

Cartographic Perspectives

Journal of the
North American Cartographic
Information Society

Number 72, 2012

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Cartographic Perspectives

Journal of the
North American Cartographic
Information Society

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ISSN 1048-9085

www.nacis.org

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LETTER FROM THE PRESIDENT

I am very proud to preside in these auspicious times for NACIS. We are riding high on the momentum of two successive annual meetings with record-setting attendance and participation. And not just at the meetings, maps are at an all-time high in relevance and utility in our daily lives too. In this Age of Utility, it is ever so important that we as a society continue to facilitate map accessibility, practice map aesthetics, and educate geoprofessionals and the public in graphic literacy. I will champion this mission in leading the initiatives planned before me by the outstanding leadership from recent past-presidents Erik Steiner and Tanya Buckingham. Their groundwork in outlining procedures and pioneering knowledge-continuity tools has created an unprecedented atmosphere for productivity. In the coming year, your board of directors will help me work toward broader stability for NACIS and added benefits to you, our members.

We will continue to modernize and integrate the three primary conduits of the NACIS body; Membership (nacis.org), Study and Practice (*Cartographic Perspectives*), and our Public Forum (cartotalk.com). Very soon work will begin on modernizing the design of the nacis.org website to more centralize all our member activities and benefits. *Cartographic Perspectives* (CP) recently lead the modernizing charge with making recent volumes open-access. In the near future, all back issues of CP will also be available in this form. The most recent leader in modernizing NACIS is Cartotalk. Not only has the forum gotten a facelift, but functional enhancements were made to the management toolbox as well.

On the nearest horizon is a call for nominations. I am pleased to be serving during the inaugural year of the *Corlis Benefideo Award for Imaginative Cartographies*. The award's namesake pays homage to an enviable, cartographic talent in Barry Lopez's short story "The Mappist." Since we are a collective of map professionals, it only seems natural that we acknowledge others for their contributions to our profession. Please contemplate the creative cartographic influences in your life and who is responsible for them. Please visit the NACIS website to learn more or send nominations directly to cb@nacis.org.

At the recent annual meeting in Portland we unveiled the *Atlas of Design*. The brainchild of Tim Wallace and Daniel Huffman, this first edition was well-received

and wildly successful in that we sold out at an unanticipated rate. Reprinting a second edition of this first volume will happen soon, and the discounted price is one of the membership benefits that we intend to continue. Such success encourages us and, we hope, future volunteers to help publish subsequent volumes in the years ahead.

All the while our charge of producing a quality annual meeting will always be purposeful. In particular, this year's program in Greenville, South Carolina will be the first one produced using dual program chairs in the vice president and vice president-elect. Such reinforcement will add resources and creativity that will provide you with the eventful conference opportunities you have come to expect. I anxiously look forward to seeing you there no matter which side of the microphone you choose.

All of these initiatives, and more, would not have been possible without the perpetual energy of volunteers that NACIS attracts and fosters. Most of this enthusiasm is typically directed internally. The last part of the NACIS body that I will address is the outstretched hand of each member. Outreach is an often overlooked part of our busy lifestyles. You will be surprised at how much easier public speaking becomes when you, the map expert, repeatedly talk about the things you know best, maps. Personally, I seek out opportunities to educate others about what I do. From Rotary Clubs, to Soroptimists, to Cub Scouts, to grade schools, to university classrooms, there are multitudes of gatherings to tell people about what you do and why it matters. The artifacts of our professions are interesting to most, and even more so once you contribute your cartographic perspective. My own challenge in the next year is to keep NACIS on the upward path by managing your elected volunteers on the board of directors. To further help us, my challenge to you is to reach out to some organization in your community by volunteering to talk about your profession. Not only will you have bridged the gap between your profession and your community, but you will also have bridged the gap between being just a part of a society and taking an active role in shaping it.

In Maps We Trust,

Neil H. Allen

Mapping Potential Metro Rail Ridership in Los Angeles County

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ABSTRACT

Los Angeles County, like many metropolitan areas, is coping with increasing street and highway traffic. Public transit, and particularly rail, often is regarded as a strategy to help reduce urban traffic congestion, especially in these times of economic downturn, rising gas prices, pollution, and growing awareness of global climate change. The objectives of this paper are to identify the potential ridership and current utilization of the Metro Rail system of Los Angeles County using the process of "Trip Generation," a travel demand forecasting model, and to present the results of the Trip Generation analysis in the *Atlas of Potential Metro Rail Ridership* to support visual planning about public transit. The potential ridership produced and attracted to each station was estimated using Origin-Destination (O-D) flow patterns from residential and employment regions. Estimation of the number of potential riders accessing the Metro Rail system involves a spatial analysis of the location of current Metro Rail stations serving populations in a reasonable access time by walking. Service Area Zones (SAZ) then were delineated and mapped to indicate the areas that the potential riders could be served by existing stations within a ten minute walking interval. The potential ridership was measured to be approximately one million, a figure ten times larger than the present level of Metro

Rail utilization. The analysis results across stations were compiled into the *Atlas of Potential Metro Rail Ridership* for the purpose of ridership promotion, system forecasting, and service planning.

KEYWORDS: Transportation, Spatial Analysis and Modeling, GIS, Cartography, Urban

INTRODUCTION

Los Angeles County is internationally known as an automobile-oriented region. Residents living in the area are accustomed to the convenience of freeways and the independence provided by automobiles. Like many metropolitan areas, Los Angeles County is struggling to control increasing street and highway congestion. Public transit such as metro rail is an increasingly attractive strategy to reduce traffic congestion in cities with high levels of automobile dependency, but so far has seen minimal success in Los Angeles County due in part to its deeply ingrained polycentrism, or urban structure of multiple, poorly connected economic centers. The Metro Rail system is the mass transit rail system in Los Angeles County and is run by the Los Angeles County Metropolitan Transportation Authority (LACMTA). It was estimated that 100,000 riders access the system by walking, based on the figures of the 2006 On-Board Survey records. As of June 2011, the system encompasses 79 route miles, serving 70 stations, with an average weekday boarding of 300,000 riders (LACMTA 2011 (Figure 1)).

The objectives of this paper are to identify the total potential ridership within walking access to the Metro Rail, and the current level of utilization therein, as well as the visual presentation of ridership access in the *Atlas of*

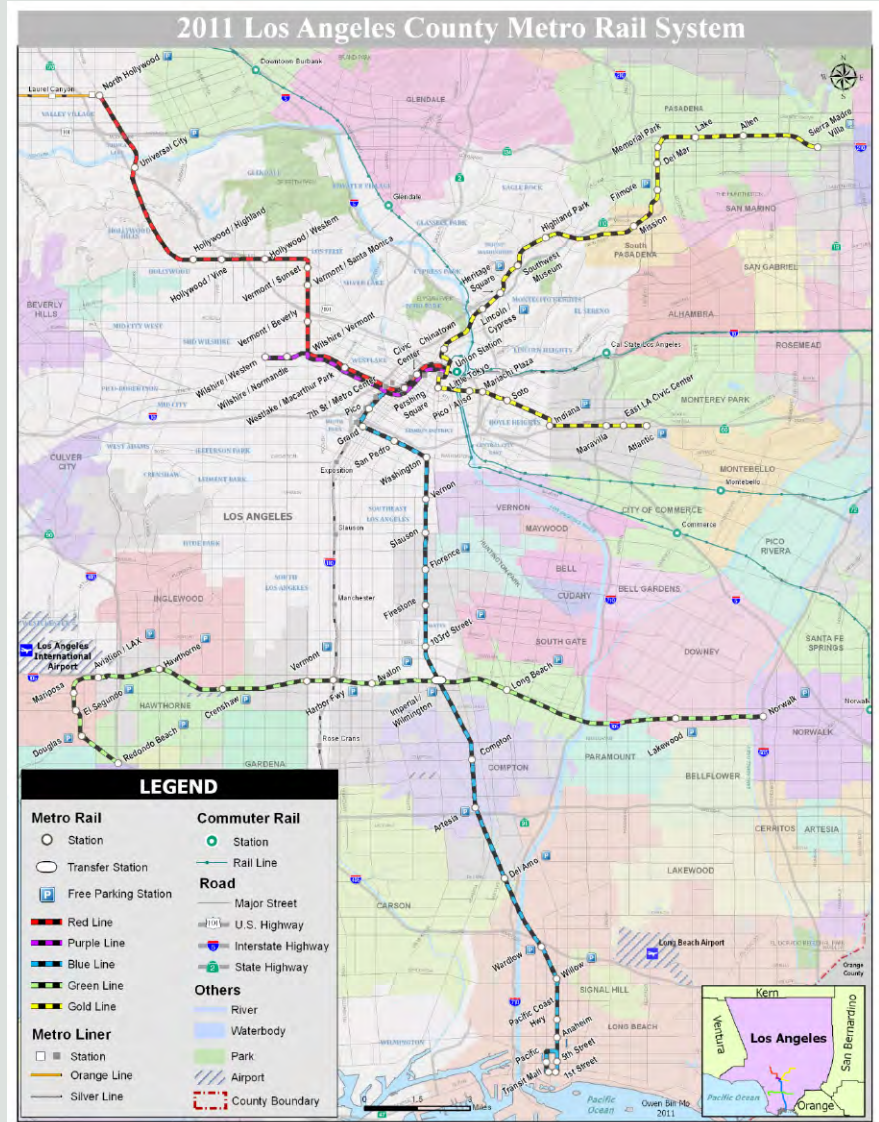


Figure 1. Map of 2011 Los Angeles County Metro Rail system.

Potential Metro Rail Ridership. To determine the potential ridership, a spatial analysis was completed to delineate Service Area Zones (SAZ) in which riders could access a station within a reasonable amount of time spent walking (ten minutes). Subsequently, the results were compiled into the *Atlas* for visual support of ridership promotion, system forecasting, and service planning; the *Atlas* is available for download at the *Cartographic Perspectives (CP)* website. The article proceeds with four additional sections, which include a background, a description of the analysis method, an overview of the analysis and mapping results, and a conclusion.

BACKGROUND

Research has found that the spatial accessibility (i.e., travel distance and travel time) to a transit connection point is the primary determinant of transit use (Murray et al. 1998; Beimborn et al. 2003). Walking access is expected to have an important role in supporting service improvement planning by increasing accessibility and potential ridership levels. The concept of Origin-Destination (O-D) flow is fundamental to forecasting potential ridership and its relationship to pedestrian access. Cartography is the generation of maps for the analysis, recognition, and prediction of spatial phenomena. The subsequent subsections treat the topics of walking access, O-D flow, and how spatial phenomena are represented cartographically in public transportation analysis.

WALKING ACCESS

The term “access” regarding public transportation refers to the ability to make use of the transit system, a process associated with riders arriving to and departing from the services of the Metro Rail system. Access often is perceived in spatial terms based upon physical proximity to the service and associated cost in traveling to the service. Access to public transit also is influenced by socioeconomic components such as income, vehicle ownership, and family size. As public transit is the most economical transportation option in Los Angeles County, socioeconomic characteristics are not considered in the following analysis. This analysis instead focuses on travel distance and travel time as the main measure of accessibility, with a specific emphasis on walking.

The choice of transportation mode for traveling to a transit station impacts the transportation management policy of an urban area. The primary form of accessing the Los Angeles Metro Rail system is by walking, with 52% of inbound riders traveling to the station by foot (Mo 2009). The percentage of walkers is higher for outbound riders of the Metro Rail system, as approximately 80% of outbound riders walk from a station to their final destinations (LACMTA 2006).

Ensuring suitable service coverage is a worthwhile objective, as the time taken to reach a station has a major impact on total travel time, which influences

potential ridership (Murray et al. 1998). It is very important to know how much time Metro Rail riders are willing to walk, so that the effective service area of a transit station can be identified. AASHTO's (American Association of State Highway and Transportation Officials) walking guideline was applied for analyses of walking access to the San Francisco Bay Area Rapid Transit (BART) stations and Light Rail Transit (LRT) stations in Edmonton, Canada. In general, areas within approximately five minutes walking time (at three miles per hour) are considered "well-served." Areas within approximately ten minutes' walking time are considered "served" (O'Neil et al. 1992; O'Sullivan et al. 1998). Beyond walking access, taking the bus, driving, and riding bicycles constitute other alternative access modes for people using metro rail.

FORECASTING ORIGIN AND DESTINATION POTENTIAL RIDERSHIP

Transportation forecasting is the process of estimating the number of people or vehicles that will use a specific transportation facility in the future. The Four-Step Travel Demand model is a well-known tool for forecasting future demand and performance of large-scale transportation systems (TCRB 2006; SCAG 2008; MWCG 2010). *Trip Generation*, the initial step in the Four-Step Travel Demand model, is applied to forecast potential ridership in Los Angeles County.

Trip Generation predicts the number of daily rider trips originating from or destined for a given region (TCRB 2006; SCAG 2008; MWCG 2010). Origin and Destination (O-D) constitute the two "ends" for each trip, which are the portions on the journey between two activities. The potential ridership produced from and attracted to each station is estimated using assumptions derived from residential and employment characteristics (Figure 2).

Origin ridership analysis focuses on residences. Typically, people start from home in their first trip. Residential population information is considered to be the most basic form of information about the travel patterns of a region. The number of potential riders is measured within the service area to calculate the possible number of trips using the transit service that could be made from the home to work, shopping, school, social, recreational, or other kinds of places.

Destination ridership analysis concentrates on employees. Employment regions are important local trip destinations where employees may utilize transit services. The actual or projected employment in an area determines the number of home-work trips that attract riders from the original areas (SCAG 2008; MWCG 2010). The more employment within an area, the more potential riders can be generated.

Destination ridership analysis also emphasizes trip attractors other than the workplace. Typically, trip attractors are concentrated in and around major employment centers such as shopping malls, commercial retail centers, and hospitals, while trip origins are spread across a wider geographical area. Understanding the trip attractors in Los Angeles County becomes very important, particularly when estimating the Metro Rail potential ridership.

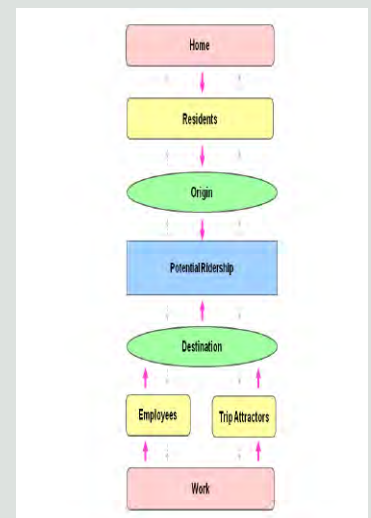


Figure 2. Potential Ridership
Generation of O-D Flow.

The variety of trip attractors in Los Angeles County were identified through the regression coefficients for the trip attraction models employed in the year 2003 SCAG Regional Travel Demand Model. This model related the number of trip attractors to the number of employees working in different sectors of the employment region, including retail (for example, one employee leads to 4.678 trips), public administration (3.439), other services (3.303), art and entertainment and food (3.136), education and health (0.698), professional services (0.25), and information (0.227). The retail services have the highest rate of attractions due to the large number of customers drawn to department stores, supermarkets, and other daily-use facilities. Excluded for analysis were: Employees working within the transportation sector, facility maintenance and operations, construction, agriculture, fire protection, manufacturing, and the wholesale food processing industries. All of these have very little chance of attracting clients specifically to their workplace on a daily basis in the Los Angeles area.

The geographic locations of major residences and employment can be used to establish a need for a transit service. Based on the concept of O-D flow analysis, forecasting potential ridership can be provided by aggregating measurements of residents, employees, and trip attractors. Estimating the potential ridership generated from residential and employment areas served by Metro Rail stations is beneficial for transit planning, marketing, and system expansion.

THE USE OF CARTOGRAPHY IN PUBLIC TRANSPORTATION ANALYSIS

The cartographic method is to use various combinations of the procedures for analyzing and processing maps based on the rules of spatial arrangement of phenomena and their interrelationships, dependence, as well as development. A *cartogram* is a map in which the size of each entity is proportional to some value associated with the entity (Campbell 2001). Cartograms not only came to define how transit maps were produced but also have potentially limited our

ability to map transit systems even more effectively.

Best known as a linear cartogram, the London Underground Tube map created in 1933 by Harry Beck (Figure 3) has been widely adopted for other network maps around the world, according to London's Transport Museum. A *linear cartogram* displays a network in a way in which the length of a connection is related to certain characteristics of the connection. This linear cartogram concept shows not necessarily the geographic location but rather that of where a place is topologically. For example, Beck's map represents a subway



Figure 3. London Underground Tube map designed by Henry C. Beck in 1933.

station with a dot, which does not resemble the actual station at all but rather the relative position of a station along the route. Station connections are related to one another, and different fare zones, via color-coded lines connecting all of the related route stations via vertical, horizontal, 90-degree, and 45-degree angles. As a result, information is provided to the viewer without unnecessary visual clutter. The map quickly became popular because the metro railway ran mostly underground and therefore the physical locations of the stations were irrelevant to travelers wanting to know how to get to one station from another.

The later application of this approach to the New York subway system map was, however, met with a different reaction. Not long after Mr. Massimo Vignelli's version was released in August 1972, complaints arose (Heller 2010; Rawsthorn 2012) (Figure 4). Vignelli's version included some geographical references—for example, outlines of Central Park and the boroughs—but many New Yorkers were outraged by what, to them, was a misrepresentation of their city. Tourists struggled to relate to Mr. Vignelli's design, for what they had witnessed above ground was completely different to that of the map. The geographic accuracy of the subway was done away with in order to show a clean interpretation of New York's puzzling underground lines, which located many of the stations in the wrong places. White geometric shapes were used to reduce the boroughs. Conventional topographic details including streets and parks were eliminated. The color beige, instead of blue, was used to picture the waters surrounding the city, which was even more radical. A dull gray was used to depict Central Park, whose geometry and size were also presented in unconventional fashion (Rawsthorn 2012). The eye of the beholder was forced to see only the essentials for the simplified map that looked less like a traditional map and more like a schematic depicting electronics. The public failed to recognize it as the map did not cater to their needs; it seemed the linear cartogram concept was ahead of the time. Finally the M.T.A. bowed to the public by replacing the map, in 1979, with a geographical one—reintroducing all the basic map conventions including blue water, and most important, the New York City street grid. The revision of the 1998 map contained more information, including alternate bus services and free transfer points, as well as more emphasis to the size and color of the lines, and route numbers. Considered as a more cheerful map by the public, the newly revised subway map for New York City was released in June 2010. To assure a more simplified navigation system, the map has a user-friendly appearance and brilliant colors (Figure 5).

Making a meaningful map is the ultimate goal of cartographers. The desired goal is to allow map readers to extract and analyze information from the represented spatial data. Both subjective decisions and complex data modeling tasks are involved in the design of a map. This article searches alternative visualization methods of metro rail transit in Los Angeles County to see what enables us to extract and analyze information about current and potential ridership.

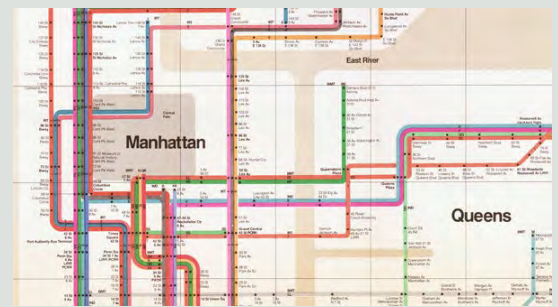


Figure 4. New York Subway Map designed by Massimo Vignelli in 1972.



Figure 5. New York Subway Map released by MTA in 2010.

METHODS

The following section describes the spatial analysis procedure used to apply and enhance the Trip Generation technique for estimating the potential ridership of Los Angeles County. The description is organized into four subsections: (1) Network Analysis, (2) GIS Program Procedures, (3) Integrated Potential Ridership, and (4) Atlas Compilation.

NETWORK ANALYSIS

Geographic Information Systems (GIS) technologies have proven to be a valuable transportation management and modeling platform, due to the ability to model linear and network features within the system, whether it is the assessment of broad-scale regional policies or linking specific capacities (Nyerges 1995; Biba et al. 2010). Network analysis is the technique used to calculate and determine the relationship and locations of network facilities in transportation, utility, and communication systems. The network analysis method employs a reasonable network of functionality to determine travel time to transit facilities. The network analysis method increases spatial precision because it distributes spatial analysis along a linear length, rather than across the entire region; therefore, there is less chance of overestimating the ridership compared with the buffer method (O'Neill et al. 1992).

Routing, districting, and allocations are the three advanced applications of network analysis (Briggs 2009). Routing finds the shortest path between two points, such as locating hotels from an airport. Districting expands the study area along a network until one or more criteria (time, distance, or object count) is reached, and then defines a districting plan for services like voting, schools, policing, or fire protection. Allocation assigns locations to the nearest center based on the travel time or distance through a network.

Performing the network analysis requires four steps computationally, several of which have sequential sub-processes (Figure 6). The first step is the building of a road network from which riders in each census block group have access to the Metro Rail stations. The second step is calculation of travel time in minutes from all road segments linking home or work regions to Metro Rail stations. The length of each road segment was calculated in feet and three miles per hour is assigned as the average walking speed. Single walking time measurement of ten minutes for all individuals in each area was applied. The third step is delineating and mapping Services Area Zones

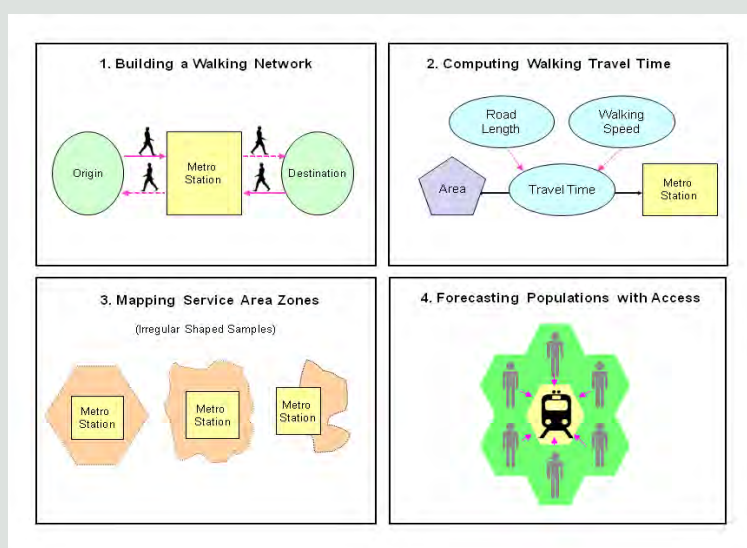


Figure 6. The procedure of Network Analysis method.

(SAZs), or contiguous areas within which potential riders could walk to a station in ten minutes or less. The final step is analysis of the populations with transit access, which includes four sub-steps (Figure 7): (a) identifying census block group overlapping with each SAZ; (b) computing the total population of the overlapping block groups, (c) calculating populations for each portion of the SAZ based on the geometry method ratio (total population of an SAZ = the area of an SAZ / the total area of a census group * the total population of a census group), and (d) uniting all portions of the SAZ to form the population estimate.

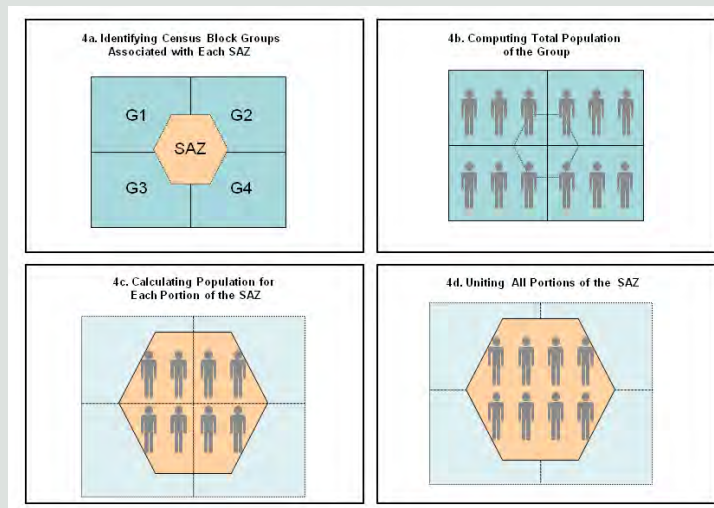


Figure 7. The sub-steps of forecasting population with access.

GIS PROGRAM PROCEDURES

The above spatial analysis was completed using the Network Analyst extension and other functionality provided in ArcGIS 10. TIGER/Line shapefiles are the essential data layers used for GIS network analysis, which were spatially extracted from the U.S. Census Bureau's MAF/TIGER database and the Thomas Brothers GIS Graphics Files, a private company with proprietary geospatial information sets; the pair of information sources included datasets for roads, railroads, rivers, legal boundaries, and statistical geographic areas. The GIS processing involved numerous steps and intermediate database captures, including preparing data, defining spatial reference systems, matching demographic data with GIS data layers, calculating traveling time for road segments, building a network dataset, mapping SAZ, and computing potential ridership; the complete GIS program procedure for analyzing potential Metro Rail ridership is pseudo-coded in Figure 8.

INTEGRATED POTENTIAL RIDERSHIP

Based on the O-D flow pattern, the potential ridership of each station is integrated with the geographical location

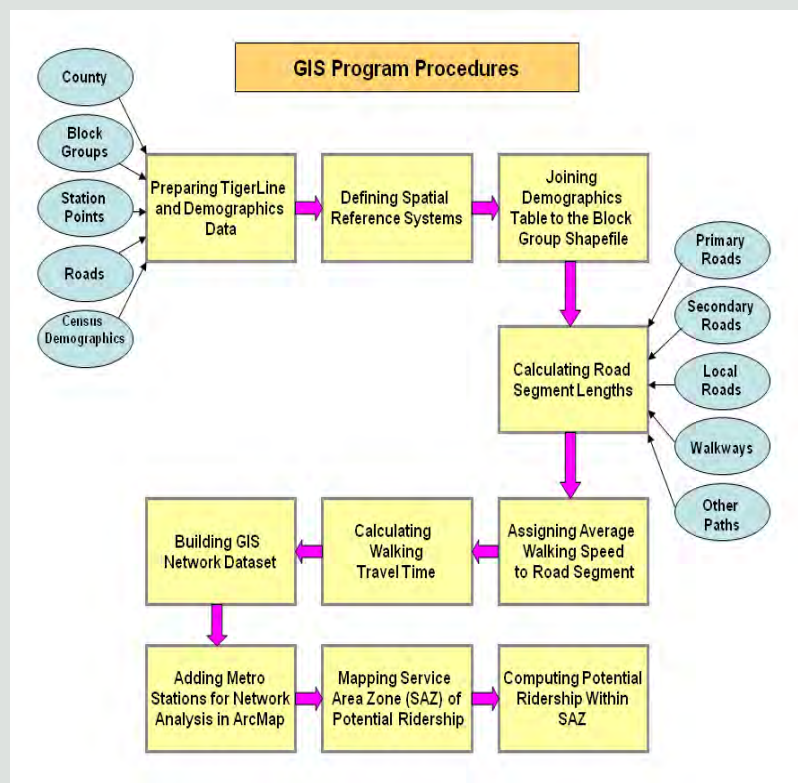


Figure 8. GIS program procedures for analyzing potential ridership.

of residents, employees, and trip attractors into service coverage areas with reasonable access time to a station. The same procedure was used to forecast the population of residents and employees with access to the system within the SAZ, with the aid of the Network Analyst extension. Then the number of potential attractors was estimated based on the category of employment services located in the SAZ, the number of employees working in those regions, and the Trip Attraction ratio indicating the number of trip attractors generated by each employee. For example, consider an SAZ containing two types of employment services: Retail and Public Administration, with 10 employees for each service. The trip attraction ratios are 4.678 for Retail and 3.439 for Public Administration; therefore, the trip attractor for this SAZ is approximately 81 ($10 \times 4.678 + 10 \times 3.439$). The formula for the integrated potential ridership is shown as:

$$PR = R + E + A \qquad A = \sum_{i=1}^n E_i \beta_i$$

Where:

PR = the potential ridership

R = Residents

E = Employees

A = Trip Attractors

n = the number of categories within employment service

i = Service type

β = the ratio of trip attractions.

ATLAS COMPILATION

The *Atlas of Potential Metro Rail Ridership* was compiled following completion of the spatial analysis to present the results. Los Angeles County is larger than the combined areas of Rhode Island and Delaware—comprising 4,083 square miles in total—and is a conglomerate of eighty-eight incorporated cities and many unincorporated areas. Further, Los Angeles County is an urban center characterized by extreme *polycentrism*, or multiple regions of economic activity (rather than a single center or core region) with few connections among the regions (Giuliano and Small 1991; Gordon 1996; McMillen 2001; Modarres 2003 and 2011; Giuliano 2004).

Given the nature of polycentrism exhibited in Los Angeles County, traditional cartographic methods for depicting the rail network and associated potential ridership could not be used. For example, the well-known linear cartogram concept designed by Harry Beck in 1933 for the London underground, displaying subway stations as dots connected by lines, is not suitable in all circumstances. The same concept was adopted for generating the New York Subway map, with several additional geographical references, as designed by

Massimo Vignelli. These, however, failed to be recognized by New Yorkers and tourists (Heller 2010; Rawsthorn 2012). With public pressure, the map was replaced with a geographical one in 1979, and was revised again in 2010. The map changed throughout time to reflect the ever-changing characteristics and needs of people in the city, or the region.

It instead is necessary to generate a collection of maps in support of urban planning regarding the Metro Rail. The subsequent *Atlas of Potential Metro Rail Ridership* provides a reference map for the Metro Rail system as well as a series of choropleth, proportional symbol, isarithmic, and dasymetric maps explaining potential ridership along Metro Rail lines and stations. The basemap for the *Atlas* includes the locations of a transit station, associated transit lines, surrounding parks, neighborhoods, coastlines, and political boundaries (e.g., community, city, region, and county, where appropriate). Each map's specific theme is layered atop the basemap reference.

The *choropleth* approach is used to represent housing density, commercial density, and industrial density by adjusting the color hue and color value, with darker areas indicating higher density. Color shading also was used to indicate additional land use categories, such as institutional use, transportation, government land, parks/agriculture, water, and others. Table 1 provides a description of areal map features and their symbol styling (Table 1, page after next).

The proportional symbol technique is applied in several ways, each using size to convey a numerical result of the spatial analysis by SAZ. The underutilization ratio is represented using a pie chart, the potential ridership (split among residents, employees, and attractors) is represented by a vertically stacked column chart, and boarding from walking is represented using a single-column chart.

The isarithmic technique is used to locate the SAZ boundaries for estimating potential ridership. Isochrone is defined as a curve line drawn on a map connecting points at which something occurs or arrives at the same time. In transportation planning, the isochrone method is commonly applied to indicate areas of equal travel time. Each line-bounded area on these maps is a ten minute walking isochrone, or line of equal walking time, with areas within the boundary requiring less than ten minutes to reach a station, and areas outside of the region requiring more than ten minutes (Figure 9).

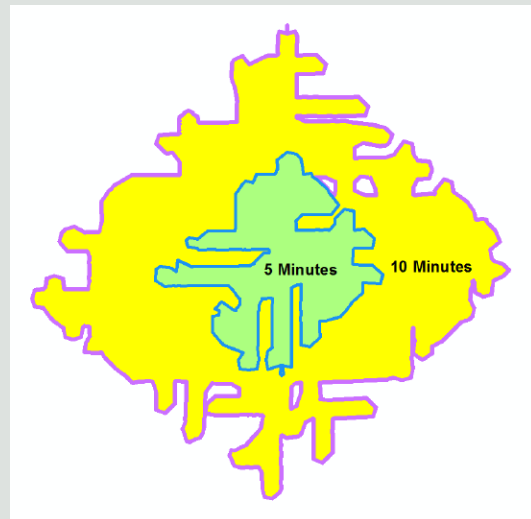


Figure 9. Isochronic map of area within 5-minute and 10-minute intervals for riders to access a station.

Potential Metro Rail Ridership in Los Angeles County

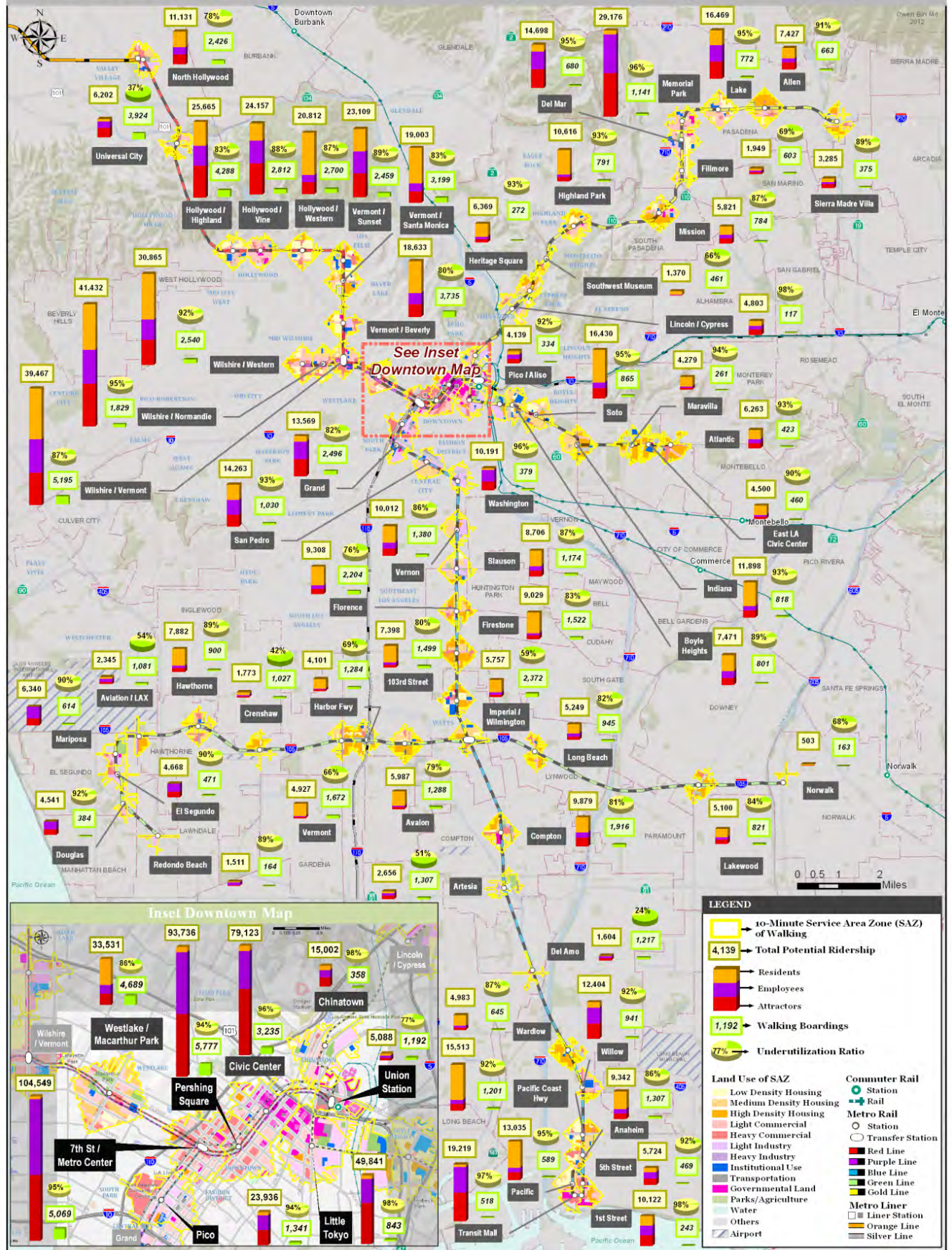


Figure 10. Map of Potential Metro Rail Ridership in Los Angeles County.

Primary Land Use	Features or Objects	Secondary Division	Color Scheme
Housing	Apartments, Condominiums, Townhouses, Single Family Residents, Mixed Multi-Family Residents, etc.	Low Density	Yellow
		Medium Density	Light Orange
		High Density	Orange
Commercial	Department Stores, Retail Centers, Shopping Malls, Business Parks, Recreational Regions, Offices, Stadiums, Commercial Developments, etc.	Light	Light Red
		Heavy	Maroon
Industrial	Electrical Power, Maintenance, Water Storage, Natural Gas and Petroleum, Liquid Waste, Wholesaling, Warehousing, etc.	Light	Light Purple
		Heavy	Purple
Institutional Use	Schools, Colleges, Universities, Day Care Centers, Medical Health Care Facilities, Special Care Facilities, Religious Facilities, etc.		Blue
Transportation	Bus Terminals and Yards, Park-and-Ride Lots, Truck Terminals, etc.		Dark Gray
Governmental Land	Government Offices, Fire Stations, Police and Sheriff Stations, Correctional Facilities, Other Public Facilities, etc.		Magenta
Parks / Agriculture	Parks, Golf Courses, Open Spaces, Cemeteries, Vacant Land, Agriculture Land, etc.		Green
Water	Rivers, Lakes, Ocean, Waterways, etc.		Light Blue
Others	Under Construction, Undefined Areas		Light Gray

Table 1. Areal Map Features and their symbol styling.

Dasymetric mapping is applied to create a single value for each SAZ to reflect potential ridership linked to the distribution of the population within the effective service area by a station (Figure 10). Population distribution is commonly displayed using decennial census data. However, those data are aggregates of geographic units such as census tracts or block groups whose boundaries do not reflect the actual distribution of population for the service area. In order to realistically place population data over SAZ, the dasymetric method is applied to disaggregate the census population by using boundaries to divide the area into source zones of relative homogeneity. Then, source zones are overlaid within the ancillary data set, the SAZs. Moreover, the populations of every source zone associated with each SAZ are estimated with the purpose of portraying the potential ridership for each station.

The maps included in the *Atlas* were generated at different cartographic scale ranges to support system-wide, line-based, and station-based analysis. Inclusion of a variety of themes and scales supports both a general audience as well as transit planning for future service improvement to the system.

RESULTS

This section analyzes total potential ridership integrated with residents, employees, and trip attractors having station access and compares the results with the mode choices by riders from an on-board survey completed for the Metro Rail system (LACMTA 2006). Comparing the differences between potential ridership and actual boarding data, a utilization ratio is calculated to indicate the level of utilization. To efficiently analyze the results and make accurate comparisons, transfer stations and non-interchange stations with varied routes are categorized into different tables. The results are intended as a support service for improvement planning regarding the Metro Rail system. The *Atlas* was leveraged directly to identify or visually confirm the following insights into the transit use patterning.

TOTAL INTEGRATED POTENTIAL RIDERSHIP

With the integration of residents, employees, and trip attractors, the potential ridership is estimated to be approximately one million within a ten minute walking interval to the station, which is about ten times higher than the actual amount of boardings having walking access to rail stations according to the 2006 on-board survey (Table 2 and Figure 10).

Metro Rail Station	Walking Boarding	10-Minute SAZ Integration						
		Residents	Employees	Trip Attractors	Potential (Total)	Under-utilization	Under-utilization ratio	Cover Area (sq mi.)
Transfer Stations	13,828	23,065	68,867	64,894	156,826	142,998	91%	1.24
Red/ Purple Lines	43,613	124,218	131,936	169,280	425,434	381,821	90%	4.68
Blue Line	23,800	83,158	59,382	65,633	208,173	184,373	89%	5.94
Green Line	10,814	26,173	15,227	13,527	54,927	44,113	80%	2.88
Gold Line	11,400	73,733	63,795	86,998	224,526	213,126	95%	6.17
Total	103,455	330,347	339,207	400,332	1,069,886	966,431	90%	20.91

Table 2. Total integrated potential ridership of Metro Rail system in Los Angeles County.

