

University of Groningen

Mapping Medieval Leiden

van Steensel, Arie

Published in:

Trabajar en la ciudad medieval europea = Working in the Medieval European City

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2018

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

van Steensel, A. (2018). Mapping Medieval Leiden: Residential and Occupational Topographies. In J. Á. Solórzano Telechea, & A. Sousa Melo (Eds.), *Trabajar en la ciudad medieval europea = Working in the Medieval European City* (pp. 237-260). (Instituto de Estudios Riojanos. IV. Serie), (Ciencias Históricas; Vol. 37). Instituto de Estudios Riojanos.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



TRABAJAR EN LA CIUDAD MEDIEVAL EUROPEA

JESÚS Á. SOLÓRZANO TELECHEA
ARNALDO SOUSA MELO
(EDITORES)

37 CIENCIAS HISTÓRICAS



TRABAJAR EN LA
CIUDAD MEDIEVAL EUROPEA

JESÚS ÁNGEL SOLÓRZANO TELECHEA
ARNALDO SOUSA MELO
Editores

TRABAJAR EN LA CIUDAD MEDIEVAL EUROPEA

Gobierno de La Rioja
www.larioja.org



**Instituto
de Estudios
Riojanos**

Logroño, 2018

Solórzano Telechea, Jesús Ángel

Trabajar en la ciudad medieval europea / Jesús Ángel Solórzano Telechea y Arnaldo Sousa Melo (editores). Logroño: Instituto de Estudios Riojanos, 2018.-
487 p.: il. col; 24 cm. - (Ciencias Históricas; 37).

D.L. LR 387-2018. - ISBN 978-84-9960-115-1

Clase Trabajadora-Europa-Historia. I. Solórzano Telechea, Jesús Ángel. II. Sousa Melo, Arnaldo. III. Instituto de Estudios Riojanos. IV. Serie.

308-054(4)“04/14”

Reservados todos los derechos. Ni la totalidad ni parte de esta publicación pueden reproducirse, registrarse o transmitirse, por un sistema de recuperación de información, en ninguna forma ni por ningún medio, sea electrónico, mecánico, fotoquímico, magnético o electroóptico, por fotocopia, grabación o cualquier otro, sin permiso previo por escrito de los titulares del copyright.

Los trabajos de la presente publicación fueron presentados en los *XIII Encuentros Internacionales del Medioevo en Nájera* y han sido sometidos a una doble revisión anónima por pares y por el siguiente Comité Científico Internacional: Amélia Aguiar Andrade (*Universidade Nova de Lisboa*). Raphaela Averkorn (*Universität Siegen*). Iñaki Bazán Díaz (*Universidad del País Vasco*). David Ditchburn (*Trinity College Dublin*). Ariel Guance (*CONICET-Universidad de Córdoba de Argentina*). Juan Francisco Jiménez Alcázar (*Universidad de Murcia*). Ricardo Izquierdo Benito (*Universidad de Castilla-La Mancha*). Christian Liddy (*University of Durham*). Denis Menjot (*Université de Lyon II*). Ana María Rivera Medina (*UNED*). Giuliano Pinto (*Università degli studi di Firenze*). Sarah Rees Jones (*University of York*). Teófilo F. Ruiz (*University of California-Los Ángeles*). Vicente Salvatierra Cuenca (*Universidad de Jaén*). Isabel del Val Valdivieso (*Universidad de Valladolid*).

Primera edición: marzo, 2018

© Jesús Ángel Solórzano Telechea, Arnaldo Sousa Melo (editores)

© Instituto de Estudios Riojanos, 2018

C/ Portales, 2 - 26001 Logroño

www.larioja.org/ier

© Imagen de cubierta: Biblioteca Nacional de Austria. Codex Vindobonensis. Serie Nova 2644

Depósito Legal: LR 387-2018

ISBN: 978-84-9960-115-1

Diseño gráfico de colección: Ice comunicación

Impresión: Gráficas Isasa, S. L. - Arnedo (La Rioja)

Impreso en España. Printed in Spain.

Índice

PRESENTACIÓN

- 11 Leonor González Menorca. Consejera de Desarrollo Económico e Innovación de La Rioja
- 13 Jonás Olarte Fernández. Alcalde de Nájera

INTRODUCCIÓN: TRABAJAR EN LA CIUDAD MEDIEVAL

- 15 Jesús Á. Solórzano Telechea

PRIMERA PARTE: ORGANIZACIÓN Y REPRESENTACIÓN DEL TRABAJO

- 23 Entre trabalho *ordenado* e trabalho *livre*: regulamentação e organização dos mesteres em Portugal nos séculos XIV e XV
Arnaldo Sousa Melo
- 39 La organización del trabajo en la Corona de Aragón
Germán Navarro Espinach
- 73 Los oficios del vestir en la Castilla bajomedieval: algunas consideraciones sobre su estructura y organización
Tomás Puñal Fernández

- 103** Discipline et contrôle, représentation et discours: travailler dans une ville médiévale allemande
Gisela Naegle
- 131** La tratadística bajomedieval sobre los oficios urbanos en las penínsulas Ibérica e Itálica: tipología y caracterización
Josué Villa Prieto

SEGUNDA PARTE: REMUNERACIÓN LABORAL, OFICIOS Y LUGARES DE TRABAJO

- 163** Mercaderes, compañías mercantiles y agentes comerciales burgaleses en las principales plazas atlánticas, según los registros de averías del puerto de Bilbao (1481-1501)
José Damián González Arce
- 189** Controlar los salarios públicos en tiempos de crisis: las retribuciones municipales en la Barcelona del siglo XV
Laura Miquel Milian
- 209** *Als calafats e mestres d'axe e altres qui obrat e lavorat han'*. La construcción de la galera real de Alfonso el Magnánimo en 1431
Pol Junyent Molins
- 237** Mapping Medieval Leiden: Residential and Occupational Topographies
Arie van Steensel
- 261** Meat Halls in the Low Countries: butchers under municipal control
Dirk J. de Vries
- 279** El capítulo de la Seo de Mallorca: sus trabajos y salarios (1400-1420)
Maria del Camí Dols Martorell
- 293** Trabajar a la noche en la ciudad medieval hispánica
Ezequiel Borgognoni

TERCERA PARTE: POLÍTICA, TRABAJO Y TRABAJADORES

- 315** Del obrador al *Consell*. La actividad política de menestrales y artistas en las ciudades catalanas bajomedievales
Eduard Juncosa Bonet
- 349** Mundo laboral, política municipal y *trends* económicos en las ciudades catalanas de la baja edad media: el ejemplo de Gerona (1340-1440)
Albert Reixach Sala
- 379** “Sandice de dois sapateiros e alfaiates?” O repertório de ações coletivas dos mestrais lisboetas nos séculos XIII e XIV
Bruno Marconi da Costa

