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THE IRISH IN 1850 CLEVELAND:
AN HISTORICAL GIS APPROACH TOWARDS ETHNIC STUDIES

An Essay Submitted to the
Office of Graduate Studies
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John Carroll University
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By
Bernard J. McCafferty
2017
The essay of Bernard J. McCafferty is hereby accepted:

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Date

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Date

4/28/17
Preface and Background

I like to chase dead people. Not in a spiritual or ghost hunting way, but through genealogy, recreating past lives by analyzing the tantalizing few clues that our ancestors left behind. Genealogy is a form of research – solving mysteries and answering questions by investigating the information available, making assumptions, testing theories, and documenting the results. Unlike today’s internet-connected world where we leave hundreds of traceable footprints every day, the surviving social inventory from our nineteenth century ancestors may consist of a few disjointed scraps of aging manuscript collecting dust on a shelf in the county archives. Luckily, an ever increasing number of these records are finding their way online, either through pay-to-use sites like Ancestry.com, religious collections such as the LDS-sponsored FamilySearch, or on government and personal websites that have been scanned and shared with the community. The challenge is in the transcription of handwritten records, connecting and merging multiple sources that are related to a single individual, and integrating these disparate databases into a common format that can be analyzed. Once consolidated, researchers are better able to understand the underlying dynamics influencing the social and historical environment they are studying. My project will attempt to solve two different aspects of this challenge: First, in the absence of a single source of data, various archival records can be combined in order to build a model that accurately predicts where an individual lived in 1850 Cleveland and, secondly, other types of information can be attached to this record and then spatially mapped using GIS (Geographic Information
Systems) software. While my essay is historical in nature, the changing face of humanities in general (and history in particular) has opened new cutting-edge opportunities to incorporate digital technology in the quest towards further understanding the effects of time and space on human behavior and events.

While genealogy provided the initial spark, a combination of other factors led me to this project. Growing up in an active Irish household on the West Side of Cleveland, we were taught very early about the culture of “All Things Irish.” The St. Patrick’s Day Parade, Irish soda bread, jigs and reels, and a sense of who you were and where you came from were deeply infused in my upbringing. Green was worn proudly, everyone was somehow related, and the East and West Side of Cleveland were two very different worlds. Questions such as “What parish are you from?” and “Who are your people?” were not only conversational icebreakers, but would also identify your ancestral line as well as your place within the Irish community, both here in Cleveland and back on the old sod. Our parents and grandparents knew everyone in their neighborhood and the term “Cleveland Irish” became synonymous with family, community, and history. When you grew up in this environment, the culture of All Things Irish became integrated into your DNA.

During the mid-nineteenth century, Cleveland was rapidly transformed from a small, isolated town to a major industrial, commercial, and retail center. This growth and prosperity was primarily the result of economic factors associated with the building of the Ohio Canal and, later, from the railroads, positioning the city on the lake at a strategic transportation junction. As was the case with many other Midwestern cities, this industrial explosion was fueled on the backs of labor provided by recent immigrants from
Ireland, Germany, and England. Immigrants came here for a variety of reasons, primarily economic and familial, moving to areas where friends and relatives had already settled. But what brought these Irish immigrants to Cleveland rather than Buffalo, Chicago, or Detroit? While the history of the Irish in Cleveland began with the canals, the catalyst was the flood of Famine Irish arriving at the same time that the city was poised for exponential industrial growth. The research question became: Who were these first Irish who established Cleveland as a future destination for the several hundred thousand that would soon follow and, more importantly, could I document their lives to determine their origin and trace the history of the Irish in Cleveland?

Genealogy introduced me to the variety of historical records online as well as the processes necessary for evaluating, documenting, and analyzing this data. I soon realized that there was no centralized repository tying these records together into a cohesive database; for the project I was undertaking, I would have to create my own. The seventh census of the United States, conducted in 1850, would prove to be a logical starting point. This census was the first to record not just the heads of household, but all individuals along with their age, occupation, and country of birth. One could now separately identify the Irish as a subset of the census data. Being the most comprehensive social record available at this critical juncture in Cleveland Irish history, the census would eventually form the baseline for my collective database. If I could track individuals rather than merely reporting on aggregates, I could attempt to answer social questions regarding where they lived and worked, the occupations they held, and how the communities and neighborhoods developed – not only for the Irish, but for any identifiable ethnic group. If one could accomplish this, it would provide a foundation for future studies on the
assimilation of these ethnic groups paralleled with the rapid industrial growth of
Cleveland. This led to my thesis: that the 1850 census, which did not contain addresses,
could be combined with other data records to accurately pinpoint where people lived in
nineteenth century Cleveland.

The baseline census data transcriptions, which were extremely labor intensive,
took an incredible amount of time and were actually begun several years ago. While I
was very familiar with Excel, learning GIS programming entailed a steep learning curve.
I had actually started the address mapping project and transcribed the 1850 census while
researching similar academic studies. The terms “Historical GIS” and “Spatial
Humanities” were foreign to me, but once I used them as key phrases, I was able to locate
several similar projects. Since I had already started to build and map my GIS database
prior to reading complementary research, it allowed me to compare my methodology to
previous published works and my processes were not unduly influenced by these papers.
There were many similarities in both the process to consolidate data, as well as the
objective to visually present features (social inventory) that could be attached to an
individual and mapped accordingly, and these will be discussed in my essay.

I would like to thank those who have encouraged my madness and challenged me
along the way, especially my advisor Dr. Brenda Wirkus and Professor Dr. Valerie
McGowan-Doyle. Sláinte and go raibh maith agat to my Irish Studies colleagues, friends
and family, and those who enjoy and support the culture of “All Things Irish.” Finally, a
special thanks to my wife Kathy, who put up with my hobby (compulsion?), supported
me when the wheels came off, pushed me to keep going, and always encouraged me to
dream big.
Introduction

Nineteenth century census abstracts can only provide data at an aggregate level; state, county, city, and occasionally a smaller subset such as city ward are the smallest level of demographics available. While these statistics are convenient when compared against other similar entities, in an immigrant city like Cleveland, there really was no “average” as the demographics were very different in the various neighborhoods. Ward 1, the largest ward both in size and in population (see Figure 1), contained farms in the southeast, the city’s elite residential area along Euclid Street (now Euclid Avenue), the city center and municipal buildings surrounding Public Square, a business district west of the square on Superior Street, markets and shops along Champlain and Michigan Streets, warehouses on Merwin Street, and low-end housing occupied by recent German and Irish immigrants along the river in the flats of Cleveland Centre. At a time in history when Cleveland was poised for exponential economic and industrial growth, the immigrants who propelled this expansion can only be measured down to the level of a city ward.

This project will suggest two different but connected dimensions related to our further understanding of the ethnic heritage in a city like Cleveland. First, in the absence of a single source of address data, one can combine three different data sources – census records, city directories, and deed, plat, & tax records – to show that the census marshal took a linear path and that, assuming this, we can accurately predict where an individual lived in 1850 Cleveland. Once this foundation is established, other social attributes can be attached to the individual such as wealth, ethnicity, or occupational status, and then these attributes can be spatially represented at a household level. In order to achieve this
objective, this essay will emphasize the benefits of GIS mapping and then show examples of how this technology can be applied to real-world historical research.

![Ahaz Merchant's 1850 Map of Cleveland](http://www.railsandtrails.com/Cleveland/index.html)

*Figure 1. Ahaz Merchant’s 1850 map of Cleveland showing the three city wards.¹*

The ability to map the physical place of residence in an urban area prior to the 1880 census is nearly impossible due to the lack of meaningful address reporting in any of the surviving social inventories. Compounding this was the fact that addresses changed over time as new buildings were erected, there was no structured numbering system, and many individuals were tenants who moved often and did not actually own their home or property, leaving few clues to identify where they lived. In a rapidly changing city like Cleveland in 1850, demographics measured at the aggregate level do

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¹ Ahaz Merchant moved to Cleveland in 1818 and was a Cuyahoga County surveyor. The map used as a baseline for this project is the *The Ahaz Merchant Map of Cleveland and Ohio Cities, July 1850*, courtesy of the State Library of Ohio, downloaded from [http://www.railsandtrails.com/Cleveland/index.html](http://www.railsandtrails.com/Cleveland/index.html).
not provide the granularity needed to analyze highly localized patterns responsible for the future development of the ethnic communities. The ability to study an ethnic group such as the Irish at the individual level would provide new insight and further understanding of the social, cultural, and economic challenges that they faced immediately following the Irish Famine (1845 to 1850), a crucial time and place in Irish American history.