METRO RAIL TRANSFER STATIONS

A transfer station is the railway facility that allows riders to transfer from more than one railway route within a public transport system. Union Station, 7th Street/Metro Center, Wilshire/Vermont and Imperial/Wilmington are the four transfer stations in the current system (Figure 11). As the maps indicate that

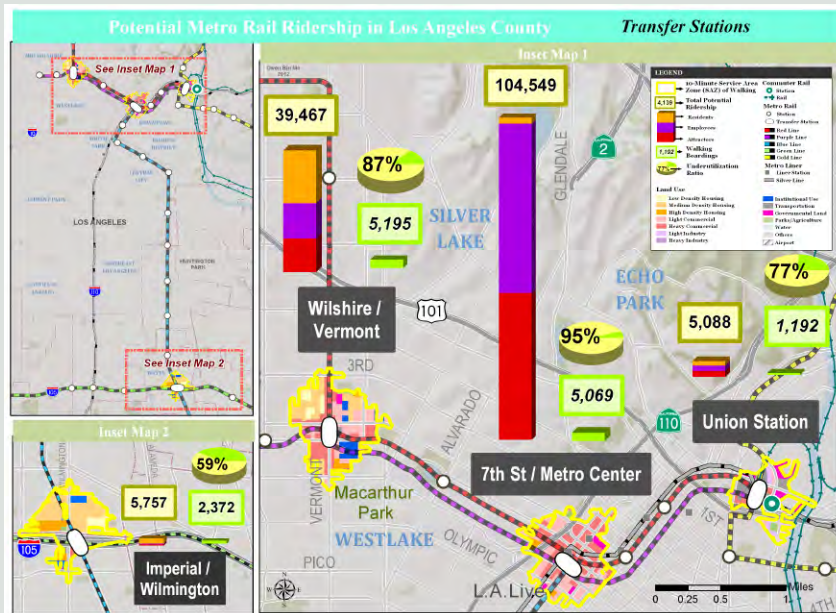
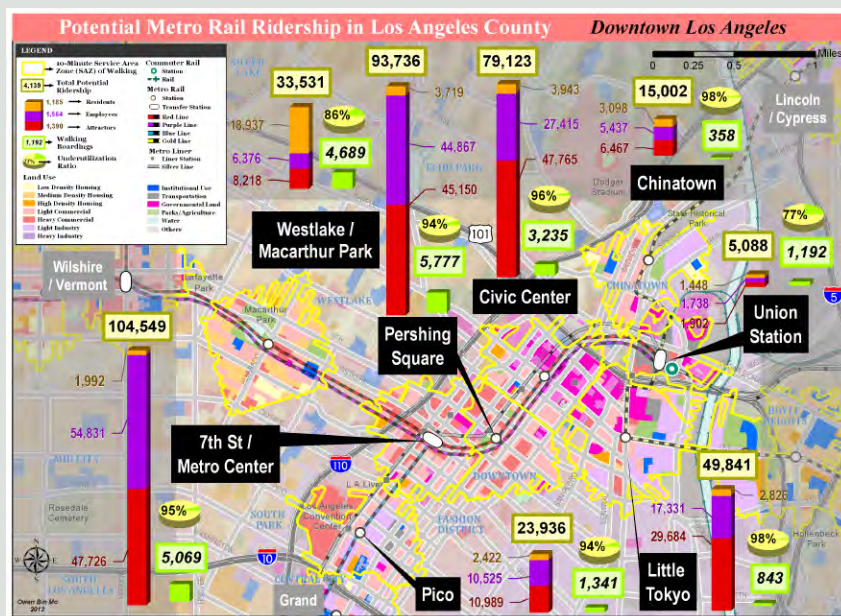


Figure 11. Map of the Metro Rail transfer stations.

Union Station mainly is fed by the commuter rail or bus services, it was not surprising to see that its potential ridership numbers were medium-sized in the system. When integrating all of the factors to determine potential ridership, the 7th Street/Metro Center station, located in the Financial District of Downtown Los Angeles, shows the highest ridership on record amongst all stations in the system. The Wilshire/Vermont station is another top-ranked station with potential ridership at 41,432, eight-times higher than actual recorded boardings, one of the top-five highest potential ridership numbers resulting from the analysis. Functioning much like Union Station, Imperial/Wilmington has medium-sized ridership as well.

Metro Red Line/Metro Purple Line

The Red and Purples lines are grouped in one branch, as they are still jointly recorded in boarding by LACMTA. The Metro Red Line begins at Union Station and travels to the Wilshire/Vermont station, where the track is shared with the Metro Purple Line, then runs north through North Hollywood; the Metro Purple Line runs to the Mid-Wilshire area from the Wilshire/Vermont station. Most of the stations in this group show great potential ridership, netting over 20,000 potential riders as this branch travels through the central business district of Los Angeles. The Civic Center and the Pershing Square stations have the highest potential ridership of stations within the Red and Purple lines

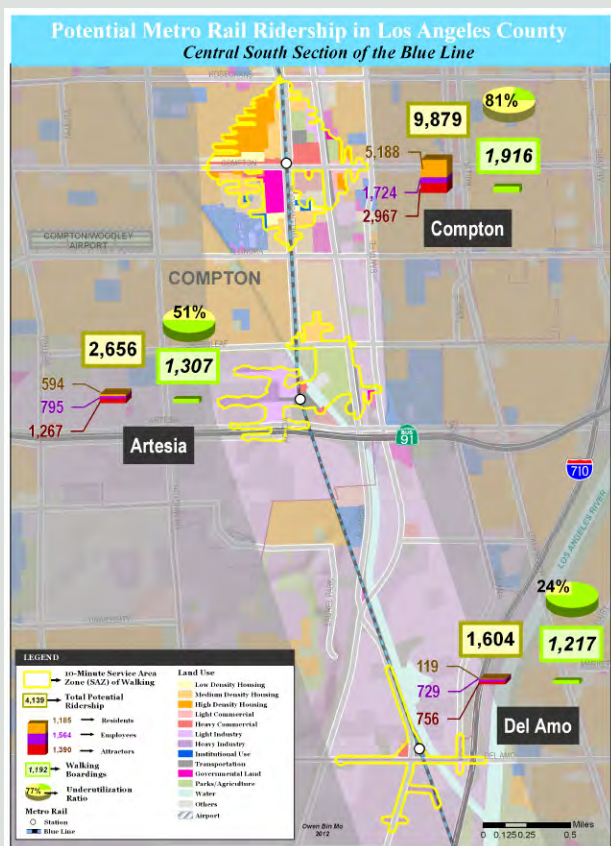


(Figure 12). Along with the Wilshire/Normandie station, the Civic Center and the Pershing Square stations also have large underutilization ratios.

Metro Blue Line

The Metro Blue Line, which is a light rail line, follows a north-south route, connecting downtown Los Angeles to downtown Long Beach. In general, most of the stations can generate more than 9,000 riders according to the model. Pico Station has the highest potential ridership numbers for the Metro Blue Line, followed by the Transit Mall and Pacific Coast Highway stations. Even though the Del Amo station captured the smallest potential ridership of all stations on the Metro Blue Line with the ten-minute SAZ, it is the most utilized station

across the entire system, with a value of 76% (Figure 13). This suggests that when the pedestrian environment around the station improves, ridership numbers also may increase.



Metro Green Line

The Metro Green line runs almost entirely along the center divider of the I-105/Glenn Anderson freeway. The potential ridership of the Green Line is quite low compared with other Metro Rail system lines (Figure 14). Building the rail line along the freeway is problematic due to insufficient walking paths and inadequate bus connections. Another factor includes non-direct linking with other transportation facilities such as commuter rail and the airport. The Aviation/LAX station does not provide right-of-way access to the airport; instead, the station uses shuttle bus service to connect the station to the Los Angeles International Airport (LAX). The situation is similar for the Norwalk station, as bus services are required for transfer to the commuter rail station. Further, there are not many popular destinations along the Metro Green Line route, and it often is described colloquially as the train that goes “from nowhere to nowhere.” The freeway stations also are perceived as inhospitable due to freeway pollution, noise, safety, and accessibility. The Hawthorne station is estimated to have the highest potential ridership on the Metro Green Line. The Douglas station is the least utilized while the Crenshaw station is the most utilized station, followed by Aviation/LAX.

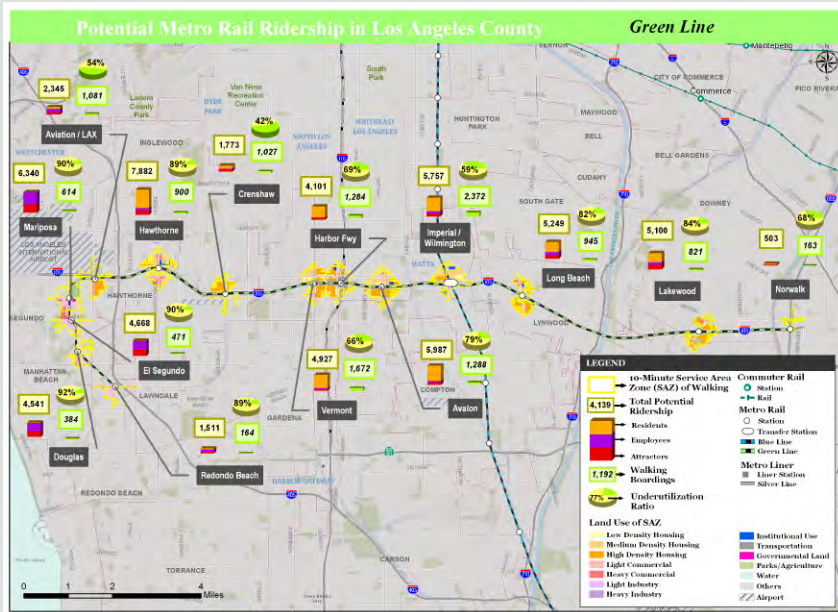


Figure 14. Map of the Metro Green Line.

Metro Gold Line

The Metro Gold Line route operates in a crescent shape between east Pasadena and East Los Angeles, passing through downtown Los Angeles. Some factors may help explain the high underutilized ratio between the actual boarding and potential ridership for the Metro Gold Line stations. First, the travel speed is one of the distraction issues, for the Metro Gold Line has the slowest travel speed of all Metro Rail lines, with 54 minutes to travel its 19.7 mile length (21.9 m/h) (LACMTA 2011). Furthermore, it is a new line and it may take time to attract ridership. If more direct connections were available along the Metro Gold Line, it could attract more commuters to use the service; therefore, it may be the Metro line that could see the highest increase in boardings. The Little Tokyo station is measured to have the highest potential ridership on the Metro Gold Line. Along with the Lincoln/Cypress and Chinatown stations, the Little Tokyo station also has a low utilization ratio. The Memorial Park station in Pasadena exhibits the second highest potential ridership numbers of the Metro Gold Line, as the station serves Old Town Pasadena, a major commercial center (Figure 15). Even though the Southwest Museum station is the most utilized station on the Gold Line, the actual boarding record is not very high

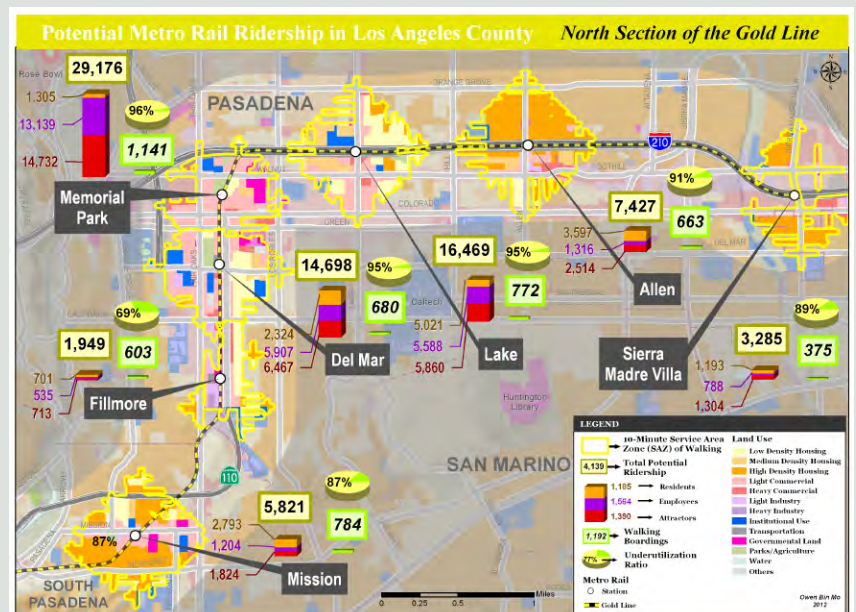


Figure 15. Map of North Section of the Metro Gold Line.

since the station mainly served the Southwest Museum, which was closed in 2011.

Metro Rail Station Utilization

There is a large amount of potential for the Metro Rail, as the underutilization ratio is 90% for the whole system. The Little Tokyo station (Metro Gold Line) exhibits the great disparity between potential ridership and actual boarding, followed by Lincoln/Cypress (Metro Gold Line) and 1st. Street (Metro Blue Line). The Del Amo station (Metro Blue Line) is the most utilized station in the system, followed by Universal City (Metro Red/Purple lines) and Crenshaw (Metro Green Line).

Unlike automobile travel, in which all activity sites have immediate access connection through roadways, the existing Metro Rail system does not directly link all sites within the Greater Los Angeles area. Many residential regions are not served by the existing Metro Rail system; there are many job opportunities and commercial centers located outside of the service area. Riders might not utilize the Metro Rail service when it requires a longer commute time or multiple transit trips for one single personal trip. In order for Metro Rail system to be chosen over the automobile, it has to be competitive in terms of cost, time, convenience, and flexibility. New stations, hypothetical routes, or alternative access options are needed to link those “isolated” activity sites. The better the network, the higher the number of potential riders that can be converted into actual ridership.

CONCLUSION

SPECULATED DIFFICULTIES OF METRO RAIL SYSTEM

Metro Rail must compete with the automobile, which is still the most attractive mode of transportation. What obstacle exists that prevents millions of people from having access to rail as an alternative to driving? Los Angeles County has been evaluated by many scholars as the paragon of polycentrism for which the area population is difficult to serve from a transit perspective (Giuliano and Small 1991; Gordon 1996; McMillen 2001; Modarres 2003 and 2011; Giuliano 2004).

It is trip density within a corridor that determines potential demand for metro rail, not population density. Making metro rail both productive and cost effective—carrying many passengers between point A and point B—is one of the only ways to be successful. Dotted with very large centers of activity, railroads will work best in compact population corridors with at least one end in a very dense population center (Rubin 2000). Traditional downtown/outbound patterns do not conform in Los Angeles County. Spreading jobs and other destinations over more central locations, polycentrism reduces the density of activity at any single location; that is, not every destination will be able to have

an easy connection to a rail line. Los Angeles County's polycentricism makes it more difficult to justify costly investment in high-speed rail service with dedicated right-of-way in serving each activity center. This further decreases the attractiveness compared to the automobile, given the need to travel to different destinations serving multi-purpose trips, and to combine multiple errands in a single trip.

POTENTIAL SUCCESS OF METRO RAIL SERVICE

Will the Metro Rail system succeed? First, the system does have a history of service upon which to build. The Pacific Electric Railway, also known as the Red Car System, interconnected cities in Los Angeles, Orange, San Bernardino, and Riverside Counties using streetcars, light rail and buses, beginning in 1901 (Walker 2006). The systems also connected with the "Yellow Car" system serving downtown Los Angeles and cities of Hawthorne, Gardena, and Torrance. Second, it is fairly well documented that it was automobile companies that bought out the rail and dismantled the service in the 1930s and 1940s (Snell 1974 and 1995; Span 2003). By intentionally running the rail out of business, auto companies helped to reinforce the market for their major product, meaning that the automobiles created the polycentrism, not that polycentrism created the need for automobiles. Third, increasing population, environmental concerns, traffic congestion, and gasoline prices are other factors that push the need for mass transit services. Furthermore, the existing transit system already serves users with few economic resources. Much of the rationale for rail in Los Angeles will attract a new segment of the population to transit, who perceive the quality of rail to be faster, more comfortable, more reliable, more cost efficient, and with far fewer traffic jams. Moreover, new statistics from LACMTA indicate success: the average weekday boardings have increased more than 20%, from 300,000 in June 2011 to 363,000 in June 2012.

FUTURE PERSPECTIVES

The polycentric and complex landscape of Los Angeles county needs many different solutions to work together cohesively to increase the attractiveness of the Metro Rail system. Reliable bus service is just one solution among many other alternative solutions including park-and-ride, biking, and Bus Rapid Transit (BRT). In most cases, the quality of the pedestrian environment around rail stations should be addressed. When real and even perceived delays and inconveniences create a sense of insecurity, riders usually choose to use their personal automobiles.

Transit properties, governments, and private developers must make a cooperative effort to increase the attractiveness of the Metro Rail system. For providing rapid transit services to more parts of the county, the LACMTA is seeking public commitment to fulfill its Long Range Transportation Plan for the county as more rail and bus rapid transit extensions are opened, under construction, and planned for millions of people to have access to a rail alternative to driving. Metro Rail will become part of the cooperative effort to improve the overall

commute throughout Los Angeles County. The expansion of the Metro Rail system is but one part of the puzzle; it will help to fulfill the goal of creating a greener and more viable Los Angeles County.

ACKNOWLEDGMENTS

Sincere appreciation is given to Dr. John Kirchner for his direction, assistance, and guidance. Kudos to Dr. Hong-Lie Qiu and Dr. Stephen Mulherin for their positive reviews and support. I also wish to thank Dr. Chausie Chu, the Systems Analysis and Research team of the Long Range Planning and the Coordination Department of the Los Angeles County Metropolitan Transportation Authority (LACMTA) for providing an opportunity to gain professional work experiences in transportation planning. Moreover, recognition is extended to Robert Cáliz, Gene Manley, and Mark Gerardy for their insightful comments, which greatly improved this paper. I am particularly grateful to the editor and reviewers from *Cartographic Perspectives* for guiding this paper through every stage of writing and production. Their support and editorial insights when crucial decisions had to be made were invaluable.

REFERENCES

- Biba, S. Curtin, K., and Manca, G. 2010. "A New Method for Determining the Population with Walking Access to Transit." *International Journal of Geographical Information System*, 24 (3): 347–364.
- Beimborn, E. A., Greenwald, M. J., and Jin, X. 2003. "Accessibility, Connectivity, and Captivity: Impacts on Transit Choice." *Transportation Research Record*, 1835: 1–19.
- Briggs, R. 2009. "Analysis and Modeling in GIS." *Dallas: The University of Texas*. <http://www.elbuscadorppt.com/ppt/analysis-and-modeling-in-gis.html> (accessed June 1, 2010)
- Campbell, J. 2011. *Map Use and Analysis*. McGraw-Hill, Boston, 4th edition.
- Giuliano, G., and Small, K. 1991. "Subcenters in the Los Angeles Region." *Regional Science and Urban Economics* 21, 2: 163–82.
- Giuliano, G., 2004. "Analysis of Los Angeles Metropolitan Spatial Structure." University of Southern California.

- Gordon, P., and Richardson, H. 1996. "Beyond Polycentricity: The Dispersed Metropolis, Los Angeles, 1970-1990." *Journal of the American Planning Association*. 62 (3): 289-295.
- Heller, S. 2010. "A More Cheerful New York Subway Map." *The New York Times*. <http://www.nytimes.com/2010/06/02/arts/design/02map.html> (accessed August 8, 2012)
- Los Angeles County Metropolitan Transportation Authority (LACMTA). 2006. "On- Board Survey Results Gold Line Transit Rider Survey." *Austin: Nustats*.
- . 2011. "Ridership Statistics." *Los Angeles County Metropolitan Transportation Authority*. http://www.metro.net/news_info/ridership_avg.htm (accessed June 1, 2011)
- Metropolitan Washington Council of Governments (MWCG). 2010. "Four-Step Travel Model." http://www.mwcog.org/transportation/activities/models/4step/4_step.asp (accessed September 1, 2010)
- McMillen, D. P., 2001. "Nonparametric Employment Subcenter Identification." *Journal of Urban Economics* 50.
- Mo, B. 2009. "GIS Network Analysis for Finding the Potential Metro Rail Ridership in Los Angeles County." *2010 AASHTO GIS for Transportation Symposium*. <http://www.gis-t.org/files/bCRt4.pdf> (accessed April 1, 2010)
- Modarres, A. 2003. "Polycentricity and Transit Service." *Transportation Research Part A: Policy and Practice*, 37 (10): 841-864.
- Modarres, A. 2011. "Polycentricity, Computing Pattern, Urban Form: The Case of Southern California." *International Journal of Urban and Regional Research*, DOI: 10.1111.
- Murray, A., Davis, R., Stimson, R. and Ferreira, L. 1998. "Public Transportation Access." *Transportation Research Part D: Transport and Environment*, 3(5): 319-328.
- Nyerges, T. 1995. "Geographical Information Systems Support for Urban/Regional Transportation Analysis." *Geography of Urban Transportation*, 2: 53-77.
- O'Neill, W.A., Ramsey, R.D., and Chou, J., 1992. "Analysis of Transit Service Areas Using Geographic Information Systems." *Transportation Research Record*, 1364: 131-138.

- O'Sullivan, S., and Morrall, J. 1996. "Walking Distance To and From Light-Rail Transit Stations." *Transportation Research Record 1538*: 19–26. National Research Council (U.S.). Transportation Research Board.
- Rawsthorn, A. 2012. "The Subway Map That Rattled New Yorkers." *The New York Times*. http://www.nytimes.com/2012/08/06/arts/design/the-subway-map-that-rattled-new-yorkers.html?_r=1 (accessed August 8, 2012)
- Rubin, T. 2000. "Learning from Los Angeles: Rail and Transportation Equity." *Technology Transfer Newsletter*, Spring 2000.
- Snell, B. 1974. *American Ground Transport: A Proposal for Restructuring the Automobile, Truck, Bus, and Rail Industries*. Washington: U.S. Government Printing Office.
- Snell, B. 1995. "The Street Car Conspiracy: How General Motors Deliberately Destroyed Public Transit." *Lovearth.net*.
<http://www.lovearth.net/gmdeliberatelydestroyed.htm>
(accessed August 8, 2012)
- Southern California Association of Governments (SCAG). 2008. "2003 SCAG Model Validation and Summary Regional Transportation Model." *Resolving Regional Challenges*.
www.scag.ca.gov/modeling/pdf/MVS03/MVS03_TOC.pdf
(accessed December 1, 2010)
- Span, G. 2003. "Paving the Way for Buses—The Great GM Streetcar Conspiracy." http://www.baycrossings.com/Archives/2003/03_April/paving_the_way_for_buses_the_great_gm_streetcar_conspiracy.htm (accessed August 8, 2012)
- Transit Cooperative Research Program (TCRP). 2006. "Fixed-Route Transit Ridership Forecasting and Service Planning Methods." *TCRP Synthesis 66*. http://gulliver.trb.org/publications/tcrp/tcrp_syn_66.pdf
(accessed December 1, 2010)
- Walker, J. 2006. *Images of Rail: Pacific Electric Red Cars*. Arcadia Publishing: 7

John Ogilby, Post-Roads, and the “Unmapped Savanna of Dumb Shades”: Maps and Mapping in Kenneth Slessor’s Poetic Sequence *The Atlas*, Part Two

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ABSTRACT

Written by the acclaimed Australian poet Kenneth Slessor, “Post-roads” is the second poem of his sequence *The Atlas* and of his collection *Cuckooz Contrey* (1932), in which it debuted. Like the other four *Atlas* poems, “Post-roads” begins with a quote from a prominent seventeenth-century map-maker; in this case, John Ogilby (1600–1676)—the celebrated British publisher, surveyor, and cartographer. Slessor not only transformed Ogilby’s work (and portrait) into poetic images, but made Ogilby’s “tireless ghost” the central character of his poem. This article, part of the first full-scale examination of Slessor’s ambitious but poorly understood sequence, begins by reproducing the poem and tracing the poem’s development in Slessor’s poetry notebook. To reconstruct his creative process, it details the poet’s debt to the ephemeral catalogue of atlases and maps in which he discovered his title, epigraph, central character, and a possible source for the colorfully named coaches and carriages that conveyed passengers not only throughout London and Britain beginning in the early seventeenth century, but also throughout Australia from around 1800 to 1920. After comparing poet and cartographer, we consider the poem’s relationship to two of Ogilby’s atlases: the monumental *Britannia* (1675) and the posthumous, if far more accessible *Traveller’s Guide* (1699, 1712). Both reveal how Ogilby—even from the grave—helped passengers like the poem’s

“yawning Fares” trace their routes. Finally, after offering reasons for Slessor’s choice of “Guildford” out of all the place-names along the roads through England and Wales, and proposing literary inspirations for “Post-roads,” the paper returns to Slessor’s hero/artist.

KEYWORDS: Kenneth Slessor (1901–1971); *Cuckooz Contrey* (1932); *The Atlas* sequence (ca. 1930); “Post-roads”; poetry—twentieth-century; poetry—Australian; poetry and maps; cartography—seventeenth-century; John Ogilby (1600–1676)

INTRODUCTION

This is the third article in *Cartographic Perspectives* to focus on *The Atlas* (ca. 1930). In *CP* 70, my “Introduction to Maps and Mapping in Kenneth Slessor’s Poetic Sequence *The Atlas*” presented the background for this first extended analysis, in several parts, of that five-poem sequence (Haft 2011). Beginning with a brief biography of Slessor as poet, journalist, and man about Sydney, it surveyed his third solo collection, *Cuckooz Contrey* (1932), before turning to *The Atlas*, which both opened and debuted in that collection. Examining the notebook in which he drafted all five poems (NLA MS 3020/19/11) revealed the enormous effort that Slessor—then at the height of his artistry and productivity—lavished on *The Atlas* and on mastering the period in which it is set. Not only does the sequence encompass nearly half of the 282 pages in that “National Treasure” (Elizabeth Caplice, e-mail to author: May 28, 2010), but, as the notebook makes clear, Slessor considered naming his entire collection *The Atlas* (September 13, -s242²), before eventually choosing the catchier title *Cuckooz Contrey*. A review of his corpus, furthermore, showed that the sequence uniquely combines interests and strategies apparent in Slessor’s earlier and later poems, including his fascination with the cartography of exotic places and bygone eras, as well as his emphasis on the arts and the use of illustrations to heighten his poetry’s allure. And I tracked down *Old Maps of the World* (Francis Edwards 1929), the rare and hitherto elusive catalogue to which Slessor refers in his notes on *The Atlas*. What that first article and the remaining parts of my study attempt to prove is that the relationship between that ephemeral catalogue and *The Atlas* is far more profound and far-reaching than anyone might have anticipated.

Next came Part I, “Who’s ‘The King of Cuckooz’?” Published in *CP* 71 (Haft 2012), it dealt with three related documents—each replete with narratives of power, wealth, and desire: “The King of Cuckooz,” the first poem of *The Atlas*; Robert Norton’s 1620 *Platt of Argier*, whose title Slessor used to begin his poem; and *Old Maps of the World*, which advertised and described Norton’s manuscript map (Francis Edwards 1929, 105–106). By weaving together some curious strands of literature, cartography, geography, and history, “Who’s ‘The King of Cuckooz’?” offered new insights into Slessor’s use of cartographic sources in constructing the poem.

“Post-roads,” the second poem of *The Atlas* sequence and of *Cuckooz Contrey* generally, is the subject of this present essay. As was the case in “The King of

The notebook in which he drafted all five poems revealed the enormous effort that Slessor—then at the height of his artistry and productivity—lavished on The Atlas and on mastering the period in which it is set.

Cuckooz,” Slessor found his poem’s title and epigraph while perusing *Old Maps of the World*, and once again the epigraph he chose is also the title of a work by a seventeenth-century British surveyor/cartographer featured in the *Dictionary of National Biography*. But the similarities end there. Robert Norton (d. 1635) was a gunner and artillery expert; his plan of Algiers, a one-of-a-kind surveillance map produced during a military operation. John Ogilby (1600–1676), a “renaissance” man and acclaimed cartographer, was also a prolific publisher of classical translations, maps, and atlases. Norton’s manuscript map is a priceless treasure housed in the National Maritime Museum in Greenwich, England, whereas Ogilby’s posthumous *Traveller’s Guide* (1699, 1712), chosen by Slessor as the epigraph for “Post-roads,” was an inexpensive pocket-guidebook based on his most famous atlas, *Britannia* (1675). The *Platt of Argier* is set on the Barbary Coast amidst pirates and mysterious kings in 1620; *The Traveller’s Guide* directs passengers in coaches and on horseback along the roads of England and Wales at the end of that century. In “The King of Cuckooz,” the narrator addresses his beloved by poem or letter during the British expedition to Algiers, or else face-to-face shortly thereafter. In “Post-roads,” Slessor alternates not only between his own era and Ogilby’s, but also between the living and the dead. What makes “Post-roads” so fascinating is that it picks up on the nineteenth-century trope that mortals have no chart of heaven—think of Emily Dickinson’s “I never saw a moor,” Walt Whitman’s “Darest Thou Now O Soul,” or Edmund Clarence Stedman’s “The Discoverer.” Slessor presents his “tireless ghost of *Ogilby*” as possessing both the energy and the skill to make one.

KENNETH SLESSOR’S “POST-ROADS”

Let’s begin with the poem itself:³

The Atlas, 2: “Post-roads” (ca. 1930)

“The Traveller’s Guide, or a Most Exact Description of the Roads of England; being Mr. Ogilby’s Actual Survey and Mensuration by the Wheel, &c.”

Post-roads that clapped with tympan heels
 Of tilburies and whiskys rapidly spanking,
 Where’s now the tireless ghost of *Ogilby*?
 Post-roads
 That buoyed the rich and plunging springs
 Of coaches vaster than Escurials,
 Where now does *Ogilby* propel that Wheel,
 What milestones does he pause to reprimand,
 In what unmapped savanna of dumb shades?

Ye know not—ye are silent—brutish ducts
 Numbed by the bastinadoes of iron boots,
 Three hundred years asnore. Do you forget
 The phaetons and fiacres, flies and breaks,

The world of dead men staring out of glass
That drummed upon your bones? Do you forget
Those nostrils oozing smoke, those floating tails,
Those criniers whipped with air?

And kidnapped lights,
Floats of rubbed yellow towed from window-panes,
Rushing their lozenges through headlong stones;
And smells of hackneys, mohair sour with damp,
Leather and slopped madeira, partridge-pies
Long-buried under floors; and yawning Fares
With bumping flap-dark spatulas of cards—
“Knave takes the ten ... oh, God, I wish that it,
I wish that it was Guildford”...

Ogilby
Did not forget, could not escape such ecstasies,
Even in the monasteries of mensuration,
Could not forget the roads that he had gone
In fog and shining air. Each line was joy,
Each computation a beatitude,
A diagram of Ogilby's eye and ear
With soundings for the nose. Wherefore I think,

Wherefore I think some English gentleman,
Some learned doctor of the steak-houses,
Ending late dinner, having strolled outside
To quell the frivolous hawthorn, may behold
There in the moonshine, rolling up an hill,
Steered by no fleshly hand, with spokes of light,
The *Wheel*—*John Ogilby's Wheel*—the *WHEEL* hiss by,
Measuring mileposts of eternity.

The seventeenth-century word “Post-roads” refers to the roads or postal routes on which travelers and mail used to be conveyed by horse and coach from one station or inn to another prior to the coming of the railroad. Addressing the post-roads directly, Slessor's I-narrator attempts to bring them to life after “three hundred years asnore” so that they too can reminisce about an age when traveling by carriage was as familiar as taking a train or driving a car today, though burdened with more discomfort. Unlike the short, bouncy stanzas of “The King of Cuckooz,” “Post-roads” emulates its subject with its five dense stanzas of eight or nine long enjambed lines; of consonant sounds and staccato rhythms, relieved by the dactylic gallop of horses and Ogilby's long-short-short name. Winding his way through past and present is the “tireless ghost” of British surveyor/cartographer/publisher John Ogilby, whose seductive strip maps not only popularized travel along the roads of England and Wales but also inspired other cartographers to depict roads on large-scale maps (Tooley et al. 1999–2004, 3:345–346). As if Ogilby were not prominent enough, Slessor has turned him into the ecstatic antithesis of Sisyphus and Ixion, two of the most notorious sinners in classical mythology. Sisyphus's talent at outwitting

death ultimately condemned him to Tartarus/Hell and to “rolling” an enormous boulder “up a hill” only to watch it roll back down again (*Odyssey* 11.593), whereas Ogilby’s “Mensuration by the Wheel” is “a beatitude,” a state of eternal bliss. For repeatedly violating the sanctity of guest-friendship, Ixion was bound forever to a fiery wheel (Pindar’s *Pythian Odes* 2.21–48), while Slessor’s Ogilby uses his wheel “with spokes of light” to survey the “unmapped savanna of dumb shades.” If the poem dwells on punishment at all, it’s the “brutish” post-roads whose bones have been “numbed” by heavy boots and “drummed upon” by carriages, or the “frivolous hawthorn” “quelled” by a gentleman relieving himself after dinner.⁴

Slessor completed “Post-roads” immediately after “The King of Cuckooz” (March 6, -s65, to April 5, -s90). Yet “Post-roads” did not begin as the second poem of *The Atlas*. According to the entry dated “March 18” in his poetry journal, Slessor originally intended it to be fourth (-s76; see March 30, -s84):

- (1) ✓ The King of Cuckooz Contrey
- (2) ✓ Dutch Map (Blaeu)
- (3) Lost Lands Mermaids
- (4) ✓ Post Roads of Europe
- (5) ... Seafight

As the checks beside the “March 18” and “April 3” (-s88) entries make clear, Slessor’s difficulty with the third poem—which he alternately called “Lost Lands” or “Mermaids” until nearly half-way through his manuscript drafts⁵—resulted in “Mermaids” coming fourth. That “Post-roads” became second, in the end, had less to do with its completion date than with Slessor’s belated decision to turn “Dutch Seacoast” into the central poem of *The Atlas*.

Slessor composed “Post-roads” almost as quickly as his “rapidly spanking” vehicles convey their “Fares”—the paying passengers on hired coaches. The drafts of the poem commence on “April 5” (-s90), proceed sequentially through “April 21” (-s100, with the misplaced insertion MS 3020/19/4, -s128 and -s129, belonging to the April 15–17 entries, -s97 to -s98), and then skip ahead to a typed insertion between “May 2” and “May 3” (-s107). On that typed page, all of the third stanza and most of the fifth, except for the final line, appear in their published form; and in the fifth stanza, Slessor proves his bonafides as a poet and life-long drinker by repeating himself (“Wherefore I think,/ Wherefore I think . . .”), then penciling in “moonshine” for “moonlight” and “quell” for “smell” in the felicitous phrase “quell the frivolous hawthorn.” The first stanza gave Slessor the most difficulty: nine of fourteen journal entries on “Post-roads” are attempts to map out the poem by means of this initial stanza (-s90 to -s96, -s128 to -s129). Slessor discarded several experiments, including the nearly illegible opening lines of his “April 5” entry (-s90) and his attempts to find rhymes for “past” (April 9, -s93). References to “footmen” or “grooms” (April 7, -s92) disappeared as being too reminiscent of his earlier poem “Next Turn,” in which a carriage—along with its footmen, coachman, and post-boys—are

poised ominously to convey us from life's theater to our final destination (Slessor and Lindsay 1926, 33; Slessor, Haskell, and Dutton 1994, 61–62, 354–355; see Jaffa 1971, 60). Originally, Slessor imagined “post-roads like [a] jolly skeleton dancing over green country” (April 5, -s90, and April 7, -s92). However, by the time he decided to address the post-roads as “brutish ducts” (April 15, -s97), another late seventeenth- and early eighteenth-century word meaning “passages leading in any direction” (*OED* [1933] 1971, 1:702, 3),⁶ that concrete image had replaced the more abstract addressee “World of lost movement that a map reveals,” “World of lost carriages . . . and wheels,” and “Lost ages when the post-roads clapped with heels” (April 11, -s95).

“TILBURIES AND WHISKEYS RAPIDLY SPANKING”

From the start, Slessor concentrated on the colorful names of the horse-drawn coaches that were still traversing the roads during his youth, not only in Australia (Foster 2011) but also in England, where he lived from 1908 to 1910 with his parents (Slessor 1970, 253). At the bottom of his “April 5” entry (-s90), he listed no fewer than eighteen of these names:

<u>carriages</u>	
berlin	phaeton
break	postchaise
britzka	random
cabriolet	fly
calash	sociable
chaise	stage
clarence	tilbury
fiacre	whiskies
mail-phaeton	whiskey

From the start, Slessor concentrated on the colorful names of the horse-drawn coaches that were still traversing the roads during his youth.

After repeated attempts to use more, including “barouches” (April 5, -s90) and “Peterloo’s carriage” (*ibid.*, and April 7, -s92), Slessor settled on six:

break: “a large wagonette” (*OED*, s.v., “break,” *sb.*² 2); i.e., a large “four-wheeled carriage, made open or with a removable cover and furnished with a seat or bench on each side facing inwards and with one or two seats arranged crosswise in front” (*OED*, s.v., “wagonette”)

fiacre: “a small four-wheel hackney coach for hire, a hackney coach, a French cab” (*OED*, s.v., “fiacre”)

phaeton: “a species of four-wheeled open carriage, of light construction; usually drawn by a pair of horses, and with one or (now generally) two seats facing forward” (*OED*, s.v. “phaeton,” 2)

fly: “a quick-travelling carriage” (*OED*, s.v., “fly,” *sb.*² II.3)

tilbury: “a light open two-wheeled carriage, fashionable in the first half of the 19th century” (*OED*, s.v. “tilbury,” 1)

whiskies [see below]

whiskey: “a kind of light two-wheeled one-horse carriage, used in England and America in the late 18th and early 19th c.” (*OED*, s.v., “whisky, whiskey,” sb.²)

Slessor enjoyed collecting names like these for his poetry. Among his papers at the National Library of Australia are small address books in which he’d

catalogued the names of women and men, birds, cigarettes, whiskies, flowers, and perfumes—all listed under subject titles (NLA MS 3020 2/1). Slessor doesn’t acknowledge his sources, but Sir Walter Gilbey’s *Early Carriages and Roads* (1903), listed as item 825 in the Francis Edwards catalogue *Old Maps of the World* (Francis Edwards 1929, 139), supplies most of these names. G.A. Thrupp’s 1877 *History of Coaches* is so thorough that it underlies the entry “carriages” in the 11th edition of *The Encyclopaedia Britannica* (1910–1911, 5:401–406). And the 1875 *Encyclopaedia Britannica* contains a list similar to Slessor’s: its table includes not only most of the names he mentions but also alternative names as well as the “countries of origin” for the so-called “modern” carriages (9th edition, 5:136, s.v., “carriages”). If Slessor didn’t know these names from memory, he may have begun by collecting them from a general reference work, then explored more detailed studies like Thrupp’s or Gilbey’s (see also Gilbey 1905). Not

on his list are two well-known terms that also appear in his poem: “hackneys” (“carriage[s] kept for hire” or “horse[s] kept for hire”: *OED*, s.v. “hackney,” I.5 and I.2, respectively) (Figure 1), and “coaches” (“large [en]close[d] carriage[s] with four wheels, with seats inside, and several outside, used for public conveyance of passengers; see “stage-coach”: *OED*, s.v., “coach,” 1a). Since the earliest definition of “coach” in the *Oxford English Dictionary* is “a large kind of carriage: in the 16th and 17th centuries, usually a state carriage of royalty or people of quality” (ibid.), Slessor whimsically compared such coaches with the Escorial (i.e., Escorial), the chief palace of the Spanish monarchs near Madrid (*OED*, s.v., “escorialize”). “Tilburys” and “whiskys,” both of which are featured on the list and in “Post-roads,” turn out to be anachronistic in a poem focusing



Figure 1. “Hackney Coaches in London, 1637.” From Sir Walter Gilbey’s *Early Carriages and Roads* (London: Vinton & Co. 1903, page 29). According to Gilbey, the hackney coach—a public carriage for hire—came into being in 1605, though the first stand wasn’t established until 1634 (27).

on the seventeenth century. However attentive Slessor was to the period in which he set his poem, historical accuracy often took back seat to considerations of rhythm, rhyme, sound, or association.

Despite their importance to “Post-roads,” however, Slessor was looking for something more than old-fashioned coaches and carriages. Horses clearly didn’t do the trick, since he only alludes to them in “smells of hackneys” and in his gorgeous lines “Do you forget/ Those nostrils oozing smoke, those floating tails,/ Those criniers whipped with air?”⁷ He also avoids referring directly to carriage wheels, although “tympan” in “tympan heels” brings to mind “drum-shaped wheels” as much as the “drum-like” sounds of horses on the post-roads (*OED*, s.v., “tympan,” 6 and 1, respectively). After pages of crossed-out attempts, including the evocative “this geography of wheels” (April 10, -s94), Slessor wrote, “Where’s now the ghost of Ogilby?” (April 13, -s96), thus introducing the character who ties his poem and my study together.

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OLD MAPS OF THE WORLD

Slessor couldn’t get to Ogilby, however, until he solved the problem of the poem’s epigraph. Slessor found it, as usual, in the 1929 Francis Edwards catalogue *Old Maps of the World*, this time in item 836, “OGILBY (JOHN), *Traveller’s Guide*” (p. 140). But unlike Robert Norton, whom he uncovered before beginning “The King of Cuckooz” (Haft 2012, 11–15), Ogilby came to Slessor’s attention only after he’d begun “Post-roads.”