CUARTA PARTE: LA ACTIVIDAD ECONÓMICA Y LABORAL DE LAS MUJERES

- 411** Tiempo y espacio de las mujeres trabajadoras en una ciudad de frontera (Murcia, siglos XIII-XV)
María Martínez Martínez
- 451** ‘From the tavern to the meat hall. Women’s economic activities in the fifteenth and sixteenth century butchers guild in Leuven
Nena Vandeweerd
- 471** ‘Women’s economic activity in Polish Towns at the Turn of the Middle Ages and the Early Modern Time
Urszula Sowina

Mapping Medieval Leiden: Residential and Occupational Topographies

Arie van Steensel
University of Groningen

INTRODUCTION

Location matters in contemporary society in several different ways; it determines, for example, the value of property, the degree of access to public services, and the quality of living conditions. In another sense, its power concerns the ways in which people identify with places – their sense of belonging to a particular location because of affinity, residence or occupation. Both aspects of location are central to questions concerning the history of labour in medieval cities and towns, as has been shown in recent research into the property market of Gloucester and the residence patterns of artisans and labourers in Florence¹. These examples also illustrate the complexities and labour-intensiveness of mapping economic and social relations in late medieval and early modern cities and towns, even though more powerful digital tools are now available to analyse and visualise the data from primary sources.

This contribution aims to introduce a historical mapping tool in development for the premodern town of Leiden, which was part of the Burgundian-Habsburg Low Countries and, from the late sixteenth century, the Dutch Republic. The tool is exceptional in the sense that it is built on a unique source: the so-called map-book of streets and waterways (*Straetbouc* and *Waterbouc*, in the literature

1. Casson, M., and Casson, C. "Location, Location, Location? Analysing Property Rents in Medieval Gloucester", *The Economic History Review*, 69, 2016: 575–99; Eckstein, N.A. "Addressing Wealth in Renaissance Florence: Some New Soundings from the Catasto of 1427", *Journal of Urban History*, 32, 2006: 711–28.

commonly known as the *Stratenboek en Grachtenboek*), which was produced in the last quarter of the sixteenth century. Both source and tool are critically evaluated in the first and second part of the chapter, focusing on the possibilities and limitations of a parcel-based, historical Geographic Information System (HGIS) for research into late medieval and early modern urban societies. In the third part, it is tentatively explored how this tool could be used to inscribe aspects of the history of work into Leiden's spatial and socio-economic landscape more precisely, by analysing the information about residence and occupation that can be gleaned from the maps.

The development of a historical Geographic Information System for the town of Leiden is an ongoing project². It draws on examples of other historical GIS tools for premodern cities, such as ALPAGE (Paris) and DECIMA (Florence)³, but is distinguished by its longitudinal and parcel-oriented approach. The project is informed by recent critical studies on the possibilities of GIS in the discipline of history, and it aims to contribute to these debates in the long run⁴. One of the important benefits of historical mapping tools are the various possibilities they provide to analyse the ways in which spaces shaped and were shaped by human (inter)actions. The social and economic space of medieval and early modern towns has, however, attracted relatively little attention from historians so far, who have mostly focussed on the political, social and cultural meanings of public space⁵. One of the questions raised in this chapter, however, revisits

2. For further information about Mapping Historical Leiden project, see hkk.erfgoedleiden.nl, in Dutch. The first phase of this project (2016) was financially supported by the Netherlands Organisation for Scientific Research (NWO) and Data Archiving and Networked Services (DANS). Carlijn van der Baan, Petra Dreiskämper, Jan Dröge, Johan Feikens, Ellen Gehring, Martin Hooymans, Hans Mol and Roos van Oosten have contributed to this project in various ways.

3. Noizet, H., Bove, B., and Costa, L.J., (Eds.) *Paris de parcelles en pixels: analyse géomatique de l'espace parisien médiéval et moderne*. Presses Universitaires de Vincennes, Saint Denis, 2013; Terpstra, H., and Rose, C. (Eds.) *Mapping Space, Sense, and Movement in Florence: Historical GIS and the Early Modern City*. Routledge, New York, 2016.

4. Knowles, A.K., and Hillier, A. (Eds.) *Placing History: How Maps, Spatial Data, and GIS Are Changing Historical Scholarship*. ESRI Press, Redlands, CA, 2008; Boonstra, O., and Bloothoof, G. (Eds.) *Tijd en ruimte: nieuwe toepassingen van GIS in de alfawetenschappen*. Matrijs, Utrecht, 2009; Bodenhamer, D.J., Corrigan, J., and Harris, T.M. (Eds.) *The Spatial Humanities: GIS and the Future of Humanities Scholarship*. Indiana University Press, Bloomington, 2010; Von Lünen, A., and Travis, C. (Eds.) *History and GIS: Epistemologies, Considerations and Reflections*. Springer, Dordrecht, 2013; Gregory, I.N., and Geddes, A. (Eds.) *Toward Spatial Humanities: Historical GIS and Spatial History*. Indiana University Press: Bloomington, 2014.

5. See, for example, Stabel, P. "The Market-Place and Civic Identity in Late Medieval Flanders", Boone, M., and Stabel, P. (Ed.) *Shaping Urban Identity in Late Medieval Europe*. Garant, Leuven and Apeldoorn, 2000: 50–53;

the older historiography on urban social topography and geography⁶, which aimed at charting and explaining the distribution patterns of social and economic indicators. It will be argued that the opportunities provided by digital tools make it possible to analyse the links between social relations, residence patterns, wealth distribution and occupational clustering in a more profound way, allowing historians to formulate new hypotheses about the interrelatedness of these variables and the spatial dimension of urban social and economic life in the premodern period.

1. LEIDEN'S PRE-CADASTRAL MAPS

Jan van Hout, Leiden's diligent town secretary (1564-1569, 1572-1609), took the initiative in 1583 to compile a map-book of the town's waterways and streets. The 96 maps of the waterways and canals, drawn and edited by a number of persons, were numbered and bound into a book in 1588⁷. The main purpose of this exercise was to survey and regulate the width of the streets along canals and waterways, in order to prevent inhabitants from illegally widening the streets when renewing their timbering. This was a cheap solution for property owners, since they had to contribute to the maintenance of the quays in proportion to the width of their properties. However, the book was probably not long used for this purpose, since the timbering was rapidly replaced by stone quay walls at the end of the sixteenth century⁸.

Similarly, a set of 32 maps of the town's streets was drawn between 1588 and 1597 and bound together around 1600⁹. The purpose of these maps was basically the same, as they were intended to be used to set the proportional contribution property owners were supposed to make to the maintenance of the

Arnade, M.C. Howell, and W. Simons, "Fertile Spaces: The Productivity of Urban Space in Northern Europe", *Journal of Interdisciplinary History* 32, no. 4 (1 April 2002): 515–48.

6. See, for example, the contributions to Denecke, D., and Shaw, G. (Eds.) *Urban Historical Geography: Recent Progress in Britain and Germany*. Cambridge University Press, Cambridge, 1988; Meinhardt, M., and Ranft, A. (Eds.) *Die Sozialstruktur und Sozialtopographie vorindustrieller Städte*. Akademie Verlag, Berlin, 2005.