While the term “Historical Geography” has been used since the early 1900s (Jakle, 1980, p. 3), Historical Geographic Information Systems (HGIS) is a more recent development. This phrase is also associated with the term “Spatial Humanities,” the art of studying people as they change over time and space. Both can be achieved by applying new technologies, along with old-fashioned detective work, to produce comprehensive maps depicting various stages of social and cultural integration and assimilation. GIS has the ability to leverage large databases constructed from individual-level information to visually represent patterns not available using standard statistical analysis. The potential benefits for research can be tremendous. “Quantitative geography and urban history place an emphasis on the analysis of spatial patterns. Statistical measures of the density, clustering and dispersion of resident groups in an urban landscape can provide insights into a community’s social, political, cultural and economic structure” (DeBats & Lethbridge, 2005, p. 84). The challenge is to locate and consolidate historical data records that, when joined together with a unique identifier, allow one to leverage GIS’s capabilities to display this data relative to positions on the earth's surface. Could one assume that the census marshal would follow a linear path, and that this path could be used as a basis for physically locating urban residents in 1850?
This essay is divided into two parts. In the first part, I will attempt to validate the assumption that the census marshal followed a linear path and that this path could be recreated with additional information. I accomplished this by merging the data from three primary sources: the 1850 federal census, the 1850 Cleveland city directory, and Cuyahoga County deed and tax records. Spatial maps were created by overlaying an 1850 Cleveland City map onto current-day Cleveland using the GIS software program Maptitude. The addresses were then manually input into Maptitude and the corresponding latitude and longitude coordinates determined. This process resulted in identifying the geographic coordinates for approximately eighty-one percent of the 17,019 individuals contained in the 1850 Cleveland census. The ultimate goal of this project, however, was to successfully create spatial maps based upon these physical household addresses for all individuals, which in turn can be used for additional social, economic, demographic, and ethnic studies. Secondly, in order to demonstrate the power of HGIS, other social catalogs including home ownership and occupation were appended to the individuals and households to show the future potential for urban studies using this method. In the first example, simple density and pin maps were produced and specific ethnic residential areas determined. After these ethnic concentrations were identified, occupational information was attached to the map as a measure of social status. Finally, home ownership and the value of real estate owned were added to the map, and a picture

2 All of these original archived records were located online and manually transcribed by the author.
3 There are numerous GIS software programs available. Maptitude Geographic Information System Mapping Software by Caliper was chosen in that they offer a free software license to students. Information on the product and applications can be found at http://www.caliper.com/Maptitude/MappingSoftware.htm.
of Cleveland’s social structure began to emerge. These preliminary findings were then analyzed and possible root causes proposed.

Much of this project is original research, and therefore considerable time is allocated to the methodology used to collect, consolidate, and present the data. Unfortunately, there are limited prior works that can be used for comparable studies. There are a wide range of GIS applications in historical research, yet only two comparable projects were discovered, and both of these were focused a decade later than this essay’s timeframe. While there are numerous ethnic studies that focus on the 1850 timeframe, due in part to the availability of the expanded census data, the findings are typically related to standard statistical analysis. This project will, however, substantiate that by successfully reporting location data at the individual level, the process could be expanded to provide additional analysis of other social categories and different ethnic groups, therefore providing future research opportunities for the Greater Cleveland academic community.

**Background – A Review of the Literature and Cleveland’s Ethnic Heritage**

The study of humanities is the study of culture, which can be defined as either “the ideas, customs, and social behavior of a particular people or society,” or “the attitudes and behavior characteristic of a particular social group” (Oxford University Press, 2017). An argument could be made that immigrants transplanted to a new location, often due to situations outside of their control, would try to retain much of what was familiar in their native land, their so-called “cultural baggage.” Yet, one could also assume that their new environment and community would influence the development of a
new culture, based on previous customs and beliefs yet molded by the realities of everyday life in a foreign city. While the first pioneers to settle in Connecticut’s Western Reserve were typically of English stock, it was the later-arriving immigrants who provided the stimulus for Cleveland’s growth during the nineteenth century. The assimilation of these foreigners into this new society, as well as the cultural identity they developed within their ethnic communities, is the story that needs to be told regarding the history of the Irish in Cleveland.

Cleveland in 1850 was not unique when compared to other growing cities in the Midwest. It was, however, poised for industrial greatness based on the confluence of transportation, the availability of raw materials, and the abundance of cheap labor. During her first thirty years, Cleveland was a small sleepy village, surveyed in 1796 by Moses Cleaveland and plotted to resemble a typical New England town. The completion of the Ohio & Erie Canal in 1832 positioned the city as a staging point for goods being transported between the Great Lakes and the Ohio (and eventually Mississippi) rivers. All of these goods had to be manually unloaded from one boat, stored, and then reloaded onto another vessel. The city’s riverfront along the Cuyahoga River functioned as the transshipment point for the commodities that passed through her borders, while the railroad companies had just begun to purchase land along the lakefront and river staging areas. Warehouses were rapidly built along the Cuyahoga River to store this cargo, and small manufacturing shops sprang up to process these goods and add value to the raw materials prior to their final journey to marketplace. In 1846, shipbuilding was one of the area’s largest industries, employing over five hundred men in various occupations on both sides of the river (Cleveland Plain Dealer, 1846) while the iron and steel industries
were still in their infancy awaiting the imminent arrival of the railroads to cheaply transport the coal and iron ore needed to establish Cleveland as a steel-making city. The population grew accordingly, and as was the case in any walking city, the immigrant population typically settled near their place of employment. Housing was at a premium, and the local builders struggled to construct residential units capable of supporting this growing population, forcing many to live in boarding houses or temporary residences (Chapman, 1981, p. 47). The thriving city was expanding faster than the existing infrastructure could support. As Figure 2 shows, 1850 was a critical point in time for Cleveland as the population grew exponentially in the years that followed. Where these newly arrived immigrants settled would shape the future development of the ethnic neighborhoods for the next fifty years.

Cleveland in 1850 would have been categorized as a mid-sized city and representative of the typical mid-nineteenth-century urban form (DeBats, 2008, pp. 19-20). It resembled many other growing cities in the nation’s midsection in that the three largest immigrant populations were the Germans, Irish, and English (see Table 1). Considering that the focus of this project is on the Irish, they will be the primarily ethnic group examined in this essay. The German population provides an ethnic comparison group to measure the assimilation of a different culture that faced many of the same challenges as the Irish in adapting to life in a different country, and the processes and

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4 As listed in the 1850 Cleveland City Directory, Cleveland had four iron and brass foundries. There was a paper mill south of the city in Brooklyn and a steam engine plant in Ohio City. The only other major industry besides shipbuilding was the Gas and Coke Plant that provided fuel for the gaslights.
5 In 1850, Cleveland was listed as the 45th largest urban area in the U.S., coincidentally the same as it was ranked in 2010. The highest Cleveland ever ranked in population was 5th in population as recorded in the 1920 census (U.S. Department of Commerce; The History of Cleveland History Timeline).
Figure 2. Historical Population of Cleveland 1820-1870. This graph was assembled from decennial census records, callouts on the 1850 Ahaz Merchant city map, and Charles Whittlesey’s “Early History of Cleveland, Ohio” (1867, p. 456).

Methodologies developed here can easily be transposed to any other identifiable group in the city. As the largest ethnic group, the Germans were both identified and somewhat isolated from the established local population by their language, which became a solidifying and identifiable feature of their culture. The Irish, on the other hand, could read and speak English (although that was debatable based on the thickness of the brogue); their cultural differences originated in the thirty-two separate counties of origin in Ireland, each with its own habits and peculiarities. The Irish emigrants who arrived in the early 1800s typically brought trade skills from the old country, but that was not necessarily the case for later arrivals, and especially not the Famine emigrants. “Though immigrants were generally less skilled than natives, the skills possessed by the immigrants varied in a continuum; as a group, the Irish had the fewest skills, the English
somewhat more, and the Germans were among the most skilled of the immigrants” (Cohn, 2000, p. 364). Lacking marketable skills left them no choice but to take work as menial laborers. In one sense, they were lucky: they arrived in American at a time when most jobs required a strong back, not a skilled hand or nimble brain.

Table 1

*Cleveland 1850 Census Population*

<table>
<thead>
<tr>
<th>Country of Birth</th>
<th>Total</th>
<th>Total %</th>
<th>Adults</th>
<th>Adult %</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>8991</td>
<td>52.8%</td>
<td>3716</td>
<td>37.9%</td>
</tr>
<tr>
<td>Germany</td>
<td>3235</td>
<td>19.0%</td>
<td>2476</td>
<td>25.2%</td>
</tr>
<tr>
<td>Ireland</td>
<td>2190</td>
<td>12.9%</td>
<td>1689</td>
<td>17.2%</td>
</tr>
<tr>
<td>England</td>
<td>1370</td>
<td>8.0%</td>
<td>1075</td>
<td>11.0%</td>
</tr>
<tr>
<td>Canada</td>
<td>394</td>
<td>2.3%</td>
<td>182</td>
<td>1.9%</td>
</tr>
<tr>
<td>Scotland</td>
<td>231</td>
<td>1.4%</td>
<td>184</td>
<td>1.9%</td>
</tr>
<tr>
<td>Isle of Mann</td>
<td>165</td>
<td>1.0%</td>
<td>145</td>
<td>1.5%</td>
</tr>
<tr>
<td>Holland</td>
<td>98</td>
<td>0.6%</td>
<td>66</td>
<td>0.7%</td>
</tr>
<tr>
<td>France</td>
<td>61</td>
<td>0.4%</td>
<td>46</td>
<td>0.5%</td>
</tr>
<tr>
<td>Unknown or Other</td>
<td>287</td>
<td>1.7%</td>
<td>230</td>
<td>2.3%</td>
</tr>
<tr>
<td><strong>Total Individuals</strong></td>
<td><strong>17019</strong>*</td>
<td>***</td>
<td><strong>9809</strong></td>
<td><strong>2.3%</strong></td>
</tr>
</tbody>
</table>

*Note. Adults are those 18 years and older. Records were compiled by the author from the 1850 census.*

* Historical census records report that Cleveland’s 1850 population was 17,034. My research found several families living in different wards that were enumerated twice, and so my records contain fifteen fewer individuals.

