Discovering Edom

Polish archaeological activity in southern Jordan

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edited by

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There are places on Earth that are truly unique – so saturated with traces of the past that they almost echo with the voices of people who lived there centuries ago. Strolling through the wilderness of southern Jordan or visiting desert archaeological sites in this part of Jordan, we discover not only monuments and details about the life of past communities, but also today's problems of their protection, conservation and often complicated functioning in the modern world. Being a treasury of knowledge about our past, southern Jordan – the historical land of Edom – should be a constant field of scientific activity that can offer not only new monuments or traces of the past, but also an enormous amount of information that will allow us to expand our knowledge about ancient times. The archaeologist's privilege is not only to study the past and come into contact with monuments, but also to rejoice in the beauty of this region and to experience the friendliness and hospitality of the people who live in this unique place.

In 2014, a series of new Polish research projects began in southern Jordan. Archaeologists and students from the Jagiellonian University are conducting surface research and excavations within the districts of At-Tafila and Ma'an. The projects are directed by a group of scientists from the Institute of Archaeology of the Jagiellonian University. In cooperation with the Jordanian Department of Antiquity, Polish researchers are looking for traces of human activity in this area dated from the Stone Age to the Middle Ages. The area of exploration and research is located in the vicinity of important archaeological sites such as the Edomite capital of Buseira and the Sela rock cliff, and also near Wadi Feynan – the famous copper valley which played a key role in the production of this raw material and its export to neighbouring areas, especially in the Bronze Age. Also standing in this part of Jordan are its most famous monument, Petra the rock city of the Nabataeans, and the crusaders' castle in Shawbak.

The longest-lasting research activity of the Kraków archaeologists is a project devoted to the period of the Bronze Age. Findings from this period can help answer questions about the presence and activity of human groups during this period in Edom. The long-term goal of the research is to search for and analyse the routes and paths of movements of people in prehistoric periods in this area, as well as environmental changes and their impacts on the functioning of past societies. The whole of

the activities and research undertaken as part of the project is the beginning of a broad body of work aimed at getting to know the region and describing its cultural landscape and the role of environmental changes in its transformation. This project will help scientists understand the region's functioning across the centuries, and also aid its development by identifying tourist attractions and drawing attention to cultural and environmental attributes worth protecting and popularizing.

The works of the Kraków researchers in Jordan have been recognized by the National Science Centre, which provided a grant to expand them in order to learn more about the history of southern Jordan in the Bronze Age, the exploration of which is one of the most interesting research problems of contemporary archaeology in the Middle East. This period, which lasted approximately 1,750 years (3700–1950 BC), was full of events and changes crucial for the development of human culture. The first centres of urban character were created, the technology of production of many objects developed (e.g. metallurgy), and long-distance trade flourished. The areas of Egypt and the Middle East saw a barrage of social changes in this period: the birth of the first kingdoms of a spatial nature (Egypt in the predynastic, archaic and Old Kingdom periods) and city-states controlling minor areas (Mesopotamia, Syria-Palestine); the shaping and gradual deepening of the hierarchical, complicated structure of individual communities; and the development of cults and funerary customs. Writing appeared for the first time as well as developed ideology of power and religion. Population shifts and the impact of mobile nomadic groups are evident, especially in southern Jordan, which could not remain an empty area, lying in the vicinity of dynamically changing areas. Through archaeological excavations on selected sites, the researchers from Kraków are trying to describe the stages of human activity of this period. The aim of the analyses will also be to answer the question about possible contacts of the region with Egypt and the rest of the Levant, i.e. the areas where important changes took place at that time, and where the state of research on the Bronze Age is more advanced. Excavation works are supplemented with specialist laboratory analyses, thanks to which it is possible to establish the exact age of discovered relics, as well as the methods of their production and use.

A little later, the work of two more Polish projects began. The first of them concerns the period of the Middle Ages. Archaeologists are exploring the castle-monastery located in the area of At-Tafila – Qasr ed-Deir. After the initial seasons we may assume that Qasr ed-Deir should be seen as a compact, multiphase complex and its origins should most probably be dated to the Roman – Byzantine Period. The complex was developed and reconstructed more than once and the last great alterations should

be dated to the Mamluk period. The future analysis of the stratigraphy of masonry elements combined with the analysis of the archaeological material should yield more precise results (as the archaeological excavations are hopefully to be continued in the following years).

The second of the above-mentioned projects is focused on the Roman period as well as on the application of modern techniques in the protection of antique relics in southern Jordan. Since many archaeological sites are at risk of erosion and robbery, establishing efficient methods of documentation is one of the most pressing challenges of modern archaeology and cultural heritage protection. South Jordan abounds in sites dated – among others – to broadly understood antiquity. Their documentation is a huge logistic and methodical challenge. The project started with documenting two south Jordanian sites: the Roman fort in Dajaniya and the remains of the city of Tuwaneh. These two sites are characterized by a relatively good state of preservation of monumental architecture. Documentation is being prepared by an archaeological expedition from the Department of Classical Archaeology of the Jagiellonian University in co-operation with surveyors from the AGH University of Science and Technology, Faculty of Mining Surveying and Environmental Engineering, Kraków, Poland. Efforts to document these sites are supported by the use of two methods: 3D laser scanning and close range photogrammetry. Final result of this work will be – besides the full documentation of visible remains – the establishing of a methodology of documentation based on both methods and indicating their potential and limitations. The project will be extended in subsequent years to include excavation research and preparing of 3D tours, available through the Internet.

Another important activity worth mentioning is the analysis of the environmental conditions prevailing in this area for centuries and in the present times. This research will not only allow for a better understanding of the functioning of ancient cultures, but will also help in the use of the current nature for the development of tourism.

The work carried out by Polish scientists in southern Jordan takes place in a difficult, mountainous desert region. Many activities require the use of special methodology and equipment, the ability to work in difficult terrain, and physical preparation. Another very important aspect of the projects is the help and support of the local population, who have been very kind and helpful towards the Polish researchers.

It is also worth mentioning that the Kraków research works conducted in Jordan since 2014 are the first independent scientific activities of Polish archaeologists in this area. Their implementation was possible thanks to the support of Italian archaeologists who have been working in Jordan for over 30 years. The Italian team, headed by

Professor Guido Vannini from the University of Florence, made the background available to Polish scientists and shared their experience at the initial stage of the project.

The activity of Polish research projects is also an important contribution to the protection of relics and archaeological sites in this area, often underestimated today due to their relatively unspectacular character, but crucial for the development of scientific knowledge. The research will allow collecting of data which will help to develop the Polish scientific activity in Jordan in the following years.

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Polish archaeological contribution to the research and protection of Middle Eastern cultural heritage. Remarks on the last decades

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Abstract: Polish archaeological and conservational research and activities have a long history, full of successes and significant discoveries. Major Polish academic centres have been conducting research and conservation works for over 100 years, protecting the heritage of the Middle East and expanding our knowledge about the history of this crucially important region. In particular, in recent decades many research projects in such countries as Egypt, Israel, Lebanon, Syria, Jordan, Saudi Arabia and Kuwait have been conducted and met with recognition of the international scientific society. The Polish research contribution and legacy of working in the Middle East cannot fail to be noticed and constitute a recognizable mark of the Polish scientific and conservation brand.

Keywords: Middle East, cultural heritage, Polish archaeology, Jagiellonian University, Warsaw University, Polish science

Over the last 20 years Polish scientists have contributed greatly to the many aspects of studies on the history of mankind as well as to the preservation of the cultural and historical heritage of the Middle East. Over recent decades Polish research teams have been very successful in investigating archaeological sites in Egypt, Syria, Jordan, Israel and Lebanon.

This scientific work has been coordinated with carefully planned and well-performed (given the local conditions) activities aimed at the popularisation and promotion of Polish science, and also of the region which played a crucial role in the history of humankind. Supported by numerous exhibitions, meetings, open lectures, and coverage in the media, Polish archaeological discoveries concerning Middle East and its history have become an excellent showcase of Polish humanities at the turn of the 21st century.

The Polish Centre of Mediterranean Archaeology of the University of Warsaw (PCMA)[1] is without doubt the most important Polish institution involved in Middle Eastern and north African research, and it can also boast of its achievements in popularising Polish science and discoveries. It is dedicated to organising and coordinating Polish archaeological research (excavations and study works), conservation works and reconstruction projects in north-eastern Africa, in the Middle East, and in Cyprus, i.e. in the territories of such countries as Egypt, Sudan, Cyprus, Syria, Lebanon, Iran, and Kuwait. The projects organised and/or supported by the PCMA include archaeological sites representing a broad chronological range, from the dawn of civilisation (prehistoric times), through all the historic periods of ancient Mediterranean civilisations, up to Late Antiquity and early Arab period. It is the only institution whose works are led by Polish scholars representing a wide range of Polish research institutions (universities in Kraków, Poznań, Toruń etc.), often in collaboration with foreign research centres. The Centre's tasks also include comprehensive documentation of the finds, archive management, and the production of quality books and periodicals that record the results of the research and greatly popularise it internationally. The PCMA also makes efforts to popularise the results of archaeological excavation and conservation projects among the Polish public by organising events like exhibitions and symposia, and through its intensive publishing activity. The PCMA administers the Research Centre in Cairo, which ensures efficient management of the Polish archaeological and conservation effort in Egypt and represents Polish scholars in their relations with the authorities responsible for antiquities and heritage protection in Egypt.

The above-mentioned Polish Research Centre in Cairo, founded in 1959 by the renowned archaeologist Kazimierz Michałowski, is a very important part of the Polish Centre of Mediterranean Archaeology of the Warsaw University. The Cairo centre was established to perform logistical and administrative supervision of the research carried out in Egypt, as well as to represent Polish investigators to the Egyptian authorities and other archaeological centres in Cairo, and to just be their home, their research base in Egypt. It also performs the function of a research unit with its own library, organizing regular lectures presenting the latest Polish archaeological discoveries.

The first attempts to mark the role of Polish archaeologists in Egypt and more generally in Middle East took place in 1937, when Kazimierz Michałowski began excavations in Edfu, conducted by University of Warsaw in cooperation with the French Institute of Oriental Archaeology in Cairo. After three seasons of research and a 3-year hiatus

[1] Visit www.pcma.uw.edu.pl for more information about most recent activities of PCMA.

Fig. 1. Kom el-Dikka (Egypt – Alesandria) – ancient theater and ruins of the city unearthed by Polish archaeologists (photo by Robert Słaboński)

caused by the Second World War, two decades later, in 1959, the Polish Research Centre in Cairo, located at 14 Baron Empain Street, was opened. It is worth emphasizing that the Polish Research Institute has been operating since 1957, but using private houses. Establishment of a permanent research institution acting next to renowned archaeological institutes was a testament to the achievements of Polish archaeology along the Nile and the whole Middle East. Kazimierz Michałowski became the head of the institution bearing the official name of the Polish Mediterranean Archaeology Station of Warsaw University in Cairo, and he held the office until his death in 1981. The official opening ceremony of the Cairo station took place in April 1960, and it was even not disturbed by a huge *chamsin* wind storm, described by many as 'the worst of all'. After opening offices in Cairo, Polish excavations in Egypt and the Middle East expanded very quickly. In 1959 a Polish team began a research project in Palmyra (Syria), and in 1960 at Kom el-Dikka (Egypt – Alexandria; Fig. 1) and in the area of the temple of Hatshepsut (Egypt – Deir el-Bahari). As well, Polish researchers took part in the rescue of the Nubian temples as part of the UNESCO project of relocation of Abu Simbel temple. During the UNESCO activity many interesting discoveries, significant for archaeology, were made in Sudan at the site of Faras. In subsequent years research in Cyprus (Nea Paphos) as well as on Egyptian sites like Tell Atrib, Cairo (Mosque of Emir Qurqumas),

Qasr Ibrim, Valley of the Kings (tomb of Ramses IV), Abu Simbel, and Sudanese sites in Dongola and Kadero was successfully conducted. Every year the number of sites surveyed by Polish scientists was growing (Lipińska 2007: 19–30).

Since the death of Kazimierz Michałowski in January 1981 the PCMA has been managed by his disciples: Zofia Sztetyłło (1981), Waldemar Chmielewski (1982), Wiktor Andrzej Daszewski (1982–1991), Michał Gawlikowski (1991–2005), Piotr Bieliński (2005–2014) and Tomasz Waliszewski (since 2014). Since 2007, according to the regulations of the Centre of Mediterranean Archaeology of Warsaw University, the Director of the Research Station in Cairo has been appointed on the basis of the results of an open competition. At present, the station in Cairo also employs persons reporting directly to the director of the station, working on, among others, administrative, economic and technical support of research teams.

It is worth mentioning that the increasing number of expeditions involving activity on several new sites (e.g. Naqlun Marina El-Alamein, Marea, Pelusium, Saqqara, and Dahleh Oasis and Tell el-Retaba) has resulted in the need for organizational change of the administrative structures of the Cairo station. In 1986 the supervising Centre of Mediterranean Archaeology of the University of Warsaw was established, directed by Kazimierz Michałowski. Based in Warsaw, it also manages the station in Cairo and several terrain missions. In 1994 the Centre opened a new headquarters in Cairo, purchased through the Foundation for Polish Science. Since the 1960s the activity of Polish archaeologists in Egypt has tremendously increased (see e.g. Laskowska-Kusztal 2007). The Centre has also launched research in other Middle Eastern countries such as at Tell Arbid, Tell Qaramel, Hawarte (Syria), Chhîm and Jiyeh (Lebanon) and in Sudan (El-Zuma, Banganarti, Selib, Ghazali, etc.). Every year dozens of Polish researchers, including archaeologists, conservators, anthropologists and architects are involved in research in Egypt and other countries in the region[2]. Polish specialists have established numerous contacts with Egyptian scholars, officials, inspectors and workers. Many sites investigated by Polish scientists have taken primary positions in the history of Egyptology and excavations in Egypt. The Temple of Hatshepsut and the Temple of Tuthmosis III at Deir el-Bahari have become examples of excellent maintenance projects, while Kom el-Dikka in Alexandria is a fine example of a superior tourist attraction. Tell el-Farcha site (explored by the Polish Archaeological Expedition to the Eastern Nile Delta, see below) has in recent years become a symbol of crucial discoveries for the archaeology and early history of Egypt.

[2] Many of the Polish activities conducted in the Middle East is described in: K. Michałowski, M. L. Bernhard (eds.), Od Nilu do Eufratu – polska archeologia śródziemnomorska 1981–1994, Warszawa 1995.

One of the most important and significant Polish works supervised by the Polish Centre of Mediterranean Archaeology was conducted since 1959 on the Syrian site of Palmyra (Gawlikowski 2010, see also the journal *Studia Palmyreńskie*). As a result of this activity, important achievements in the study of architecture and sepulchral sculpture have been implemented under the direction of Anna Sadurska, Barbara Filarska and Michał Gawlikowski. On that basis the scientific journal *Studia Palmyreńskie* was established. The journal, published by The Polish Centre of Mediterranean archaeology, is presenting the archaeology of both the city and the region of Palmyra. It is open to all specialists interested in Palmyrean issues, covering a broad range of themes concerning all aspects of Palmyra's civilization, from the earliest period until Arab times. The scope of the journal covers not only archaeological discoveries, but also the history of Palmyra, its religion, art and epigraphy. It is obvious that Polish researchers who left Syria after the outbreak of civil war are today looking towards this place with special attention and concern.