7. Erfgoed Leiden en Omstreken, Stadsarchief II (hereafter ELO, SA II), no. 5513.

8. De Baar, P.J.M. "Jan van Hout en zijn Stratenboek en Grachtenboek", *Ups en Downer. Bundel artikelen bij het afscheid van mr. W. Downer als gemeentearchivaris van Leiden*. Leiden, 1985: 6–9.

9. ELO, SA II, no. 5153.

pavement of the streets bordering their properties¹⁰. However, in spite of the efforts made and expenses incurred by the authorities, the secretary, the surveyors and the map makers, it is not entirely clear whether the surveyed maps actually served to this end (they show little wear, for example). The maps, nonetheless, provide a relatively accurate view of Leiden's urban landscape in the late sixteenth century, and they testify to one of Jan van Hout's efforts to reform the town's administration –in this case by charting property ownership in detail– as well as to the expertise of the surveyors who were contracted to produce the maps¹¹.

Figures 1 and 2 show two examples of the maps: one from the *Grachtenboek* and one from the *Stratenboek*. The first map shows the beginning of Leiden's main street, the *Breestraat*, with the old orphanage, the 'Ouwe weeshuis', located roughly in the middle of the upper side of the street. The buildings at that side of the street also appear on the second map, depicting the streets and properties along the river Rhine, after the merging of the Old Rhine and the New Rhine. Because this map is drawn with the south on top, the orphanage ('De weesen ofte het heyligegeest huis') appears at the upper side, towards the left. The second map was drawn in 1583, and the first is dated 1588, which explains the different names for the orphanage. The medieval Holy Ghost Orphanage was moved to the former hospital of Our Lady (*Onze Lieve Vrouwengasthuis*) along the *Hooglandse Kerkgracht* in late 1583, and therefore the property between the *Breestraat* and the *Boommarkt* was called the old orphanage in 1588¹². Hence, the first point to make is that the maps were produced during a time span of fourteen years, as a consequence of which they show changes in the ownership, function and borders of properties.

A second point regards the measurement of the properties and streets that are noted on the maps. The orphanage measures 8-1-0 on both maps at the waterside, along the *Boommarkt*, and 7-3-0 at the side of the *Breestraat*. These numbers

10. De Baar, "Jan van Hout en zijn Stratenboek en Grachtenboek", 11–16.

11. See, for Van Hout: Bostoën, K.J.S. *Hart voor Leiden: Jan van Hout (1542-1609): stadsbestuurder, dichter en vernieuwer*. Uitgeverij Verloren, Hilversum, 2009: 101–11. The involved surveyors were Simon Fransz van Merwen, Salomon Davidsz Dulmanhorst and Jan Pietersz Dou. See, for the latter: Westra, F. "Jan Pietersz. Dou (1573-1635). Invloedrijk landmeter van Rijnland", *Caert-Tbresoer: Tijdschrift voor de historische cartografie in Nederland*, 2, 1994: 37–48.

12. Ligtenberg, C. *De armezorg te Leiden tot bet einde van de 16e eeuw*. Nijhoff, 's-Gravenhage, 1908: 206–7.



Figure 1: The first part of the Breestraat according to the *Stratenboek*. The location of the old orphanage is indicated.



Figure 2: The first part of the Rhine and the Boommarkt, according to the *Grachtenboek*, with the location of the orphanage marked.

denote the width of the properties in *Rijnlandse roeden* (3,767 metres), *voeten* (0,314 metres) and *duimen* (2,61 centimetres); twelve thumbs made a foot, and twelve feet a rod. Thus, the frontage of the plot on which the orphanage had been located measured 26,7 metres at the *Breestraat* side in 1588. Since the surveyors were only interested in measuring the sides of the parcels, properties or buildings that bordered the streets or waterways, on the basis of which the owners' contributions were calculated, the maps never show more than three measured sides of a plot. For example, the corner property on the first map, at the lower side of the *Breestraat* belonging to Clais Jansz, was measured at 7-0-9 (*Breestraat*), 7-10-0 (*Rapenburg*) and 5-9-6 (alley). In most of the cases, however, only the width of the frontage is mentioned, and it is not always clear whether this was the frontage of a property or a building. Therefore, the more neutral term 'parcel' will be used here to denote the plots on the maps.

Besides the fact that the maps do not provide all measures of the parcels, a more complex problem is that the surveyors did not bother to draw the complete parcels, or just drew a straight line, giving little insight into how the back alleys and courtyards were organised (only the gates or entrances show up on the maps), or if cottages were built behind the parcels bordering to the streets or waterways. This becomes very clear from Figure 2, on which only the owner of a property and the width of the parcel at the street-side are given; the same applies to other maps from the *Streetbook*. The lack of information about the precise location and measurement of all property boundaries, explained by the objectives of the map makers, renders it impossible to create a complete and accurate cadastral map on the basis of these sources, as will be shown below. In a strict sense, the sixteenth-century map books were not proper cadastral maps resulting from an exhaustive land survey that defined property boundaries and registered official ownership rights¹³.

Finally, it is important to note that in spite of the efforts of the town secretary, surveyors and map makers, the maps have a number of shortcomings and contain minor errors, such as cartographic mistakes, missing parcels, or misdrawn boundaries. By comparing information from other fiscal, cartographic or visual

13. See, for the history of the cadastre in the Netherlands: Koeman, C. "Bijdragen van het kadaster aan de kartografie van Nederland", *Op Goede Gronden. Een bundel opstellen ter gelegenheid van het 150-jarig bestaan van de dienst van het Kadaster en de Openbare Registers*. Staatsuitgeverij, 's-Gravenhage, 1982: 103–31.

sources, it can be established that some parcels actually comprised more than one building or house, as is the case, for instance, at the corner of the *Nieuwe Rijn* and the beginning of the *Vismarkt* across the water. These issues do not distort the quality of the digital parcel map in a fundamental way, but they necessitate an interpretation of the individual maps and comparison with other contemporary cartographic sources. Overall, the limitations of the *Grachtenboek* and *Stratenboek* are primarily explained by the objectives of those who commissioned the project, and the context in which the maps were produced.

