Historical Cadastral Maps
for
Locating and Sizing Old Jewish Cemeteries

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[Slide 1] In her talk on this panel, Dr. Caroline Sturdy Colls has given an excellent overview of advances in the use of technology to examine historical Jewish cemeteries, from her experiences at the Centre for Archaeology at Staffordshire University. Those methods include both desk-based analysis and field work, ranging from exploitation of surviving evidence to new adaptations and developments in instrumentation and computational methods, to locate Jewish cemeteries and even individual stone markers. My talk will cover one small part of that range, the use of historical cadastral maps for locating and sizing old Jewish cemeteries, using accessible archival records and simple digital tools available to everyone.

[Slide 2] Before discussing the methods, I should first explain what a (historical) cadastral map is. A cadastre (or cadaster) is a survey of land and recording of its features, usually for the purpose of taxation. Typical cadastral surveys result in carefully-rendered maps, plus registers of land (and building) ownership and quality, measured however the local authority values private and public property. All governments in Europe and North America use cadastral surveys to regulate fair taxation today, but the system has also been in general use on those continents for more than a century, in one form or another. In my work for Gesher Galicia, I use cadastral maps from the 19th century to help historians study demographics and family history in towns of the former Austrian Empire, but the same maps can also be used for other purposes, such as studying the evolution of Jewish cemeteries.

Original paper copies of historical cadastral maps can be found in national archives and libraries of Europe, in regional and local land survey offices, and occasionally in private collections. Digital scans of these maps can also be found on the websites of the national archives and libraries, as well as a few specialist websites.

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Why should historical cadastral maps be part of a researcher's toolbox for defining the boundaries of old Jewish cemeteries? Partly because of their precision; many traditional sources of geographic information about cemeteries (Yizkor books, memory maps, and the recollections of local residents) are imprecise or simply wrong. Partly because many current online sources are incomplete or repeat earlier errors. And primarily because few other available records precisely define cemetery boundaries.

Historical cadastral maps may have some of these same limitations, but even where imperfect can often supplement other sources to help develop a useful picture of cemetery boundaries.

[Slide 3] Historical cadastral maps were produced in much of Europe in the past two centuries. Driven by technical advances by the French, surveyors working for the Habsburgs documented the entire Austro-Hungarian Empire more than once in the 19th century, and surveys continued as land ownership changed and exploitation progressed. The maps were refined in stages from initial field sketches to accompany the survey measurements, through intermediate sketches with improved accuracy, to final-state lithographed maps of high accuracy. Most surveys were revised several times over the decades, so that many towns were documented three or more times. But only a fraction of the original maps have survived; for most towns, only a single map is available now, and for some towns, none.

A primary reason for using historical cadastral maps for Jewish cemetery research is the accuracy of the maps. In most cases, the surveying and cartography were conducted under strict controls and using technology which is hardly surpassed today. The paper maps were produced at high scale, typically 1:2880, so that small landscape features could be rendered in forms recognizable to pedestrians on the land. At the usual scale, the width of typical fine boundary lines on the maps represents a land dimension of 1~2m, giving very useful precision for later study.

The accuracy of the original lithographed paper maps was compromised by original survey errors, map production (cartography) errors, and more recently by paper distortion due to moisture, storage, and handling. Early-stage sketch maps are typically much less accurate, though still valuable for relative position of features and boundaries. When working with digitized versions of these maps, additional distortions are introduced from scanning or other imaging methods. In studies of geo-referencing accuracy of historical cadastral maps, total error bounds of 15~20m are quoted, but the relative accuracy of boundaries referenced to nearby permanent geographic features is much better; when a corner or edge of a cemetery can be accurately fixed, often the entire boundary is accurate to a few meters.

[Slide 4] How does one find a Jewish cemetery on a historical cadastral map? The representations vary, but for standard maps from the Austrian Empire, they usual key is to look for a triangle (Δ). 19th-century legends produced in several languages to explain the use of symbols on the maps usually depicted Jewish cemeteries with a triangle, to distinguish them from Christian cemeteries depicted with a cross.

[Slide 5] Depictions of Jewish cemeteries on imperial cadastral maps can be divided into "classical" and "variant" representations. The typical or "classical" depiction on the map is one or more triangles within the boundary of the cemetery; the excerpts here from six different maps show some of the range. Even in the "classical" depictions, one can see the perspective of the imperial culture: while Catholic cemeteries are colored white, designating them as land useful for no other purpose, Jewish cemeteries are colored green, representing agricultural value; on the map of Leżajsk, the cemetery is labeled *ogrody* (gardens), and on the map of Milevsko, the Jewish cemetery is marked with a *W*, indicating land suitable for livestock grazing.

[Slide 6] Despite strong oversight of all aspects of Austrian imperial administration, the depiction of Jewish cemeteries on cadastral maps was far from uniform. Especially in later maps, the triangle symbol gave way to a rounded symbol more representative of typical Jewish matzevot, either alongside triangles or alone. Borrowing from the association with building materials in the map legend, sometimes the symbolic stones were colored pink. And when cartographers were inclined and had time, in a few cases ancient Jewish cemeteries were depicted as romantic ruins with leaning stones and overgrown vegetation. But less artistically-inclined cartographers sometimes designated Jewish cemeteries with only words, as in the map for Żurów, "Israelitische friedhof".

