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THE ROAD (NOT) TAKEN. RECONSTRUCTING PRE-MODERN ROADS IN VIABUNDUS. METHODS AND OPPORTUNITIES

1. Introduction

The Viabundus project (www.viabundus.eu), which was initiated in 2019 as a collaboration between the University of Göttingen and the Research Centre for Hanse and Baltic History Lübeck, provides a digital infrastructure for the research into pre-modern traffic and mobility in Northern and Central Europe in the period of 1350-1650. A first version of the growing platform has been launched in 2021 and is currently running its second update. The map and its underlying database consist of several elements, most prominently the reconstructed routes of pre-modern highways.

Pre-modern mobility has long been an issue in all historic disciplines and has been discussed in several different contexts. Since mobility is not a static construct and its nature is movement within time and space, visualizing it on maps has always been a difficult task in research. Even though roads tend to show a high path dependency in terms of trajectory and frequentation, they bring their own methodological challenges when it comes to mapping. The static and two-dimensional nature of maps, however, brings its own problems that need to be reflected in any endeavor that relies heavily on them.

In Germany, attempts at the reconstruction of roads go back to the field of Historical Geography (Denecke 2019), mostly and most accurately on a regional level (recently Fütterer 2016; Herzog 2017), some more on a super-regional level, such as the *Atlas Hansische Handelsstraßen* (Bruns, Weczerka 1962), on which Viabundus is based. Archaeological research focuses on Roman roads, either those that survived or probable trajectories, reconstructed by use of Least Cost Path Analysis (Verhagen *et al.* 2019). Projects that inspired Viabundus include ORBIS The Stanford Geospatial Network Model of the Roman World (https://orbis.stanford.edu/) and viator-e (https://viatore.icac.cat/map/).

While the general layout and data structure of the Viabundus project have been described elsewhere (Holterman *et al.* 2022), this paper will focus more on the exact methods and associated problems in the reconstruction of roads, as well as show a quick and rudimentary application of the Viabundus-data in combination with data on pilgrim badges provided by courtesy of the Kunera project[1].

[1] We thank the colleagues from the Kunera project for the dataset used in this article. Please visit https://kunera.nl/en for their online viewing tool.

2. Reconstructing roads. methods, problems and perspectives

As with any reconstruction of roads, it has to be kept in mind that the results do not necessarily show an accurate historical situation, but rather give us an idea of routes. Routes in this case are meant as the general direction of travel, the idea of the direction one had to take in order to arrive at the destination. The road in this regard is the exact path within the terrain, which is heavily defined by geographical conditions. Following this understanding, roads are highly variable due to changing geographical or climate conditions (Robert 2009). Several roads can run along the same route and in fact, it has to be assumed that the road network consists of parallel-running roads that lead to a destination in a poly-linear fashion (Fütterer 2016). This presents a problem within any mapping endeavor: while it may be the aim to be as accurate as possible within the visualization, showing the trajectory of every road within a route could lead to very unclear and confusing maps. On the other hand, only showing one example of a road consolidates the very modern, but false, impression that there was one "right" way to choose in order to arrive at one's destination, much in the sense of a modern highway.

Since this dichotomy cannot be solved at this point, it is important to stress that the displayed connections within Viabundus are routes. Keeping this in mind, there are some general guidelines which may lead to more accurate road reconstructions which help make some educated guesses at the historical course of a road. Depending on the researcher's background and access to sources, the approaches to the reconstruction of roads may differ: the traditional historical approach entails the mapping of stations along a road mentioned in the sources, while the archaeological approach focuses on the mapping of road relics in the field. It has been long acknowledged that the combination of several approaches yields the most accurate results.

2.1 *Reconstruction based on written sources*

Especially for the reconstruction of medieval roads, researchers are in the fortunate situation to have access to written sources that describe historic travel routes. For the Early Middle Ages, royal itineraries feature prominently, which are joined by toll accounts in the High and Late Middle Ages; personal travel accounts complete the broad scope of sources that give us insight into medieval travel. There are several works that have used exactly these sources to scrutinize medieval mobility, with very interesting results. While questions concerning the practice of ruling in itinerant kingship, strategies of economic control or cultural contact (Müller-Mertens 1980; Reichert, Stolberg-Vowinckel 2009; Straube 2015) can be adressed, there are precious few mentions of roads themselves. Mapping the mentioned places usually results in straight lines leading from A to B with no idea of the actual

path taken. The picture within the source material needs to be refined by supplementing the rather general images with the knowledge of infrastructure or overlaying several known travel itineraries, or by synchronizing itineraries with known road relics.

2.2 *Reconstruction based on maps*

Large quantities of the mapping in Viabundus have been undertaken using the retrogressive method of referencing historical maps. However, the first known maps tend to be more or less symbolic representations of the world, which were not necessarily meant to be used by travelers (Baumgärtner 2008). Even maps from the 16th century, which appear to represent the first geographically accurate visualizations of the landscape, tend to be simplified or idealized, since they were still not meant for travel orientation. The first measured and triangulated maps only start to emerge at the beginning of the 19th century, which are therefore the first maps that can be used for the reconstruction of roads. Only in the Low Countries and Flanders, the first triangulated maps were created in the 16th century, most notably by Jacob van Deventer, whose maps were largely used in the research of Dutch Viabundus.