2. A DIGITAL ATLAS OF PREMODERN LEIDEN

Notwithstanding these source-critical observations, the pre-cadastral maps of Leiden are above all a rich source that provide unique insights into the socio-economic and spatial organisation of a sixteen-century Dutch town. The importance of the source has since long been recognised by historians –a photolithographic reproduction of a great number of the maps was, for instance, published in the nineteenth century¹⁴– but of more meaning is the thorough study by the urban architectural historian Van Oerle on the development of Leiden in the medieval and early modern periods, who produced a remarkable set of socio-graphic maps based on the *Grachtenboek* and *Stratenboek*, as well as census and fiscal records from the second half of the sixteenth century¹⁵. In fact, his work demonstrates that Leiden has sufficient records to provide a detailed insight of the socio-economic and spatial development of the town from the later Middle Ages to the present. Although Van Oerle's printed maps are very detailed and of high quality, they inevitably provide a static snapshot of the distribution of wealth, building density and occupations in early modern Leiden. It should therefore come as no surprise that efforts were made to analyse the same data with digital tools that became more mainstream for historians after the turn of the twenty-first century. Tim Bisschops was the first to research the historical social geography of Leiden using GIS-software, calling for the use of parcels as core analytical units for research into urban social structures

14. Van Dulmanhorst, S.D., and Dou, J.P., *Leiden vóór 300 jaren en thans*, Pleyte, W. (Ed.). Brill, Leiden, 1874.

15. Van Oerle, H.A. *Leiden binnen en buiten de stadsvesten: De geschiedenis van de stedenbouwkundige ontwikkeling binnen het Leidse rechtsgebied tot aan het einde van de Gouden Eeuw*, 2 vols. Brill, Leiden, 1975. The maps are part of the second volume.

and the history of housing and construction¹⁶. Unfortunately, despite this innovative approach to creating parcel maps and linking spatially-referenced data, this research project has not resulted in a widely accessible historical mapping tool. Nevertheless, the idea of developing a digital atlas for medieval and early modern Leiden builds upon important older initiatives, and benefits from the experiences of other historical (urban) GIS-projects.

Several steps had to be taken to turn the maps from the *Grachtenboek* and *Stratenboek* into a single digitised map with geo-referenced parcels, to which spatially referenced information can be linked for analysis and visualisation. First, the digitised maps were cut out, in order to geo-reference them properly; that is, to relate the digital images to the right geographic location. This process requires the availability of a so-called base map with known coordinates, upon which the maps can be plotted. The most suitable georeferenced maps to this end are the oldest cadastral maps of the Netherlands, which were finalised in 1832 after the authorities during the French occupation (1795-1813) had taken the initiative to survey and register land and property ownership¹⁷. As part of the Mapping Historical Leiden project, the 1832-cadastré of Leiden was digitised, georeferenced and vectorised by the Fryske Akademy (Leeuwarden), which has extensive experience with unlocking these sources¹⁸. The 1832 cadastral maps are widely used as a starting point for regressive map analysis, because they offer the possibility of a parcel-based historical GIS, and were themselves drawn before the medieval townscapes were irreversibly changed by processes of demographic growth and industrialisation in the nineteenth century¹⁹.

Thus, the first step was to geo-reference all the late sixteenth-century maps, on the basis of the early nineteenth-century cadastral maps. In brief, this procedure requires that common points on both maps are identified, in order to map

16. Bisschops, T. "Ruimtelijke vermogensverhoudingen in Leiden (1438-1561): Een pleidooi voor een perceelsgewijze analyse van steden en stedelijke samenlevingen in de Lage Landen", *Stadsgeschiedenis*, 2, 2007: 121–38; Bisschops, T. "De methodes van het historisch huizenonderzoek. Sleutels tot de ontwikkeling van stedelijke GIS voor de prekadastrale periode. Cases: laatmiddeleeuws Antwerpen en vroegmodern Leiden", d'Hondt, J. (Ed.) *Huizenonderzoek en stadsgeschiedenis*. Levend Archief, Brugge, 2009: 25–40.

17. Koeman, "Bijdragen van het Kadaster aan de kartografie van Nederland", 101-31.

18. HISGIS Leiden, <http://www.hisgis.nl/hisgis/gewesten/leiden> (accessed 1 April 2017).

19. Mol, J.A. "Building a Parcel Based Historical GIS for the Netherlands with the Cadastre of 1812-1832: Results, Problems and Perspectives", Busch, M., Olesen, J.E., and Kroll, S. (Eds.) *Die Schwedische Landesaufnahme von Vorpommern 1692-1709*. Ludwig, Kiel, 2015: 35–54.

the non-geo-referenced plans onto the geo-referenced plans. Subsequently, the mapping process needs to be finetuned, for example by fitting the surface to a set of points using the spline interpolation technique (this is a function offered by GIS-software), and by manually adjusting the geo-referencing²⁰. The result of this process is shown for the earlier mentioned maps from the *Stratenboek* en *Grachtenboek* (see Figures 3 and 4). It has, however, to be emphasised that the result of the geo-referencing process is inevitably determined by the quality of the maps and the historian's interpretations. First of all, the ease by which maps could be plotted varied, indicating differences in the accuracy of the original plans. The latter also becomes clear from the fact that a great number of overlapping maps showed discrepancies in the boundaries of parcels that had to be reconciled. In a few cases the digital images of the original maps were of inferior quality, due to the fact that they had been folded or tightly bound together into the original manuscript. Secondly, it was not always possible to find recognisable points which could serve as points of reference; and in these cases the building lines on both maps were used, although these boundaries may have changed between the late sixteenth and early nineteenth centuries (in the case of the plans showing the town's gates, walls and moats, this solution was unfortunately impossible). In sum, despite the objective to work as accurately and systematically as possible, cartographic distortions could not be completely avoided, given the quality and nature of the original sources and the interpretative decisions that had to be made.

In total, 135 different maps (some of the original maps had to be cut-up) were georeferenced to create a single view of Leiden's townscape in the last quarter of the sixteenth century (see Figure 5). The next step was to vectorise the parcels on the basis of the geo-referenced sixteenth-century maps, meaning that the boundaries of each parcel were digitally redrawn, resulting in vector polygons consisting of vertices and paths. These vector data are very important, because they constitute the geo-referenced parcels to which other data can be linked and form a starting point for any parcel-based analysis. For those working with historical maps with data that often have no well-defined boundaries, it is challenging to work with GIS software that assumes that data in mapped areas

