The spatial humanities is a new interdisciplinary field resulting from the recent surge of scholarly interest in space. It prospects a ground upon which humanities scholars can collaborate with investigators engaged in scientific and quantitatively-oriented research. This spatial turn invites an initiative focused on geographic and conceptual space and is poised to exploit an assortment of technologies, especially in the area of the digital humanities. Framed by perspectives drawn from Geographic Information Science, and attentive to cutting-edge developments in data mining, the geo-semantic Web, and the visual display of cultural data, the agenda of the spatial humanities includes the pursuit of theory, methods, case studies, applied technology, broad narratives, persuasive strategies, and the bridging of research fields. The series is intended to bring the best scholarship in spatial humanities to academic and lay audiences, in both introductory and advanced forms, and in connection with Web-based electronic supplements to and extensions of book publication.

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LOCATING THE MOVING IMAGE
NEW APPROACHES TO FILM AND PLACE

EDITED BY JULIA HALLAM AND LES ROBERTS

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Mapping the Ill-Disciplined?  
Spatial Analyses and Historical Change in the Postwar Film Industry

DEB VERHOEVEN AND COLIN ARROWSMITH

Making maps is hard, but mapping Guizhou province is especially so. . . . Southern Guizhou has a multitude of mountain peaks. They are jumbled together, without any plains or marshes to space them out, or rivers or water courses to put limits to them. They are vexingly numerous and ill-disciplined. . . . Their configurations are difficult to discern clearly, ridges and summits seeming to be the same. Those who give an account of the arterial pattern of the mountains are thus obliged to speak at length. In some cases, to describe a few kilometers of ramifications needs a pile of documentation, and dealing with the main line of a day's march takes a sequence of chapters.

—GUIYANG PREFECTURAL GAZETTEER (1850)

INTRODUCTION

As part of a broad disciplinary shift from a focus on measuring the value and meaning of cultural artifacts to understanding the import of cultural flows, humanities researchers are progressively turning to other disciplines and disciplinary practices to inform their research. For film scholars, rather than providing a reading of specific media texts and their qualities, there is an increasing focus on the contextual events that shape and formulate cinema practice. This chapter is an example of how cross-disciplinary relationships, for example between cinema studies, geospatial science, statistics, and the creative arts can uncover new research questions and test methodologies across uncharted disciplinary terrain. It also offers an opportunity to reflect on some of the key assumptions around collaborative research, through its reorganization of academic spaces and sites of knowledge.

In the following case studies we examine how films circulate in specific ways, revealing how their itineraries and destinations are equally as significant as the content of a given cultural object. Our focus in this chapter is to demonstrate how different spatial methodologies can reveal the circulatory matrices of film exhibition. Following Jeffrey D. Himpele we use circulation, "as a frame to overcome the misleading bifurcation between political and corporate structural conditions, seen as production, and the cultural meanings within them, seen as consumption." One of the real values of our collaborative study of postwar cinema lies in our exploration of the relationships between the cinemas themselves. In developing our collaboration, however, a series of ancillary questions has also arisen: How tractable is the research landscape of the humanities? How easily can we delineate its disciplinary configurations and confusions? In appropriating and adapting approaches from science-based disciplines, how can we continue to acknowledge and speak of the jumbled, the vexingly numerous, and the ill-disciplined?