Very important Polish archaeological works are also being conducted under the aegis of the PCMA in Lebanon. In Chhîm a research project was developed from 1996 to 2008 jointly with the Lebanese Direction Générale des Antiquités. The excavations were led by Tomasz Waliszewski, who is also the present director of the Polish Centre of Mediterranean Archaeology of the University of Warsaw. Excavations were finally completed in 2008. On this site, traces of human activity from the Bronze Age to the Early Islamic era were identified. The most interesting discoveries are a Roman sanctuary from the 1st–2nd century AD, oil compressors also from Roman times, and a Christian basilica with a floor mosaic from the 5th century AD (see Waliszewski et al. 2002: 5–104). Another important site is Jiyeh (ancient Porphyreon) where excavations have been conducted by the PCMA together with the Lebanese Direction Générale des Antiquités since 2003. They are also directed by Tomasz Waliszewski. Many important discoveries have been revealed on this site, such as a centre of ceramics production, an early-Roman necropolis, and a Late Antique and Christian basilica, with a mosaic floor dated back to the 5–6th century AD (Waliszewski 2005: 419–422).

The latest research project is being conducted in Lebanon under the direction of Zuzanna Wygnańska, in Akkar Province in the northern part of Lebanon. This is one of the most important areas connecting Syria and Mesopotamia with the Mediterranean coast. This province is mentioned in the written sources from the late Bronze Age as a territory of rivalry between Egypt and the Hittite Empire. The aim of the PCMA project is to document traces of settlement in the plateau area. During the

archaeological reconnaissance carried out in 2018, the team from PCMA localized 29 sites, including several megalithic graves and two large-sized 'broad room' buildings with apses, dated to Early Bronze I (second half of the 4th millennium BC). The most sensational discovery was the connection of these buildings with boulders decorated with engravings with a snake motif, suggesting a cult purpose, perhaps related to a funeral cult. In addition, defensive buildings, a quarry, a sanctuary and remains of residential architecture of periods from the beginning of our era until the eighteenth century were identified (PCMA 2018a).

More distant areas of the Middle Eastern region also fall within the interests of Polish researchers. In cooperation with Kuwait's Department of Antiquities and Museum of the National Council for Culture Arts and Letters (NACCAL), Polish explorers from the PCMA are exploring archaeological sites of different ages, identifying pottery workshops, ancient farms, camel, sheep and goat pens, as well as desert wells. This is a part of several Kuwaiti-Polish archaeological missions working continually for over 10 years. As the leaders of the team underlined, there is a strong and urgent need for an implementation of a rescue program for many archaeological sites in Kuwait. This type of activity and motivation is specially beloved by Polish researchers, who are usually very sensitive towards heritage protection and rescue actions.

Extremely important findings were provided by studies conducted by Piotr Bieliński and Agnieszka Pieńkowska on sites of Bahra 1 and Kharaib ed-Desht on Fajlaka Island. On the first of them, among others, the largest Ubaid culture settlement on the Arabian Gulf was discovered, a workshop producing tubular beads from the *Conomurex persicus* shell and a rich set of local ceramics (the so-called Coarse Red Ware) imported from Mesopotamia (Bieliński 2018). On the second site, in turn, there were discovered: a fishing village with residential buildings and fishing installations (nearly one hundred stoves for fish processing), a large stone structure with internal buttresses, fishing structures located along the shores of Kharaib el-Desht Bay and a rich set of imported glass bracelets (see e.g. Pieńkowska 2017). During the recently completed excavation campaign on Bahra 1 site, archaeologists from the University of Warsaw studied an architectural complex different from those constructions hitherto known on this site. According to them many indications suggest that this building had a cult function, combining local tradition with concepts borrowed from the Ubaid culture. That would make it the oldest cult building not only in Kuwait, but also in the whole region (PCMA 2018b).

One of the other teams working in Kuwait, headed by Łukasz Rutkowski, searched archaeological sites in As-Sabiya Desert over seven seasons, focusing mostly on tumuli graves and other stone constructions. As a result of this activity eight stone structures

were explored in Muheita and Nahdin. The team also excavated a cluster of five structures, including two tumuli (mounds of earth and stones raised over graves) and another one partially pulled down in the past. These discoveries were preliminarily dated to the Bronze Age, and more exactly between the 2nd part of the III millennium B.C. and the 1st half of the II millennium B.C. (see e.g. Rutkowski 2014: 431–461; Pawlicki 2014: 462–470).

All leaders and members of Polish research teams conducting excavations at the Egyptian and Levantine archaeological sites are used to enjoying the hospitality of the Research Centre in Cairo. One of the most important examples of PCMA activity is certainly an annual conference entitled *The Poles on the Nile and The Poles in the Middle East* which presents the results of the works currently conducted by the Polish archaeologists in the areas of Egypt and Sudan as well as on the sites located in the Levantine part of the region. One should also mention the annual journal *Polish Archaeology in the Mediterranean* (PAM; Fig 2) which provides up-to date reports on current fieldwork carried out by Polish scholars in the Mediterranean. Also until recently, an excellent example of promotional activity of the scholars associated with the PCMA were the works conducted in recent decades on the Tell Abrid site in Syria. A superb website, press releases and other media activity made it possible to disseminate knowledge about ancient north-eastern Syria and the Chabur River basin to a wide variety of audiences. Unfortunately, the outbreak of civil war interrupted the promising activity of this team.

Fig. 2. PAM journal published by Polish Centre of Mediterranean Archaeology, University of Warsaw since 1990

It should also be noted that Polish researchers are among the most active in obtaining research grants focused on the Middle Eastern areas. In recent years dozens of such grants have been implemented in various Polish scientific institutions. In 2017, the European Research Council awarded an ERC Starting Grant for the project *UMMA – Urban Metamorphosis of the community of a Medieval African capital city*, which is processed under the direction of Artur Obłuski at the above-described Polish Centre of Mediterranean Archaeology. The UMMA research project has an interdisciplinary character. Its scientific team plans to use the most modern research methods combining such fields as archaeology, physics, biology and chemistry. Geophysical investigations and stable isotope studies will be also used, to provide most precise data contributing to our knowledge on the history of mankind.

The Polish Archaeological Expedition to the Eastern Nile Delta, led by the Jagiellonian University in Kraków and the Archaeological Museum in Poznań, is another excellent example of Polish scientific activity performed in Egypt and related with the broader area of the Middle East. For more than 20 years the expedition has been conducting field works, which currently are among the most important and widely recognized excavations in Egypt (Fig. 3–7). Extraordinary, sensational discoveries of the world's oldest brewery, rich burials, golden statues of previously unknown rulers, and

Fig. 3. Tell el-Farkha (Egypt – Nile Delta) – trade factory from the predynastic and archaic period. One of the most important archaeological sites excavated by Polish archaeologists (photo by Robert Słaboński)

Fig. 4a. Tell el-Farkha (Egypt – Nile Delta) – Western Kom: deposit of 62 objects discovered by Polish scientists and presently exhibited in Egyptian Museum in Cairo (photo by Robert Słaboński)

Fig. 4b. Tell el-Farkha (Egypt – Nile Delta) – Eastern Kom: one of the two golden figurines discovered in 2006 (photo by Robert Słaboński)

enigmatic figures of deities have garnered much interest in the worldwide media and have revolutionised the studies on the origins of ancient Egypt. These finds have immediately become quoted in handbooks of ancient Egyptian culture, and many of the artefacts uncovered by Poles belong to the greatest attractions of the famous Egyptian Museum in Cairo (Chłodnicki 2011: 65–81).

Tell el-Farcha is one of the most important archaeological sites currently being excavated in Egypt (Fig. 8–9). The

Fig. 5. Tell el-Farkha (Egypt – Nile Delta) – Western Kom: exploration of early Egyptian brewery complex (photo by Robert Słaboński)

discoveries made there over the last several years have vastly influenced the picture of the Nile Delta in the period of the Pharaonic state formation. The site is situated in the north-east of the Delta, about 120 km from Cairo, 10 km from the contemporary city of Simbillawin and about 15 km from ancient Mendes, which once played a crucial role in the history of the decline of Tell el-Farcha. The site is formed by three hills (koms) totalling approx. 4500 m^2 in area, which are elevated no more than 5 m over the surrounding farmlands. The southern and eastern boundaries of the site are marked by the contemporary village of Ghazala. In 1998, Polish archaeologists from the Polish Archaeological Expedition to the Eastern Nile Delta started investigations under the supervision of Krzysztof Ciałowicz from the Jagiellonian University in Kraków and Marek Chłodnicki from the Archaeological Museum in Poznań[3]. On the Western Kom, a structure serving as a residence or temple was uncovered, and its youngest layer yielded a deposit of objects interpreted as offerings. Nearby, in the older layers, a complex of breweries was discovered, which is the second-oldest structure of this kind in Egypt. The oldest layer revealed the relics of a large structure linked with the Lower Egyptian culture, which provided evidence for the

[3] Complete information concerning first 10 years of excavations is available in: K. Ciałowicz, M. Chłodnicki, A. Mączyńska, Tell el-Farkha I, Poznań 2012.

Fig. 6. Tell el-Farkha (Egypt – Nile Delta) – Eastern Kom: exploration of predynastic cemetery (photo by Robert Słaboński)

development of local architectural traditions in the Nile Delta before the appearance of the Naqadians (Ciałowicz 2012: 149–162). In the Central Kom, numerous dwellings and household buildings were discovered, their function confirmed by a large number of tools, animal bones and domestic refuse (Chłodnicki, Gemming 2012: 89–105). The Eastern Kom, however, remained a puzzle for the researchers until 2001, when the trenches opened in that place revealed graves, the majority of which had not been looted in antiquity. Thus far, the works conducted on the cemetery have resulted in the discovery and exploration of more than 120 graves dated to the times of Dynasties 0, I and II, i.e. to the period crucial for the beginnings of Egyptian history. The burials are richly furnished and only some of them have been looted. In 2003, the oldest grave in the *mastaba* type was discovered in the Eastern Kom; such graves usually belonged to high-ranking officials from the period of the Egyptian state formation. The tomb is still under exploration (Dębowska-Ludwin 2012: 53–77). The site at Tell el-Farcha offers a unique opportunity to thoroughly investigate a settlement complex whose chronology spans from the local Lower Egyptian culture, through the stages linked with the Naqadian population, up to the rule of the first dynasties and the beginning of the pyramid period, as well as its connections with the Levantine settlement. From a scholarly point of view the works conducted at Tell el-Farcha are perhaps the most important studies of the formative

Fig. 7. Polish Archaeological Expedition to the Eastern Nile Delta in 2013 (photo by Robert Słaboński)

period in Egypt ever conducted (Kołodziejczyk 2005: 149–157). This magnificent site remains a field for theoretical studies and analyses, resulting every year in new publications and scientific ideas (see e.g. Ciałowicz, Czarnowicz, Chłodnicki eds. 2018).

The potential of these excavations for promotion and popularisation has also been well-exploited by the project leaders. Thus far, several exhibitions presenting the photographs from Tell el-Farcha have been organised. They were shown in the years 2001–2013 in several cities in Poland and abroad (e.g. Kraków, Poznań, Katowice, Cairo). Between 2000 and 2013 more than 100 publications about the excavations and discoveries made at Tell el-Farcha appeared in the daily press and in popular science journals (including *National Geographic*). Several years of popularisation and promotional activities not only made the results of the excavations widely known in Polish society, but they also helped to gain important support from many institutions and have been rated highly among the most important Polish research achievements of recent years in rankings published by scientific institutions and in the press (see e.g. Kołodziejczyk 2015).

In recent years the area of Israel and Jordan has also become an important workplace for Polish researchers. In this context it is worth underlining two projects carried out by archaeologists from the Institute of Archaeology of the Jagiellonian University

Fig. 8. Polish conservators working on the objects from votive deposit from Tell el-Farkha, in the laboratory of the Egyptian Museum in Cairo (photo by Robert Słaboński)

Fig. 9. Egyptian Museum in Cairo. Museum showcases fulfilled with objects discovered by Polish archaeologists in Egypt (photo by Robert Słaboński)

Fig. 10. Polish excavations at Tel Erani in Israel (photo by Agnieszka Ochał-Czarnowicz)

Fig. 11. Tel Erani (Israel). One of the Bronze Age jars discovered during the 2013 season (photo by Marcin Czarnowicz)

in Kraków. The first project, on Tel Erani site in Israel, started in 2013 (Fig. 10–11). The main goal of the project is to determine the course of trade routes connecting Egypt to the Middle East during the Early Bronze I, i.e. in the fourth millennium BC. Excavations conducted at Tel Erani near Kiryat Gat are exploring one of the most important prehistoric sites in the northern Negev. During several seasons of excavations a part of a city wall was uncovered. The site is considered by experts to be the key to understanding the so-called early Egyptian colonization in the area of the Levant (Ciałowicz, Yekutieli, Czarnowicz eds. 2016). So far, evidence of such relations has been observed at the other end of the route, while conducting Polish research at Tell el-Farcha in the Nile Delta, where a number of imports from Southern Levant were discovered by the Polish team (Czarnowicz, Pasternak, Ochał-Czarnowicz, Skłucki 2014: 235–244).

One effect of the recent research seasons was the discovery of structures confirming that during the Early Bronze Age on the Tel Erani site the oldest defensive walls in this area were built. It was a part of an extensive settlement founded, at least partially, by Egyptian settlers. Excavations are carried out with the cooperation and participation of archaeologists from Ben Gurion University of the Negev. This is the only excavation project currently being carried out by Polish archaeologists in Israel.

Regarding the current unstable situation in the region, Jordan seems to be the only country offering favourable conditions for scientific research, and it is becoming increasingly popular among scientists. Polish institutions are focusing their interest on the Hashemite Kingdom as well. The Polish Centre of Mediterranean Archaeology of the University of Warsaw has in recent years been conducting a research program in Beit Ras in Jordan, which covers the ancient city of Capitolias. The archaeological team working on this site is a cooperative group developed on the basis of an agreement between the PCMA and the Department of Antiquities of the Hashemite Kingdom of Jordan. The site is very important and was described by Claudius Ptolemy, a geographer of the 2nd century AD, as a part of the Decapolis, that is, a group of ten Graeco-Roman cities in eastern Palestine[4]. During the excavations the Polish team, directed by Jolanta Młynarczyk, examined the alignment of walls, which was registered in an electro-resistive scan, and it seems to concur with that of the streets of the Roman-period Capitolias. Many artefacts were collected during the first seasons, including fragments of roof tiles, tesserae (mosaic cubes) and several coins, as well as lumps of 'raw glass', slag, and production waste which point to the existence of glass-production workshops in the area of the excavated part of the city (see e.g. Młynarczyk 2017; Burdajewicz 2017).

[4] Among them were also modern capitals, such as Damascus in Syria and Philadelphia (Amman) in Jordan, as well as Scythopolis (Beth Shean) and Hippos (both in today's Israel) and Jerash and Gadara (in Jordan).

