# The Chora of Gerasa/Jerash

## Achim Lichtenberger – Rubina Raja

## Introduction

The city of Gerasa is situated in the fertile hill country of northwestern Jordan (fig. 1).<sup>1</sup> It was founded in the 2<sup>nd</sup> century BCE, as "Antioch on the *Chrysorrhoas*, the former Gerasa" and flourished in the Roman, Byzantine and Early Islamic periods until it was destroyed by an earthquake in 749 CE.<sup>2</sup> Subsequently the city was largely abandoned and reduced immensely in scale.

Gerasa belonged to the Decapolis, a term of the Roman period, covering nominally only a group of cities located in what today is modern day southern Syria, Jordan and Israel.<sup>3</sup> These cities, including Gerasa, displayed profound Greco-Roman urban layouts and were modelled on the Greek *polis* model (fig. 2).<sup>4</sup> The *poleis* of the Decapolis – as other Roman cities in the Greek east – had autonomous administrations with civic institutions and a territory (*chora*) with clearly marked boundaries.<sup>5</sup> Some of the territories were quite large and not static, but changed over time. Within the territories, villages and hamlets were situated and these settlements were administered by the cities, and the inhabitants of the hinterland counted as citizens of the respective cities. These territories, the hinterlands, were the economic backbones of the cities, which relied heavily on agricultural production.<sup>6</sup> Often the territories concurred with the actual topography of the land, where rivers, wadis as well as mountain or hill ranges acted as natural limits.<sup>7</sup>

To determine the size of city-territories in the southern Levant, a combination of sources must be taken into consideration. Literary sources such as Eusebius and Jerome sometimes mention villages and places belonging to a specific city. Also Josephus occasionally refers to villages as belonging to specific cities. These mentions, however, occur by chance, and the ancient authors were not interested in a systematic description of city territories. Sometimes they were concerned with biblical topography for example and therefore describe circumstances rather anachronistically. Another important group of evidence are the epigraphic sources. In past scholarship, Roman milestones were used to determine the extent of city territories.<sup>8</sup> Since they mention the distance of the milestone to or from a city, it has been postulated that this positioning indicates an administrative belonging to the city. However, it has become obvious that this is not a reliable methodological approach and therefore, it is not used any more as a determining criterion for measuring the hinterland's extent. More reliable for the determination of city territories are inscriptions, which use specific dating eras. Each city had its own era. In the Decapolis region most cities had an era, which went back to the Roman conquest by Pompey the Great in 64/63 BCE.9 When Trajan established the province of Arabia in 106 CE, non-Decapolis cities in the region belonging to this province used an era starting in 106 CE. Therefore, dated inscriptions found in villages

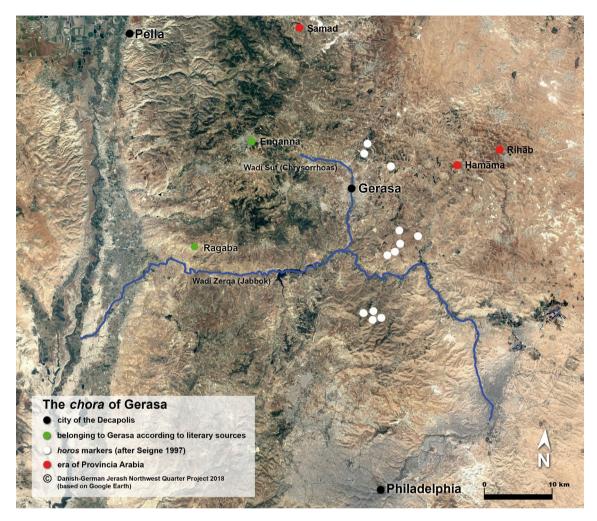
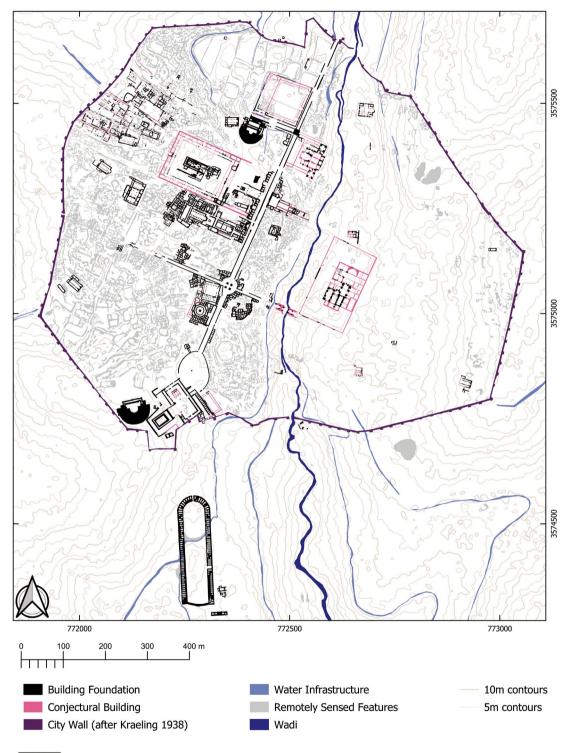