Cinema data is characteristically highly complex, heterogeneous, and interlinked. Its use for research requires collaboration not just between previously unrelated disciplines (cinema studies, geospatial science, statistics, information management, computer science, to name a few) but also between career academics and non-academics (such as amateur researchers, curators, collectors, enthusiasts, industry bodies, and policymakers) and between different registers of academic practice (professors and postgraduates for example). Simply recognizing that film industries generate data with a temporal and a spatial element enables the building of connections that can reveal previously obscure influences and relationships. For cinema studies, for example, there is the question of the most appropriate geographical visualization (geovisualization) approaches for portraying and measuring the spatial arrangement of film circulation and cinema location. For geospatial research, on the other hand, there is the question of how we manage time within what is essentially a static technology, namely geographic information systems (GIS). The geographic analysis of micro-historical data, then, has implications for research across both fields.
But at a more fundamental level, these case studies demonstrate how resourceful research configurations built around solving specific problems result in new, contingent sites of knowledge production. In galvanizing teams made up of differently specialized researchers that are problem-oriented, rather than discipline- or program-specific, we are proposing a model for collaboration that is itself mindful of the temporalities of contemporary academic practice. In the words of Mario Biagioli, this model foregrounds "a new and distinct pattern of postdisciplinarity." For Biagioli, modular research practices such as the ones we will outline constitute "neither a family of disciplines, nor a new bud or branch of the tree of knowledge. It is a problem specific collaboration that takes place within a limited temporal window and in places that may have little to do with standard departments and institutes. . . . What matters the most is to maximize the quality of one's skills and to expand their range so as to be able to move from one fruitful collaboration to the next."

Specifically, this chapter will discuss two preliminary studies that link film histories to geospatial science in order to examine spatial influences in cinema history. We are not proposing these cases as exemplars for a newfound disciplinary rapport between the familiar binary distinction "humanities and sciences." Nor are we suggesting that there is an identity crisis underlying every instance in which the contemporary humanities encounter new methodologies. Instead we would like to see these time-specific collaborations as demonstrations of how shared problems can be the catalyst for creative partnerships between different researchers, each possibly motivated for entirely different reasons. These "tactical" problem-based teams do not propose or require institutional recognition to succeed. In fact they most often thrive in the interstitial cracks of research funding regimes or outside the provenance of ordinary departmental and disciplinary administration. They present a formidable challenge to the academy's laborious attempts to administer and streamline research output using commensuration strategies such as discrete "field of research" codes.

Both our case studies are concerned with the distribution and exhibition of films in Melbourne in the postwar period. The first of these builds on previous research into the Greek film circuit in Australia. The second study draws upon a more comprehensive cinema database (Cinema and Audience Research Project—CAARP) to ascertain the key factors that influenced the nature of cinema venues for the period following the introduction of television broadcasting in the mid-1950s in Melbourne. Both studies utilize the analytical tools provided by geographical information systems (GIS) technology to reveal spatial patterns that emerged during the periods of time covered by the research. The studies differ in terms of personnel. The first study, which uses a statistical process referred to as Markov chains to extract patterns of film movement, employed a specialist statistician to model the data. These patterns were then visualized by a creative artist to facilitate the analysis. The second case study draws on research undertaken by a postgraduate candidate and relies on prior research by information management and computer science specialists. Both case studies are excellent examples of how historical cinema data can be expanded through the analysis of spatial arrangement and geography. And both reveal the value of problem-based research for articulating focused collaborative opportunities.

CASE STUDY 1: MARKOV CHAIN ANALYSIS OF GREEK FILM DIFFUSION IN AUSTRALIA

This study investigates whether or not spatial patterns of film movement from one venue to the next existed for the diffusion of Greek cinema in Australia between 1956 and 1963. A Greek "cinema circuit," or sequence of venues, emerged in Australia in the postwar period, coinciding with significant Greek immigration into Australian cities and changes in both the Australian and Greek film industries. It has been anecdotal noted that the patterns of movement of films within the Greek cinema circuit during this period were determined by the provenance of the films, in particular the identity of the production company. We were led to believe that films produced by rival Greek studios were distributed around Australia differently, suggesting the existence of sophisticated practices of market segmentation within the Greek diaspora. We wanted to test whether or not this was the case and, if so, which patterns were statistically significant. These patterns could then be examined by film researchers as a mechanism for extracting information about the latent relationships between Greek film producers and Australian venue operators, patterns that have been, to date, largely noted as hearsay. The rationale for our study was to demonstrate the role of geographic and statistical analysis in under-
standing cinema circuit behavior. For example, why did particular films show in particular cinemas first before moving to another? Did different cinema circuits exist for different film production companies and/or for different film genres? Do these spatial patterns also reveal social delineations? Which geospatial and/or statistical techniques might be gainfully used in micro-historical studies? And, beyond micro-historical studies, can we more broadly ask, how are divergence and discontinuity a factor in cinema history?