20. For this project, Esri's ArcGIS software was used.

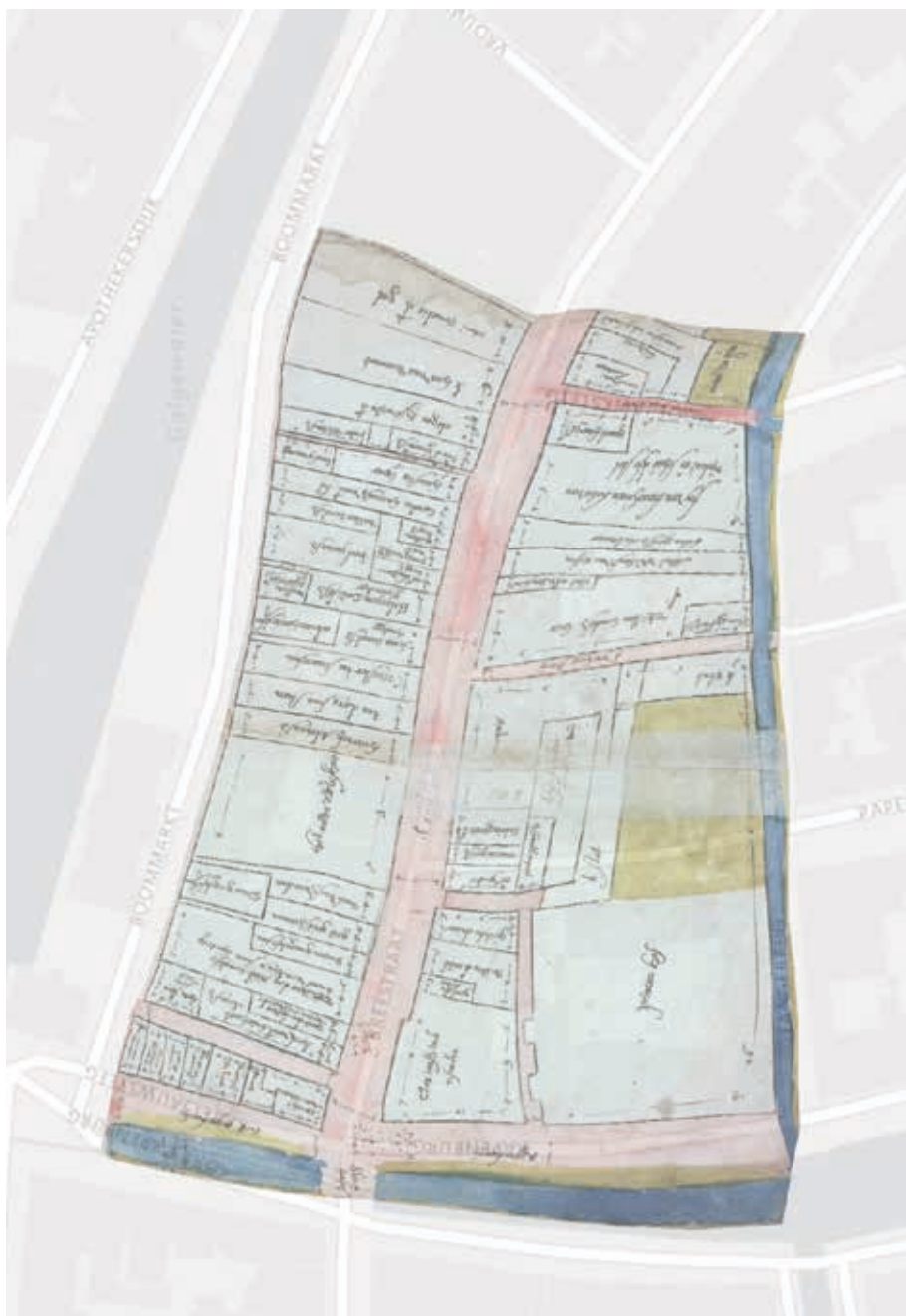


Figure 3: Digitised and geo-referenced map from the *Stratenboek*, superimposed on the modern street plan of Leiden.



Figure 4: Digitised and geo-referenced map from the *Grachtenboek*, superimposed on the modern street plan of Leiden.



[Figure 5: Geo-referenced and vectorised map of Leiden on the basis of the *Stratenboek* and *Grachtboek*.

(polygons) have discrete boundaries²¹. Given the fact that the original plans do not provide all parcels' precise boundaries, it is factually impossible to draw them in a historically accurate way, even when it would have been possible to use a dotted line to indicate fictional boundaries. As a consequence of the limitations imposed by the software, polygons had to be drawn, even when only the façade of a building or the frontline of a parcel were depicted on the original maps. Furthermore, the overlapping sixteenth-century plans sometimes gave conflicting boundary lines of parcels or buildings, in which cases a decision had to be made on which line to follow. Figure 6 shows the vectorised parcels

21. See, for a critical discussion of this problem: Bodenhamer, D.J. "Beyond GIS: Geospatial Technologies and the Future of History", Von Lünen, A., and Travis, C. (Eds.) *History and GIS*. Springer, Dordrecht, 2013: 1–13.



Figure 6: Vectorised parcels on the basis of the first maps of the *Stratenboek* and *Grachtenboek*.

for the two earlier mentioned maps used to illustrate the results of this whole endeavour. In sum, the vectorising process involved a lot of interpretation, and some of the inner boundaries drawn are open to debate, or are even imaginary, as explained. It is, however, important to stress that the leading principle was to follow the original source as accurately as possible, rather than to correct it by reconstructing a map of late sixteenth-century Leiden on the basis of multiple sources, which may be a valuable endeavour for the future.

A total number of 2,619 unique parcels have been drawn on the basis of the maps. This number does not mean that Leiden counted the same number of buildings in the late sixteenth century, because not all buildings were depicted on the original maps. In fact, it is certain from other sources that the total num-

ber of houses and other buildings was higher, because only the parcels of which the owners were to contribute to the maintenance of streets and waterways were included in the surveys for the sixteenth-century maps. Nonetheless, the data derived from the *Grachtenboek* and *Stratenboek* provide some idea of the building density of the different quarters of late sixteenth-century Leiden. More important, the whole exercise of geo-referencing and vectorising the plans has resulted in an online digital atlas, which is already consultable online and which can be used as a base map for further spatial analyses²². Despite all practical and methodological issues raised by the cartographic sources, it is unique in that they enabled the construction of a parcel-based historical GIS for a premodern town.

The data included on the maps – measurements, name(s) of owner(s), and, if mentioned, occupation of owner – are linked to the specific parcels. Presently, the digital atlas is being further developed. On the one hand, an effort is being made to link the sixteenth-century parcels to those of the early nineteenth-century parcels of the first cadastre, as this would enable longitudinal analyses of the town's history (a so-called historical geo-coder is used for this purpose, which allows linking parcels in time and defining their relationships). Besides, from a building history perspective, it is also possible to reconstruct the ownership of particular properties back to the fourteenth century²³. On the other, several datasets with fiscal and census data from the fifteenth and sixteenth centuries are being prepared to be linked to the map. A particular challenge in this case is the fact that those sources often only mention the quarter or the street in which the taxed inhabitants lived, making it a time-consuming task to identify each parcel to which the corresponding details can be linked. A solution in some cases is that the tax collectors followed fixed routes, making it possible to count the number of houses, but otherwise identification of tax payers and parcels depends on information from additional sources.

22. See, the project's website: hlc.erfgoedleiden.nl (in Dutch). This website offers the possibility of consulting existing datasets, but also of uploading and linking personal datasets. The functionality is constantly improved. Furthermore, a web-viewer of the *Grachtenboek* and *Stratenboek* is also provided at www.leidseregioinkaart.nl/kaarten/1583. The code of the application is made available through GitHub.