Furthermore, archaeologists from Kraków have in recent years been carrying out a new Polish research project in southern Jordan. Archaeologists and students from Kraków began survey exploration of Wadi Mashra area in the At-Tafila Directorate (Fig. 12). The project is directed by Piotr Kołodziejczyk from the Institute of Archaeology of the Jagiellonian University in Kraków. Since 2014, Polish archaeologists in cooperation with the Jordanian Department of Antiquities have been looking for traces of human activity from the Stone Age to the Medieval times. The area of the survey is located in the vicinity of important archaeological sites such as the capital of the Edomites – Bosra (now the city of Buseira) and the rock-cut Sela refugium, often interpreted as an important cult place and arena of great events from the Iron Age. After five years of research, scientists are sure that this region played an important role in prehistoric times. This view is evidenced by many finds – e.g. pottery, flint tools, glass items, etc. – which are now the subject of further analysis. Archaeologists from Kraków are especially interested in finds from the Bronze Age which may help to answer many questions related to human presence in the area of Edom in that period (Kołodziejczyk 2014: 245–252). Another important research problem is the role of the southern Jordan in the Nabatean and Roman periods and its relationship with trade routes and other major centres of the northern part of the Edom plateau. The second team, headed by Jarosław Bodzek, Kamil Kopij and Łukasz Miszk is conducting exploration of Dajaniyeh Roman military fortress and the city of Tuwaneh (see Bodzek et al., in this volume). A long-term research topic for the Kraków archaeologists is primarily a reconstruction of transportation routes in southern Jordan and the role of environmental conditions in transformations of human activity in this area. Some of the conducted projects will also be the beginning of thematically and methodologically integrated field works and analyses devoted to the role of environment and landscape in archaeology. A late prehistorical project (HLC Project – see Kołodziejczyk et al., in this volume) related to the at-Tafileh region will also help in understanding the processes of cultural change and locate them in the context of nature and landscape, and will popularize customs and traditions in modern Jordan. Exploration carried out during recent years was conducted in very difficult mountainous terrain. The Polish team made a documentation of more than 70 areas with artefacts which may be described after further analysis as archaeological sites or landscapes. This activity is also a departure point for a much larger presence of the Jagiellonian University team in southern Jordan[5]. The research group started regular excavations on selected sites in cooperation with Jordanian scholars and

[5] Visit www.hlcproject.org for more and current information.

Fig. 12. Polish scientific project in southern Jordan. Artifacts discovered during 2015 season and area of the project (photo by Piotr Kołodziejczyk)

antiquity protectors. It is also worth mentioning that the activities of the Institute of Archaeology of the Jagiellonian University in Jordan starting in 2013/2014 was the first Polish independent research project in this area. Its implementation was possible thanks to the kind support provided by an Italian team of archaeologists from the University of Florence, working for many years in the area of southern Jordan, under the direction of Professor Guido Vannini. While both research groups operate independently, they remain in very friendly cooperation. This cooperation continues in the context of a third Kraków project conducted in southern Jordan. A team headed by Przemysław Nocuń and Agnieszka Ochał-Czarnowicz is exploring the castle of Qasr ed-Deir in the vicinity of At-Tafila city. After the initial seasons we may assume that Qasr ed-Deir should be seen as a compact, multiphase complex and its origins should be most probably dated to the Roman-Byzantine Period. The complex was developed and reconstructed more than once and the last great alterations should be dated to the

Mamluk periods. Future analysis of the stratigraphy of masonry elements combined with analysis of the archaeological material should yield more precise results (as the archaeological excavations are hopefully to be continued in the following years).

The presence of Polish archaeologists and conservators in the Middle East has led to great contributions to the study and protection of cultural heritage on a globally significant scale. It is worth noting that Polish scientists are conducting their research in places that are not only particularly important for understanding the history of civilization, but are also threatened by conflict, economic development, and environmental factors. The important achievements of Polish archaeologists have put them at the forefront of the global scientific community, making archaeology the ideal showcase for Polish science. The changes taking place in the Middle East and the problems arising over the past few years have unfortunately hampered the work in several places, but at the same time they have prompted Polish archaeologists to explore new areas and directions in their research and activities.

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Discovering Edom. Polish archaeological activity in southern Jordan
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HLC Project 2014–2019. Research activity of the Jagiellonian University in southern Jordan

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Abstract: From 2014 a new Polish scientific project conducted works dedicated to the area of southern Jordan. In a special way, it focused on the period of late prehistory in the area of the city of At-Tafila. As part of this project, selected sites underwent surface surveys and excavation works, which have already brought interesting and important effects.

Keywords: southern Jordan, archaeology, Neolithic, Bronze Age, HLC Project

A Polish research meta-project in southern Jordan called *Heritage-Landscape-Community* (HLC Project, www.hlcproject.org)[1] was launched in 2014. Archaeologists and students from the Institute of Archaeology of the Jagiellonian University are conducting survey and excavations of an area in At-Tafila and Shawbak Directorates. The project is directed by Dr. Piotr Kołodziejczyk. In cooperation with the Jordanian Department of Antiquities, Polish archaeologists are looking for traces of human activity from late prehistory. The area of the project is located in the vicinity of important archaeological sites such as the capital of the Edomites – Bosra (now the city of Buseira) or the rocky Sela refugium, often interpreted as an important cult place and arena of a great battle between the Israelites and Edomites. The project area is also close to the famous Wadi Feynan valley of copper mines, which played a key role in the processing of this material and its exports to neighbouring areas, especially in the Chalcolithic period and in the Early Bronze Age.

[1] The current members of the HLC Project team are: Marek Nowak (archaeologist, chert specialist), Michał Wasilewski (geologist, geoarchaeology specialist), Jacek Karmowski (archaeologist, field director) Marcin Czarnowicz (archaeologist, ceramologist), Agnieszka Brzeska-Zastawna (archaeologist, chert specialist), Justyna Zakrzeńska (archaeologist, chert specialist), Katarzyna Radziwiłko (archaeologist, public archaeology), Barbara Witkowska (archaeologist, field director), Jan Ledwoń (documentalist), Bartosz Klose (dokumentalist).

Kraków archaeologists are especially interested in identification of finds from the Bronze Age, which may help to answer many questions related to human presence in the area of Edom in that important period. A long-term research topic of Polish archaeologists is primarily a model of transportation routes in southern Jordan and the role of environmental conditions in the development and transformation of late prehistoric human activity in this area. The whole project also constitutes a beginning of thematically and methodologically integrated field works and analysis devoted to the role of landscape in archaeology and cultural changes. The HLC Project will help in understanding the processes of cultural change and locate them in the context of nature and landscape. It will be also a very interesting analysis in the context of modern Jordan and the development of tourism as well as protection of heritage and traditions.

It is also worth mentioning that the activities of the Institute of Archaeology of the Jagiellonian University during the 2014 season was the first Polish independent research project in southern Jordan. Its implementation was possible thanks to the support provided by an Italian team of archaeologists from the University of Florence, working for many years in southern Jordan under direction of Professor Guido Vannini. While both research missions operate independently, they maintain a very friendly cooperative relationship.

As a result of these activities the first specialized project concerning the Early Bronze Age in southern Jordan (see below) was started in 2017. This is also possible thanks to the National Centre of Science, whose specialists appreciate our efforts and have granted us research funds for the next few years[2].

Initial survey research

Conducted since 2014, the initial survey works took place mostly in a very difficult mountainous landscape. The Polish team documented artefacts in more than 100 areas, which may be described after further analysis as either archaeological sites or landscapes. As an result a collection of thousands of pottery sherds and flint tools as well as several other interesting items, some made of slate or glass (of early medieval provenience), were identified. All the examined zones are located in the upper, north-eastern part of the Wadi Mashra – Wadi Salim area. The documentation of the explored zones became part of a spatial database available for further processing in

[2] National Science Centre grant UMO-2016/22/E/HS3/00141.

GIS software. Further parts of the selected area will be examined over the next survey seasons. The main aim of the survey field work was to locate and document unknown or barely known archaeological sites in this region. The scientific objectives are focused on the determination of the chronology and nature of human presence in this area during the period from the Stone Age to Medieval times. A more detailed goal of this project is to determine the extent and nature of the presence of human groups in the micro-region, and to discover clues leading to explanation of the problem of gaps in Bronze Age settlement in southern Jordan. The methodological aspects of the project are also worthy of mention, such as verifying the dating and analysing urgent research needs. Further goals include the protection of all the decaying relics on the surface, which are undergoing weathering and anthropogenic processes, or the suggestion of further research methods for the area, which are difficult to access at the moment.

Nowadays the At-Tafileh region might appear hostile because of its semi-arid habitat (Saqq, Atallah 2013) and mountainous, difficult terrain, but climate changes through the epochs have been confirmed. In the past, the climate in the region was less harsh and more humid, and this enabled societies to lead an agricultural and pastoral lifestyle (Shehadeh 1985; Shea 2013: 9). This allows for the conclusion that many archaeological traces of past activities must be located in the area of our interest.

Despite the fact that archaeological research of the At-Tafileh region is in its initial stage, after a few years of surveys and small scale excavations it has become clear that this area is very interesting and worthy of further investigation. The region seems to be very promising from archaeological and paleo-environmental points of view. In the eastern and south-eastern part it has been significantly changed by contemporary mining activities (quarries) which exploit the Turonian limestone and dolomitic limestone. The southern and central parts (and in ancient times probably the eastern part too) have been levelled and cleared for agricultural (and settlement) purposes. As we can observe, the Wadi Mahsra – Wadi Salim area and its neighbouring territories are one of the most interesting areas in the region and seem to offer enormous potential in terms of heritage and natural values. It is perfectly clear as well that the whole At-Tafileh region, which constitutes an important part of what in ancient times was called the land of Edom, is marked by numerous historical sites that require attention, research, and promotional activities. In this context we may assume that the most important objective of the project started in 2014 is to gather as much information about the region as possible, using an integrated approach combining the broad spectrum of humanities methods with special tools of the natural and technical (especially computer) sciences. The application of these research methods will provide answers

to crucial questions and will allow us to collect materials for the development of scientific research work in subsequent years. Special interest is focused on the analysis of environmental changes in the region and their impact on the presence and activity of human groups as well as developing the landscape model, allowing the discovered archaeological material to be interpreted and placed in a topographical context, to explain the cultural processes and the role of landscape in the functioning of the past societies in this area.

Early Bronze Age in southern Jordan – remarkable time in an unusual place

Following the reconnaissance conducted in 2014–2016 (Kołodziejczyk et al. 2018), in 2017 the HLC and working in cooperation with the Department of Antiquities of the Ministry of Tourism and Antiquities of the Hashemite Kingdom of Jordan started excavation of two sites: Munqata'a and Faysaliyya (Fig. 1). The main objective was to establish the nature of human occupation at both sites and to determine their chronological phasing. The driving idea behind this specific research activity is a comprehensive review of the region in the Early Bronze Age, establishing the nature and dynamics of human occupation from a case study concentrating on the micro-region of At-Tafila and its association within the context of neighbouring areas. Key research issues include settlement patterns, social structure and organization, external relations and cultural influences within the

Fig. 1. Location of sites excavated by HLC Project team (drawing by J. Karmowski)

Levant and possibly as far as Egypt, two regions known to have witnessed important events during that age. In addition, evidence of architectural and funerary traditions have been observed in the archaeological record. The picture of the Early Bronze Age of the region derived from the fieldwork of the HLC Project will be considered against the backdrop of earlier cultural units and phases, from the Palaeolithic through the Chalcolithic periods, in order to present the path of development of the prehistoric and early historic communities in the region. Detailed studies will focus on pottery and chipped stone working traditions, as well as the question of production technologies and foreign and local trade networks. Survey results incorporated into the study have highlighted the significant impact of environmental factors on the functioning of those early societies.

Considering the background of this research project we have to assume that the Near East is an area not only of importance for the history of culture, but it is also very vast and diverse. The history of the land, legible thanks to many scientific analyses, makes it one of the most significant for learning the history of mankind – from the moment when representatives of our species left Africa approximately 200 thousand years ago up to the present day. The Early Bronze Age period in the Near East is one of the most fascinating research problems in contemporary archaeology. Lasting for approximately 1,700 years (3700–1950 B.C.), the period abounded in events and cultural changes. During the Early Bronze Age the first urban centres appeared, production technologies of various objects were developed (e.g. metallurgy) and long-distance trade flourished. At that time many important social changes occurred in the lands of Egypt and the Near East – the first kingdoms of spatial character appeared (Egypt in Predynastic, Archaic and Old Kingdom periods) as well as city-states controlling smaller areas, a hierarchical structure of particular communities was shaped and gradually deepened, and cults and funeral customs developed. Writing systems and ideologies of power and religion were developed and became a crucial factor of cultural existence. Migrations are clearly evident and the influence of mobile nomadic groups on the functioning of especially the area of southern Jordan, which in the environment of dynamically changing areas could not have been a 'blank spot'. We have to fill this gap with new data from various types of research.

Thus the main aim of the described project is an attempt to establish the role of the region of southern Jordan in this important period. Through archaeological excavations at selected sites the Polish team will try to describe the stages of human activity in this period in the area of interest. As an example the area covering the micro-region of At-Tafila city in southern Jordan will be studied. Excavations will be

also supported by specialized laboratory analysis in order to determine the exact age of the discovered artefacts as well as methods for their production and use.

The latest work of the Early Bronze Age project has focused on the two sites specified above. The archaeological site of Munqata'a is located about 3 km north-west of the modern town of At-Tafila, on the northern slope of a wadi, below 520 m ASL. The wadi begins in the town and descends westward toward the Dead Sea Rift. The survey team documented high concentrations of loose artefacts along with remnants of stone walls in several places on the surface, suggesting substantial settlement in the area. Munqata'a is located in the lower part of the valley and can be reached only by a small path descending down the steep slope. Robbers' pits pockmark the site, and chert, stone and ceramic artefacts from various periods scattered prolifically over the surface attest to recent plundering. The second site – Faysaliyya – lies about 5 km south-east of the town of Shawbak, on a plateau situated about 1200–1300 m ASL, in the northern part of the historical and geographical highland region of Edom. The Arabian Desert begins to the east and the Dead Sea Rift to the west; to the north is the Moab highland starting from Wadi Hasa. The area is also called the Eastern Highland or Jabal al-Adhiriyāt. It is actually the locale for a cluster of prehistoric sites, with at least two discovered in 2016 by the Jordanian Department of Antiquities surveying the area in connection with the planned construction of a wind farm. The sites were dated tentatively from the Stone Age to the Bronze Age on the grounds of a huge flint assemblage on the surface and some presumed stone architecture remains.

The first two excavation seasons (2017 and 2018) conducted on both sites brought interesting information and an assessment of the selected locations for inference about the late prehistory and especially the Neolithic – Early Bronze Age period. It also allowed for better planning of subsequent works and defining research needs, like the necessity of conducting laboratory analysis (OSL and ^{14}C dating) to permit precise dating of poorly preserved archaeological layers on both sites. It is also possible to make the first detailed chronological observations for the examined sites. At Faysaliyya, the two zones with traces of prehistoric occupation that were observed can be interpreted as settlement and farming, judging by the distribution of the artefacts and based on comparison of the archaeological evidence with geological observations. Stone structures consisted of walls, circles and cairns (Fig. 2–3). The huge number of chert tools, smaller amounts of pottery and a stone pendant indicate heavy use of the area, especially during the later phases of the Early Bronze Age and the beginning of the Middle Bronze Age periods (Figs 4–10). This observation was confirmed by the radiocarbon dating which determined the dates as between 2600–2300 BC.