Three entries—items 140, 146, and 836—are crucial to reconstructing Slessor’s discovery of his epigraph. The title “Post-roads,” it turns out, doesn’t derive from the Ogilby entry at all but from item 140, a half-page entry devoted to the maps in the *Atlas Universel* (1757) by Gilles and Didier Robert de Vaugondy (Francis Edwards 1929, 60). The Francis Edwards description of item 140 concludes with the words: “five maps at the end showing the *post-roads in Europe*” (ibid.: emphasis mine). Slessor shows his awareness of item 140 when he opens his journal entry of “March 30” (-s84) with the phrases “The Atlas” and “(4) Post-Roads of Europe,” then refers to the catalogue item by the authors, title, and item number of the *Atlas Universel*. Slessor also identifies Gilles and Didier Robert de Vaugondy as “Robert and Vaugondy,” a mistake found in the catalogue’s item 140. On the same page of his journal (March 30, -s84), Slessor underlines the words:

(146)—“The Shires of England and Wales described by Christopher Saxton being the Best and Original Mapps with many Additions and Corrections viz. ye Hundds, Roads, &c., by Philip Lea” . . . London, 1690.

A glance at item 146 in the catalogue reveals the Saxton atlas and all the details that Slessor lists in his journal (Francis Edwards 1929, 63). But the surprise is not that Slessor faithfully copied items 140 and 146 from the Francis Edwards catalogue: it’s the fact that the phrases “post-roads of Europe” and “Mappes, with ye Hundds, Roades, etc” [*sic*] also appear as early as the fourth page of his

PART III ROAD BOOKS

CARY (J.)

- 819 Survey of the High Roads from London to Hampton Court, Windsor, Tring, Hertford, Rochester, Dorking, &c., &c. (scale 1 in. to a mile). Number of Inns on each Separate Route, also the different Turnpike Gates, &c., *80 very nicely coloured maps of the roads*, sq. 8vo, *bf. calf*, 1790. £1 10s
- 820 Actual Survey of the Country Fifteen Miles round London, scale 1 in. to a mile, *51 coloured maps*, sm. 8vo, *calf*, 1811. 7s
- 821 New Itinerary; or an Accurate Delineation of the Great Roads . . . throughout England and Wales, with many of the principal Roads in Scotland, &c., Second Ed., with improvements, *2 maps*, 8vo, *half calf*, 1802. 8s
- 822 Seventh Edition, with Improvements, 8vo, *morocco*, 1817. 12s
- 823 Tenth Edition, 8vo, *calf* (*joint broken*), 1826. 5s
- 824 Traveller's Companion, or, a Delineation of the Turnpike Roads of England and Wales, *42 coloured maps, bound with Cary's New Itinerary*, 11th Ed., 6 col. *maps*, 8vo, *calf*, 1828. 14s
- 825 GILBEY (SIR W.) Early Carriages and Roads, *illustrs.* (extra matter inserted), 8vo, *cl.*, 1903. 14s
- 826 KEARSLEYS' Stranger's Guide, or Companion through London and Westminster, and the Country Round (within 14 Miles), *2 maps*, sm. 8vo, *boards, uncut* [*c.* 1795]. 8s
- 827 KITCHEN (T.) Traveller's Guide through England and Wales, *map*, sm. 4to, *orig. half binding*, 1783. 12s
- 828 LUCKOMBE (P.) England's Gazetteer, *map*, 3 vols. in 1, *thk.* 12mo, *bf. calf*, 1790. 6s

OGILBY (JOHN)

- 829 Britannia . . . or an Illustration of the Kingdom of England and Dominion of Wales; By a Geographical and Historical Description of the Principal Roads thereof, . . . *102 copperplate maps and elaborate frontispiece*, folio, *calf*, *Printed by the Author*, 1675. £9
- An exceptionally fine and tall copy of the second edition, on large and thick paper, in a contemporary binding in excellent state.

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Figure 2. The first of the three pages comprising Part III, "Road Books," in the 1929 Francis Edwards catalogue *Old Maps of the World, or Ancient Geography; a Catalogue of Atlases & Maps of All Parts of the World from XV Century to Present Day* (London: F. Edwards Ltd., page 139). The final entry on the page describes "an exceptionally fine and tall copy" of John Ogilby's celebrated 1675 *Britannia* (item 829), and is the first of eight items devoted to Ogilby's road maps and guides. The third of four catalogues in the short-lived "new series" produced in 1929, *Old Maps of the World* and its companion booklets were larger and far better illustrated than the more than 500 Francis Edwards catalogues preceding it. Courtesy of the New York Public Library and of Francis Edwards Ltd.

Atlas drafts ("Atlas 4": February 28, -s61). On that occasion Slessor identified neither the catalogue nor its item numbers. Yet the phrases prove that he'd come across the title of his second poem even before that of his first poem ("Atlas 5": March 2, -s62). All that remained was for him to shorten to "Post-roads" (April 3, -s88) his preliminary title "Post-roads of Europe" (February 28, -s61; March 18, -s76; March 30, -s84). In the end, however, Slessor used neither item 140 nor item 146 as the epigraph of "Post-roads." "Atlas Universel" was too brief and abstract, while the suitably quaint and garrulous title of Philip Lea's edition of Saxton's maps makes no reference to "post-roads."

So how *did* Slessor find Ogilby? The catalogue's description of item 146 informs the reader that "the roads of Ogilby and Seller were added" to the 1690 edition of Philip Lea's maps (Francis Edwards 1929, 63). When Slessor went looking for these road maps, he found none by Seller in the "Road Books" part of the catalogue, but he did find more than a page devoted to John Ogilby (Part III, 139–140) (Figure 2). Since "Road Books" occupies only three pages, Slessor read on. At the beginning of the catalogue, the list of important dates in the history of cartography ("Data," 6–7) told him that Saxton's 1597 *Atlas* was "the first atlas of English *county* maps," while Ogilby's [*sic*] 1675 "Book of English *Roads* [was] the first of *its* kind" (7: emphasis mine). Investigating further, he might have discovered that Ogilby's 1675 "Book of English Roads"—more famously known as *Britannia*—contained a three-page section titled "Of the Post-Roads of England" (Ogilby 1675, after "Preface": see Chubb, Skells, and Beharrell [1927] 1966, 85). And that this section of *Britannia* catalogues the major roads out of London and several secondary roads, along with their miles and stages.

Yet here again, Slessor did not choose an edition of Ogilby's *Britannia* as the epigraph for "Post-roads," even though the catalogue advertises three copies of that monumental and hugely successful atlas (items 829–831: Francis Edwards 1929, 139–140). Instead, he selected one of the "portable" editions listed in *Old Maps of the World* (items 832–836)—specifically, Ogilby's "*Traveller's Guide, or a most Exact Description of the Roads of England*" (Figure 3). As soon as Slessor laid eyes on item 836, he interrupted his composition of "Post-roads" to write "MAP" in capital letters in his journal. Below that, he copied "No.836," the entire title, and the (circled) date "1712" supplied by the catalogue (April 7, -s92: bottom left). In the subtitle of *Traveller's Guide*, "*being Mr. Ogilby's Actual Survey and Mensuration by the Wheel*," Slessor had found the concrete image that begins and ends his poem—"Ogilby's *Wheel*."

In the little that has been written about “Post-roads,” John Ogilby takes center stage. Slessor’s friend and fellow poet/editor Douglas Stewart reprinted the first four poems of *The Atlas* in his important anthology *Modern Australian Verse* (Stewart 1964, 3–9), but he misidentified Ogilby as “an eccentric scientist” who “measured England in the *eighteenth* century ‘by the wheel’” (Stewart 1969, 158; Stewart 1977, 74: emphasis mine). The anonymous writer who reviewed *Cuckooz Contrey* for the *Sydney Morning Herald* didn’t have much more to add: before quoting the poem’s first stanza, he identified Ogilby only as “a pioneer in the methods of measuring distance by wheel, elaborated in the modern cyclometer and speedometer” (November 12, 1932, p. 8: NLA MS 3020/8/20). After defining the unusual words in “Post-roads,” Haskell and Dutton supplemented their annotated edition of Slessor’s *Collected Poetry* with a brief biographical reference to Ogilby, though their contribution fails to mention *Britannia*, the title by which his 1675 atlas is best known (Slessor, Haskell, and Dutton 1994, 359):

‘Mr. Ogilby’ is John Ogilby (1600–76). English author and printer who published many geographical works, including ‘An Illustration of the Kingdom of England and Dominion of Wales, by a Geographical and Historical Description of the principal Roads thereof’ (1675).

Slessor himself provided no “Author’s Notes” for “Post-roads” at the end of *Cuckooz Contrey*, despite the fact that he appended notes to *The Atlas* as a whole and to every other poem of the sequence (Slessor 1932, 75). Yet however absent, abbreviated, or misleading these identifications may be, I shall argue that “Post-roads” itself demonstrates that Slessor knew enough about the surveyor/cartographer of the poem’s epigraph not only to name *and* describe Ogilby in the body of the poem, but also to feature him as the poem’s dominant character. Compare “Post-roads” to “Dutch Seacoast,” for instance, or to “The King of Cuckooz.” The third poem of the sequence describes the Joan Blaeu of its epigraph only as “the great cartographer” (see Haft, forthcoming); while the narrator of “The King of Cuckooz” assumes Norton’s (highly fictionalized) persona without ever naming him(self) (Haft 2012, 8–9, 26–28). As for the two remaining poems of *The Atlas*, both “Mermaids” and “The Seafight” focus on the map image, but ignore the cartographer entirely.

FRANCIS EDWARDS LIMITED · Read Books		
830	Another Copy, wanting frontispiece, but with all the maps, folio, old calf (rebacked), 1675.	£5
831	The Fourth Edition, maps, Reissue of the original plates, with 48 pages of text, folio, old calf, 1698.	£5
832	Owen and Bowen. Britannia Depicta or Ogilby Improved, being a correct Copy of Mr. Ogilby's Actual Survey . . . of Roads in England and Wales, 273 pp. of maps, 8vo, orig. calf (repaired) Tho. Bowles . . . and Em. Bowen near ye King of Spain in S. Katherine, 1720.	£10
First Issue of the First 8vo Edition of Ogilby's Roads. Only two other copies known according to Chubb, viz. Sir George Fordham's and Dr. Penfold's. It is stamped on the upper cover of the binding with the name of a previous owner, Edward Walsh. An extremely popular work, four editions were issued in as many years and it continued to be printed up to 1764.		
833	Fourth Edition, 273 pp. of maps, 8vo, old calf, rebacked, Printed and Sold by T. Bowles, 1736.	£1 10s
This is the 5th issue of the Fourth Edition, the maps the same as in previous editions, but extra wording added to a few titles and preliminary matter increased.		
834	Roads through England, or Ogilby's Survey, revised, improved, and reduced to a portable size by John Senex, oblong 8vo, original sheep wrapper, Paris, Le Rouge, 1759.	£1
Title in French and English (rubbed), French text and alphabetical list of towns, and 101 plates.		
835	Another [English] Edition, 101 copperplate maps, London, J. Bowles, oblong 8vo, leather wrapper, Title browned but maps clean, 1762.	£1 5s
836	Traveller's Guide, or a most Exact Description of the Roads of England: being Mr. Ogilby's Actual Survey and Mensuration by the Wheel, &c., folding map, 8vo, calf, [1712].	£1 5s
837	OGILBY (DAVID) A General Itinerary of England and Wales, with part of Scotland, containing all the Direct, and Principal Cross Roads, . . . folding map, 8vo., hf. calf, 1804.	6s
838	OWEN'S New Book of Roads, or a Description of the Roads of Great Britain, map, 3rd Ed., Corrected, sm. 8vo, original sheep, 1782.	7s
PATERSON (D.)		
839	Travelling Dictionary . . . distance of all the Principal cities . . . from each other, 8vo, boards, 1797.	6s
840	New and Accurate description of all the Direct and Principal Cross Roads, map, 8vo, hf. mor., 1799.	8s
841	Thirteenth Edition, map, 8vo, contemporary straight grain red morocco, gilt extra, 1803.	15s
842	Another Copy, half calf.	6s
843	Eighteenth (and Best) Edition, 9 new maps or plans, by Edw. Mogg, 8vo, hf. vellum [N.D.].	15s

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Figure 3. The second of the three pages comprising Part III, “Road Books,” in the 1929 Francis Edwards catalogue *Old Maps of the World* (London: F. Edwards Ltd., page 140). Items 830–836 are devoted to John Ogilby’s road maps and guides. Item 831 advertises the 1698 edition of the *Britannia*; while item 836 features the “Traveller’s Guide . . .,” whose title Slessor chose as the epigraph for “Post-roads.” Courtesy of the New York Public Library and of Francis Edwards Ltd.

Slessor would have read about Ogilby in the famous 1660–1669 memoirs of Samuel Pepys (1633–1703: see Pepys, Latham, and Matthews 1970).⁸ A contemporary of Ogilby, Pepys described not only the art of coach-building in some detail (*Encyclopedia Britannica* 1911, 5:403, s.v., “carriages”), but also his embarrassment at being seen in hackneys (Pepys’s April 18, 1664 entry; see Thrupp [1877] 1969, 48, 103, 105; Gilbey 1903, 43–54). Slessor took from Pepys details for two other *Cuckooz Contrey* poems, both of which bracket *The Atlas* in composition: namely, the name and brief characterization of the eponymous hero of “Captain Dobbin” (April 1929: Slessor, Haskell, and Dutton 1994, 77–82, 362–364; see Pepys’s July 11, 1665 entry, and Haft 2011, 9, 23–24, 31, 33–34) as well as the epigraph and certain lines of “The Country Ride” (November 1930: Slessor, Haskell, and Dutton 1994, 95–96, 378–379; see Pepys’s April 11, 1661 entry).

To supplement Pepys’s references, Slessor could rely upon the *Dictionary of National Biography* for its detailed life of Ogilby (Goodwin 1921, 14:908–911). Whether or not Slessor saw Ogilby’s original works, he may have had access to facsimile editions and comprehensive carto-bibliographies (see Harley 1970, xxv–xxvi) like T. Fairman Ordish’s *Roads out of London; being photographic reprints extracted from Ogilby’s “Britannia,” 1675, with so much of his text as relates to them* (Ogilby and Ordish 1911); or Sir Herbert George Fordham’s *John Ogilby (1600–1676), his Britannia, and the British Itineraries of the Eighteenth Century* (Fordham 1925); or Thomas Chubb’s *Printed Maps in the Atlases of Great Britain and Ireland: a Bibliography, 1579–1870* (Chubb, Skells, and Beharrell [1927] 1966). In fact, the Francis Edwards catalogue cites “Chubb’s *Atlases of Great Britain* . . . and Sir George Fordham’s *Works*” as being among the “few excellent books” published on the history of cartography (1929, 5). And Chubb himself, in his extensive “Biographical Notes” (417–457), recommends that the reader searching for more information on Ogilby consult the *Dictionary of National Biography* and the original printing of Fordham’s monograph on Ogilby (444; Fordham 1925). Moreover, the catalogue entry on Ogilby’s *Britannia* clearly derives from Chubb’s reference to the work’s “102 copper plates” and “elaborate frontispiece” (Francis Edwards 1929, 139; Chubb, Skells, and Beharrell [1927] 1966, 85), just as the catalogue’s omission of Fordham’s first name “Herbert” reflects its absence in Chubb’s bibliographical note on the “most varied career” of John Ogilby (444). Finally, Chubb’s description of *Britannia*’s layout is so clear that Slessor would know the order and content of each of its maps even without Ogilby’s atlas in hand (85–87).

Whatever Slessor read about Ogilby must have appealed to him, for the two men bore an uncanny resemblance to one another.

Whatever Slessor read about Ogilby must have appealed to him, for the two men bore an uncanny resemblance to one another. Like Slessor, Ogilby was born with the century and “gave way to fate” during his seventies (Anthony à Woods, quoted in Van Eerde 1976, 130). Both had Scottish ancestry: although little is known of his parents (Withers 2004, 41:566), Ogilby was born in Scotland and his portraits display its heraldic lion (see Aubrey and Clark 1898, 2:99; Van Eerde 1976, 13, 122, 179), while Slessor inherited his Scottish blood from his mother, Margaret McInnes (Dutton 1991, 4). Intensely visual and disciplined “in preparing and publicizing their work” (Van Eerde 1976, 103, 94), both men concentrated on poetry for decades: Ogilby’s beautifully illustrated translation of Homer’s *Iliad* won the admiration of Pope (Van Eerde 1976, 13; cf. Goodwin 1921, 14:911); while Slessor’s poetry reveals his penchant for painterly images

and works of art (Haft 2011, 15–22). But then “shutting up the Fountain of the Muses,” as Ogilby put it in the preface of his 1670 atlas *Africa*, both poets “left Clambering steep Pernassus [*sic*], and fell into the beaten way, and more frequented Paths of Prose” (Ogilby 1670, quoted in Harley 1970, vii). After 1948, Slessor didn’t publish a single new poem, though he edited books and periodicals, published a short story and miscellaneous works on Australian cities and wine, and continued to put out articles, leaders for newspapers, and reviews of books (Thomson 1986, 204–206). Despite being married, each spent much of his time with other professional men in London coffee houses or Sydney pubs (Van Eerde 1976, 126; Dutton 1991, 129–131; Caesar 1995, 61). Ogilby and Slessor not only loved maps but created enduring works of cartographic literature in the form of atlases or map-obsessed poems (see Haft 2011, 22–27). And both were wildly successful in more than one career: Slessor was a celebrated journalist as well as poet (1920–1971: *ibid.*, 8; see Dutton 1991); while Ogilby embarked on a startling number of occupations, culminating in the surveying and cartographic projects he undertook in his late-sixties. In fact, the enthusiasm, focus, and break-neck productivity exhibited by Slessor’s “tireless ghost of Ogilby” pales before the qualities Ogilby exhibited in his own improbable life, not the least of which was the “untiring energy” that his contemporaries repeatedly extolled (Goodwin 1921, 14:909; Aubrey and Clark 1898, 2:103–104).

Though “from a gentleman’s family” (Aubrey and Clark 1898, 2:99), Ogilby became a dancer after paying his father’s debts. When a misstep lamed him, he taught dancing, built and managed a theater, and turned to soldiering (ca. 1620–1641: Withers 1921, 41:566). After the execution of his patron, the most senior minister of Charles I, Ogilby took up Latin at Cambridge (ca. 1645), then Greek (ca. 1654), and began translating and publishing the classics—Virgil’s poetry (1649), Aesop’s *Fables* (1651) and *Aesopics* (1668), Homer’s *Iliads* (1660) and *Odysseys* (1665) [*sic*]; as well as a two-volume Bible, which he produced and illustrated “with chorographical sculps” (1659/1660). Then came the Great Fire of September 2–5, 1666, memorialized in Pepys’s diary. After that fire destroyed the greater part of Ogilby’s plates and property, Brian Harley says that Ogilby was appointed “sworn viewer” to help reestablish property boundaries in the burned-out parts of London (1970, vii), while Margret Schuchard argues that Ogilby was never a sworn viewer but nevertheless received “permission to make an exact survey of the capital” as part of his management of “an ever increasing surveying business for the completion of his *Britannia* project” (Schuchard 1975, 18 and 17, respectively). Whatever the reason, Ogilby learned surveying from the professionals with whom he worked, and during his final decade threw himself into publishing geographical and cartographical works. He did so well that he became the “Cosmographer” of Charles II (1671: Van Eerde 1976, 130), who, as his king and new patron, was “genuinely excited by map and chart” (Barber 1997, 105). Though Ogilby’s great map of London was not published until shortly after his death (1676–1677: Fordham 1925, 159; Harley 1970, vii), he put out atlases on various parts of the world between 1669 and 1673 as part of his *English Atlas* (Skelton and Chubb 1970, 185): *Africa* (1670), *Atlas Japannensis* (1670), *America* (1670), *Atlas Chinensis* (1671), and *Asia* (1673).⁹

But his masterpiece and “the only original work of Ogilby’s geographical books” was *Britannia* (Ogilby 1675: Schuchard 1975, 82). Drawing on Ogilby’s surveys

Both men were wildly successful in more than one career: Slessor was a celebrated journalist as well as poet; while Ogilby embarked on a startling number of occupations, culminating in the surveying and cartographic projects he undertook in his late-sixties.

that were sponsored by Charles II in the early 1670s (Ogilby 1699 and Ogilby 1712 Preface, B1r; Fordham 1925, 157), it was the most accurate and detailed road atlas of its time. Here is how Catherine Delano-Smith and Roger Kain summarize his achievement (1999, 171):

Ogilby's choice of scale, one inch to one (statute) mile, proved so suitable for general use that it came to be adopted by later county map-makers, including, in due course, the Ordnance Survey. Approximately 7,500 miles (12,000 km) of road, surveyed consistently at 1,760 yards per [statute] mile, and 73 mail roads in England and Wales, are represented on 100 maps and described in 200 pages of written text.

Accolades abound. Alan MacEachren says, "John Ogilby must be credited, in large part, with popularization of strip maps for highway travel" (1986, 15–16). Ashley Baynton-Williams describes *Britannia* as "the first national road-atlas of any country in Western Europe" and "one of the two greatest English atlases published before the nineteenth century" (Baynton-Williams 2006; cf. Millea 2007). Katherine van Eerde exclaims that "in its comprehensiveness, its incorporation of new devices of computation and delineation, and its opulence of paper, design and decoration, [*Britannia*] immediately set a new standard for map-making in England" (1976, 137). Brian Harley adds: "it remains unchallenged as the greatest advance in the mapping of England between the sixteenth-century surveys of Christopher Saxton and the county surveys of the second half of the eighteenth century" (1970, xix). Pirated as soon as it came out, *Britannia* profoundly influenced road maps for well over a century and established Ogilby's lasting fame in cartographic history. *Britannia* became so popular and was reproduced so often that the Francis Edwards catalogue offers it at no more than £9 (item 829; item 830 at £5), a very appealing price for such a treasure. Especially as its advertised price to subscribers in 1672 was a whopping £4 to £5 (Schuchard 1975, 26; see 125).

BRITANNIA

*For the map-lover,
Britannia is a revelation.*

For the map-lover, *Britannia* is a revelation. Opening the atlas, the reader discovers an elaborate frontispiece (Figure 4) with two men, strip map in hand, emerging on horseback from a London city gate (Schuchard 1975, 81) over which flies the Royal Standard. As they head along a road into the countryside, everything around them bustles with activity. A horse-drawn carriage has already crossed a bridge ahead and is beginning the trek uphill. To their right, the master surveyor on horseback instructs two men on foot who are pushing a perambulator or measuring wheel—Ogilby's "Wheel Dimensurator" (Preface to *Britannia*, in Harley 1970, xv)—to ascertain the length of a crossroad. In the foreground, four men consult a map titled "The Continuation of the Road" (left). Nearby, four surveyors and cartographers converse around a table cluttered with the tools of their trade, including a terrestrial globe turned to Africa (right)—a subtle allusion, perhaps, to Ogilby's earlier atlas. Above is a banner announcing the title of the atlas and its promise to be the first volume

of a series. At the very top flutter three putti, each holding one of Ogilby's maps: a road map (London to Barwick, left); a city map (London, middle); and a county map (Yorkshire, right).

Inside *Britannia*, the reader is greeted with over one hundred double-leaf maps. Each contains six or seven vertically aligned and ribbon-like strips, each of which is two-and-a-half inches wide (Chubb, Skells, and Beharrell [1927] 1966, 85) and covers approximately seventy miles (Baynton-Williams 2006). These strips could be cut out of *Britannia* or published separately, like those carried by the man on horseback or by the angel in the upper-left of the frontispiece (Harley 1970, xviii; Van Eerde 1976, 137). However presented, each map is read from bottom-left to top-right: the road named in its title cartouche (top-center) unwinds county-by-county past landmarks—at measured intervals and with direction changes indicated by compass roses—towards its final destination. So clear is Ogilby's presentation that "the reader can follow the road on paper as if physically riding along it" (Delano-Smith and Kain 1999, 170).

Besides the frontispiece, the most discussed and reproduced of Ogilby's attractive maps tend to be those with title cartouches illustrating the tools that made the national survey and Ogilby's maps possible (see Ogilby 1675 and Ogilby [1675] 1970, plates 1, 21, 80, 100; Hyde 1980, 3): namely, the theodolite or "surveyor's compass" used for determining the angles when roads change direction (Harley 1970, xv); and the wheel, complete with its dial showing the distances measured in ten-mile revolutions (Ogilby 1675, Preface, C1r; reproduced in Bricker and Tooley 1968, 36; Ogilby 1675 and Ogilby [1675] 1970; Baynton-Williams 2006). There is also the headpiece on Ogilby's dedication to Charles II, which shows two putti flanking the British coat-of-arms: one cherub carries both a theodolite and a map of England and Wales; the other rolls the wheel and displays a road map (reproduced in Ogilby [1675] 1970; Schuchard 1973, 76; Schuchard 1975, 81; Baynton-Williams 2006).

In "Post-roads" Slessor has transformed graphic representations into poetic images. Most



Figure 4. Frontispiece of John Ogilby's *Britannia* (London, 1675). Amidst the bustle of this English scene, a master surveyor (on horseback) instructs two others (on foot) as they push the perambulator or measuring wheel—Ogilby's "Wheel Dimensurator"—to ascertain the length of a crossroad (lower right). Above all, three putti with banners advertise the atlas and its maps. Although Ogilby's name is nowhere to be found, two names do appear on the bottom: Francis Barlow, who drew the frontispiece ("Fran. Barlow inv."); and Wenceslaus Hollar (1607–1677), one of London's leading engravers, who engraved it ("W. Hollar fecit 1675").

Measuring 35.5 x 20.3 centimeters (14 x 8 5/6 inches), the frontispiece is widely reproduced (e.g., Chubb, Skells, and Beharrell [1927] 1966, opposite p. 84; Schuchard 1973, 83; Hyde 1980, 3; Taylor 1998, 58; Baynton-Williams 2006), and a zoomable image is available online from the Map Collection of Hampshire County Council Museums Service, from which this illustration derives (Norgate and Norgate 1996–2006a). Courtesy of Jean and Martin Norgate.



Figure 5. Portrait of Ogilby ("Johannes Ogilvius") engraved by the elder William Faithorne ("Guil. Faithorne sculp.": 1616–1691) after a painting by Sir Peter Lely ("P. Lilly pinxit"). Though not in *Britannia*, this portrait graced the 1654 *Works of Publius Virgilius Maro*, translated, adorned with Sculptures, and illustrated with Annotations by John Ogilby (London, Printed by Thomas Warren for the author, and are to be had at his House in King's-Head Court in Shoe-lane). Like other portraits of the future cartographer, Faithorne's reveals Ogilby's prominent nose. Courtesy of the National Portrait Gallery, London.

obvious is how the poem echoes *Britannia's* frontispiece with its depiction of a journey, by horseback and carriage, along a well-traveled road into the countryside. Just as "T.B. Macaulay in his famous *History of England* [1849–1861] . . . used Ogilby's maps to help visualize the countryside" of 1685 (Harley 1970, xx), Slessor has animated Ogilby's frontispiece by investing the visual scene with other sensual images, most of them rooted in seventeenth-century vocabulary. What began in his poetry journal as explicit and general—"a diagram of senses, hearing, sound and . . ." (April 19, –s99)—became in "Post-roads" both concrete and specific. There are the sounds of "tympan heels," passengers' voices, and the punishing blows or "bastinadoes of iron boots."¹⁰ There is the visual world of "dead men staring out of glass" and a gentleman poised to "behold there in the moonshine, . . . John Ogilby's Wheel." There is the taste of "madeira" and "partridge-pies," the "smells" of "hackneys" and "mohair sour with damp," the touch of the wheel "steered by no earthly hand." Slessor even emulates the frontispiece's juxtaposition of mortal activity and immortal art. Most tellingly, Slessor's Ogilby—with his wheel and maps—has replaced *Britannia's* putti as the symbol of the transcendence of both art and science.

"A diagram of Ogilby's eye and ear/ with soundings for the nose" suggests that Slessor saw at least one of the portraits of Ogilby that accompanied his translations of classical texts (Goodwin 1921, 911; Schuchard 1973, 13, 32, 81; Van Eerde 1976, 178–179; Hyde 1980, 3; Withers 2004, 41:567). The most famous likeness was engraved by the elder William Faithorne after a painting by Sir Peter Lely (Figure 5). Although that much-reproduced portrait did not grace the pages of *Britannia*,

it did appear in Ogilby's 1654 *Works of Publius Virgilius Maro* (Virgil et al. 1654) and was reproduced by Fordham in his monograph on Ogilby (1925, opposite title page; see also Harley 1970, viii; Schuchard 1973, 4; Withers 2004, 41:566; Baynton-Williams 2006). In particular, the phrase "soundings for the nose" not only alludes to the senses but also highlights the cartographer's attractive, but very prominent nose.¹¹

For his epigraph, however, Slessor rejected the pretentious and imperialistic title “*Britannia*,” choosing instead the title of the inexpensive and highly portable *Traveller's Guide*. To better understand Slessor's choice, a chronology of Ogilby pocket guides will place *The Traveller's Guide* within its historical context and also clarify several items that the poet found in the “Road Books” section of the Francis Edwards catalogue.

Despite the achievement of his *Britannia*, Ogilby knew that an atlas exceeding 600 pages and seven kilograms could only reside on the tables of wealthy arm-chair geographers (Delano-Smith and Kain 1999, 168–169 and 277 n.109). Not only was *Britannia* out of reach for most travelers and their budgets, but its folio size made it cumbersome to peruse either on horseback or in a coach (Taylor 1998). As an alternative, therefore, Ogilby published *Mr. Ogilby's Tables of his Measur'd Roads* (Ogilby 1676: Fordham 1925, 168; Schuchard 1975, 97, no.33), whose thirty-four octavo—or pocket-size—pages were filled with *tables* rather than maps and descriptive text to indicate distances from one town or landmark to the next (Fordham 1925, 160, 168–170). By the third edition, it had morphed into *Mr. Ogilby's Pocket Book of Roads* (Ogilby and Morgan 1679: Fordham 1925, 169; Schuchard 1975, 90, no.36); and by the fourth edition, it had become *Mr. Ogilby's and William Morgan's Pocket Book of the Roads* (Ogilby and Morgan 1689: Fordham 1925, 169–171; Schuchard 1975, 106, no.43). That title, now featuring the name of Ogilby's step-grandson and partner/heir, William Morgan (d. 1690: Tooley et al. 1999–2004, 3:280), would still be used in one form or another as late as 1794, the date of its twenty-fourth and final edition of 266 pages (Ogilby and Morgan 1794: Fordham 1925, 169–172).

Pocket editions of Ogilby's beautiful *strip maps*, by contrast, did not appear until forty years after his death (Delano-Smith and Kain 1999, 172). Between 1719 and 1720, no fewer than three competing editions hit the market (Delano-Smith 1999, 172; Baynton-Williams 2006): Thomas Gardner's *A Pocket-Guide to the English Traveller . . .* (Ogilby et al. 1719: see Fordham 1925, 173; Chubb, Skells, and Beharrell [1927] 1966, 110–111); John Senex's *An Actual Survey of all the Principal Roads of England and Wales* (Ogilby and Senex 1719: see Fordham 1925, 174; Chubb, Skells, and Beharrell [1927] 1966, 112–116; Francis Edwards 1929, items 834–835, for later editions); and the popular *Britannia Depicta* or *Ogilby Improved* by John Owen and Emanuel Bowen (Ogilby, Owen, and Bowen 1720: see Fordham 1925, 175–176; Chubb, Skells, and Beharrell [1927] 1966, 117–125; Hodson and Skelton 1984–1997, 1:94–95; Francis Edwards 1929, items 832–833). By the 1770s, these direct offspring of Ogilby's work were being replaced by Daniel Paterson's *A New and Accurate Description of all the Direct and Principal Cross Roads* (Paterson 1771: see Francis Edwards 1929, items 840–843) and *Owen's New Book of Roads* (Owen 1779: see Francis Edwards 1929, item 838, for the 1782 edition), whose own numerous editions carried Ogilby's ideas into the nineteenth century (Fordham 1921, 16; Harley 1970, xxix). Not until John Cary's national survey at the end of the eighteenth century and the publication of his *New Itinerary* in 1798 was Ogilby “definitely displaced in the country as a whole by the new measurements in

For his epigraph, Slessor rejected the pretentious and imperialistic title “Britannia,” choosing instead the title of the inexpensive and highly portable Traveller's Guide.

complete road-book form” (Fordham 1925, 177, 157; see Francis Edwards 1929, items 821–823). As Slessor discovered, the Francis Edwards catalogue offers editions of all these works except Gardner’s.

Initially priced at 3 shillings, sixpence (3s.6d.), *The Traveller’s Guide* was another pocket-edition designed for a modest budget. What makes it unique is how cleverly it straddles the line between *Britannia* and the other portable guides of Ogilby’s work. Both Ogilby and Morgan had died before *The Traveller’s Guide* appeared in 1699, and then was reprinted, with only cosmetic changes, in 1712 (Schuchard 1975, 100–102; cf. Fordham 1925, 166). Although the latter edition is the one advertised in *Old Maps of the World*, “1712” does not appear anywhere in Slessor’s epigraph. To his mind, such a date would have conflicted not only with what he knew about Ogilby’s lifespan but also with the other seventeenth-century maps (he thought) he’d chosen for the rest of

The Atlas epigraphs.¹² Nor did *The Traveller’s Guide* derive from the acclaimed 1675 edition of *Britannia*. Instead, it was based on the 1698 edition of *Britannia*. Published by Abel Swall (fl. 1665–1699: Tooley 1999–2004, 4: 235, s.v. “Swale”) and Robert Morden (d. 1703: *ibid.*, 3:278), to whom Morgan had given Ogilby’s plates (Harley 1970, xviii–xix; Skelton and Chubb 1970, 247; Schuchard 1975, 9), the 1698 *Britannia* was touted as “more concise and intelligible” than the original (Ogilby 1698, “To the Reader,” quoted in Harley 1970, xxviii; see Fordham 1925, 165–166, Schuchard 1975, 98–100, and Francis Edwards 1929, item 831). Not only did the editors remove the frontispiece and dedication that accompanied the 1675 edition, but they entirely reset its text, shrinking 200 pages of text down to only 47 pages. Entitled *Itinirarium Angliae* [sic], or *A Book of the Roads of England and Wales*, &c. and situated at the front of the volume, the abridged text was followed by a two-page alphabetical table. This table, in turn, contained the plate and page number of each city/town and corresponding road featured on the strip maps that comprised the remainder of the atlas (Ogilby 1698, 1–47, and 47–48, respectively; Harley 1970, xxvii–xxviii). But though the 1698 *Britannia* fills only 350 pages, it is still a folio edition, whereas *The Traveller’s Guide* is an octavo edition, measuring a mere 20.5 x 13.5 x 3 centimeters (8 x 5 1/4 x 1 1/4 inches) and containing only 265 diminutive pages (Fordham 1925, 167). Its remaining editor Abel Swall could therefore boast that “...the Traveller is here furnished at small Expense, with a Guide that will conduct him through all the Principal Roads of England” (Ogilby 1712, Preface, A2V). As important to Slessor, the full title of *The Traveller’s Guide* indicates that it is a pocket reference combining description and tables in a novel way compared to the tables-only guide dating from 1676 on (Ogilby 1712, in Schuchard 1975, 101–102). The emphasis on description must have appealed to the poet as much as the title’s reference to Ogilby, the Wheel, mensuration, and travelers in general. Though it is quite long, Slessor used only the introductory lines of the title as his epigraph for “Post-roads”: “*The Traveller’s Guide, OR, A Most Exact Description OF THE ROADS OF ENGLAND. BEING Mr. OGILBY’S ACTUAL SURVEY, and Mensuration by the WHEEL*” (Figure 6).

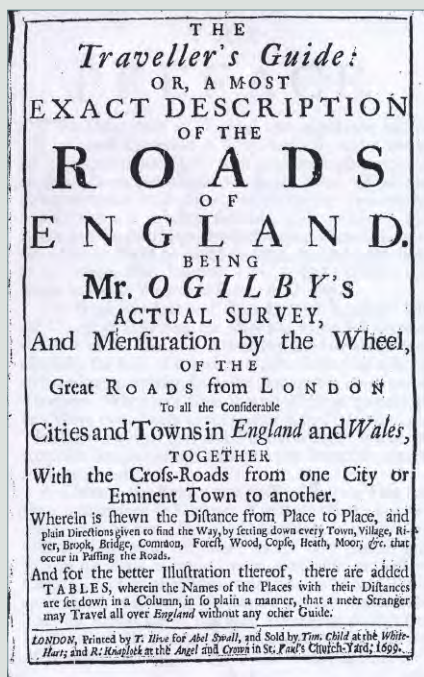


Figure 6. The (first) Title Page of The Traveller’s Guide (Ogilby 1699). Although Fordham refers to the 1712 edition as the “second and unaltered impression” of the 1699 edition (1925, 166), Schuchard notes that there are minor differences, including the replacement of “1699” with “1712” on the second title page (O1r, Tables) (1975, 102). Image from Early English Books Online: Text Creation Partnership (EEBO-TCP) and accessed at the NYPL-Research Library, January 14, 2013.

Most surprising of all, however, is the *total absence of strip maps* in *The Traveller's Guide*. In every edition of *Britannia*, Guildford—the town that Slessor's tired travelers long to reach—had appeared on the strip map entitled *The road from London to Portsmouth* (Figure 7). But that map, like the 100 other strip maps in *Britannia*, has been replaced in *The Traveller's Guide* with *tables* “wherein the names of all places in the maps of [Ogilby's] *Britannia* are set down, with the distances from town to town; and all other remarks necessary for the instruction of travellers” (Ogilby 1699 and 1712, 2nd title page: Tables, O1r). A person traveling from London to Guildford would find in *The Traveller's Guide* only a single map. Measuring 24 x 19 cm (9 ½ x 7 ½ inches: Schuchard 1975, 101), that small “folding map” is advertised in item 836 of the Francis Edwards catalogue (1929, 140). With the promising title “New Mapp of the Roads of ENGLAND Shewing the Reputed distances from one town to another” (Ogilby 1699 and 1712, after “The Contents,” A3r–A4v), the unsigned diagrammatic map shows “an integrated network of roads” offering a “multiplicity of itineraries mapped out on a single sheet of paper” (Delano-Smith and Kain 1999, 167 and 168). Unfortunately, it is so small, so overrun with names and distances, as to be practically illegible—unless, of course, one knows to look for Guildford along the road running southwest from London toward the Isle of Wight (bottom, center-right).

The traveler gets more help from the tables and descriptions, once he has familiarized himself with the guide's abbreviations, competing sets of measurements, and dual parts—each with its own title page (A1r, O1r). In “The Contents,” he is told to look up “Guilford”—which is how the *The Traveller's Guide* usually spells the town's name—in the “Alphabetical Table” following page 187. That “TABLE of the *Cities, Principal Corporation and Market-Towns* . . . with the *Roads* to which they belong” (Ogilby 1699 and 1712, N6v–N8v [188–192]) lists two items to the right of Guildford's name: “Portsmouth,” the road along which Guildford is located, and “58,” the page describing Guildford itself (N7r [189]). Upon turning to page 58 in the first part of the guide (B1r – N6r [1–187]), the traveler discovers that pages 57 to 59 contain all the practical details of his trip there and back (cf. Ogilby 1675 and Ogilby [1675] 1970, 59–60). Directly under the heading “The Road from LONDON to PORTSMOUTH . . .,” a table lists ten towns, followed by the counties (57) and rivers through which the road runs, the road's condition (“affording generally a good Sandy Way, well frequented and accommodated,” 58), “turnings to be avoided,” and descriptions of landmarks (58–59). The table on page 57 immediately alerts the traveler that Guildford lies between Cobham and Godalmin. Along the nearly seventy-four miles of road to Portsmouth, Guildford is thirty miles southwest of London by “The Dimensuration,” but only twenty-five miles by “The Vulgar *Computation*.” Because the old British mile of 2,428 yards was longer—“though not in any precise fashion” (Van Eerde 1976, 136)—than Ogilby's dimensurated statute mile of 1,760 yards (Fordham 1925, 157; Chubb, Skells, and Beharrell [1927] 1966, xiv, 444; see Ogilby 1712, A2v), Slessor could play on the confusion that Ogilby's mensuration must have caused. For the poem's “yawning Fares” would have found their journey suddenly “increased” by five miles!

Although Slessor does not describe Guildford, only his passengers' impatience to be there, *The Traveller's Guide* offers on page 58, as promised, descriptions of

Most surprising of all is the total absence of strip maps in The Traveller's Guide.

