes and Bing (2004) continuously point out, the marketing emphasis on any given film is aimed entirely at its opening weekend and thereafter at keeping it at or near the top of the box office chart. If a film “flops” its opening weekend, support and resources are quickly reallocated elsewhere in the studio’s repertoire and the film disappears from view almost immediately. The compression of these time horizons corresponds with the synthesis of box office chart and film review on aggregator websites such as RottenTomatoes.com or Metacritic.com. These websites not only list box office performance on their home pages but also port the quantitative logic of the charts into the realm of criticism, creating an aggregated “review score” that reduces an array of film reviews and ratings to a single number. Though Hollywood insiders lament this development, such as the parade of anonymous sources in Barnes’ (2017) feature on Rotten Tomatoes in *The New York Times*, it’s clear that aggregators are top-of-mind for studio financiers and marketers – a fact only underscored when considering that RottenTomatoes is now owned by two studios (Fandango, a subsidiary of NBCUniversal, owns 75%; WarnerMedia owns 25%). It falls beyond the scope of this essay to explore such contemporary developments, but connections are suggestive.

Conclusion

This chapter has sought to contextualize Hollywood’s contemporary privileging of Big Data and financialization within a longer historical arc of data practices and techniques of counting culture. Hollywood box office charts are a paradigmatic example of how practices of measuring and counting that informationalize and “datafy” commodities and behavior have cascading implications in the cultural industries. Films as aesthetic objects and, by extension, filmmaking as a complex of collaborative practices, become abstracted into categories of metadata deemed relevant by chart and industry insiders, visualized and flattened for inscription on a two-dimensional surface or interface, then ranked hierarchically by a single metric (box office gross over a given unit of time). These charts are easy to reproduce and thus propagate widely across media environments. They are visually appealing against the walls of text that typically surround them. And they are accessible for a wide audience given that they do not demand close reading but rather scanning and inspection.

Box office charts are a species of *logistical media* in the way they coordinate action and establish or reinforce infrastructures of space and time for the film in-

dustry. New rhythms of time were inscribed on box office charts that pushed the attention, resources, and emphasis onto the opening week and weekend as the primary unit by which to track, measure, and assess any given film's success or failure. And as charts spread across the culture, insiders operationalized them in decision-making processes that affected film production at every moment along the supply chain, from development to exhibition and beyond. Such informational forms, and the data practices that produced them, became an increasingly important zone of competition – not just between films contained in the charts but among studio heads looking for any advantage, informational, economic, or otherwise, over their competitors.

While box office charts are precursors of contemporary recommendation, search, and newsfeed algorithms, the latter have clearly exceeded the scope and scale of box office charts and similar “paper machines.” In digital environments, the granularity of measurement, speed of aggregation, complexity of calculation, and specificity of outputs individually tailored to each platform user, all vastly exceed what early chart producers such as A.D. Murphy could have imagined. These cloud-based data practices of audience measurement and tracking have wide-ranging implications on the production, circulation, reception of culture, as examined elsewhere in this volume. My hope is that the above analysis shows that differences between digital and paper-based data practices are of degree, not kind. Looking to these earlier cultural moments and forms allows media and cultural historians to observe inflection points, moments in which the epistemological ground begins to shift. Because these early data practices were not yet widespread, and often occurred in single publications, they offer the benefit of analytic and methodological clarity. They provide resources for reconstructing genealogies of cultural activity, while also deflating narratives emanating from Silicon Valley that fetishize the new-ness of digital culture.

Like most logistical media, box office charts have become so familiar that it is difficult to bring their operations into view. The more familiar an infrastructure or a data practice becomes, the easier it is to assume its universality and ahistoricism, as if it was inevitable or eternal. Scholars have lately become more attuned to these questions, highlighting that all structures of knowledge and all data practices are historically contingent, subject to power asymmetries, and open to revision. As we spend more of our time enframed and thus perplexed by “consumption junctions” (Greenberg 2008; Vonderau 2015) like aggregators, algorithms, recommendations, and play-lists, we might cast our eyes back to learn from the data practices that mediated similar struggles over resources, representation, and epistemology in previous historical moments and media environments.

