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Reconstructing medieval landscapes: the Austrian research project *Tabula Imperii Byzantini* and its work in Western Anatolia

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Abstract

The research project *Tabula Imperii Byzantini* (TIB) of the Austrian Academy of Sciences in Vienna is dedicated to the historical geography of the Byzantine Empire; i.e. to the space, landscapes and settlements of the Eastern Mediterranean, mainly between the 4th century AD and the middle of the 15th century AD. The project was founded by Professor Herbert Hunger in 1966 and deeply inspired by the work of the well-respected project *Tabula Imperii Romani* (TIR) whose investigation period usually ends in the late 3rd century AD. Thirteen volumes of TIB have been published to date, the first one in 1976 and the last one just recently in April 2020. The majority of the books are dedicated to landscapes in Anatolia, the Aegean Sea and the Balkan Peninsula, to the core areas of the Byzantine Empire, but an additional volume with nearly 2,700 pages focuses on Northern Syria. This paper begins with basic information on the origins of the research project, its history and developments, including methodological improvements. Following this, the article will focus on the work in Anatolia and finally present some new observations concerning the situation in late antique and medieval Western Asia Minor.

Keywords: Historical geography, cartography, Late Antiquity, Byzantium, Anatolia.

1. The early days of the *Tabula Imperii Byzantini* research project

The research project entitled *Tabula Imperii Byzantini*, meaning "Atlas of the Byzantine Empire" has existed for more than fifty years. Professor Herbert Hunger (1914-2000), in later years president of the Austrian Academy of Sciences in Vienna (1973-1982), presented the concept of a research project dedicated to the historical geography of Byzantium at the 13th International Congress of Byzantine Studies in Oxford in September 1966. On this occasion, he emphasised the exemplary function of the congeneric *Tabula Imperii Romani* project that had been founded in 1928 with the intention to create a map of the whole Roman Empire, based on the International Map of the World (IMW) and at a scale of 1:1,000,000. In his presentation, Professor Hunger also underlined the need for local maps with a more precise scale for areas with a high density of relevant historical places[2].

Two months later, on 23 November 1966, the Austrian Academy of Sciences established a research institution for Historical Geography of the Eastern Mediterranean, the *Commission of the Tabula Imperii Byzantini*. This was the official birth of the research project which is now in its 55th year. Professor Hunger was appointed head of the Commission and among its members were such admirable scholars as the classical philologist Albin Lesky (1896-1981), the archaeologist Hermann Vetters (1915-1993), the art historian Otto Demus (1902-1990), the geographer Hans Bobek (1903-1990) and the

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2. Hunger 1967, 481. Külzer 2019a, 85-86. Külzer 2020, 14.

cartographer Erik Arnberger (1917-1987)[3]. In December 1966, Professor Hunger gave a precise description of the general approach and scientific aims of the project. The general map should be at a scale of 1:1,000,000 and the local maps at a scale of 1:200,000. The atlas should mention not only cities and larger settlements but also villages and estates, rivers, lakes and mountain ranges with historical importance, documented by either literary sources or archaeological remains between the late 3rd/early 4th century AD and the middle of the 15th century AD. A special volume providing a detailed catalogue of lemmata, a gazetteer of all the mentioned toponyms, should accompany each map. Each lemma must follow an accurately defined structure, starting with a precise description of the location of the historical site and a list of all its historical name variants, documented not only in Greek and Latin sources but also, if available, in Slavonic, oriental or western vernacular languages. In this process, priority is always given to the Greek variant; the Greek term is the relevant one for positioning the site within the catalogue. For the sake of completeness, places whose historical name remains unknown but which have archaeological remains that reveal their former importance, should be included in the gazetteer as well, classified under their current name.

Afterwards, each lemma should note, in a separate chapter, important historical events connected with the individual sites, including historical events related to religion, culture and society, paying particular attention to the oldest and most recent evidence in the period under observation. Another chapter should list the relevant monuments connected with the individual sites, such as fortifications, fortresses, major houses, palaces, churches and monasteries, as well as bridges and preserved road sections; at the end, there should be a catalogue of the notable academic literature[4].

However, the single volumes are more than just compilations of data. They also have an analytical function, focusing particularly on historical events and church history, trade and economics, based on the information given by the sources. The main roads and, in coastal areas, also the trans-regional network of sea routes have to be presented. Each volume is completed with information concerning the geography and climate, vegetation and natural resources. In this way, regional and historical narratives emerge that have relevance not only for scholars dealing with the eastern Mediterranean in late Antiquity and the Byzantine period but also for a wider community of academics focusing on historical geography, landscape archaeology and cultural history in general[5]. It was clear from the start that such a project could not be carried out by bookish academics working exclusively from their desks in Vienna; regular field trips into the individual areas of operation were (and are) an absolute necessity.