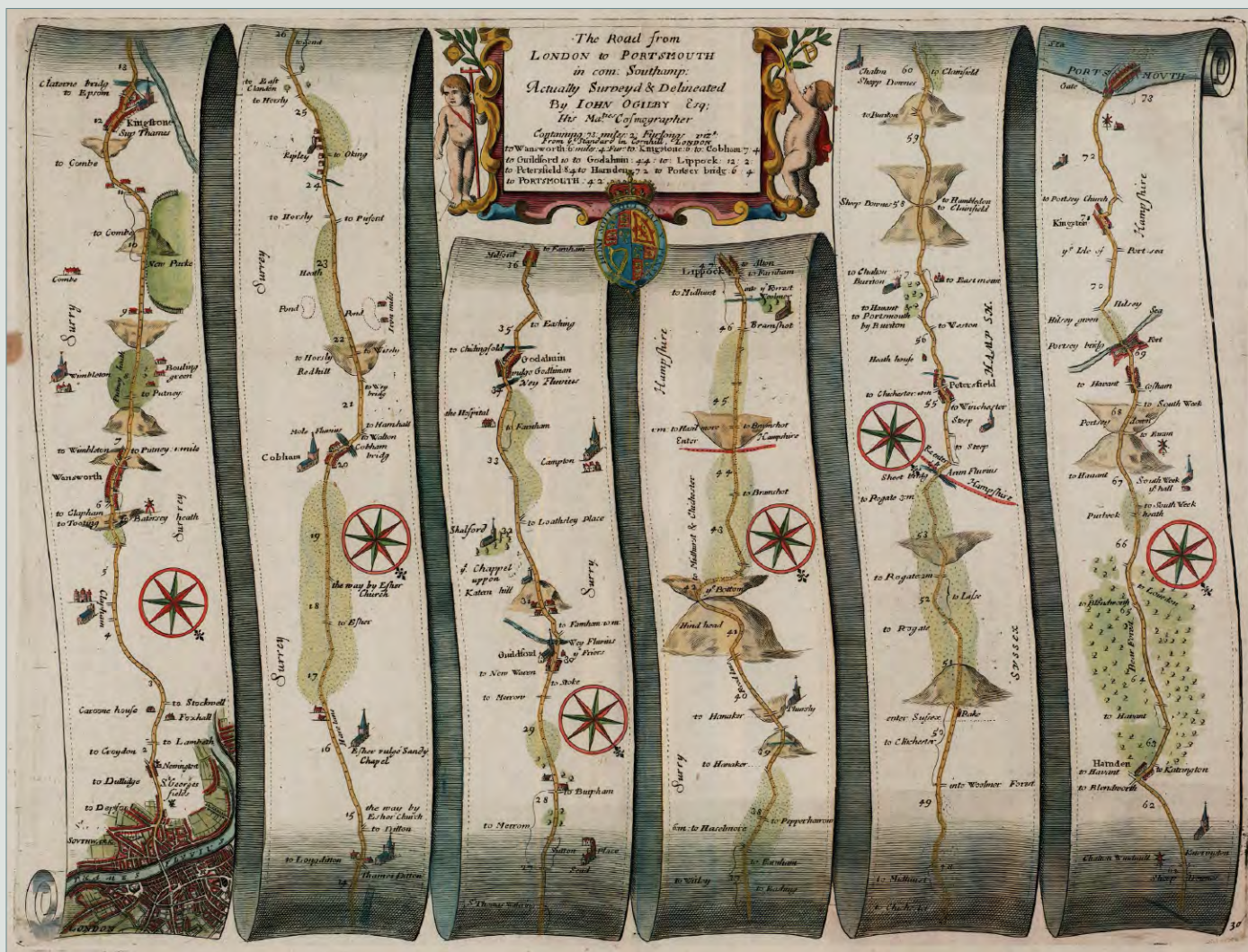


Figure 7. Strip Map entitled *The Road from London to Portsmouth, “actually surveyd [sic] and delineated...by John Ogilby Esq[ire]: His Ma.ties Cosmographer.”* (1675). Plate 30 in John Ogilby’s *Britannia* (London, 1675) measures 43 x 56 centimeters (17 x 22 inches). Linking England’s capital to its naval port, this “great road” is the thirteenth “Direct Independant” [sic] listed in Ogilby’s atlas (Ogilby 1675 and Ogilby [1675] 1970, “A Catalogue of the Several Roads”). *Britannia* was also “an attempt at a scientific study not only of the roads but also of the terrain and habitations on either side of the roads” (Van Eerde 1976, 137). Guildford—the town that Slessor’s tired travelers long to reach—appears on the third (from the left) of the six strips, just above the compass rose pointing southwest; because it lay midway between London and Portsmouth, Guildford’s inns were popular overnight spots for travelers. Ogilby’s strip maps with their “linear view” are precursors to the AAA TripTik maps that the American Automobile Association used to customize for member motorists (MacEachren 1986, 7, 17–18). A zoomable image is available online from the Map Collection of Hampshire County Council Museums Service, from which this illustration derives (Norgate and Norgate 1996–2006b). Courtesy of Jean and Martin Norgate.

the road from Cobham to Guildford and of Guildford itself. To make reading easier, the guide informs the traveler that all distances are in miles and furlongs, with eight furlongs to the mile (Ogilby 1712, “The Preface,” A2v). In other words, “21’4” (below) indicates that the southern end of Cobham is twenty-one miles and four furlongs, or 21 1/2 miles, from London; while “29’7” means that the northern end of Guildford is almost thirty miles, or 29 7/8 miles, from the capital. A narrative of sorts begins to appear once we spell out (in brackets, as per the key on the A2v of “The Preface”) the abbreviations that helped reduce

the size of *The Traveller's Guide* (58: original emphasis; see Ogilby 1698, 15; cf. Ogilby 1675 and Ogilby [1675] 1970, 60):

... at the end of [*Cobham*], cross *Mole flu*[vius, or “river”] ...

At 21'4 descend[ing] 3 F[urlongs] to a Heath between 2 Ponds and by some Iron-Mills on the Right, come to *Ripley-V[illage]*, on the Left at 24'4. Whence over a Brook call'd *St. Thomas Watering* at 26'4 leave *Send-Ch[urch]* and *Sutton-Place* on the Right, and enter *Guilford* at 29'7 on *Wey flu*[vius, or “river”] rising about *Aulton* in *Hampsh[ire]* and made Navigable by Sluces: 'Tis a large Town Corp[oration] containing 3 Parish-Ch[urches]. Govern'd by a Mayor, &c. and sends Burgesses to Parl[iament]. The Assizes for the County, are sometimes kept here; and a good M[arke]t on *Saturd[ay]* with several good Inns, as the *Red Lyon*, *White Hart*, &c.

Thence over *Wey* at the End of the Town, leave ...

This is as close as Ogilby gets to the narratives found in modern travel guides. On the other hand, if the traveler requires only a simple *outline* of the directions, he can go to the tables in the second part of the guide (O2r – X4v [193–254]: see Fordham 1925, 167). *These* tables aren't in any edition of *Britannia* for the simple reason that they were created to replace the atlas's informative strip maps. But the Preface of *The Traveller's Guide* does offer its readers this assurance: “Nor are the maps totally wanting, for the Tables at the latter end contain (A2r) also all the words ... that are set down in the Maps, which ranged in columns, and the distances marked, render these Tables as useful as the Maps” (A2v). To find and decipher these tables, however, he must first consult “Directions to the Reader” (O1v [opp. 193]) and “The Contents.” Below “The Road from London to Portsmouth, passing thro' Guildford [*sic*]” (A3r), he sees two page numbers: the first, “57,” indicates the “page in the book” (i.e., Part I, *Itinirarium Angliae*); and the second, “204,” “the page in the tables” (i.e., Part II). Turning to page 204, he discovers these directions partway down the columns of figures under “The Road from LONDON to PORTSMOUTH” (Figure 8):

From LONDON thro'	Miles F[urlongs]
<i>Cobham</i>	4'0
[4'0 is the distance from the previous town]	
<i>Cobham-Br[idg]e</i> over <i>Mole flu</i> [vius]	0'3
A Descent of 3 Furl[ongs]	1'1

The image shows a page from Ogilby's *The Traveller's Guide* (1699), specifically page 204, which details the route from London to Portsmouth. The page is divided into two main sections: the left side for the route to Portsmouth and the right side for the route to Barnstable. The left section is titled 'The Road from LONDON to PORTSMOUTH' and includes a sub-header 'in Corn. Southampton. [Pag. 57.]'. The right section is titled 'The Road from LONDON to BARNSTABLE in Devon. Continued to Hatherly and to Turo in Cornwall. [P. 61.]'. Both sections contain tables with columns for distances in miles and furlongs, and descriptions of the route, including towns and landmarks. The left table lists distances from London, such as 4'0 to Cobham and 0'3 to Cobham-Br[idg]e. The right table lists distances from London, such as 4'0 to Cobham and 0'3 to Cobham-Br[idg]e.

Figure 8. “The Road from London to Portsmouth,” page 204 of *The Traveller's Guide* (Ogilby 1699; and Ogilby 1712). This itinerary and those surrounding it have replaced the strip maps—like the one shown in Figure 7—that made *Britannia* so memorable and expensive. Nevertheless, *The Traveller's Guide* promised its budget-minded readers that the tables contain “the names of all places in the maps of [Ogilby's] *Britannia*..., with the distances from town to town; and all other remarks necessary for the instruction of travellers” (Ogilby 1699 and 1712, 2nd title page: Tables, O1r). Image from Early English Books Online: Text Creation Partnership (EEBO-TCP) and accessed at the NYPL-Research Library, January 14, 2013.

Enter a Heath	
Between 2 Ponds and the Iron-Mills, Right	0'7
Cross a Rivulet	1'5
<i>Ripley</i>	0'4
Roads divide; bear Right	1'1
St. <i>Thomas Watering</i> Brook	0'7
By <i>Send-Chap[el]</i> and <i>Sutton-Place</i> ; Right	0'7
29'7] Guilford on <i>Wey</i> flu[vius]	2'4
At the Town's End Roads divide; bear Left...	

Our traveler might as well be inputting Cobham and Guildford into MapQuest, Google Maps, or the AAA TripTik® Travel Planner, so little have our methods of giving directions changed over time.

Despite their appeal to a wordsmith like Slessor, the verbal itineraries on which The Traveller's Guide relies for the sake of economy certainly represent a step backwards in the history of cartography.

Yet despite their appeal to a wordsmith like Slessor, the verbal itineraries on which *The Traveller's Guide* relies for the sake of economy certainly represent a step backwards in the history of cartography. However much the strip maps that Ogilby had developed for *Britannia* may be “associated with process types of description,” they are nevertheless “an outgrowth of verbal or pictorial itineraries that were commonly used prior to development of navigational charts and road maps” (MacEachren 1986, 14; Wood 1992, 43). Furthermore, “by eliminating other details and focusing attention on features of a route, the strip map is ideally suited to route following, but at the same time is ill suited to route planning” (MacEachren 1986, 14). Today, of course, route planning and route following are seamlessly interwoven; the Web and portable GPS devices offer us free or inexpensive verbal directions accompanied by a strip map superimposed over a zoomable map or satellite image of the region through which we are traveling. All that is missing is the artistry, the signature of the human touch.

If Slessor perused Fordham's monograph on John Ogilby, he saw one of the tables reproduced from the 1699 *Traveller's Guide* and showing the distances between towns in the “ancient British and modern Statute Miles” (Fordham 1925, opp. 166; see also Ogilby 1699 and 1712, A2v; Chubb, Skells, and Beharrell [1927] 1966, xiv and 444). That wasn't the only detail Slessor played with in “Post-roads.” He also mimicked literary practices common in Ogilby's era, such as the use of long, descriptive titles and the habit of italicizing some words and capitalizing others in order to call attention to “*Ogilby*” and “*The Wheel—John Ogilby's Wheel—the WHEEL*” (see Chubb, Skells, and Beharrell [1927] 1966, opposite 88). Nevertheless, it is unlikely that Slessor laid hands on *The Traveller's Guide* itself, unless he found it in a private library or antiquarian's shop. As we've seen, *Britannia* went through five editions over twenty-three years (Harley 1970, xxvii–xxviii), whereas *The Traveller's Guide* saw just two printings. After 1712 “there was no further impression of the text” of Ogilby's *Britannia*; despite the fact that “his road-maps were reproduced in a long series from 1719 onwards” (Fordham 1925, 167) and that Ogilby's tables continued to be reproduced until 1794. Both types of pocket guides were so much more abundant than *The Traveller's Guide* that Slessor might have been familiar with some of them. If not, he could have found, in Chubb's work, a title page of Owen's 1720 *Britannia Depicta* ([1927] 1966, opp. 188, “by courtesy of Mr. Francis Edwards”); and, in Fordham's work, not only a facsimile of Ogilby's strip map from the 1719 *Pocket Guide to the English Traveller* (1925, 164), but also a

1676 table from *Mr. Ogilby's Tables of his Measur'd Roads* (between pages 168 and 169). The National Library of Australia happens to own a leather-bound copy of the 1712 *Traveller's Guide*, but it was not accessioned until 1972—a year after Slessor died (NLA RA SF20).

"OH, GOD, I WISH THAT IT, I WISH THAT IT WAS GUILDFORD"

Slessor's "yawning Fares" can be forgiven for wishing "that it was Guildford." The poem's "plunging springs" and "numbed" post-roads remind us that prior to the mid-nineteenth century, coaches had poor suspension and no rubber tires to cushion their wheels (*Encyclopaedia Britannica* 1911, 5:405, s.v., "carriages"). During Ogilby's last years, steel springs were just beginning to replace leather straps (Thrupp [1877] 1969, 2, 42, 48), and roads were variable at best. Adding to the jostling and noise was the discomfort of cramped quarters and extended journeys. Stage coaches, introduced earlier in the seventeenth century, carried six to eight passengers inside (*ibid.*, 102; Gilbey 1903, 55–58). Guildford lies only thirty miles from London, but because ordinary coaches averaged only four to four-and-a-half miles an hour (Gilbey 1903, 55), the trip took at least seven hours from London (Figure 9). Even in 1703, a quarter century after Ogilby's death, coaches took fourteen hours to reach Portsmouth, *if* the roads and weather co-operated (Thrupp [1877] 1969, 106). Since Guildford is midway between London and England's naval port, most passengers spent the night there. Furthermore, during Ogilby's final years, glass windows began replacing leather curtains (Thrupp [1877] 1969, 102; Gilbey 1903, 45–47; *Encyclopaedia Britannica* 1911, 5:403, s.v., "carriages") to protect passengers from the elements and offer views of the passing landscape—as in Slessor's "world of dead men staring out of glass." But their presence in "Post-roads" suggests that at some point darkness has fallen, for passing lights and the glow of coach lamps are reflected in the windows: "kidnapped lights,/ floats of rubbed yellow, towed from windowpanes." On the brink of pulling in for the night, in other words, Slessor's coach remains forever shy of its destination.

To while away time, Slessor's Fares eat, drink, talk, and play cards. "Playing cards in Coach" was one of Slessor's initial ideas for "Post-roads" (April 5, -s90, April 7, -s92), and the pack of cards advertised on the page opposite Ogilby's *Traveller's Guide* may have been the inspiration (Francis Edwards 1929, 141):¹³

850. . . . A reissue of Morden's maps of 1680.



Figure 9. "The Machine," A.D. 1640–1750." From Sir Walter Gilbey's *Early Carriages and Roads* (London: Vinton & Co., 1903, page 56). According to Gilbey, the stage coach began to be used around 1640 (56). Like the one in this image, those coaches traveling between London and the principal towns of the country resembled hackney coaches, but were larger (55). Although Slessor uses only the word "men," women and children were also passengers.

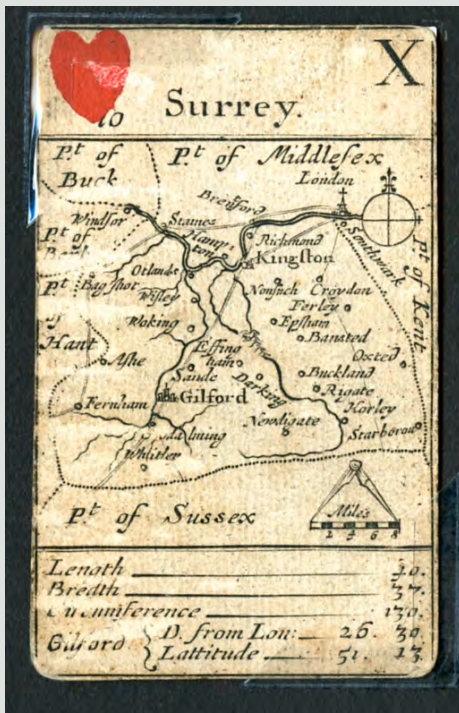


Figure 10. Robert Morden Playing Cards Featuring the English County of Surrey as the Ten of Hearts. The card on the left comes from the second edition of Morden's playing cards (Morden 1676b), since it includes the names of neighboring counties, a feature omitted in the first edition published earlier that year (Morden 1676a: see Skelton and Chubb 1970, 153, "Morden 95"). The card on the right is a reprint of Morden's third edition (Morden 1680: Shirley 1988, 95, "Morden 3"), this time by Homan Turpin, a second-hand bookseller active in the latter half of the eighteenth century (Morden and Ogilby [ca. 1773–1785]: Skelton and Chubb 1970, 157, "Morden 103"; Hodson and Skelton 1984–1997, 3:120–121, "273: Robert Morden...circa 1785?"). The Turpin reprint is untrimmed and lacks the suit-mark, but appears in the original outline color. Otherwise, the cards are identical: both measure about 9 x 5.5 centimeters (3 3/4 x 2 1/4 inches) and have three horizontal panels on the front (the back is blank). The upper panel displays the card's number (on the left, in small Arabic numerals; on the right, in large Roman numerals), suit (if stenciled), and name of the county representing the suit. The middle panel is the Surrey map, complete with a scale of miles and compass indicator, and featuring the county's major towns, rivers, and roads. The lower panel lists the county's length, "breadth" [sic], circumference, and both the latitude and distance from London to Guildford [sic], Surrey's primary city. What makes Morden's playing cards special is that he inserted Ogilby's roads onto his own small county maps and copied, onto the bottom panels of the cards, Ogilby's distances from London to various towns. In fact, Morden's geographical playing cards were "the earliest complete set of county maps to show the roads" of England and Wales (Skelton and Humphreys 1952, 70 n.4).

They are in the form of a pack of cards; the four suits are the 4 parts of England, and each map is numbered, or else bears a portrait representing either King, Queen, or Jack.¹⁴

Although Slessor's poetry notebook doesn't mention item 850, this delightful entry describes a pack of playing cards not only roughly contemporaneous with Ogilby (1680: Tooley et al. 1999–2004, 3:278), but also designed as maps of the 52 counties of England and Wales (Mann and Kingsley 1972, Plate XVIII, "d"). Moreover, their cartographer is none other than Robert Morden, the very mapseller who acquired Ogilby's plates after the death of William Morgan and later published the 1698 edition of Ogilby's *Britannia*, upon which *The Traveller's Guide* is based. Better still, Morden initially printed his cards in 1676, the year that Ogilby died (Skelton and Chubb 1970, 151–152, "Morden 94"). On the "Explanation" card accompanying the original edition (151), Morden explained that he'd inserted Ogilby's roads onto his own small county maps and also copied Ogilby's distances from London to various towns onto the bottom panels of the cards (152). After Morden decided that the eastern counties would represent the suit of hearts, he made Surrey—the county in which Guildford is located—his ten of hearts (152) (Figure 10). How delicious if the "knave" in "Post-roads" is taking the "ten" of Guildford/Surrey!¹⁵

Although drafts of “Post-roads” reveal that Slessor experimented with “Bristol” (April 9, -s93) and even “England” (April 11, -s95), he ultimately chose *Guildford* rather than some other town along Ogilby’s roads as the longed-for destination of his “yawning Fares.” Known for its beauty, the town is situated on the river Wey, “its old streets contain[ing] a number of picturesque gabled houses, with quaint lattices and curious doorways” (*Encyclopedia Britannica* 1875, 11:262, s.v., “Guildford”). William Cobbett (1763–1835), the Surrey-born journalist and radical reformer, had this to say in one of his popular *Rural Rides* (October 23, 1825: Great Britain Historical GIS Project 2004):

I, who have seen so many, many towns, think [Guildford and its surroundings] the prettiest, and, taken all together, the most agreeable and most happy-looking that I ever saw in my life. Here are hill and dell in endless variety. Here are the chalk and the sand, vieing [*sic*] with each other in making beautiful scenes. Here is a navigable river and fine meadows. Here are woods and downs. Here is something of everything...

For an Australian poet like Slessor, Guildford carried additional resonances, lying as it does on the road to Portsmouth, from whose harbor the first convicts and others set sail for Australia in 1787, eventually reaching Sydney Cove on 26 January 1788, the “date . . . still celebrated as Australia Day, marking the beginnings of European settlement” (State Library of New South Wales 2011). Nostalgic settlers to Australia transported the English toponym “Guildford” to Australia, where it became the name of a Sydney suburb, twenty-five kilometers (15.5 miles) west of Slessor’s home.

In literary terms, on the other hand, Slessor’s “Knave takes the ten” alludes to *Alice’s Adventures in Wonderland*, particularly the trial scene in which the Knave of Hearts is accused of taking the Queen’s tarts (1865, Chapters 11–12). Its author, the Reverend Charles Lutwidge Dodgson—a.k.a., Lewis Carroll (1832–1898)—moved his family to Guildford in 1868, and currently resides at The Mount Cemetery there (Cohen 1995, 240–241, 527; Cohen 1998, 1195; Rose 2001, 87–89). Lewis Carroll’s much anticipated centenary occurred in 1932, the year that “Post-roads” was published in *Cuckooz Contrey*.

Slessor’s poetry notebook introduces *another* famous nineteenth-century English writer: Charles Dickens (1812–1870). At first, the words “Dickens [rides?] in coaches” (April 5, -s90) and “Dickens scene” (April 7, -s92) appear to be early experiments going nowhere. Closer investigation, however, reveals that he owned several books by/about Dickens (Slessor Collection, University of Sydney’s Fisher Library 2002–2012) and that Dickens evoked a number of images in Slessor’s mind. After all, Dickens began as a journalist involved at the very heart of the profession during the early years of “modern journalism” (Douglas-Fairhurst 2011, 70). Like Slessor nearly a century later, he began reporting when he was nineteen; and his letters from 1831–1836 reveal not only how often he traveled by coach throughout the country, but also how much that experience fed his literary imagination (*Encyclopedia Britannica* 1911, 8:178–183, s.v., “Dickens, Charles John Huffam”). Furthermore, his friend and biographer John Forster attests that Dickens “saw the last of the old coaching days, and of the old inns that were a part of them; but it will be long before the readers of his living

In literary terms, Slessor’s “Knave takes the ten” alludes to Alice’s Adventures in Wonderland, particularly the trial scene in which the Knave of Hearts is accused of taking the Queen’s tarts.

Slessor’s poetry notebook introduces another famous nineteenth-century English writer: Charles Dickens.

page see the last of the life of either” (Forster and Hoppé [1872] 1966, 1:51). Born in Portsmouth, Dickens mentions Guildford in *Nicholas Nickleby* as “the place from which Mr. Vincent Crummles and his company had proceeded to Portsmouth,” and *David Copperfield*’s hero spent a blissful day with Dora in the area around Guildford (Dexter 1925, 22–23). Travel guides claim that Dickens spent nights in the town, whose historic attraction derives from its superb location on the main road from London to the great ports of the central south coast—Portsmouth, Southampton, and Winchester (The Angel Hotel 2011; see plate 39, “London to Chichester,” in Ogilby 1675 and Ogilby [1675] 1970). As Friends International in Guildford explain in their online tour of Guildford and its surroundings (2012):

All roads converge on the Guildford gap to pass through the Downs, and so much of the traffic from London to the central south coast passed through the town. Travellers needed rest and by the 17th century Guildford had earned a good reputation for its inns—the Angel, the White Lion, the Red Lion, the White Hart and the Crown.

The inns flourished as road-travel increased, particularly when Portsmouth developed as a major naval base from Restoration times. . . The early 1800s saw a boom in the coaching trade. 28 services passed through Guildford, with an average of 10 coaches a day travelling in each direction, with perhaps 200 passengers.

However this all came to an end in the 1840s as the railways proved a quicker, cheaper and more comfortable way to travel. The last coach ran through Guildford in 1849, the year the railway reached Portsmouth from London.

If the Red Lion and the White Hart ring a bell, it’s because Ogilby’s *Traveller’s Guide* recommends “several good Inns, as the *Red Lyon, White Hart, &c.*” His contemporary John Aubrey goes further, raving that Guildford “has been always most famous for its Inns and excellent Accommodation for Passengers, the best perhaps in *England*” (Morris 1914, 87).

Finally, a short-story by Dickens may have been the literary inspiration for “Post-roads.” Although it contains no reference to Guildford, “The Story of the Bagman’s Uncle,” originally published in September 1837 as chapter 49 of *The Posthumous Papers of the Pickwick Club* (Dickens 1983), also interweaves present and past, the living and the dead, as its ghostly coach and passengers speed through the night. In Dickens’ tale, a traveling salesman regales the “gentlemen” (48) in the inn where Mr. Pickwick is staying (Project Gutenberg, Ebook 580) with a “true” story told him by his dearly departed uncle. One night, after drinking too much at a friend’s house, the bagman’s uncle was walking back to his lodgings when he stumbled upon an enclosure littered with “old worn-out mail coaches” (Dickens 1983, 52):

My uncle . . . thought of the busy bustling people who had rattled about, years before, in the old coaches, and were now as silent and changed; he thought of the numbers of people . . . whom one of those crazy mouldering vehicles had borne, night after night, for many years, and through all weathers . . . Where were they all now!

Whether he fell asleep or not, the coaches suddenly came alive and he was transported to the past, where he gallantly rescued a fellow passenger from her kidnappers. Then, just as suddenly, he was back in the present, shivering with cold. He'd learned one thing, though: "the ghosts of mail coaches and horses, guards, coachmen, and passengers, were in the habit of making journeys regularly every night" (63).

"THE TIRELESS GHOST OF OGILBY"

In "Post-roads" Ogilby's wheel, however dated it may be to Slessor, symbolizes human progress and ecstatic obsession. As Ogilby himself attested, during his own lifetime the wheel had become the surveyor's high-tech tool, supplanting the chain for ease and accuracy in measuring distances (Ogilby 1675 and Ogilby [1675] 1970, Preface, C1r). With the wheel and his cadre of surveyors, engravers, cartographers, and influential advisers (Harley 1970, vii, xv–xviii), Ogilby seized upon the late seventeenth century's "economic optimism" to produce road maps of an ever expanding network of highways and services (ibid., v). Because the historical Ogilby, unlike Slessor's single-minded character, had better things to do than to push the wheel around; he managed in a handful of years to impose order on the roads of England and Wales, leaving maps, tables, and guides for future travelers to navigate upon them. Moreover, given how "slight" were "the documentary and cartographical materials available" to him, he overcame extraordinary obstacles (Fordham 1925, 177–178):

Ogilby had to organize a perambulation of the roads, with the collection and recording of the notes necessary for the construction of his maps, and the drawing and engraving of the plates upon which they are represented, with the collection also of the descriptive details relative to the towns and other places lying on or near the roads themselves. He was in every sense on new ground, and his success is evidence of the energy, determination, and organizing and artistic talent which characterized his life in all its varied phases.

Ogilby was wildly successful . . . until death took him. Of the five volumes he'd proposed for his world atlas, known as his "*English Atlas*" (1669: Schuchard 1975, 124), "Europe" never was published and other volumes remained incomplete (ibid., 82, 129). The final volume—*Britannia*—was to have three parts, yet only the road atlas saw the light of day (Skelton and Chubb 1970, 185–186; Harley 1970, ix–x, xiv). Neither Ogilby nor Morgan succeeded in raising the funds to publish his atlas of twenty-five town-plans or his county atlas with descriptive text (Fordham 1925, 162–163; Chubb, Skells, and Beharrell [1927] 1966, 85); and Surrey was not one of the three county maps that Ogilby managed to publish separately (Skelton and Humphreys 1952, 70). Even the astounding 12,000 kilometers (7,500 miles) of England and Wales that were mapped in *Britannia* amount to less than a third of those he'd hoped to survey and immortalize on paper (Delano-Smith and Kain 1999, 171). And neither Ireland nor his native Scotland appears in any of his work (Van Eerde 1976, 122).

In "Post-roads" Ogilby's wheel, however dated it may be to Slessor, symbolizes human progress and ecstatic obsession.

No wonder Slessor's "ghost of *Ogilby*" is so "tireless." Brought up short by death, he is once again in every sense on new ground. Freed from mortal restraints, he can't stop measuring the "mileposts of eternity." Before him lies an unprecedented opportunity to survey and map the "unmapped savanna of dumb shades." Between his death and "Post-roads" lay the Industrial Revolution, which triggered an explosive increase in human population. Although it took until 1800 for a billion people to walk upon earth at the same time, the twentieth century would begin with 1.6 billion people and end with 6.1 billion (Population Reference Bureau 2012). Furthermore, Slessor composed his poem between two brutal World Wars: the first claimed 8.5 million lives (Community Television of Southern California 1996–2004), while the second—currently regarded as "the deadliest military conflict in history"—would take seven times that number, or 2.5% of the world's population (*Wikipedia* 2012, s.v., "World War II Casualties"). Slessor's *Ogilby* simply has no time to lose. Never before have so many people passed, or been poised on the brink of passing, from life to death. To the tipsy gentleman emerging from dinner in Slessor's final stanza, the "hiss" of *Ogilby*'s wheel is a stark reminder "to eat, drink, and be merry" (Ecclesiastes 8:15).

*"Post-roads" presents the afterlife as very personal indeed. For *Ogilby*'s mensuration has transformed him—like Homer's prophetic Tiresias or Virgil's Anchises—into a heroic figure who transcends death.*

Graham Burns once compared "Post-roads" to Slessor's "The Night-Ride" (1924: Slessor, Haskell, and Dutton 1994, 67, 356–357), in which a train ride into darkness becomes a metaphor for life's "rapid journey towards oblivion" (Burns 1975, 6). Burns could have strengthened his argument by mentioning Slessor's reference to "dumb shades," which alludes to the stagnant life-in-death of the disembodied souls crowding Homer's underworld in *Odyssey* 11 and much of Virgil's underworld in *Aeneid* 6. But Slessor's allusion also quietly acknowledges the enduring nature of poetry, an art he shares with *Ogilby* as translator of these ancient epics.¹⁶ While Burns finds the final stanza "sinister" because it supposedly "mov[es] out past the human into the impersonal processes engulfing it" (1975, 7), I suggest that "Post-roads" presents the afterlife as very personal indeed. For *Ogilby*'s mensuration has transformed him—like Homer's prophetic Tiresias or Virgil's Anchises—into a heroic figure who transcends death. *Ogilby*'s very obsession with his art gives him an immortality that Slessor hoped to achieve by crafting poems like "Post-roads," sequences like *The Atlas*, collections like *Cuckooz Contrey*. In fact, what Andrew Taylor says about Slessor's Captain Cook applies to Slessor's *Ogilby*, whom the poet created shortly after composing "Five Visions of Captain Cook" (May 1929: Slessor, Haskell, and Dutton 1994, 87–94, 366–376; Taylor 1987, 64):

His daemonic power to defy chaos, to engage with "mystery," to choose "a passage into the dark" and to charm order across the face of disorder—all is linked causally with poetry in such a way that it insists on being read as metaphoric of it.

As Slessor said about writing poetry, it is "a pleasure out of hell" (Slessor and Haskell 1991, 162).

* * *

Slessor's Ogilby soon had a worthy successor in "The Cartographer" by poet Rosemary Dobson (1920–2012). A celebrated Australian poet mentored by Slessor (Dutton 1991, 265, 312), Dobson published "The Cartographer" as the seventh part of her verse play *The Devil and the Angel* (1945–1946: Dobson 1948, 11–12). In it, a dying cartographer, who has spent his life listening to sailors' "tales of strife and wonder," is tempted by the two messengers of death with the promise of exploring the "'Terra Incognita,' The Unknown Land" of his dreams. No sooner is he informed that neither heaven nor hell has been mapped than he cries "Both, both! ... and gather[s] up his compass" to accompany the astonished angel and devil to the afterlife (1948, 12).

Their response? "We spread our hands and sighed at one another."¹⁷

NOTES

1. "NLA" refers to the National Library of Australia, which holds the Papers of Kenneth Adolf Slessor (1901–1971) under the designation MS 3020.
2. For brevity, subsequent references to items in the poetry notebook that contains Slessor's drafts of *The Atlas*—MS 3020/19/1—will be abbreviated "–s#". For example, "–s242" represents both "NLA MS 3020/19/1/242" (for the paper version) and <http://nla.gov.au/nla.ms-ms3020-19-1-s242-v> (for the online scan). As explained in my Introduction, Slessor drafted *The Atlas* (ca. 1930) in a 1927 desk calendar: neither 1927 nor the date accompanying each entry has anything to do with the actual year, month, or day in which the poet created the various parts of his sequence. Nevertheless, I've included the notebook's "month" and "day" ("September 13") along with its "page" number (e.g., –s242) to aid identification.
3. "Post-roads" is reprinted from the Haskell and Dutton edition *Kenneth Slessor: Collected Poems* (Slessor, Haskell, and Dutton 1994, 72–73), whose version removes the parenthesis printed (in error) at the end of the epigraph in the original version in *Cuckooz Contrey* (Slessor 1932, 11–12), but is otherwise identical to it. Like Haskell and Dutton, I quote the poem in its entirety. Rather than annotating some of Slessor's highly allusive and self-consciously baroque vocabulary in notes on the poem (ibid., 359–360), however, I explain the poet's word/phrase choices as they become germane to my article's larger arguments.
4. "Post-roads" so impressed Tasmanian poet and journalist S. Clive Turnbull that he penned this glowing tribute to Slessor on August 22, 1949 (NLA MS 3020 1/2/113):

What an astonishing fellow you were to turn out so much that was good in an age when the output of most of us is a hair-shirt for later years . . . In *Cuckooz Contrey* we are really in the groove. "Post-roads" is one of my favorites—a superb piece of work I think.

5. Slessor kept trying to connect the increasingly divergent poems, a struggle most obvious in his May 25 (–s132) through June 2 entries (–s138). See my forthcoming article on “Mermaids.”
6. Unless otherwise noted, definitions come from the *Compact Edition of the Oxford English Dictionary* (1971), a micrographic reproduction of the thirteen-volume 1933 edition subsequently abbreviated as *OED*.
7. Anglicized from the French in the 16th and 17th centuries, “crinier” is “the part of the...protective covering of a war-horse which covered the ridge or back of the neck and the mane” (*OED*, s.v. “crinière”). Although the rest of “Post-roads” has nothing to do with war, the first poem of *The Atlas* (“The King of Cuckooz”) and the last poem (“The Seafight”) certainly do.
8. Pepys refers on several occasions to Ogilby’s literary works, which he purchased or won by lottery: there are three references to Ogilby’s *Aesop’s Fables* (January 5 and 18, 1661) and/or *Aesopicks* (February 19, 1666), one reference to his *Coronation* (February 19, 1666; see Harley 1970, vii), and another to his Bible (May 27, 1667). Slessor owned a three-volume edition of Pepys’s *Diary* (829: Slessor Collection, University of Sydney’s Fisher Library 2002–2012). And in a poem written after Slessor’s death, Douglas Stewart refers to his friend’s fondness for Pepys (“For Kenneth Slessor”: Stewart 2012, stanzas 6–7):

I think of how we sat there light and lucky
While the soft candlelight flowed round the room
And heard you talk of Pepys and William Hickey,
Tennyson’s verse and drunken pranks of Lamb;

Or venturing forth, where oystery rocks were waiting
At Bobbin Head and you were Captain Slessor,
Staunch on your launch I see you navigating
Like Captain Dobbin, your great predecessor...

9. Dates of publication for all of Ogilby’s work derive from Schuchard (1975, 30–31), although different dates are offered, for instance, by Harley (Harley 1970, xxv). *Old Maps of the World* advertises a number of maps from his geographical volumes: e.g., item 439 (*Aethiopia Superior*, p. 102), items 462–465 and 467 (various African islands, p. 104), item 473 (*Barbaria*, p. 104), item 481 (*Fezzae et Marocchi*, p. 105), item 514 (*Regno Congo*, p. 108), item 656 (*Nova Hispania*, p. 125), item 678 (*Barbados Descriptis*, p. 127), item 757 (Brazil, p. 133), item 766 (Columbia, p. 133), item 778 (Guiana, p. 134), and item 783 (Venezuela, p. 135).
10. “Bastinado” is a Spanish word for “an Eastern method of corporal punishment, by beating with a stick the soles of the culprit’s feet” (*OED*, s.v., “bastinado,” *sb.* 3). It generally means “a blow with a stick or cudgel...; esp. one upon the soles of the feet” (*ibid.*, 1).

11. “Soundings for the nose” also plays on the “soundings” mentioned on pilots and sea charts in *Old Maps of the World* (e.g., Francis Edwards 1929, items 151, 646, 654; see Slessor’s draft titled “Atlas 4,” February 28, -s61).
12. See my upcoming article on the final poem of *The Atlas*, “The Seafight,” for details.
13. Before the quote are the words “TURPIN (H.) A Brief Description of England and Wales, containing a particular Account of Each County, title, 126 pp. text and 52 maps, 12 mo, cont. sheep [1750]” (Francis Edwards 1929, 141; see Morden and Ogilby [ca. 1773–1785]). Homan Turpin was a second-hand bookseller who reissued Morden’s 1680 edition of playing cards in atlas form, perhaps in 1750 (Chubb 1927, 90–91, item CIX; Francis Edwards 1929, 141), or in 1770 (Mann and Kingsley 1972, 27); or, according to Hodson and Skelton, around 1785 (1984–1997, 3:120–122, item 273), since no record of the cards has been found in Turpin’s surviving catalogues of 1767–1783. Each card in the Turpin reissue was printed on “contemporary sheepskin,” otherwise known as vellum.
14. Robert Morden was not the first English publisher of map playing cards. A century earlier, in 1590, William Bowes used the general map of England and Wales in Christopher Saxton’s atlas as the basis for his county maps; however, roads are not included on either the 1590 playing cards or on the ca. 1605 reprint (Skelton and Chubb 1970, 16–18 and Plates 4–5; Mann and Kingsley 1972, 26, 29 and Plates I–X). W. Redmayne’s playing cards came out the same year as Morden’s, but are smaller, inferior in design, and lack roads on the county maps (1676, 1677, 1711–1712: Skelton and Chubb 1970, 153–154 and Plate 34b; Mann and Kingsley 1972, 27, 29 and Plate XII, esp. “d”). Finally, John Lenthall published playing cards “closely copying those by Morden” (ca. 1711–1712: Shirley 1988, 95, “Morden 3”; Mann and Kingsley 1972, 27, 29 and Plates XIII–XVII, esp. XIV “c”). Slessor’s “flap-dark spatulas of cards” may refer to the elongated oval shape of playing cards featured, for instance, in the ca. 1470–1480 pack from the South Netherlands (Cloisters Collection 1983). Each card is 7 x 13.7 centimeters (2 ¾ x 5 3/8 inches), substantially longer than its more common, rectangular cousins.
15. As Gillian Hill notes, “In [Turpin’s] atlas the cards are pasted opposite a descriptive text, which gives the history of the various counties . . . In this form the playing-card has become useless to the gambler, and finds a place in the schoolroom or library” (1978, 17).
16. Slessor’s personal library, 918 items of which are housed at the University of Sydney, contains a copy of Homer’s *Iliad* (603) and *Odyssey* (560), books on ancient Greek poetry (550, 781) as well as Latin poetry (261, 610), and many works on classical culture and history (229, 230, 259, 609, 611, 619, 635, 700, 772–774, 780–781, 783, 809, 815). See the Slessor Collection in the University of Sydney’s Fisher Library (2002–2012).

17. Stay tuned for Part III of my study. In “Dutch Seacoast,” the third poem of Slessor’s sequence *The Atlas*, the poet’s admiration for one of the “painted towns” by Joan Blaeu (1598–1673) makes him wish that “the great cartographer/ . . . could . . . but clap up like this/ My decomposed metropolis,/ Those other countries of the mind,/ So tousled, dark and undefined!”

REFERENCES

Citations that follow indicate works available to Slessor as well as more up-to-date secondary sources.

ARCHIVAL RESOURCES

EEBO (Early English Books Online), © 2003–2012 ProQuest LLC: <http://eebo.chadwyck.com/home> (for John Ogilby’s works)

Francis Edwards Ltd. Archive, Grolier Club Library, Grolier Club, New York City

Hampshire County Council Museums Service, Hampshire County Council (2013): <http://www3.hants.gov.uk/museum.htm>

New York Public Library, Lionel Pincus and Princess Firyal Map Division

Papers of Kenneth Adolf Slessor (1901–1971), MS 3020, Manuscripts Branch, National Library of Australia, Canberra, Australia: <http://nla.gov.au/nla.ms-ms3020>

Project Gutenberg: www.gutenberg.org (Samuel Pepys’s *Diary*, EBook 4200; Lewis Carroll’s *Alice in Wonderland*, Ebook 11; Charles Dickens’ *The Posthumous Papers of the Pickwick Club*, Ebook 580)

Slessor Collection, Special Collections Database, University of Sydney, Fisher Library (2002–2012): <http://opac.library.usyd.edu.au:81/search/c?SEARCH=slessor> (especially the books by or about Dickens: 535, 540, 545–547, 557).