Once in Cleveland, however, the Irish and Germans filled very different occupational, economic, and social roles. The Famine Irish, in particular, had minimal skills and left Ireland starving and destitute, while the Germans exported their skills and often emigrated to escape religious or political oppression (Wittke, 1948, pp. 712-13).

As Table 1 shows, when children are removed, the combined percentage of Irish and German adults outnumbers those born in the U.S. To compare and contrast how these two ethnic cultures interacted, their similarities, differences, and even competition for the same jobs, required analysis at an individual level. As an example, one can look at the
occupations these two groups held. Germans tended to be merchants and skilled artisans while the Irish were primarily laborers. Of the 1,128 German adult males who reported an occupation, seventy percent held jobs that were classified as professional, intermediate, or skilled workers while sixty-two percent of the 642 adult Irish males were classified as partly skilled or unskilled laborers. These differences, and the resulting social and economic impact, will become evident once these individuals are mapped into GIS.

The first impetus in Cleveland’s economic development began with the authorization of the Ohio and Erie Canal in 1825, and with the canal came the Irish. The canal was opened to Akron on July 4, 1827 and finally to the Ohio River at Portsmouth in 1832, giving Cleveland access southward through eastern and central Ohio to the Ohio River (Kennedy, 1896, pp. 218-226). Historian Samuel Orth reported that the first Irish immigrant to locate in Cleveland was William Murphy in 1830 (Orth, 1910, p. 115), although there were people of Irish descent in Cleveland for a number of years prior to that. Many were early pioneers from the east coast, typically of Scotch-Irish descent and often from Ulster in Northern Ireland. Once the canal was announced, the Irish came in waves. After finishing the Erie Canal, many of these canal diggers simply moved further west and continued the backbreaking manual labor on a another canal in a new state. Different types of vessels were used on the canals than on the Great Lakes, and so nearly

all freight arriving at the mouth of the Cuyahoga had to be unloaded, stored, and either used or transferred to another vessel. It was very likely that canal laborers who wished to avoid the harsh working conditions would have opted for other low-paying labor jobs in the multiple businesses that sprung up to support the barge and canal industry. While Cleveland thrived during the 1830s and 1840s as a major market port on the Great Lakes, the profile of the Irish immigrant did not. The famine in Ireland, the Great Hunger (an Gorta Móir), changed the face and identity of the Irish in America for years to come. Although the actual numbers will never be known, estimates are that upwards of 1.5 million people perished between 1845 and 1851 (Woodham-Smith, 1989, p. 411), and Kerby Miller (1985) estimated that over 2.1 million more emigrated between 1845 and 1855 (p. 291). Many of the starving emigrants were bound for England, Canada, the U.S., and some eventually came to Cleveland.

History is often measured at a critical point in time, and 1850 provided a unique opportunity to establish a baseline for studying the Cleveland Irish for a number of reasons. The seventh census of the United States coincided with a Cleveland city directory produced during that same year. Since the 1850 census was the first to identify all individuals and their country of birth, the Irish could be identified as a subset with a greater degree of accuracy than by guessing based on a particular surname. The Irish were the second largest ethnic group in the city behind the Germans, with seventeen percent of the adult population reporting Ireland as their country of birth (see Table 1). Since the country of birth was listed for all individuals, females, especially those who changed surnames or married non-Irish husbands, could also be included in the analysis. There are concerns regarding the accuracy of the census; some researchers believe up to
fifteen percent of the individuals were not enumerated (Debats, 1991, p. 547). Results from this project show that thirty-eight percent of adults in the city directory could not be linked to individuals in the census (see Table 5). Still, the 1850 census provides the most complete social inventory available, and therefore proved to be an excellent starting point for the consolidation of data into a baseline GIS database.

Once the initial database was populated and unique individuals matched between the census and city directory, the challenge became how to present and analyze the data as more than just tables and graphs. The answer was found in a common technology used every day: GIS. GIS software is essentially a relational database in which each data record can be represented by specific geo-coordinates, and can therefore be spatially represented on a map. GIS can handle the large volume of data necessitated by individual (vs. aggregate) reporting, and can be used to integrate data on these individuals from a number of various sources. In addition to being a spatially referenced database, GIS is also a visualization and analytical tool that has the ability to isolate and segregate specific datasets for in-depth analysis.7 “GIS, with its dramatic visualization capacities, promises new insights into the broad question of urban social structures, their connection to wider social change, and the nature of social relations amongst urban residents” (DeBats & Lethbridge, 2005, p. 78). Knowles (2000) furthers this line of thought: GIS “inevitably heightens one's awareness of geographical relationships, the physical characteristics of places and regions, and the often unmined historical data contained in

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7 For additional information on the growth of GIS as a tool for historical research, see Bodenhamer, et.al. *The Spatial Humanities: GIS and the Future of Humanities Scholarship*; Anne Kelly Knowles, ed. *Placing History: How Maps, Spatial Data, and GIS Are Changing Historical Scholarship*; and Gregory and Ell, *Historical GIS: Technologies, Methodologies, and Scholarship.*
maps and other geographical sources” (p. 458). Both of these descriptions can be shown through the wide variety of different applications employing GIS for historical studies.

Research into published HGIS projects revealed a surprising variety of research applications, although very few of these were related to urban studies, and even fewer focused on the mid-nineteenth century. Leveraging GIS’s ability to track physical change over a period of time, the Great Britain Historical GIS (GBHGIS) project combined UK census and vital statistics registrations with Poor Law Union records8 from 1840 to 1973 while adjusting to changes to the administrative boundaries. The GBHGIS is structured so that a user can input a specific date and the tool will build the administrative boundaries that were in existence at that time, then layer on top of that any of the available statistical data from that specific time period.9 The China Historical GIS10 project found a creative way to track changing boundaries over a two thousand year time frame by using coordinate points to represent the settlements and then circling these settlements with “spheres of influence” to signify administrative control from a local warlord. The goal of the Tokyo’s Urban History (Siebert, 2000) project was to convey all of the major features of Tokyo from the nineteenth century to the present, including data on the physical landscape, administrative boundaries, population, economy, transportation, and land ownership. While these projects represent the varied scope and applications for GIS, there were only two examples found that were closely

8 Vital statistics are government records of all birth, marriage, and deaths, also known as BMD. The Poor Law Union was a geographical territory and early local government unit established in England and Ireland for the purpose of poor relief.
9 Great Britain Historical GIS website http://www.port.ac.uk/research/gbhgis/
10 China Historical GIS website https://www.fas.harvard.edu/~chgis/
related to this project: DeBats and Lethbridge’s detailed city analysis of Alexandria, VA and Newport, KY, and a web-based relational database project for Washington, DC during the time period of the Civil War.

In “GIS and the City: Nineteenth-Century Residential Patterns,” Donald A. DeBats and Mark Lethbridge (2005) set out to see if GIS could be used as a tool to validate whether general concepts typically associated with large mid-nineteenth century cities could also be applied to two different medium-sized American cities: Alexandria, VA in 1859 and Newport, KY in 1874. Their project set out to test Sam Bass Warner’s characterization of social patterns in 1860 Philadelphia and whether ethnic groupings were influenced by, or were resistant to, class groupings in a pre-industrial urban environment. The plan was to examine how “GIS mapping and statistical techniques might assist our understanding of the socio-spatial relationships in these two towns and specifically how these techniques might further our understanding of the interplay between structural (e.g. class) and cultural (e.g. identity) approaches” (p. 79). Merging a combination of tax, census, city directory, and poll records, they located the precise place of residence of over seventy percent of the free inhabitants of both cities. While surviving poll records are rare to find in local historical archives, their availability for these two cities allowed the authors to extend their study to include both social and political research in the development of residential patterns within an urban environment.

_Civil War Washington_, a project published by the Center for Digital Research in the Humanities at the University of Nebraska-Lincoln, is an interactive website that chronicles the war's impact on the city by evaluating and visually representing the social,
political, and cultural changes that were influenced by the Civil War. The dynamic capabilities of the custom GIS map interface allows users to move between contemporary and historical views of the city and select various data sets as individual layers on these maps and then pan or zoom in on specific features. Each data point includes feature information for that record, detailing the documentation source and other pertinent information. The project mapped the First Ward of the city, but the census records are limited to only adult heads of household, not all individuals who were enumerated in the city in 1860. In “Historical Geography, GIS, and Civil War Washington,” Rob Shepard explains that the team was interested in studying the pre-war social conditions within the nation’s capital, utilizing the census records to investigate basic socioeconomic and race issues. “Maps, map-making, and cartography played crucial roles in the Civil War, and we believe they play similarly important roles in the current study and understanding of the war-time capital” (Civil War Washington: Maps, 2006). The strength of this project is the interactive web-based GIS interface that enables non-technical users to easily customize the visual representations by selecting different data layers. Shepard suggests the advantage of this technology is that “GIS adds an important component to the historical scholarship of the project … opening entirely new routes of study for those historians who are willing to ask questions of the spatial distribution of data” (2015, p. 51). This aligns with the benefits of data-driven research, where one is not constrained by previous research and can truly think “outside of the box.”