For the purposes of pattern extraction in this study we adopted a statistical process referred to as Markov chain analysis. Markov chains provide a powerful technique for analyzing time series events where an initial condition results in a number of alternative outcomes that can be predicted through a probability distribution. For example Xia, Zeephongsekul, and Arrowsmith have adopted Markov chains to show patterns of movements of tourists visiting Phillip Island in Victoria, where different attraction options on the island result in a range of alternative visiting patterns. The graphic representation of film distribution as a Markov chain demonstrates spatial discontinuities (individual venues), the production of temporal divergence (emphasizing the passage of time between screenings), and the multiplicity of simultaneous events (emphasizing synchronous releases). Using Markov chains, we can see graphically how film diffusion (and film history) moves both forwards and sideways at once from a singular point of origin.

We restricted our research period to the years between 1956 and 1963, and two particularly well-known and popular Greek film production companies, Finos Films and Anzervos Films. Between 1956 and 1963 alone some twenty-seven venues made up a thriving Greek cinema circuit throughout several Australian cities at a time when hundreds of thousands of Greeks migrated to Australia. These years are defining ones for the evolution of the Greek film circuit in Australia, as mass migration ensured steady customers and proclivity of film production in Greece ensured steady supply. Reliable data for capital city screenings is available for this period from a single source, the Greek-language newspaper *Neos Kosmos*. It was also during these years that the acquisition of newly abandoned cinemas began and major commercial alliances between rival distributors were developed within Australia and with Greek companies such as Finos and Anzervos. Finos Films was the largest and most successful film production company in postwar Greece, specializing in lavish musicals. Anzervos Films, established in direct competition with Finos, developed a reputation for the production of melodramas.

The specific objective of our research was to establish whether or not there existed distinct cinema circuits for these popular Greek film production companies. This would enable us to evaluate anecdotal assertions that exclusive agreements between venue operators in Australia and Greek film production companies influenced the specific configuration of Greek film diffusion in Australia. The implications of this analysis also propose the significance of social segmentation or ranking within marginal film distribution businesses (who got to see which films first), revealing film circuit behavior as having both spatial and social dimensions. Earlier studies by Verhoeven and Arrowsmith have shown significant spatial correlation of Greek cinema venues to demographic concentration. By interrogating collected data on Greek film diffusion in Australia and extracting statistically valid patterns of movement from one venue to the next, this study offers significantly more granularity in its correlation of spatial and temporal patterns.

For this project a research assistant collected data including film title, production company, date of screenings, and venue name and address, including city of venue. Data was sourced from archival newspaper and oral history research as well as from government records, including censorship documents, and theater license and company records. The data was then stored in a project spreadsheet developed by the research assistant. For valid Finos films, a total of eighteen cinema venues and twenty-nine different films were extracted and transferred to the GIS database. Anzervos provided twenty-four films shown within sixteen different venues. Venues were located via street address or actual GPS recorded locations where street address was not given. For the cinema venues, a letter was assigned from A through W (table 5.1). For each of the films numbered from 1 to 29 for Finos and 1 to 24 for Anzervos, patterns of cinema venues were derived from the dates of screenings. These sequences were then drawn in the form of a tree graph. Sections of these tree graphs are shown in figure 5.1.

