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Mapping early Utrecht printers and publishers: experiences with building a geographical interface

Summary: Recently Utrecht University Library together with external partners put the former printers and publishers located in the city of Utrecht literally on the map. This was organized as part of the project *Vroege Utrechtse drukkers en uitgevers op de kaart* ('Early Utrecht Printers and Publishers on the Map'). The project yielded a geographical interface (http://arkyves.org/view/geocontextutrecht/) visualizing the various locations of the former printers and publishers from the time period 1450-1825. Three georeferenced historical map layers from different dates are used to clarify the geographical situation of the Utrecht center in those days, which could also be compared with the current state. All the former locations of printers and publishers are clickable and link to specific biographical data, printers' marks, and (sometimes digitized) publications of the printers and publishers in question. In the Northern Netherlands the city of Utrecht has been the cradle of book printing. By using the spatial-temporal application this rich printing history of Utrecht is unlocked. Besides offering easy access to a tremendous amount of old printing data, the site also aims to be a source for scientific analysis of spatial and statistical patterns in book and print history. In the future the application will have new functionalities and will also be expanded with other Dutch and European cities.

The paper focuses on the usability of the geographical interface as a powerful tool to visualize complex spatial and historical phenomena, and to connect these with linked open data. Furthermore, the advantages and constraints of the georeferenced historical map layers are discussed. By doing this, recommendations for improving existing and future initiatives will also be given.

Introduction

In 1514 Jan Berntsz set up as a young book printer in Utrecht. Until 1530 he would remain almost the only printer in this city which was at the time the major city of the Northern Netherlands. First his shop was situated 'achter dat ghevanghen vleyschuys' ('behind that prison meat house'), later he also worked 'opden hoec van die Saelstraet' ('on the corner of the Zadelstraat'), and next 'bij de Maartensbrug op dien hoec van sint Mertenstoorn in die gulden Leeuw' ('near the Maarten's Bridge on the corner of the St. Martin's tower in the Golden Lion'). All fairly cryptic address details rather confusing for a layman in the field of the history of the city of Utrecht. Recently however, Utrecht University Library together with external partners has put the former printers and publishers located in Utrecht literally on the map. This was organized as part of the project *Vroege Utrechtse drukkers en uitgevers op de kaart* ('Early Utrecht Printers and Publishers on the Map'), which resulted in a geographical interface,[1] visualizing the various locations of the former

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[1] http://arkyves.org/view/geocontextutrecht/. The website is the result of a cooperation between Arkyves, Special Collections of the University of Amsterdam, the Utrecht University Library, the Utrecht Faculty of Humanities, and the Utrechts Archief. The Utrecht data were delivered by Margot Nolta, Utrecht student in art history, under supervision of dr. Marco van Egmond (Utrecht University Library), and dr. Jeroen Salman (Faculty of Humani-

printers and publishers from the time period 1450-1825. What are the backgrounds of this project? How did the geographical interface get its form and what about its functionality? What can we learn from building such an interface? This paper will try to find answers to these questions.

Utrecht: cradle of book printing

The city of Utrecht deserves a specific geographical interface in the field of publishing history, because in the Northern Netherlands it has been the cradle of book printing (Schlusemann & Salman, 2016). The city has a fine scoop in the history of the art of book printing: the earliest dated print in the Dutch-speaking region was printed here in 1473. At that time Nicolaes Ketelaer and Gerard de Leempt (c. 1450-c. 1491) brought the *Historia scholastica* by Petrus Comestor to the market, a Biblical textbook about the history of the world, originally written in the 12th century. But maybe even as early as the period between 1466 and 1473 books were printed in Utrecht, the so-called prototypographical editions, editions with loose letters which cannot be dated and localized with certainty. Research showed that these editions could have been published in Utrecht, but in any case in the Dutch-speaking region (Fig. 1).