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There were common elements between this project and both of those studies regarding the process for GIS database development. Both studies also provided examples of how to analyze the results. DeBats and Lethbridge used a combination of census and city directory information but relied primarily on existing tax records for anchoring address locations. In Alexandria, this was made possible in that the tax assessor followed the exact same route every year recording real estate tax values and established a repeatable pattern for traversing the city. While the original duplicate tax record books are available for Cleveland, they do not record the path of the assessor and can only be used to confirm a street location to a plat record. This, however, does not identify physical addresses for individuals who did not own the property where they lived. In both Alexandria and Newport, DeBat’s team built contemporary city maps from scratch, a time consuming venture but one which would yield a more accurate picture with no extraneous markings or folds to compromise the spatial maps. One millimeter fold or crease in a map at 1:10,000 scale can introduce an error of ten meters in the geocoded map (Gregory & Ell, 2007, p. 46). In order to minimize the potential for error, the Civil War Washington team instead used contemporary maps and split these into multiple segments, geocoded the individual maps using over four thousand reference points, then reassembled the individual pieces back into GIS. As for map and address geocoding, DeBats (2008) reported that “the physical mapping of Newport was more straightforward than that of Alexandria because the Sanborn Fire Insurance Map (1886) was sufficiently close to our period of interest (the mid-1870s) to allow its use as the basic block plan for the city” (p. 21). Their reliance on the tax records as the primary source for address location and the use of 1886 Sanborn Fire Insurance maps for
determining precise building locations were not options for the recreation of 1850 Cleveland.\textsuperscript{12} \textit{Civil War Washington}, on the other hand, built its address scheme using only the city directory and developing a custom tool to estimate where an address would fall based on detailed directions for addresses in the directory (i.e., located at the NE corner of Pennsylvania Ave. and West Twenty-first Street). As was the case in Cleveland, Shepard notes “historical address information is not always useful for contemporary researchers: much of the built environment has changed over time, sometimes including complete rerouting, renumbering, and renaming of roads and places” (2015, p. 37). This project’s methodology, which was initiated prior to reviewing either of these two papers, yielded a combination of these two different approaches, and is explained in detail in Appendix A.

DeBats and his team arrived at several interesting conclusions that can be extrapolated to the HGIS project for Cleveland. The city of Newport in 1860 was similar in composition to Cleveland in 1850 in that the primary ethnic groups were the Germans and Irish, and the city was situated along a river that provided transportation and supported the local industries. “The dispersal of Newport’s industrial population … facilitated the development of ethnic and occupational spatial concentrations and, hence, communities of differing economic and ethnic groups” (2008, p. 26). The conclusion is that industry influenced ethnic densities, a result that one would also expect in Cleveland.

\textsuperscript{12} The Sanborn Maps were originally created for assessing fire insurance liability in urbanized areas. There was a twelve year difference between the study of Newport, KY, and the available Sanborn maps, which Debats determined was close enough to use as a reference. The difference of thirty-six years between the 1850 census and the 1886 Sanborn maps was determined to be too large of a gap to map the city of Cleveland accurately.
Their output was shown as density core maps that locate the German and Irish ethnic concentrations, overlaps between groups, and in the case of Newport, any intermingling with the Free Black population. In contrast, Civil War Washington focused on spatially mapping wealth and social status by using different sized points to convey wealth. Both of these visual presentation techniques will be applied to Cleveland.

The benefit of using HGIS to represent a place in time can yield results greater than spatial maps alone can produce. “GIS can aid the advancement of historical scholarship in three ways: first, by providing revisionist studies that challenge existing orthodoxies; second, by tackling questions that have not been resolved to date; and, third, by providing approaches that enable researchers to ask completely new questions” (Gregory & Healey, 2007, p. 644). On the other hand, GIS can also introduce other challenges that may be difficult to solve for the average social historian. There is an enormous amount of effort required to create the integrated GIS database. Historical GIS databases are rarely copied from a single source; instead, they take data from multiple sources, often transcribed by hand, and integrate this data into a structure that may be biased by the researcher’s primary objectives. Much of this source data includes scanned or original archival material that must be converted from analog to digital form in order to be useful with GIS. “The most unusual and sometimes most time-consuming aspect of historical GIS is the process of converting historical analog data to digital form. The rule of thumb among GIS users is that up to ninety-five percent of project time goes to preparing the system to yield results” (Knowles, 2000, p. 463). Linking and merging the records for individuals between census, directory, and plat archives is also a very labor intensive exercise. DeBats estimated that compiling and integrating the records for a city
the size of Newport took at least a year of effort for an individual researcher, while Alexandria consumed almost eighteen months of full time work (DeBats & Lethbridge, 2005, pp. 22-26). Learning a new software application can also be an intimidating and daunting task. GIS data entry, map creation, and general spatial concepts are not always intuitive to a social or historic researcher. “Historians rarely possess the technical facility that GIS training inculcates and are often uneasy with ‘the visual way of knowing’ that is inherent to exploring and representing spatial data” (Knowles, 2000, p. 465). When starting from scratch, there was a steep learning curve to gain familiarity with the program before the assembled data could be successfully input into GIS in order to produce useful maps. There was, however, one issue mentioned repeatedly in multiple papers that this project did not share with the other researchers - the common complaint for additional funding to build the database.

Part I: Address Mapping and the Census

This section will summarize the processes and methodology used for data transcription, merging of individual records, GIS database construction, address mapping, and general assumptions.13 Three key steps were necessary to convert the raw archival data into a usable GIS database:

1. Data collection: The various archival records were transcribed into a Microsoft Excel spreadsheet beginning with the 1850 census. As

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13 As noted before, the entire process was extremely time consuming and was essentially a project in and of its own. Since much of this project consists of individual research, documenting the process used to gather and integrate the data was critical. For a more detailed explanation of my methodology, process, and assumptions, please refer to Appendix A.
additional records were transcribed, common individuals were identified with a unique ID and the new records merged with the census baseline. All transcriptions and merging of individuals were done manually by this author from the original handwritten records and followed established genealogical guidelines and best practices.

2. Conversion of the spreadsheet data into GIS usable map coordinates. This process involved several different steps:

   a. A base map was developed using the 1850 Ahaz Merchant Cleveland city map as a reference. The map was edited, rotated, and resized so that it could be overlaid on top of a modern georeferenced map of Cleveland, using physical anchor reference points that would have remained constant over time to align the two maps.¹⁴

   b. The merged Excel data was imported into Maptitude and the physical location manually placed based on self-defined degrees of confidence (DOC) that were associated with each household address. Street reference points were determined by a shift in even/odd address in the census path, typically at an intersection, or by a change in the route to an adjoining street. After mapping

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¹⁴ Georeferencing is a term wherein the coordinate system of an image or map can be directly associated to a ground system of geographic coordinates, so that each position on the map has a specific set of unique coordinates. For additional information, see https://www2.usgs.gov/faq/node/3545
known households, the physical address schema was then recorded for each city block.

c. House addresses that could not be absolutely identified were placed as a separate layer and assumed to fit into plat locations that were shown on the map to have had improvements (based on the tax records) but did not show any residences.

3. Additional data elements from other records were appended onto the individual and household coordinates to demonstrate the power of HGIS as a tool. The primary examples in this project include density mapping of ethnicity based on the census country of birth and race. A secondary census field, value of real estate, was then mapped to show the different locations where homeowners resided, which could also be used to infer personal wealth.

Pinpointing the addresses on the 1850 map was a manual process that required some level of experience with the GIS tool. Maptitude allows the user to physically locate a record by identifying the point on the map where that record should be placed and then moving the record to that location. However, not all records could be placed with the same level of accuracy. After examining the data points and the potential margin of error, the household data was categorized into various levels of accuracy, termed “Degree of Confidence,” resulting in four different levels of accuracy as defined below:

1. **DOC1** – Contains both an address from the directory and a corresponding plot record, or a smaller subplot within the original plot. This is the highest level of
accuracy, and house placement is estimated to be within an average of seventy feet. 15

2. DOC2 – Contains only a numerical address or plot number. These numbers were typically located within close proximity to a DOC1 point to minimize the potential margin of error.

3. DOC3 – The locating record is a street name without a corresponding address, or an individual who is situated in the census path between two known DOC1 and DOC2 data locations.

4. DOC4 – A residence that is in a transition between different neighborhoods in the census, or a group of more than four households that formed large gaps in the census path. These were probably tenement houses or other types of temporary housing since, by definition, the census marshal was instructed to count all individuals in a boarding house as belonging to a single residence. The assumption was that the majority of these individuals would be located within close proximity to each other, and could therefore be plotted sequentially.

