Appendix for Flâneur: Sources & GIS Mapping Techniques

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In conjunction with a wonderful team of GIS specialists, we combined demographic, economic, and occupational information to create maps of early National Philadelphia from three types of records: federal censuses, city directories, and state tax lists. We computerized the 1790 US Census and the 1791 Philadelphia City Directory, both of which registered people in the city and its suburbs of Southwark and the Northern Liberties. (Matt Ainsley generously makes the 1791 data available on his website, http://mysite.verizon.net/handworn/). We also entered data from a sample of 60% of taxpayers lining in the downtown wards in 1789. Names, addresses, occupations, number and composition of households, tax brackets, gender, and race were among the attributes used for the present study.[1]

We matched individuals among the three data sets, using both a name-matching program and, in questionable cases, doing it by hand. All of these, needless to say, are time-consuming tasks. We then developed a unique identifying code (UID) for each address (or structure), allowing for various householders living in a single house to be linked to one structure as identified by the address. The result was a single dataset containing information about approximately 50,000 residents in 1789, 1790, and 1791. We will make this dataset and a gaggle of maps available for any scholar or layperson to use free on the project's website:

http://mappinghistoricphiladelphia.org/home.html.

An incredibly important team at Montana State University helped translate the data to maps using GIS software. We thank Professor Stuart Challender, Alex Schwab, Tara Chesley-

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[1] Clement Biddle, *The Philadelphia Directory* (Philadelphia, 1791), available in the Library Company of Philadelphia. U.S. Bureau of the Census, *Heads of Families of the First Census of the United States taken in the Year 1790: Pennsylvania* (Washington, D.C., 1908). The 1789 Provincial Tax List is in the Philadelphia City Archives. All of the dozen city directories in the 1790s and early 1800s are available online.

Preston, and Alice Hecht for bringing their expertise in GIS to this project, both in the past and the present, as well as for working so hard and with such enthusiasm.

In 1796, John Hills drew an incredibly detailed and precise map of the city that we used for the background in the computer-generated maps in the project.[2] We based our addresses on the 1791 City Directory. Probably because it was linked at the time with the 1790 census conducted the previous year and benefitted from the work of those officials, the 1791 directory is one of the most inclusive, accurate city directories in the 1790s. Although several directories exist for 1785, it was not until 1791 that address began to assume consistency.

To our surprise and delight, superimposing modern street centerlines on the 1796 map showed little deviation from William Penn's original layout of the city or even from the streets in downtown Philadelphia today. Of course, streets and alleys have been destroyed by landfill and other projects, and while other streets have appeared, and a few were added or changed their names. Fortunately, name changes are indicated in the beginning of most directories. For most of streets still in existence, however, relatively little has changed since Hills created his original map—good news for our GIS project.

One of the most difficult but most crucial steps was identify the addresses that Philadelphians used on street corners (see maps of the corner addresses in separate files). Unlike modern numbering systems, individual blocks do not progress by 100, 200, 300, and the like. Instead, structures were numbered to the corner (say, 69 North Third), and then the succeeding number was used across the street at the next corner (e.g. 71 North Third). The 1791 directory indicates the numbers of some corners. A directory in the mid-1790s recorded a block-by-block directory (rather than alphabetized by last name), which provided even more data. We also

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[2] John Hills, 1797, Wheat and Brun no. 468, Library of Congress, Washington, D.C.

undertook computerized searches of Philadelphia newspapers to fill in yet more street corner addresses. We have are confident that we have located the vast majority (at least 90%) of the residents in the correct blocks, if not always in the *exact* spot (since the latter information is not available). The city finally adopted a modernized, standardized street numbering scheme in early nineteenth century.

We also computerized the 1801 city directory, which was recorded block-by-block, easing some of our difficulties of locating addresses correctly. We will make the 1801 and the 1795 city directory available online as well. We are hoping to enter data for the 1800 census as well, although other projects (or the Grim Reaper) may claim us first.

One of the primary problems of this kind of data is that the male takers of the censuses and city directories, either through personal bias or to fulfill the purpose of recording the information (or because residents refused to be indentified), missed a number of householders and people. It is certain that most of the "missed" (who do not show up in our datasets) were the poor, women, and black residents. We have filled in some data with other records. For example, we supplemented both the 1791 and the 1801 directories with information from the censuses of 1790 and 1800. In addition, heads of households—the category used in the directories and censuses—hide many other of the same types of people who were *within* the household.

Early American historians have not had the same luxury as scholars working in more recent periods of American history, especially from the mid-nineteenth century onward, to utilize GIS as a tool to visualize data. However, the difficulties associated with the process of using the technology are not limited to any particular sub-field within the discipline. Still, Early American historians face certain hurdles that others working in later eras are less likely to encounter. First,

and most obvious, is the availability of historical data, which for those working in the Early

Modern period is frequently a problem. Moreover, since history tracks change over time (or the

lack thereof), gaps in the historical record are clearly an associated dilemma. Furthermore, for

GIS to work most effectively, the ability to define exact locations is crucial. Yet, even relatively

large early American cities like Philadelphia did not necessarily have standardized street

addresses until the time of the Civil War.[3]

For all historians, the decision to undertake a GIS-based project is a difficult one,

particularly if the historian alone will ultimately do all the work. While historians of modern eras

often can obtain the necessary data in a useful digital format (usually as spreadsheets), there is

still the significant hurdle of learning GIS software. Furthermore, the industry-standard package

used by GIS professionals is quite expensive indeed. If a scholar resides at a university that

teaches GIS, a site license can be acquired with little expense, but those without such affiliations

are effectively shut out. Most significant, however, is the time spent away from other academic

pursuits, such as writing. One solution to this problem is interdisciplinary collaboration.[4]

Historians who teach at institutions that offer GIS programs can collaborate with

colleagues in those departments. Collection of data remains the purview of the historian, while

GIS instructors and their students handle the technical process. The benefit for both historians

GIS departments is clear: GIS students get experience working on real-world projects and

historians can use the time otherwise spent learning software to analyze the maps that are

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[3] One visible and successful ongoing Historical GIS work is The Spatial History Project at Stanford University, whose projects fall within this timeframe: http://www.stanford.edu/group/spatialhistory/cgi-bin/site/index.php.
[4] ESRI, the company that produces the industry-standard ArcGIS software, does offers a free-to-use online version. While anyone can produce maps, the ability to query a dataset in order to produce many different maps from the same dataset on-demand does not exist in the free version. Moreover, the amount of data that any single map can contain is limited and program performance can vary simply based on the speed and stability of one's internet connection. Thus, it is not useful as a tool for historians interested in complex uses of demographic information.

produced. Furthermore, collaborative efforts also foster interdisciplinary learning. The historian will learn how to use the powerful querying features of the GIS software, which requires only a minimal time commitment, and the technologically-minded GIS students (and their professors) will learn some history. Of course, collaboration need not be restricted to other disciplines. Early American historians engaged in a GIS project can certainly partner with one or two of colleagues in their own field.