Obviously, these areas of operation needed a more precise definition. The decision was to delimit the individual geographical regions and working areas for the *Tabula Imperii Byzantini* project based on the division of the Late Roman provinces, as recorded by the geographer Hierocles in the 6th century AD. His compendium *Synekdēmos*, which translates as "Travelling companion" and is essentially based on older documents dating back to the early 5th century AD, mentions 923 settlements in 64 provinces[6]. This accurate administrative division has no equivalent in later centuries of the Byzantine period. An initial proposal to use the system of *Themata* that had developed from the 7th century AD onwards was soon discarded, since their boundaries cannot always be determined nowadays; furthermore, some settlements such as Smyrna (İzmir) and Adramyttium (Edremit) in Western Anatolia, to mention just a few, belonged simultaneously to different *Themata*[7]. The requirements for absolute accuracy that are essential in creating a scientific atlas were not met by this system of

3. Hunger 1966, 51-52. Külzer 2019a, 88-89. Külzer 2020, 15.

4. Hunger 1966, 52-53. Hunger 1979, 115. Hunger 1991, 275. Külzer 2019a, 88-89.

5. Hunger 1979, 111-112. Hunger 1991, 275. Külzer 2020, 17.

6. Honigmann 1939. See also http://awmc.unc.edu/awmc/applications/bam/modules/hierokles (11.02.2021). Jones 1971, 514-521.

7. Külzer 2019a, 91, 118 Fig. 1. Concerning the *Themata*, see Haldon 2005, 68-73, 105, 128, 130. Koder 2017, 14-16.

classification. It was therefore indispensable to take Hierocles and the arrangement he had recorded as the basis for research. Responsible for this classification was Johannes Koder, in those days assistant Professor of Professor Hunger, and in later years his successor in the function as chair of the Commission.

The research work started with an analysis of selected Byzantine written sources, mainly the writings of medieval historians and geographers. Already in the autumn of 1965, one year before the initiation of the project, students of Byzantine Studies and related disciplines had begun to look through these writings in search of valuable topographical information. By July 1968, they had annotated more than 12,000 index cards and, by 1970, the number of cards exceeded 45,000[8]. Most of these cards still exist, preserved in the archive rooms of the project after careful evaluation of the information provided.

2. Methodological developments

A research project can only exist for several decades if it constantly reviews its methods and, if necessary, extends and improves them. In the beginning, the research consisted of evaluating four types of sources: Firstly, the *literary sources* composed in late antiquity and the Middle Ages. Besides historical and geographical writings, hagiographical texts, documents, sea charts and itineraries are also included, as well as inscriptions and seals. Most of the material is written in Greek but in some cases it is in Latin, Slavonic, Oriental or western vernacular languages. Secondly, the *archaeological material*. This comprised not only the larger structures of a site, preserved either physically or documented in the literature, but also its ceramics and small finds, which are often important to determine its age in general. Thirdly, the *onomastic sources*, the toponyms which transfer memories of a former function or building. A place called "Manastır" for example, indicates the former presence of a monastery[9]. Fourthly, the *physical* or *geographical realities* of individual sites, including their climatic conditions, water resources, ground conditions and geological structures[10]. The geographical reality of a site changes constantly. There is a continuous transformation of space due to political, social or geomorphological factors such as changes in settlement, sedimentation and sea level fluctuation, changing river courses, soil salinisation, drawdowns and much more. Researchers must reconstruct the *former* landscape and its special conditions and never use the current territory for academic theories. In our case, this approach has led to a vital methodological enhancement; since at least the 1980s, the *Tabula Imperii Byzantini* has taken into account scientific results from dendrochronology and pollen analysis, from paleo-climatology and geomorphology, to mention just a few disciplines, insights from environmental history in general which have enriched the former practice that was exclusively focused on Humanities[11].

This methodological innovation helps to bring us closer to the historical reality and the volumes accompanying the maps benefitted immensely from this diversification. The same applies to the settlement theories that have been included into the project since the mid-1980s[12]. The statements of literary sources in particular provide a kind of historical snapshot, with particular interest in the lives of the upper classes, especially those living in the capital Constantinople. In most cases, the late antique and medieval authors were not interested in the countryside or the local matters of daily life and commonplace events. To get such information, researchers can resort to the concrete data from archaeological excavations, already analysed since the beginning of the project, as well as the theoretical details gained from two research theories: *Location Theory* and *Central Place Theory*. Using a combination of both, historians can reconstruct more details concerning villages and marketplaces, the cultivation of agricultural goods, land use, the distribution of fields and

8. Bulletin 1968, 42. Bulletin 1971, 18. Hunger 1972/1973, 82-83.

9. This toponym has been attested several times in north-western Anatolia, see TIB 13, 1178.

10. Koder 2010, 15-21. Külzer 2010, 174-180.

11. For example, see Koder 2010, 15-17. Külzer 2018a, 75-81. Telelis 2000, 223-243. Telelis 2005, 41-50.

12. Koder 1986, 155-187. Koder 1996, 84. Koder 2006, 159-183.

arable land and the pastures and wooded areas around individual sites, as well as local trade and commodities. However, these results are only relevant to complete the picture; the information provided by the four types of sources mentioned above takes priority as it is more reliable.

Furthermore, the time frame for the period under discussion has developed and been extended, in both directions. According to the concept of Professor Hunger, the individual maps of the *Tabula Imperii Byzantini* should depict the situation between the late 3rd/early 4th century AD and the mid-15th century AD. However, in line with the idea of settlement continuity, the Roman period became more relevant for the project. Several places and villages mentioned in literary sources from the 1st or 2nd century AD, for example in the writings of Strabo of Amaseia (ca 63 BC-23 AD) or Plinius Secundus (23-79 AD), were probably inhabited until the 4th century and the beginning of the early Byzantine period. Therefore, it was decided to incorporate these places into the maps and describe them in the volumes as well. This development was especially important for scholars dealing with Antiquity and the maps of the research project became even more relevant to them.