For each of the film movements a probability was calculated by an expert statistician. Initial probabilities were calculated for the number of films that commenced at each of the venues (table 5.1 shows frequencies for Finos Films).
TABLE 5.2. Primary and Secondary Key Markov Chains for Anzervos and Finos Film Circuits for Venues in Melbourne and Sydney

<table>
<thead>
<tr>
<th>NUMBER OF VENUES</th>
<th>ANZERVOS</th>
<th>FINOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>2</td>
<td>BC</td>
<td>AD</td>
</tr>
<tr>
<td>3</td>
<td>BCB</td>
<td>BCA</td>
</tr>
<tr>
<td>4</td>
<td>BCBC</td>
<td>BCBA</td>
</tr>
</tbody>
</table>

For subsequent movements of films between venues, conditional probabilities were calculated from moving from one venue to the next venue in the sequence. These probabilities were conditional based on an initial venue being visited first. Patterns of probabilities were determined for each successive movement and the probability of moving along an entire chain (Markov chain) was then calculated. Key Markov chains identified for each of the film producers are shown in table 5.2.

The key difference between pathway patterns for Anzervos and Finos films is in the number of cinemas that films were shown at, which is generally greater for Finos (twenty-nine films screening at eighteen different venues) than for Anzervos (twenty-four films at sixteen venues). The number of different venues at which films were permitted to launch was also greater for Finos (eight) than for Anzervos (six). In addition, there are many more bifurcations for the Finos trees, which indicates that these films were more likely to screen at a greater number of cinemas through the course of their release, while for Anzervos these movements are generally more linear and do not persist throughout a circuit to the same degree. Bifurcation also occurs much earlier in the circuit, indicating that more current films were shown more extensively throughout the Greek cinema network and that the distributors of Finos Films had working relationships with a greater number of film venues.

ANALYSIS

Approaching cinema history from a detailed problem-based approach such as the one outlined above invariably reveals more complexity than answers per se. We were motivated by our findings to ask more detailed questions and to search beyond the data itself for further explanation.
And the emergent shortcomings of our application of Markov chain analysis to cinema data prompted us to adjust and reformulate our techniques as the research progressed. Nevertheless, working with data, and with specialist data researchers, is enormously valuable for cinema historians since it can sanction new readings, recommend new lines of inquiry, and present unfamiliar angles to our accustomed analytical maneuvers and perspectival complacencies.

Analysis of the Markov patterns shows that there was a strongly defined primary release circuit for both Finos and Anzervos films, made up of four venues (two in Melbourne and two in Sydney). This demonstrates that the Greek circuit conformed in principle with contemporary mainstream practices of film distribution in Australia at the time, in which venues were sequentially divided between “first-run” (venues A and B) and “move-over” or “second-run” (venues C and D) exhibition. The analysis clearly shows that only single prints of these films were released in Australia. By regularizing and maximizing first-run release in the separately operated Greek cinema chains or Sydney (venues B and C) or Melbourne (venues A and D) before transferring between cities, the Australian distributors of these films were able to minimize their costs relative to box-office returns. The analysis also challenges aspects of the anecdotal record that propose an exclusive arrangement between Finos Films and Melbourne venue operators; eleven Finos films premiered in Melbourne (in four different venues) but sixteen opened in Sydney (at only two venues) and almost all titles were screened in both cities. The data suggests instead a higher level of commercial cooperation between Melbourne and Sydney venue operators than otherwise supposed. The Melbourne-based film importer Peter Yiannoudes of New World Entertainment has claimed that Finos Films granted his company exclusive rights to distribute their movies in Australia but that from the end of 1958 he established a close working relationship with the Sydney-based exhibitor Chris Louis, whose advantage during this period is attributed to his use of permanent theaters (venues B and C, the Lawson and Doncaster cinemas) rather than “four-walled” occasional venues (such as the Melbourne venues A and D, the Melbourne Town Hall and Nicholas Hall). Melbourne-based Greek film importers did not acquire a purpose-built cinema until early 1962 (Venue J, the National). The data also reveals a sharp distinction between diasporic community cinema circuits and foreign-language screenings at nearby art house cinemas (such as venue H, the Savoy). Celebrated Greek film auteur Mihalis Kakogiannis’s The Girl in Black (To Koritsi Me Ta Mavra) screened at the Savoy some two and a half years before appearing on the Greek circuit and Stella moved over from the art house to popular circuits after almost a year. Only one film moved in the other direction: To Telefuto Pseuma (A Matter of Dignity) opened at the Melbourne Town Hall before moving quickly to the Savoy and then reappearing more than a month later in Sydney at the Lawson.