Fig. 1: Map of hinterland of Gerasa.

can help to decide whether a particular village belonged to a city of the Decapolis or to the province of Arabia. And finally, in rare cases so-called '*horos* markers', inscriptions that outline the territory of a city, help to establish the size of a given city's hinterland. Such inscriptions are extremely rare, but in the case of Gerasa, some are available and provide good evidence for borders.<sup>10</sup>

## The limits of the chora

Since we must assume that all the fertile land in the region belonged to cities during the Roman period, the borders of the *chora* of Gerasa are also defined by the borders of the other Greco-Roman cities adjoining the territory of Gerasa.<sup>11</sup> To the south, Philadelphia is generally assumed to be the next *polis*, and until *'horos* markers' were



© 00 © The Danish German Jerash Northwest Quarter Project. This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 License.

Fig. 2: Map of Gerasa.

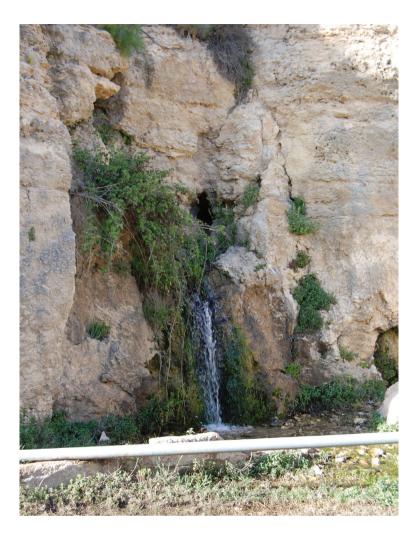


Fig. 3: Springs of the river Chrysorrhoas at Suf.

found, it was generally accepted that the Wadi Zerqa was the border between the two territories.<sup>12</sup> To the west, Gerasa bordered with the Jewish Peraia, and Ragaba is attested to have been a fortress settlement within the territory of Gerasa.<sup>13</sup> In the north, Pella and the territories of other northern Decapolis cities or of a city from the province Arabia (Samad) must have been the limit of Gerasa's territory, although natural borders are not easily recognizable.<sup>14</sup> To the east, the watershed and the transition zone to the desert would have constituted a natural border, and indeed, the modern villages of Rihab and Hamama have yielded inscriptions that are dated according to the era of the province Arabia, proving that these places belonged to a city which did not use the Pompeian era, and therefore definitely did not belong to Gerasa, who used it.<sup>15</sup>

On the basis of this general description and summary of the known evidence, we can roughly outline the territory of Gerasa.

The '*horos* markers' that were found by Jacques Seigne in the territory of Gerasa help to get a more precise picture of the territory of Gerasa.<sup>16</sup> These markers consist of Greek inscriptions cut into bedrock in different locations marking the PO(lis) GE(rasenon) ("city of the Gerasenians"). Find spots north and east of Gerasa show that the territory of the city probably did not extend far into the transition zone towards the desert but was restricted to the area of the so-called 'Jerash-basin' around the river *Chrysorrhoas*. However, it is remarkable that the '*horos* markers' also extend to the south of the Wadi Zerqa, an area that earlier was assumed to have belonged to the city of Philadelphia. It is clear through the '*horos* markers', that Gerasa also owned territory south of Wadi Zerqa, although by now we do not know how far west along the southern bank of the river this territory extended.