The upper time limit was also redefined and significantly extended up to the 19th century, Christian and Jewish sacred buildings from the post-Byzantine period marked, with only few exceptions, the location of an older equivalent. Only in the reign of Sultan Abdül-Mecid I (1839-1861) did the religious minorities of the Ottoman Empire get permission to build churches or synagogues on sites where none had existed before, such as the Haṭṭ-i Şerif of Gülhane, dated 3 November 1839 and, in a later addition, the Haṭṭ-i Hümâyûn, dated 18 February 1856. Therefore, sacred buildings erected before the mid-19th century should be included in the volumes in order to represent the historical reality of the Byzantine Empire more accurately[13].

From 1984 onwards, the volumes of *Tabula Imperii Byzantini* were enriched with photographs in order to document special landscapes and monuments in the individual working areas and to record their status. This measure was of particular importance due to the immense decline experienced by medieval monuments in scientific terms since the late 1970s/early 1980s. Earthquakes and other natural disasters have always caused destruction in the eastern Mediterranean and there has been a continuous loss of buildings and architectural masterpieces over the centuries. However, the increased industrial development of the landscapes that started in the 1970s increased this destruction even further. Construction work for roads and dams, urban sprawl and the shifting of villages, but also illegitimate excavations by treasure hunters, have been responsible for these alterations and demolitions, whose real extent was unknown. These facts show the importance of documentation and the project's photographic archive has grown with each field trip. To date, the archive contains more than 52,000 slides, about 25,000 monochrome pictures, and more than 15,000 digital photos. Only a small sample of this material can be published but, as a whole, it constitutes a valuable historical inventory prepared for the scientific community and ready for further research[14].

According to the original concept, the individual maps of *Tabula Imperii Byzantini* should be presented at a scale of 1:1,000,000. Already in the autumn of 1970, however, it was decided, mainly at the suggestion of Viennese geographers and cartographers, to change the scale to 1:800,000 to facilitate lemmata and inscriptions. The project dismissed the idea of borrowing from the International Map of the World and, with this new scale, established a criterion of its own. To improve the accuracy of the maps, the *Global Positioning System* (GPS) has been used more and more since the beginning of the 21st century. The has opened the door to the new and manifold possibilities offered by digital cartography and we will talk about this later. Furthermore, the use of Digital Humanities, especially in the form of *Historical Geographical Information Systems* (HGIS), improve the accuracy of the individual maps and enrich the data material presented [15].

13. Koder 1996, 80-81. Külzer 2020, 23-24.

14. Polloczek 2020, 183-196. See also the comparison of the situation now and then in Külzer, Polloczek, Popović 2020, 219-238.

15. Kelnhofer 1976, 5. Popović 2020, 157-181. Doukas, Demoula 2015, 791-812.

3. *Tabula Imperii Byzantini* and the mapping of Anatolia

The academic tradition of mapping Anatolia and its historical situation was already active in the 19th and early 20th centuries. Among others, one can refer to Heinrich Kiepert (1818-1899) and Alfred Philippson (1864-1953), both of whom created several maps which are still useful today[16]. However, in some cases recent research has enriched the historical and geographical knowledge depicted in these works and numerous landscapes and areas appear, today, in a completely different way. This explains the need for new maps of Asia Minor that reflect our current scientific knowledge. Unfortunately, there is no single map of Anatolia within the project of *Tabula Imperii Romani* at present. Therefore, the research work of *Tabula Imperii Byzantini* into these extensive landscapes is significant for scholars interested in the ancient period and also in Late Antiquity (Fig. 1).

The first field trip to Anatolia was carried out in 1969 and a second in 1971. The first volume of *Tabula Imperii Byzantini* appeared in 1976 and was dedicated to Hellas and Thessalia, central regions of modern Greece[17]. One year later, in 1977, the first volume dealing with Anatolian matters appeared. It was dedicated to the road system in Cappadocia and part of a subseries, entitled *Veröffentlichungen der Kommission für die Tabula Imperii Byzantini* (VTIB), whose aim was to provide the opportunity to discuss certain issues in more detail. The analytical approach of the regional communication networks developed here became exemplary for later publications[18]. Another VTIB volume published in 1979 discussed the early Byzantine architecture in Cappadocia[19]. Two years later, in 1981, the second volume of *Tabula Imperii Byzantini* appeared, this being the first one to deal with the countryside of Anatolia. The book describes Cappadocia and neighbouring landscapes[20]. Together with a volume of 338 pages, four maps were presented to the public: a topographical map and a thematic map of the region, both at a scale of 1:800,000 and two local maps showing micro-landscapes of special interest, both at a scale of 1:5,000.

The lemmata on the thematic map represent settlements, fortresses and sacred buildings and distinguish between fortified settlements, unfortified ones and unfortified ones with a fortified acropolis; between smaller and bigger fortresses and legionary camps; between monasteries, single churches in a landscape, chapels and so-called *hagiasmata*, places with a holy spring or fountain. The operational phases of the individual sites are expressed by different colours, distinguishing between a use in the 4th-7th century, the 7th-10th century, the 10th-13th century and the 13th-15th century. Other colours can represent continuous use from the 4th-15th century or vacancy that lasted for some time (Fig. 2). Different colours indicate whether a notation or place name is an old or modern one. A decreasing value for the lemmata (from settlements to fortresses, from monasteries to single buildings) ensures clarity and prevents too many entries at the same site; the complete stock of buildings beyond the lemma in question is explained in the individual lemmata of the volume[21].