Fig. 2–3. Excavations on Faysaliyya site (photo by P. Kołodziejczyk)

It is, however, necessary to mention that the whole area of the site is covered by artefacts from the Palaeolithic period (Fig. 19). The horizon of the pastoral cultures, already recognized by scholars in the nearby Jurf area (see, e.g. Fuji et al. 2017), is visible at the site and may be at this moment roughly linked with the period between

Fig. 4. "Tent stone" from Faysaliyya site, Early Bronze Age (photo by P. Kołodziejczyk)

Fig. 5. Decorated bowl from Early Bronze Age III–IV, Faysaliyya site (photo by P. Kołodziejczyk)

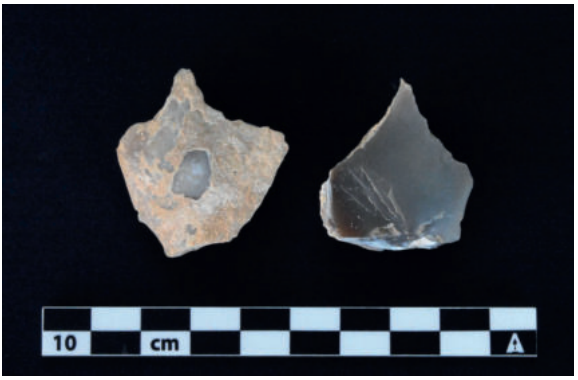

Fig. 6. Faysaliyya site. Epipaleolithic perforators (photo by P. Kołodziejczyk)

the Chalcolithic and the Early Bronze Age. Meriting special note is a carved stone from one of the stone structures at Faysaliyya, which is known from sites dated to the pastoral Neolithic–Bronze Age cultures (Fuji et al. 2017: 571, 572, 575–576). It was used here in wall construction, probably to protect against water or wind flow. This assumption is based on parallels (e.g. Fuji et al. 2012: 143, fig. 20) known from the Jarf Basin and several sites located about 100 km to the east of Faysaliyya. They are often described as barrages (flood gates), securing important pastoral areas, or directing water to other areas (Fuji et al. 2012; 2017). The structure may be a harbinger of a system of similar structures at the site, as they are usually known to occur in clusters over an area of considerable size. This may be a relic of a farming-housing structure related to the late prehistory period.

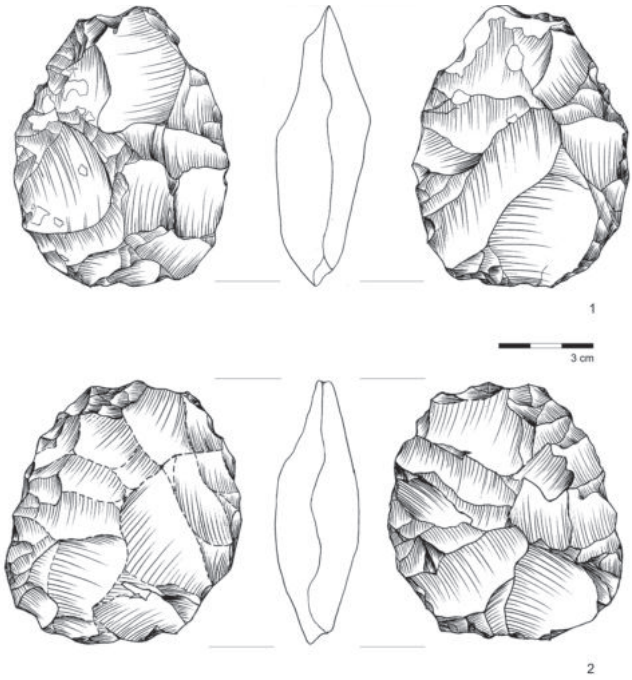

Fig. 7. Faysaliyya site. Lower Paleolithic artifacts – Acheulian handaxes (drawings by B. Witkowska and J. Kościuk)

Relics of a stone settlement structures (Fig. 12–14) were surely discovered in the two trenches established at the extensive Munqata'a site, which covers most of the lower part of the valley there. The finds suggest a sequence of Early, Middle and Late Neolithic settlement phases with some very vague indications of a Chalcolithic and Early Bronze presence (only in the chert inventory). The huge number of chert tools (Fig. 15, 17) and the relatively high amount of pottery (also with traces of paint), both from the excavated probe and the survey zone, reflect intense exploitation in late prehistory, specifically during the Neolithic period. The characteristic pottery finds (Figs 16, 18) are probably related to the Pottery Neolithic (PN), which is very commonly represented in this area and can be linked tentatively to the Jericho IX culture, which represents the first stage of farming communities in the southern Levant. Munqata'a would thus be the southernmost known site of this chronological horizon. This observation was also confirmed by the only radiocarbon date obtained from the Munqata'a site – 6500 BC – which focuses our attention on the late Neolithic. The results of the field season also show the need for a model of environmental changes for both sites, focusing primarily on flood activity and erosion processes, as these factors played a significant role not only in the past, when the site was actively used, but also during the post-depositional stage.

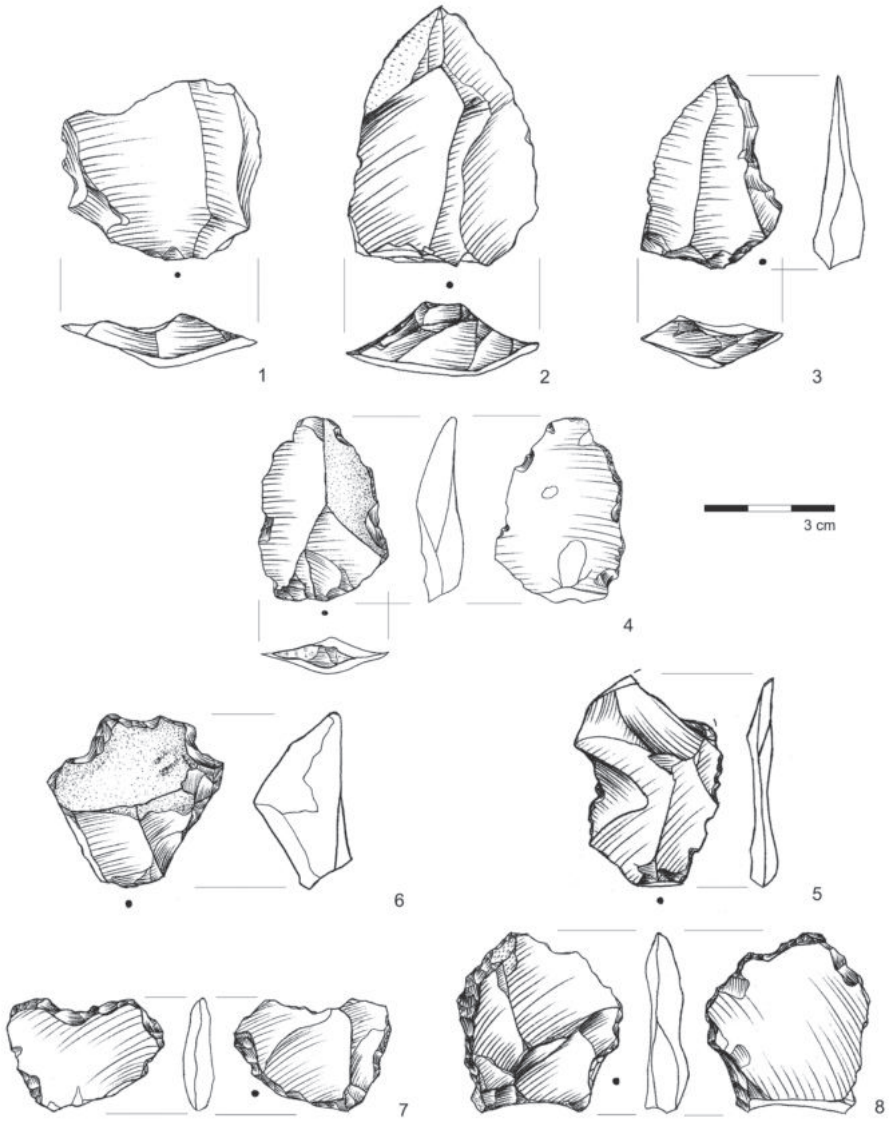

Fig. 8. Faysaliyya site. Middle Paleolithic artifacts – Levallois flakes and points (drawings by B. Witkowska and J. Kościuk)

It is also evident that the HLC Project will be useful specifically to curb the illegal digging that has been going on, especially in the Munqata'a area.

In 2019 the Polish team conducted surveys and excavations in an area located in the vicinity of Namata village, in the At-Tafileh directorate, on the upper part of Wadi Salim surroundings, on the sites of Ain Sawan and Ain Sawan North (Fig. 20–21).

Fig. 9. Faysaliyya. Epipaleolithic, Neolithic and Early Bronze Age artifacts – microliths: backed bladelets or rectangles; regular bladelets, blades of medium size; tabular scrapers made of flat cortical flakes and flake perforators (drawings by B. Witkowska and J. Kościuk)

During this prospection two zones with traces of human activity from prehistoric times were distinguished and excavated. The first zone was an almost plain terrace with visible relics of walls on which 3 small trenches were established. Within these trenches very small amounts of pottery pieces and flint objects were found. The stone

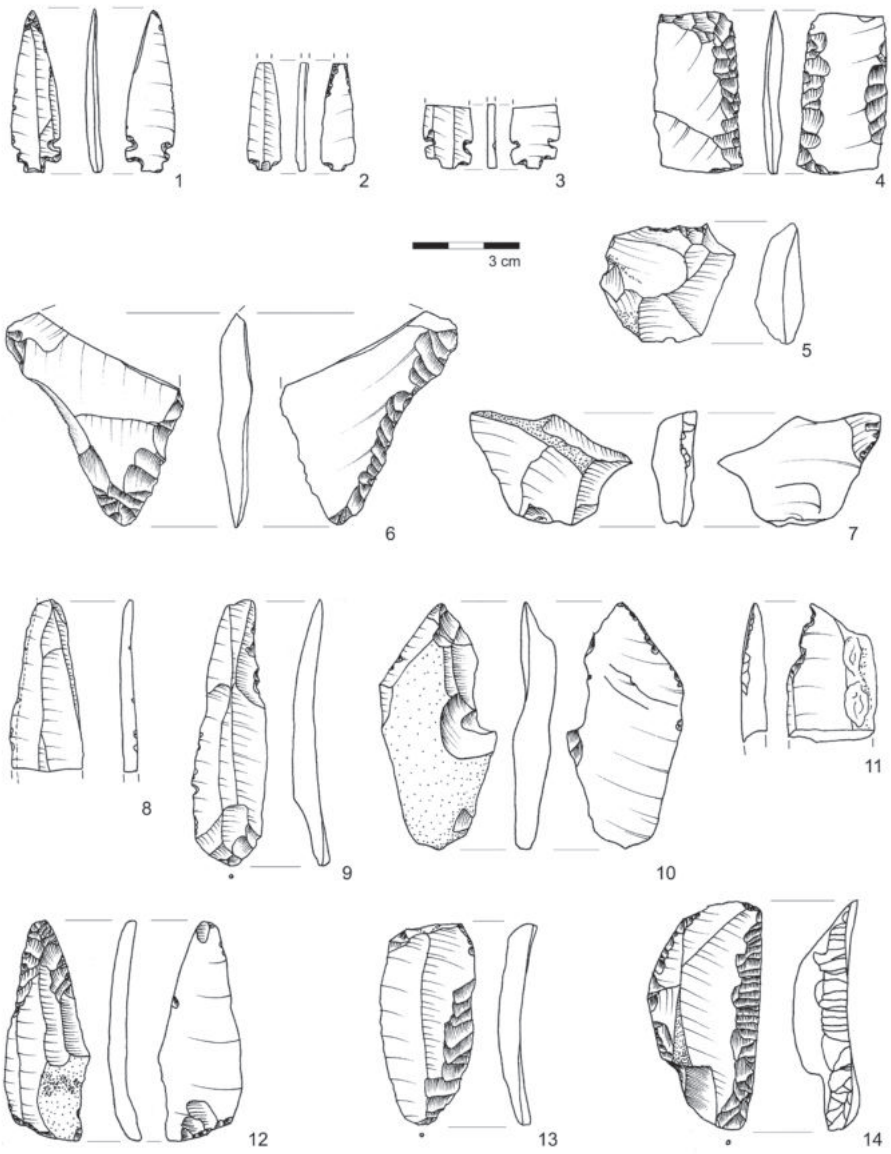

Fig. 10. Munqata'a. Middle Neolithic artifacts – projectile points (Helwan and Abu Salem points), bladelets, flakes, knives and perforators (drawings by B. Witkowska and J. Kościuk)

wall which was partially excavated was also documented on the surface on the line of about 80 meters. It seems possible that we are dealing here with the relics of agricultural activities and structures dated back to the Iron Age or later periods. In the second location two sequenced trenches were opened to reach the relics of the stone structures

Fig. 11. HLC Project team on Munqata'a site (photo by P. Kołodziejczyk)

Fig. 12. Excavations on Munqata'a site (photo by P. Kołodziejczyk)

partially visible on the surface. As an effect of this activity a part of a rectangular structure was revealed. This may be a house or an agricultural fence or building, according to the artefacts dated back to the Roman or Byzantine period. This observation seems to be confirmed by the objects revealed during the 2019 season. During excavations

Fig. 13. Excavations on Munqata'a site (photo by P. Kołodziejczyk)

Fig. 14. Excavations on Munqata'a site (photo by P. Kołodziejczyk)

a very limited number of flint tools and pottery (also with traces of painting) were identified. In addition, two pieces of small and badly preserved metal objects were identified. Preliminary conclusions and the chronological outcome of this season are directing our dating to the later periods – the Iron Age, Roman and Byzantine times.

Fig. 15. Munqata'a site. Arrow heads from early Neolithic period (photo by P. Kołodziejczyk)

Fig. 16. Munqata'a site. Pottery jar of Jericho IX culture (photo by P. Kołodziejczyk)

Fig. 17. Munqata'a site. Arrow heads from early Neolithic period (photo by P. Kołodziejczyk)

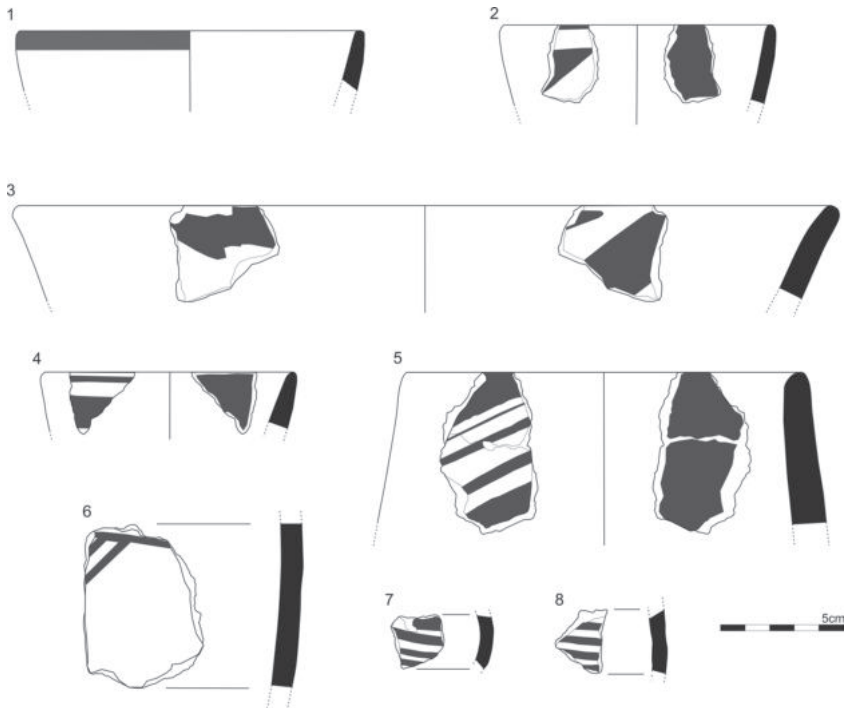

Fig. 18. Munqata'a. Painted pottery of Jericho IX Neolithic horizon (drawings by A. Świetlicka, J. Ledwoń)

Fig. 19. Hand axe from surface survey near At-Tafileh (photo by P. Kołodziejczyk)

It seems very likely that most of the structures and artefacts discovered on the site are related to agricultural or farming activities.