Gerasa was part of the extensive Roman imperial infrastructural system. Due to Roman milestones and physical evidence of actual Roman period roads, several roads connecting Gerasa with other cities of the Decapolis are well attested.<sup>17</sup>

#### The river Chrysorrhoas

Situated in the center of the *chora* of Gerasa was the river *Chrysorrhoas*, today called Wadi Jerash and/or Wadi Suf.<sup>18</sup> This river, which crossed the civic center of Gerasa, was even integrated into the name of the city. When the city was founded in the 2<sup>nd</sup> century BCE by the Seleucids, the city was named "Antioch on the *Chrysorrhoas*". Also in later periods the river figured prominently in the images projecting the civic identity of the city, representing the river that also was venerated as a deity – a common Hellenistic and Roman tradition. The urban fabric of the city center was also heavily shaped by the river, which literally cut the city into two parts – an eastern and a western part. Several bridges were therefore needed to cross from one side of the city to the other.

The river had its main springs at a village, today called Suf, about 6 km northwest of Gerasa – as well as the catchment basin further north – from where it flowed towards the city (fig. 3). After leaving the city walls, the river continued for about another 6 km to the south and flowed into the Wadi Zarqa. Especially the upper part of the wadi – between Gerasa and modern Suf – was and is fertile and rich in water and soils. This area was managed through terraces (fig. 4). It is this area of the upper wadi, which probably is mentioned in a Roman period inscription located in the northern theater in Gerasa. This inscription speaks about the "gardeners of the upper valley" and it is remarkable that these gardeners formed an association,<sup>19</sup> underlining the fact that they were no ordinary gardeners but rather landowners, who had their fertile lands in the territory of the city. This underlines the agricultural significance of the valley of the *Chrysorrhoas*, and it shows how the agricultural structures of the hinterland impacted the social organization of Gerasa. It is testimony for the city-hinterland relationship, a relationship in which the hinterland not necessarily was marginalized but fully participated in the socio-political life of the urban center.



## Fig. 4: Modern terraces in Wadi Suf.

## Villages, hamlets, forts, sanctuaries, quarries and water supply

Hitherto, the settlement structure of the hinterland of Gerasa has not been systematically investigated, although much detailed work has already been done.

D. Kennedy and F. Baker surveyed the immediate surroundings of the city and documented numerous single sites and also the deterioration of these sites, mostly due to modern construction work.<sup>20</sup> What is lacking, however, is a general study of the overall settlement structure of the hinterland of Gerasa.<sup>21</sup> The most comprehensive study was done by Kennedy in 2004, who compiled previous surveys, but mostly restricted himself to a quantitative count of sites and not a qualitative interpretation of settlement structures.<sup>22</sup> What is clear, however, from his study – taking into account the work done very early by Nelson Glueck and Siegfried Mittmann – is that there are numerous ancient sites located in the *chora* of Gerasa.<sup>23</sup> Most of them are described only as sites with pottery and some ruins. Still, these early surveyors found notable settlement remains in numerous locations including Tell Faysal,<sup>24</sup> Khirbet Ain Shara,<sup>25</sup> Khirbet el-Bediye,<sup>26</sup> Khirbet el-Msherfe,<sup>27</sup> Khirbet wl-Mrabba,<sup>28</sup> Khirbet Safsafa,<sup>29</sup> Suf,<sup>30</sup> Der Amud,<sup>31</sup> Rugm,<sup>32</sup> Khirbet es-Sabata,<sup>33</sup> Khirbet Zuqrit,<sup>34</sup> Qasr Sabihi,<sup>35</sup> Hele,<sup>36</sup> Chlal,<sup>37</sup> Ras el-Qwem,<sup>38</sup> Mesar Tokh,<sup>39</sup> Khirbet Abu Harasi,<sup>40</sup> Mehbethah,<sup>41</sup> Chatla,<sup>42</sup> Medwar,<sup>43</sup> Khirbet el-Qre,<sup>44</sup> el-Hute,<sup>45</sup> Geba<sup>46</sup> and Khirbet Qurei.<sup>47</sup> It is difficult to gain a clear

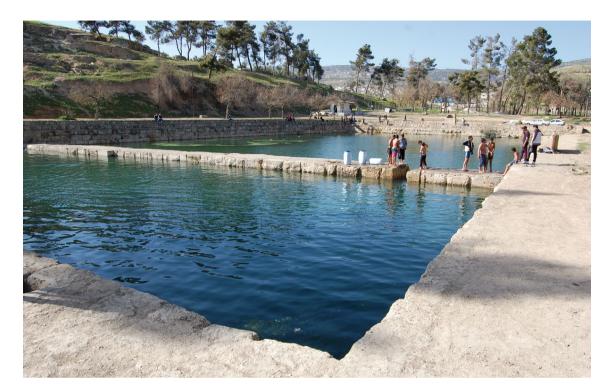


Fig. 5: Pools at Birketein.