After placing the DOC1 locations on the map, the DOC2 locations were then added by spreading the households between the known DOC1 locations based on address number. Again, assuming that the census taker took a linear path on his rounds, one can assume that people listed in the census with no address but located between known DOC1 addresses also lived in that general area on the same street. The DOC3 points were then added to the map, again aligning the new additions to approximate houses lined up along a particular street and sometimes re-adjusting the previous points to allow for appropriate spacing on the map. These different DOC points were added as layers, a

15 The average width of a standard two acre plot in Cleveland was approximately one hundred thirty-five feet, which would correlate to an accuracy of within seventy feet if the house were placed in the middle of the plot. Even greater accuracy can be achieved if one can further refine the location of the house based on other related variables including additional houses on the lot or deed lot descriptions.
key feature of the mapping software. By layering these points, one can easily add or remove different data sets, which allows for greater control visually when printing out maps based on accuracy. After plotting the first three DOCs, seventy-nine percent of the 3,129 households in Cleveland were physically located with a fairly high degree of accuracy, more than enough to feel confident that the additional mapping process would provide solid results when other social-economic factors were added.

Table 2

<table>
<thead>
<tr>
<th>DOC</th>
<th>Ward 1</th>
<th>Ward 1%</th>
<th>Ward 2</th>
<th>Ward 2%</th>
<th>Ward 3</th>
<th>Ward 3%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>281</td>
<td>19%</td>
<td>201</td>
<td>19%</td>
<td>49</td>
<td>8%</td>
<td>531</td>
<td>17.0%</td>
</tr>
<tr>
<td>2</td>
<td>370</td>
<td>25%</td>
<td>323</td>
<td>31%</td>
<td>203</td>
<td>34%</td>
<td>896</td>
<td>28.6%</td>
</tr>
<tr>
<td>3</td>
<td>479</td>
<td>32%</td>
<td>318</td>
<td>30%</td>
<td>252</td>
<td>43%</td>
<td>1049</td>
<td>33.5%</td>
</tr>
<tr>
<td>4</td>
<td>349</td>
<td>24%</td>
<td>214</td>
<td>20%</td>
<td>90</td>
<td>15%</td>
<td>653</td>
<td>20.9%</td>
</tr>
<tr>
<td>Total</td>
<td>1479</td>
<td>1056</td>
<td>594</td>
<td>3129</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3

<table>
<thead>
<tr>
<th>DOC</th>
<th>Ward 1</th>
<th>Ward 1%</th>
<th>Ward 2</th>
<th>Ward 2%</th>
<th>Ward 3</th>
<th>Ward 3%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1753</td>
<td>22%</td>
<td>1178</td>
<td>22%</td>
<td>483</td>
<td>13%</td>
<td>3414</td>
<td>20.1%</td>
</tr>
<tr>
<td>2</td>
<td>2208</td>
<td>28%</td>
<td>1875</td>
<td>35%</td>
<td>1451</td>
<td>40%</td>
<td>5534</td>
<td>32.5%</td>
</tr>
<tr>
<td>3</td>
<td>2250</td>
<td>28%</td>
<td>1468</td>
<td>27%</td>
<td>1188</td>
<td>33%</td>
<td>4906</td>
<td>28.8%</td>
</tr>
<tr>
<td>4</td>
<td>1759</td>
<td>22%</td>
<td>912</td>
<td>17%</td>
<td>494</td>
<td>14%</td>
<td>3165</td>
<td>18.6%</td>
</tr>
<tr>
<td>Total</td>
<td>7970</td>
<td>5433</td>
<td>3616</td>
<td>17019</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The low percentage of households in Ward 3 that contained both address and plot number was indicative of the ward composition in that this ward contained the growing industrial and warehouse districts. Inexpensive housing would have been provided for the general laborers, but the majority of these property owners lived elsewhere within the city, as will be shown in Part II. There were gaps in the census path that lacked enough
resident owners to pinpoint an address; this happened in several locations in Ward 3 and also occurred in one section of Ward 1 – an area in the flats known as Cleveland Centre. There were approximately one hundred and thirty households in this section of the census, mostly German and Irish, with very few corresponding address and plot records to anchor the points to the map. Due to its proximity to the river, this section of the flats was in a less than desirable area where recent immigrants and manual laborers would have resided, individuals who would not have owned real estate. Many of these were probably recent Irish immigrants who had arrived penniless fleeing from the Famine, and lived in what today would be termed “low income housing.” In order to map this area, I relied on another historical source to estimate household residence – a lithograph from 1851 showing Cleveland Centre and Ohio City (Kennedy, 1896, p. 260).

Cleveland Centre, a strip of land located near the present day Oxbow Bend, was parcelled into small lots in 1833 by land speculators James S. Clarke, Edmund Clark, and Richard Hilliard. The area is important to ethnic studies in that many Irish and German working-class immigrants lived there, and St. Mary’s on the Flats, the first Roman Catholic Church in Cleveland, was built in 1838 on the corner of Columbus and Girard Streets. In this area, warehouses occupied most of the land along the river on Merwin Street, and the peninsula of land was connected to Ohio City and Brooklyn Township by two of the three bridges spanning the Cuyahoga River at the time. The Columbus Street bridge, the first permanent bridge built across the Cuyahoga River, was the site of the infamous “bridge war” between Cleveland and Ohio City in 1836 (Campen, 1997; Dubelko, 2016). John W. Reps has written on the historical accuracy of bird’s-eye lithographs and the use of the drawings in recreating urban environments (DeBats, 2008,
Based on the lack of owner-occupied residences, the lithograph served as a secondary source to locate these one hundred thirty-one households to the north end of Cleveland Centre, with a few houses randomly spaced along Columbus Street (see Figure 3 and Figure 4).

As with any historical recreation, the accuracy of the original records must be taken into account. Having the luxury of tax records for Alexandria in which the assessor followed the same route every year, DeBats contends that the census records could prove unreliable for determining physical location. His supporting evidence is a city block map that shows owners from the tax records against individuals in the census path. Comparing the route of census taker to that of the tax assessor, DeBats determined that the order of census visitation and residence of the owner only coincided occasionally (DeBats, 2008, p. 27). Yet, in a previous paragraph, he contradicts this statement: “In some situations, the census order of visitation did follow the actual order of residence, and in those cases one can infer precise place of residence from the census order,” citing a reference to a rural analysis in Wisconsin, conducted by Michael P. Conzen who estimated that census order and plat book information overlapped about seventy-five percent of the time (DeBats, 2008, p. 26). DeBats relied primarily on the tax records to determine the place of residence. My argument is that, in Cleveland, as was probably the case in Alexandria, property was often owned by a person who did not reside in that building (such as hotels and rental units) and therefore would not be enumerated sequentially in that particular area of the census.
Figure 3. An 1851 view of Cleveland Centre and Ohio City looking north from Scranton Heights. The Columbus Road Bridge is on the left.

Figure 4. Cutout from the 1850 Ahaz Merchant map of Cleveland Centre. Notice that many of the available building lots as shown in Figure 3 were empty in 1851.
Another issue with accuracy that became evident was the surprisingly low number of individuals that could be successfully matched between the census and the city directory. The *General Business Directory for the City of Cleveland* (Smead & Cowles, 1850) was published towards the end of 1850 and the census survey for Cleveland’s three wards was conducted between July 15 and August 26, 1850. The census marshal was to record “the name of every person whose usual place of abode on the 1st day of June, 1850.”¹⁶ Both of these records were compiled within months of each other, and two of the three Cleveland wards were enumerated by the same person who compiled the directory, Isaac N. Mason. Yet, the high rate of people (thirty-eight percent) in the directory who were not found in the census was a little surprising, considering that the census was enumerated at essentially the same time the directory was being published (see Table 4). Spelling errors contributed to this error rate in that two similar individuals might not be potentially identified due to sharing a common name or simply gross misspellings. The directory contained primarily male listings, and it appears many individuals in the city did not participate, even though the general listing in the directory was free (see Figure 5) as shown in this ad from the July 8, 1850 *Cleveland Plain Dealer* (p. 3). Exploring this discrepancy and the potential under enumeration of the census would be a worthy project for another researcher.

¹⁶ See Appendix C for the instructions given to the census marshals regarding numbering households, families, and determining the residence where an individual lived.
Table 4

**Individuals in the 1850 Cleveland City Directory**

<table>
<thead>
<tr>
<th>Individuals</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total names in Directory</td>
<td>3281</td>
<td></td>
</tr>
<tr>
<td>Duplicate names</td>
<td>231</td>
<td></td>
</tr>
<tr>
<td>Total Individuals</td>
<td>3050</td>
<td></td>
</tr>
<tr>
<td>Found in census</td>
<td>1881</td>
<td>62%</td>
</tr>
<tr>
<td><strong>Not found</strong></td>
<td><strong>1169</strong></td>
<td><strong>38%</strong></td>
</tr>
</tbody>
</table>

Note. The high rate of individuals not correlated between the 1850 census and the city directory was unexpected. Additional research is needed to determine whether this was due to census underenumeration, the transient nature of general laborers, or errors in the spelling of names that prevented matching unique individuals.

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**Figure 5**. Advertisement for the Cleveland city directory. The general advertisement to have a name and occupation listed was free.