Figure 1. Pages from the Historia scholastica by Petrus Comestor (1473) and the Fasciculus temporum by Werner Rolevinck (1480), also incorporated in the digital exhibition of Utrecht incunabula on the website of Special Collections Utrecht University Library (http://bc.library.uu.nl/utrecht-incunabula).

Around 1500 Utrecht had circa 25,000 inhabitants, making it the largest city in the Netherlands. In the 17th and 18th century it lowered in rank. Around that time the number of inhabitants was around 30,000 and it was the sixth city after Amsterdam, Rotterdam, Haarlem, Leiden and The Hague. Yet the booksellers' business expanded considerably during that period, speaking in num-

bers. For instance, around 1663 25 booksellers were active and around 1800 this number had increased to 45. Recent research into the Utrecht book trade shows that in the entire 17th century approximately 150 printers and publishers were active and in the next century around 180 (Schlusemann & Salman, 2016).

The Utrecht book business mainly operated on a regional level, which is not to say that the business was not lucrative. The surrounding towns, villages and the countryside were reasonably affluent and people came to town regularly to buy luxury goods such as books. Also the founding of Utrecht University in 1636 acted as an important impulse for the local book trade, especially in the field of legal and theological editions. A close connection between the academic community and the book trade was created.

The above mentioned importance of the city of Utrecht as to the book printing history, especially in its earliest origin, was the reason for Utrecht University Library to draw attention to its collection of Utrecht incunabula as well. In a digital exhibition a chronological overview is presented with the most important incunabula and highlights from the Utrecht printers' history.[2]

Previous history and background of the project

The idea of geocontexting printers and publishers originates from members of the Rhode Island Historical Society (United States), who launched the website *The Atlas of the Rhode Island Book Trade in the Eighteenth Century* in 2010.[3]
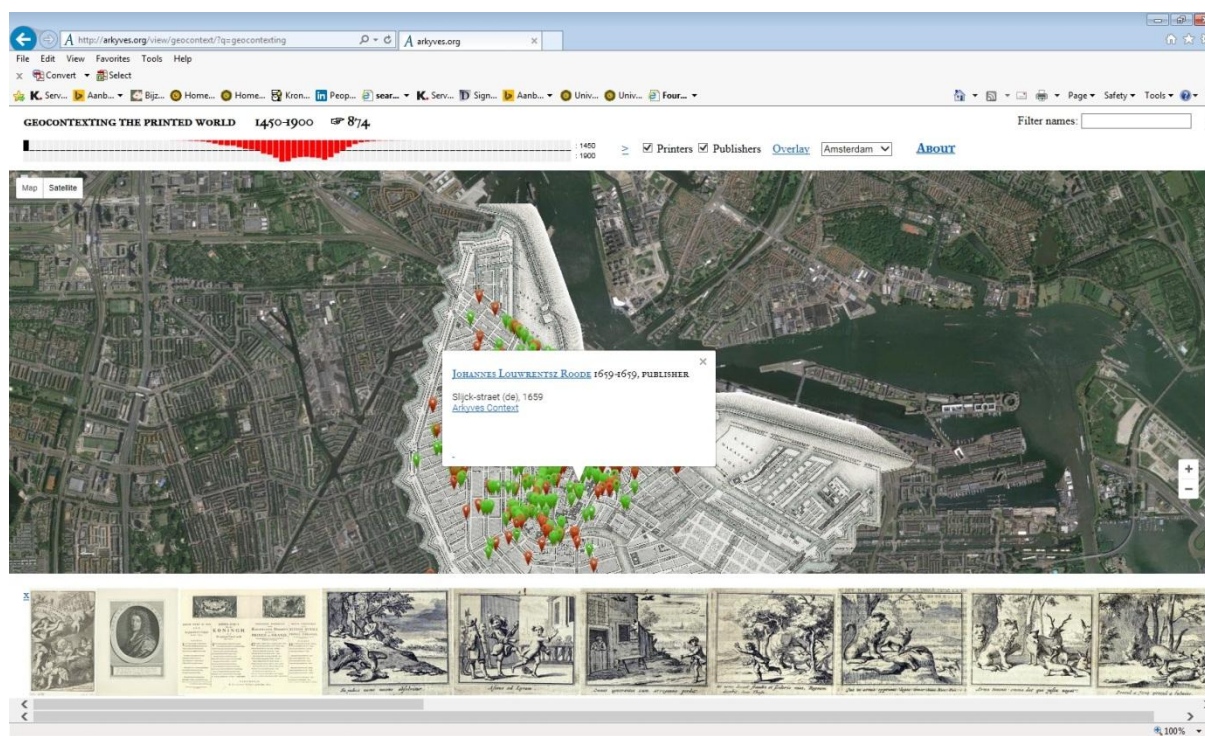