We should emphasise the very important support given to the HLC Project team by the Embassy of the Republic of Poland in Amman, under the direction of both the previous Ambassador Krzysztof Bojko and the current head of the Embassy – Ambassador Andrzej Świeżaczyński (Figs 22–23). Thanks to this support, the work of the Polish team is much safer and much easier in logistics and organizational terms.

Fig. 20. Excavations on Ain Sawan site (photo by P. Kołodziejczyk)

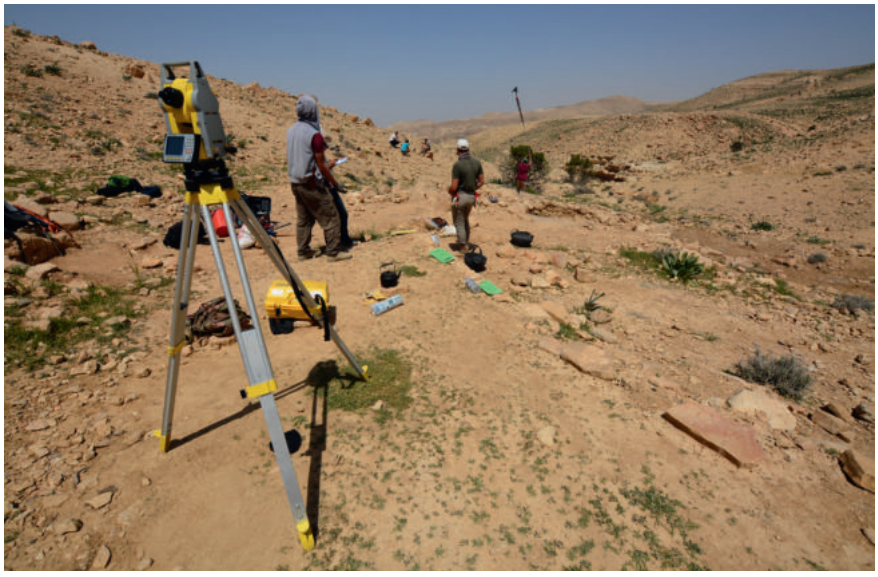

Fig. 21. Excavations on Ain Sawan site (photo by P. Kołodziejczyk)

It is also worth mentioning that the HLC project research activity is conducted in difficult terrain conditions. It requires physical involvement from the team members. At some sites camping is necessary and delivering of supplies constitutes a very difficult logistical task.

Fig. 22. Research works in excavation headquater in Dana village (photo by P. Kołodziejczyk)

Fig. 23. Visit of Polish Ambassador Andrzej Świeżaczyński on the Faysaliyya site during excavations (photo by P. Kołodziejczyk)

The work of the described Polish project will provide an important contribution to the protection of archaeological heritage in the area of Southern Jordan, often underestimated today because of its relatively unspectacular character (when compared

to sites such as Petra or Kerak). It surely constitutes a key to the development of scientific knowledge. The study will also let us to develop the work of Polish scientists in Jordan in the coming years.

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Discovering Edom. Polish archaeological activity in southern Jordan
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Results of "Archaeological Study of Dajaniya & Tuwaneh" (ArTu:DTu) 2018 survey of Dajaniya (Ma'an-Husseiniyeh), Southern Jordan

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Abstract: Between 3 and 6 November 2018 our team conducted an archaeological survey at Dajaniya, Ma'an-Husseiniyeh district, Southern Jordan. The primary goal of the work was to document the architectural remains and to verify dating of the site. Documentation work was completed using laser scanning and close-range photogrammetry. In order to verify the dating, a surface prospection was carried out. Additionally, a virtual tour of the site was created using a spherical camera.

Keywords: Dajaniya, Roman fort, Roman Arabia, Limes Arabicus, archaeological documentation, photogrammetry, laser scanning

Introduction

The remains of the Roman fort in Dajaniya[1], Ma'an-Husseiniyeh (Fig. 1) are located 4.6 km from a modern settlement, Al-Husseiniyeh. The site is situated approx. 30 km north-east of the Udruh and 78 km south of the Lejjun legionary fortresses, in close vicinity to the remains of a *castellum* in Jurf ed-Darawish (located only 19 km to the north-east). The surveyed fort lies between two Roman roads running along the Empire's borders, 3.5 km west of today's Desert Highway, which runs along the ancient

[1] MEGA Number 5983; GPS coordinates: 30.5527, 35.7618.

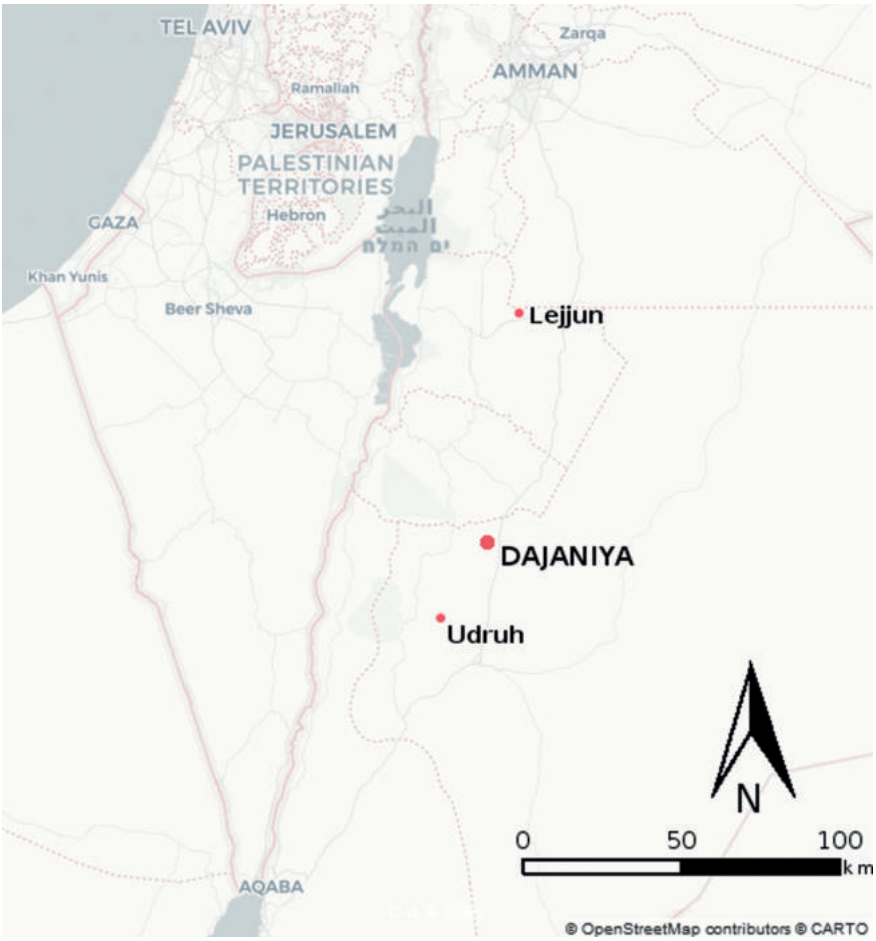

Fig. 1. Map of the region with the location of the forts in Dajaniya, Udruh and Lejjun (author: K. Kopij using © CARTO)

border road, and 13 km east of the King's Highway, situated partially over the Roman *Via Nova Traiana*.

The site (Fig. 2) has riveted the attention of numerous researchers and travellers. Among the early scholars, the most important role was played by Brünnow and von Domaszewski, authors of the very first plan of the fort (Brünnow, von Domaszewski 1905: 8–13). Equally important was the work by Thomsen, concerning the region's milestones and roads (Thomsen 1917). Glueck also shared his observations concerning the fort in his two publications (1935; 1940). It was not until the 1980s, however, that further visits were paid to the site that resulted in scientific publications. The first of the then visitors was Freeman (Freeman 1990), followed by Kennedy and Riley,

Fig. 2. Satellite image of the site (source: Bing Maps)

authors of several publications devoted to aerial explorations of Jordanian antiquities (Kennedy, Riley 1990: 168, 172–75, 192–93). Subsequent studies were conducted under the supervision of S. Thomas Parker, who concluded the outcome of the *Limes Arabicus Project*, first in *Romans and Saracens* (Parker 1986) and then in several consecutive reports (Parker 1976; 1987; Godwin 2006) covering, among other things, survey works in Dajaniya. The site was also visited by Findlater (2002). The latest research to date was performed by Rucker (2007), who focused on the fort's immediate vicinity, mapping all sites within a distance of 5 km and collecting surface material.

The fort's walls make a rhombus measuring 102.20×99.15×99.75×101.10 m (Freeman 1990; Godwin 2006: 276). The building material (or at least the limestone) was probably taken from a quarry in Wadi al-Muqta'a, discovered in the 1990s approximately 7.5 km north of the structure (Godwin 2006: 276). The average thickness of the curtain wall is 2.25 m (Gregory 1996: 378; Godwin 2006: 276). Brünnow and von Domaszewski (1905: 12) inform that the wall-walk on top of the walls was at a height of 4.70 m, which leads us to believe that their total height was approx. 5 meters. The circumference of the walls was reinforced by 14 towers, probably two-storied (Brünnow, von Domaszewski 1905: 12). This, however, cannot be known for certain as the towers are more poorly preserved than the walls, a fact to be linked to the construction technology: the tower walls are half as thick as the curtain wall

(Gregory 1996). The towers significantly differ in size. The biggest of them is the eastern tower, measuring 8.80×8.50 m, while the smallest is the interval tower north of the SE wall, measuring only 4.80 m (Gregory 1996: 378). The towers are assessed to have been soaring approx. 2.35 meters above the walls, spaced every 22.5 to 25 meters. Here, the south-eastern wall stands out, with four towers instead of two and a spacing of 13 m (Gregory 1996: 378–79).

Adjacent to the internal wall façade was a row of one- and two-chamber structures, sometimes interpreted in literature to be remains of stables (Kennedy, Riley 1990: 173), separated from the rest of the fort's buildings by a communication route (*via sagularis*).

The interior of the fort was divided in two by a *via principalis*, a major circulation route crossing the centre of the complex (southeast–northwest axis) and connecting its two main gates. The south-west part was composed of a row of two-chamber barracks. The similar-looking north-east part is disturbed by the presence of the *principia*. The north-east part of the main communication route housed a capacious rectangular water cistern measuring 12.8×5.5 m, originally roofed. Beyond the walls, to the south of the southern corner there is a 40 m^2 reservoir (Brünnow and von Domaszewski 1905: 12–13, figs 566–567; Gregory 1996: 379). Judging by Kennedy's aerial photographs (2004: 170–71, fig. 16.7) it seems more rectangular in shape than assumed by Brünnow and von Domaszewski, most likely as a result of modern-day modifications (Godwin 2006: 275). Archaeological verification may not be possible any longer because of the construction works performed at the site in recent years (construction of a new reservoir).

Moreover, outside the walls there are also two other structures. The oval one, situated more eastwards (diameter approx. 9.5 m), has remained unexplored to this day. Based on his observations, Parker believed it to be remains of a lime kiln or an iron smelting furnace. The other structure (Godwin 2006, fig. 14.4), situated to the south-east of the fort, is rectangular in shape (10.41×7.48 m). The excavations revealed foundations of three quern-stones and several warehousing rooms, in use at the same time as the fort (Godwin 2006: 277).

Although a number of researchers (Brünnow, von Domaszewski 1905: 311; Lander 1984: 144–45; Godwin 2006: 285) suggested an earlier origin of the fort, the hitherto research indicates that the major part of the period in which the fort was functioning falls within the late Roman and early Byzantine periods, i.e. ca 284–502 AD (Gregory 1996: 380; Kennedy and Riley 1990: 175; Parker 1986: 93–94; Godwin 2006, 276–8). It must be noted that although fragments of early Roman ceramics, dating from the 2nd century AD, were found within the fort and in adjacent areas, no structures potentially linked to these findings have been reported (Godwin 2006: 285). The stronghold

probably originated in the times of Diocletian's reorganisation of the border at the turn of the 3rd and 4th centuries AD. Results of the survey (including trial trenches) performed as part of the *Limes Arabicus Project* indicate that the fortress shortly ceased to be used for stationing the army unit for which it was originally built. Room T.3 was turned into a refuse dump as early as the mid-4th century (Godwin 2006: 280). The garrison probably underwent rapid reduction. It seems that towards the end of the early Byzantine era (right after the mid-4th century), rooms T.2 and T.3 were no longer in use (Godwin 2006: 280). Late Byzantine strata (I–II; ca 500–551 AD) were only found in T.1 and T.6. Interestingly, in the early 6th century, a layer of dung formed in the south-west part of T.1, room interpreted as *aedes principiorum*. All this demonstrates that the facility's function changed, perhaps as a result of the earthquake of 502 AD, making it no longer the most sacred structure in the fort (Godwin 2006: 283). This phase of its use seems to have been short, whereupon the room ceased to be used at all. Eventually the vaulting collapsed, probably due to the earthquake of 551 AD (Godwin 2006: 283). Some of the trial trenches revealed strata older than 551 AD, but all they testify to is the temporary use of some rooms in the fort (Godwin 2006: 284–5).

One important fact has not been established yet, i.e. which military unit was stationed in the fort. Because of the atypical dimensions and plan of the site, even the type of the forces that occupied the structure remains unknown. Brünnow and von Domaszewski (1905: 8–12) thought it must have been the *cohors quingenaria equitata*, a unit composed of 120 cavalrymen and 380 infantrymen, while other researchers tend to lean towards cavalry (Gregory 1996: 381). In the opinion of Kennedy and Riley (1990: 168), it was either several different units or one-half of the *cohors quingenaria equitata* that were stationed in the fort (hence its atypicality). They concluded that Dajaniya had been unable to accommodate a garrison composed of 500 soldiers plus a considerable number of horses, since there is no evidence suggesting that the buildings located within the fort area had more than one storey.

Season 2018

Objectives of study

The principal objective of works performed in 2018 was to develop comprehensive three-dimensional documentation of the archaeological remains. Due to the inability to use an unmanned aerial vehicle (UAV), a decision was made to use a combination of

Ultra-Low Altitude Photogrammetry (ULAPh) and laser scanning. Additionally, the site's chronology was verified with a surface survey, and documentation of looting pits right outside of the fort's walls was developed. Finally, a spherical camera was used to create a virtual tour of the fort (Fig. 3).