23. Bisschops, "Ruimtelijke Vermogensverhoudingen in Leiden (1438-1561)", 130–33; Van der Vlist, E.T. "De Weversteeg te Leiden in de Middeleeuwen. Een verkenning aan de hand van een veertiende-eeuwse oorkonde", Moes, J.K.S., and De Vries, B.M.A. (Eds.) *Stof uit het Leidse verleden. Zeven eeuwen textielnijverheid*. Utrecht, 1991: 46–51.

3. URBAN SOCIAL TOPOGRAPHIES

The digital atlas is primarily a tool that should facilitate historical research and allow historians to answer questions about Leiden's social and economic life in the premodern period more adequately. Not all these questions are necessarily new. The spatial aspect of social inequality and mobility has been addressed by urban historians and historical geographers since the 1970s, who empirically examined the urban social topography. They challenged the ideas of the urban sociologist Sjöberg about the static and hierarchical link between social class and the spatial organisation of pre-industrial cities, as well as the work of the historical geographer Vance focusing on occupational clustering as the main determinant of urban spatial organisation, as it appeared that premodern cities and towns were, for example, characterised by social mixing rather than social or occupational zoning²⁴. By reconstructing the residential distribution of wealth and occupations, it appeared that poor and rich households were not physically segregated in a structural way, although particular occupational groups sometimes clustered in particular streets, and wealthier households tended to be found in the urban centre rather than the periphery. It is clear that boundaries drawn by historical geographers were generally less neat in practice, and that an analysis at the level of households or houses was required to provide a more profound analysis of the relations between status, wealth, occupation and residence²⁵.

In fact, multiple forces shaped patterns of residential segregation in early modern Holland. Lesger and Van Leeuwen, for example, identify the physical environment, access to transportation, social distance, occupational structures, city size and building history, and politics as factors²⁶. Their analysis shows the

24. Sjöberg, G. *The Preindustrial City: Past and Present*. Free Press, New York, 1960; Vance, J.E. "Land Assignment in the Precapitalist, Capitalist, and Postcapitalist City", *Economic Geography*, 47, 1971: 101–20; cf. Langton, J. "Residential Patterns in Pre-Industrial Cities: Some Case Studies from Seventeenth-Century Britain", *Transactions of the Institute of British Geographers*, 65, 1975: 1–27.

25. Denecke, D. "Sozialtopographie und sozialräumliche Gliederung der spätmittelalterlichen Stadt. Problemstellungen, Methoden und Betrachtungsweisen der historischen Wirtschafts- und Sozialgeographie", Fleckenstein J., and Stackmann, K. (Eds.) *Über Bürger, Stadt und städtische Literatur im Spätmittelalter*. Göttingen, 1980: 161–202; Boulton, J. *Neighbourhood and Society: A London Suburb in the Seventeenth Century*. Cambridge University Press, Cambridge and New York, 2005, chapter 7.

26. Lesger, C., and Van Leeuwen, M.H.D. "Residential Segregation from the Sixteenth to the Nineteenth Century: Evidence from the Netherlands", *Journal of Interdisciplinary History*, 42, 2012: 339–40.

durability of residential patterns, because ‘location preferences tend to solidify. These preferences are embodied in long-lasting constructions like houses and public buildings. For this reason, municipal and socio-spatial developments coalesce into a morphological structure with a great degree of historical continuity and path dependency’²⁷. Taking these insights into account, historical research should not just focus on reconstructing the spatial distribution of social and economic markers, but also explain how this distribution and residential patterns were connected to the historical development of power relations, social and economic stratification, environmental factors, and physical determinants, in order to avoid a too functionalist interpretation.

Urban social topographies in the medieval and early modern periods were varied; recent studies on work and labourers, however, has hardly followed up on this insight. The spatial distribution of industrial and trade activities has drawn comparatively little attention in the history of labour, although the centrality of markets and the clustering of polluting industries have been widely observed by historians. Despite the renewed interest in space and its relevance for the urban economic organisation, the history of work in the medieval and early modern periods has mostly focussed on themes, such as labour relations, legislation, wages, labour market development, and the nature of the working class (mobility, identity, gender). In their outstanding synthesis, Lis and Soly, for instance, highlight the multiple strategies of labourers, thereby questioning the idea of a linear development from a household economy to a capitalist wage economy²⁸. These insights from the history of work can be fruitfully linked to a spatial analysis of the urban economy, as Colson has recently demonstrated in a contribution to the economic geography of late medieval London. He takes issue with the assertion that medieval economic space was strictly regulated, as his analysis of occupational clustering indicates that the spatial organisation of economic activities was largely determined by processes of specialisation, whereby grouping offered economic advantages through interdependencies and location, or increased access to customers²⁹.

27. Lesger and Van Leeuwen, “Residential Segregation”, 369.

28. Lis, C., and Soly, H. *Worthy Efforts: Attitudes to Work and Workers in Pre-Industrial Europe*. Brill, Leiden and Boston, 2012: 451.

29. Colson, J. “Commerce, Clusters, and Community: A Re-Evaluation of the Occupational Geography of London, c. 1400-c. 1550”, *The Economic History Review*, 69, 2016: 104–30.

4. LEIDEN AROUND 1600: PRELIMINARY RESULTS

Leiden's historical GIS will eventually enable complex spatial analyses of social and economic variables, when more information about population density, quality and value of properties, type of residence, occupations and trades, wealth and income, and property ownership are unlocked. These data can be gleaned from the comparatively rich fiscal and census sources that have been preserved for the second half of the sixteenth century, but it is a time-consuming process to link these data to the proper parcels, because in many cases the sources do not provide precise information about location. Yet, by linking the various bits of information to this unit of analysis (rather than at the level of the wards), it is possible to identify the parcels to which the involved individuals or households were connected. The specific residential patterns, wealth distribution, and occupational topographies of the second half of the sixteenth century can be understood as the result of a historical interplay between the town's (built) environment, power structures, and socio-economic relations.

Leiden expanded dramatically in the later Middle Ages, as its population increased from an estimated 4,000 inhabitants in the mid-fourteenth century to about 6,000 inhabitants in 1440. The town's population continued to grow until the end of the fifteenth century, when it passed the threshold of 12,000 inhabitants, a number that probably remained stable until the last quarter of the sixteenth century. This demographic development reflected the economic expansion of Leiden, which coincided with the take-off of Holland's economy in the fourteenth century. The town secured access to international markets in this period, and became an important centre of cloth production. The textile industry blossomed, with minor ups and downs until the late fifteenth century, and largely shaped the political and social relations of the town³⁰. Firstly, the majority of the urban workforce found employment in the textile industry, and half of the urban population depended on it, but, together with the majority of artisans and labourers in other sectors, they were excluded from formal political influence, as the urban magistrates succeeded in suppressing the formation of

30. Brand, H. 'Urban Policy or Personal Government. The Involvement of the Urban Elite in the Economy of Leiden at the End of the Middle Ages', Diederiks, H., Hohenberg, P.M., and Wagenaar, M. (Eds.) *Economic Policy since the Late Middle Ages. The Visible Hand and the Fortune of Cities*. Leicester University Press, Leicester, 1992: 17–35; cf. Duplessis, R.S., and Howell, M.C. "Reconsidering the Early Modern Urban Economy: The Cases of Leiden and Lille", *Past and Present*, 94, 1982: 49–84.

guilds harbouring political ambitions. Instead, the town was ruled by a political elite, which largely overlapped with the economic elite, and together they maintained strict control over and protection of the urban economy. Moreover, the control of the economic organisation, and of the cloth industry in particular, by a coalition of magistrates and 'industrial capitalists' resulted in a rather repressive wage policy, which in the long run negatively affected the purchasing power of a significant share of the urban workforce, especially the low-skilled textile workers³¹.