There are a number of limitations that have been noted with the research methodology so far. First, the small number of records used in the Markov chain determination has not enabled any model validation to take place. Ordinarily data would be randomly selected as “training data” to be used in determining the transition probabilities and “test data” to be used to validate the patterns using a simple statistical test, such as the chi-squared test, to compare the test data against the training data. Second, the original advertisements used to source the database did not always specify exact screening times. This has affected the detail of our analysis because in the case of film titles screening at two venues on the same date, it is not possible to accurately determine which venue should be allocated the first position in the chain. Third, the assumption of “stationarity” was adopted whereby sequential movement probabilities were calculated under the assumption that the probability of moving from one venue to another was the same irrespective of where along the Markov chain it occurred. This is possibly not always the case; the likelihood of a particular one-step transition may diminish as we move further along the Markov chain such as would occur in the case of repertoire screenings.

Finally, future research is required into the representation of temporal lag from one cinema to the next within an individual circuit. Despite absolute timing being implicitly shown in figure 5.1, there is no consideration to the relative time differences (“windows”) between these movements. For example, following the Markov chain sequence BCKC for film 16, we can infer that film 16 commenced its screening at venue B before moving onto C, K, and then back to C. But there is no indication in this figure of the time the film spent at venue B before moving to C, and whether or not there was any delay in that movement. The identification of “clearance periods” is particularly significant for determining the distinctiveness of different forms of a release (e.g., first or second run,
revival, or repertory) in the ordering of a film's movement between venues. It would also enable contextual analysis of film circuit behavior that accounts for the acquisition of new cinemas over time.

To address these concerns and the evident limitations of our previous attempts to represent film circuit movement, we undertook preliminary visualization of the temporal lag in Greek cinema Markov chain analysis using the visual metaphor of olive trees (in reference to the Greek nature of the data). Markov chains are sometimes referred to as "trees," which they resemble when tilted ninety degrees. In this visualization, the lengths of the tree's branches correspond to the length of interval between screenings at consecutive venues (see figures 5.2 and 5.3). The olives convey the city in which films finished (where light gray is a Sydney venue and dark gray a Melbourne venue). The leaf color indicates the location of screenings (pale gray is Queensland, light gray is New South Wales, darker gray is Victoria, dark gray is South Australia). The branch length is days between screenings and is drawn to scale. A bushy tree indicates a generative venue from which many films are launched into the circuit (see figure 5.3). A sparse tree with few branches and olives indicates a venue lower in ranking that seldom launches films (see figure 5.2). In the case of Melbourne Town Hall (figures 5.2 and 5.3) we can immediately see that there was a privileged relationship between this venue and a particular type of film, namely high-budget films produced by Finos rather than the films of the rival studio Anzervos. In one glance, these images suggest that the Greek film circuit used deliberative strategies of segmentation, linking particular films to particular venues in order to create distinct market differentiation.


Like the first case study, the second case study also demonstrates the value of spatial analysis, data mining, and visual representation in historical cinema studies research. This study investigates the changing nature of Melbourne cinema venues in a turbulent period for the industry. In particular, it examines the spatial arrangement of various changes to film
venues, including seating capacity, screen numbers, management and ownership, and the primary purpose of venue as well as times and locations for the opening and closing of venues. And like the Greek cinema circuit exemplar, this case study combines spatial, historically temporal, and multivariable data to explore the geographic patterns of cinema operation and influence in the postwar period. This study developed research inquiries prepared by a PhD student, a cinema historian, and a geospatial scientist, and it relied on technical assistance from a GIS specialist.

The postwar years are usually characterized as a period of arbitrary or wholesale cinema decline. According to one influential Australian study, "What the trade found hardest to accept was that the closings were indiscriminate." Using spatial analyses within GIS, we have been able to demonstrate through proximity analyses and clustering techniques how changes to the various facets of cinema venues have not been random, and we have been able to identify which variables might explain the survival of cinemas in particular locations.