References

- Acland, Charles R. 2020. *American Blockbuster: Movies, Technology, and Wonder*. Durham, NC: Duke University Press.
- Barnes, Brooks. 2017. "Attacked by Rotten Tomatoes." *The New York Times*, September 7. Accessed August 26, 2021. <https://www.nytimes.com/2017/09/07/business/media/rotten-tomatoes-box-office.html>.
- Biskind, Peter. 1999. *Easy Riders Raging Bulls: How the Sex-Drugs-And Rock'N Roll Generation Saved Hollywood*. New York City: Simon and Schuster.
- Bowker, Geoffrey C., and Susan Leigh Star. 2000. *Sorting Things out: Classification and Its Consequences*. Cambridge, MA: MIT Press.
- Bowker, Geoffrey C. 2005. *Memory Practices in the Sciences*. Cambridge, MA: MIT Press.
- Buckland, Warren, and Christopher Long. 2006. "Following the Money: The Lord of the Rings and the Culture of Box Office Figures." In *The Lord of the Rings: Popular Culture in Global Context*, edited by Ernest Mathjis, 88–98. London: Wallflower Press.
- Case, Judd A. 2013. "Logistical Media: Fragments from Radar's Prehistory." *Canadian Journal of Communication* 38 (3): 379–395.
- deWaard, Andrew. 2020. "Financialized Hollywood: Institutional Investment, Venture Capital, and Private Equity in the Film and Television Industry." *JCMS: Journal of Cinema and Media Studies* 59 (4): 54–84. Accessed August 26, 2021.
- Eco, Umberto. 2009. *The Infinity of Lists*. New York: Rizzoli.
- Elsaesser, Thomas, Alexander Horwath, and Noel King, eds. 2004. *The Last Great American Picture Show*. Amsterdam: Amsterdam University Press.
- Finn, Jonathan. 2016. "Timing and Imaging Evidence in Sport: Objectivity, Intervention, and the Limits of Technology." *Journal of Sport and Social Issues* 40 (6): 459–476.
- Frohmann, Bernd. 2004a. "Documentation Redux: Prolegomenon to (Another) Philosophy of Information." *Library Trends* 52 (3): 387–407.
- Frohmann, Bernd. 2004b. *Deflating Information: From Science Studies to Documentation*. Toronto: University of Toronto Press.
- Gitelman, Lisa, ed. 2013. *"Raw Data" Is an Oxymoron*. Cambridge, MA: MIT Press.
- Goody, Jack. 1977. *The Domestication of the Savage Mind*. Cambridge, UK: Cambridge University Press.
- Goody, Jack. 1986. *The Logic of Writing and the Organization of Society*. Cambridge, MA: Cambridge University Press.
- Goody, Jack, and Ian Watt. 1963. "The Consequences of Literacy." *Comparative Studies in Society and History* 5 (3): 304–45.
- Greenberg, Joshua M. 2008. *From Betamax to Blockbuster: Video Stores and the Invention of Movies on Video*. Cambridge, MA: MIT Press.

- Guillory, John. 2004. "The Memo and Modernity." *Critical Inquiry* 31 (1): 108–132.
- Hakanen, Ernest A. 1998. "Counting down to Number One: The Evolution of the Meaning of Popular Music Charts." *Popular Music* 17 (1): 95–111.
- Havelock, Eric A. 1963. *Preface to Plato*. Cambridge, MA: Harvard University Press.
- Hayes, Dade, and Jonathan Bing. 2004. *Open Wide: How Hollywood Box Office Became a National Obsession*. New York: Miramax Books.
- Hayward, Mark. 2019. *Identity and Industry: Making Media Multicultural in Canada*. Montreal: McGill-Queen's University Press.
- Huber, Alison. 2010. "Making Time Stand Still: How to 'Fix' the Transient Top 40." *International Journal of Cultural Studies* 13 (2): 147–162.
- Jancovic, Marek, Axel Volmar, and Alexandra Schneider, eds. 2020. *Format Matters: Standards, Practices, and Politics in Media Cultures*. Lüneburg: Meson Press.
- Kittler, Friedrich. 2010. *Optical Media*. Cambridge: Polity.
- Kittler, Friedrich A. 1999. *Gramophone, Film, Typewriter*. Translated by Geoffrey Winthrop-Young and Michael Wutz. Palo Alto, CA: Stanford University Press.
- Krajewski, Markus. 2011. *Paper Machines: About Cards & Catalogs, 1548–1929*. Cambridge, MA: MIT Press.
- Lapriore, Elaine. 2003. "Passings." *USC News*, June 18. Accessed August 27, 2021. <https://news.usc.edu/1581/Passings/>.
- Latour, Bruno. 1987. *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, MA: Harvard University Press.
- Latour, Bruno. 1990. "Drawing Things Together." In *Representation in Scientific Practice*, edited by Michael Lynch and Steve Woolgar, 19–68. Cambridge, MA: MIT Press.
- Lauer, Josh. 2017. *Creditworthy: A History of Consumer Surveillance and Financial Identity in America*. New York City: Columbia University Press.
- LeCavalier, Jesse. 2016. *The Rule of Logistics: Walmart and the Architecture of Fulfillment*. Minneapolis: University of Minnesota Press.
- Levi-Strauss, Claude. 1966 [1962]. *The Savage Mind*. Chicago: University of Chicago Press.
- Lord, Albert Bates. 2000 [1960]. *The Singer of Tales*. Edited by Stephen Arthur Mitchell and Gregory Nagy. Cambridge, MA: Harvard University Press.
- Mathijs, Ernest. 2006. *The Lord of the Rings: Popular Culture in Global Context*. New York City: Wallflower Press.
- Mattern, Shannon. 2013. "Methodolatry and the Art of Measure." *Places Journal*, November. Accessed August 27, 2021.
- McLuhan, Marshall. 1962. *The Gutenberg Galaxy*. Toronto: University of Toronto Press.
- Murphy, A.D. 1962. "A Queueing Model of Information Flow in a Command and Control System." M.Sc. Thesis, Monterey, CA: United States Naval Postgraduate School.