Figure 2. The city of Amsterdam in an earlier version of the website of Geocontexting Printers and Publishers.

On this website the Rhode Island Historical Society makes available an attractive temporal-spatial approach of printers and publishers who used to be active in this region of the United States. Next

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[2] http://bc.library.uu.nl/utrecht-incunabula

[3] http://www.rihs.org/atlas/

the University of Amsterdam started to build a new website, after the example of *The Atlas of the Rhode Island Book Trade,* in which the printers' history *worldwide* was unlocked in a temporal and geographical way: *Geocontexting Printers and Publishers* (Fig. 2). By linking things such as biographies, printers' marks, published works to specific locations a wealth of data about the early book printers and publishers is made accessible. In this way a splendid and functional tool is being created for scholars, students and other parties interested in book history and the history of the book trade.

In relation to the city of Amsterdam lots of work had been done by the middle of 2014 by adding address data of former printers and geotagging their locations. As regards the city of Utrecht, these metadata had not been entered yet. However, references to Utrecht printers were already published on the website *Geocontexting Printers and Publishers,* mainly thanks to the used data from the Utrecht printers' list of Utrecht University Library.[4] For a good functionality and overview of the site it was required to find out the addresses of the printers in question and to geotag them. The project 'Early Utrecht Printers and Publishers on the Map' set up and finished in 2015 had to support an upgrade of the website, generally speaking, and the creation of a Utrecht 'gateway'.

Setting up a geographical interface

Specifically the following improvements and additions had to be dealt with:
- Adding metadata and location data in relation to the former Utrecht printers and publishers from the period 1450-1800;
- Modernizing and creating a new look and feel of the interface;
- Better visualization of the distribution of the printers and publishers by using a dot map;
- Adding more historical map layers with accurate georeference and good options to zoom in;
- Linking the Utrecht metadata with other linked open data, such as the Short Title Catalogue of the Netherlands (STCN) and *Arkyves*;
- Linking with digital full text databases.

In 2015 the Utrecht Faculty of Humanities commissioned a trainee to link the Utrecht metadata to the underlying database. To this purpose the trainee used various primary and secondary sources available in the University Library and the Utrecht Archives.

Thanks to the work of the trainee other unknown printers and printers' addresses came to light. We now know of approximately 350 printers and publishers being active in Utrecht in the years between 1450-1800 whereas a number of 250 were assumed. The precise locating of the publishers and printers turned out to be rather difficult. Finding out the exact locations would demand a too thorough search through the archives and therefore fell outside the scope of the project. Nevertheless, a considerable number of locations were determined, especially based on scientific research that was carried out at an earlier stage. And furthermore, the streets of the largest part of the printing and publishing population could be located, making the spatial patterns and developments clearly recognizable on a somewhat higher spatial analysis level. Of a minority of the professional group no single indication of an address could be found; in the application these printers are indicated by a pop-up screen stating 'Printers/publishers with unknown location'.

Of course, historians and other researchers can find supplementary address and location data in the future. This information can always be added to the database. In that sense it is a 'dynamic' application which is continuously being developed. Feedback from users is always welcome.