This lemma concept was applied without major changes during the following decades. In 1984, the next volume on Anatolia appeared, dedicated to Galatia and Lycaonia; i.e. the landscapes around the Turkish capital Ankara and its wider hinterland. This includes two maps at a scale of 1:800,000: a thematic one and a topographical one, and altogether 69 figures, five in the text and 64 at the end of the volume. Two years later, a new book in the VTIB series introduced Cilicia[22] and, in 1990, the complete volume on that important region of Asia Minor appeared[23]. Besides the two usual maps at a scale of 1:800,000, this includes a local map of the area of Seleucia at a more detailed scale of 1:200,000, as well as 402 figures documenting numerous details of the region. In the same year, a volume with two maps at a scale of 1:800,000 also appeared, focusing on the historical provinces of

16. Among others, Kiepert 1890-1892. Philippson 1910. Philippson 1912.
17. TIB 1.
18. Hild 1977.
19. Restle 1979.
20. TIB 2.
21. TIB 2, 12-14.
22. Hellenkemper-Hild 1986.
23. TIB 5.

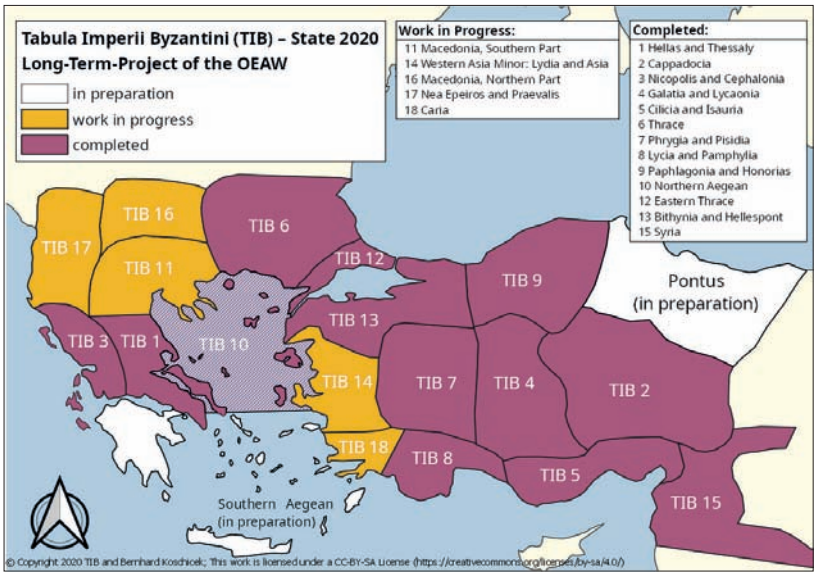

FIGURE 1. *Tabula Imperii Byzantini*, State of Research 2020.

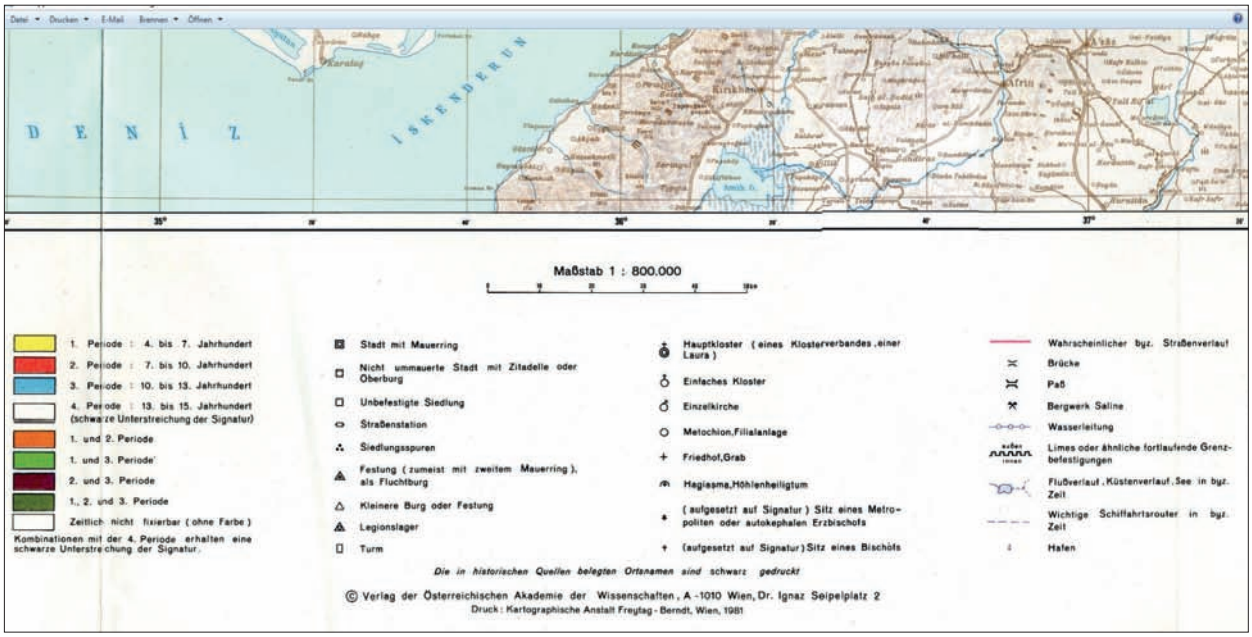

FIGURE 2. *Tabula Imperii Byzantini* "Cappadocia", map legend.