GENERAL RESOURCES

Angel Hotel, The. 2011. The Angel Hotel: “History.” <http://www.angelpostinghouse.com> (January 13, 2013).

Aubrey, John, and Andrew Clark. 1898. *Brief Lives: Chiefly of Contemporaries, Set Down by John Aubrey, between the Years 1669 & 1696*. Oxford: Clarendon Press.

- Barber, Peter. 1997. "Maps and Monarchs in Europe, 1550–1800." In *Royal and Republican Sovereignty in Early Modern Europe: Essays in Memory of Ragnhild Hatton*, edited by Robert Oresko, G.C. Gibbs, and H.M. Scott, 75–124. Cambridge: Cambridge University Press.
- Baynton-Williams, Ashley. 2006. "John Ogilby." *Mapforum.com: Specialist Antique Map Magazine* 1.1. London: Mapforum Ltd. <http://www.mapforum.com/01/magazine.htm> (January 13, 2013).
- Bricker, Charles, and R.V. Tooley. 1968. *Landmarks of Mapmaking: An Illustrated Survey of Maps and Mapmakers*. Amsterdam: Elsevier.
- British Museum, F. M. O'Donoghue, and C.E.B.G. Schreiber. 1901. *Catalogue of the Collection of Playing Cards Bequeathed to the Trustees of the British Museum by Lady Charlotte Schreiber*. London: Longmans & Co.
- Burns, Graham. 1975. *Kenneth Slessor*. Melbourne: Oxford University Press.
- Caesar, Adrian. 1995. *Kenneth Slessor*. Melbourne: Oxford University Press.
- Chubb, Thomas, J.W. Skells, and H. Beharrell. (1927) 1966. *The Printed Maps in the Atlases of Great Britain and Ireland: A Bibliography, 1579–1870*. London: Dawsons of Pall Mall.
- Cloisters Collection. 1983. "Set of Fifty-Two Playing Cards." Metropolitan Museum of Art Online. <http://www.metmuseum.org/Collections/search-the-collections/70016900?rpp=40&pg=1&ft=playing+cards&pos=2> (January 13, 2013).
- Cohen, Morton N. 1995. *Lewis Carroll: A Biography*. New York: Alfred A. Knopf.
- Cohen, Saul B., ed. 1998. *The Columbia Gazetteer of the World*. New York: Columbia University Press.
- Community Television of Southern California. 1996–2004. "World War I Casualty and Death Tables." *The Great War and the Shaping of the Twentieth Century*. PBS.org. http://www.pbs.org/greatwar/resources/casdeath_pop.html (January 13, 2013).
- Delano-Smith, Catherine, and R.J.P. Kain. 1999. *English Maps: A History*. Toronto: University of Toronto Press.
- Dexter, Walter. 1925. *The England of Dickens*. Philadelphia: J.P. Lippincott.
- Dickens, Charles. 1983. "The Ghosts of the Mail." *The Complete Ghost Stories of Charles Dickens*, edited by Peter Haining, 48–62. New York and Toronto: Franklin Watts.

- Dobson, Rosemary. 1948. *The Ship of Ice: With Other Poems*. Sydney: Angus and Robertson.
- Douglas-Fairhurst, Robert. 2011. *Becoming Dickens: The Invention of a Novelist*. Cambridge: Belknap Press of Harvard University Press.
- Dutton, Geoffrey. 1991. *Kenneth Slessor: A Biography*. Ringwood, Vic., Australia: Viking.
- Encyclopedia Britannica: A Dictionary of Arts, Sciences, and General Literature*. 1875. 9th edition. Philadelphia: J.M. Stoddart & Co.
- Encyclopedia Britannica: A Dictionary of Arts, Sciences, Literature and General Information*. 1911. 11th edition. Cambridge: University Press.
- Fordham, Herbert G. 1921. *Maps, Their History, Characteristics and Uses: A Handbook for Teachers*. Cambridge: University Press.
- Fordham, Herbert G. 1925. "John Ogilby (1600–1676): His Britannia, and the British Itineraries of the Eighteenth Century." *Transactions of the Bibliographical Society* (The Library), 4th Series, 6.2 (September):157–178. Reprinted, Oxford University Press, 1925.
- Forster, John, and A.J. Hoppé. (1872) 1966. *The Life of Charles Dickens*. 2 vols. London: Dent.
- Foster, Peter. 2011. *Coaches, Carriages & Carts: Horse-drawn Vehicles in Australia*. Stepney, S. Aust: Axiom Australia.
- Francis Edwards (Firm). 1929. *Old Maps of the World, or Ancient Geography; a Catalogue of Atlases & Maps of All Parts of the World from XV Century to Present Day*. London: F. Edwards Ltd.
- Friends International in Guildford. 2012. "The Angel Hotel 'Posting-House.'" *Tour of Guildford*. <http://www.friendsinternationalguildford.org.uk/tour/angel.html> (January 13, 2013).
- Gilbey, Walter, Sir. 1903. *Early Carriages and Roads*. London: Vinton & Co.
- Gilbey, Walter. 1905. *Modern Carriages*. London: Vinton & Co.
- Goodwin, Gordon. 1921. "Ogilby, John (1600–1676)." *The Dictionary of National Biography: From the Earliest Times to 1900*, edited by Leslie Stephen, George Smith, and Sidney Lee, 14:908–911. London: Oxford University Press.

Great Britain Historical GIS Project. 2004. "William Cobbett's *Rural Rides*, Oct. 23rd to 27th, 1825: Chilworth to Winchester." *A Vision of Britain through Time*. Great Britain Historical GIS. University of Portsmouth. http://www.visionofbritain.org.uk/text/chap_page.jsp;jsessionid=238F3FB44A115C0A81898C43DF1F7432?t_id=Cobbett&c_id=17 (January 13, 2013).

Haft, Adele J. 2011. "Introduction to Maps and Mapping in Kenneth Slessor's Poetic Sequence *The Atlas*." *Cartographic Perspectives* 70:5–43. <http://www.cartographicperspectives.org/index.php/journal/article/view/42> (January 13, 2013).

Haft, Adele J. 2012. "Who's 'The King of Cuckooz'? Maps and Mapping in Kenneth Slessor's Poetic Sequence *The Atlas*, Part I." *Cartographic Perspectives* 71:5–51. <http://www.cartographicperspectives.org/index.php/journal/article/view/cp71-haft> (January 13, 2013).

Harley, J.B. 1970. "Introduction." *Britannia, London 1675*, by John Ogilby, v–xxxi. Amsterdam: Theatrum Orbis Terrarum.

Hill, Gillian. 1978. *Cartographical Curiosities*. London: British Museum Publications Ltd.

Hodson, D., and R.A. Skelton. 1984–1997. *County Atlases of the British Isles Published After 1703: A Bibliography*. 3 vols. Tewin, Welwyn, Hertfordshire, England: Tewin Press.

Hyde, Ralph. 1980. "John Ogilby's Eleventh Hour." *The Map Collector* 11 (June):2–8.

Jaffa, Herbert C. 1971. *Kenneth Slessor*. New York: Twayne Publishers.

MacEachren, Alan M. 1986. "A Linear View of the World: Strip Maps as a Unique Form of Cartographic Representation." *The American Cartographer* 13.1 (January):7–25.

Mann, Sylvia, and David Kingsley. 1972. *Playing Cards Depicting Maps of the British Isles, and of English and Welsh Counties*. London: Map Collectors' Circle.

Millea, Nick. 2007. *The Gough Map: The Earliest Road Map of Great Britain?* Oxford: Bodleian Library.

Morden, Robert. 1676a. *The 52 Counties of England and Wales, Geographically described in a pack of Cards, Whereunto is added ye Length, Breadth, & Circuit of each County, the Latitude, the Scituation [sic] and distance from London of ye principal Cities, Towns, and Rivers. With other Remarks as plaine and ready for the playing of our English Games as any of ye Common Cards*. Sold by Robert Morden at the Atlas in Cornhill, Will. Berry at the Globe in the Strand, Robert Green in Budge row, and George Minikin at the King's Head in S. Martin's.

Morden, Robert. 1676b. *The 52 Counties of England and/ Wales, Geographically described in a pack of Cards...* Sold by Robert Morden in Cornhill, W. Berry in the Strand, near Charing Cross, Robert Green in Budge row, and G. Minikin in St. Martin's.

Morden, Robert. 1680. *A Pocket Book of All the Counties of England and Wales: Wherein Are Describ'd the Chief Cities, Market-Towns and Others; with the Rivers and Roads from London. To Which Is Added, a Compass, Shewing the Bearing, and a Scale for the Distance of Places. There Is Also Given the Length, Breadth, and Circumference of Each County: the Latitude of Each City or Town, and Its Distance from London. Being a Necessary and Plain Direction for Travelling to Any Place or Town in All England or Wales.* London: Sold by Robert Morden at the Atlas in Cornhil, and Joseph Park stationer, at the three Ink-bottles in Castle-ally, under the west-end of the Royal Exchange.

Morden, Robert, and John Ogilby. (ca. 1773–1785). *A Brief Description of England and Wales; containing A particular Account of each County; With its Antiquities, Curiosities, Situation, Figure, Extent, Climate, Rivers, Lakes, Soils, Agriculture, Civil and Ecclesiastical Divisions, Cities, Towns, Palaces, Corporations, Markets, Fairs, Manufactories, noted Places, Bays, Harbours, Products, &c. and the Number of its Inhabitants. As Also, The Distance of each Market Town from London, by the latest Survey, with the Latitude and Longitude of each County, Town or City, and on what Point of the Compass from London. Embellished with Maps of Each Country. Very useful for Travellers and others, and very proper for Schools, to give Youth an Idea of Geography, and the Nature of his own Country, and each County.* London: Printed for H. Turpin, No.104, St. John's Street, West Smithfield.

Morris, Joseph E. 1914. *Surrey's Capital: A Handbook for Guildford and Its Surroundings.* Guildford: F. Lasham.

Norgate, Jean, and Martin Norgate. 1996–2006a. Frontispiece of John Ogilby's *Britannia* (London, 1675). "Old Hampshire Mapped." Department of Geography, University of Portsmouth. <http://www.geog.port.ac.uk/webmap/hantsmap/hantsmap/ogilby/ogy8larg.htm> (January 13, 2013).

Norgate, Jean, and Martin Norgate. 1996–2006b. The Road from London to Portsmouth in John Ogilby's *Britannia* (London, 1675). "Old Hampshire Mapped." Department of Geography, University of Portsmouth. <http://www.geog.port.ac.uk/webmap/hantsmap/hantsmap/ogilby/og30larg.htm> (January 13, 2013).

Ogilby, John. 1675. *Britannia, Volume the First, Or, an Illustration of the Kingdom of England and Dominion of Wales: By a Geographical and Historical Description of the Principal Roads Thereof, Actually Admeasured and Delineated in a Century of Whole-Sheet Copper-Sculps: Accomodated with the Ichnography of the Several Cities and Capital Towns, and Completed by an Accurate Account of the More Remarkable Passages of Antiquity: Together with a Novel Discourse of the Present State.* London: Printed by the author.

Ogilby, John. (1675) 1970. *Britannia, London 1675*. Amsterdam: Theatrum Orbis Terrarum.

Ogilby, John. 1676. *Mr. Ogilby's Tables of His Measur'd Roads: So Digested, That Any Great Road or Branch May Readily Be Found; with the General and Particular, Computed & Measur'd Distance, and the Distinction of Market and Post-Towns. With Other Remarks. to Which Is Added, a True Account of the Markets and Fairs, &c. Collected in His Survey. By John Ogilby, Esq; His Majesty's Cosmographer. Licensed March 31th, 1676. H. Oldenburg*. London: printed by the author, and sold at his House in White Fryers.

Ogilby, John. 1698. *Britannia, Or, the Kingdom of England and Dominion of Wales Actually Survey'd: With a Geographical and Historical Description of the Principal Roads, Explain'd by One Hundred Maps on Copper-Plates: with the Ichnography, or Drought of the Several Cities, Chief Towns, &c., and a View of the Churches, Houses, and Places of Pote on the Road: Also an Account of the Most Remarkable Passages of Antiquity Relating to Them, and of Their Present State*. London: Printed for Abel Swall . . . and Robert Morden.

Ogilby, John. 1699. *The Traveller's Guide, Or, a Most Exact Description of the Roads of England: Being Mr. Ogilby's Actual Survey, and Mensuration by the Wheel, of the Great Roads from London to All the Considerable Cities and Towns in England and Wales, Together with the Cross-Roads from One City or Eminent Town to Another: Wherein Is Shewn the Distance from Place to Place, and Plain Directions Given to Find the Way, by Setting Down Every Town, Village, River, Brook, Bridge, Common, Forest, Wood, Copse, Heath, Moor, &c. That Occur in Passing the Roads: and for the Better Illustration Thereof, There Are Added Tables, Wherein the Names of the Places with Their Distances Are Set Down in a Column, in so Plain a Manner, That a Meer Stranger May Travel All Over England Without Any Other Guide*. London: Printed by T. Ilive for Abel Swall, and sold by Tim. Child . . . , and R. Knaplock.

Ogilby, John. 1712. *The Traveller's Guide, OR, A Most Exact Description OF THE ROADS OF ENGLAND. BEING Mr. OGILBY'S ACTUAL SURVEY, and Mensuration by the WHEEL OF THE Great ROADS from LONDON to all the Considerable Cities and Towns in England and Wales, Together with the Cross-Roads from one City or Eminent Town to another. Wherein is shewn the Distance from Place to Place, and plain Directions given to find the Way, by setting down every Town, Village, River, Brook, Bridge, Common, Forest, Wood, Copse, Heath, Moor, &c. that occur in Passing the Roads. And for the better Illustration thereof, there are added TABLES, wherein the Names of the Places with their Distances, are set down in a Column, in so plain a manner, that meer Strangers may Travel all over England without any other Guide*. London: Printed for W.B. and sold by J. Churchill, D. Brown, J. Nicholson, R. Knaplock, J. Wyat [and 16 others].

Ogilby, John, Thomas Gardner, Jacob Tonson, and John Watts. 1719. *A Pocket-Guide to the English Traveller: Being a Compleat Survey and Admeasurement of All the Principal Roads and Most Considerable Cross-Roads in England and*

Wales. In One Hundred Copper-Plates. London: Printed for J. Tonson at Shakespear's Head over-against Katherine-Street in the Strand.

Ogilby, John, and William Morgan. 1679. *Mr. Ogilby's Pocket Book of Roads: With the Computed & Measured Distances and the Distinction of Market and Post Townes.* London: Printed for the author and sold at his house.

Ogilby, John, and William Morgan. 1689. *Mr. Ogilby's and William Morgan's Pocket Book of the Roads: With Their Computed and Measured Distances, and the Distinction of Market and Post-Towns.* London: Printed for the author and Christopher Wilkinson, 1689.

Ogilby, John, and William Morgan. 1794. *The Traveller's Pocket-Book: Or, Ogilby and Morgan's Book of the Roads, Improved and Amended, in a Method Never Before Attempted. Containing, I. a New Whole Sheet Map of the Roads in England and Wales, . . . Viii. an Alphabetical List of All the Cities.* London: printed for B. Law and Son, J. Johnson, S. Bladon, J. Sewell, E. Newbery [and nine others in London].

Ogilby, John, and T. Fairman Ordish. 1911. *Roads Out of London: Being Photographic Reprints Extracted from Ogilby's "Britannia," 1675, with so Much of His Text As Relates to Them.* London: London Topographical Society.

Ogilby, John, John Owen, and Emanuel Bowen. 1720. *Britannia Depicta, Or, Ogilby Improv'd: Being a Correct Coppy of Mr. Ogilby's Actual Survey of All Ye Direct & Principal Cross Roads in England and Wales: Wherein Are Exactly Delineated & Engraven, All Ye Cities, Towns, Villages, Churches, Seats, &c., Scituate on or Near the Roads, with Their Respective Distances...: Lastly Particular & Correct Maps of All Ye Counties of South Britain.* London: Printed for & sold by Tho. Bowles ... & E. Bowen.

Ogilby, John, and John Senex. 1719. *An Actual Survey of All the Principal Roads of England and Wales: Described by One Hundred Maps from Copper Plates. On Which Are Delineated All the Cities, Towns, Villages, Churches, Houses, and Places of Note Throughout Each Road. As Also Directions to the Curious Traveller What Is Worth Observing Throughout His Journey. The Whole Described in the Most Easy and Intelligible Manner.* London: Printed for & sold by J. Senex.

Owen, W. 1779. *Owen's New Book of Roads: Or, a Description of the Roads of Great Britain. Being a Companion to Owen's Complete Book of Fairs. ... The Second Edition, Corrected and Greatly Improved. Illustrated with a Neat and Correct Map of Great Britain.* London: Printed for W. Owen; and Mess. Goadby and Co. at Sherborne.

Paterson, Daniel. 1771. *A New and Accurate Description of All the Direct and Principal Cross Roads in Great Britain: Containing, I. an Alphabetical List of All the Cities, Boroughs, Market and Sea-Port Towns, in England and Wales...*

Ii. the Direct Roads from London...: Iii. the Cross Roads of England and Wales: Iv. the Principal Direct and Cross Roads of Scotland: V. the Circuits of the Judges in England, Never Before Published: the Whole on a Plan Far Preferable to Any Work of the Kind Extant. London: Printed for T. Carnan.

Pepys, Samuel, Robert Latham, and William Matthews. 1970. *The Diary of Samuel Pepys*. Berkeley: University of California Press.

Population Reference Bureau. 2012. "Human Population: Population Growth." Population Reference Bureau. <http://www.prb.org/educators/teachersguides/humanpopulation/populationgrowth.aspx> (January 13, 2013).

Rose, David. 2001. *Guildford, Our Town: Uncovering the Stories behind the Facts*. Derby: Breedon.

Schuchard, Margret. 1973. *John Ogilby, 1600–1676: Lebensbild eines Gentleman mit vielen Karrieren*. Hamburg: Paul Hartung.

Schuchard, Margret. 1975. *A Descriptive Bibliography of the Works of John Ogilby and William Morgan*. Bern: Herbert Lang; Frankfurt: Peter Lang.

Shirley, Rodney W. 1988. *Printed Maps of the British Isles, 1650–1750*. Hertfordshire: Map Collector Publications.

Skelton, R.A., and Thomas Chubb. 1970. *County Atlases of the British Isles, 1579–1850: A Bibliography*. London: Carta Press.

Skelton, R.A., and Arthur L. Humphreys. 1952. *Decorative Printed Maps of the 15th to 18th Centuries: A Revised Edition of Old Decorative Maps and Charts*. London: Staples Press.

Slessor, Kenneth. 1932. *Cuckooz Contrey*. Sydney: Frank C. Johnson.

Slessor, Kenneth. 1970. *Bread and Wine; Selected Prose*. [Sydney]: Angus & Robertson.

Slessor, Kenneth, and Dennis Haskell. 1991. *Kenneth Slessor: Poetry, Essays, War Despatches, War Diaries, Journalism, Autobiographical Material, and Letters*. St. Lucia, Qld., Australia: University of Queensland Press.

Slessor, Kenneth, Dennis Haskell, and Geoffrey Dutton. 1994. *Kenneth Slessor: Collected Poems*. Pymble, Sydney: Angus & Robertson.

Slessor, Kenneth, and Norman Lindsay. 1926. *Earth-Visitors: Poems*. London: Fanfrolico Press.

- State Library of New South Wales. 2011. "From Terra Australis to Australia: The First Fleet." State Library of New South Wales. Online exhibit. http://www.sl.nsw.gov.au/discover_collections/history_nation/terra_australis/firstfleet.html (January 13, 2013).
- Stewart, Douglas. 1964. *Modern Australian Verse*. Sydney: Angus & Robertson.
- Stewart, Douglas. 1969. Kenneth Slessor's Poetry. *Meanjin Quarterly* 2:149–168.
- Stewart, Douglas. 1977. *A Man of Sydney: An Appreciation of Kenneth Slessor*. Melbourne: Nelson.
- Stewart, Douglas. 2012. "For Kenneth Slessor." *Afterhours Inspirational Stories*. Inspirational Poems, Poetry, Quotes. Online resource. <http://www.inspirationalstories.com/poems/for-kenneth-slessor-douglas-alexander-stewart-poems> (January 13, 2013).
- Taylor, Andrew. 1987. *Reading Australian Poetry*. St. Lucia, Qld., Australia: University of Queensland Press.
- Taylor, Susan. 1998. "Cross-Reference." *Mercator's World* 3.1 (January/February):59.
- Thomson, Andrew Kilpatrick. 1968. *Critical Essays on Kenneth Slessor*. [Brisbane]: Jacaranda.
- Thrupp, George A. (1877) 1969. *The History of Coaches*. Amsterdam: Meridian Publishing Co.
- Tooley, R. V., Josephine French, Valerie Scott, and Mary Alice Lowenthal. 1999–2004. *Tooley's Dictionary of Mapmakers*. 4 vols. Tring, Herts, England: Map Collector Publications in association with Richard Arkway.
- Van Eerde, Katherine S. 1976. *John Ogilby and the Taste of His Times*. Folkestone, England: Dawson.
- Virgil, John Ogilby, Franz Cleyn, Wenceslaus Hollar, William Faithorne, and Pierre Lombart. 1654. *Works of Publius Virgilius Maro*, translated, adorn'd with Sculptures, and illustrated with Annotations by John Ogilby. London: Printed by Thomas Warren for the Author, and are to be had at his House in King's-Head Court in Shoe-lane.
- Withers, Charles W.J. 2004. "Ogilby, John (1600–1676)." *Oxford Dictionary of National Biography: In Association with the British Academy: from the Earliest Times to the Year 2000*, edited by H.C.G. Matthew and Brian Howard Harrison, 41:566–567. Oxford: Oxford University Press.
- Wood, Denis, and John Fels. 1992. *The Power of Maps*. New York: Guilford Press.

ACKNOWLEDGMENTS

Many have contributed to this publication. The Professional Staff Congress of the City University of New York provided the generous PSC-CUNY Faculty Research Award (62232-00) that enabled me to research not only at the Mitchell Library of the State Library of New South Wales in Sydney, but also at the Slessor archive at the National Library of Australia in Canberra. Hunter College CUNY gave me a year sabbatical in which to produce a manuscript. The Eastend Arts Council furnished the light-filled Wallace Stegner House in Eastend, Saskatchewan, where I began polishing this article in 2011 while writer-in-residence. Paul Slessor has been kind and supportive. My research went smoothly because of the incomparable Alice Hudson and Nancy Kandoian of the Lionel Pincus and Princess Firyal Map Division of the New York Public Library; Map Curators Martin Woods and Brendan Whyte of the Map Section of the National Library of Australia; Ed Vesterberg and Andy Carr in the Maps Section at the Mitchell Library of the State Library of New South Wales; Marian De Saxe of the Fisher Library at the University of Sydney; Matthew Stuckings and Lisa Joseph of the National Library of Australia as well as Elizabeth Caplice, Claire Cruickshank, Susan Thomas, and Adiba Jadeer of the Pictures and Manuscripts Branch; William Latey of Jonathan Potter Limited (Antique Maps), London; Mary Alexander, former Collections Officer at the Guildford Museum; Tom Harper and Jo Dansie of the British Library; Tom Morgan of the National Portrait Gallery, London; Jean and Martin Norgate and the Department of Geography, University of Portsmouth; Norman Clarius, interlibrary loan specialist at Hunter College; Paul Cole and Richard Markgraf of the PSC-CUNY Research Foundation of the City University of New York; Robert Buckley and AnneMarie Rivera of the Research Administration at Hunter College; and the anonymous reviewers of this article along with *Cartographic Perspectives* editor Patrick Kennelly, assistant editors Laura McCormick and Rob Roth, and the NACIS and Editorial boards for being receptive to a series of articles about Slessor. Finally, my life would not be as rich without Rob, Marie-Anne, Luc, Bec, and Ruby Small, who welcomed us into their Australian homes; Ethel and Ken Wills, who introduced us to Eastend and became fast friends; Michael Leaver and Peter Engelhart, for sharing not only good times but also their Berkeley home; William Mayer, who is much missed by his colleagues and friends in the Classics Program at Hunter College; Harold Haft, the best of fathers; and Jordan Zinovich, writer, poet, and my heart's traveling companion.

This paper is dedicated to Dale Zinovich, with admiration and love, on her 80th birthday.



Figure 1. Map case drawers marked with China markers.

for processing maps received through the Federal Depository Library Program (UGA is a regional depository for federal documents), allowing us to finally eliminate a processing backlog that had existed for more than a decade. Gift atlases were sorted and boxed, to be cataloged in our new space. We sorted our extensive collection of Georgia air photos, formerly housed in thirty-five four-drawer file cabinets, into nearly 1200 archival boxes to better preserve and access the collection. Even without a definite date, the Map Library was ready to move.

When ground was broken for UGA's new Special Collections Building in early 2010 (<http://www.libs.uga.edu/scl/facilities/building.html>), planning for what would eventually become MAGIL began in earnest. The space MAGIL now occupies formerly housed the Richard B. Russell Library for Political Research and Studies (<http://www.libs.uga.edu/russell/>). Approximately two-thirds of their 14,000 square foot space was closed to the public and devoted to compact shelving and staff work areas. After much debate, it was decided that half of the existing compact shelving would be removed to make way for our public area and future GIS lab; the rest of the compact shelving would be retrofitted to accommodate map



Figure 2. Map case on a wooden frame, ready to move.

cases. What was originally the public exhibit area would house the government documents stacks and microfiche cabinets; the Russell Auditorium and adjoining offices would become MAGIL's staff area. The exterior entrance to the Russell Library would be converted to a large window to allow for natural light in the subbasement; the main entrance to MAGIL would be adjacent to the elevators and stairs. Most importantly, since the color scheme in the non-public areas featured a particularly hideous shade of mustard yellow from the 1970s



Figure 3. Shrink-wrapped atlases on a pallet.



Figure 4. Uncataloged maps being sorted in our old space. Tables were set up where the map cases used to be.

that could not be written off as retro, there would be new paint and carpet throughout. It all looked great on paper; my staff and I could hardly wait for the move to get started.

As it turned out, we wound up waiting a bit longer than expected. The move of the soon-to-be former Map Library ultimately depended on the move schedule of the Special Collections Libraries, which in turn depended on the completion of their new building. Unfortunately, our original plan to close the Map Library in early December 2011 was overly optimistic. Due to a number of factors, not the least of which was the enormous scope of the Special Collections move, the Map Library did not close for good until April 19th, 2012; we remained closed for the next 3 months. Even as I finally started posting signs announcing our impending closing, I found it hard to believe that after five years of anticipation, the move was finally about to happen.

The move itself was completed in several stages. The first stage involved moving the air photos onto newly-installed compact shelving, and installing the map cases on the Russell Library's former compact shelving carriages (Figure 5); this was done before our new space was remodeled to ensure that the new carpet would not be damaged. The Russell Library space we were about to occupy had been used as a staging area for the Special Collections moves, with their exterior door (our future window) turned into a temporary loading dock. This was to our advantage, as our soon-to-be-former space also had a loading dock, which allowed the map cases to be transported flat rather than tipped on their sides. However, like many large map collections, we have several different styles of map cases. As much as possible, I wanted to group like cases together; this was easier said than done. In addition to 245 five-drawer map cases in many different shades of gray, plus eight in olive drab, there were five types of handles in combinations of round, square, matte and/or shiny to match. We created extensive spreadsheets listing every single drawer, with columns for drawer content, color and handle type. To make everything match, we marked every single map case section and drawer with erasable China marker so the movers would know what cases went where (Figure 1). Although this made staging the map cases somewhat complicated for the movers—the Walter Hopkins Company, who had also installed the original compact shelving in the Russell Library—it meant that we had to do very little shifting and rearranging of the map collection once it arrived in our new space (Figure 2).

Once the map cases were moved, the remainder of their installation on the movable carriages was completed, including the addition of atlas shelving to



Figure 5. Compact shelving carriages ready for map cases. Note the “retro” mustard yellow pillars that were last painted in the 1970s—fortunately, they have since been painted an off-white.



Figure 6. Public area of the Map and Government Information Library under construction.



Figure 7. Public area of the Map and Government Information Library with paint, carpet, furniture and globes.

the tops of the map cases. Remodeling of our new space continued, including moving walls for our new GIS lab, installing standing shelving and furniture, as well as new paint and carpet throughout. Back at our old location, my staff and I consolidated and organized the map cataloguing backlog of an estimated 15,000 maps that used to be randomly scattered in drawers throughout the collection (Figure 4). After a month, it was time to move again. This time, the Libraries' in-house move team plus the UGA Physical Plant moved our books, atlases (Figure 3), uncatalogued maps, small map cases and the remainder of our furniture; our Systems staff moved our computers, printers and scanners. The next few weeks were dedicated to unpacking, shelving and settling into our new space, and to moving parts of the government documents collection into the

subbasement. Finally, almost three months after we had closed, the arrival of our globes marked the last stage of our move; it was time to open our new library.

By all accounts, the new Map and Government Information Library is a great success. Libraries' faculty and staff love the layout and color scheme, which was largely dictated by the gray map cases and light blue carriages. Students are fascinated by the compact shelving and especially by the moving map cases. Everyone is thrilled to have the map collection back on campus. As of this writing, MAGIL is still a work in progress; there is some final construction work to be completed, the move of the government documents collection will continue through the end of the calendar year, and our GIS lab is still on the drawing board. But those are relatively minor details; far more important is that UGA has a new library dedicated to maps and government documents, two rich but long-underutilized collections. After so many years of planning and preparation, I am thrilled that MAGIL has finally come to fruition and am looking forward to the bright future of our new library.

For further information about the UGA Libraries' new Map and Government Information Library, please visit our new Web site (which is also a work in progress, but hopefully not for long!) at <http://www.libs.uga.edu/magil>.



Figure 8. Reference desk with the GIS lab in the background. Note the hanging wires—still a work in progress.



Figure 9. New compact shelving for our Georgia air photo collection. Note the bare wood floor—still a work in progress.



Figure 10. Map cases in the Map and Government Information Library. The table top on the low cases was built for MAGIL. Note the atlas shelves on top of the map cases in the background.

Techniques in Google Earth and Google Maps

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INTRODUCTION

The three contributions here come from a graduate course entitled “Cartographic Methods,” taught by Michael Peterson at the University of Nebraska at Omaha during the 2012 Spring semester.

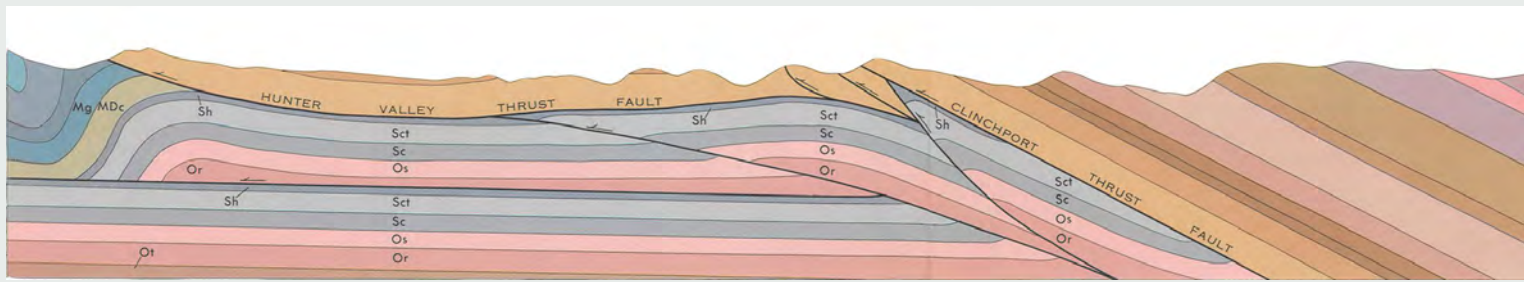
The course dealt with various ways of using cloud resources to make maps. Konal Dobson begins by examining how Google Earth can be used to depict subsurface geology through pop-up block diagrams. Kevin Fandry uses the timespan function in Google Earth to create an interactive animation. William Shrader then examines alternative ways for producing so-called “heat maps” through Google Maps.

—Michael Peterson

VISUALIZING SUBSURFACE GEOLOGY WITH GOOGLE EARTH Konal J. Dobson

INTRODUCTION

Google Earth is a useful interactive mapping tool that allows users to control oblique perspective views of the earth. This perspective view makes it possible to blend three-dimensional features of the earth's surface with traditional two-dimensional map space. The Google Earth user can view a mountain range obliquely by controlling the angle of view. It is also possible to input a building as a 3-D object. This allows users to view a three-dimensional cityscape.



A 3-D element is added to Google Earth by building a model that consists of a block that's been draped with pixels to give a representation of the building's exterior. Users of Google Earth could create models other than buildings and share those models. One suggestion for a useful 3-D model other than a building is a model of subsurface geology. Since a building consists of a block model that extends in the positive z-direction, a user could create a block model of subsurface geology that would extend from the surface of the earth into the negative z-direction. This article reviews the procedure for creating a 3-D model of subsurface geology, sharing that model with Google Earth, and controlling its display so the user can elevate the block from within Google Earth, thereby making it possible to view subsurface geologic features.

PREVIOUS RESEARCH

Research into this concept had been previously conducted by Declan De Paor in 2009. Dr. De Paor states that geologists and geophysicists are interested in what is below the surface of the earth rather than what's above the surface. Google Earth is quite capable of displaying the earth's surface, and with the added modeling capabilities, Dr. De Paor has been able to create models of subsurface geology that can be viewed in Google Earth. Dr. De Paor considers it a powerful pedagogic tool to be able not only to view subsurface geology but to actually lift a block up out of the ground and see subsurface geologic features. Students can, in this way, connect surface features with the underlying subsurface geology. Many of the techniques reviewed in this article were developed by Dr. De Paor.

REQUIRED PROGRAMS AND MATERIALS

To begin, a user will need both Google Earth and Google's 3-D modeling program, SketchUp. Both of these programs are available as free downloads. Next, the user needs a geologic map of any area. The geologic map needs to include a cross-section and a traditional map view that shows the spatial location of the cross-section that is to be displayed. For this example, a geologic quadrangle map titled Swan Island Quadrangle, Tennessee is used (USGS 1971). Our objective is to create a block that displays a cross-section on the face of the block. For this purpose, a user will need a digital image of the cross-section in one of a variety of formats. JPEG, PNG, and TIFF are all suitable formats for the cross-section image. The Swan Island geologic map used in this example was scanned from paper and saved as a JPEG image. A simple text editor is needed to adjust the underlying KML code within Google Earth.

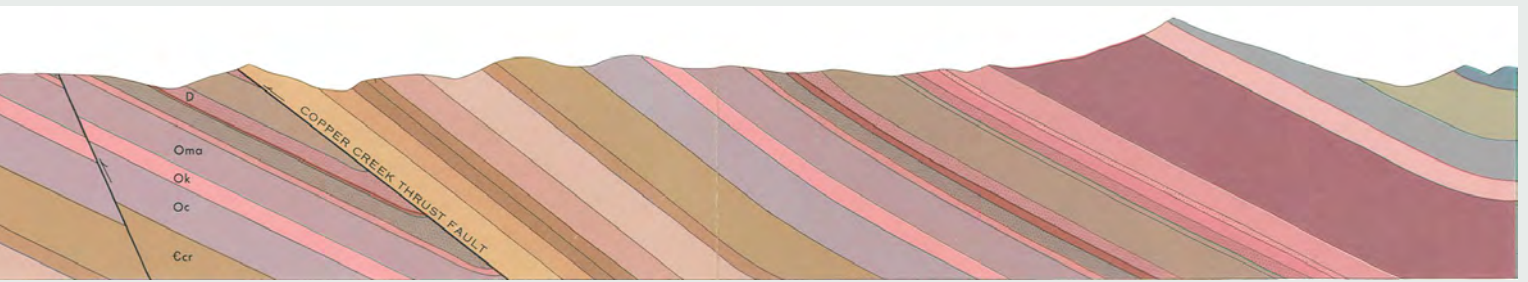


Figure 1. Swan Island Quadrangle, Tennessee, cross-section.

STEPS IN MAKING A GEOLOGIC CROSS-SECTION FOR GOOGLE EARTH

1. In SketchUp, use the rectangle tool to create a rectangle on the ground surface.
2. Use the Push/Pull tool to extend the rectangle into a cube. The rectangle needs to extend from the subsurface in the negative Z direction (Figure 2).
3. For the cross-section that will be displayed on the face of the block select File > Import. Find the cross-section JPEG and open. Within the Import dialog box select the 'Use as texture' option.
4. Adjust the size of the block to fit the cross-section (Figure 3).

MARK GOOGLE EARTH WITH THE LOCATION OF THE CROSS-SECTION

With the model created in SketchUp, the next step is to find the location in Google Earth where this block is to be displayed. The Swan Island Quadrangle gives the lat/long coordinates of each corner. Use those coordinates to determine where to put the place marks in Google Earth. Next, use the 'Add Path' tool to mark the strike line that corresponds to the cross-section that is to be displayed.

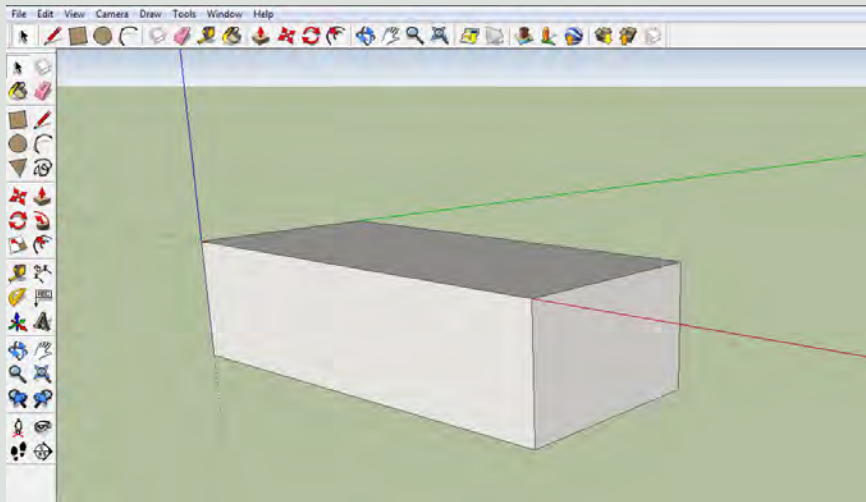


Figure 2. Block created in SketchUp extended in the negative Z direction.

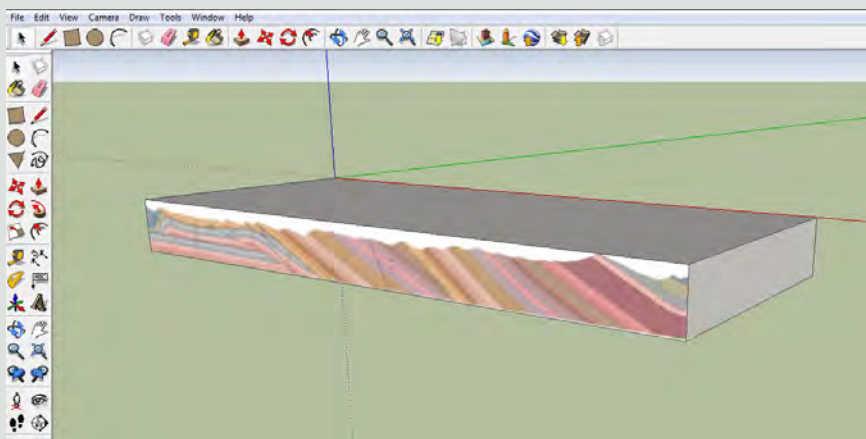


Figure 3. Block created in SketchUp with cross-section displayed on the face.

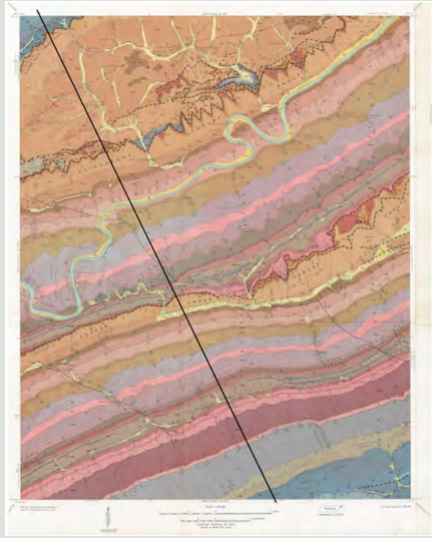


Figure 4. Swan Island geologic map with the strike line for the cross-section marked in bold black.