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[4] http://drukkers.library.uu.nl/

Besides finding and adding locations of printers and publishers the trainee also enhanced the data. Sometimes short biographies were included, as well as the names of the signboards and other information. Further enhancing was done by linking to the STCN (Short Title Catalogue Netherlands), the retrospective national bibliography of the Netherlands covering the period 1540-1800. In this way an overview of the publisher's stock is easily obtained. In addition there is a link to relevant printers' marks and iconographic visual material through the website of *Arkyves*, an aggregate database for studying the history of culture.
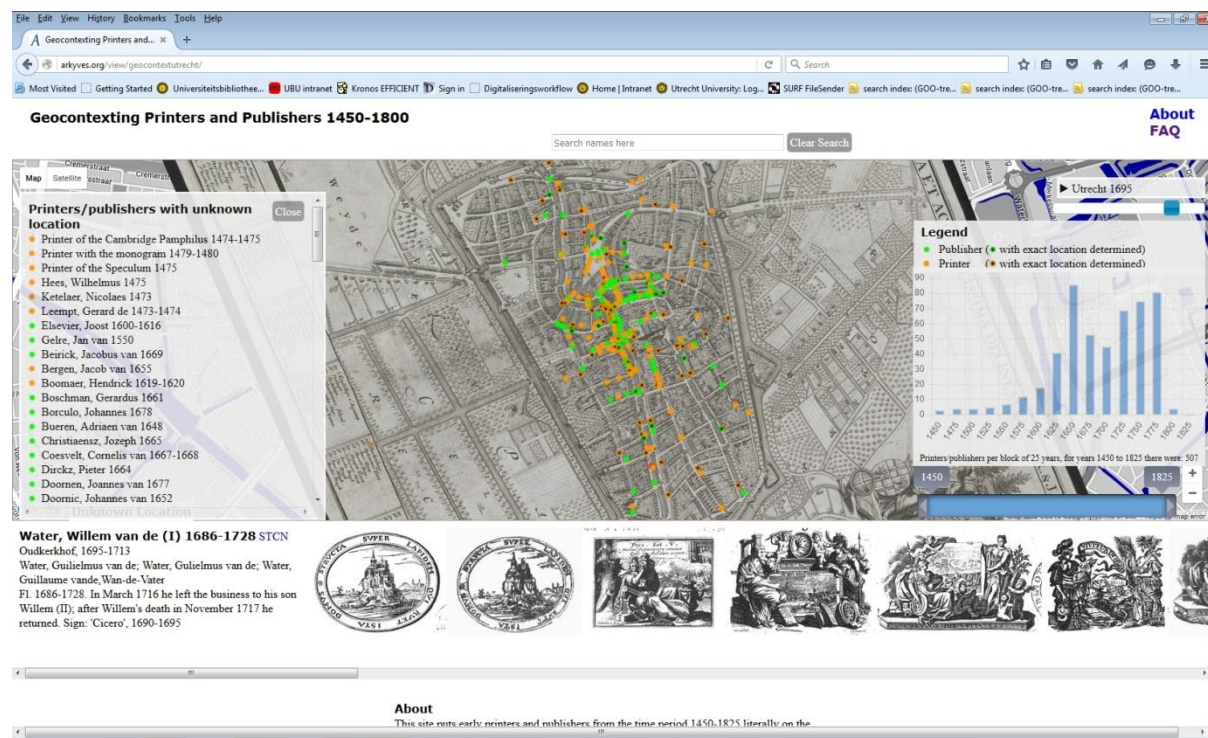

Figure 3. The application of Geocontexting Printers and Publishers in a test version,
with a depiction of iconographic images from Arkyves.

Thanks to a wonderful collaboration with people from the University of Amsterdam the website *Geocontexting Printers and Publishers* finally got a major upgrade. The interface has been thoroughly taken in hand, modernized and provided with a better visualization (Fig. 3). All the former locations of printers and publishers are clickable and link to specific biographical data, printers' marks, and (sometimes digitized) publications of the printers and publishers in question. Further interpretation of the data is possible with the help of a dynamic graph and a movable timeline. For instance, it is now possible to analyze the spreading of the Utrecht printers and publishers over various periods (see Fig. 4). Furthermore, of the city of Utrecht three historical map layers have been included in the application representing the situations of 1598, 1695 and 1776. The practical value of these map layers are dealt with in detail now.