picture of the nature of these settlements but chronologically they usually range from the Hellenistic to early Islamic periods, with a middle Islamic resettlement period as well. The character of the sites is difficult to determine, since we usually do not know whether they only were small hamlets such as the villas discussed by Sapin<sup>48</sup> or large villages including several structures. Some of the sites have remains of houses, tombs, cisterns, oil presses and churches. It would certainly be worthwhile to investigate these sites further in the future, especially since Glueck and Mittmann did not undertake systematic intensive surveys but extensive surveys, covering points of interest.<sup>49</sup> A more systematic survey has been undertaken along the road from Jerash to al-Husn,<sup>50</sup> but an intensive survey of a larger area of the *chora* of Gerasa is still lacking.

Some of the sites, such as Ragaba at the eastern end of the *chora*, had a fortificative function, as attested by literary sources.<sup>51</sup> Among the known sites within the *chora* of Gerasa, there are also rural, extra-urban sanctuaries attested at Birketein (fig. 5)<sup>52</sup> and Mehbethah.<sup>53</sup> The latter is hardly known or investigated. Furthermore, some of the sites in the immediate vicinity of the city center are quarries, and the stones were used for constructing the monuments of Gerasa.<sup>54</sup> Other infrastructural installations are water pipes and channels leading to the city center. Some of them led from the spring area in Suf to Gerasa, and in recent years a lot of progress has been made about the water supply of Gerasa due to the work of D. Boyer<sup>55</sup> and the application of LIDAR data and historical air photography analysis (fig. 6).<sup>56</sup>

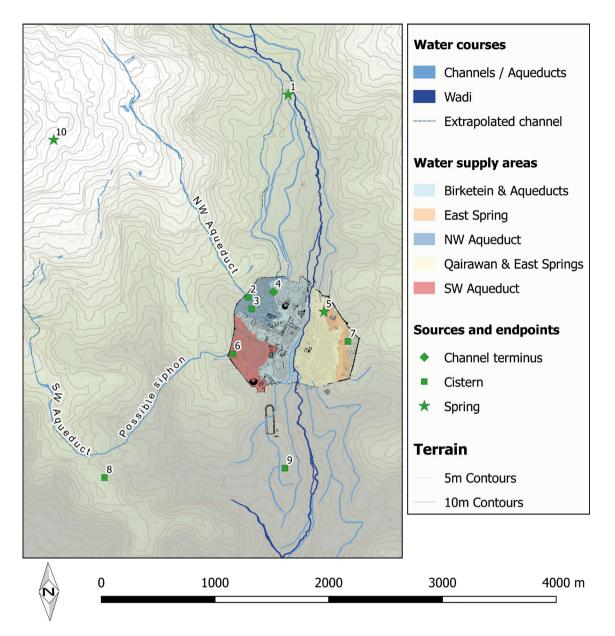


Fig. 6: Water supply system at Gerasa.

## Suburban Gerasa

The city of Gerasa was enclosed by city walls, which walled an area of approx. 84 hectares.<sup>57</sup> Gates at various points in the walls provided access to the city. These walls and gates were clear limits between the city's core and the territory outside. However, also immediately outside the city, monuments were erected, and these monuments were directly related to the city. As in most Greco-Roman cities, *necropoleis* were located



Fig. 7: The so-called 'Hadrian's Arch'.

outside the city and this is also true for Gerasa, were tombs lined the streets leading to and from the city.<sup>58</sup> Many of these tombs have been documented. They mostly count *hypogaea*, underground tomb chambers, but also some monuments located above ground have been investigated. Such tombs not only lined the roads outside the city, but they were found also beyond the roads all around the city. This extra-urban area was surveyed by David Kennedy and his team and they not only found tombs in the immediate vicinity of Gerasa but also agricultural installations such as oil presses and basins.<sup>59</sup> This mix of structures underlines that although the world of the dead was separated from the settlement by the city walls, there was not a sharp division between graves and production sites, and that agricultural and economic activities took place close to burial grounds.