Figure 5. Screen capture from Google Earth showing the area of interest with strike line of cross-section marked in cyan.

STEPS FOR PLACING BLOCK IN GOOGLE EARTH

1. In SketchUp click the 'Preview Model in Google Earth' tool. This will open Google Earth and a layer titled 'SUPreview0' will have been added.
2. Expand SUPreview0 Layer to show two sub-layers.
3. Right click on the 'Model' sub-layer. Click 'Properties'.
4. With the 'Properties' dialog box open, the user can drag and resize the model so that it fits and lines up at the proper location.
5. Also within 'Properties' users can select the 'Altitude' tab and raise and lower the block to get a preview of how it will look in Google Earth (Figure 6).
6. After proper adjustments are made click 'OK' to close the properties dialog box.

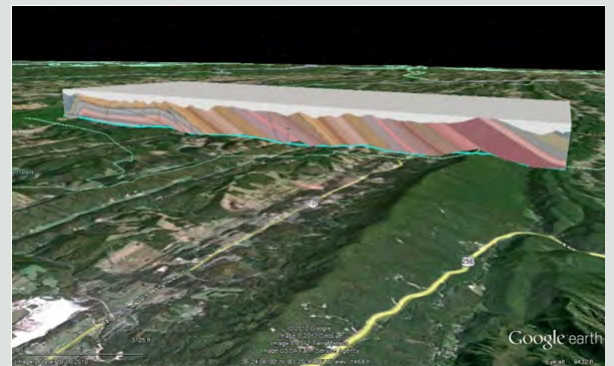


Figure 6. Screen capture from Google Earth showing the elevated block model with the cross-section displayed.

RAISING AND LOWERING THE BLOCK WITH THE TIMESPAN FUNCTION

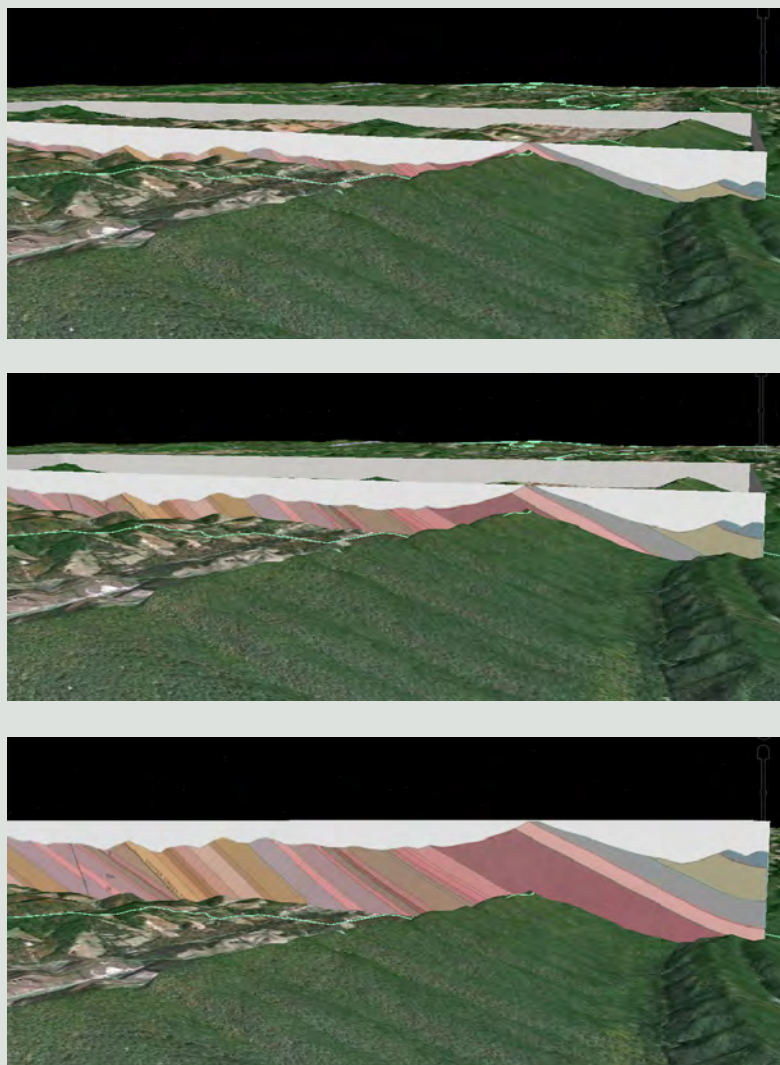
The model has now been created and shared in Google Earth. The next step is to make it possible to raise and lower the block. Raising and lowering this block is a powerful visual tool that will help students connect the surface terrain to


```

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  <Folder>
    <name>Models</name>
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          <z>0.9202695640238787</z>
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          <href>C:/Users/Konal/AppData/Roaming/Google/GoogleEarth/untitled.dae</href>
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          <viewRefreshTime>0</viewRefreshTime>
        </Link>
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            <sourceHref>untitled/texture.jpg</sourceHref>
          </Alias>
        </ResourceMap>
      </Model>
    </Placemark>
  </Folder>
</Document>

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Figure 7. Code to implement timespan function.



Figures 8. Sequence of screen captures in Google Earth showing the block being raised.

the subsurface geologic features. For this, the timespan function can be used. The basic logic behind this function accepts an arbitrary span of time, 100 years for example. At year 1, the model can be set just below the Earth's surface. At year 10, the model can be set 10 meters in the air. At year 50, the model can be set at 50 meters in the air and so on. This will give users a slider bar that can be adjusted from 0 to 100 years which will raise and lower the model as the user slides the timespan slider back and forth. As adjustments are being made, Google Earth is writing underlying code in KML.

1. To view the code for the model, select 'SUPreview0' in the 'Layers' panel, right-click, copy and paste into a text editor. This is the underlying KML code in Google Earth for the block model.
2. Add 'Timespan' code shown in Figure 7 into the KML file in the text editor.
3. Since this code is specific to the Swan Island, TN, cross-section and location, fields within this timespan code will need to be replaced. Replace location, orientation, scale, link, and alias with figures specific to the user's location. These fields can all be found within the code that was copied and pasted in step 1 of this section.

4. Copy and Paste this section repeatedly to create each different timespan segment. This first section goes from <begin> 000 to <end> 001 with an altitude of 0. The next section would go from <begin> 001 to <end> 002 at an altitude of 10, for example. With repetition the user can create as many timespan segments as are needed, each with a sequentially higher elevation.
5. Save this code in the text editor with an extension of .kml.
6. Double-click the KML file; this will open it in Google Earth and raise and lower the block using the timespan slider.

SUMMARY

Google Earth is designed to visualize three-dimensional features in the environment. 3-D buildings have been added for many cities. An alternative application of this feature is viewing subsurface geology. Creating a block model of subsurface geology, sharing the model with Google Earth, and adding the timespan function to raise and lower the block in Google Earth results in a very useful representation. The presentation of the subsurface in this way could be a powerful tool for viewers to connect surface terrain to subsurface geology.

REFERENCES

- De Paor, D. "AGU Scientists Tech Talks—Using Google SketchUp with Google Earth for Scientific Applications." January 27, 2009. Online video clip. Youtube. Accessed April 2, 2012.
- USGS. 1971. Geologic Quadrangle Map, Swan Island Quadrangle, Tennessee, 1:24,000.

INTERACTIVE ANIMATION WITH GOOGLE EARTH'S TIMESPAN FUNCTION

Kevin Fandry

INTRODUCTION

Online mapping tools have reinvented the map animation interface, once criticized for its lack of interactivity. For example, the tiling system used by Google Maps allows for seamless zooming and scrolling between map images, redefining what animation within a map can do. Google Earth has expanded on animation by allowing a multitude of pre-programmed functions to be easily tied to a map. One such function is TimeSpan, a form of dating that allows users to turn data sets off and on through the use of a slider. As an improvement for interactivity within map animations, functions such as TimeSpan will increase user response to animated maps, helping create new ways of expressing information within maps.

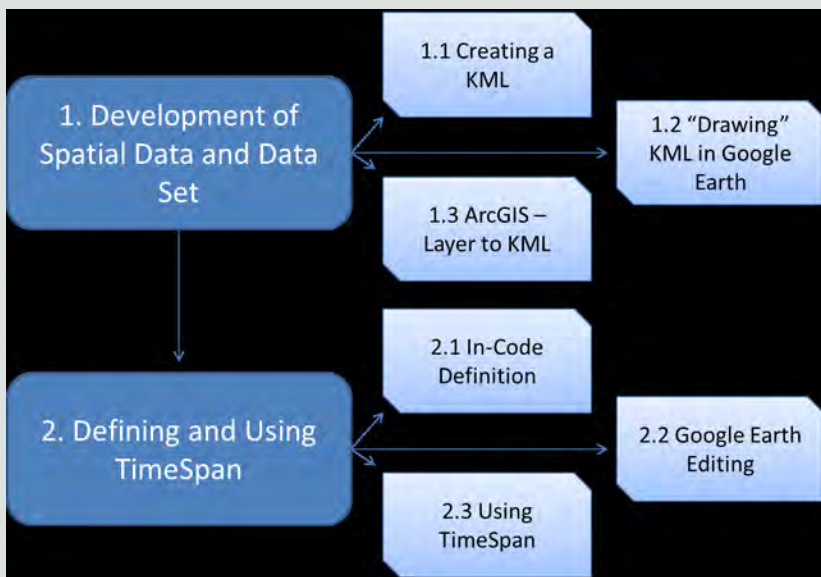
The TimeSpan function is designed to show historical satellite imagery. Combining the functionality of TimeSpan with point, line, or polygon data would allow for the generation of multiple maps with increased functionality and interactivity. TimeSpan is a reference to a given period of time associated with a feature being represented through Google Earth. It can be contiguous, an example being the addition of US state polygons to show the order of addition to the Union. As the slider crosses the year in which a state was added, the associated polygons appear on the map. TimeSpan can also be non-contiguous by representing overlays of deforestation, advancement of glaciers—or, as in the example below, changes in agricultural practices.

IMPLEMENTING TIMESPAN

Using TimeSpan within Google Earth can be explained with a series of step-by-step instructions, as represented in Figure 1.

DEVELOPMENT OF SPATIAL DATA AND DATA SET

Google Earth uses the KML (Keyhole Markup Language) file as the basis for map generation and data storage. To take advantage of the TimeSpan function, a KML (or multiple KMLs) will need to be generated. There are different methods for generating a KML file; however, the desired product may dictate how the KML is created. The example provided is



Figures 1. Outline of key instructions to implement TimeSpan function within Google Earth.

representing changes in intensity in hog production at the county level for the state of North Carolina from 1950 to 2005. The data sets are from the United States Department of Agriculture (USDA) and the National Agricultural Statistics Service (NASS). Esri's ArcGIS is initially used for data processing and spatial representation.

When creating a KML from a layer within ArcGIS, the user must first design the layer to its desired representation. The example provided is a choropleth map, designed to aid users in noticing changes in quantitative data. Setting a projection for the map is not necessary, as it will be converted to fit Google Earth. With the layer designed appropriately, open the Layer to KML tool (which can be accessed through a tool search). The parameters needed for the Layer to KML tool consist of the Layer to be converted, an output name and location for the KML, and the output scale, as depicted in Figure 2. Output scale can be directly taken from the extent measure on the ArcGIS interface. The extent shown was 1:4,385,249; therefore, the output scale is simply 4385249. Repeat the process for the number of layers necessary, with each layer creating a new KML.

Another method for generating a KML would be to use Google Earth itself. This can be done by either typing in the point locations needed to define the polygons or “drawing” the polygons using the tools provided by Google Earth. Both options are time-consuming. The geo-referencing capabilities provided through ArcGIS make it ideal for most scenarios.

DEFINING TIMESPAN

With the desired KMLs created, they can now be viewed within Google Earth. Applying the TimeSpan function is done in a number of ways, the first being to define TimeSpan within the code itself. Within Google Earth, right-click the folder labeled Temporary Places; this will copy and combine the code for all KML files currently active. Next, paste the copy into a preferred editing application, such as TextEditor, Xcode, NotePad, or NotePad++.

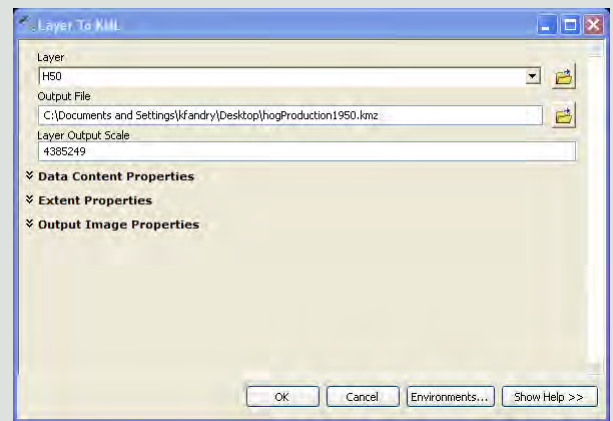


Figure 2. Display of the Layer to KML tool within ArcGIS, and necessary parameters.

```

1180 </body>
1181
1182 </html>]]></description>
1183 <!-- TimeSpan -->
1184 <!-- begin 1950 -->
1185 <!-- end 2005 -->
1186 </TimeSpan>
1187 <!-- styleUri -->
1188 <!-- MultiGeometry -->
1189 <!-- Polygon -->
1190 <!-- tessellate -->
1191 <!-- outerBoundaryIs -->
1192 <!-- LinearRing -->
1193 <!-- coordinates -->
1194 -81.23970418775782,36.36549354576037,0 -81.17648398854539,36.4155730
1195 </coordinates>

```

Figure 3. Displaying the placement of the TimeSpan within KML code.

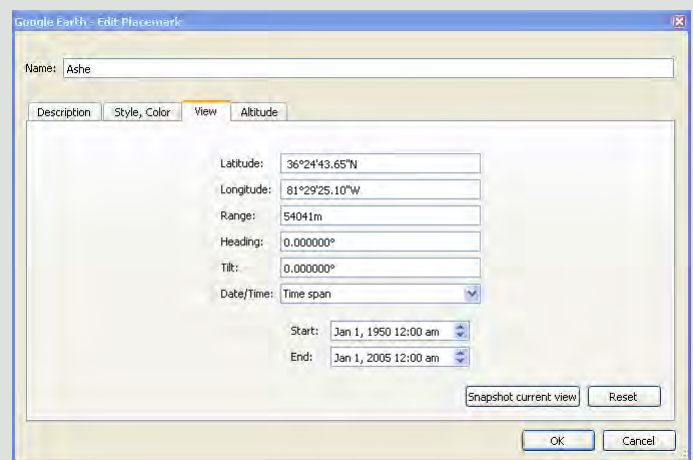


Figure 4. Displaying the Editor Window with Google Earth and necessary parameters to use TimeSpan.

When editing TimeSpan within the code itself, there are two key components: Placement and Format. Placement for TimeSpan generally occurs following the description call—or the call referencing the data set (hog production in this example) located within the KML—and precedes the geographic extent (coordinates) of the file, as shown in Figure 3. The TimeSpan function will need to be added to every geographic feature individually; for the example, this means every county for every layer. The Format for TimeSpan is as follows:

YYYY-MM-DDTHH:MM:SSZZZZZZ

- “Y” represents Year, the minimal requirement for TimeSpan to work
- The first “M” represents Month
- “D” represents Date
- “T” is a divider between Date and Time
- “H” represents Hour
- The second “M” represents Minute
- “S” represents Second
- “Z” represents the difference from UTC

Example: 1950-02-23T10:35:47+4:00

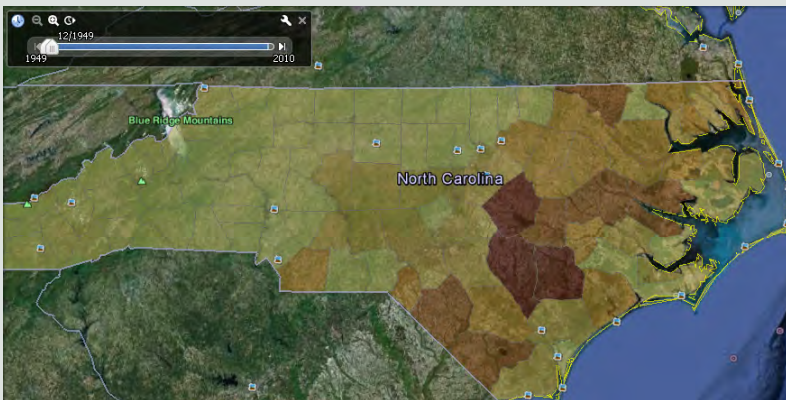


Figure 5. Active KML displaying hog production numbers in 1950 for North Carolina.

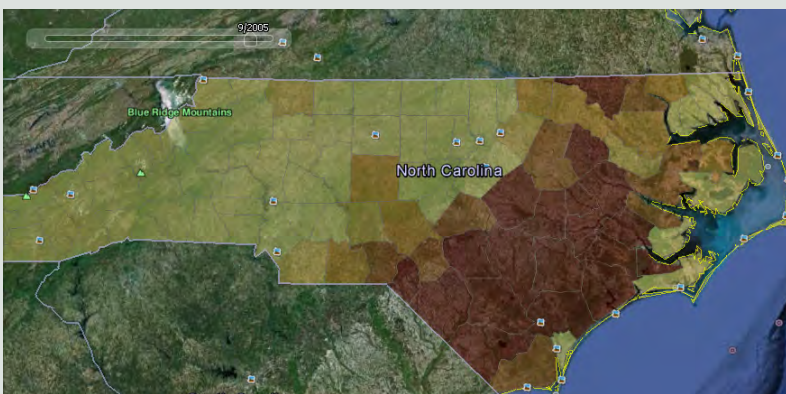


Figure 6. After transition through the slider bar, the KML now shows production numbers for 2005.

To implement the TimeSpan function, make a call to it and then include a “begin” time. For a contiguous map, an “end” time is not necessary. For the model example, which is non-contiguous, an end time is needed. Note: the time slider will stop in reference to the last “end” call. If creating a non-contiguous map, add an “end” call to the final KML layer, as shown in Figure 3.

Another method of implementing TimeSpan is within Google Earth through its editing window. Again, this will have to be applied to every geographic feature individually in each layer. To successfully edit within Google Earth, follow these steps in reference to Figure 4:

- Right-click on a feature and select “Properties/Get Info” (Microsoft/Apple)
- Select “View”
- Select “Reset” if necessary
- Under “Date/Time” select “Time span”
- Add the desired “Start” and “End” times
- Click “OK”

Whichever method used, the result will be the same when displayed in Google Earth. When reopened, a slider bar now opens automatically with the KML, with a start time of 1950. As the slider bar reaches 2005, the image now switches to a new choropleth map as shown in Figures 5 and 6.

SUMMARY

The TimeSpan function allows for new methods of interactive animated mapping. The interactivity inherent within Google Earth and the TimeSpan function makes it possible for a multitude of data to be presented in this way, re-defining animated mapping. By adding in methods of interactivity to animated maps, their overall appeal to general map users may increase. Increasing appeal and use of animated maps will help advance the creation and a publication of new methods of spatial representation, therefore increasing the amount of knowledge that can be gained from maps.

REFERENCES

- “KML Reference.” Keyhole Markup Language. Google Developers. <https://developers.google.com/kml/documentation/kmlreference> (accessed 5 April, 2012)
- “Time and Animation.” Keyhole Markup Language. Google Developers. <https://developers.google.com/kml/documentation/kmlreference> (accessed 5 April, 2012)

GOOGLE HEAT MAPS

William Shrader

INTRODUCTION

Heat maps, more properly termed density or shaded isarithmic maps, use semi-transparent overlays to show the density or frequency of events with a yellow, orange, and red sequence of colors. Heat maps are effective for showing density information. The default options in Google Maps API Version 3 are limited. It is not possible to adjust the intensity or diffusion of the points. In addition, the map does not stay constant at different scales. These problems lead to poor representations of the information and can be misleading to a map viewer that is not aware of the problem.

An alternative to using Google's implementation of the heat map is to use the separate HeatMapAPI. A free version of this software enables users to adjust the intensity of heat maps by configuring the "boost" and "decay." This article will explain the advantages of the HeatMapAPI. The free version can be used as a tool for creating custom map mash-ups for a limited number of points.

HEAT MAPPING WITH GOOGLE MAPS

Figure 1 is an example of a heat map created using Google Maps. This map depicts the intensity of reported tornado occurrences in the United States from 1950 to 2010. This map is effective because it represents a large amount of points—a total of 28,916. Figure 2 shows another heat map, with far fewer points, of the famous "John Snow Cholera Map." Snow mapped the locations of deaths from a Cholera outbreak in London in 1854, helping him discover the source of the outbreak—a contaminated community water pump. The representation in Figure 2 is not as effective in showing this geographic distribution.

At zoom level 17, the 591 latitude and longitude points of the individual deaths are not visible. This is because they are located too far apart from each other at this zoom level. Zoom level 14 shows a good distribution of the points but there is not much variance in the intensity of the colors and the scale of the map prevents users from seeing any of the underlying detail.

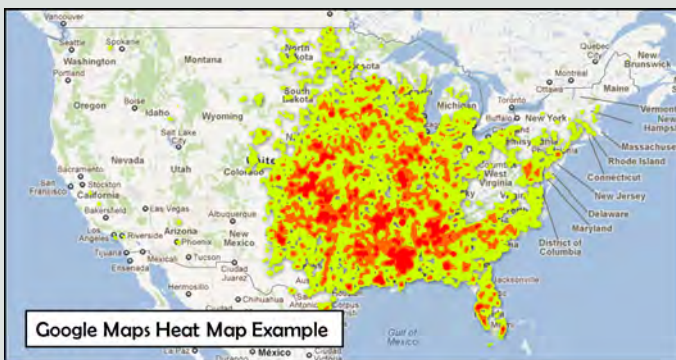


Figure 1. "Tornado Tracks 1950–2010," Fusion Table ID: 894938 from the Storm Prediction Center.

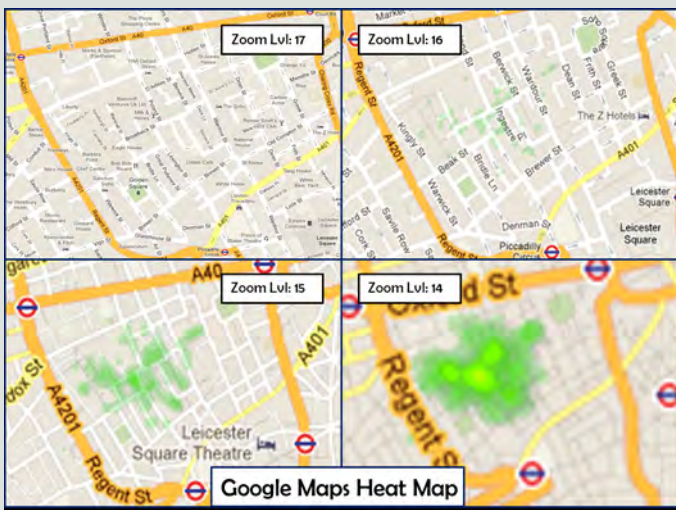


Figure 2. "Dr. John Snow's Ghost Map—Deaths," Fusion Table ID: 418541 (Dobson 2012).

HEAT MAPPING WITH THE HEATMAP API

The HeatMapAPI creates a layer that is placed on top of a Google Map. Figure 3 shows an example of the HeatMapAPI, that is using a smaller data set of the same latitude and longitude points as Figure 2. The data set is smaller because the free version of the HeatMapAPI is limited to 100 points. There are still



Figure 3. "Dr. John Snow's Ghost Map—Deaths." Data exported from Fusion Table ID: 418541. Created with HeatMapAPI and viewable at <http://maps.unomaha.edu/GoogleMapGallery>

differences between the various zoom levels. The map was made to be displayed at zoom level 17, for which the boost and decay have been adjusted.

The HeatMapAPI enables you to adjust the intensity of the heat map by adjusting the "boost" and "decay." By increasing the boost, the value of a single point will be greater over a larger distance. By increasing the decay, the value of a single point will be greater when it is adjacent to other nearby points. By decreasing the decay, the value will be less when adjacent to other nearby points. However, when adjusting the decay, points that aren't that near to others will hold their value, meaning that they will still be visible (Geospatial Analytics Inc. 2011).

Before using the HeatMapAPI, a key from the HeatMapAPI's website needs to be acquired, and then a simple Google map will need to be created using the appropriate code. To make the HeatMapAPI work, three scripts will need to be linked, as shown in Figure 4. Underneath the Google Maps API script, add the script for JQuery and the two scripts for the HeatMapAPI. This is where the personal HeatMapAPI key is needed (Geospatial Analytics Inc. 2011).

When using the free version of the HeatMapAPI, users are limited to inputting 100 or fewer latitude and longitude points. Paying for a license, which starts

at \$39 a month, enables users to input more points. Inputting the points is relatively simple. Figure 5 shows one method for entering the latitude and longitude points.

The next section of code, Figure 6, pushes information to the proxy page and configures the style of the heat map layer and the Google map. Line 29 sets the pixel size for the heat map layer. For best results, make it the same as the

Google map. Next is adjusting the boost and decay.

Before this is done, decide on the appropriate zoom level for viewing the map, as this is the level at which adjustments should be made.

The boost gives the input points a greater value that results in an increase in the resultant intensity. If it is left blank, it will defer to its default value, which is 1. Increasing the boost too much will result in the layer rendering very slowly, especially when using larger map sizes, so it is recommended to keep that value smaller, if possible (Geospatial Analytics Inc. 2011).

The decay will be a number that is smaller than 1 and where the default is 0. At the default setting there is no decay. A number that is closer to 1 will increase the decay, or diffusion, to the points that are adjacent to each other. A number that is less than 0 will decrease the decay to adjacent points. Most users

find that leaving this adjustment at 0 is sufficient for their purposes (Geospatial Analytics Inc. 2011).

The best way to learn how to adjust the boost and decay is by simple trial and error.

The next step is to define the location and name of the proxy page, which is “proxy.php,” and the proxy page will need to be located in the same directory as the web page (Geospatial Analytics Inc. 2011). The next step is to configure the Google Map. Set the latitude and longitude, zoom level, and map type. The last step is to add the HeatMapAPI layer onto the Google Map, as shown on line 42 in Figure 6.

The web page coding is complete, but there is one more crucial step to take before the map will work—creating the proxy page.

```
8 // Add scripts. In addition to the Google Map API, add jQuery, HeatMapAPI, and HeatMapAPI key
9 <script type="text/javascript" src="http://ajax.googleapis.com/ajax/libs/jquery/1.4/jquery.min.js"></script>
10 <script type="text/javascript" src="http://maps.googleapis.com/maps/api/heatmap/js"></script>
11 <script type="text/javascript" src="http://www.heatmapapi.com/heatmapapi/heatmapapi.js"></script>
12 <script type="text/javascript" src="http://www.heatmapapi.com/heatmapapi/heatmapapi.js"></script> // input your key
13 </script>
```

Figure 4. Adding Scripts (Hume 2012).

<https://github.com/ahume/mapping-workshop/blob/master/code-examples/heatmap-api/libya.php>

```
15 var points = [
16   [{"lat": 51.513279, "lon": -0.136681}, // input the latitudes and longitudes in this format
17   [{"lat": 51.513690, "lon": -0.134675} // free version of HeatMapAPI is limited to 100 points
18 ];
```

Figure 5. Format of latitude and longitude points (Hume 2012).

<https://github.com/ahume/mapping-workshop/blob/master/code-examples/heatmap-api/libya.php>

```
20 function init() {
21   var myHeatmap = new GEOHeatmap(); // names the heatmap
22   data = []; // collects the data for the proxy page
23   for (var i = 0, j = points.length; i < j; ++i) {
24     data.push(points[i].lat);
25     data.push(points[i].lon);
26     data.push(5); // pushes the data to the proxy page
27   }
28   // configure HeatMapAPI
29   myHeatmap.Init(900, 700); // set pixels for your maps size
30   myHeatmap.SetBoost(.1); // increase the intensity of the heat
31   myHeatmap.SetDecay(0); // decreases the intensity of the heat for points the
32   myHeatmap.SetData(data);
33   myHeatmap.SetProxyURL('proxy.php'); // communicates with the HeatMapAPI proxy page
34   var latlng = new google.maps.LatLng(51.513353, -0.136621);
35   var myOptions = {
36     zoom: 17,
37     center: latlng,
38     mapTypeId: google.maps.MapTypeId.ROADMAP
39   };
40   var map = new google.maps.Map(document.querySelector("#map"), myOptions);
41   google.maps.event.addListener(map, 'idle', function(event) {
42     myHeatmap.AddOverlay(this, myHeatmap); // places the HeatMapAPI on top of the Google map
43   });
44   window.onload = init;
45 }()
```

Figure 6. Proxy page that configures the heat map, and the Google map (Hume 2012).

<https://github.com/ahume/mapping-workshop/blob/master/code-examples/heatmap-api/libya.php>

The purpose of the proxy page is to communicate between the client and the server; also, it prevents users from gaining access to the HeatMapAPI's private network. The proxy collects the latitude and longitude data and sends it to the HeatMapAPI web service. The web service takes the information and uses an algorithm to create the heat map layer, then sends it back to the proxy page and onto the web page.

The site <http://heatmapapi.com> has premade proxy pages for their users to copy, and they are available in six different web languages. For this demonstration, the proxy that was written in PHP was chosen. Save the proxy in the same directory as your web page or they will not be able to communicate with each other and provide the appropriate name such as "proxy.php" (Geospatial Analytics Inc. 2011). The heat map is now complete. Figure 7 shows an example of what the completed code should look like.