Finally, this resulted, to a certain extent, in a process of proletarianisation, as can be concluded from a wealth tax levied in 1498. Of the total number of 3,010 households, 553 were assessed as being too poor to contribute to the tax, while about a third of the households owned less than 25 pounds and were exempted from a full assessment, meaning that 56,3 per cent of households can be regarded as living at a subsistence level at the end of the fifteenth century, when economic and social circumstances had deteriorated in the Dutch town. Meanwhile, 71,3 per cent of the town's wealth was in the hands of 243 households (8,1 per cent)³². In other words, the distribution of wealth was rather skewed, and a significant part of the urban populace regularly relied on social support.

Various attempts have already been made to analyse and map the distribution of wealth and income in late medieval Leiden at the level of the wards³³. In order to accommodate the growth of the population, the town of Leiden expanded twice in the fourteenth century, but the space enclosed by the town walls remained the same from 1389 to 1611, meaning that the demographic growth in this period had to be accommodated within the existing urban space. Earlier analyses demonstrate that the wealthiest of Leiden's medieval wards (*bonnen*) were located in the town's centre (the earliest occupied wards of *Burchstreng*,

31. Brand, H., and Stabel, P. "De ontwikkeling van vollerslonen in Enkele laat-middeleeuwse textielcentra in de Nederlanden. Een poging tot reconstructie", Duvosquel, J.-M., and Thoen, E. (Eds.) *Peasants and Townsmen in Medieval Europe. Studia in Honorem Adriaan Verbulst*. Gent, 1995: 203–22.

32. Noordam, D.J. "Leiden in last. De financiële positie van de Leidenaren aan het einde van de Middeleeuwen", *Jaarboek der Sociale en Economische Geschiedenis van Leiden en Omstreken*, 13, 2002: 22.

33. Van Oerle, *Leiden binnen en buiten de stadsvesten*; De Boer, D.E.H. "Te vongelinc geleit.' Sociale en economische problemen in Leiden aan het eind van de Middeleeuwen", De Boer, D.E.H. (Ed.) *Leidse facetten. Tien studies over Leidse geschiedenis*. Zwolle, 1982: 6–22; Brand, H. "Sociale omstandigheden en charitatieve zorg", Marsilje, J.W. (Ed.) *Leiden tot 1574. De geschiedenis van een Hollandse stad*. Leiden, 2003: 121–24; Bisschops, "Ruimtelijke Vermogensverhoudingen in Leiden (1438-1561)", 125–27.

Wolhuis and *Zevenhuizen*), while the newer and more densely-built peripheral wards (such as *Overmare* in the north, *Levendaal* in the east and *Rapenburg* in the south) were overwhelmingly poorer. The social segregation in the fifteenth and sixteenth centuries, however, was not absolute, because some wealthy entrepreneurs lived in poorer parts of the town (for example, drapers established themselves in *Nieuwland* in the vicinity of the *raamlanden*, where their cloth was dried and stretched), while poor households lived in the back alleys of the wealthier streets. Bisschops and Brand differ in opinion as to whether the spatial distribution of wealth evolved during the later medieval period, and whether it was caused by the economic and demographic growth in the fifteenth century, or was rather the result of the labour relations that reinforced economic inequality social polarisation, and social distance from the mid-fifteenth century onwards³⁴.

A more detailed assessment of the spatial distribution of wealth and residential patterns in Leiden, based on an analysis at the parcel rather than ward level, is necessary to answer these questions satisfactorily. Regarding occupational topography, the data that can be gleaned from the *Stratenboek en Grachtenboek* are revealing, although the interpretation of this information is problematic due to the fact that the maps were produced over a time span of fourteen years, during which people moved, died or even took up new professions. Besides, the occupations of only 907 individuals are mentioned on the gross number of 4,065 parcels drawn on the maps³⁵. The spatial distribution of the parcels linked to an owner with a known occupation are shown in Figure 7, from which two provisional observations can be drawn. Firstly, the distribution shows no clear patterns of clustering, although, for instance, the weavers were predominantly residents of the eastern wards of *Gansoord* and *Sint Nicholaasgracht*. Secondly, the map only shows individuals who owned a property, and of whom their occupation is mentioned, since tenants are not included in the original source. Thus, in order to make meaning out of these data, it is necessary to enrich the dataset with information from other sources.

A number of other fiscal and census sources provide social and economic data about Leiden's population in the second half of the sixteenth century. For

34. Brand, A.J. "Leiden rond 1500. Een pre-industriële stad onder spanning", *Leids Jaarboekje*, 100, 2008: 103–13.

35. The occupations and professions have been standardised according to the Historical International Classification of Occupations (HISCO) scheme; see, <https://socialhistory.org/nl/projects/hisco-history-work>.

instance, the proportion of properties inhabited by its owners and the share of properties rented out can be established on the basis of tax registers that record the annual rental value of Leiden's houses in 1557 and 1561 (the same sources have been used as a proxy for estimating the distribution of income)³⁶. In 1557, 833 tenants (30 per cent) were registered on a total of 2,757 taxed properties, whereas four years later, 1,018 (36 per cent) out of 2,287 properties were rented out³⁷. When mapped at the ward-level, it appears that tenancy was most prevalent in the peripheral, socially more heterogeneous wards, where poorer labourers and migrants settled, whereas combined residency and ownership was common in the four oldest wards. But there were exceptions to this general pattern, shown by a visualisation at the parcel-level, which related to property rights, preferences of property owners for specific locations in town³⁸, and the relative high turnover of property owners and tenants. In the *Wanthuis* ward, for example, 72 properties were inhabited by their owners, while 26 were rented out (Figure 8).

Besides the challenges involving the reconstruction of a digital base map, a parcel-oriented approach is further complicated by the fact that few sources actually provide detailed information about the location or residence of individuals. The tax register from 1557, for example, records the wards and sometimes the streets in which taxed properties were located, but gives no clues about precise locations. Although the tax-collectors followed a more or less fixed route, it is still necessary to corroborate this information with other sources in order to identify the proper location of the properties. This needs to be done in a systematic way by creating a relational database in which various bits of information about properties and individuals can be entered and geo-coded³⁹. The result of this process is shown for the *bon* *Wanthuis*, one of the wealthier wards, located between Leiden's main street, the *Breestraat*, and main waterway, the *Nieuwe Rijn*, in which the town hall was situated, as well as the main fish market. As Figure 8 also shows, the occupational structure of the ward was rather diverse,

36. Soltow, L., Van Zanden, J.L. *Income and Wealth Inequality in the Netherlands, 16th-20th Century*. Transaction Publishers, Amsterdam, 1998: 28, 35.