[Slide 7] Tools to enable the use of historical cadastral maps in Jewish cemetery research can be very simple or very powerful; for many projects, the simple tools are more than adequate. In general the goal is to geo-reference and overlay the historical map on a representation of the modern geography, so that historical boundaries can be identified on the modern landscape. For initial orientation, scaling, and alignment, simple tools such as Google Earth are quite useful. Land view satellite images linked to internet mapping tools such as Google Maps and Bing Maps are valuable; in many regions it is helpful to compare images from several services, as the quality varies widely. More powerful tools such as GIS can be used to add analytic capability, but often the visual graphics and GPS coordinates of the simple tools are sufficient.

[Slide 8] The geo-referencing step can be accomplished using precise corner coordinates and reference data from the historical maps. For many researchers, however, the graphical accuracy of historical cadastral maps means a simple visual alignment of permanent landscape features between the map and satellite images allows easy but fairly precise referencing of cemetery boundaries to modern geography without the need for special software.

[Slides 9~19] A good first example is the old (first) Jewish cemetery of Sokołów Małopolski in south-east Poland, formerly part of Austrian Galicia. The history of this cemetery is well documented, and does not require mapping or special technology to define, but it makes for a good visual demonstration of how historical maps can be useful. In this sequence of images, an 1853 cadastral map of the town is layered on a modern satellite image from Google Maps, and visually aligned using Photoshop Elements, an inexpensive image manipulation program. Then the transparency of the historical map is increased in steps to reveal the modern town. As the satellite image appears, the old market square evolves into a city park, the roads become paved streets, and, unfortunately, the old Jewish cemetery (marked *Ogrody* on the map) becomes an industrial site. [Note: the image quality in this presentation has been reduced to keep the file size of the pdf small; the actual map scan images are good resolution, so the map is visually sharp.]

[Slide 20] As noted earlier, governments track changes in property ownership and boundaries in their maps and registers. Sometimes original historical maps are used to directly record changes over time, as in this example from Ulanów, also in south-east Poland today. When the original map was surveyed and lithographed in 1853, the Jewish cemetery was a boxy L-shape, shown green and with trees. The red lines around the original black-line cemetery boundary on this map copy show the new boundaries of the cemetery following additions made sometime after 1853; by then, the cemetery had doubled in area, and had become a large rectangle. In the image to the right, a Bing Maps satellite image shows the same cemetery, with the same boundaries barely visible through the trees. A few years ago my wife and I walked this cemetery, which is quite large and well-kept, and still retains a number of matzevot.

[Slides 21~36] The same method can be used to locate and size cemeteries which are otherwise undocumented, or where the existing documentation is spare or conflicting. An example is the Jewish cemetery of Hrymailiv in western Ukraine, formerly Grzymałów in Austrian Galicia. At the time of this conference in October 2015, descriptions of this cemetery are weak or non-existent on key reference sites of Jewish heritage, including those of the US Commission for the Preservation

of America's Heritage Abroad, the IAJGS International Jewish Cemetery Project, and Virtual Shtetl. On a visit to the town with my wife in 2011, we learned the cemetery was used as an informal park and walking path for local townspeople, unfenced and with no surviving matzevot.

Several historical cadastral maps of Hrymailiv are preserved in state archives in Ukraine; three of those still include sheets which document the Jewish cemetery. In this series of slides, I have layered maps from 1828, 1861, and about 1910 on a modern satellite image from Bing Maps, to show the evolution of the cemetery boundaries. In 1828, the cemetery is nearly square in shape. Before 1861, a small trapezoidal land parcel was added at the north of the original cemetery. By about 1910, a long finger of land had been added to the northwest. Today, houses and gardens occupy much of the original land of the Jewish cemetery; the informal park occupies only the northern additions. This conflicts with at least one recent report on the cemetery, which says that "within the limits of the cemetery are no structures."

[Slide 37] Historical cadastral maps are valuable to cemetery research because of their accuracy and their high scale, showing land features in great detail. But in many parts of Europe there are no surviving historical cadastral maps, or none were ever created. Then other mapping methods may be useful, as Dr. Sturdy Colls has described. Larger cemeteries may be noted with good relative accuracy on maps of lower scale, including street maps or, as shown on this slide, a large series of military maps. Here, the third military survey of the Austrian Empire documented land and building features important to strategic defense work, which in the late 19th century included Kraków's new Jewish cemetery, today known as the Miodowa cemetery.

[Slide 38] Of course there are many other resources which can provide images for this same kind of simple overlay-and-compare work; a few examples are shown here. In the upper row are images which were useful for examining the old (first) Jewish cemetery in my wife's ancestral town of Rohatyn, today in western Ukraine. At left is an excerpt of an 1846 cadastral field sketch of Rohatyn, showing the Jewish cemetery at one side of a prominent hill called "Jerusalem". As a field sketch, the geographic accuracy of the drawn boundaries and features was quite poor, but much of the distortion could be removed by aligning and adjusting the sketch to recognizable fixed features in the modern town. In the center is a preliminary cadastral sketch of the cemetery from a 1921 property change record, showing a proposed boundary adjustment; again, this sketch is not accurate, but the shapes of the areas and several of the boundary corners can be used to rectify the image. At the right is an excerpt from one of many aerial photographs taken by Luftwaffe pilots during the last year of German wartime control of the region, and which have survived in archives in the US and elsewhere; the old Jewish cemetery of Rohatyn is shown clearly, with good accuracy, and with many other land features useful for alignment and verification.

In the lower row are two images of Rohatyn's new (second) Jewish cemetery, which dates from the 1920s. At left is a panorama photograph taken this year (2015), showing only post-war memorials placed there by Jewish descendants. At right is another excerpt from the 1944 Luftwaffe photographs, clearly showing the new cemetery and its boundaries in that year.

[Slide 39] Here I will end with a few internet links to resources for cemetery research and for information about historical cadastral maps.