```

1 <html>
2 <head>
3 <style type="text/css">
4   html, body, #map {
5     margin: 5px;
6     padding: 5px;
7     height: 95%;
8   }
9 </style> // add scripts. in addition to the Google Map API, add JQuery, HeatMapAPI, and HeatMapAPI key
10 <script type="text/javascript" src="http://ajax.googleapis.com/ajax/libs/jquery/1.4/jquery.min.js"></script>
11 <script type="text/javascript" src="http://maps.googleapis.com/maps/api/js?sensor=false"></script>
12 <script type="text/javascript" src="http://www.heatmapapi.com/JavaScript/HeatmapAPIGoogle3.js"></script>
13 <script type="text/javascript" src="http://www.heatmapapi.com/JavaScript/HeatmapAPI3.aspx?k=YOUR_KEY_HERE"></script>
14 <script type="text/javascript">
15   (function() {
16     var points = [
17       {lat: 51.513279, "lon": -0.136681}, // input the latitudes and longitudes in this format
18       {lat: 51.513690, "lon": -0.134675} // free version of HeatMapAPI is limited to 100 points
19     ];
20     function init() {
21       var myHeatmap = new GEHeatmap(); // names the heatmap
22       data = []; // collects the data for the proxy page
23       for (var i = 0, j = points.length; i < j; ++i) {
24         data.push(points[i].lat);
25         data.push(points[i].lon);
26         data.push(5); // pushes the data to the proxy page
27       }
28       // configure HeatMapAPI
29       myHeatmap.Init(900, 700); // set pixels for your maps size
30       myHeatmap.SetBoost(.1); // increase the intensity of the heat
31       myHeatmap.SetDecay(0); // decreases the intensity of the heat for points that are adjacent to each other
32       myHeatmap.SetData(data);
33       myHeatmap.SetProxyURL('proxy.php'); // communicates with the HeatMapAPI proxy page
34       var latlng = new google.maps.LatLng(51.513353, -0.136621);
35       var myOptions = {
36         zoom: 17,
37         center: latlng,
38         mapTypeId: google.maps.MapTypeId.ROADMAP
39       };
40       var map = new google.maps.Map(document.getElementById("map"), myOptions);
41       google.maps.event.addListener(map, 'idle', function(event) {
42         myHeatmap.AddOverlay(this, myHeatmap); // places the HeatMapAPI on top of the Google map
43       });
44     }
45     window.onload = init;
46   })();
47 </script>
48 </head>
49 <body>
50 <div id="map" style="width: 100%; height: 95%;"></div>
51 </body>
52 </html>

```

Figure 7. Complete example of the code (Hume 2012).

<https://github.com/ahume/mapping-workshop/blob/master/code-examples/heatmap-api/libya.php>

SUMMARY

The HeatMapAPI has a number of advantages over Google's default heat map. Being able to adjust the boost and decay are the best features of this product. However, the free version is limited to 100 points or less, and paying for a HeatMapAPI license can be expensive. Also, the HeatMapAPI name is displayed on the maps when using the free version of the API. Another downfall is that at different zoom levels, the densities of the points change, which alter the representation of their intensity; however, this issue isn't nearly as much of a problem as it is in Google Maps implementation. Additionally, the rendering and display can be very slow. This could be fixed if the HeatMapAPI were to tile the heat map layer.

A useful additional feature would be a slider bar for adjusting the boost and decay. This would eliminate the trial and error when configuring the map, as

well as addressing discrepancies when changing zoom levels. Adding a variety of color schemes would be a nice feature as well. Despite these minor downfalls, the free HeatMapAPI is a valuable educational tool for understanding density mapping.

REFERENCES

- Dodson, R. "Dr. John Snow's Ghost Map—Deaths." Fusion Tables ID: 418541, April 7, 2012 https://www.google.com/fusiontables/DataSource?docid=1DIIOjeERBEaWHlu47L3_7EJEmbl2hinNDmsP9w (accessed April 7, 2012)
- Geospatial Analytics Inc. HeatMapAPI. <http://www.heatmapapi.com/Default.aspx> (accessed April 7, 2012)
- Hume, A. Mapping—Workshop. <https://github.com/ahume/mapping-workshop/blob/master/code-examples/heatmap-api/libya.php> (accessed April 7, 2012)
- Shrader, William, Dr. John Snow's Cholera Map, Density Heat Map. <http://maps.unomaha.edu/GoogleMapGallery> (accessed April 7, 2012)
- Storm Prediction Center. "Tornado Tracks 1950-2010." Fusion Tables ID: 894938. <https://www.google.com/fusiontables/DataSource?docid=1vUFBtzPXPm1HSmwDTnNHcFvq2ch-UF49Vrpg8g> (accessed April 7, 2012)

Visualizing Body Movement: Experimental Techniques for Mapping Change

Sarah Bennett, University of Wisconsin–Madison
www.scarabcat.net

THE STILL BODY BECOMES INVISIBLE

ISOLINES:



I made these map posters to visually compare our experience of the moving body, as the dance theorists Maxine Sheets-Johnstone and Rudolf Laban each thought of it. For both, movement is made up of our changing existence as it is felt and expressed in space. When I turned to cartographic methods to visualize their ideas, I used flow mapping, spatial reference systems, and small multiples.

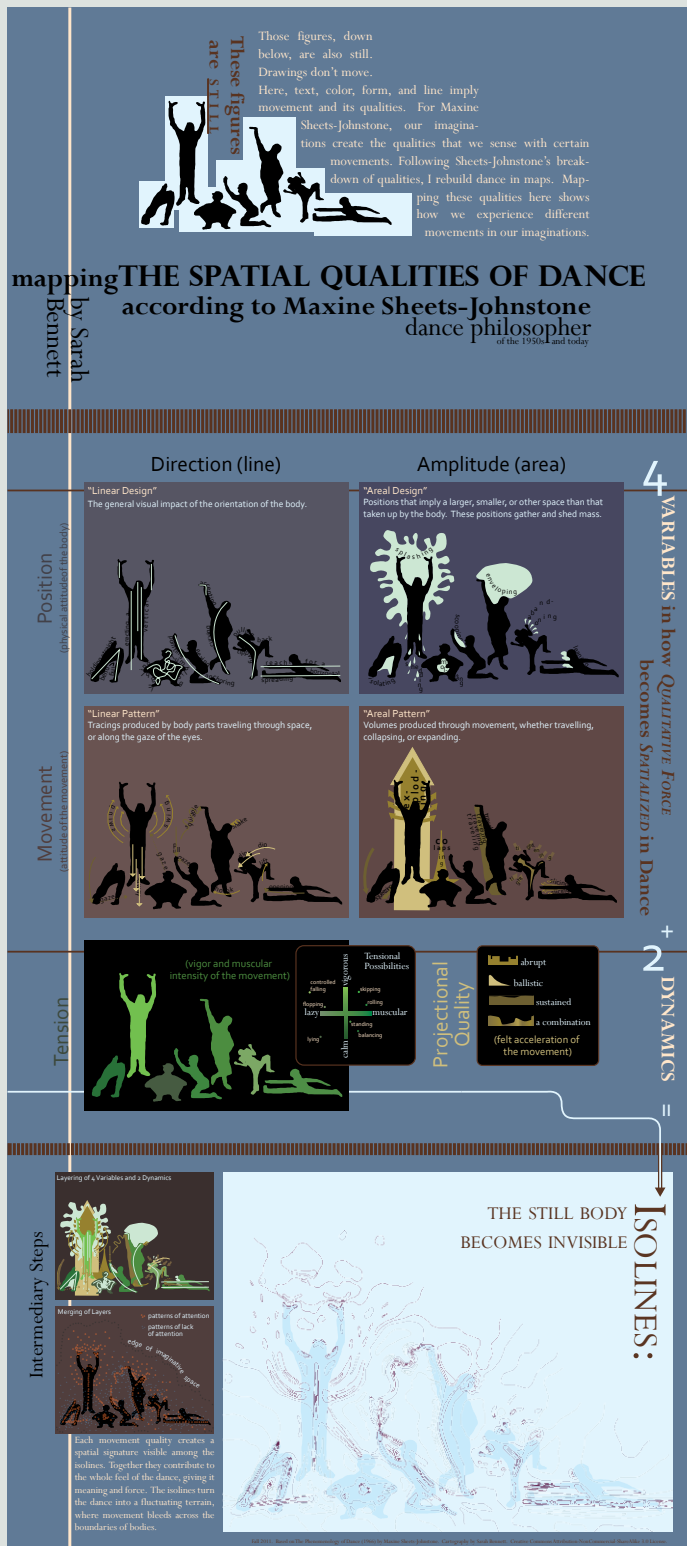


Figure 1. The steps needed to create an isoline map of dance according to Sheets-Johnstone's movement system.

In my maps, arrows show sensations flowing through the body. Lines organize the space around the body into platonic solids that are used as landmarks for movement. Small multiples overlap to show progression across a river.

These techniques fall short of the spatial reality of movement for Sheets-Johnstone and Laban. For them, movement is not a change in position that can be described as traveling from A to B. Movement is dynamic, the way a melody moves through time. The qualitative sensations and expressions that happen between A and B, like suddenness or heaviness, are what make up movement. An arrow or a still drawing of the body can only approximate movement qualities, since they indicate the end points better than what happens in between.

Because traditional mapping methods ignore the nature of movement, I first turned to isoline mapping, which you can see at the bottom of the blue poster (Figure 1). Isolines are usually used to show a snapshot, a single point in time. Here, the isolines are ekstatic: they show "nowness" the way we experience it, as a synthesis of the immediate past, the present moment, and the immediate future. This allows the isolines to describe change through time using their tendency to seem like they are moving themselves, through their aesthetic force. Ideally, tracing the isolines with your eye causes sensations akin to those in the original movement, recreating the betweenness of qualities of movement. Viewers of this map usually stare at it for a while, and come away pleased, if not really able to describe what they were looking at.

My second move was to do away with Bertin's visual symbolic taxonomy. Step three (Figure 2) uses a gestural system to describe each motion: a thick or thin line does not denote "heavy" or "light" weight in each instance the way a large or small shape would normally denote quantity, so the symbol cannot be read as the constituent parts of the line. Instead, you must perform the gesture that would create that line. I gave the lines textural qualities that suggest a gesture with familiar marking tools like pens or paint. This was a better way of evoking quality than a simple arrow or a symbolic puzzle, but it remains to be seen whether the viewer can really understand it.

While these methods of mapping movement probably introduce confusion by breaking many rules, they may make mapping change easier or more attractive in other, more common mapping contexts.

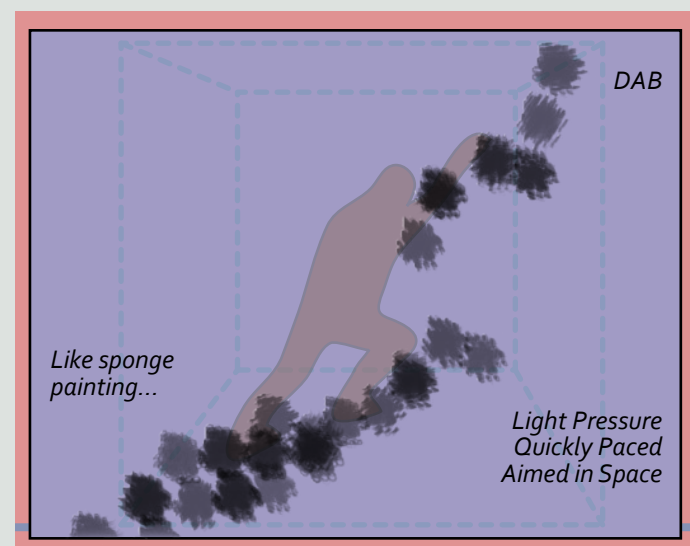
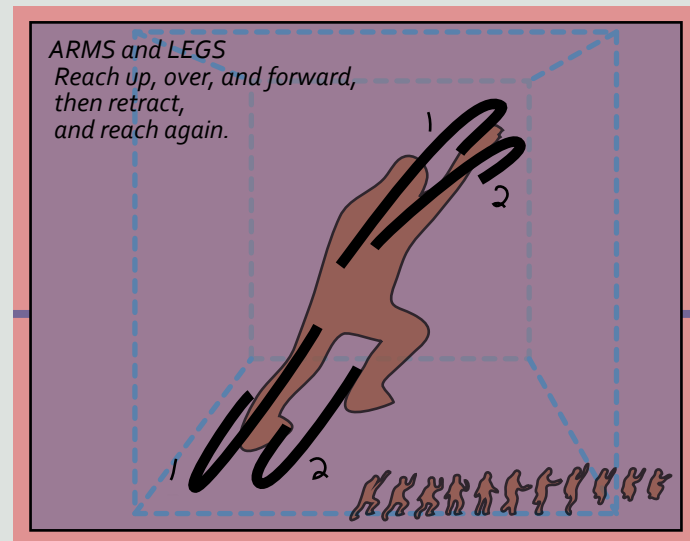
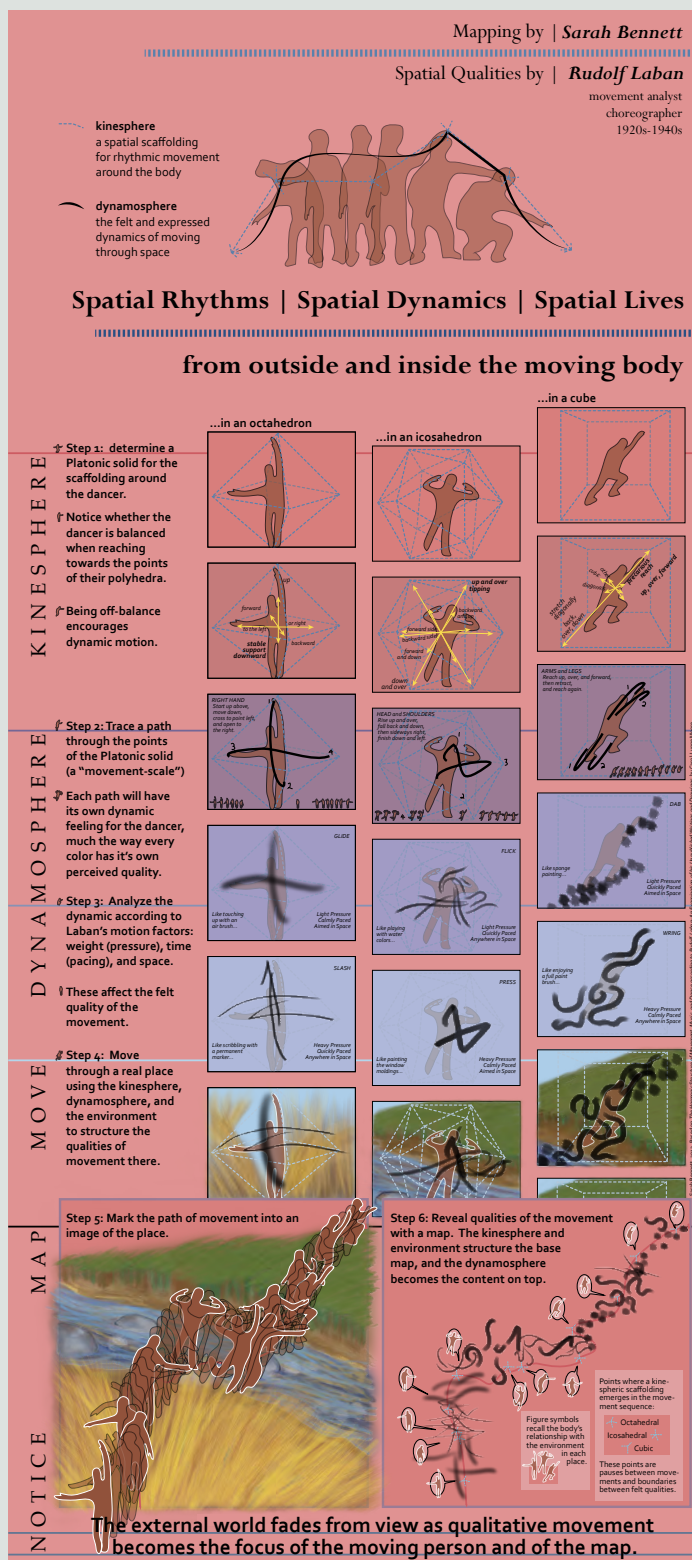


Figure 2 (detail). Development of a gestural symbology to show climbing a steep hill.

Figure 2. Visualizing Laban's famous movement system applied to a trip across a creek.

Visual Fields focuses on the appreciation of cartographic aesthetics and design, featuring examples of inspirational, beautiful, and intriguing work. Suggestions of works that will help enhance the appreciation and understanding of the cartographic arts are welcomed, and should be directed to the section editor, Daniel Huffman: daniel.p.huffman@gmail.com.

USA: THE ESSENTIAL GEOGRAPHY OF THE UNITED STATES OF AMERICA



Published by David Imus, Eugene, OR, Imus Geographics, 50" x 35.3", ISBN: 978-0-9818551-2-7, Folded; \$12.95.

Review by: Dan Cole,
Smithsonian Institution

Unlike most books that I have reviewed in the past, this map arrived pre-reviewed by eight individuals including such eminent cartographers as Stuart Allan and Tom Patterson. Imus describes *The Essential Geography* as “the first map created with the goal of so clearly representing the basic geography of the USA that it becomes understandable and interesting to everyone. Aiming to set a new standard in cartographic clarity, this map gives Americans a unique opportunity to see geographic associations, to grasp the essential character of our national landscape, and in the process become more geographically aware; making *The Essential Geography* map an invaluable resource for all Americans.” (Press Release, November 15, 2010)

Such broad self-promotional claims must be examined: taken individually, they would be impressive; collectively, they are somewhat astonishing. What is it that renders a map “understandable and interesting to everyone”? Imus does not explain, but implies that it has something to do with “clarity.” Have there been no clear maps of the US (or other places) before? Further, could not his aim to set a “new standard in cartographic clarity” be construed as something of an insult to some of the reviewers, mentioned above, and quoted on his map? The last sentence above assumes that Americans (who *are* typically geographically illiterate and unaware of GIS) have not previously seen, or even had an opportunity to see, geographic associations of our national landscape. A goal of making Americans geographically aware also raises the question: Is this map being marketed in support of a campaign to reestablish the teaching of Geography in our primary and secondary school systems, or will this map supply all such wants by itself? None of these questions are easy to answer.

Imus also makes some rather more specific claims that are easier to evaluate, such as, for instance, that the map “allows you to easily follow rivers, locate forested and mountainous areas, differentiate time zones, find the highest point in each state, or judge relative population density by the density of city names.” We also learn that

the map “depicts approximately 700 iconic American landmarks that have never been shown on a map of this kind, landmarks which help define the history and geography of the United States” (ibid.). I will look into these issues below.

This map is available as rolled paper or laminated sheets, or, like the reviewed copy, as a folded paper edition. The map is projected using the Albers Equal Area Conic projection, and the contiguous states plus the Hawaiian inset are at a scale of 1:4 million, while the Alaskan inset is set to 1:9 million. Overall, the map appears attractive, and fortunately does not stop its detail at the Canadian and Mexican borders. Viewed from a distance of 6 feet, one can easily see the green state boundaries, and get a feel for the topography based on shaded relief.

Upon closer inspection, the shaded relief is toned subtly and thus does not overpower any portion of the map. Cities and villages are easy to spot with lettering set to a visual hierarchy. Major cities have offset side notes indicating interesting historical sites, tourist attractions and major universities. One city that was short-changed on the last item is Honolulu, which is missing the University of Hawai’i.

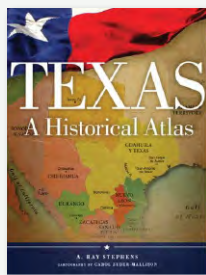
Likewise, interstates, US routes, and state highways are well-labeled and portrayed in red. Other linear features, such as political boundaries, rivers, time zone lines, and the Continental Divide are easy to locate, read and follow. All along the bottom collar is a clearly laid out tri-lingual legend (English-Spanish-French). Since space is tight, many abbreviations are used on the map and all are spelled out in a type block situated in the Gulf of Mexico. Off the left side of the map is a tri-lingual “Dear Map Reader” introduction. Below that section is what seems at first to be an unfortunate printing error; a portion of text printed upside down, containing excerpts of praise from six reviewers. I suspect that it is printed this way because the layout designer was thinking about the arrangement when the map is folded, but if it is also printed like this on the rolled paper or laminated versions, then such thinking is indefensible.

Areal features, such as national parks, national wildlife refuges, and wilderness areas are also easy to locate and delineate. One set of areal features, Indian Reservations, referred to by the author using the politically correct toponym, “Native American Reservations,” are not treated consistently. While one would not expect a map at this scale to include the hundreds of federally recognized tribal locations, it would seem logical that those which are presented would be all treated alike. One may assume that small reservations, dot-sized at this scale, will be presented as such; but some larger

reservations, the Umatilla in Oregon and the Isabella in Michigan, to name two, appear as dots when they could easily have been portrayed as polygons. Further, some of the larger reservations are not depicted at all, like the Omaha and Winnebago Reservations in Nebraska. Lastly, whereas large reservations are almost all delineated using gray-toned linework, one reservation, that of the Navajo Nation, has been singled out and bounded by black linework. In addition, while a number of reservations are currently officially identified with the word “Nation” in their title (for example, Yakama, Jicarilla Apache, and Tohono O’odham), only the Navajo has earned the word Nation on this map. No explanation is given for this special treatment.

The index on the reverse side of the map is divided into eight categories: Land and Water, Native American Reservations, Intercontinental Airports, Landmarks, Universities, State High Points, Regions, and Populated Places. Each of these titles is noted using the tri-lingual format. All categories, except for the State High Points, are meticulously laid out in alphabetical order, and they include parks, cities and so on in nearby areas of Canada and Mexico. The High Points are arranged from highest to lowest in elevation. Finally, the right hand panels include a tri-lingual User Guide for map readers using this map for the first time.

Overall, *The Essential Geography* is an excellent map, and while the claims for it made in the press release may be debatable, I believe that this map can be used as an important tool in classrooms and elsewhere. Nonetheless, it should be used in conjunction with other maps (such as Federal Lands, Indian Lands, Airports and so on) when a fuller picture is desired. In spite of the criticism noted above, I recommend this map and hope that future editions will make any corrections in layout, missing items, and inconsistencies.



TEXAS: A HISTORICAL ATLAS

By A. Ray Stephens and Carol Zuber-Mallison.

Norman, OK: University of Oklahoma Press, 2010.

448 pages, 175 color maps, 81 color and black and white photographs, 45 charts.

\$39.95, hardcover.

ISBN: 978-0206138732

Review by: Tom Nance, National Ice Center

Texas: A Historical Atlas is a compilation of 86 essays supported by 175 vivid and easily understood maps. There are also many photographs, portraits, sketches, representations of forts and battle layouts, and county-

specific facts. The atlas describes Texas’ geography, history, and current affairs from the time of the first inhabitants to the present. As Dr. Stephens observes, “The relationship of history and geography can not be separated. One must be aware of the natural features in order to understand and appreciate the activities of inhabitants.”¹

This book is divided into three parts: “Natural Texas,” “The Texans,” and “Modern Texas.” The very brief first section (about 7% of the book), “Natural Texas,” is an introduction to the geography, weather, water, and plant life of the state. Half of the atlas is taken up with the second section, “The Texans.” It is divided into six subsections, each discussing one of the major ethnic groups (indigenous, European/American, and Mexican) or pre-twentieth-century historical events and periods that shaped the place known as Texas. This was, for me, the most interesting and engaging part of the atlas. The final section, “Modern Texas, 1900–2009,” has two subsections: “Modern Texas, 1900–1945” and “Contemporary Texas, 1945–2009.”

As I mentioned, the large middle section, “The Texans,” really captured my imagination. The tales of exploration kept me entertained, covering resistance to tyranny, disorganization and defeat, desperate victories against overwhelming odds, the founding of a nation, becoming part of another nation, and fighting for rights that, one eventually comes to realize, maybe weren’t so right. I personally enjoyed piecing together the evolution of Texas over time, and was astonished at aspects I had never before considered. For example, I had never recognized how large a role water played in shaping Texas—in more ways than just political boundaries. Most settlements began near bays, river crossings, or springs. Forts were built to protect those settlements and other key terrain, such as passes and trade routes between settlements. The wagons that blazed those trails between settlements usually followed the path of least resistance, and the road network used today closely resembles the major roads of early Texas.

The main narrative is also sprinkled with informative sidebars. I especially enjoyed the one dealing with “The Variable Vara” (p. 76) describing the use of the Spanish customary length unit in land surveying, and how it is that seven different types of vara came to be used. This book linked events together in such a way that I came to realize just how disorganized the Texas Revolution really was.

The “Modern Texas” section is also substantial, but is far less readable. This section of the book is primarily composed of facts and figures broken down in charts and tables and mapped by county. As a compendium of statistics it is no doubt useful, but after the engaging and dramatic presentation of the previous material, it is a bit tedious.

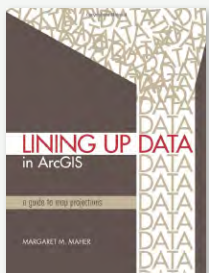
The essays were contributed by a variety of authors, so no single writing style predominates. All the essays were well written and easily understood, and accompanied by maps, charts, and diagrams which were also well designed, descriptive, and easily understood. Most of the material captured my attention and interest. It was easy, while reading the essays, to follow along on the maps, which were clear and immediately understandable.

One of Dr Stephens' main goals in publishing *Texas: A Historical Atlas* was to update and expand on his earlier version of the work, the *Historical Atlas of Texas*. While I cannot compare this new atlas to the earlier publication, I can vouch for the strengths of this edition. I grew up in Texas, in Live Oak County, and in reading through this book have learned a great deal more about my home state's history than I had imagined possible. I would definitely recommend *Texas: A Historical Atlas* as a reference and possibly a text book for Texas history and geography classes, or even generally, for the avid know-it-all Texan.

Notes

1. Author Interview, undated press release, (Norman, OK: University of Oklahoma Press, 2010).

LINING UP DATA IN ARCGIS: A GUIDE TO MAP PROJECTIONS



By Margaret Maher.

Lining Up Data in ArcGIS: A Guide to Map Projections

By Margaret Maher.

Esri Press, 2010

184 Pages

ISBN: 978-1-58948-249-4

\$24.95

Review by: Fritz C. Kessler

The map in Figure 1 shows the county outlines for West Virginia, and, offset somewhat to the east, point features for West Virginia's county seats. Obviously, the two data sets should line up but do not. If you have worked with spatial data, you have probably experienced a similar situation. Do you know how to solve this mis-alignment problem? If not, then *Lining Up Data in ArcGIS* is a resource that you should examine. *Lining Up Data* provides an elementary approach to understanding how users interact with ArcGIS to identify, define, and manipulate coordinate systems with the end goal of making sure their data aligns properly. This is a tall order for any book to fill, and this is the first text that takes this elementary yet practical method to solving the most common coordinate system problems in the GIS

(geographic information system) environment—a novel approach to a topic that has undoubtedly frustrated many GIS users.

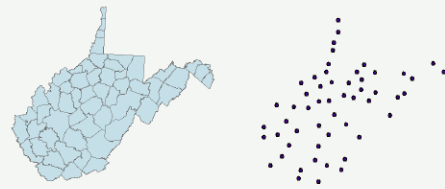


Figure 1. An example of data sets that should align but do not.

Lining Up Data begins with a Table of Contents, moves on to a Preface, a short statement on the author, and then includes an Introduction. The Introduction to *Lining Up Data* simply lists thirteen common questions/problems that GIS users are likely to encounter when working with spatial data in the ArcGIS environment. These questions/problems are the basic fodder for the ten chapters that follow.

Chapter 1 is a primer on how to identify the type of coordinate system that is loaded into your ArcGIS environment. The chapter begins with a useful overview of some common error messages and warnings that users may encounter while working with coordinate systems. The utility of defining a map projection and of using the *project* command, and the differences between the two, are explained in some detail. A useful section on identifying a map projection based on the numeric extents of the coordinate values is provided. The difference between geographic, projected, and local coordinate systems is also explained.

Chapter 2 helps you identify a spatial data set's geographic coordinate system. The chapter provides step-by-step explanations of two common mis-alignment problems in ArcGIS. The first problem is a datum mismatch situation (e.g., one data set is cast in the NAD27 datum and the other is set to the NAD83 datum). The second example occurs when one data set has an assigned projected coordinate system while the second data set has only a geographic coordinate system defined. As explained in the chapter, a partial solution to these problems involves a datum transformation.

Chapter 3 assists in identifying a spatial data set's projected coordinate system. In this chapter, discussion begins with a focus on two common grid systems: the State Plane Coordinate System and the Universal Transverse Mercator coordinate system. For each grid system, attention is paid to explaining how the coordinate limits reported in the Layer Properties window can help the user identify which projected coordinate system is being used and how to remedy situations where, for example, no coordinate system definition has been applied to a spatial data set. There are many helpful hints provided throughout the chapter

on ways to identify and resolve problems with alignment issues when a spatial data set is cast in a grid system.

Chapter 4 presents information dealing with coordinate systems that use non-standard measurement units. For example, the Universal Transverse Mercator system uses meters as the default unit of measurement. For instances where the desired unit of measurement is feet, *Lining up Data* explains the steps necessary to modify the associated projection file. This chapter concludes with an explanation of how to alter existing projection files and choose the appropriate units of measurement for the data set.

Both chapters 5 and 6 detail the use of computer assisted design (CAD) files in ArcGIS. Chapter 5 starts with a list of seven issues that will be commonly encountered when using CAD files in ArcMap. Some of these issues include non-standard units, an attached local coordinate system with an arbitrary origin, and problems with rotation. Chapter 5 proceeds to explain how to address and remedy each of the seven issues in ArcMap. Chapter 6 takes the reader through a step-by-step process on how to align and rotate CAD data in ArcMap.

Chapters 7 and 8 focus on datum transformations. Before discussing datum transformations in ArcMap, the chapter smartly begins by pointing out the utility of the European Petroleum Survey Group's authoritative database on datums and their transformations. Attention then turns toward a light discussion on the difference between three and seven parameter methods, HARN and NADCON, and NTV2 and Molodensky-Badekas transformation methods. The chapter wraps up with a quick overview of creating and saving a custom datum transformation. Chapter 8 discusses how to apply datum transformations, how to change the coordinate system in the data frame environment, and the use of the project tool.

Chapter 9 takes on the age-old question of *what map projection should I use?* The chapter makes a distinction between a geographic and projected coordinate system. The bulk of the chapter concentrates on projected coordinate systems: their properties, which map projection is best-suited for a particular purpose, how to create a customized map projection, how placement of standard lines can impact length measurements, and the purpose served by false eastings and northings.

Chapter 10 is an amalgam of topics, and discusses projection files, adding data, and buffers. Discussion begins by highlighting the difference between geographic and projected coordinate systems. The discussion of projection files (identifiable by the .prj file extension) and their contents is covered separately under each type of coordinate system. An overview of adding x, y data into ArcMap and how to convert these data to a shapefile or geodatabase feature class is explained. The chapter ends

with an explanation as to why buffers drawn in ArcMap are not always round.

Three appendices are included. Appendix A includes references to Knowledge Base articles from the Esri Support Center, where the interested reader will find articles covering a variety of topics dealing with map projections, datums, and grid systems. Appendix B lists the default install paths for ArcGIS desktop, which includes version 9.x and 10.0. Appendix C lists the default profile paths to the coordinate system folder (versions 9.3, 9.3.1, and 10.0 only). A "further reading" section (listing only three texts—two of which are map projection related), data source credits, and an index of terms round out the book.

The key strength of this book is the no-nonsense approach on clearly explaining how to correct common situations in ArcGIS when spatial data do not line up. Each chapter contains numerous screen shots of data, forms, maps, and graphics to explain why spatial data do or do not line up in ArcGIS. The chapters are concise, focusing discussion on various coordinate systems topics and their interplay in ArcGIS, which helps the reader quickly find a solution to a problem. All maps and graphics are presented in full color on the same referring page rather than being tucked away near the end of the book. Almost every spatial data alignment problem is illustrated with a map or graphic. The fact that it includes many screen captures of windows—showing what to choose from pull-down lists or which buttons to select to gain access to other windows—is quite helpful. Those with a math phobia will want to take note here. There is a deliberate avoidance of mathematical explanations throughout the text. If the reader is interested to know the mathematical foundation of a Helmert seven-parameter datum transformation, they should look elsewhere.

There are some contentious issues with this text. First, a few minor points. The examples used throughout the book are mostly limited to the coterminous United States. While the essence of the questions/problems presented in this text are of universal application, providing a broader selection of examples would be helpful. In Chapter 9, there is an erroneous perpetuation that conformal projections preserve the shape of the data. Conformal projections do no such thing, and nowhere in the text is there any mention of conformal projections preserving angular relations.

Now discussion turns toward my main point of contention. The book's organization seems to have begun with a series of common coordinate systems questions/problems that were collected by the author (based on her years experience with Esri support services). This is a novel approach. However, those questions/problems were then subjugated to more conventional chapter titles and the essence of easily finding solutions to these

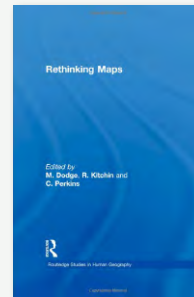
common questions/problems becomes problematic. For instance, the first chapter's title is "Identifying the Type of Coordinate System for Data using ArcMap." Compare this title to the questions that formulated the fodder for this chapter: "... *when I add the data I get an error message that says 'missing spatial reference'...*", and "... *I get a Warning box that says 'Inconsistent extent'...*". Connecting these questions to the chapter title might seem a bit of a leap for a neophyte. While the intent was to use common coordinate system questions/problems to formulate each chapter, the present arrangement does not really benefit those who are novices about coordinate systems. For instance, assume a GIS user notices that a specific data set appears to be consistently shifted in one direction. The novice wouldn't necessarily know a datum transformation was needed. Looking through the Table of Contents, their question doesn't appear. They would then become even more frustrated in searching through the text trying to find an answer to this general question. Given the intended goal of providing practical solutions to coordinate system problems to coordinate system tyros, this chapter arrangement could be improved.

Using the basic question/problem idea as the foundation, several options for improving upon the organization and presentation of the book's material suggest themselves. First provide a succinct overview of datums, map projections, and grid systems. This material would build a foundational knowledgebase that is not tied to ArcGIS or any other software. Second, present an overview on how ArcGIS represents, stores, and handles coordinate systems. Third, organize coordinate system questions/problems into subjects having a common theme. In most cases, coordinate system problems deal with alignment themes (e.g., "*my data do not align*" or "*when I load a spatial data set it doesn't appear on screen*"). There are many different themes that could be developed, but each alignment theme would be organized according to what the GIS user would see on screen or would obtain through the Layer Properties window. An explanation as to why the problem occurred, why the situation is problematic in ArcGIS, how to conceptually understand the problem, and what practical remedies can be found in ArcGIS would accompany each theme. Fourth, a more comprehensive listing of (non-Esri tied) references should be provided that could guide the interested user to additional source material.

Despite the many color-rich pages of screen shots, callout boxes, and text, I left the book with mixed feelings about its worth and target audience. On the one hand, I could see the frustrated GIS analyst examining *Lining up Data* to learn how to identify a coordinate system based on the coordinate values shown in the Layer Properties window and how to perform some rudimentary trials on attempting to align their spatial data. On the other hand, if someone wanted to learn the foundational reasons as to why a particular spatial data set does not align one would be disappointed

with this text: this book does not educate you about coordinate systems. Rather, this book is designed as an overview of how to handle common coordinate system problems in the ArcGIS environment. In short, if you need a no-nonsense book that may help you identify and solve misalignment problems in ArcGIS, this would be worth a try. If you wish to delve deeper into the field of map projections, datums, and grid systems, then look elsewhere.

RETHINKING MAPS: NEW FRONTIERS IN CARTOGRAPHIC THEORY



Edited by: Martin Dodge, Rob Kitchin and Chris Perkins.

2009 Routledge. 272 pages, figures.

Price: \$150.00, hardcover,

ISBN 978-0-415-46152-8

\$44.95, softcover,

ISBN 978-0-415-67667-0

Review by: Jörn Seemann, Universidade Regional do Cariri, Brazil

Maps are changing, and so are our ideas and conceptions about them. In the early 1990s, the British geographer David Rhind observed that cartographers "are too often a group open to new technologies, but closed to new concepts" (*Proceedings of the XV ICA Conference*, Bournemouth, 1991). With the emergence of new digital features such as "apps with maps," mashups, online mapping, and geodesign, human beings have been literally plugged into a completely different world of cartography that urges them to rethink the map.

This rethinking is exactly what the three British geographers Martin Dodge, Rob Kitchin, and Chris Perkins are proposing in this collection of 12 essays from various authors on "new frontiers in cartographic theory:" identify ideas and approaches that serve as a framework within which to rethink maps. In their introduction, the editors declare that their aim is to "demonstrate the vitality of present thinking and practices in cartography" (p. 2). The essays in the volume cover a wide range of topics and approaches, from philosophical musings and state-of-the-art reports to participatory methodologies and cultural map readings; approaches that underline how mapping and mapmaking are complex and diverse processes with a strong non-technical, socio-cultural dimension that researchers need to explore.

In chapter 2, Jeremy Crampton delves into a dense web of philosophy from Plato to Foucault in order to mull over the relationship between mapping, knowledge, and race. He analyzes his topic through the historical

emergence and development of the choropleth map, which by its nature creates a false impression of bounded and homogenous space. For this critique, he introduces the reader to the idea of “clines” (areas with a continuous gradient), a term originally coined by the English biologist Sir Julian Huxley.

In the following chapter, Leila Harris and Helen Hazen present a critical approach to the mapping and mapmaking of conservation areas. They contend that the conventional cartographic approach for the delimitation of reserves and protection areas is insufficient because it does not come to grips with the migration patterns and daily routes of animals and how these can shape spaces and territories. The authors make a plea for “critical conservation mappings” that take into account the seasonal, fluid, and changing aspects in conservation, and combines cartography with topics such as political ecology and the relationships between humans and their environments. Following the recent trend toward a “more-than-human geography,” Harris and Hazen invite the reader to debate, retool, remap, and perform the mapping of conservation areas.

Written by the Austrian geographer Georg Gartner, chapter four outlines the technologies that underpin Web 2.0. Contents, services, and apps such as geotagging, mashups, or blogs go beyond merely following links on the screen, and raise questions about the quality, design, and aesthetics of features as well as issues of privacy and data protection.

Michael Goodchild’s contribution (chapter 5) is an attempt to sketch out a brief history of the digital representation of geographic information. He quickly describes the development of data modeling from the early 1960s, that was based on “flat files” (one record per line), through the introduction of relational data and topological structures in the 1970s, to the object-oriented approach introduced in ArcInfo 8 in 1994. Goodchild points out that the history of data modeling is a history in constant becoming. No single approach can handle the qualities and quantities of information, so in the future new ways of dealing with the representation of data will continue to emerge.

Chapter 6 describes *TheirWork*, a free online community mapping project created by Dominica Williamson and Emmet Connolly (<http://www.theirwork.org/about/>), and offers it as an empirical example for such undertakings. They describe how people from the area around Loe Pool, a small freshwater lake in Cornwall, England, can express how they feel about their own place and share their experience with others by adding information, comments, photos, and observations to an online map. The ongoing project aims to build up a detailed collaborative knowledgebase of a specific environment in order to point out the importance of conserving, preserving, and protecting our everyday space.

In her essay on the relationship between “cartographic representations and the construction of lived worlds” (chapter 7), Amy Proppen takes a cultural look at maps and images and conceives cartographic practice as embodied knowledge. Far from seeing visual representations as “views from nowhere,” she provides insights into how cartographic imagery can shape—and is shaped by—cultural assumptions, and how it influences the geographic imagination. In order to underline her arguments, Proppen analyses visual material from the Apollo Space Program, which was the first endeavor to record images of Earth from space as the “blue planet.”

The literary scholar Tom Conley rethinks maps through the lens of cinematic cartography in chapter 8. For him, both movies and maps are representations that construct narratives and help the viewer to locate himself/herself in time and space. Conley presents two different approaches to this cinematic cartography: the first refers to the philosophical underpinnings of “moving images” in the light of Gilles Deleuze’s writing on cinema, while the second approach deals with the use of cartographic material in the movies themselves. Conley wittily analyzes a map that appears in Alfred Hitchcock’s movie *39 Steps* and concludes that the study of cinema as a cartographic medium can open up new directions in which to rethink maps.

In chapter 9, Jim Craine and Stuart Aitken have a close look at the “mechanistic logics” of cartography and present an alternative approach to the study of mapmaking and map reading that emphasizes affect and emotion. Based on poststructuralist writers such as Gilles Deleuze and Pierre Lévy, they coin the term “affective geovisualizations” and argue that new technologies have resulted in new modes of data exploration and consequently in new forms of cognition and image appreciation.

In the tenth chapter, Chris Perkins, the co-editor of this volume, invites the reader to a “playful rethinking of maps” in a double sense: he conceives playing as both a metaphor for mapping and as an object of cartographic studies. Perkins presents the example of computer golf games and points out how the fictitious world of golf on a screen, with its simulations and its functions to map or even design golf courses, can be considered a cartography-related cultural practice that needs further scrutiny. In this approach, his focus is on performance and movement, with its relations, interactions, and practices, rather than on the representational and cognitive aspects of these computer maps.

John Krygier and Denis Wood’s contribution (chapter 11) is a revised version, in the form of a graphic novel, of their theoretical musings about maps as propositions that they have presented at several conferences. In their provocative reflections, they contend that maps are subjective arguments or propositions rather than

value-free representations or pictures. By producing cartographic propositions, mapmakers are responsible for their maps. The mapmaker's versions of space and place can also be contested by other mapmakers with different propositions.

The book editors round up their (re)thoughts on maps in a final chapter they call a "manifesto for map studies." They suggest a research framework based on three M-words: *modes, methods, and moments of mapping*. "Modes" address "alternative ways to think through cartographic history and contemporary practice" (p. 220), and include maps on a screen, the insertion of cartography in visual culture in general, as well as authorship and (institutional) infrastructures of mapmaking. "Methods" correspond to the necessity of developing research strategies to study mapping practices and contexts, such as the differences between virtual and material maps, the political economy of the map production processes, and the emotional and ethnographic aspects of mapping. "Moments" entail events, incidents, and accidents that contribute to the understanding of mapping practices, and which need to be examined in detail. These (hi)stories can be "moments" of failure (for example, when something goes wrong during the mapping process), change, memory, or creativity.

The twelve essays in *Rethinking Maps* show that the study of maps can go far beyond what are sometimes thought of as the boundaries of the discipline of cartography. Literary scholars, social scientists, political ecologists, and many other groups are all intensely interested in maps, and can definitely enrich the theoretical and practical debates on cartography with their insightful approaches to the representation of space and place. One or another mapmaker might complain that philosophy is irrelevant for cartography and that cartographic practitioners do not need this knowledge since they produce maps according to what their clients demand. However, this could be a misreading of the present situation. Similar to the video rental market, cartographers should read the sign (or the map) of the times. Just to remember, Blockbuster Inc. had to file for bankruptcy because they ignored the innovative concepts of online videos, DVD by mail and rental kiosks in supermarkets offered by their competitors Netflix and Redbox. New concepts may open up new markets, even for cartographers. In this sense, it would have been interesting to have included a chapter on "cartography in practice" in the book. An essay written by a professional from the area could give insights into the world of commercial cartography and the problems and solutions that exist.

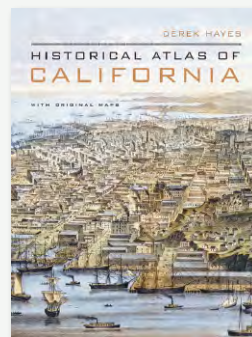
The reader of *Rethinking Maps* may also complain about the structure of the volume. There is no clear logical order in the sequence of the chapters. One idea might have been to organize the essays according to the three

M's (modes, methods, and moments) proposed by the editors in the final chapter. This way, the reader would be able to find a thread in the writing and establish links between the contributions. A wide range of different approaches in cartography should lead to dialogue and not to fragmentation.

As an invitation to rethink maps, the book could have included more figures, maps, and other visual examples to help illustrate these new directions in cartographic thought. What do these cartographies look like? How can we represent them? The exorbitant price of the volume (\$150 in hardcover, but only \$45 in paperback) may even make us wonder if the book format is the most adequate medium to express these ideas.

In conclusion, *Rethinking Maps* is a refreshing inspiration for the debates in cartography and serves to (auto-)reflect on our own cartographic ideas and practices. Opposite to what the subtitle of the book states, there are no new frontiers in cartographic theory: in fact, there are no limits to thinking about maps and mapping at all, and we still have not "charted" all these fascinating possibilities.

HISTORICAL ATLAS OF CALIFORNIA



By Derek Hayes.

Berkeley, CA: University of California Press, 2007. 256 pages, 476 maps, \$45.00, hardcover. ISBN: 978-0520252585

Review by: Kellee Koenig,
Conservation International

From its initial black ink-engraved depictions of California as an island, to a technicolor terrain model using satellite imagery, Derek Hayes' *Historical Atlas of California* shows developments and changes in cartography as well as in the political boundaries of California. Its 34 chapters are organized chronologically and thematically, using contemporary maps whenever possible. There are also images throughout, such as posters, book covers, and photographs, to support the maps and text. The hardcover book is slightly larger than average, suggesting it would be an appropriate coffee table book.

The maps included in this atlas rightfully steal the show, with chapter text laid out as a secondary element around them to emphasize this point. The selection of maps is beautiful and interesting, presenting a wide variety in terms of theme and visual appearance.

The captions are excellent, both for describing the content of the map and providing context on its significance. The author's writing style is never too formal, perhaps even "California casual," but becomes more personal towards the end of the atlas, for example in his commentary on the artwork of a guidebook cover on page 224. The lengthy captions are well worth reading, and not just for understanding the particular map they describe. Many captions, such as that for map 360, contain information that does not relate directly to the map and is not otherwise mentioned in the chapter. This works to maintain a clean layout, but it would often have been better to have incorporated this material in the chapter text. While the different fonts used for the captions and text help differentiate the two, their layout when on the same page (e.g., p. 233) was a bit confusing at first glance. It was also bothersome to occasionally have captions placed furthest in a spread from what they were describing (pp. 190–191). Putting some maps in the Catalog, Bibliography, and Index makes those sections more visually appealing, but tends to hide those maps at the same time and it must be assumed they were included as "bonus maps" for the thorough reader to discover.