We have established that although street addresses were not a recorded census field until 1880, physical addresses for individuals in mid-nineteenth century cities can be accurately recreated by combining several different data sources to create a single record.
using the federal census as a foundation. Using this method, approximately eighty percent of the residents in 1850 Cleveland can be accurately located on a contemporary map, thus indicating that the census marshal’s path, at least in Cleveland, can be used in conjunction with other data sources for spatial HGIS mapping. These results are summarized in Figure 6. The first column is the list of houses numbered from the ward and the census taker’s path. This is the linear sequential path that the marshal followed during the course of his duty. The house address and street address were found in different sources; if there is an address, it came from the city directory while street name could have come from deed transfers or tax records. Keep in mind that the street and address may have belonged to a family member (i.e. a son or brother) if the head of household (HOH) was not in the directory records. The street addresses did follow an even/odd format, which did assist in determining which side of the street the house was on. The DOC column shows the accuracy rating of the address as based on the previous descriptions. Finally, the columns labeled Dir, Tax, and Deed document the different sources from which the information was obtained, which again correlates with the DOC accuracy. As a final example, Figure 7 shows a partial map of Ward 2 and the start and stop routes taken by the marshal over a four day period. These two examples clearly show that the census marshal followed a linear path from house to house, and that this path can be used to accurately recreate individual residences in 1850 Cleveland.
Figure 6. Sample of Cleveland Ward 1 census path combined with city directory and plat records.

<table>
<thead>
<tr>
<th>House ID</th>
<th>H Add</th>
<th>H Street</th>
<th>H Lot</th>
<th>H Sub</th>
<th>Notes</th>
<th>DOC</th>
<th>Elr</th>
<th>Tax</th>
<th>Deed</th>
<th>1980 ID</th>
<th>First</th>
<th>Last</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEI-0037</td>
<td>--</td>
<td>Prospect St</td>
<td>108 5</td>
<td>1</td>
<td>10738</td>
<td>1 x</td>
<td>1 x</td>
<td>John Hall</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0039</td>
<td>107</td>
<td>Prospect St</td>
<td>108 6</td>
<td>N</td>
<td>14466</td>
<td>1 x</td>
<td>1</td>
<td>Charles Leonard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0040</td>
<td>92</td>
<td>Prospect St</td>
<td>106 2</td>
<td>2</td>
<td>14026</td>
<td>1 x</td>
<td>1</td>
<td>Almer Howie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0041</td>
<td>90</td>
<td>Prospect St</td>
<td>106 1</td>
<td>2</td>
<td>14462</td>
<td>1 x</td>
<td>1</td>
<td>Andrew Keese</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0042</td>
<td>88</td>
<td>Prospect St</td>
<td>105 1</td>
<td>1</td>
<td>17130</td>
<td>1 x</td>
<td>1</td>
<td>George Smith</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0043</td>
<td>84</td>
<td>Prospect St</td>
<td>104 5</td>
<td>1</td>
<td>15214</td>
<td>1 x</td>
<td>1</td>
<td>Samuel Mather</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0044</td>
<td>80</td>
<td>Prospect St</td>
<td>103 1</td>
<td>2</td>
<td>11939</td>
<td>1 x</td>
<td>1</td>
<td>John Conlon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0045</td>
<td>82</td>
<td>Prospect St</td>
<td>103 1</td>
<td>2</td>
<td>14197</td>
<td>1 x</td>
<td>1</td>
<td>Abigail Wheeler</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0047</td>
<td>--</td>
<td>--</td>
<td>103 1</td>
<td>2</td>
<td>17683</td>
<td>1 x</td>
<td>1</td>
<td>H Thompson</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0048</td>
<td>78</td>
<td>--</td>
<td>103 1</td>
<td>2</td>
<td>14888</td>
<td>1 x</td>
<td>1</td>
<td>Levokie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0049</td>
<td>--</td>
<td>Prospect St</td>
<td>102 3</td>
<td>2</td>
<td>16797</td>
<td>1 x</td>
<td>1</td>
<td>William Sobies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0050</td>
<td>72</td>
<td>Prospect St</td>
<td>103 1</td>
<td>2</td>
<td>13192</td>
<td>1 x</td>
<td>1</td>
<td>J. Gillis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0051</td>
<td>--</td>
<td>--</td>
<td>103 1</td>
<td>2</td>
<td>16888</td>
<td>1 x</td>
<td>1</td>
<td>Siles Rhodes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLEI-0053</td>
<td>68</td>
<td>Prospect St</td>
<td>103 1</td>
<td>2</td>
<td>12397</td>
<td>1 x</td>
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**DOC1 = lot + address or lot + sub-lot**

**DOC2 = address or lot only**

**DOC3 = street only or between known addresses**

**DOC4 = transition or unknown**

**Multiple families at same location**
Figure 7. Diagram of the route taken by the census marshal in Cleveland’s Ward 2 between Aug. 12 and Aug 15, 1850. Circles show the start location while square boxes mark the end location for that section of the census path.

Part II: GIS Mapping Applied to 1850 Cleveland

There is ongoing debate in academic circles on whether true research should be data-driven or hypothesis-driven. Traditionalists would argue that if one needs to
formulate a hypothesis first, and then look for confirming data. Conversely, with the advent of big data and sophisticated analysis tools, researchers are free to explore new topics and ideas without being constrained by established ways of thinking. “Urban and national systems both tend to be data led. They are built because a significant body of data exists that it is believed will provide a valuable research resource in GIS form rather than to answer specific research questions” (Gregory & Healey, 2007, pp. 640-641). This project began with the intention of being data-driven, consolidating different historical data sources in the belief that eventually patterns would emerge that would prove to be a worthy subject to investigate. Yet, as with any project wrapped in assumptions, the proof is when one applies the findings to produce results. As stated, the primary goal of this project was to claim that by using a combination of census, directory, and plat records, one could successfully map where individuals lived in 1850 Cleveland. This section of the essay will expand on the secondary goal, which was to introduce additional attributes, connect these to an individual and house ID, and then present the results via spatial mapping, visually representing the demographic output. The following maps will substantiate the assumption that the census is a valuable tool for determining city residence by presenting a variety of possible applications for this type of research.

Since the original focus of this essay was ethnic studies, specifically the Irish, the first examples demonstrate how an individual can be tagged with an attribute, in this case the country of birth, and then how corresponding data can be plotted using GIS based on the household residence where the individual lived. Simply plotting points on a map would show where people lived, but would not identify the higher concentrations one would expect to see in an ethnic neighborhood. Multiple people living at the same
address would be represented by a single overlapping point, diluting the concentration of multiple individuals. Instead, the results can be shown in a kernel density map, which leverages integral GIS analysis tools for greater clarity. The density map calculates the density (quantity) of a feature (ethnicity) within a certain range (neighborhood) based on the spatial relationship of the locations, and then applies weight (color intensity) to show the areas of highest concentration. Figures 8 through 11 show basic density maps for the three largest ethnic groups in the city; since this was the antebellum period, a snapshot of the small black & mulatto\textsuperscript{17} population is also included. The maps plot the adult male population (eighteen years of age and older) for the year 1850, with the higher concentrations appearing as darker colors on the map. The key insight from this data-driven experiment was to identify where ethnic concentrations may have existed and, if different groups settled in different areas of the city, try to develop possible explanations for these spatial patterns.

A cursory review of Figure 8 shows that the Irish were primarily concentrated in the area along the East bank of the Cuyahoga River near the lake on River Street. Another concentration is located just south of this area at the Canal Basin including part of Cleveland Centre. This was to be expected in that most of the menial labor jobs available would be associated with the canal and lake transportation – unloading boats, transferring freight in and out of warehouse storage, and the loading the cargo back onto another boat. Also, Cleveland’s fledgling industries, consisting of several iron and brass

\textsuperscript{17} The census specifically recorded race as a survey question in the section titled Explanation of Schedule No. 1 – Free Inhabitants: “Under heading 6, entitled ‘Color,’ in all cases where the person is white, leave the space blank; in all cases where the person is black, insert the letter B; if mulatto, insert M. It is very desirable that these particulars be carefully regarded” (U. S. Census Bureau, 2015).
foundries, the Cleveland Gas Light and Coke Co., and the Cleveland, Columbus and
Cincinnati Rail Road Company’s car plant, were all located in the northwest corner of
Cleveland where the river empties into the lake. There were smaller concentrations of
Irish south of Public Square who were probably connected to the small businesses along
Superior Street, and even smaller pockets east and southeast of the city.

Figure 8. Irish Adult Population Density Map  Figure 9. German Adult Population Density

Figure 10. English Adult Population Density  Figure 11. Black Adult Population Density
Figure 9 shows that the German population density overlaps the Irish along the river, but they also had higher concentrations in different areas of the city. There were three distinct concentrations in Ward 3, one along the river and two other settlements north of Superior along Water (now W. 9th St) and Seneca (W. 3rd St.) streets. Assuming as DeBats set out to prove in regarding Warner’s hypothesis that industry can influence ethnic residential patterns (2008, pp. 81-83), one explanation is that the Germans had different occupations than the Irish, and had attained greater economic status that afforded them better housing in the higher terrain of Cleveland rather than the swampy marsh along the river. There was a large concentration of Germans living northeast of the city near Erie (E. 9th St.) and St. Clair and another southeast of the city, although here they were dispersed over a wider geographic area, something which will need to be further examined. Figure 10 shows the population density for those born in England. The English had smaller concentrations but appear to have been spread more evenly across the city. One assumption would be that the English had more cultural similarities and possibly stronger connections to Cleveland’s original settlers. Many of the English immigrants were Protestant, and would have shared a common social background with those from New England and the east coast who were also from English stock. Finally, Figure 11 shows the small black and mulatto population (two hundred and fifty-four individuals, sixty-six males) spread out over the city. This dispersion could be explained in that over fifty percent of the Black and Mulatto adult males who reported an occupation were employed as either cooks or waiters, and their general distribution would be tied to the location of the city’s hotels where they were often employed. There
is one concentration on Prospect St. with ten different adults or family units live in the same general area; these numbers and patterns of African Americans in the city would change drastically over the next several decades.