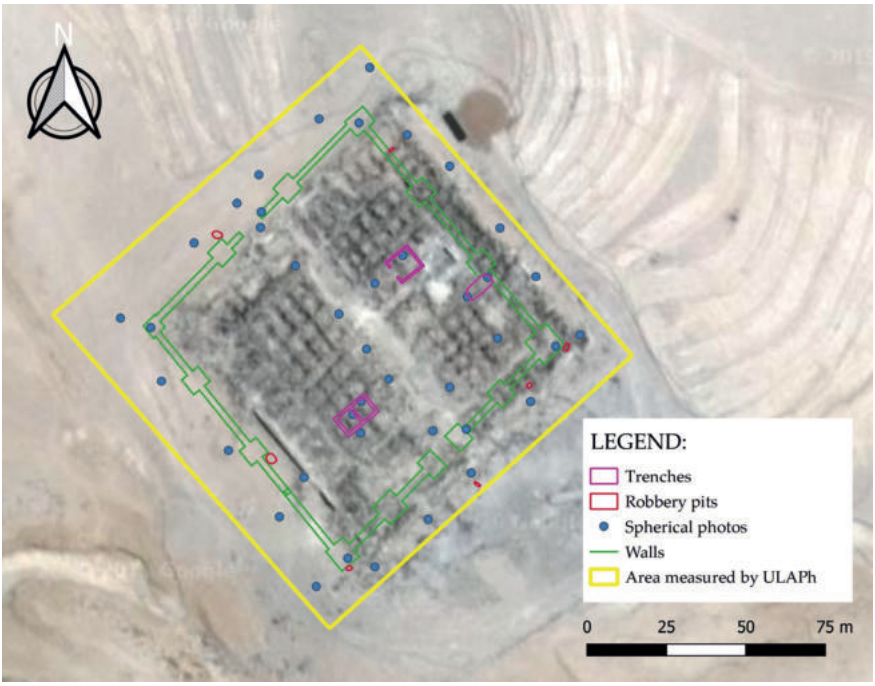

Fig. 3. Areas of activity marked on satellite imagery (authors: A. Słodowska, E. Puniach)

Field prospection

Between 3 and 6 November 2018, acting based on Excavation Permit No. 2018/58 issued by the Department of Antiquities, Ministry of Tourism & Antiquities of the Hashemite Kingdom of Jordan, our team conducted surface prospection of the fort and its immediate vicinity. The territory was divided into 10 areas (Areas 1–10), with surface material collected from each (Fig. 4). Three of the zones (Area 1–3) coincided with the sample excavations performed as part of the *Limes Arabicus Project*. One (Area 4) adjoined to T.2–3 directly on the east side, while the other two (Areas 5–6) covered the *via principalis*. The remaining four zones (Areas 7–10) covered the rest of the fort. Beyond the fort, has been set four zones from which surface material was collected (Areas

11–14). Table 1 presents quantitative information concerning the material, organised into several groups. Results of a detailed analysis of the diagnostic pottery fragments collected during field prospection will be published in a separate study.

Table 1. Quantitative information on material collected during surface prospecting. The number of fragments has been specified

	Pottery fr.	Glass fr.	Roof tiles	Oil lamp fr.	Bronze fr.	Flint	Spindle whorl	Pipe fr.
Area 1	3	-	-	-	-	-	-	-
Area 2	7	-	1	-	-	-	-	-
Area 3	9	-	1	-	-	-	-	-
Area 4	121	-	7	-	-	-	-	-
Area 5	13	-	10	-	-	-	-	-
Area 6	51	-	7	-	-	-	-	-
Area 7	77	-	8	-	-	-	-	-
Area 8	91	-	10	-	-	-	-	-
Area 9	5	-	4	-	-	-	-	-
Area 10	271	-	22	-	-	-	-	-
Area 11	384	-	20	-	-	-	1?	-
Area 12	730	1	14	1	-	-	-	-
Area 13	237	-	68	-	1	1	-	1
Area 14	119	-	24	-	-	-	-	-

Plan of the site and 3D model of architectural remains

Among the main objectives of the 2018 research was to create a new plan of the site and a 3D model of the architectural remains. As it was impossible for us to use UAV-based photogrammetry, the method was replaced with Ultra-Low Altitude Photogrammetry (ULAPh), close-range photogrammetry and terrestrial laser scanning. All measurements were performed in connection with the control network established within the site. The network consisted of nine points with coordinates positioned in the ED50/Jordan TM (EPSG:3066) coordinate system, using the Precise Point Positioning (PPP GNSS), Real Time Kinematic (RTK GNSS) and tachymetric methods. Coordinates of individual control points were determined to an accuracy of 1 cm. Additionally, the control points were measured using Real Time eXtended (RTX GNSS)

GNSS, a method suitable for real-time positioning of points with only one GNSS receiver and without access to terrestrial networks of reference stations. The accuracy

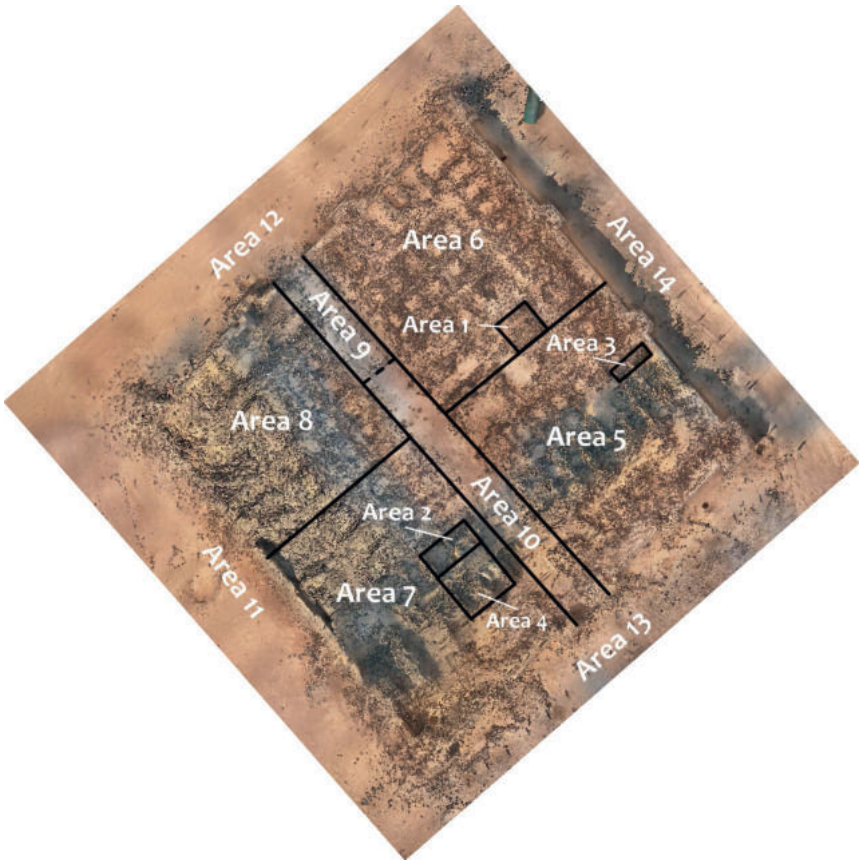

Fig. 4. Division of the fort into areas from which surface material was collected (author: M. Kajzer)

of coordinate measurements declared by the manufacturer is 2 cm (horizontally) and 5 cm (vertically). At Dajaniya, we had an occasion to confirm both the accuracy and the usefulness of RTX GNSS for documentary measurements of archaeological sites.

The photogrammetric data used for the development of an orthomosaic and a digital surface model (DSM) of the entire site was obtained with a GoPro HERO 6 Black action camera with a wide-angle lens, mounted on a five-meter-long outrigger (Fig. 5). The 12 MP photographs were taken at previously mapped survey points, arranged in a grid with mesh measuring approx. 5×5 m. Eight oblique photographs (in eight directions) were taken at each point. All in all, more than 4,000 images were taken at 500 survey points. Additionally, a photogrammetric control network was established during the field works, composed of 160 control points with co-ordinates determined using the RTK GNSS method with an accuracy of 2 cm.

Fig. 5. ULAPh – measuring system (photo by M. Bernaś)

The data obtained was processed using the Structure from Motion (SfM) algorithms in Agisoft Metashape, to generate an orthomosaic (resolution: 4 mm) (Fig. 6) and a DSM (resolution: 16 mm) (Fig. 7) for an area of 1.7 ha. Although time-consuming, this method of obtaining and processing data, named ULAPh, produces satisfactory results, with an accuracy of 3 cm.

As part of the documentary work performed, a comprehensive 3D scan of the fort's outer façade wall was made, supplemented with a scan of the inner south-west and north-west façades. Additionally, 3D scans of the trial trenches (T.1, T.2 and T.3) excavated as part of the *Limes Arabicus Project* were obtained. The research was conducted with the use of a Faro Focus M70 terrestrial scanner. The measurement data, in the form of point clouds with a resolution of 3 mm/10 m, was collected from 47 stations, and then registered and georeferenced based on 100 targets with coordinates determined in connection with the control points using Total Station. The final product (accuracy: 2 cm) of the process is a high-resolution point cloud representing all the architectural remains of the Dajaniya site (Fig. 8).

To be able to reliably compare several measuring methods used for documenting archaeological sites, our team also turned to close-range photogrammetry (a Nikon D60 camera with a 24 mm lens) to develop 3D models of the fort's walls and the three trial trenches. All in all, 1,440 photographs (with a resolution of 24 MP) were

Fig. 6. Orthomosaic position of Dajaniya (authors: P. Ćwiąkała, P. Cierpich, J. Ruchała)

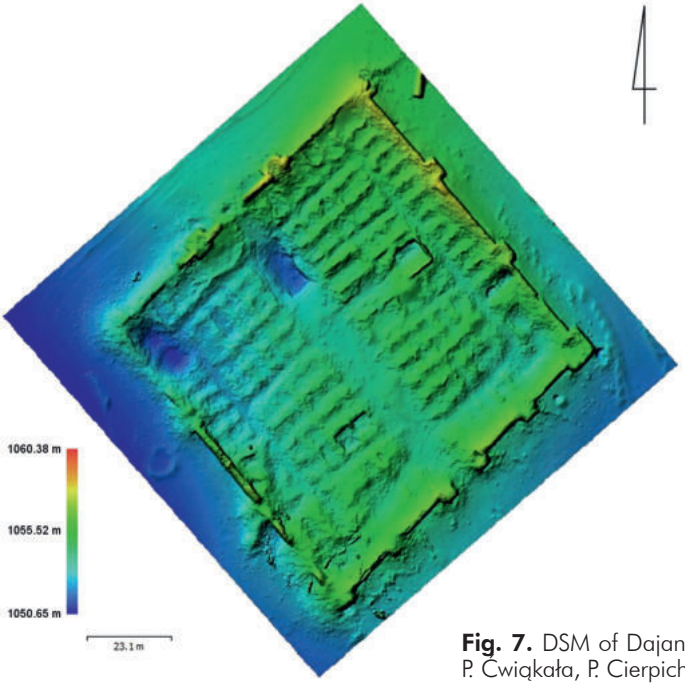

Fig. 7. DSM of Dajaniya's position (authors: P. Ćwiąkała, P. Cierpich, J. Ruchała)

Fig. 8. Point cloud from terrestrial laser scanning representing architectural remnants at the Dajaniya site (authors: A. Ochałek, E. Puniach)

Fig. 9. Point cloud from short-range photogrammetry representing the south-western wall of the fort (author: E. Puniach)

obtained during the field works and nearly 160 control points were established and measured. The data was then processed using Agisoft Metashape software, to create models of the structures measured (Fig. 9) with an accuracy of 7 mm. Another device used for the documentation was a Faro Freestyle 3D hand-held scanner (Fig. 10), which allows real-time capturing, automatic processing and visualisation of data. The measurements produced a coloured point cloud generated in situ. The method was used for documentation of the T.1 trial trench and an opening in the fort's south-west wall (Fig. 11).

Documentation of looting pits

Close-range photogrammetry was used to develop three-dimensional documentation of seven looting pits. The photographs were taken with a Canon EOS 700D (35 mm lens) while the control points were measured with Total Station. The following operations were performed in the process of documenting the pits: establishing and measurement of control points (7 to 13), taking 50 to 200 photographs of the structure, data processing in the Agisoft Metashape software and generating the final product (point cloud, orthomosaic, DSM). Each model of the looting pits was georeferenced in the ED50/Jordan TM system, as illustrated by Figure 12.

Fig. 10. Faro Freestyle 3D hand-held scanner at work (photo by M. Bernaś)

Fig. 11. Cloud of points from a hand-held scanner representing a hole in the south-western wall of the fort (author: K. Widuch)

Virtual tour

In order for a wider audience to be able to learn about Dajaniya, a virtual tour of the fort was created as part of the research. The work was performed on the ViarLive portal, with the outcome available at https://viar.live/tour/txsy9m[2]. The virtual tour is

[2] There are two language versions available at the moment, the Polish and the English.

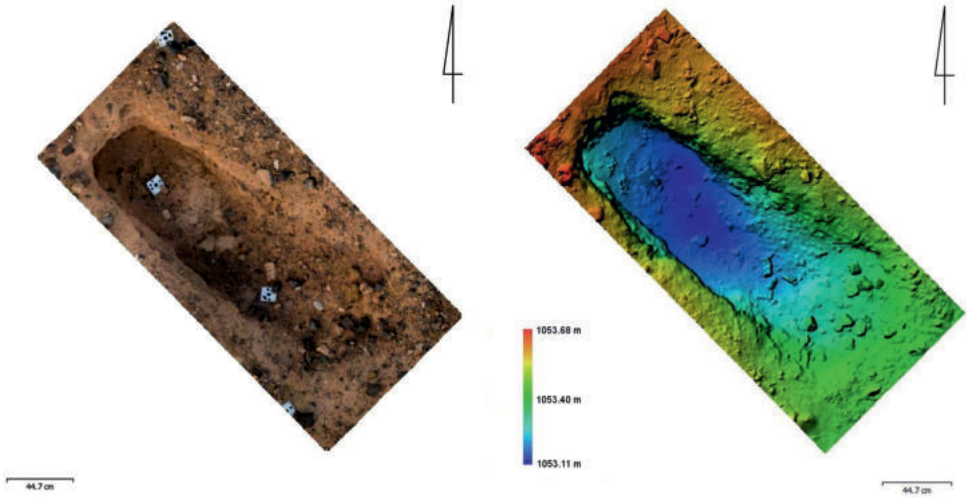

Fig. 12. Orthomosaic and DSM of H-burial dug at the Dajaniya post (author: K. Sawicka)

composed of 33 spherical images taken with a Ricoh Theta SC (Fig. 13), with each image positioned with the use of the RTX GNSS method. The images cover the entire site and visualise not only the ruins of fort and gate walls, but also the interiors, including *principia, aedes principiorum*, the cistern, *via principalis* and *via sagularis*.

Conclusions

Outcome of works conducted by our team in the 2018 season:

- development of orthomosaics and DSMs;
- partial laser scanning of the fort's architecture;
- photo documentation of seven looting pits located outside of the fort's walls;
- virtual tour.

Preliminary investigation of the ceramic material confirms the hitherto established chronological frames of the site, but more details will be presented in a separate study after examination of the fragments of vessels collected.

Yet another effect of our work was the development of a methodology for documenting large areas where UAV cannot be used. Time-consuming as it is, Ultra-Low Altitude Photogrammetry (or ULAPh) is one of the alternatives for preparing DMSs and orthomosaics in such conditions.