However, this does not necessarily mean that the roads reconstructed from maps all stem from the 17th century. It can be assumed that several roads already existed and have existed for a while by the time they were mapped. Historical records may give indications in this regard, as well as the founding dates of towns and villages or the mention of bridge tolls, watchtowers or inns that lie along the roads, which are also recorded within Viabundus. Only with the beginning of the 18th century and the emergence of causeways that were much more straightforward than the preceding poly-linear roads, a careful review of the roads is in order. While causeways much more resemble modern highways in that they were built regardless of geographic obstacles, some may have been founded on medieval roads, while others were entirely new creations. However, even in these "newer" maps, medieval roads can still be found. They are usually displayed as secondary roads and appear much more crooked than the orderly causeways.

2.3 *Reconstruction based on infrastructure*

Traffic-related infrastructural elements provide a necessary addition to the reconstruction of roads. While written sources may remain vague, the knowledge of such infrastructure gives us a clearer idea of where a road may have had its course. However, "infrastructure" is quite a broad term in this context. While the discussion on how well different points of infrastructure indicate the existence of a road must take place elsewhere, in Viabundus some specific elements were taken into account (Fig. 1). These include first and foremost settlements (including castles, monasteries or watchtowers) and

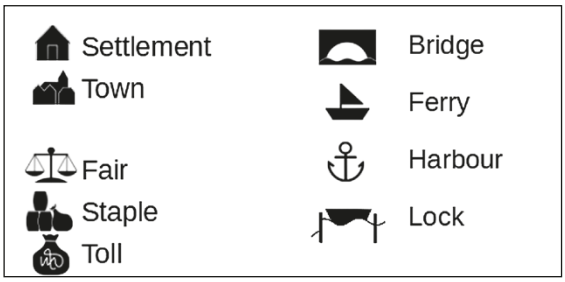

Fig. 1 – List of attributes recorded in Viabundus.

towns, which are the backbone of the traffic network, but also traffic facilities like bridges, ferries or fords, controlling instances like toll stations or staples, as well as economic focal points, such fairs or harbors.

In addition to scattered mentions within primary sources, information on such points of infrastructure may be derived from different areas: There are works that deal specifically with toll and customs stations (Pfeiffer 2015; Straube 2015). Other local studies that often describe infrastructural elements are the histories of towns. Historical maps may also indicate the existence of vanished infrastructure and therefore give a starting point for the search for those facilities. In the course of Viabundus' creation, it has become more and more apparent that a street map cannot be complete without the corresponding infrastructure, which prompted the attempt at the inclusion of thorough information on the points mentioned above.

2.4 *Reconstruction based on archaeological methods*

Road relics in the terrain let us reconstruct historic courses of roads quite accurately and have given us a good idea on where medieval roads can be found. Based on the findings of physical road relics, there are some general observations one can follow that make the course of a road plausible (Denecke 1969, 1979). Some observations include that roads tended to avoid wet river valley areas, as these were prone to flooding. A much more reliable path was found on the watersheds of rivers, for which even steep inclines were overcome. We can see the formation of holloways at such inclines and oftentimes, such holloways run parallel to each other, which indicates the continued usage of certain ascents. Modern digital data, such as Digital Terrain Models (DTM) based on aerial photographs and Lidar scanning, are a widely-spread tool to identify such creases and holloways in the terrain.

The main problem with road relics however, is that of dating. While the relation of holloways to each other may tell us about their relative chronology, in most cases only tangible finds may make absolute dating possible. Most

often, the knowledge of such road relics is the result of personal inspection of researchers or the analysis of digital terrain models or Lidar-scans; systematic excavations or surveys are rarely undertaken, which then do not yield any findings.

For medieval roads, excavations outside urban areas are rare. Due to the lack of pavement and the fluctuating character of the unpaved roads, it is hard to pinpoint the location for an excavation. Additionally, there is the question on what one hopes to achieve by excavating what is essentially a dirt road. In the end, the holloway merely shows us a pre-modern pathway, but we rarely know how old it really is. Therefore, the information on specific road relics in Viabundus is equally sparse.

3. Highway to salvation: case study on pilgrims and roads

The potential of Viabundus lies not only in the visualization of medieval roads, road systems and networks, but also in the possibility of combining it with other datasets that relate to mobility. Kunera (https://kunera.nl/en) is a database with a free web application by the Radboud University in Nijmegen (NL). It collects and visualizes the points of origin, as well as the finding places of medieval pilgrim badges and *ampullae*, therefore serving as a database on medieval visual culture as well as pilgrimage. As a focal point of medieval mobility, pilgrimage appears to be one of the natural crossover points with Viabundus.