Although occupation is not the only factor that contributes to socioeconomic status or prestige, there is certainly a correlation between one’s job, social class, and wealth. Occupation is a field that could be used in a variety of ways, such as estimating the social status of the individual or measuring occupational mobility. In the next example, occupational status will be compared to the value of real estate reported in the census and attached to the individuals to determine if the Irish and German ethnic densities were primarily inhabited by home owners or tenants and boarders. First, the occupations would need to be classified by status. This was accomplished using the “Occupational Coding Guidelines” from IPUMS (U. S. Census Bureau, 2015) and also “Social Grading of Occupations,” which followed the Registrar General’s occupation grading for the UK (Hall & Jones, 1950). Occupations were graded into five categories as shown from the examples in Table 5.

Table 5

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Categorization of the occupations listed was fairly straightforward; however, there was some uncertainty among lower skill level jobs. When unsure of the proper category, the following guideline was followed: “The distinction between skilled and semi-skilled or unskilled manual work is not always easy to draw. If a trade has no special name it is as a rule safe not to class it as skilled. Skilled work requires special training, adaptability, and responsibility for the process and material on which a man is engaged” (Hall & Jones, 1950, p. 34). A spatial map of the occupations held by the Irish coded by occupational status is shown in Figure 12.

Figure 12. Occupational status classification for Irish adult males.
Comparing Figure 12 to Figure 13, one can see that where the highest density of Irish lived along the Cuyahoga River, there is a noticeable lack of property owners – they were essentially all renters or boarders. The one lone Irish property owner on Water Street was Patrick Farley, one of the early Irish transplants who made Cleveland his new home (Orth, 1910, p. 115). In fact, the value of Farley’s real estate, $5,000, was actually the highest of all of the Irish in the city. This is in comparison to early settler Leonard Case who reported real estate holdings of $200,000. Only fifty-nine Irish males reported any real estate value to the census enumerator (as did four females), with a value ranging between $100 and $5,000. These maps show that the Irish, in general, held low or

Figure 13. Irish adults reporting real estate. The largest circle represents $5,000 while the smallest circles represent $100, which would usually indicate a parcel of land with no house or other improvements.
unskilled job, were for the most part renters or boarders, and those seven percent of adult males who actually did own property had an average real estate valued at less than $865. So how did the Irish compare with the Germans, the other major ethnic group in Cleveland? From Figure 14, one can see that the German population had migrated to different areas of the city than had the Irish. Following the same process, we will examine if occupation and real estate value (as a sign of wealth) may have coincided with these areas of density. Figures 14 shows the German population density compared to those with occupations classified as “skilled” in Figure 15, which accounts for almost sixty percent of the German male occupational status. Jobs in this category would include bakers and butchers, carpenters and cabinet makers, blacksmiths and coopers, grocers and peddlers, masons and merchants, tailors and shoemakers. These are occupations that today would be classified as “middle class.” Figure 15 shows that the areas of highest population density are also areas where a large proportion of skilled German workers lived. The question is, were these middle class workers able to afford to purchase land and build their own houses or were they also tenants?
Figure 14. German adult male core density locations.

Figure 15: German adult males with skilled occupations (red).
Figure 16 answers this question; Germans were beginning to buy property and build houses on the outer edges of the city, which would also indicate the early beginnings for defining ethnic German neighborhoods. Interestingly, most of those who lived in the business district north of Superior did not own real estate, although there were concentrations of skilled workers along Seneca. A quick review of the census information for this area shows skilled workers typically living together, often in the company of others sharing the same occupation. This could indicate that they were boarders living at the store or shop where they were employed, although further analysis would be needed to identify and map these small businesses and compare addresses to the households where these workers lived. These spatial maps show a clear social stratification between the German and Irish groups in the city: the Germans had attained middle class status and were moving up the socioeconomic ladder. And while the average value of real estate reported was only slightly higher than the Irish ($871 vs. $865), twenty-two percent of German adult males owned some property, a clear indication that they were better off as a group. One final observation: although a number of German and Irish laborers lived along the river, Figure 13 and Figure 16 show these building were owned by individuals who lived elsewhere and rented these properties to the newly arrived immigrants, both Irish and German.
Figure 16. German adults who reported some value of real estate in the census.
Conclusion

What began as a quest to locate a few ancestors turned into a journey to uncover the secrets left behind by the first generation of Irish to settle in Cleveland. The key to unlocking their mysteries was found through a creative method for using current technology to paint a picture of where, when, and why the ethnic groups in Cleveland settled in certain areas of the city. This project has shown that by using a combination of the city directory for street address, tax and plat records to anchor a location, and the census to fill in the blanks, one can successfully identify where people lived in 1850 Cleveland with a high degree of accuracy. Once the physical location of the household has been determined, individuals can be spatially mapped onto an 1850 map of the city using GIS software. Since GIS is essentially a database that is georeferenced to static coordinates, other attributes associated with these individuals can also be attached to the map, opening up a whole new opportunity for research into the social, cultural, economic, and political history of nineteenth century cities like Cleveland. “In the historical world, however, the scarcity of places fully mapped at the individual level remains a limiting feature for the spatial analysis of past communities” (DeBats, 2008, p. 17). Now that the difficult work has been done, Cleveland joins the ranks of one of these few cities that is primed for further studies. This is just the beginning. As the ancient Chinese proverb states, “A journey of a thousand miles begins with a single step,” so too the journey to unravel the mysteries of the thousands of Irish who walked through the city of Cleveland begins with a single GIS database.
References


Appendix A: Transcription and GIS Mapping process

Transcription process: The city of Cleveland in 1850 was divided into three separate wards (see Figure 1). Ohio City and her 6,365 residents, many of them also Irish and German immigrants, would not become part of Cleveland until annexed in 1854. Census records for the three Cleveland wards were manually transcribed and entered into Excel spreadsheets. The unique data sets that were recorded for each of these individuals include: full name, age, sex, race, house and family number (multiple families could share a common household), value of any real estate, occupation, country of birth, and whether the individual could read and/or write. Each person was then assigned a unique individual ID and associated with a physical location via the house number. Heads of household were determined by examining the family unit, and families were assembled based on parents and children sharing a common surname. A similar transcription process was implemented for the 1850-51 Cleveland city directory. The social inventory for this dataset, while not all-inclusive, included the individual’s name, occupation, street number and address, and occasionally employer name and address. Coincidentally, the person responsible for compiling the city directory, Isaac N. Mason, was also the same Assistant Census Marshal responsible for Wards 1 and 2 in the 1850 Census, and was the first individual listed in the 1850 Ward 1 census (Smead & Cowles, 1850, p. 3). These 3,050 names were transcribed and entered into Excel and then cross-

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18 The actual population of Ohio City was smaller than the number reported in the 1850 census. S. O. Griswold reports that the census marshal was confused regarding the boundary lines and counted all of Brooklyn as Ohio City. (1888, pp. 310-311).

19 1850-1851 General Business Directory for the City of Cleveland was published by Smead & Cowles. Other Cleveland City Business Directories were published in 1837, 1845-46, 1846-47, 1848-49, 1850-51, 1852-53, 1856, 1857, 1859-60, 1861-62, and then from 1863 onward (cpl.org, 2011). Many of these are available online although those after 1850 have not been transcribed.
referenced with the census information to manually identify and merge individual records. Once this was completed, sequential address cluster patterns began to emerge on the census list, indicating that the census marshal had most probably followed a direct linear path while interviewing. It also became apparent at this time that locating the residence would prove more beneficial, and so each house was also assigned a unique identifying ID. Associating an individual with a physical household would allow multiple people to be associated with a single data point (the house), and as they moved, their future residence could be tracked to show urban migration patterns and ethnic neighborhood development.

*Anchor with plat records:* The next challenge to be solved involved georeferencing the address to a physical location based on a contemporary map of Cleveland. The Ahaz Merchant 1850 map could be used for street locations, but a permanent logical address scheme would not be fully implemented until 1906. In the meantime, addresses changed regularly as new buildings were built between existing structures. Urban growth and catastrophic fires also changed the urban landscape, while new streets were continually added and then names of old streets changed. Some streets didn’t have addresses, and other small streets were not even listed on the maps. The only directions provided regarding the numbering of street addresses was a vague reference in the 1837 city directory:

The numbers of houses are regulated as follows: In all streets running parallel with Superior street, except Champlain and Michigan streets, the numbers commence at the west ends; in Superior lane the numbers commence at the foot of Superior street; in Merwin street, at Superior lane; in River street, at Union lane; Water street and Bank street, at the south ends; Prospect street
and Rockland street commence at the Public Square; and all streets running
across Superior street, parallel with and including Seneca street, are
considered to terminate at Lake Erie; the numbers in Champlain and
Michigan streets commence at Ontario street (MacCabe, 1837).