Figure 4. Spread of Utrecht printers (orange) and publishers (green) in the time periods 1450-1550, 1550-1650 and 1650-1750.

Advantages and constraints of georeferenced map layers

Visitors to the site can choose an appropriate map layer as a background for visualizing the locations of contemporary printers and publishers. The map layer can be made more or less transparent by shifting the transparency button at the top right. In this way the layers show a cartographical image of the city of Utrecht in former centuries and make the application more appealing and comprehensible. The drawings of the houses of the printers in question are often elevational drawings or 'standing up' (three-dimensional) drawings and sometimes drawn in true to reality.

The old maps are georeferenced with the help of Maptiler (Klokan Technologies). Because the town plans had to present an accurate picture of the old situation and the former locations of the printers and publishers, a choice was made for a *local* and *exact* transformation by means of Thin Plate Spline or 'morphing' (Boutoura & Livieratos, 2006; Balletti, 2006; Brovelli & Minghini, 2012, 101).

As said before, three old map layers are presented. The oldest map dates from 1598 and was published in Utrecht by the famous engraver and silversmith Adam van Vianen (c. 1569-1627). The second layer is an image of the accurate plan engraved by Jan van Vianen and published by Caspar Specht in 1695. Also geometrically correct is the plan of Utrecht, based on the survey of J.W. Raven and pupils of the orphanage of the Fundatie van Renswoude in 1776, and published by the firm of Van Schoonhoven in 1778.

Why the choice for these three maps? In the first place because there was a fairly well balanced spreading of town plans over the period 1450-1800, namely from the end of the 16th, 17th and 18th centuries. In the second place the maps present a lively image of the former geographical setting of the city, placing relevant book printers and publishers in their correct historical-geographical contexts. Visitors to the website become part of the 16th, 17th, and 18th surroundings of the Utrecht book trade as it were (Rumsey & Williams, 2002, 11).

No map is perfect and this also applies to the three town plans chosen. Each old plan has its own advantages and disadvantages and its own characteristics (Table 1). For instance the map by Van Vianen has no proper geometrical basis, making the city more rectangular and not so much harpshaped (Fig. 5). Besides, the roads and waterways are drawn in too widely. Nevertheless the

drawings of the major buildings are as much as possible elevational drawings and true to reality, and so the map gives a fairly reliable image of Utrecht at the end of the 16th century. This, despite the fact that certain buildings shown on the map were at that time no longer there.

Map	Geodetic accuracy	Chronometric accuracy	Topographical accuracy	Further remarks
Van Vianen, 1598	*	**	**	- Elevational drawing - Exaggerated depiction of waterways - Important buildings veracious
Specht, 1695	***	***	**	- Elevational drawing - Important buildings veracious
Raven, 1776/1778	***	***	**	- Orthographic projection - Basic form important buildings not always veracious

Table 1. Comparison of the town plans of Utrecht in the application of Geocontexting Printers and Publishers.

The beautiful map by Specht from 1695 is better than the one of 1598: it has geodetic accuracy and also from a chronometric point of view is nearly correct (Fig. 6). The major buildings have been portrayed true to reality, but the individual houses have a usually uniform character.

Geodetic and chronometric accuracy make the map by Raven from 1776/1778 (Fig. 7) also reliable. However, here we see an orthographic projection and generalized building blocks, increasingly usual at that time. The basic forms of these special buildings are not always true to reality.