37. ELO, SA I, no. 992 (1557) and no. 933 (1561).

38. Brand, "Leiden rond 1500", 109–12.

39. Cf. a similar, but not spatially unlocked, database for late-medieval Brussels: Vannieuwenhuyze, B. "Who's Who in Late-Medieval Brussels?", Colson, J., and Van Steensel, A. *Cities and Solidarities. Urban Communities in Pre-Modern Europe*. Routledge, London and New York, 2017: 132–50.

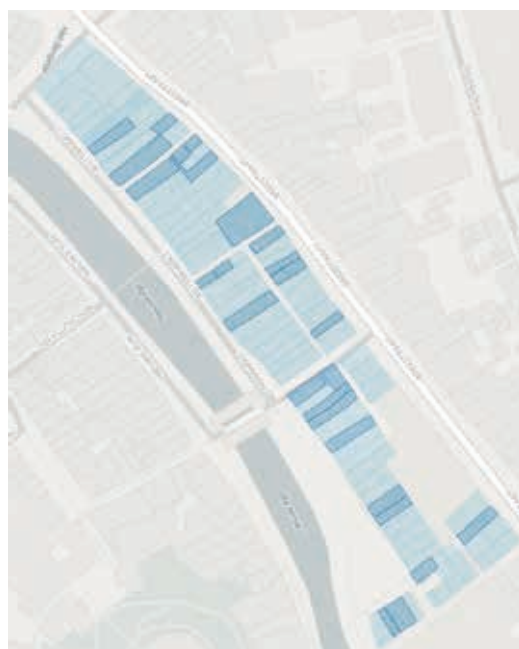
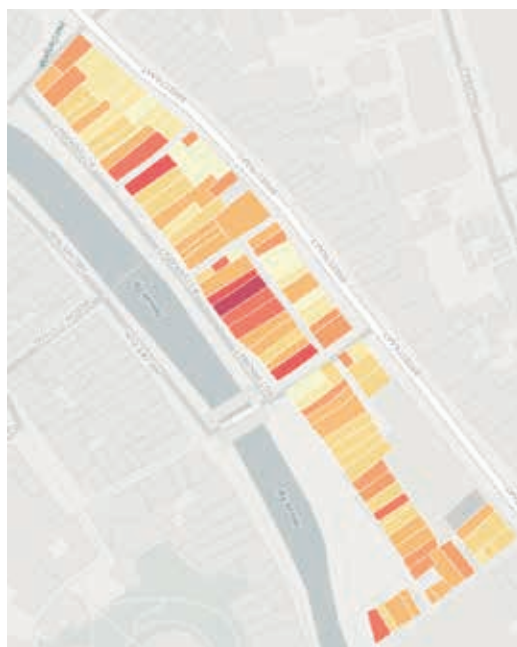


Figure 8: Distribution of income (darker blue colour indicates higher value), occupations (30 distinct occupations), and tenancy (dark parcels) in the *Wantbus* ward, 1557.

but it reflects the fact that it was the wealthiest ward in 1557, with an average income per household twice as high as the town's average. The occupations of 66 inhabitants of the ward are known, and among them were nine drapers, but also eight cobblers and eight bakers. The distribution of income was relatively equal, and the majority of inhabitants (73 per cent) lived in their own properties, making it a socially rather homogenous ward. These observations, however, should be put into perspective; it was only in the course of sixteenth century that the *Wanthuis* ward achieved this position⁴⁰, and further research has to explain why wealth increasingly concentrated in this part of Leiden.

CONCLUDING REMARKS

Leiden's development was not much different from those of other late medieval and early modern towns, in the sense that it experienced alternating periods of economic and demographic expansion and contraction in this period. The main question, however, is how the dynamic interplay of these broader processes with the spatial structure of urban economic activities and social stratification produced persistent occupational topographies and residential patterns. This question can be adequately answered by analysing the spatial distribution of economic and social markers over time, for which a historical GIS offers a useful tool, as has been demonstrated in this contribution. Leiden's municipal archives not only offer an exceptional cartographic source – the *Grachtenboek* and *Stratenboek* – standing at the basis of the developed digital mapping application, but also fiscal and census records, together allowing for a reconstruction and analysis of the town's socio-economic topography in the second half of the sixteenth century. The first step in this process has been completed, while the next – the even more time-consuming compilation of a relational database with various geo-coded data about Leiden's inhabitants and their activities in this period – is in progress. Nevertheless, the preliminary results offer an empirically more refined understanding of the links between location, economic activities, value of property, residence, and access to services, and as such promise to make a significant contribution to several aspects of the history of work in late medieval cities and towns.

40. Bisschops, "Ruimtelijke Vermogensverhoudingen in Leiden (1438-1561)", 126. According to the 1498 wealth tax, *Wanthuis* was the fifth wealthiest ward, with an average wealth per inhabitant just above the town's average; see, ELO, SA I, no. 578.

Si quiere comprar este libro, puede hacerlo directamente a través de la Librería del Instituto de Estudios Riojanos, a través de su librero habitual, o cumplimentando el formulario de pedidos que encontrará en la página web del IER y que le facilitamos en el siguiente enlace:

[http://www.larioja.org/
npRioja/default/defaultpage.jsp?idtab=488335](http://www.larioja.org/npRioja/default/defaultpage.jsp?idtab=488335)

El estudio sobre el “trabajo en la Edad Media” es un objeto histórico de difícil análisis, ya que en la Europa medieval no había un término específico que designara el trabajo tal como lo concebimos en la actualidad; sin embargo, a lo largo del Medioevo, tomó forma el concepto de trabajo. Durante la Edad Media, en las ciudades europeas se produjo un cambio de mentalidad respecto al trabajo, ya que pasó de ser considerado un castigo a fuente de productividad y de mejora de la calidad de vida. En las ciudades se produjo la gran especialización del trabajo para satisfacer las exigencias técnicas, el desarrollo de la industria, en especial la relacionada con los tejidos, así como un desarrollo organizativo sin parangón, que conllevaron cambios en los tiempos del trabajo, la movilidad de los trabajadores, las protestas laborales, las reivindicaciones salariales, las peticiones de representación política de los trabajadores, el desarrollo de las cofradías de oficio, y la mujer se incorporó al mundo laboral. Estos y otros temas en torno al trabajo en la ciudad medieval europea son objeto de estudio en la presente monografía.

Gobierno de La Rioja
www.larioja.org

 **Instituto
de Estudios
Riojanos**



Ayuntamiento
de Nájera