While the combination of the data does not answer questions per se, it does lead in interesting directions. First of all, the main and most basic point of interest would be how the finding and production places of pilgrim badges relate to the roads mapped in Viabundus. This opens questions to the traveling routes of pilgrims (Figs. 2, 3). The simple co-visualization of Viabundus and Kunera-data already gives us first insights[2]. Using the well-researched area of the Netherlands as an example, one can clearly see how a majority of both the finding places and the origins of pilgrim badges correlate with the roads mapped in Viabundus. This is especially striking since the data in this map is not differentiated by date, i.e. the mostly late-medieval roads seem to correlate with the high to late medieval pilgrim badges, indicating that the routes seem to be older than originally thought and show a high persistence. Though some locations of pilgrim badges appear to be just off the roads, this does not mean that the data is not accurate: Viabundus maps the main roads apt for long-distance traffic on carts and wagons and not several parallel routes and footpaths that lead to and from the main road.

Given the fact that the intention of the Viabundus project was to facilitate research in economic history, it is quite interesting how well the dataset

[2] The data used for this paper is based on Viabundus version 1.2 from 21.09.2022.

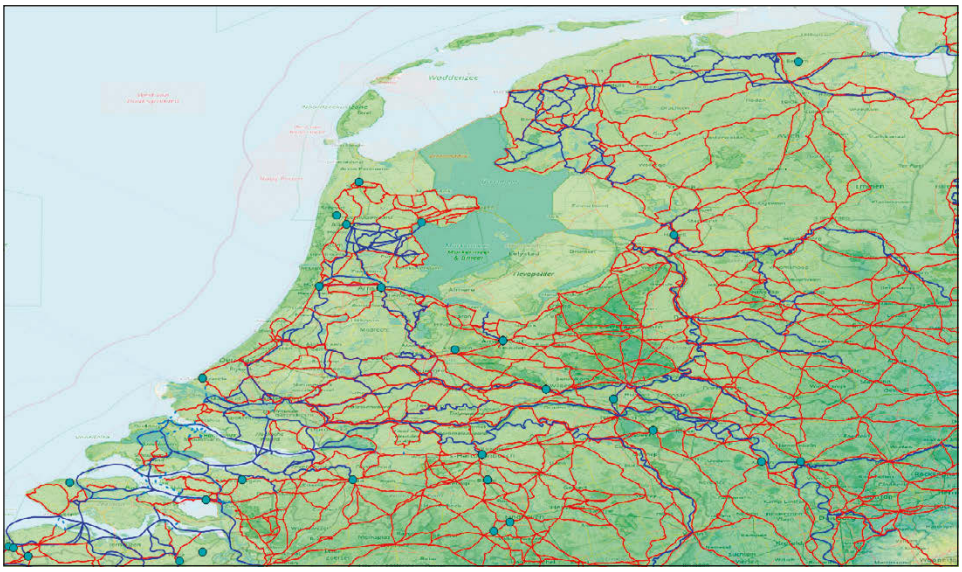

Fig. 2 – Origin places of pilgrim badges in the Netherlands with the traffic network 1350-1650.

Fig. 3 – Finding places of pilgrim badges in the Netherlands.

matches with the mobility of pilgrims (who are a mostly urban phenomenon). Religious mobility seems to have moved along the same lines as traders. This gives rise to the question whether we can think religious and economic mobility as separate entities or if the infrastructure provided for pilgrims were also welcome amenities to trading caravans and the like. Others have already pointed out that commercial accommodation, i.e. inns, were the result of an increasing number of pilgrims on medieval roads and the fact that Christian establishments like hospitals and monasteries were not able to accommodate the masses anymore (Schmugge 1983). Therefore, paid accommodation developed, which, in consequence, functioned as places of trade as well (Peyer 1987). This correlation suggests that «the merchant on a pilgrimage and the mercantile pilgrim merge into a lucky symbiosis» (Schmugge 1983, 59; translation by author). It is therefore only natural that the same routes were used. The fact that most of the origin sites of pilgrim badges find themselves along the same routes as well suggests that it would not have been a difficult endeavor to combine pilgrimage and trade. Even if a large majority of pilgrims was not merchants, the data suggests that merchants and "full-time" pilgrims may have used the same routes and shared infrastructure.

4. Conclusion

While the reconstruction of pre-modern roads is an inaccurate science at its best, this article has shown that there are several approaches that lead to acceptable approximations of medieval roads. At the same time, for most applications a close approximation to a route may be more serviceable than the actual reconstruction of all historical roads that ran within an area. Viabundus aims to provide such approximations in the awareness of all methodological problems. Combining Viabundus data and Kunera data has shown the research potential within the street map. By correlating road data with existing data on other categories of material culture, new approaches to pre-modern mobility can be found and long-standing assumptions may be further solidified.

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ABSTRACT

The Viabundus pre-modern street map attempts to show medieval and early modern traffic connections. However, mapping medieval and pre-modern land routes comes with methodological challenges which are reflected upon in this paper. The reconstruction is based on written and archaeological sources, historical maps, and establishments of traffic infrastructure. Correlating the data with the origin places and finding places of pilgrim badges shows the research potential of the endeavor, as the simple co-visualization of the data already provides interesting connecting points.