The extent of geodetic accuracy and the way in which topography is represented in the various town plans has consequences for the readability of the visualized printers' data. Two examples may explain this. The first example concerns the direct surrounding of the famous Dom Tower, in the heart of the city of Utrecht (Fig. 8). The earliest two plans (at the left and right top) show a lively and realistic image of the area, but the difference in the width of the roads and waterways result in a somewhat deviant location structure. At the plan from 1776/1778 (below left) the road pattern matches the situation in those days, but the building blocks have been generalized and there is no elevational drawing. Therefore the image speaks less to the imagination, moreover because the basic forms of the special building are not always correct.

Figure 5. Plan of Utrecht and detail of the city center (below), Adam van Vianen, 1598
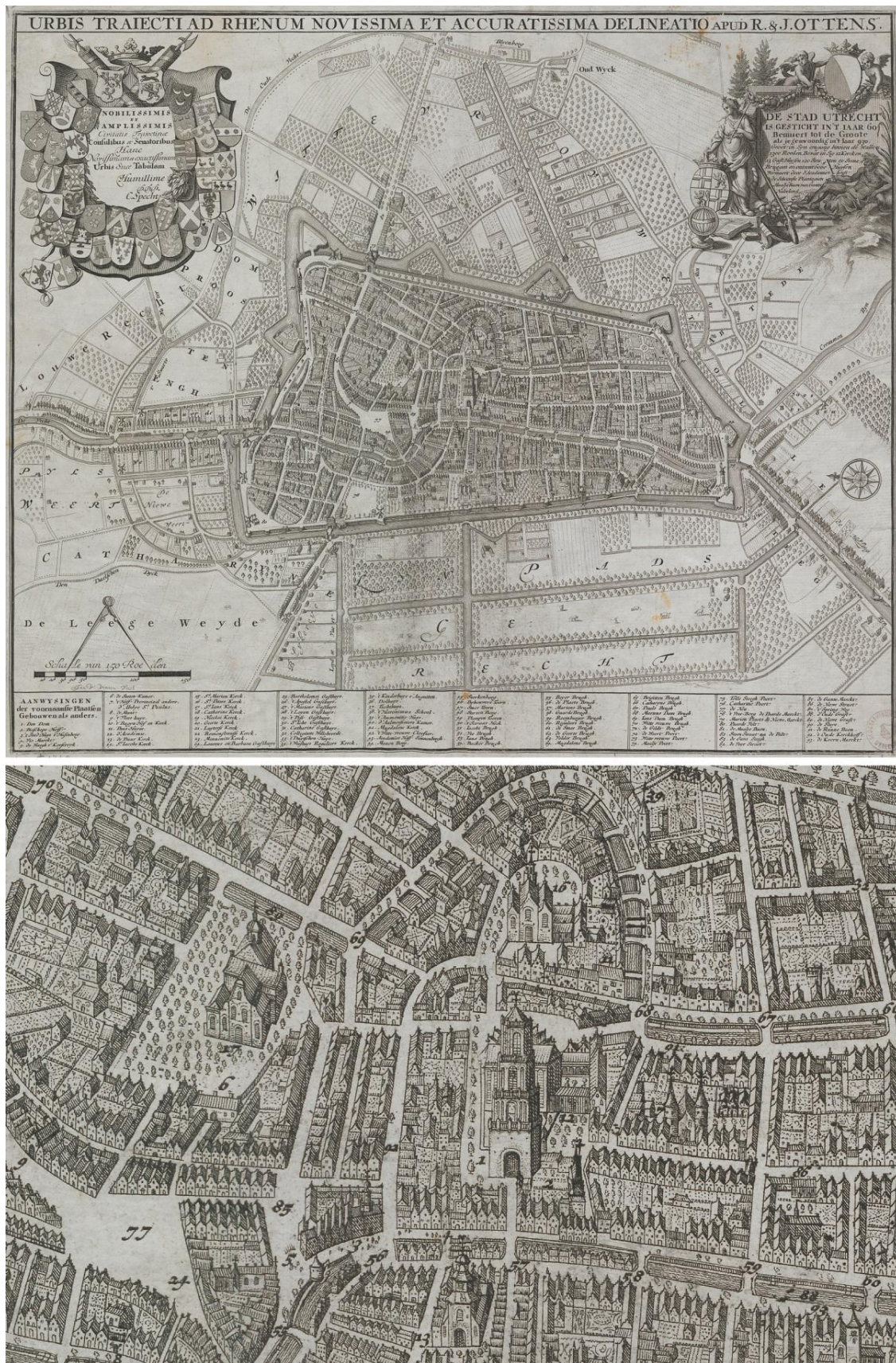(unchanged edition 1651/52).