Other monumental structures were also erected in the suburbs of Gerasa. The most impressive monuments are visible when entering the city from the south. A monumental gate (the so-called 'Hadrians Arch') was built approx. 250 m south of the south gate. This gate was purely representative and served as an honorific monument (fig. 7).<sup>60</sup> It was constructed on the occasion of the visit of Hadrian in 129/30 CE and welcomed visitors from the south and marked their vicinity to the city center. Similar extra-mural gates were also built in other places of the region such as Gadara.

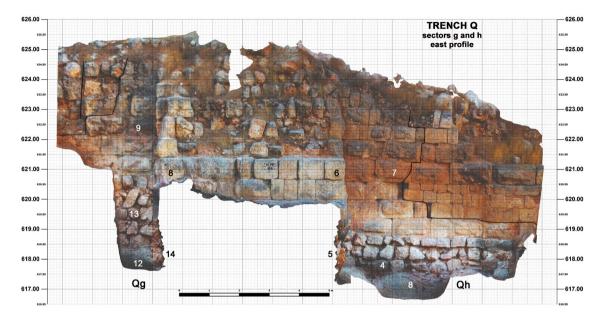


Fig. 8: Beam holes at the outer face of the city walls.

Between 'Hadrians Arch' and the south gate of the city another suburban monument was constructed. This monument, the hippodrome, is one of the largest in Gerasa.<sup>61</sup> The hippodrome was constructed in this location most likely because this was the only suitable flat area for such a large monument in close vicinity of the city center. After the hippodrome fell out of use, which it did soon after it was constructed, in the late Roman period, it was used for burials and for workshops – a fact which again underlines that a sharp division between the world of the dead and the living did not apply to the liminal suburban zone in antiquity in this region. In the Byzantine period, chapels and churches were erected there as well.

Due to encroachment of the modern city of Jerash, we only have little information about other structures situated immediately outside the city walls, but recently an octagonal Byzantine church was unearthed outside the north gate.<sup>62</sup>

There is, however, also a substantial amount of ephemeral architecture along the outside of the city walls of Gerasa. When the walls collapsed in the earthquake of 749 CE, the lower parts of the outer faces were buried. Whenever excavations uncover the outer faces, beam holes and seams are found along the walls, hinting at sheds, roofs or other ephemeral constructions along the outside of the walls. These structures have not yet been investigated, but during the excavations in the northwest quarter done by the Danish-German Jerash Northwest Quarter Project, we documented such beam holes in trench Q (fig. 8). It is, however, difficult to date such structures, but due to their locations we can assume that they antedate the earthquake and relate to ephemeral constructions.

## Epilogue

Although extensive and intensive archaeological field survey has taken place in the hinterland of Gerasa, a systematic study of the *chora* still remains a research desideratum. Outside the city walls of Gerasa different zones of hinterland occupation can be traced spanning from urban structures in immediate proximity to the walls over infrastructurally important sites in the vicinity that served for quarrying and water supply to forts at the borders of the territory. There is a variety of locations related to agricultural production within the hinterland, and as David Kennedy and others have emphasized, it would be worthwhile to undertake a systematic investigation of the whole hinterland, to better understand the economic resources of the city. This paper is only a modest summary of some of these features and has demonstrated that very differing sources must be brought together if we want to understand the extent and nature of Gerasa's *chora* in detail.

#### Notes

<sup>1</sup> Kraeling 1938; Zayadine 1986; Kennedy 2007; Lichtenberger – Raja 2018a.

<sup>2</sup> On the earthquake and the consequences cf. Lichtenberger – Raja 2019 with further bibliography.

<sup>3</sup> On the term "Decapolis" in history cf. Lichtenberger 2003, 6–20.

<sup>4</sup> Raja 2012, 137–189.

<sup>5</sup> In the following cf. Avi-Yonah 1977, 127–129; Isaac – Roll 1982, 11 f. Kennedy 2004 takes a different approach to determining the city territory.

<sup>6</sup> Tietz 2015.

<sup>7</sup> On Gerasa in a regional and geographical setting, see most prominently Kennedy 1998; Kennedy 2004; Kennedy 2007.

<sup>8</sup> Lichtenberger 2003, 29 note 27.

<sup>9</sup> Stein 1990.

<sup>10</sup> Seigne 1997.

<sup>11</sup> On the chora of Gerasa cf. Avi-Yonah 1977, 175–177; Lichtenberger 2003, 194 f.