The one constant that could be used to anchor a point permanently was the original plat
record. On July 22, 1796, Moses Cleaveland, a shareholder in the Connecticut Land
Company which had purchased land in the Western Reserve, arrived at the mouth of the
Cuyahoga River to establish the a city that would be the capital of this new territory. His
team of surveyors laid out the county and a new town, including a 10-acre Public Square,
located on the high ground overlooking Lake Erie and the Cuyahoga River. The original
city plots were each two acres while the outlying lots east and south of the city were ten
acres apiece, and most were originally purchased by east coast investors who had no
intention of moving to the Western Reserve. As these plots were divided, and subdivided
again, all deed transfers were recorded by the County and are available online (Cuyahoga
County Fiscal Office, 2017).

GIS Mapping process: I chose the program Maptitude, a mapping software
program created by the Caliper Corporation, primarily because they offered a free $650
software license to students. Maptitude is primarily intended for business users, while it
does have the option for mapping and analysis of custom external data, the tool was not
necessarily designed as a Historical GIS tool. The first challenge was to recreate 1850

20 Deed records were found by searching the Cuyahoga County Recording Division, a branch of the
are available beginning July 14, 1810.
Cleveland in the mapping program, since antebellum Cleveland was geographically very different then today. Urban sprawl and development have changed the landscape and erased neighborhoods, as evidenced by the streets that used to occupy the areas surrounding the Terminal Tower and the Gateway complex. Maptitude has the functionality to overlay different maps or pictures onto the current map. After the map was sized and rotated to the correct angle, modern day reference points were identified and linked to identical points in the old map. Overlaying maps onto Maptitude and geocoding the coordinates for 1850 households will simplify future expansion by allowing the addition of future city maps without having to change the original reference points, so that migration patterns can be plotted as the city expands. Maptitude has the ability to manually pinpoint a location by physically placing it on the map and then exporting the location’s longitude and latitude into an Excel file. Once the house locations were identified, the exported latitude and longitude coordinated were then used in a lookup table to identify the physical location for all residents of that household.
Appendix B: Deed and Tax Records

The following picture shows an example of a deed transfer recording. The legal description would typically begin with a reference to its location in Cleveland, being “number seven in the twelfth range of townships in the Connecticut Western Reserve in the State of Ohio,” and then identify the original lot number followed by a detailed plot description (see Figure 17).

![Figure 17. Partial example of a deed transfer record.](image)

Tax duplicate records are available at the Cuyahoga County Archives and also online at Ancestry.com. The tax assessor recorded the owner’s name, the original allotment number, a subdivision number (if the original property had been divided), a description of the property, the street that the property fronted, and the assessed value of the property (see Figure 18).
Taxes were assessed based on millage at different rates for the State of Ohio, roads, schools, and the city of residence. A notice in the *Plain Dealer* on October 2, 1850, provided the state and local tax rates for Cuyahoga County. An individual living in the City of Cleveland would pay the following tax rates (see Table 6 and Figure 19):

Table 6

<table>
<thead>
<tr>
<th>Cleveland City Tax Rate for 1850</th>
</tr>
</thead>
<tbody>
<tr>
<td>State and Canal Tax                                           3 1/5 mills</td>
</tr>
<tr>
<td>County Bridge and School Tax                                  2 2/5 mills</td>
</tr>
<tr>
<td><strong>Cleveland City</strong></td>
</tr>
<tr>
<td>City purposes                                                 4 3/5 mills</td>
</tr>
<tr>
<td>Railroad purposes                                             2 2/5 mills</td>
</tr>
<tr>
<td>Township purposes                                             1 1/5 mills</td>
</tr>
<tr>
<td>Road purposes                                                 0 ¾ mills</td>
</tr>
<tr>
<td><strong>Total millage</strong>                                             <strong>14.55 mills</strong></td>
</tr>
</tbody>
</table>

*Note.* Millage transcribed from the treasurer’s report in Figure 19.
Treasurer’s Notice.

In conformity with the statutes of Ohio, prescribing the duties of County Treasurer, I hereby give notice that the Taxes levied in the county of Cuyahoga, for the year 1850 on each dollar valuation on the County Duplicate, are as follows, to wit:

For State and Canal Tax
- 3 1-2 Mills.

County Bridge and School Tax
- 2 2-3 "

And for Township purposes, as follows:

Dover, - - - - 1 Mill.
Olmsted, - - - - 1 1-2 Mills.
Rockport, - - - - 2-3 "
Middletown, - - - - 1 2-3 "
Strongsville, - - - - 1 2-3 "
Brookline - - - - 1 2-3 "
Orrville - - - 1 mill.
Royatton, - - - 2-3 mills.
Newburgh, - - - 4-3 "
Independence, - - - 4-3 "
Brecksville, - - - 4-3 "
East, - - - 1 mill.
Warrensville, - - - 3-5 mills.
Bedford, - - - - 1 4-5 "
Mayfield, - - - 2-3 "
Orange, - - - 3-5 "
Solon, - - - 3-5 "
Chagrin Falls, - - - 1 2-3 "
East Cleveland, - - - 2-5 "

Cleveland City:

City purposes, - - - 3 1-2 "
Railroad do. - - - 2 2-3 "
Township do. - - - 1 1-5 "
Road do. - - - 3-4 "

Ohio City:

City purposes, - - - 2 "
Township do. - - - 1 2-3 "
Road do. - - - 3-4 "

The Treasurer, or his Deputy, will attend at the Court House, in the City of Cleveland, during the months of October, November, and until the 24th day of December, for the purpose of receiving taxes.

G. C. DODGE, Treasurer of Cuyahoga County.

Treasurer’s Office, Cuyahoga Co., Sept. 20th, 1850.

Figure 19. October 2, 1850 Cleveland Plain Dealer notice showing state and county tax rates for 1850 (p. 3).
Appendix C: 1850 Census: Instructions to Marshals and Assistant Marshals

1. Under heading 1, entitled "Dwelling houses numbered in the order of visitation," insert the number of dwelling houses occupied by free inhabitants, as they are visited. The first house visited to be numbered 1; the second visited, 2; the third one visited, 3; and so on to the last house visited in the subdivision. By a dwelling house is meant a separate inhabited tenement, containing one or more families under one roof. Where several tenements are in one block, with walls either of brick or wood to divide them, having separate entrances, they are each to be numbered as separate houses; but where not so divided, they are to be numbered as one house.

If a house is used partly for a store, shop, or for other purposes, and partly for a dwelling house, it is to be numbered as a dwelling house. Hotels, poorhouses, garrisons, hospitals, asylums, jails, penitentiaries, and other similar institutions, are each to be numbered as a dwelling house; where the house is of a public nature, as above, write perpendicularly under the number, in said column, the name or description, as "hotel," "poorhouse," etc.

2. Under heading 2, entitled "Families numbered in the order of visitation," insert the number of the families of free persons as they are visited. The first family visited by the assistant marshal is to be numbered 1; the second one visited, 2; and so on to the last one visited in his district.

   a) By the term family is meant, either one person living separately in a house, or a part of a house, and providing for him or herself, or several persons living together in a

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house, or in part of a house, upon one common means of support, and separately from others in similar circumstances. A widow living alone and separately providing for herself, or 200 individuals living together and provided for by a common head, should each be numbered as one family.

b) The resident inmates of a hotel, jail, garrison, hospital, an asylum, or other similar institution, should be reckoned as one family.

3. Under heading 3, entitled, "The name of every person whose usual place of abode on the 1st day of June, 1850, was in this family," insert the name of every free person in each family, of every age, including the names of those temporarily absent, as well as those that were at home on that day. The names of every member of a family who may have died since the 1st day of June is to be entered and described as if living, but the name of any person born since the 1st day of June is to be omitted. The names are to be written beginning with the father and mother; or if either, or both, be dead, begin with some other ostensible head of the family; to be followed, as far as practicable, with the name of the oldest child residing at home, then the next oldest, and so on to the youngest, then the other inmates, lodgers and borders, laborers, domestics, and servants.

All landlords, jailors [sic], superintendents of poorhouses, garrisons, hospitals, asylums, and other similar institutions, are to be considered as heads of their respective families, and the inmates under their care to be registered as members thereof, and the details concerning each designated in their proper columns.

Indians not taxed are not to be enumerated in this or any other schedule.
By place of abode is meant the house or usual lodging place of a person. Anyone who is temporarily absent on a journey, or for other purposes, without taking up his place of residence elsewhere, and with the intention of returning again, is to be considered a member of the family which the assistant marshal is enumerating.

Students in colleges, academies, or schools, when absent from the families to which they belong, are to be enumerated only as members of the family in which they usually boarded and lodged on the 1st day of June.

Assistant marshals are directed to make inquiry at all stores, shops, eating houses, and other similar places, and take the name and description of every person who usually slept there, provided such person is not otherwise enumerated.

Inquiries are to be made at every dwelling house, or of the head of every family. Those only who belong to such family, and consider it their home or usual place of abode, whether present or temporarily absent on a visit, journey, or a voyage, are to be enumerated. Persons on board of vessels accidentally or temporarily in port, temporarily boarding for a few days at a sailors boarding or lodging house, if they belong to other places are not to be enumerated as the population of a place.