Figure 6. Plan of Utrecht and detail of the city center (below), Caspar Specht, 1695
(unchanged edition c. 1740).

Figure 7. Plan of Utrecht and detail of the city center (below), J.W. Raven, 1776/1778.

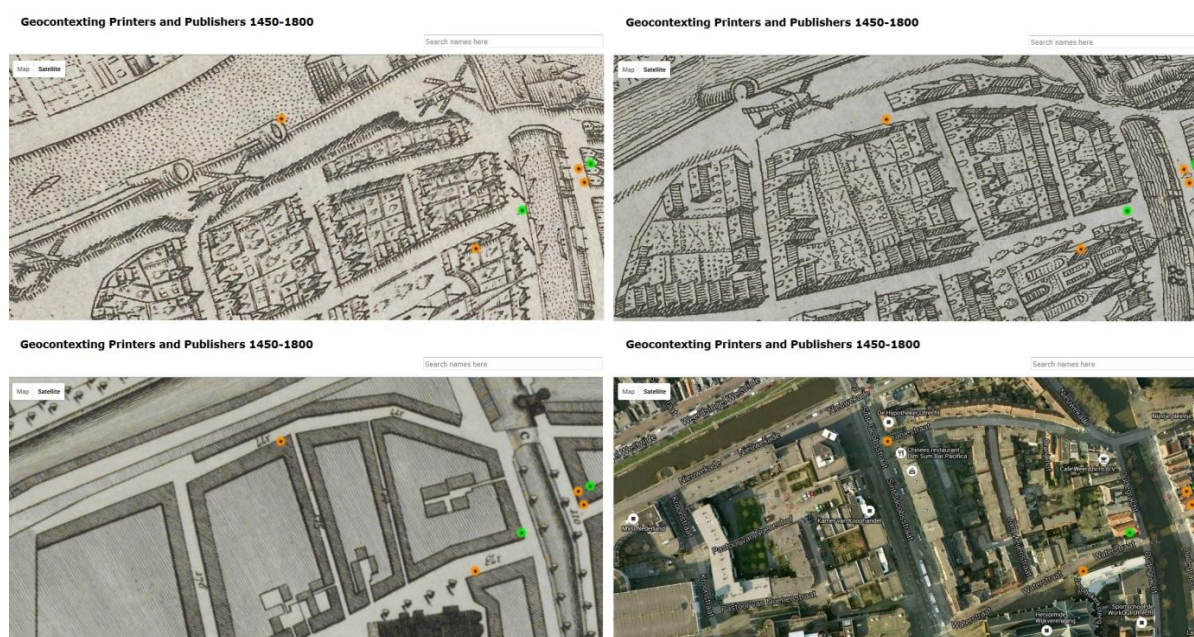Figure 8. Comparison map layers Utrecht city center.

Figure 9. Comparison map layers Utrecht near the former Weerdpoort.

A second example concerns an area in the north of the Utrecht city center near the former Weerdpoort (Fig. 9). Here we see that the elevational drawing of the Jacobskerk (St. James' Church) (in the center below the various drawings) on the 1695 plan sort of 'blocks the view' of a location of a printer further down the Waterstraat. This speaks in favor of the use of old maps with an orthographic or flat projection.