Fig. 13. Spherical photo of the fort (photo by A. Słodowska, A. Ochałek)

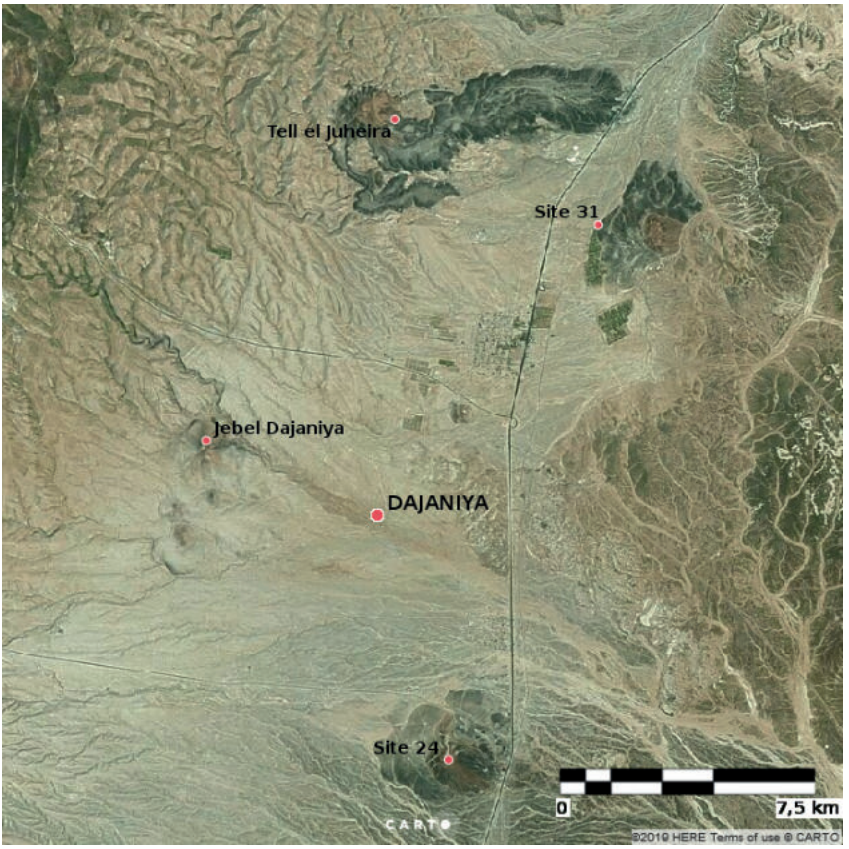

Fig. 14. Satellite image of the microregion with the localization of the four watchtowers (author: K. Kopij using © CARTO)

Moreover, we had an opportunity to confirm both the accuracy and the usefulness of RTX GNSS mesurements for documentation of archaeological sites.

Although the structure of the *Limes Arabicus* and the defence systems along the investigated section of the Roman Empire's border is very well-known, there is still a number of questions concerning the Dajaniya fort and its microregion. Therefore, in our opinion, further work is needed, focused on:

- investigation of structures along the inner façade of the curtain wall in order to verify whether they could have served as stables, as suggested by some researchers. The results are expected to answer the question about the type of military units once stationed in the fort;
- geophysical investigations of the fort's immediate vicinity in search of remains of structures connected with the camp and hidden beneath the surface. Judging by the fort's dimensions, it seems there may be more of them than have been revealed so far;
- excavation of the remains of four towers within several kilometres of the fort (Fig. 14). The results of the surface surveys performed so far indicate that at least two of them originated in the Iron Age and were restored and incorporated into the defence system (Rucker 2007: 55) during the late Roman period. Only by performing excavations it will be possible to define the relationship between these structures and the fort at the time of its operation.

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Discovering Edom. Polish archaeological activity in southern Jordan
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Results of "Archaeological Study of Dajaniya & Tuwaneh" (ArTu:DTu) 2018 survey in Tuwaneh (Tafila-Hesa), Southern Jordan

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Abstract: In November 2018, an archaeological survey was conducted at Tuwaneh (aka at-Tuwāna), Tafila-Hesa district. The main goal of the research was to develop a site plan, to document the architectural remains and looting pits and, lastly, to verify the hitherto established chronology of the site. The documentation was made using laser scanning and close-range photogrammetry and covered mainly the caravanserai complex and its vicinity. Additionally, in order to verify the chronology, a surface prospection was performed.

Keywords: Tuwaneh, Roman Arabia, Arabia Petraea, caravanserai, archaeological documentation, photogrammetry, laser scanning

Introduction

Situated on the *via Nova Traiana*, approx. 5 km south of today's road between Tafilah and Jurf ad-Darawish (Fig. 1), the Tuwaneh[1] archaeological site is identified with *Thana/Thoana* of Ptolemy (V.17) and *Thornia* of the *Tabula Peutingeriana* (Bowersock 1983: 174–75). The site lies on slopes of two hills separated by a wadi once crossed by *via Nova Traiana* (approx. 2 m above its bottom) and a periodic river (Fig. 2).

The traces of human settlement are concentrated mainly on summits and slopes of the hills inclined towards the wadi. The structures on the south-eastern hill are

[1] MEGA Number 9824; GPS coordinates: 30.7494 35.7242.

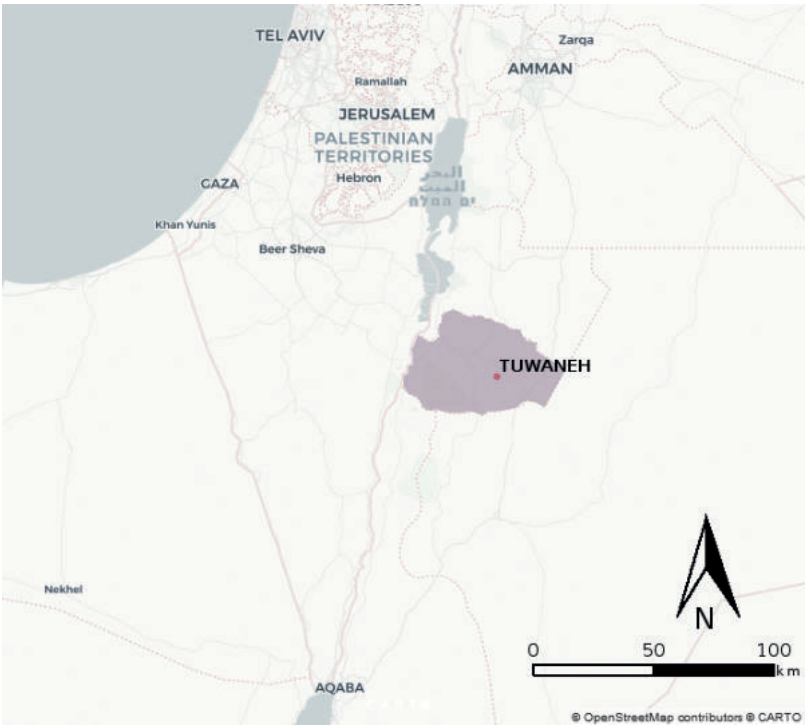

Fig. 1. Map of the region with Tuwaneh's position marked within the Tafila Governorate (source: K. Kopij with the use of ©CARTO)

more monumental, and are likely to have played commercial and representative roles, while those on the north-western hill, probably residential, are more dispersed (Fiema 1997: 314).

The area of the archaeological site may have been occupied by humans as early as in the Iron Age, as suggested by the pottery sherds dated to the period. On the other hand, however, the scarcity of the material indicates that the main phase of human settlement in Tuwaneh fell within the Nabataean through Byzantine periods, when the town was crossed by a trade route connecting, among others, Petra and Syria (Fiema 1997: 313). Substantial amounts of high-quality ceramics from Roman and Byzantine[2] periods and the monumental architecture indicate that the local residents were rather wealthy (Fiema 1993: 549; 1997: 314). Going further, a low amount of early Islamic material and a lack of any mentions in Arab sources suggest that the place lost its prominence in the late Byzantine period (Fiema 1993: 549). Finally, fragments of vessels found on

[2] Preliminary study of the ceramics collected during the survey confirms the observation. More information will be obtained through a detailed study, the results of which are to be published separately.

Fig. 2. Satellite imagery of the site (source: Bing Maps)

the surface indicate that it was probably occupied in the Ayyubid and Mamluk periods (Fiema 1993: 549; 1997: 315; MacDonald et al. 2004: 351–52).

The site has received numerous scholarly visits and surveys by researchers and travellers, including such prominent figures as Brünnow and von Domaszewski (1905, 88–91), Musil (1907–1908, I: 31–32), Glueck (1935: 80–81), Negev (1977: 608), Hart (1987: 340) and Wenning (1987: 87). Between March and May 1992, it was investigated as part of the *Via Nova Traiana* Project, which, among other things, encompassed surface prospection (Fiema 1993; 1997). Another similar study of the site was performed in 2000–2001, under the Tafila-Busayra Archaeological Survey (MacDonald et al. 2004: 348–54).

Perched on the south-eastern hill is structure C14 (named after: Fiema 1993: 549; 1997: 315), believed by Brünnow and von Domaszewski (1905: 89) to have been a Nabataean temple. The German researchers linked it to structures C15A and C15B, which they described as the temple's yard. An architectural analysis conducted as part of the *Via Nova Traiana* Project showed, however, that they were three independent structures, none of which have been used for religious purposes (Fiema 1997: 315). Given the above, Fiema has concurred with Hart's opinion (1987: 340) who considered the building to be a caravanserai. Judging by materials from C14, the structure prospered from Nabataean to Mamluk times, peaking in the Roman and Byzantine periods (Fiema 1993: 549; 1997: 315).

Another prominent feature is the presence of remains of a bathhouse, reported by Fiema (1993: 549). Fine examples of box-flue tiles (*tubuli*) or characteristic ceramic 'tubules' of rectangular cross-section, used for building Roman baths are particularly abundant (cf. Brodribb 1987: 70–83; for Roman Arabia, cf. Harvey 2011).

In the course of surface prospection, Fiema also reported a well-preserved subterranean multi-chambered tomb (Fiema 1993: 549), while members of the Tafila-Busayra Archaeological Survey revealed remains of a possible watchtower on top of the north-western hill (MacDonald et al. 2004: 348).

Season 2018

Objectives

Due to the short duration of the study and limited human resources, we started the development of a site plan and the process of recording architectural remains with documenting several critical points of the town located on the south-eastern hill. First, we performed work within the caravanserai and its neighbourhood (Fig. 3). The caravanserai is the best preserved of all the structures within the site. Determination of its function and chronology will be crucial for understanding the character of the hill on which it is situated and the function of the ancient town in general. The second area surveyed was the area of the *thermae* and its environs. We chose that place not only for its prominent, well-preserved architectural structure, but also because it had been regularly destroyed by looters (Bodzek, Kopij, Miszk 2019: 45–47). Both research areas were also covered by surface prospection. Similar reasons led us to document the visible fragments of a storm drain located directly to the north of the *thermae*, leading from the hilltop to the wadi. Moreover, an unidentified rectangular structure northwards of the top, we documented it as well. Lastly, was began documenting and mapping looting pits, starting with those located on top of the south-eastern hill in the vicinity of the caravanserai.

Surface prospection

Between 10 and 15 November 2018, acting based on Excavation Permit No. 2018/59 issued by the Department of Antiquities, Ministry of Tourism & Antiquities of the Hashemite Kingdom of Jordan, we performed surface prospection of the central part

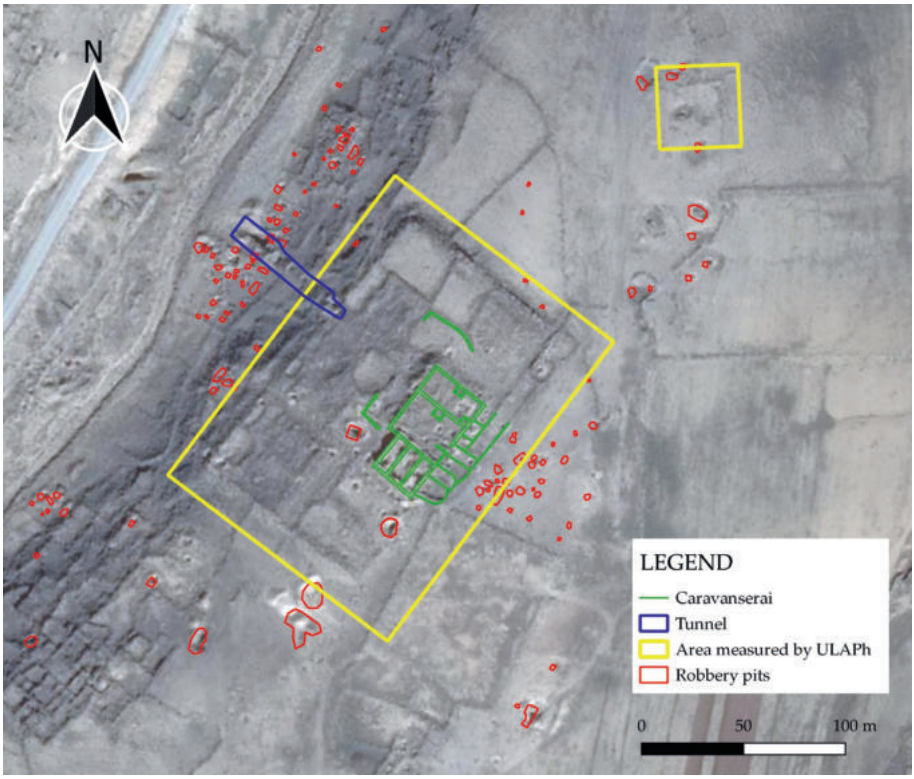

Fig. 3. Areas of activity marked on satellite images (photo by A. Słodowska)

of the site covering the caravanserai complex and its direct vicinity. Additionally, we also performed surface prospection of the *thermae* and environs and collected surface material from several looting pits and their waste piles.

The territory occupied by the caravanserai and its vicinity was divided into 10 smaller areas (Areas 1–10) (Fig. 4). Within Area 1, comprehensive surface prospection was performed, encompassing the entire specified zone of approx. 770 m^2. In addition, material was collected from two looting pits in Area 1 (D.1.1 and D.1.2). From among the remaining designated areas, only four were investigated (Areas 2–5), with focus on collecting surface material from looting pits only (D.2.1, D.2.2, D.3.1, D.3.2, D.3.3, D.3.4, D.3.5, D.3.6, D.4.1, D.4.2, D.5.1). The reasons behind the selectiveness of surface prospection included short duration of the study, small number of researchers and extensiveness of some of the looting pits, as well as the abundance of the material found, which significantly inhibited the work. Quantitative information is presented in Table 1 (exemplary set of pottery sherds, Fig. 5). Similar information on the results of field prospection within the bathhouse is presented in Table 2 (Fig. 6). Additionally,

Fig. 4. Surface-prospected zones organised into distinctive areas where the material was collected (photo by M. Kajzer)

surface material was collected from 14 looting pits in the immediate vicinity of the caravanserai complex and one in the southern part of the site. Quantitative information is presented in Table 3. Results of a detailed analysis of the 'diagnostic' fragments collected during field prospection will be published in a separate study.

Table 1. Quantitative information on material collected during surface prospecting of the caravanserai and its direct vicinity. The number of fragments has been specified

	Pottery fr.	Glass fr.	Roof tiles	Bronze fr.	Flint	Stone	Bones*	Other
D.1	3141	-	-	-	2	1	-	-
D.1.1	35	-	-	-	-	-	-	-
D.1.2	40	-	-	-	-	-	-	-
D.2.1	1082	-	2	1	-	-	-	-
D.2.2	41	1	-	-	-	-	x	-
D.3.1	106	-	2	-	-	-	x	-
D.3.2	52	-	-	-	-	-	x	1 (iron nail)
D.3.3	226	-	-	-	2	-	x	-
D.3.4	140	-	-	-	-	2	x	-
D.3.5	55	-	-	-	-	1	x	-
D.3.6	208	1	5	-	-	-	x	-
D.4.1	146	-	6	-	1	-	-	-
D.4.2	125	-	-	-	-	-	-	-
D.5.1	321	1	-	-	-	-	x	-

* for bones, it is only presence versus absence (x means presence).