<sup>12</sup> Euseb. On. 102, 19–22. See e.g. the map by Bietenhard 1977.

<sup>13</sup> Ios. ant. Iud. 13, 398. Cf. Mittmann 1987; Lichtenberger 2003, 195 note 1730.

<sup>14</sup> Lichtenberger 2003, 194.

<sup>15</sup> Avi-Yonah 1977, 175 f.; Lichtenberger 2003, 194.

<sup>16</sup> Seigne 1997.

<sup>17</sup> Mittmann 1964; Rasson-Seigne – Seigne 1995; Sapin 1998, 125–133.

<sup>18</sup> Cf. in the following Lichtenberger – Raja 2016; Lichtenberger – Raja 2018b.

<sup>19</sup> Gatier 1985, 310-312; Lichtenberger - Raja 2016, 110 f.; Seigne 2004, 176.

<sup>20</sup> Kennedy – Baker 2009; Baker – Kennedy 2011.

## Achim Lichtenberger – Rubina Raja

<sup>21</sup> For prehistoric sites, cf. Kirkbride 1958 and Hanbury-Tenison 1987, as well as the site catalogues of Glueck 1945–1949 and Mittmann 1970.

<sup>22</sup> Kennedy 2004. Another compilation of previous surveys was done by el-Khouri 2009.

<sup>23</sup> Glueck 1945–1949, 57–89. 231–235; Mittmann 1970, 73–119 nos. 176–310. See also Augustinovic – Bagatti 1951.

<sup>24</sup> Palumbo et al. 1993.

- <sup>25</sup> Mittmann 1970, 73 no. 178.
- <sup>26</sup> Mittmann 1970, 84 no. 209.
- <sup>27</sup> Mittmann 1970, 85 no. 211.
- <sup>28</sup> Mittmann 1970, 86 no. 214.
- <sup>29</sup> Mittmann 1970, 93 no. 234.
- <sup>30</sup> Mittmann 1970, 95 no. 240.
- <sup>31</sup> Mittmann 1970, 97 no. 248.
- <sup>32</sup> Glueck 1945–1949, 66 f. no. 278; Mittmann 1970, 99 no. 254.
- <sup>33</sup> Mittmann 1970, 100 no. 258.
- <sup>34</sup> Mittmann 1970, 100 no. 257; Smadi Melhem 1997.
- <sup>35</sup> Mittmann 1970, 102 no. 265.
- <sup>36</sup> Mittmann 1970, 103 no. 268.
- <sup>37</sup> Mittmann 1970, 105 f. no. 277.
- <sup>38</sup> Mittmann 1970, 108 no. 282.
- <sup>39</sup> Glueck 1945–1949, 68 f. no. 284.
- <sup>40</sup> Glueck 1945–1949, 69 no. 285.
- <sup>41</sup> Glueck 1945–1949, 89 no. 266.
- <sup>42</sup> Mittmann 1970, 115 f. no. 302.
- <sup>43</sup> Mittmann 1970, 116 no. 303.
- <sup>44</sup> Mittmann 1970, 117 f. no. 306; Sapin 1998, 118.
- <sup>45</sup> Mittmann 1970, 118 no. 307.
- <sup>46</sup> Mittmann 1970, 119 no. 309.
- <sup>47</sup> Leonard Jr. 1987, 369–373.
- <sup>48</sup> Sapin 1998, 118–120.
- <sup>49</sup> See also Kennedy 2004.
- <sup>50</sup> Leonard Jr. 1987; Palumbo et al. 1993.

<sup>51</sup> See above note 13. See also the structure at Tell Faysal (Palmubo et al. 1993) which is interpreted by the excavators as a fort, but which also could have been an agricultural estate.

<sup>52</sup> Lichtenberger 2003, 214–219.

- <sup>53</sup> Glueck 1945–1949, 89 no. 266.
- <sup>54</sup> On the quarries cf. Hamarneh Abu-Jaber 2013.
- <sup>55</sup> Boyer 2016.
- <sup>56</sup> Stott et al. 2018.
- <sup>57</sup> Lichtenberger 2003, 193 note 1703.

120

<sup>58</sup> For the most recent survey cf. Pogoda 2018.

<sup>59</sup> Kennedy – Baker 2009; Baker – Kennedy 2011.

<sup>60</sup> Bührig 2008.

<sup>61</sup> Lichtenberger 2003, 194 note 1710.