Phrygia and Pisidia. This contains 462 pages and 161 figures were attached[24]. Among other sites, the volume describes the history and archaeological remains of important settlements such as Dorylaion (Eskişehir), Hierapolis (Pamukkale) and Laodikeia (Denizli).

The next volume of *Tabula Imperii Byzantini* appeared in 1996, dedicated to the former provinces of Paphlagonia and Honōrias, creating a narrative from the late antique and medieval Black Sea region to the northern borders of Galatia. In combination with the older volumes, at this point all the parts of central Anatolia between the Mediterranean Sea and Black Sea had been mapped at a scale of 1:800,000[25].

24. TIB 7.

25. TIB 9. Concerning Eastern Anatolia, the landscapes that belonged to the former province of Pontos have yet to be adapted within the context of the project.

Since that date however, the tradition of two maps at a scale of 1:800,000 has been abandoned. From this point on, only the thematic map survived while the topographic map disappeared, mainly due to financial reasons[26]. However, this fact was less serious because the Viennese publishing house Freytag & Berndt published a Map of Turkey in 1992, developed in close cooperation with the staff of *Tabula Imperii Byzantini*. This map has been reprinted several times up to the present day and forms the topographical basis of all the maps of western and central Anatolia[27].

In the year 2000, a new volume of the VTIB series exemplified the constant engagement of the project *Tabula Imperii Byzantini* with methodological considerations and improvements; its basis were selected papers presented at a conference held in Vienna in December 1997[28]. The volume on Pamphylia and Lycia that appeared in 2004 is comprehensive, with more than 1,200 pages and 452 figures. Together with the thematic map at a scale of 1:800,000 which also offers various addenda to the southern parts of Phrygia, it contains three local maps. Two of these, using a scale of 1:400,000, focus on central Lycia and north-west Lycia, while one map at a scale of 1:200,000 shows the wider coastal area of west Lycia[29]. The latest volume of *Tabula Imperii Byzantini* appeared recently, in 2020, after long, intensive research work that started back in 1996 and has resulted in over 1,200 pages and 325 figures[30]. This contains a thematic map at the usual scale of 1:800,000, two local maps at a scale of 1:400,000 depicting the east coast of the Propontis and the Troad, and one map at a scale of 1:100,000 focusing on the Bosporus. Due to fact that this volume has taken so long to produce, the Global Positioning System and other digital cartography tools that have became important for the project as recently as the early 21st century were used only occasionally. The locations and placing of significant items between the north-east Aegean and the south-western parts of the Black Sea are mainly presented in a traditional format, without using the great potential of modern techniques. The project started to engage seriously with digital cartography in 2003 when the staff of the *Tabula Imperii Byzantini* visited a workshop at the University of Birmingham dedicated to the subject[31]. Two years later, the archaeologists Vince and Helen Gaffney gave an inspiring lecture concerning the possibilities of modelling routes and communications in former landscapes, at a second methodological workshop organised by the research project in Vienna[32]. This marked the beginning of digital cartography and the use of digital humanities by the project.

Nevertheless, due to the efforts of *Tabula Imperii Byzantini* a huge part of Anatolia has been mapped in the last few decades, proceeding from the eastern landscapes to the west. This great scientific achievement represents a valuable addition to the stock of maps from its sister project, the *Tabula Imperii Romani*.

4. Current research into Western Anatolia

The research work into Western Anatolia started early in 2009. This project focuses on the late antique provinces of Asia and Lydia, a region of about 35,000 square kilometres[33]. Within this huge area, Ephesus (Selçuk), Smyrna (Izmir), Pergamum (Bergama) and Assos (Behramkale) are among the historically significant places in Asia, and Sardis (Sart), Thyatira (Akhisar) and Philadelphia (Alaşehir) among those in Lydia. Extensive evaluation of historical writings, of academic literature, archaeological and geographical material and also six field trips between 2013 and 2018 provided numerous significant insights. These concern the location of historical sites mentioned in late antique and Byzantine sources, the discovery of settlement sites, medieval fortresses, harbour facilities, road sections and more. In north-east Lydia, it was possible to reconstruct several former communication routes running

26. TIB 9, 7-8.
27. Türkei 1992.
28. Belke, Hild, Koder, Soustal 2000.
29. TIB 8.
30. TIB 13.
31. A publication of the papers appeared three years later; cf. Haldon 2006.
32. Gaffney, Gaffney 2010, 79-91. For the conference in general, see Kislinger, Koder, Külzer 2010.
33. TIB 14.

through the Göl dağ and Simav dağları (Fig. 3). In central Lydia, various historical settlements were discovered in the region between Settae (Sidas kale) and Satala (Adala or Karataş), further to the west. In the former province of Asia, good evidence was unearthed for a dense settlement system within the Erythrai Peninsula (Çeşme Yarımadası) during the Byzantine period, refuting the previously prevailing idea of a sparsely inhabited landscape. And these are just some of the results produced[34]. The gazetteer of Western Asia Minor already has more than 700 entries and it is still growing.