As Hayes explains in his introduction, there is something here for everyone. A fair number of the maps are whimsical propaganda, promoting California as a tourist destination and agricultural producer. Others, such as map 354 depicting the 1906 San Francisco fires, show how maps can sensationalize the information they depict. "The Burning of San Francisco" chapter especially highlights the variety of biases maps can present of the same event, area, or topic, depending on the producer and audience. Within a few pages, a collection of dramatic maps shows widespread destruction, comparatively dry military and survey maps, and enthusiastically upbeat maps of the same area with the rebuilding highlighted and the fire downplayed in order to attract investment (maps 349–359). Many maps show a California of fantasies, and not just by sea monsters drawn off the coast or a promise of perpetual sunshine. One entire chapter, "On the Right Hand of the Indies," is devoted to depictions of California as an island, and there are also early Spanish maps showing it as the location of the mythical Seven Cities of Cibola (e.g., map 22). From more modern times, several maps show Daniel Burnham's proposal for post-earthquake San Francisco (maps 360–363).

It is fitting that an atlas that begins with the discoveries of early seafaring explorers would end with scientific maps showing the application of modern breakthroughs in spatial technology in near-shore areas of California. The closing chapter also includes recent examples of creative cartographic design, showcasing maps for home décor as well as everyday activities like driving.

The strength of having these maps presented in a single book is the ability to cross-reference them, allowing

comparison between, for instance, maps 365 and 233, which both illustrate the Panama-Pacific International Exposition, held in San Francisco in 1915. The former was used to demonstrate the potential local market as part of the city's Exposition bid, while the latter map was an advertisement showing San Francisco's nation-wide accessibility by railroad. Another pairing, maps 374 and 375 of the Los Angeles Aqueduct, is printed side by side to allow the reader to compare physical features on one with the aqueduct's route on the other. It is also instructive to see sequences of maps over time at the same extent and scale, such as maps 417–420 which show the evolution of San Francisco International Airport using contemporary maps. The four maps selected include the earliest map of the area (1864), and others at significant stages where cities begin to appear, the land is reclaimed from wetlands for use as an airport, and the modern airport runways are added.

While the individual maps included in this atlas may not be familiar, they can often be broadly categorized into familiar types based on cartographic style, subject depiction, etc. An exception might be maps 146–151, depicting *diseños*, Mexican land grant applications. Compared with the exquisite detail and professional quality of most maps in this atlas, their relatively amateur quality is readily apparent, as they were often painted by the land owners themselves. However, this appearance disguises the significance of these maps, which may have had a greater impact, than any other maps in the atlas, on California's settlement and growth in the areas depicted.

Hayes' love of the artist-historian, sculptor, painter, photographer, illustrator, muralist and author Jo Mora's work is evident, and rightfully so, as 3 of Mora's distinctive and whimsical maps appear in the atlas (maps 1, 372, and 474) with two of Mora's state maps serving as bookends for the atlas. As the state maps were published 18 years apart, it is interesting to compare the differences between them in features and cities shown, and how the state's history is told through a series of horizontal mural stripes covering Nevada. They are so rich with amusing detail that while a magnifying glass might be required to read all the text, it is well worth the trouble for the visual jokes and general information. In addition to artists, the inclusion of maps by famous explorers such as John Muir (map 367) reminds us that the line between early explorer and cartographer was often blurry, and can still be so today.

Today, most residents explore the state by car, and this topic is highlighted in the chapter "From Bike Paths to Freeways," which focuses on major transportation arteries and California's car culture. A Thomas Brothers' map from their popular street guides, their distinctive style easily recognized by most California drivers who pre-date online mapping services and GPS, might have seemed an appropriate choice for this section, but oddly enough is not to be found.

The wide selection of maps depicting a variety of events could easily lead the reader to believe that at least one map exists depicting every occasion in the state's history. Indeed, it seemed unusual to have any event, such as the LA riots described on page 233, mentioned in the text without an accompanying map. Understandably, these instances are rare. On the other hand, while the physical terrain model of the Los Angeles Aqueduct's route is interesting in itself and relevant to the chapter on supplying the cities with water, the inability to properly photograph it makes the inclusion of map 376 seem unnecessary.

Most of the maps in the atlas bleed off the pages, making for an interesting appearance and maximizing the page space devoted to the maps. As most maps selected for the atlas exceed the atlas' page size at their original size and scale, a cropped selection of many maps is included when shrinking the map was infeasible or undesirable. In the case of maps 374 and 379, a section as well as the entire map is shown to illustrate different points while telling the story of the Los Angeles Aqueduct.

With such detailed maps containing information equally spread throughout the space, especially with a cropped selection, the tolerance for page trimming becomes more demanding than other visuals. As such, there is a risk of the maps being cropped more than planned, as pages are trimmed just a bit less than originally intended as a result of the printing and binding process. This is especially true for maps bleeding off the left-hand page, where a small variation in trimming the page's edge occasionally resulted in the appearance of being cropped short, as some labels were missing the first letter (e.g. maps 371 and 388 in the reviewer's copy). This is minor effect, and in no way detracts from the overall visual appeal of the atlas.

One effect of the page bleed is that many pages do not display a page number, which can make finding a particular page harder. However, as numbers are only omitted for two consecutive pages at most, it is only noticed when the reader wishes to find a specific page.

The *Historical Atlas of California* is a gorgeous book that would be enjoyed by anyone who loves California, or who appreciates beautiful and historical maps generally. It provides one of the most visually engaging ways to learn about that state's fascinating history, and would be a welcome addition to any collection.

TYPOGRAPHIC MAP OF CHICAGO



By Axis Maps, LLC.

Axis Maps, 2011. 24" x 36", color, also available in grayscale. \$30, offset print on 100 lb semi-gloss paper, store.axismaps.com.

Review by: Jonathan Munetz,
University of Wisconsin–Madison

Axis Maps' typographic map of Chicago is one in a series which includes depictions of Boston, New York, San Francisco, and Washington, D.C. On each map, the roads, rivers, neighborhoods, parks, and other features of the city are fashioned purely out of type. This form is not new; the first such map was introduced in 1773 in Germany¹, but it is certainly not common. Axis Maps' typographic maps aim to be both reference and art maps, and the tension between these goals drives the design decisions behind them. That tension has led to particular graphic choices, some in line with familiar, accepted conventions, and others that are innovative, artistic features that grab the viewer's attention (Figure 1).

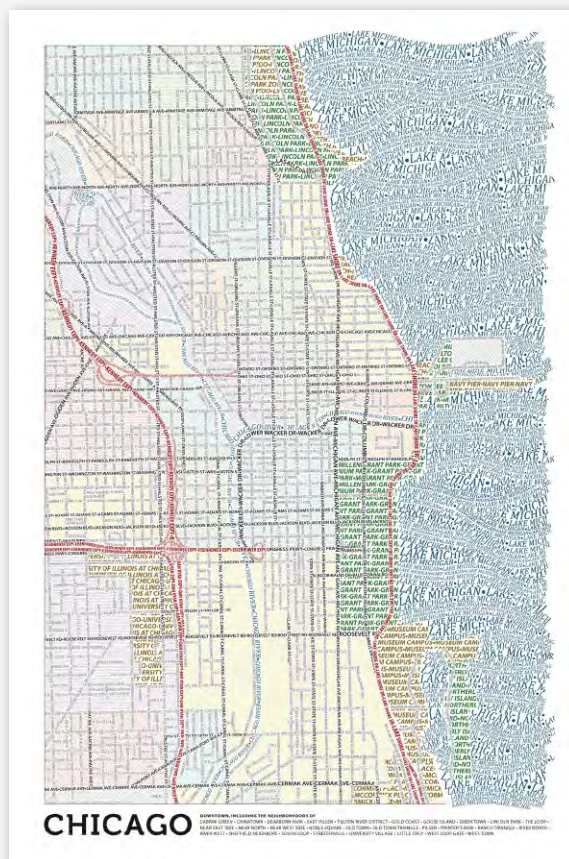


Figure 1. Axis Maps' typographic map of Chicago, 24" x 36", color.

The type, not surprisingly, is this map's most remarkable feature. Overall, the typeface choices work harmoniously

together, and give the map a clean, modern, stylish look. Lake Michigan, to the east, is set in all capitals in a decidedly angular, serif typeface. This angularity contrasts nicely with the roundness of the sans serif, roman letters of the city streets. The clear, legible street labels are divided into two hierarchical levels, with principal thoroughfares set in larger, darker type than smaller roads. Cultural features and parks appear in the italic style of the same font that is used for principal streets. Despite their distinctness, the typefaces comprising the lake, streets, and cultural features complement each other well.

The typefaces chosen for specific features are not as emotive as the map taken as a whole; and the choices sometime seem counterintuitive. For instance, sans serif type is more commonly associated with a modern, industrial aesthetic than serif type. Yet the angularity of the type chosen for the lake gives it a machined, man-made feel that seems in tension with the organic feeling evoked by the curves of the waves of the lake (Figure 2) and the sinuous movement of the Chicago River. A more curvaceous, natural-seeming type choice might have been a better fit with the character of these water bodies.

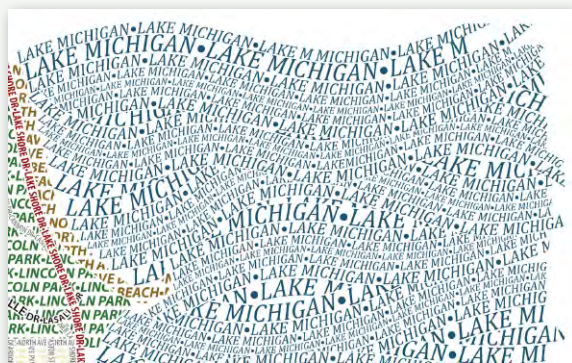


Figure 2. Detail: the lettering that comprises Lake Michigan appears to undulate, evoking a sense of movement (area shown: approximately 9.5" x 6").

The only other features on the map that appear in serif type are, surprisingly, the neighborhoods. These are the smallest labels on the map, and are tiny enough that the map-reader may fail to notice the type at all. Although one may expect conventional sans serif lettering for these cultural features, the neighborhood labels succeed because they manage to be both subtle and legible, even at their very small size (probably no more than 8 point). Neighborhoods are labeled in six different pastel tones, so that no area has the same color as one adjacent to it, a color scheme no doubt familiar to most map readers. The varied color scheme, plus a varied text angle for each neighborhood, distinguishes neighborhoods and makes their extent clear and unambiguous. The neighborhoods also function as parts of a whole, appearing unified because they belong to the same color family, with similar levels of brightness and saturation. They drift into the background, not competing for visual space with the

streets, yet can still be examined should the viewer want a closer look.

Principal thoroughfares are labeled in red, another familiar road atlas design convention. This comfortable stylistic choice unfortunately creates problems in terms of visual hierarchy, where the deep red of Lake Shore Drive, the Dan Ryan Expressway, the John F. Kennedy Expressway, and the Eisenhower Expressway jump out at the viewer. Highways indeed have profound effects on neighborhood dynamics and life on the ground in cities, yet they are probably not so important as to merit such a prominent, almost overpowering place in the visual hierarchy.

Two other features inhabit the same color family as the expressways: parks, labeled in green, and campuses and popular tourist destinations, labeled in brown. These cultural features seem important to highlight, and the choice of colors for them is logical. One trade-off of such a scheme is that, due to the green and red having similar value and saturation, people with red-green color vision impairment might see Lake Shore Drive being subsumed by Grant Park, at least from a distance. This issue is not too problematic for general viewing, and Axis offers a grayscale version of the map for those who would prefer such a look anyway (Figure 3).

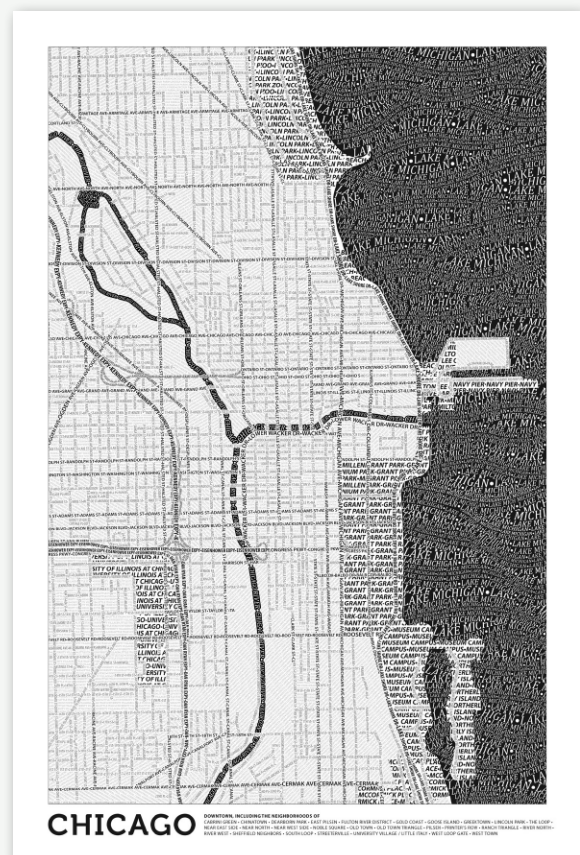


Figure 3. Axis Maps' typographic map of Chicago, 24" x 36", grayscale.

Two other concerns with the color version of this map are obviated by the grayscale version. First, while the subtle color family for the neighborhoods and the bold color families for the expressways, parks, and cultural attractions create internal cohesion, the subtle and the bold features do not necessarily cohere as a whole. Second, the subtle colors, while elegant, create figure-ground issues. It is hard to tell, for instance, where the land ends and Lake Michigan begins. From afar, parts of the city seem to disappear into the water. In other places, Lakeshore Drive looks as if it were the boundary between the water and the land even though, upon closer inspection, one can see it is not. The more subdued color of the actual land-water boundary is overpowered by the nearby deep red hues of the roads (Figure 4). As mentioned, these design choices derive mostly from convention, and are consequently familiar to viewers; thus this design overall is more likely to appeal to a broad audience. Viewers will surely find the map's more innovative and inspired qualities appealing as well.

The striking treatment of Lake Michigan represents the best of this map's novel artistic features. The letters that comprise the lake appear to undulate, evoking a wavelike feeling. Lines of serif type of varying sizes move over and under one another creating a sense of movement. Although the land ends at the map neat line, the lake is allowed to flow freely past it, mirroring the free-flowing nature of the water itself (Figure 2).

The Chicago River, on the other hand, is as unimpressive as the lake is exciting. Given that the Chicago is not much of a river itself, perhaps this choice was intentional. Still, the blue color chosen for the water is so dark that it almost appears to be a road. This confusion is particularly problematic along Wacker Drive (Figure 5), where the river and the road simply do not have enough contrast between them. On their recently released color map of Washington, D.C., as well as on the black-and-white version of this map, Axis Maps has inverted the type and background color, solving this problem. Such decisions suggest that the creators of this map are aware of its shortcomings, minor as they may be.

Overall, any detail weaknesses of Axis Maps' typographic treatment of Chicago are outweighed by the work as a whole. The authors have put together a map that is crisp and engaging, and is clever without appearing trite. In short, the gestalt effect is initially pleasant, and even more appealing upon reflection. One need not be a cartographer or a map aficionado to appreciate this map's informative and aesthetic qualities. It is even potentially useful for anyone looking for a reference map of Chicago, albeit one that comes in 24" x 36".

Notes

1. International Cartographic Association. Helen Wallis, ed. *Map-making to 1900: an historical glossary of cartographic innovations and their diffusion*. London: The Royal Society, 1976, 51.



Figure 4. Detail: the red hues of Lakeshore Drive make the road appear to be the land-water boundary (area shown: approximately 6.5" x 16.5").

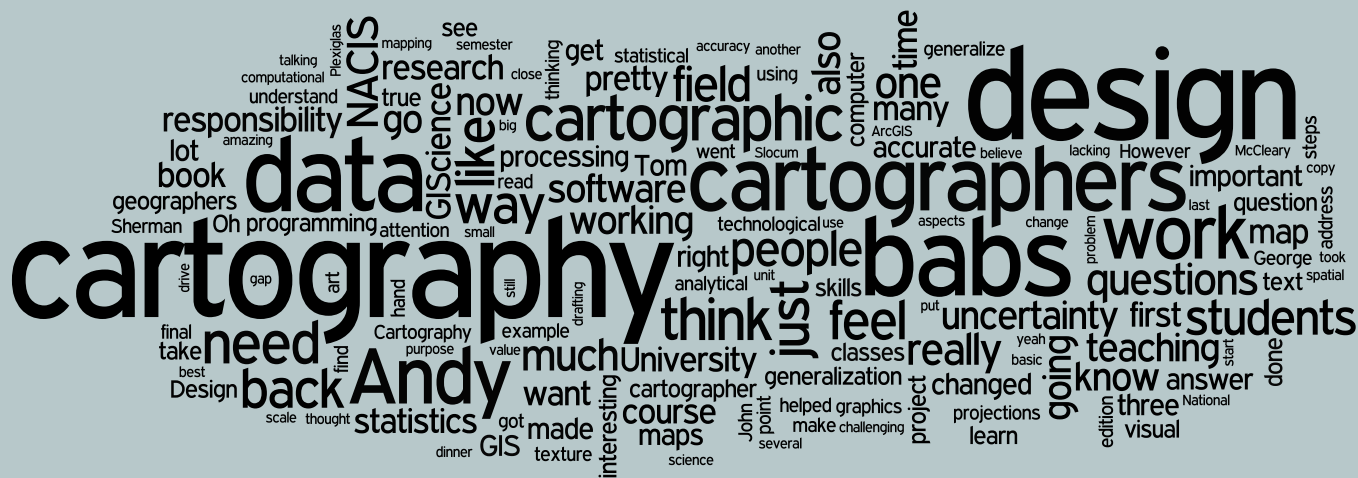


Figure 5. Detail: the Chicago River and Wacker Drive are difficult to distinguish (area shown: approximately 6" x 2").

Interview with a Celebrity Cartographer: Dr. Barbara (babs) Buttenfield

Andy Stauffer | astauffer@colorado.edu

Barbara (babs) Buttenfield | babs@colorado.edu



INTRODUCTION

In previous installments of “Interview with a Celebrity Cartographer,” well-established designers have been featured. Yet there are many facets to the field of cartography, and a skilled cartographer requires a working knowledge of all areas to create a memorable design. Cartographers who specialize in a few facets bring unique skills and design tactics to the table when creating a map. To embrace the diversity of knowledge that cartographers need, this interview features someone who specializes in map generalization and the mathematic building blocks behind data processing.

Dr. Barbara (babs) Battenfield earned her master of arts in Geography from the University of Kansas in 1979 and her doctorate from the University of Washington in 1984. After professorships at the University of California Santa Barbara, the University of Wisconsin–Madison, and SUNY Buffalo, she is currently a professor at the University of Colorado Boulder, teaching Geographic Information Science (GIS), Computer Cartography, and Information Design and Representation. She is also the Director of the Meridian Lab, a research facility that focuses on visualization and modeling of geographic information. babs' current research interests focus on cartographic generalization, multi-scale databases, representation of uncertainty, and cartographic information design. She is currently working

with the U.S. Geological Survey to generalize intermediate-scale versions of the National Hydrography Dataset (NHD) for scales ranging from 1:4,800 to 1:1,000,000. She also directs a National Science Foundation project that focuses on refining census-tract-level summary attributes using maximum entropy estimation and dasymetric modeling. babs served on the Board of Directors for NACIS from 2007 to 2009 and was on the *Cartographic Perspectives* editorial board from 1997 to 2001 and from 2008 to 2010. She was the inaugural recipient of the National GIScience Educator of the Year Award by the University Consortium for GIScience (UCGIS) in 2001. When babs isn't occupied with her teaching and research responsibilities, she enjoys fly fishing, working in her garden, and playing music with her partner Bill and friends.

INTERVIEW

Andy: First, thank you so much for agreeing to be interviewed, babs! I am excited to hear about some of your personal anecdotes and thoughts on the field of cartography. I would like to first start with a pretty traditional question: Why cartography? How did you get into the field; was there any specific event that made you choose this path?

babs: I was a psychology major at Clark, where I took a course on animal ethology. In the class, we discussed topics such as elephant burial grounds and salmon going up-river to spawn. I got wrapped up in how these animals could have sacred spaces or get back to where they were born without a map. The people who were in the psychology departments in those days, like David Stea, were very literate about geography. So the ethology professor suggested to me, "You should go across the quad and take a cartography course." Afterwards, I studied with George McCleary and never looked back; I changed my major.

The first course in the cartography curriculum was called Skills and Tools in Geography. It was essentially scale, projections, and drafting with all the statistics and number crunching. The class was pretty small with only about 20 students; and maybe seven or eight of us were cartographers. That is where I met the cohort of students that all went through the same cartography courses together. We formed a pretty tight bond, and I'm still in contact with some of them.

The course was challenging because we were all starting from essentially a zero-knowledge baseline. On top of basic mapping concepts, there were calculations, and drafting mechanics. All of the basic statistics were on hand-crank calculators. It was nothing fancy (mean, standard deviations, quartiles, etc.), but it was pretty brutal by today's standards of running to the computer lab and passing the computations through programs like ArcGIS, R, or even Excel. In



Figure 1. Dr. Barbara (babs) Battenfield.

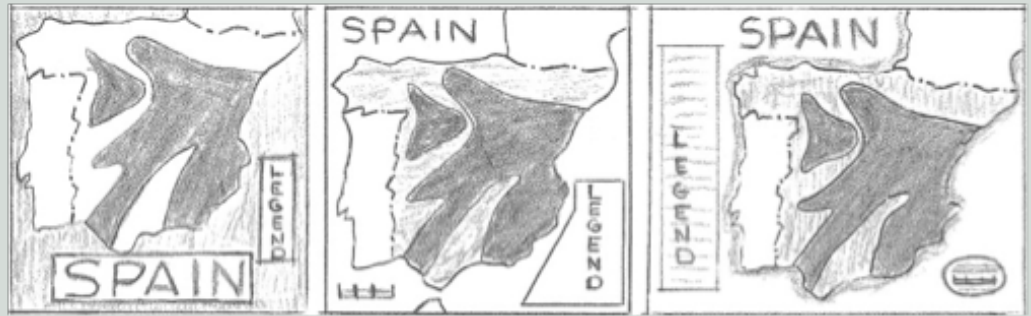


Figure 2. Alternative layouts used to guide students in a Skills and Tools in Geography drafting exercise; taken from Robinson and Sale (1969, p. 265).

another project, we had to draft a small-scale map of the Iberian Peninsula and hand letter it (Figure 2).

Through the class, I discovered that I loved the peace and quiet of drafting. I was pretty good at it; I had a steady hand. It wasn't until later classes that I realized I loved implementing a design strategy and figuring out how to make it work in the wet darkroom.

Andy: Wow. That sounds like a lot of fun with such problem solving in the lower level classes. It also seems like a perfect undergraduate experience where you get that small group of folks that you just ride to the end with. Let's move down the road a little ways and talk about NACIS. You were on the *Cartographic Perspectives* (CP) editorial board for several years, starting in 1997. You must have seen a lot of evolution in NACIS and CP. Through your experiences, do you have any favorite memories?

babs: I have a lot of fond memories from NACIS, but the one that comes to mind first was a Pecha Kucha (ぺちや くちや) in 2007. Jim Meacham did a beautiful slideshow on the work he had done in Mongolia for his atlas. He did an amazing job by capturing the culture, people, community, and sense of place. I'm getting the chills just talking about it.

daan Strebe (2008; mapmathematics 2012) did another slideshow with beautiful graphics, which looked like they were airbrushed or done in watercolor with eccentric projections (Figure 3). I distinctly remember how the distortion surfaces of each projection built up in complexity as his presentation progressed. I thought to myself that I was surrounded at NACIS by people who think deeply about the art and science of cartography. That really struck me and is one of my fondest memories of NACIS.

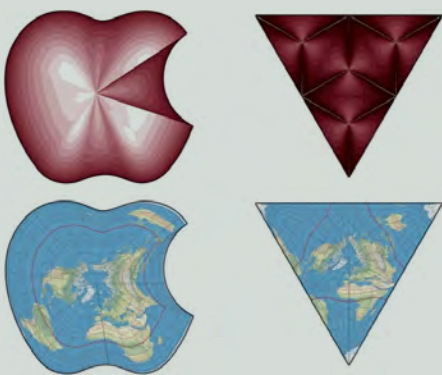


Figure 3. Distortion surfaces created by Quasiazimuthal Equal Area (left) and Snyder Equal Area Tetrahedron (right) projections from Strebe's presentation. Figures from mapmathematics.com.

Andy: That sounds like a fascinating combination of cartography and the mathematics behind it. On the note of cartographic designs that really stand out, NACIS is sponsoring the *Atlas of Design*, a collection of some of the world's best maps. The atlas will honor and showcase maps submitted by cartographers from around the world and will be accompanied by commentaries that lead readers to deeper insights into the designs. *The Atlas of Design* is available for \$35.00 and will be a Member Benefit for 25% off the cover price.

babs: Oh yeah, that seems like a really neat idea; I've already ordered a copy.

Andy: We have talked a lot about noteworthy and memorable cartographic projects. In your opinion, what do you feel has been your most noteworthy cartographic achievement or project?

babs: I would say that it was one of my final projects as an undergraduate senior. In one of my cartography design classes, with George McCleary, I built a Plexiglas globe (Figure 4). I laid out the graticule and etched all the coastline work with an electrical pen, so it's a pretty crude generalization. I compiled the linework onto a polyhedron and created a modified Plate Carrée projection. Then I had to cut the Plexiglas gores so it would be a solid container and the pieces would sit right. I didn't plan this carefully, because I thought I could cut the pieces all at right angles—which didn't fit, of course, when it came time to assemble the gores. So I took it over to the Facilities Management Department at Clark and this very nice man, Walter, helped me with the band saw. He beveled all the edges to appropriate angles. We stayed after hours for several nights to do this; I bought beer and hoagies for Walter and his crew. To submit my final semester project, I filled the globe with water and put a goldfish in it. The goldfish has long since died, but that globe still sits in my office to this day.



Figure 4. One of babs' undergraduate final projects for her cartography course: a Plexiglas globe.

Thinking back, I was way out of my league. I should have done better planning for the construction—I just had no clue how to set a beveled edge in Plexiglas. All the maps I’ve made since then have been flat. But I’ve kept the Plexiglas globe in my office and still use it in my teaching. (Andy provided the goldfish for the photos.)

Andy: **That’s very interesting having your first project not being so much about design, but about projections. So the next question building off of that, is how have your research interests changed? Transitioning from a strong design background to generalization didn’t happen overnight, I’m sure. Have there been any significant points in your life that caused these changes?**

babs: That is very true. McCleary is all about design; that’s what he did, that’s what he does. Once my cohort and I graduated, some of us continued on to the University of Kansas. We went along thinking we were just going to do design and George Jenks said, “Oh no, if you want to be a cartographer, you better get into mathematics, programming, and statistics.” He made me go off and learn FORTRAN (so now you know what decade this happened), statistics, and calculus. So, that was the first time my life changed in cartography. I took those classes, then all of a sudden I realized, *OH! You can program this stuff; you can automate it! Cool!*

The second thing that changed my research direction in cartography was when I arrived at the University of Washington to work on my doctorate. John Sherman listened to what I wanted to do, which was to generate an outline of the United States at any scale using fractals. [*babs chuckles.*] But now when I think about it, that idea was so outlandish. He very wisely replied, “I’m not qualified to help. I can assist you with the communication and the design, but I cannot help you with the analytical geometry and the programming.” Luckily, the department commissioned Tom Poiker to join my committee as co-chair with John Sherman. Every month, I would drive up to Vancouver and spend a day talking to Tom, and I would drive back to Seattle and work with John Sherman. Those conversations with Tom were pretty wild, filled with amazing ideas; we talked about artificial intelligence, expert systems, and modeling data to generalize automatically. It just made my head spin and threw my research interests for another loop. All thanks to Jenks, who got me thinking about generalization and automation; Tom Poiker, who got me thinking about intelligent programming, or rather informed programming; and John Sherman, who was patient and thoughtful and asked all the right questions...he kept my feet on the ground. Those people really made me stop and take notice of possibilities I had never thought about before.

Andy: Throughout our educations, we are all bound to have some hurdles. Looking back on your experiences, is there any advice you would have given yourself?

babs: This probably isn't the answer you are expecting. What I would have told myself back then is to be prepared that I was entering a field that was (at the time) dominated by men; and to make sure to go into the field with much thicker skin than I did.

The kind of work that I do is much closer to GIScience and to analytical cartography than to the design and production aspects of cartography. However, today, that [domination by men] is not as true of cartographic design as it is of GIScience. In the course of my career, women have entered both fields in larger numbers. But the GIScience and cartography communities remain today in some ways distant from each other. I'm very happy the way NACIS embraces what I do, because I don't publish work on design, really. It's not what I do and yet I feel very welcome.

I went to NACIS for several years, then I stopped going for a while. However, I started going back when I was working with Cindy Brewer and Charlie Frye. They encouraged me to come back and I feel very comfortable here.

Andy: I feel the same way. My first few presentations were on GIS-related topics bridging into analytical cartography. While I didn't feel ostracized, I did feel like my work wasn't quite the same as everyone else's. Yet this led to a lot of very interesting conversations about what I did and how to implement what I had done. After a while, I felt very welcomed.

This is one of the most challenging questions I have: from a technological standpoint and from a design standpoint, what do you feel the field of cartography is lacking?

babs: I want to answer this question with three answers, not two. I want to add conceptual because I believe things are lacking in all three. The conceptual gap that I see, especially in North American cartography, is a lack of understanding about spatial dependencies, uncertainty, and scale and resolution. We don't understand enough about the errors that we measure or the uncertainties that we bring in by certain processing. For example, when somebody applies a vignette, they are implying that there is gradation. However, we don't know what the shape or size of that gradation is. That's not to say we shouldn't apply vignettes. It's to say that cartographers should consider the analytical frameworks that they are draping their visual basis upon.

The technological gap is not a problem with cartographers, but with the people who build cartographic software, who might also be cartographers. Cindy Brewer and I paid attention to this when we were doing collaborative work with Esri. We were trying to show how the ArcGIS interfaces should work for type, projections, and symbology. It's not set up to go through steps in the sequence that cartographers ordinarily follow; when you are in the ArcGIS interface, you have to start here, and then you have to jump over there; it's not intuitive with the cartographic workflow. I believe that is likely true for other software vendors too, not just Esri, whose staff are working increasingly with users to improve usability. They are talking to cartographers: "How do you do this; how do you think through this?" Improving usability will close a huge technological gap.

In terms of the design, the weak spot that I see are with design principles for dynamic and interactive maps, especially with change detection. Cartographers can play a much larger role in the detection and analysis of change. They could be using visual analytics to bring that about. There are people who are doing that kind of work (Keim et al. 2008; van Wijk 2011). Another area that is lacking is data exploration. I know that statisticians are all working with this, as well as researchers in computer science and engineering. However, they aren't working with cartographers. And cartographers aren't yet banging on their doors either, saying, "Pay attention!"

I'm doing work with some demographers right now and they show me very interesting mapping problems. Recently, I was shown a graphic displaying data and uncertainty. The graphic displays a probability that the demographic categories in an enumeration unit could be categories A, B, or C. So what the person did was to apply random arrangements of pixels for each category within the enumeration unit; the design principle was that more visual noise or coarser texture (more color variation in a unit) means more uncertainty. But the problem is that changing texture also changes the hue and the value, so there is no way to get back to the legend and say this pale red means category A, B, or C. They just didn't understand how conflating value and texture could be problematic for a map reader to understand their display.

These small design choices can have radical consequences. And we as cartographers have become too desensitized to them. We just need to maintain a perspective as vigilant about displays of uncertainty as we are vigilant about displays of data.

Andy: **Do you think that we will address these problems in the future or they are being addressed now?**

babs: Oh yeah, they can be addressed, but to address them, we have to modify the way cartography is taught. I want to be careful here – a lot of people who are teaching cartography are teaching five or six classes a year. Luckily, I have the luxury to spend time on only one or two syllabi each semester. Not all academic cartographers have that luxury. They don't have a working situation that permits much exploration about teaching. So, it's easy for me to say: *we need to modify the way we teach cartography*. But the realistic situation in many places is that this is not an available option. So I say this with caution and with much respect for my peers. We need to be teaching cartography students computation, statistics, and programming. George Jenks was right when he made me learn statistics and calculus, and the same thing is true now. Computation and analysis will continue to be important as pedagogic foundations for cartography and GIScience. I was dragged kicking and screaming myself; now, I tell my own students to learn these skills at the beginning of their cartographic or GIS education because it will allow them to go farther and faster into the subject matter. Curricula that are only teaching the design, art, and graphics are missing an opportunity and are producing generations of students that are not going to be as marketable. They aren't going to have the breadth or depth of skills that cartographers need. Computation is more easily picked up by a geographer than the geographical perspective will be picked up by a computer scientist, which is largely who our students compete with on the job market.

Andy: So, if it were possible, are you suggesting a complete reconstruction of the way cartography is taught?

babs: Not at all. It needs a change of focus, a readjustment of the balance between art and science. Many faculties hotly debate whether it is acceptable to make basic statistics as a prerequisite or concurrent requisite for introductory cartography courses. The best that I could get was concurrent, and that was a very tense discussion in our department. It's not contentious among all geographers; political geographers and the quantitative social geographers see the point. But there are a number of geographers who reply that qualitative methods are just as important. And I agree, to a point. Cartographers need to know how to do a user survey, but they also need to understand how to analyze data. They still need the computational skills. So, is that a reconstruction of American cartography curricula? No; it's a modernization.

Andy: With that said, do you think technological advances—such as graphical software or Geographic Information Systems—have helped or hindered the growth of the field?

babs: I think they helped. But for a long time, cartographers didn't want to adjust to the emergence of GIScience. And that hurt the field of

cartography, particularly the research. I think that many GIScientists concluded, “We don’t need those cartographers,” and it went to those jokes about *how big is that graduated circle*, or *how wide is that line* or *how dark is that value*. Cartography, as a field, got kind of stuck in these psychophysical questions, right around the time that GIS was emerging as a powerful analytic technology. I think that one reason that GIS software lost track of how cartographers think was that disconnect which grew between the two disciplines. Now, as computer software gives geographers a functionality that permits us to ask and address more complicated questions, the need intensifies for the software to be responsive to cartographic as well as to analytic tasks.

Andy: **So, you suggest that computer software has helped to address more in-depth questions about design?**

babs: It has propelled us from *How big is that...* to *Let me analyze this spatial pattern to find out if it needs to be bigger*. Or, to take the cognitive perspective, it has allowed us to start using eye movement mapping to find out if the “Just Noticeable Difference” (JND) has actually been achieved. New technologies have changed the way we can think about cartographic aspects of software, about visual analytics, and about how we should be teaching cartography.

GIS technology is not always the only way, and it’s not always the best way to find the cartographic solution. For example, manual airbrush hillshading was a dying art until the Swiss cartographers came up with a way to automate the effects of atmospheric haze. The people who could accomplish that manually were all retiring. I’ve tried my hand at airbrushing and find that I am not very proficient. It’s quite difficult to do well. Now I look at the hillshade products coming out, for example seeing the work of people like Alex Tait or Tom Patterson. They take a partially completed cartographic product out of a GIS computing environment, move it into a graphics computing environment, such as Photoshop, and refine the visual quality of the final product.

Andy: **What do you feel is the biggest responsibility of cartographers? (Some examples might be design, accurate data, or appropriate statistical representations.)**

babs: Design, accurate data, proper statistical representations? My answer is all three. I want to qualify this answer—I am not convinced that my responsibility as a cartographer or GIScientist is accurate data. My responsibility is truth in advertising; to tell the map user, “This is the level of uncertainty for this data.” I’m not a data collector; I’m not a steward of the NHD; I’m not a remote sensor; I’m not a surveyor. I do process data, though, and I need to be aware of the fact that many of the processing steps I impose on data can corrupt or distort data

accuracy. My responsibility is to be aware of that and communicate that somehow—whether it be graphically, statistically, numerically, or in the marginal text—something to say, “I’ve processed this data and its uncertainty has changed.” But I cannot promise, and don’t want to take responsibility for, accurate data.

Andy: Sure, it’s more of taking the responsibility for how you are introducing inaccuracy or uncertainty.

babs: Yes. But remember that some of the processing steps also reduce the error. The classic example is surveyor’s triangulation. The more back sightings there are, the smaller the error triangle gets. My point is, you have to know which kinds of processing or design steps will improve or augment the accuracy. I think that we all know when we put a map into print or disseminate it online, many people assume what they see in the display is “true.” Of course it’s not necessarily accurate and we need to pay attention to that.

I feel the big responsibility in design is the statistical representation that describes the data accuracy, validity, and reliability. To acknowledge that mapped data is fit for a specific use. So all three (design, accurate data, proper statistical representations) are equally important.

Andy: This brings us to the final finishing questions, which I feel are a little bit lighter. Have you been influenced by any specific book or article? Or, do you have any recommendations to those just entering the field?

babs: Oh yeah! I have a list. First on it is Jacques Bertin’s (1983) book on semiology. Visual variables drive so much of what we do, what we try to preserve as we process data and design maps. I generalize for texture; I generalize for shape. Visual variables—there they are. So it is a very important book, even though it is hard for many students to read.

Another book that is important to me is Erwin Raisz’s *General Cartography* (1938) text. Even if you don’t read it (which you should – you should read every word), at least check out the drawings, the graphics, the text placement, and the linework depicting terrain and vegetation (Figure 5). Take close note of his attention to layout. He was an amazing cartographer. You know the old saying, about if you could have dinner with anyone in history, who would it be? One person I would love to go out to dinner with would be Erwin Raisz. If he would go out to dinner with me, I would be a happy girl. I have so many questions for him.

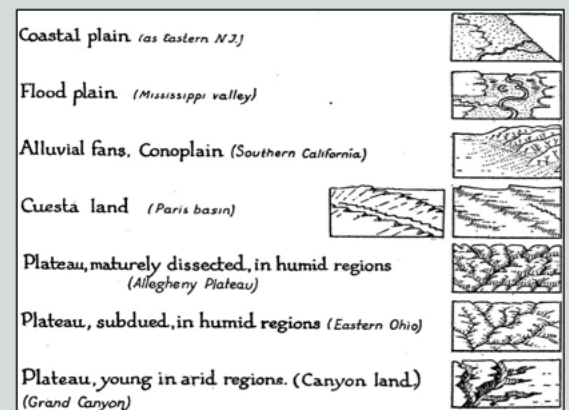


Figure 5. A subset of a table depicting how terrain should be represented on a map from Raisz’s *General Cartography* (1938, p. 151).

bb 1976

LAT. = Length of meridian degrees....	p.25
LONG. = Length of parallel degrees....	p.27
METRIC CONVERSION MILES → METERS....	p.34
MAP SCALES CONVERSION TABLE.....	p.37
POICEL LZW.....	p.63
TYPES OF POINT SYMBOLS.....	p.98
LINE.....	p.99
AREA.....	p.101

Figure 6. A portion of the custom Table of Contents that babs created in her copy of *Elements of Cartography*.

A third book is Borden Dent's *Thematic Map Design* (2009). I know the publishers are on the sixth edition now, and I really appreciate what Jeff Torguson and Tom Hodler have done in creating it. I give my students the sixth edition, and I lecture from the fifth. That is the last one Dent put out as sole author, and is my bible on thematic design. I feel as though Dent hit his stride with the fifth edition. It's a great book with clear thinking.

When I use Robinson and Sale's *Elements of Cartography* (1969) text, I go back to the third edition because that is the one I learned with. My copy is full of notes in the margin (Figure 6). I also use the text by Slocum et al. (2008). When I have a question about computational aspects of choropleth classification, for example, Slocum is my desk reference. That has come to be a very important book for me, but I don't assign it to my students; I don't believe first semester cartography students are ready for the depth at which Terry Slocum is writing. I do think that every professional cartographer should have a copy on their bookshelf, and it should be close at hand.

One last item on the reading list is anything and everything Waldo Tobler ever wrote. He really wanted to figure out what was going on in a geographical sense, in terms of the underlying computations, data organization, and processing. If you read his writings, his lifework, you see how a deep understanding of spatial relationships and solid computational skills can permit you to ask (and answer) some very interesting and challenging questions.

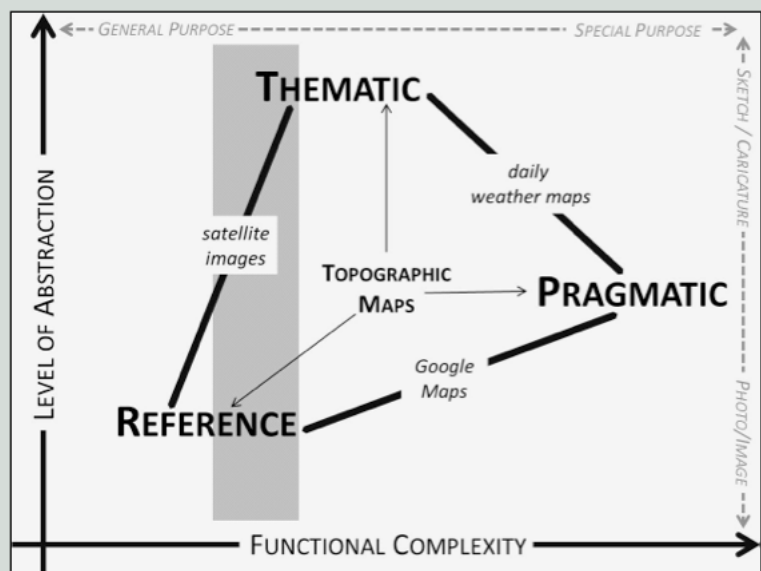


Figure 7. A graphic babs uses for her *Introduction to Cartography* course to explain the difference between topographic maps in terms of functional complexity and level of abstraction.

Andy: Okay, so last question: reference, thematic, or pragmatic (special purpose)?

babs: Topographic! That is really where my work is going now. It forms the basis for all three. If you learn how to make topographic maps, you will learn how to work with all three types. I'd like to point out in Figure 7 that Aileen Buckley suggested the addition of "general purpose" and "special purpose" to clarify Functional Complexity.

Andy: Oh, I should have seen that answer coming! Well, thank you so much for taking time out of your schedule for me and the readership. Your responses were very interesting and a pleasure to hear about.

babs: Thank you. I have really enjoyed answering these questions!

REFERENCES

- Bertin, J. 1983. *Semiology of Graphics*. Madison: University of Wisconsin Press.
- Dent, D. D., Torguson, J. S., and Hodler, T. W. 2009. *Cartography: Thematic Map Design 6th Edition*. New York: McGraw-Hill.
- Keim, D., G. Andrienko, G., Fekete, J.-D., Görg, C., Kohlhammer, J., and Malançon, G. 2008. "Visual Analytics: Definition, Process, and Challenges." *Information Visualization – Human-Centered Issues and Perspectives*, edited by Kerren, A., Stasko, J., Fekete, J.-D., and North, C [154–175]. Springer, Berlin.
- MapThematics. 2012. "Geocart Projections." Accessed October 3, 2012. <http://www.mapthematics.com/ProjectionsList.php>
- Raisz, E. 1938. *General Cartography*. New York: McGraw-Hill Book Company, Inc.
- Robinson, A. H. and Sale, R. D. 1969. *Elements of Cartography, 3rd Edition*. New York: John Wiley & Sons, Inc.
- Slocum, T. A., McMaster, R. B., Kessler, F. C., Howard, H. H. 2008. *Thematic Cartography and Geovisualization 3rd Edition*. Upper Saddle River: Prentice Hall.
- Strebe, D. 2008. "Beautiful Lies: When Distortion Becomes Art." *Cartographic Perspectives* 59: 63–66.
- van Wijk, J. J. 2011. "Guest editor's introduction: Special section on the IEEE Symposium on Visual Analytics Science and Technology (VAST)." *IEEE Transactions on Visualization and Computer Graphics* 17(5): 555–556.



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in *The Chicago Manual of Style*, 16th ed. (<http://www.chicagomanualofstyle.org>). When a direct quote, include the page number. Examples: (Doe 2001) and (Doe 2001, 38).

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Name of author(s). Year. *Title in Italics*. City of Publication: Publisher Name.

MacEachren, A. M. 1995. *How Maps Work*. New York: Guilford Press.

A. H. Robinson, J. L. Morrison, P. C. Muehrcke, A. J. Kimerling, and S. C. Gupta. 1995. *Elements of Cartography, 6th Edition*. New York: John Wiley & Sons.

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Peterson, M. 2008. "Choropleth Google Maps." *Cartographic Perspectives* 60:80–83.

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Bassett, T. J. 1998. "Indigenous Mapmaking in Intertropical Africa." *The History of Cartography. Vol. 2, Book 3: Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies*, edited by David Woodward and G. Malcolm Lewis, [page #]. Chicago and London: University of Chicago Press.

Websites: Websites may be generally referenced in running text ("On its website, the Evanston Public Library Board of Trustees states . . .") rather than with a URL listing. For more formal citations, use the following format: Author's or authors' names as in *Books*, above. Year. "Title of Document" in quotation marks. *Title of Complete Work (if relevant) in italics*. Access date. URL.

Cartography Associates. 2009. "David Rumsey Donates 150,000 Maps to Stanford University." David Rumsey Map Collection. Accessed January 3, 2011. <http://www.davidrumsey.com/blog/2009/8/29/david-rumsey-donates-150-000-maps-to-stanford>.

Maps: Maps should be treated similarly to books, to the extent possible. Specific treatment may vary, however, and it is often preferable to list the map title first. Provide sufficient information to clearly identify the document.

A Plan of the City of New York and its Environs. P. Andrews, sold by A. Dury in Dukes Court, St. Martins Lane, surveyed by John Montessoro, 1775.

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Cartographic Perspectives



Journal of the
North American Cartographic
Information Society

Number 25, 2012