The example of the surroundings of the Weerdpoort further shows that the georeference of the plans in question not always resulted in map layers that could be sufficiently compared. We see that the printer's location at the top left on the 1598 map (at the top left, on the tower) is fairly different from the 1695 and 1776/1778 maps (respectively to the top right and bottom left). This is

mainly caused by the fact that the 1598 map lacks a good geodetic basis and represents the basic form of the city of Utrecht rather as a rectangle than as harp-shaped. Despite applying many control points, using the 'Thin Plate Spline' transformation, deviations can be found in relation to this map demanding some from the imagination of the user. The 1695 and 1776/1778 plans do have a solid geodetic basis and are for that matter better usable for determining and analyzing printers' locations.

Maybe adding more control points and a classification of the width of the streets may lead to a better georeferencing of the 1598 town plan, but the poor geodetics will probably never be fully compensated for. Because this is a recurring problem at georeferencing old maps, more and more scientists are saying to use the old map itself as base layer and to have the modern geodata and metadata refer to this (Balletti, 2006, 37-39). The old map as model (B) is then no longer referenced to the base layer ('actual feature', A) leading to a distorted model (B') but the other way around: the base layer (A) is linked to the model of the old map (B) leading to a distorted base layer (A'). This has the advantage that the old map does not have to be distorted and that the relevant data always ends up in the right position and any lettering on the old map always remains readable. Furthermore, the old map can be positioned in the right direction, resulting in an optimal map image in relation to perspective. In the case of Utrecht the three plans would have east on top. In the current application, however, we see a northward orientation. This can be solved by adding a rotation function; a function we hope to create in the near future.

Using the old map as a base layer for geodata to be georeferenced would not have been so easy for the Utrecht application however. With three different old map layers the database with printers' data would also have to be provided with three different distorted base layers. And in that case, also the interface has to be designed for the presentation of these different map layers and base layers. But maybe good solutions can be thought of if they have not already been found? For the time being in the current application the choice has been to link the early printers' and publishers' locations and the digitized old maps to a modern map layer. The user will have to use some spatial intuition, although improving the georeferences of the oldest map is in part of the plan. Of course we always welcome useful tips for improvements and further developments.

Concluding remarks and recommendations

All in all through the new website *Geocontexting Printers and Publishers* a splendid temporal-spatial approach to studying the early history of printers has become available. This site gives researchers, students and other interested parties access to a handy tool for analyzing the historical world of printers and publishers. Combined with 'linked open data' geographical visualizations are a powerful means to a clear presentation and interpretation of complex spatial phenomena and processes. In this way a clear corpus was created which gives a good visual impression of Utrecht as cradle of the art of book printing in the Northern Netherlands. The application can be used as such in the teaching and research of the history of books, but is also useful for other target groups such as the citizens of Utrecht and other interested parties. It fits in perfectly with the policy of Utrecht University Library. As an innovative organization the library wants to link the old documents of the Special Collections to new techniques. In an attractive and stimulating way the library gives access to its knowledge and material about the city and university of Utrecht to science and to parties outside the academic community.

In the future the application of *Geocontexting Printers and Publishers* will be further developed by the University of Amsterdam. In this respect we may think of an expansion with other Dutch

and European printers' cities, but for instance also reconstructing the possessions of former cloister libraries could become possible. In addition, we aim at creating a link with the CERL Thesaurus.

Based on the experiences gained in the project 'Early Utrecht Printers and Publishers on the Map' the following recommendations can be made, which may be of service to other existing and still to be developed applications:

- Dependent on its original reason for production, each old map has its own specific qualities; when applying georeferenced historical map layers in an application one should be well aware of this and inform its users;
- When applying a georeferenced historical map layer it is recommended to use geodetically reliable maps;
- When showing spatial spreading patterns in combination with old maps a flat or orthographic projection is to be prefererred over a perspectival projection, even though this may result in a less lively and appealing image.

Finally: the famous 16th-century map maker Abraham Ortelius already said: 'Historiae Oculus Geographia' (geography is the eye of history). And so it is, at a single geographical glance history reveals itself, also in our own digital world!

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