Important in our context is the fact that the Global Positioning System has been used since the early days of the sub-project; this volume is the first to be dedicated to Anatolian landscapes with continuous accurate localisations; there are no ambiguities anymore, for instance regarding the information on distance from selected fixed points. This ensures that visitors can find the sites under discussion with minimum effort.

The geographical database GeoNames can easily enrich the material obtained in the field. After transferring the data to Excel files, these can be viewed in geoinformatic systems such as QGIS (Fig. 4). We used Google Earth to visualise our data and Web 3.0 technologies. First we use Google Maps, import data from an XLS file and then export to a KMZ file. This allows us to create dynamic, expandable maps which, unlike printed maps, have no editorial deadline. In addition, dynamic information is received via updates in an interactive, visual format. The Google Maps platform was chosen for its efficiency and ease of use, as it enables users to import data from a file via its web interface rather than entering them manually. It was therefore easy to produce a KMZ file (KMZ is the zipped version of a KML file) which was inserted into Google Earth, creating a 3D map. The KMZ file was uploaded to Google Drive (by creating a new "Project"), allowing anyone with the link to edit the map in real time, making any changes visible to the owners. One of the most significant benefits of this process is the ability to access the maps from anywhere (for instance, from a smartphone)[35]. These systems also make it easier to measure distances and recreate former communication routes. The next step will be to create a databank in the Open Atlas system, which will enable us to present the material in greater detail. The first area to be processed will be the region of Smyrna and its wider hinterland, including the river mouth of the ancient Hermus, modern Gediz çayı, a landscape for which a lot of information and data exist.

The Historical Geographical Information Systems (HGIS) was extremely useful for the Smyrna area as well. An analytical investigation of several 19th-century maps provided significant clues as to the location of villages and estates whose traces are hard to find today because of densely built-up urban areas. Of particular note are the maps made by L. S. Dawson 1888 and W. J. L. Wharton 1893, both based on surveys undertaken by Captain R. Copeland in the 1830s[36], and the famous map of the Lembos monastery by A. M. Fontrier, published in 1892[37].

The cartographic work of the *Tabula Imperii Byzantini* project in Anatolia has therefore been carried out on two levels. On the one hand, traditional cartography at a scale of 1:800,000, the generic criterion of the series, will continue. There will be a map of Western Anatolia using this scale, based on the topographical map mentioned above. The template exists and is pending the entry of data. On the other hand, however, there will also be a digital map of the whole region. This map will be integrated within the website of *Tabula Imperii Byzantini*[38]. As already mentioned, this has the great advantage of being able to update the map at any time and editorial deadlines that used to result in a *status quo* of each printed work will lose importance. The latest research results can be offered to the scientific community directly, avoiding the often-feared "obsolescence" of maps.

34. Among others, see Külzer 2016, 288-290. Külzer 2018, 741-748. Külzer 2019b, 150-157.

35. In this context, I would like to thank Mag. Georgia Theochari, Aristotle University of Thessaloniki, for her support.

36. Dawson 1888. Wharton 1893.

37. Fontrier 1892, Carte du Monastère de Lembos et de ses dépendances auprès de Smyrne au XIII siècle.

38. https://tib.oeaw.ac.at/index.php (22.02.2021).

FIGURE 3. The network of communication roads in the hinterland of Ephesus (Külzer 2019b, 150). Purple: traditional data // red: new data, results of the project work.

FIGURE 4. Lydia, *QGIS* 2.18 © Andreas Külzer, 2020.

Bibliography

BELKE, K.; HILD, F.; KODER, J.; SOUSTAL, P. (Hgg.) (2000). *Byzanz als Raum: Zu Methoden und Inhalten der historischen Geographie des östlichen Mittelmeerraumes*. ÖAW, phil.-hist. Kl., *Denkschriften* 283. Vienna.

BULLETIN (1968). N. N. "L'activité scientifique des Comités Nationaux. Autriche. Association Internationale des Études Byzantines". *Bulletin d'information et de coordination* 4, 40-43.

BULLETIN (1971). N. N. "Activité scientifique des Comités Nationaux. Autriche. Association Internationale des Études byzantines". *Bulletin d'information et de coordination* 5, 16-19.

DAWSON (1888). *Smyrna Harbour*, by Captain R. Copeland R. N. 1834. Corrections and additions by Captain T. Spratt C. B. R. N. 1859-60, and by Commander L. S. Dawson, R. N. 1887. London.

DOUKAS, I. D.; DEMOULA, S (2015). "Historical GIS (HGIS): An amply mature high-tech tool, to the decisive and effective help in the historical research". In: ARVANITIS, A., BASBAS, S. (eds.). *Cartographies of Mind, Soul and Knowledge.* Thessaloniki, 791-812.

FONTRIER, A. M. (1892). "Le Monastère de Lembos près de Smyrne et ses possessions au XIII[e] siècle". *Bulletin de Correspondence Hellénique* 16, 379-410 u. pl. XVIII.

GAFFNEY, V.; GAFFNEY, H. (2010). "Modelling routes and Communications". In: KISLINGER, KODER, KÜLZER (2010), 79-91.

HALDON, J. (2005). *The Palgrave Atlas of Byzantine History*. Basingstoke, Hampshire.

HALDON, J. (2006). *General Issues in the Study of Medieval Logistics: Sources, Problems and Methodologies*. *History of Warfare* 36. Leiden-Boston.