Throughout the period of analysis, there were more than 200 cinema venues in operation. There is a decrease in total cinema venue numbers from 181 in 1950 to 117 in 1970 (an overall decrease of around 35 percent in twenty years). This decrease, however, has not been uniform with respect to time. While only fourteen closures took place from 1950 to 1954, this increased to forty-eight closures from 1955 to 1959 and fifty-three in the period from 1960 to 1964. These figures challenge conventional historical accounts of cinema exhibition in this period, which claim that 33 percent of Melbourne venues had closed as early as 1959. In addition, our geographic study has also shown that the occurrence of closures corresponds to a particular geographic pattern.

Figures 5.44 through 5.4h show a sequence of geographical distributions for cinema openings and closures for the twenty years between 1950 and 1970. For 1950 to 1954, openings can be seen extending outwards from the Melbourne central business district (CBD) in an easterly direction, extending in some cases up to and beyond fifty kilometers. These openings tend to follow urban growth during this period with new suburbs being developed up to twenty kilometers from the CBD along primary arterial roads.

During 1955–59 openings extend toward the newly developing western and northern suburbs. Linear patterns indicate location along key
arterial roads. Closures are extensive but again are concentrated within twenty kilometers of the CBD toward the southeast. These patterns are replicated in 1960–64, with substantially fewer openings for this period but again concentrating along one arterial road passing through the northern suburbs of Melbourne. By 1965 to 1970 we see significantly fewer closures particularly in the southeast suburbs and comparatively greater numbers of openings throughout Melbourne.

**ANALYSIS**

Contextual analysis typically associates the increase in velocity of cinema closures with the introduction of television to Melbourne in November 1956. Commentators frequently and explicitly attribute the decline of cinema businesses to the arrival of television from the mid-1950s to the early 1960s. Certainly, Melburnians were particularly enthusiastic early adopters of television. In 1956, 5 percent of households in Melbourne possessed a TV set compared to only 1 percent in Sydney. According to cinema historian Diane Collins, by 1957 the number of set owners in Melbourne had risen to more than 25 percent, by 1959 to more than 50 percent, and in 1960 (only four years after the inaugural broadcast) to more than 70 percent. For Collins, “in the end it was in the suburbs and in country towns that television had an almost fatal impact.” For cinema historian Trevor Walters, the connection between the introduction of TV and the closure of suburban cinemas is also obvious:

Television took away the majority of suburban theatre pictures in only a few short years. Some fell instantly with the white flag waved immediately. Why bother fighting an unwinnable war was the cry from many a theatre owner out in the suburbs? Even then the cinema companies could not be jolted into any action that required spending money to modernise their theatres and make them a more attractive alternative to staying at home watching television. Instead of planning for the future and redesigning their theatres, it was lock the front door and sell everything.

For Walters, television is the catalyst for venue change, but some of the responsibility also lay with theater owners. And so there might be other explanations the data could also support. For example, specifically analyzing the evident survival of prestigious city-based venues at the expense of local, suburban theaters can provide further insight.
In the very early 1960s, as the pace of venue closures accelerated, the larger cinema chains initiated a policy of “splash” releasing (opening films in the city and at select suburban venues simultaneously), a practice that had a particularly deleterious effect on the independent suburban cinemas, which were restricted to screening films only at the conclusion of their city release. This practice ensured that unlike previous periods of significant cinema closure such as during the 1930s economic depression, city cinemas would be more durable than suburban and rural venues.