<sup>62</sup> Michel 2001, 274 no. 98.

## **Image Credits**

Fig. 1-8: The Danish-German Jerash Northwest Quarter Project.

## References

#### Augustinovic - Bagatti 1951

A. Augustinovic – R. Baggatti, Escursioni nel dintorni di 'Ajlun, Liber Annus 2, 1951, 227–314.

## Avi-Yonah 1977

M. Avi-Yonah, The Holy Land. A Historical Geography from the Persian to the Arab Conquest (536 B.C. – A.D. 640) (Jerusalem 1977).

#### Baker - Kennedy 2011

F. Baker – D. Kennedy, Jarash Hinterland Survey 2010. An Overview of the Results, ADAJ 55, 2011, 451–466.

#### Bietenhard 1977

H. Bietenhard, Die syrische Dekapolis von Pompeius bis Trajan, in: H. Temporini – W. Haase (eds.), ANRW 2, 8 (Berlin 1977) 220–261.

#### Boyer 2016

D. D. Boyer, Aqueducts and birkets. New evidence of the Water Management System servicing Gerasa (Jarash), Jordan, in: R. A. Stucky – O. Kaelin – H.-P. Mathys (eds.), Proceedings of the 9th International Congress on the Archaeology of the Ancient Near East (Wiesbaden 2016) 517–531.

#### Bührig 2008

C. Bührig, Das spätkaiserzeitliche Bogenmonument extra muros von Gadara (Umm Qais). Städtebauliche Bedeutung und Funktion eines freistehenden Torbaus an der Schnittstelle von Stadt und Umland (Rahden 2008).

## Gatier 1985

P.-L. Gatier, Nouvelles inscriptions de Gérasa, Syria 62, 1985, 297-312.

#### Glueck 1945-1949

N. Glueck, Explorations in Eastern Palestine IV, AASOR 25-28, 1945-1949, 1-711.

#### Hamarneh – Abu-Jaber 2013

C. Hamarneh – N. Abu-Jaber, Documentation and Protection of the Quarries of Gerasa, Levant 45, 2013, 57–68.

#### Hanbury-Tenison 1987

J. W. Hanbury-Tenison, Jarash Regional Survey 1984, ADAJ 31, 1987, 129-157.

## Isaac – Roll 1982

B. Isaac - I. Roll, Roman Roads in Judaea I. The Legio-Scythopolis Road (Oxford 1982).

#### Kennedy 1998

D. Kennedy, The Identity of Roman Gerasa. An Archaeological Approach, Mediterranean Archaeology 11, 1998, 39–69.

#### Kennedy 2004

D. Kennedy, Settlement in the Jarash Basin and its wider Context: A Proposal for Fieldwork and a Re-search Project to Interpret and Explain Settlement and Landuse in North-West Jordan, SHAJ 8, 2004, 197–215.

#### Kennedy 2007

D. Kennedy, Gerasa in the Decapolis. A 'Virtual Island' in Northwest Jordan (London 2007).

### Kennedy - Baker 2009

D. Kennedy - F. Baker, Jarash Hinterland Survey 2005 and 2008, CBRL Bulletin 4, 2009, 19-26.

#### El-Khouri 2009

L. El-Khouri, Roman Settlements in the Region of Northwest Jordan. Archaeological Studies (Landuse and Landscape Development) (Münster 2009).

#### Kirkbride 1958

D. V. W. Kirkbride, Notes on a Survey of Pre-Roman Archaeological Sites near Jerash, BALond 1, 1958, 9–20.

#### Kraeling 1938

C. H. Kraeling (ed.), Gerasa. City of the Decapolis (New Haven 1938).

#### Leonard Jr. 1987

A. Leonard Jr., The Jarash - Tell El-Husn Highway Survey, ADAJ 31, 1987, 343-390.

#### Lichtenberger 2003

A. Lichtenberger, Kulte und Kultur der Dekapolis. Untersuchungen zu numismatischen, archäologischen und epigraphischen Zeugnissen, Abhandlungen des Deutschen Palästina-Vereins 29 (Wiesbaden 2003).

#### Lichtenberger - Raja 2016

A. Lichtenberger – R. Raja, Living with and on the river-side. The example of Roman Antioch-on-the-Chrysorrhoas-formerly-called-Gerasa, in: J. K. Madsen – N. O. Andersen – I. Thuesen (eds.), Water of Life, Proceedings of the Danish Institute in Damascus 11 (Copenhagen 2016) 98–115.