HELLENKEMPER, H.; HILD, F. (1986). *Neue Forschungen in Kilikien*. (*VTIB* 4). ÖAW, phil.-hist. Kl., *Denkschriften* 186. Vienna.

HILD, F. (1977). *Das byzantinische Straßennetz in Kappadokien* (*VTIB* 2). ÖAW, phil.-hist. Kl., *Denkschriften* 131. Vienna.

HONIGMANN, E. (1939). *Le Synekdémos d'Hiéroklès*. Brussels.

HUNGER, H. (1966). "Communications d'Intérêt Scientifique. Principes pour l'élaboration de la *Tabula Imperii Byzantini (T.I.B.)*". Association Internationale des Études Byzantines. *Bulletin d'information et de coordination* 3, 51-53.

HUNGER, H. (1967). "Das Institut für Byzantinistik der Universität Wien". In: HUSSEY, J. M.; OBOLENSKY, D.; RUNCIMAN, S. (eds.). *Proceedings of the XIII[th] International Congress of Byzantine Studies. Oxford 5-10. September 1966*. London-New York-Toronto, 479-481.

HUNGER,H.(1979)."Neue Forschungsprojekte". In: Association Internationale des Études Byzantines, *Actes du XV[e] Congrès International d'Études Byzantines. I Chronique du Congrès*. Athens, 111-115.

HUNGER, H. (1991). Bericht über die *Tabula Imperii Byzantini*. Entstehung – Aufbau – Fortschritte, *XVIII[th] International Congress of Byzantine Studies. Major Papers*. Moscow, 275-279.

JONES, A. H. M. (1971). *The Cities of the Eastern Roman Provinces*, 2nd rev. ed. Oxford.

KELNHOFER, F. (1976). *Die topographische Bezugsgrundlage der Tabula Imperii Byzantini. Mit 12 Tabellen und 16 Abbildungen im Text*. ÖAW, phil.-hist. Kl., *Denkschriften*, Beiheft zum 125. Band. Vienna.

KIEPERT, H. (1890-1892). *Specialkarte vom westlichen Kleinasien, nach seinen eigenen Reisen und nach anderen größtenteils noch unveröffentlichten Routenaufnahmen*. Maßstab 1:250.000. Eine Karte in 15 Blättern. Berlin

KISLINGER E.; KODER, J.; KÜLZER, A. (2010) (eds.). *Handelsgüter und Verkehrswege. Aspekte der Warenversorgung im östlichen Mittelmeerraum (4. bis 15. Jahrhundert*. ÖAW, phil.-hist. Kl., *Denkschriften* 388. Vienna.

KODER, J. (1986). "The Urban Character of the Early Byzantine Empire: Some Reflections on a Settlement Geographical Approach to the Topic". In: *The 17[th] International Byzantine Congress. Major Papers*. New Rochelle, N.Y., 155-187.

KODER, J. (1996). "Perspektiven der *Tabula Imperii Byzantini*. Zu Planung, Inhalt und Methode". *Geographia Antiqua* 5, 75-86.

KODER, J. (2006). "Land-use and settlement: theoretical approaches". In: HALDON, J. F. (ed.). *General Issues in the Study of Medieval Logistics: Sources, Problems and Methodologies*. *History of Warfare* 36. Leiden-Boston, 159-183.

KODER, J. (2010). "Handelsgüter und Verkehrswege: Problemstellung, Quellenlage, Methoden". In: KISLINGER, KODER, KÜLZER (2010), 13-24.

KODER, J. (2017). "Historical Geography". In: NIEWÖHNER, Ph. (ed.). *The Archaeology of Byzantine Anatolia. From the End of late Antiquity until the Coming of the Turks*. Oxford, 9-27.

KÜLZER, A. (2010). "Möglichkeiten zur Rekonstruktion historischer Landschaften: Die Historische Geographie". In: GASTGEBER, Ch.; GLASSNER, Ch.; HOLZNER-TOBISCH, K.; SPREITZER, R. (eds.). *Fragmente. Der Umgang mit lückenhafter Quellenüberlieferung in der Mittelalterforschung*. ÖAW, phil.-hist. Kl., *Denkschriften* 415. Vienna, 173-184.

KÜLZER, A. (2016). "Byzantine Lydia: Some Remarks on Communication Routes and Settlement Places". In: MAGDALINO, P.; NECIPOĞLU, N. (eds.). *Trade in Byzantium: Papers from the Third International Sevgi Gönül Byzantine Studies Symposium*. İstanbul, 279-295.

KÜLZER, A. (2018a). "Reconstructing the Past in a changing Landscape: Reflections on the Area of Ephesus and other Sites in Western Asia Minor", *Gephyra* 16, 75-90.

KÜLZER, A. (2018b). "Dornröschen erwacht… Neue Forschungen auf der Halbinsel Erythraia (Çeşme Yarımadası) im westlichen Kleinasien". In: DRAUSCHKE, J.; KISLINGER, E.; KÜHTREIBER, K.; KÜHTREIBER, Th.; SCHARRER-LIŠKA, G.; VIDA, T. (eds.). *Lebenswelten zwischen Archäologie und Geschichte. Festschrift für Falko Daim zu seinem 65. Geburtstag*. II. Mainz, 741-748.