It is also possible that the various measures by which some businesses chose to bolster themselves before the arrival of TV had just as much impact as television itself. For Diane Collins, the sad passing of suburban cinemas was in part the result of competition between city and suburban venues and was already indicated by declining attendance at the cinema in the late 1940s and early 1950s:

Television was in much more direct local competition with the local flocks than with those special occasions when people went to town to see a big first-release film. ... On the way to this big night out families and dating couples passed the old neighbourhood cinema, its awning now advertising butcher shop specials. As there was nothing to take its place as a community facility — the venue of countless charity appeals and school speech days— passers-by momentarily regretted their defection. But as the doors of the Boomerangs, Odeons, Royals and Magnets closed, it seemed obvious that television had killed the cinema. The truth was that when television became monarch of the living room, the movies’ reign had long since ended.25

In the early 1950s, cinemas experimented with new business practices that emphasized the prestige “event” of cinema attendance (such as showcase releasing) and that progressively drew audiences away from the suburbs into more luxurious city venues. Following the example of U.S. exhibitors, who were already grappling with the arrival of television, they also introduced new wide-screen exhibition formats designed to enlarge the cinema experience. This is especially apparent if we look at the data for seating capacity changes, which reveals that the balance of change was weighted in the pre-television years and was not a rejoinder to the introduction of television.

Years before the arrival of television, many cinema businesses began installing expensive wide-screen formats. Cinemascope arrived with fanfare in Melbourne in December 1953. Other formats came later. Melbourne’s first Cinerama screenings were post-television (December 1958), and within the year 70 mm had also arrived. These technologies usually required the removal of venue seating to accommodate the expanded screens and projection facilities necessitated by the new formats. For example, the Plaza cinema was reduced from 1,253 seats to 865 when it installed Cinerama. The Esquire went from 1,526 to 1,125 seats when it adopted 70 mm. But as Trevor Walters has noted, “By the time television started, Cinemascope films were old hat as far as audiences were concerned, and were no longer a novelty factor to entice patrons along.”24 Here Walters suggests that the pace of change in cinema technologies is more relevant to the introduction of television in the U.S. than locally and is mistimed in terms of its impact on the sustainability of local businesses.

In reading the seating capacity changes in relation to the venue closure data we can see that suburban venue operators frequently chose to close rather than undertake expensive renovation of their theaters. Taking into account the organization of cinemas into chains reveals that venues associated with the dominant Hoyts cinema chain are particularly unlikely to have survived from 1950 until 1970. Those Hoyts cinemas that continued were the ones that experienced some form of change to their operations, such as adding a screen and/or decreasing seat capacity. Greater Union cinemas, on the other hand, changed more readily and experienced, on average, a longer life span than Hoyts venues.25

What is also revealed in the data and underanalyzed in accounts of cinema operation in this period is the occurrence of cinema openings. Openings in some suburban areas can be attributed to the construction of drive-ins. As drive-ins required about 5.5 hectares, they are not located in cities and inner suburban areas. The first Australian drive-in opened in the east Melbourne suburb of Burwood in February 1954 (again, prior to the introduction of television in Melbourne). Construction of drive-ins also appears to have had a negative impact on other suburban cinema venues. For George Ivanoff, the widespread construction of drive-ins through the suburbs (in 1968 there were twenty within the Melbourne metropolitan region) was especially influential on hard-top cinema decline: “The introduction of the drive-in into Australia, two years prior to the coming of television in 1956, had an adverse effect on conventional cinema attendance.”26
The proliferation of drive-ins and the changes they wrought on the film industry are also indicative of other events, such as the rise of car ownership. As noted by Ivanoff, transportation was also a major issue in the location of cinemas during this period. Between 1947 and 1954 Melbourne's motor registrations trebled. In its ready embrace of car culture, Melbourne also became an automotive manufacturing center. In 1948 Australia's first locally made car was produced at Fisherman's Bend (to the immediate south of the Melbourne central business district), with a succession of new factories opening in the suburbs of Dandenong (southeast of Melbourne) (1956), Lang Lang (toward Gippsland approximately seventy-five kilometers southeast of Melbourne) (1957), Broadmeadows (north of Melbourne) (1956), and Westall (to Melbourne's southeast) (1959). In 1950 the government abolished gasoline rationing. Increases in car ownership meant the proximity of a cinema to a major road was just as important as its proximity to demographic concentrations. Major thoroughfares such as Whitehorse Road (to Melbourne's east) and the Nepean Highway (to Melbourne's southeast) featured multiple cinema openings during this period.