#### Lichtenberger – Raja 2018a

A. Lichtenberger – R. Raja (eds.), The Archaeology and History of Jerash. 110 Years of Excavations, Jerash Papers 1 (Turnhout 2018).

#### Lichtenberger - Raja 2018b

A. Lichtenberger – R. Raja, River archaeology and urban resilience in Jerash, in: R. Raja – S. M. Sindbæk (eds.), Urban network evolutions. Towards a high-definition archaeology (Aarhus 2018) 125–130.

#### Lichtenberger - Raja 2019

A. Lichtenberger - R. Raja, Defining Borders. The Umayyad-Abbasid Transition and the Earthquake of

#### 122

AD 749 in Jerash, in: A. Lichtenberger – R. Raja (eds.), Transitions, Transformations and Continuities. The Byzantine and Umayyad Periods in Jerash Reconsidered (fifth–eighth centuries AD), Jerash Papers 4 (Turnhout 2019) (in press).

### Michel 2001

A. Michel, Les églises d'époque byzantine et umayyade de la Jordanie. Ve – VIIIe siècle (Turnhout 2001).

#### Mittmann 1964

S. Mittmann, Die römische Straße von Gerasa nach Adraa, ZDPV 80, 1964, 113-136.

### Mittmann 1970

S. Mittmann, Beiträge zur Siedlungs- und Territorialgeschichte des nördlichen Ostjordanlandes (Wiesbaden 1970).

#### Mittmann 1987

S. Mittmann, Essa, Ragaba. Drei hellenistische Festungen im östlichen Randbereich des mittleren Jordangrabens, ZDPV 103, 1987, 49–66.

#### Palumbo et al. 1993

G. Palumbo – K. Amr – A. Musa – M. Rasson-Seigne, The Cultural Resources Management Project in Jordan. Salvage Excavations at "Tell Faysal", Jarash, ADAJ 37, 1993, 89–117.

#### Pogoda 2018

C. Pogoda, Limestone sarcophagi from Gerasa/Jerash, Jordan, in: Ch. Eger - M. Mackensen (eds.),

Death and Burial in the Near East from Roman to Islamic Times, MBPA 7 (Wiesbaden 2018) 139–148. Raja 2012

R. Raja, Urban Development and Regional Identity in the Eastern Roman Provinces, 50 BC – AD 250. Aphrodisias, Ephesos, Athens, Gerasa (Copenhagen 2012).

#### Rasson-Seigne – Seigne 1995

A.-M. Rasson-Seigne – J. Seigne, Notes préliminaires a l'étude de la voie romaine Gerasa / Philadelphia, ADAJ 39, 1995, 193–210.

#### Sapin 1998

J. Sapin, À l'est de Gerasa. Aménagement rural et reseau de communications, Syria 75, 1998, 107–136.

## Seigne 1997

J. Seigne, Les limites orientale et méridionale du territoire de Gérasa, Syria 74, 1997, 121–138.

## Seigne 2004

J. Seigne, Remarques préliminaires à une étude sur l'eau dans la Gerasa antique, in: H.-D. Bienert – J. Häser (eds.), Men of dikes and canals. The archaeology of water in the Middle East. International symposium held at Petra, Wadi Musa (H.K. of Jordan) 15.–20. June 1999, OrA 13 (Rahden 2004) 173–185.

## Smadi – Melhem 1997

M. Smadi – I. Melhem, An Olive Press at Khirbat Zuqrit / Jarash, ADAJ 41, 1997, 5–12 (in Arabic).

## Stein 1990

A. Stein, Studies in Greek and Latin Inscriptions on Palestinian Coinage under the Principate (PhD thesis Tel Aviv University 1990).

## Achim Lichtenberger – Rubina Raja

#### Stott et al. 2018

D. Stott – S. M. Kristiansen – A. Lichtenberger – R. Raja, Mapping an ancient city with a century of remotely sensed data, PNAS 2018. [https://doi.org/10.1073/pnas.1721509115] (13.01.2019)

## **Tietz 2015**

124

W. Tietz, Hirten, Bauern, Götter. Eine Geschichte der römischen Landwirtschaft (Munich 2015).

### Zayadine 1986

F. Zayadine (ed.), Jerash Archaeological Project 1981-1983 (Amman 1986).