KÜLZER, A. (2019a). "Herbert Hunger und die Historische Geographie: Geschichte, Gegenwart und Zukunft der *Tabula Imperii Byzantini*". In: KÜLZER, A. (ed.). *Herbert Hunger und die Wiener Schule der Byzantinistik: Rückblick und Ausblick*. *Studies in Historical Geography and Cultural Heritage* 2. Vienna-Novi Sad, 85-121.

KÜLZER, A. (2019b). "Roads and Routes: Communication Networks in the hinterland of Ephesos". In: LADSTÄTTER, S.; MAGDALINO, P. (eds.). *Ephesus from Late Antiquity until the late middle Ages. Proceedings of the International Conference at the Research Center for Anatolian Civilizations, Koç University, Istanbul 30th November - 2nd December 2012*. Vienna, 149-160.

KÜLZER, A. (2020). "Ein historischer Atlas zum byzantinischen Reich: Anfänge und Entwicklung der *Tabula Imperii Byzantini* (TIB)". In: KÜLZER, POLLOCZEK, POPOVIĆ, 2020, 11-30.

KÜLZER, A.; POLLOCZEK, V.; POPOVIĆ, M. (eds.) (2020). *Raum und Geschichte. Der historische Atlas Tabula Imperii Byzantini (TIB) an der Österreichischen Akademie der Wissenschaften. Studies in Historical Geography and Cultural Heritage* 3. Vienna-Novi Sad.

PHILIPPSON, A. (1910). *Topographische Karte des westlichen Kleinasiens.* Maßstab 1:300.000. Blatt I und III (Gotha 1910).

PHILIPPSON, A. (1912). *Topographische Karte des westlichen Kleinasiens*. Maßstab 1:300.000. Blatt II und IV (Gotha 1912).

POLLOCZEK, V. (2020). "Vom Bildarchiv zur Diathek der TIB". In: KÜLZER, POLLOCZEK, POPOVIĆ, 2020, 183-196.

POPOVIĆ, M. St. (2020). "Das Langzeitprojekt TIB im 21. Jahrhundert: Bestandaufnahme, Adaptierung und Methodenerweiterung in der Historischen Geographie des byzantinischen Raumes". In: KÜLZER, POLLOCZEK, POPOVIĆ, 2020, 157-181.

RESTLE, M. (1979). *Studien zur frühbyzantinischen Architektur Kappadokiens. Mit 219 Abbildungen auf Tafeln und 63 Plänen* (*VTIB* 3). ÖAW, phil.-hist. Kl., *Denkschriften* 138 Vienna.

TELELIS, I. G. (2000). "Medieval Warm Period and the Beginning of the Little Ice Age in

Eastern Mediterranean. An Approach of Physical and Anthropogenic Evidence". In: BELKE, HILD, KODER, SOUSTAL, 2000, 223-243.

TELELIS, I. G. (2005). "Historical-Climatological Information from the Time of the Byzantine Empire (4th - 15th Centuries AD)". *History of Meteorology* 2, 41-50.

TIB 1: KODER, J.; HILD, F. (1976). *Hellas und Thessalia. Register von P. Soustal* (*TIB* 1). ÖAW, phil.-hist. Kl., *Denkschriften* 125, Vienna.

TIB 2: HILD, F.; RESTLE, M., *Kappadokien* (1981). (*Kappadokia, Charsianon, Sebasteia und Lykandos*) (*TIB* 2). ÖAW, phil.-hist. Kl., *Denkschriften* 149, Vienna.

TIB 4: K. BELKE, mit Beiträgen von M. RESTLE (1984). *Galatien und Lykaonien* (*TIB* 4). ÖAW, phil.-hist. Kl., *Denkschriften* 172, Vienna.

TIB 5: HILD, F.; HELLENKEMPER, H. (1990). *Kilikien und Isaurien* (*TIB* 5). ÖAW, phil.-hist. Kl., *Denkschriften* 215. I-II. Vienna.

TIB 7: BELKE, K.; MERSICH, N. (1990). *Phrygien und Pisidien* (*TIB* 7). ÖAW, phil.-hist. Kl., *Denkschriften* 211. Vienna.

TIB 8: HELLENKEMPER, H.; HILD, F. (2004). *Lykien und Pamphylien* (*TIB* 8). ÖAW, phil.-hist. Kl., *Denkschriften* 320. I-III. Vienna.

TIB 9: BELKE, K. (2020). *Paphlagonien und Honōrias* (*TIB* 9). ÖAW, phil.-hist. Kl., *Denkschriften* 249. Vienna.

TIB 13: BELKE, K. (2020). *Bithynien und Hellespont* (*TIB* 13). ÖAW, phil.-hist. Kl., *Denkschriften* 513. I-II. Vienna.

TIB 14: KÜLZER, A. (in preparation). *Westkleinasien* (*Asia und Lydia)* (*TIB* 14). ÖAW, phil.-hist. Kl., *Denkschriften*. Vienna.

TÜRKEI (1992). *Autokarte Türkei, City Plan, touristische Informationen*, Ortsregister, 1: 800 000. Vienna, 1992, often reprinted.

WHARTON (1893). *Asia Minor: Island of Khios and Gulf of Smyrna*, surveyed by Captain R. Copeland, Lieut. T. Graves and the Officers of H. M. Surveying Ships Beacon and Mastiff, 1835-37. With additions and corrections to 1892, republished in 1893 under the superintendence of Captain W. J. L. Wharton RN FRS London.