In addition, the introduction of the forty-hour week in 1948 prompted widespread diversification and dispersal of the locations in which Melbournians spent their spare time including new suburban commercial centers, race courses, suburban swimming pools (inspired by the 1956 Melbourne Olympics), bowling alleys, and even bingo halls. Also important was the development of road-based tourism destinations. Between 1957 and 1963, the number of regional motels in the Melbourne hinterland grew from 7 to 122. All this additional contextual information strongly suggests that further detailed study of the impact of rival attractions in relation to the road network (particularly major arterial thoroughfares) and their impact on the location of cinema closures is warranted.

CONCLUSIONS

Recent years have seen the widespread application of spatial analyses to non-traditional fields of study. These "new geographies," sometimes described as the "spatial turn," have resulted in collaboration between researchers from disparate disciplines. In this chapter we have presented two case studies derived from a cross-disciplinary research project based around the use of different techniques for understanding spatial patterns in the postwar Australian film industry. In the first study we applied Markov chain analysis to the Australian distribution of films produced by two different Greek film companies, Finos Films and Anzervos Films. In undertaking further research using this approach we intend to expand our data set and explore the effect of time lag on these movements. In the second study we used an existing information database (CAARP) and linked cinema-specific data to location in an effort to ascertain spatial patterns within the extensive industrial changes that occurred in the postwar period. The preliminary outcomes of this study suggest that by analyzing venue attributes in various combinations we can produce a more accurate picture of change in a notoriously volatile era for film industry businesses. While Case Study \(1 \) concentrated on the analysis of film movement from one venue to another, it highlighted the temporal and sequential nature of this movement within a cinema circuit. Case Study \( 2 \) concentrated on the geographic distribution of cinema operations (including opening and closing and seat capacity) in Melbourne throughout the 1950–1970 period and highlighted an increasing spatial concentration of closures in the period.

Both studies reveal the geographical significance of historical events and demonstrate the manifold benefits of a cross-disciplinary approach, pointing to the collaborative opportunities afforded by focused attention on specific research problems. In practice, they revealed some immediate challenges for our research, particularly around the availability (and therefore attendant cost), quality, and scale of data required for these small, intensive research inquiries. They are also suggestive of future challenges for establishing cross-disciplinary inclination in research. This is particularly so for the ways we currently organize research training in the humanities both at undergraduate levels (which is invariably discipline-specific) and at postgraduate levels (where it is obdurately oriented to monolithic, singular outcomes rather than a multitude of short-term tactical achievements). Finally, the evident expansion of methodological possibility that results from the introduction of data analysis in humanities research also suggests broader questions. For example, to what extent is the humanities' inclination for finding further complexity rather than definitive answers an opportunity or an insurmountable challenge for other disciplines? Is the convention of serendipitous discovery in the
humanities necessarily at odds with research practices that rely on procedures of logic, consistent application, and measured behavior? As the Guiyang Gazetteer quoted at the outset observes, to speak adequately to these questions will take nothing less than a sequence of chapters (and a pile of documentation).

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NOTES

The epigraph is from Guiyang Prefectural Gazetteer (1830), cited in Mark Elvin, The Retreat of the Elephants: An Environmental History of China (New Haven, Conn.: Yale University Press, 2004), 256.
3. Ibid.
6. D. Verhoeven, "Twice Born."
10. P. Yannioudes, Greek Cinema across Australia (Melbourne: Peter Yannioudes, 2010), 107.
13. Yannioudes, Greek Cinema across Australia, 22, 30, 49.
17. Ibid.
21. Ibid., 231.
22. T. Walters, The Picture Palaces of Melbourne (Melbourne: Walters, 2009), 244.
24. Walters, The Picture Palaces of Melbourne, 139.
27. Ibid., 150.