- Murphy, A. D. 1968. "Students: Stay out of Hollywood." *Cinéaste* 2 (6): 7–27.
- Nunberg, Geoffrey, ed. 1996. *The Future of the Book*. Oakland: University of California Press.
- Nyckel, Eva-Maria, and Nikolaus Poechhacker. 2020. "Logistics of Probability: Anticipatory Shipping and the Production of Markets." In *Explorations in Digital Cultures*, edited by Marcus Bukhardt and Mary Shnayien. Lüneburg: Meson Press.
- Parker, Martin. 1991. "Reading the Charts – Making Sense with the Hit Parade." *Popular Music* 10 (2): 205–217.
- Parry, Milman. 1930. "Studies in the Epic Technique of Oral Verse-Making. I. Homer and Homeric Style." *Harvard Studies in Classical Philology* 41: 73–147.
- Parry, Milman, and Adam Parry. 1987. *The Making of Homeric Verse: The Collected Papers of Milman Parry*. Oxford: Oxford University Press.
- Peters, John Durham. 1988. "Information: Notes toward a Critical History." *Journal of Communication Inquiry* 12 (2): 9–23.
- Peters, John Durham. 2013. "Calendar, Clock, Tower." In *Deus in Machina*, edited by Jeremy Stolow, 25–42. New York City: Fordham University Press.
- Peters, John Durham. 2015. *The Marvelous Clouds: Toward a Philosophy of Elemental Media*. Chicago: University of Chicago Press.
- Phiddian, Robert, Julian Meyrick, Tully Barnett, and Richard Maltby. 2017. "Counting Culture to Death: An Australian Perspective on Culture Counts and Quality Metrics." *Cultural Trends* 26 (2): 174–80.
- Poovey, Mary. 1998. *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society*. Chicago: University of Chicago Press.
- Reeves, Joshua, and Jeremy Packer. 2013. "Police Media: The Governance of Territory, Speed, and Communication." *Communication and Critical/Cultural Studies* 10 (4): 359–384.
- Robertson, Craig. 2021. *The Filing Cabinet: A Vertical History of Information*. Minneapolis: University of Minnesota Press.
- Rossiter, Ned. 2016. *Software, Infrastructure, Labor: A Media Theory of Logistical Nightmares*. London: Routledge.
- Serres, Michel. 2007. *The Parasite* [1980]. Translated by Lawrence R. Sher. Minneapolis: University of Minnesota Press.
- Shapiro, Aaron Murray. 2018. *Design, Control, Predict: Cultural Politics in the Actually Existing Smart City*. PhD Dissertation. University of Pennsylvania.
- Siebert, Bernhard. 2015. *Cultural Techniques: Grids, Filters, Doors, and Other Articulations of the Real*. New York City: Fordham University Press.
- Straw, Will. 2015. "Mediality and the Music Chart." *SubStance* 44 (3): 128–138.
- Swartz, Lana. 2020. *New Money-How Payment Became Social Media*. New Haven: Yale University Press.

- Taschereau Mamers, Danielle. 2017. *Settler Colonial Ways of Seeing: Documentary Governance of Indigenous Life in Canada and Its Disruption*. PhD Dissertation. University of Western Ontario.
- Thylstrup, Nanna, and Stina Teilmann-Lock. 2017. "The Transformative Power of the Thumbnail Image: Media Logistics and Infrastructural Aesthetics." *First Monday* 22 (10). Accessed August 27, 2021.
- Virilio, Paul. 1989. *War and Cinema: The Logistics of Perception*. Brooklyn: Verso Books.
- Virilio, Paul, and Benjamin H. Bratton. 2006. *Speed and Politics*. Los Angeles: Semiotext(e).
- Vismann, Cornelia. 2008. *Files: Law and Media Technology*. Translated by Geoffrey Winthrop-Young. Stanford, CA: Stanford University Press.
- Volmar, Axel. 2020. "Reformatting Media Studies: Toward a Theoretical Framework for Format Studies." In *Format Matters: Standards, Practices, and Politics in Media Cultures*, edited by Marek Jancovic, Axel Volmar, and Alexandra Schneider. Lüneburg: Meson Press.
- Volmar, Axel and Kyle Stine, eds. 2021. *Media Infrastructures and the Politics of Digital Time. Essays on Hardwired Temporalities*. Amsterdam: Amsterdam University Press.
- Vonderau, Patrick. 2015. "The Politics of Content Aggregation." *Television & New Media* 16 (8): 717–733.
- Wajcman, Judy. 2019. "How Silicon Valley Sets Time." *New Media & Society* 21 (6): 1272–1289.
- Werbin, Kenneth C. 2017. *The List Serves: Population Control and Power*. Amsterdam: Institute of Network Cultures.
- Wernimont, Jacqueline. 2019. *Numbered Lives: Life and Death in Quantum Media*. Cambridge, MA: MIT Press.
- Yates, JoAnne. 1993. *Control through Communication: The Rise of System in American Management*. Baltimore: John Hopkins University Press.
- Young, Liam Cole. 2017. *List Cultures: Knowledge and Poetics from Mesopotamia to Buzzfeed*. Amsterdam: Amsterdam University Press.