Fig. 5. Typical set of pottery sherds (photo by Ł. Miszk)

Table 2. Quantitative information on material collected in surface prospecting of the bathhouse. The number of fragments has been specified

Pottery fr.	Box-flue tiles fr.	Hypocaustic tiles	Tiles fr.	Stone tiles fr.	Glass fr.	Bronze fr.
44	482	153	158	5	1	3

Plan of the site and 3D model of architectural remains

With a view to starting work on the first site plan, a decision was made to make measurements using methods based on cutting-edge surveying technologies, instead of making any architectural plans directly on site. The ultimate goal was to collect as much measurements and images as possible, for processing after completion of the project. Obviously, another reason was limited time.

The documentation of architectural archaeological remains was prepared using Ultra-Low Altitude Photogrammetry (ULAPh), laser scanning and close-range photogrammetry. All documentary work was performed in connection with the control network established within the site. Coordinates of the control points were computed using GNSS data processed with the use of Precise Point Positioning (PPP) technique and angular and linear data obtained from Total Station.

Fig. 6. Ceramic building material collected in the process of prospecting of the *thermae* (photo by M. Bernaś)

Table 3. Quantitative list of material collected from selected looting pits. The number of fragments has been specified

Looing pit no.	Pottery fr.	Roof tiles	Box shaped tiles	Flint	Stone	Bones*	Other
W.5	152	-	-	-	-	-	-
W.5	33	-	-	-	-	x	-
W.9	155	-	-	-	-	-	-
W.10	462	-	-	1	-	x	-
W.11	200	-	-	-	-	x	-
W.12	504	1	-	-	-	x	-
W.14	193	-	-	1	1	x	-
W.15	91	-	-	-	-	x	-
W.16	97	-	-	-	1	x	-
W.18	546	-	1	-	-	x	-
W.19	278	-	-	-	-	x	-
W.22	40	-	-	-	-	x	-
W.23	409	-	-	-	-	x	1 (architectural detail)
W.24	179	-	1	-	-	-	-
W.236	180	-	-	-	-	-	-

* for bones, it is only presence versus absence (x means presence).

Task number one was to prepare an orthomosaic and a digital surface model (DSM) for the site. At present, such products are usually generated based on images taken by means of unmanned aerial vehicles (UAV). As we could not use UAV-based photogrammetry, an attempt was made to try alternative photogrammetric methods to prepare archaeological documentation. The method we chose was Ultra Low Altitude Photogrammetry (ULAPh), which requires a relatively simple measuring system, composed of an action camera mounted on a five-meter long leveling rod. Before the measurements, survey points were set out, making a square grid, with each square side measuring approx. five meters. Then, oblique images were taken at each point (in eight directions) (Fig. 7). The measurements were made with a GoPro HERO 6 Black, a camera with a wide-angle lens for image resolution of 12 MP. The above method was used to obtain photogrammetric data of an area of approx. 2.5 ha, located in the heart of the site (the caravanserai and its direct neighbourhood). The ground sampling distance (GSD) of data collected was 4 mm. All in all, more than 4,800 images were taken at 600 survey points during the field work. Additionally, 51 control points and 49 check points were established for the purpose of georeferencing and verification

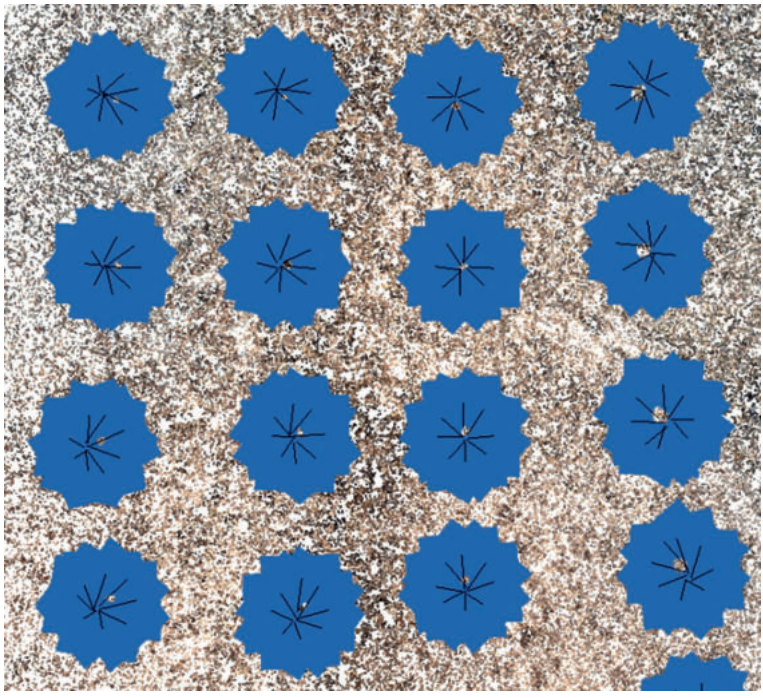

Fig. 7. ULAPh – configuration of measuring points and data collection method (author: P. Ćwiąkała)

of the accuracy of the photogrammetric products, with their coordinates having been determined using the Real Time Kinematic (RTK GNSS) technique with an accuracy of 2 cm. The field work and data collection took three days. The data obtained was processed with the use of Structure from Motion (SfM) algorithm implemented in Agisoft Metashape software. The results yielded an orthomosaic (GSD of 4 mm) and a DSM (GSD of 16 mm) (Figs. 8–9). The accuracy of measurements was assessed to be approx. 3 cm. Nevertheless, it needs to be emphasised that calculations of the height of objects with sharp edges (remains of walls, trenches or large rocks) may be determined with a greater degree of error. Going further, ULAPh was used to develop an orthomosaic and a DMS of a structure located north-east of the caravanserai complex. The area was documented with 288 images. The procedures followed for data acquisition and processing as well as the parameters of final products were the same as those described above. Because of the limited duration of the study, the large area of the site (approx. 55 ha) and the time-consuming method used in season 2018, only the fragments referred to above were documented (the overall area of approx. 2.7 ha).

Detailed documentation of the caravanserai remains was performed with terrestrial laser scanning. A Faro Focus M70 (laser scanner) was used for measurements

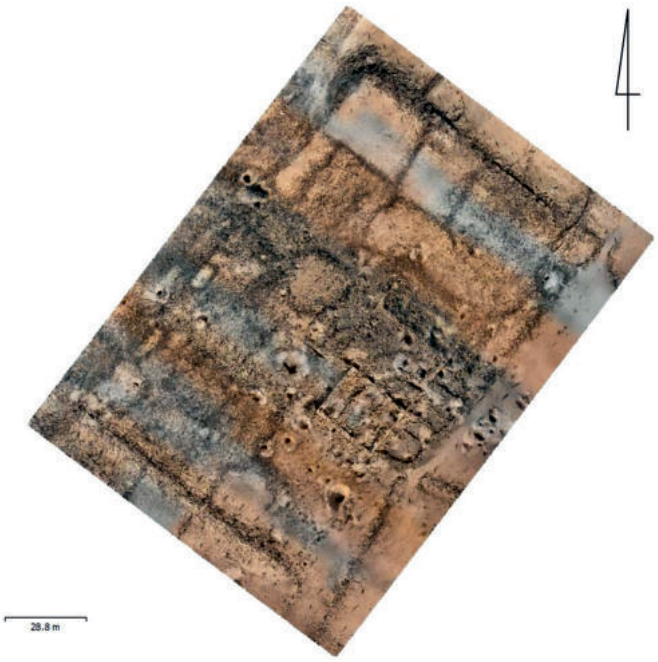

Fig. 8. Orthomosaic of caravanserai and its neighbourhood (author: P. Ćwiąkała)

(Fig. 10). During the field work we obtained high-resolution spatial data (point clouds) from 55 instrument stations. The scanning resolution was 3 mm/10 m. With the use of 100 reference targets (with coordinates determined using typical surveying techniques such as satellite and tachymetric measurements), we were able to register scans from different stations and connect the same with a single coordinate system. Finally, the laser scanning and processing of its results produced a spatial model of the building (Fig. 11), characterized by an accuracy of 2 cm, suitable to be used for the elaboration of archaeological architectural documentation

Documentation of the exposed fragments of the *thermae* was prepared based on close-range photogrammetry and hand-held scanning. Photogrammetric measurements of the structure were performed with a Nikon D60, a camera with a 20 mm lens, yielding 223 images (resolution: 24 MP). During field works, 18 control points were established and then measured using typical surveying techniques. The data collected was processed in Agisoft Metashape software to develop a three-dimensional model of the structure with a GSD of 1.5 mm and accuracy of 7.5 mm. Additionally, the very same structure was measured with a hand-held scanner (Faro Freestyle 3D), which allows real-time capturing, automatic processing and visualisation of data. The result of the measurement was a point cloud representing the structure, subsequently

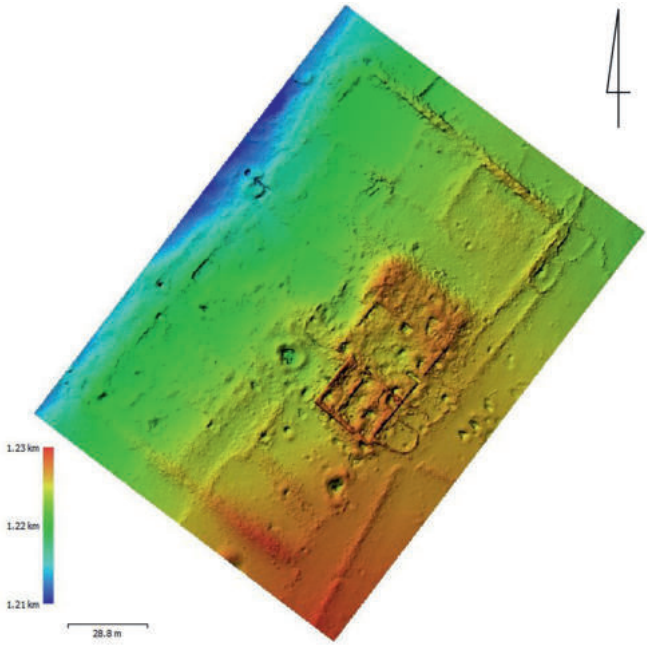

Fig. 9. DSM of caravanserai and its neighbourhood (author: P. Ćwiąkała)

Fig. 10. Faro Focus M70 terrestrial laser scanner in use (photo by M. Bernaś)

subjected to georeferencing (based on the coordinates of control points). The final effect is illustrated in Figure 12.

Close-range photogrammetry was used for developing a 3D model of selected fragments of the storm drain. The measurement was performed using a GoPro HERO 6 Black, an action camera with a wide-angle lens, on a levelling rod, and a Nikon D60, a camera with a 20 mm lens. With the first of the devices we recorded details of the geometry of underground parts of the structure, while the latter was used for photo images of inlets and openings on the surface. Data for six elements of the

Fig. 11. Fragment of terrestrial laser scanning point clouds, representing the caravanserai (author: A. Ochałek, E. Puniach)

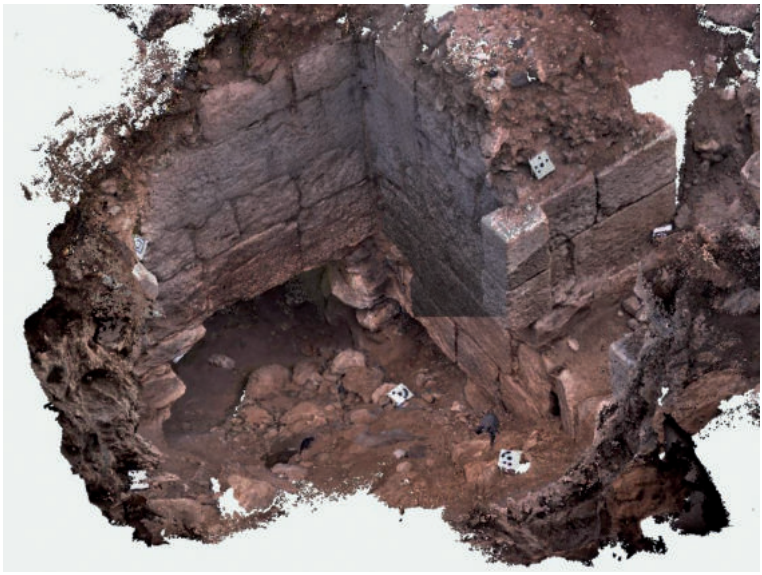

Fig. 12. Fragment of a point cloud obtained through hand-held scanning, representing the *thermae* (author: E. Puniach)

drain, accessible for direct measurements, were collected. The images taken and control points measured served as a basis for three-dimensional models of individual fragments of the structure, which were subsequently merged (Fig. 13).

Documentation of looting pits

Next to the area measured with ULAPh, we also managed to develop documentation for 119 looting pits within the caravanserai complex and in its direct vicinity (Fig. 4). The location of each pit was measured by means of Real Time eXtended GNSS technique. Additionally, all looting pits have photo documentation developed, consisting of at least four images for each pit (for examples see Fig. 14).

Conclusions

Due to the short duration of the study and methodological constraints (impossibility to use UAV), in season 2018 we only managed to develop partial archaeological architectural documentation for the town of Tuwaneh. The main result of the work is the developed measurement and photographic data that us allowed to create:

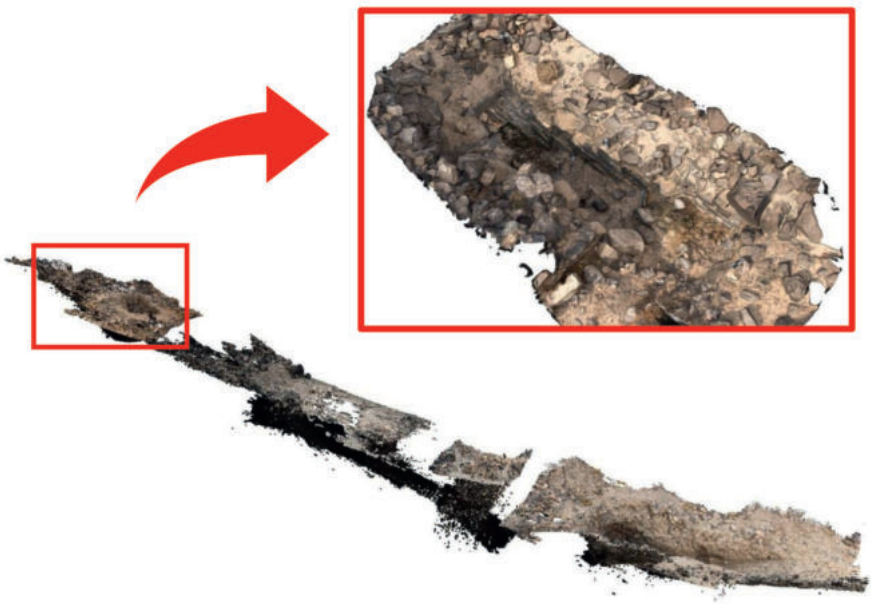

Fig. 13. Photogrammetric point cloud representing six accessible fragments of the stormwater drain (author: H. Dec)

- an orthomosaic, a DSM obtained by ULAPh and point clouds obtained by a laser scanning for the caravanserai and its neighbourhood;
- an orthomosaic, a DSM obtained by close-range photogrammetry and point clouds obtained by a hand-held scanning for the remains of *thermae* visible on the surface;
- an orthomosaic, and a DSM obtained by ULAPh for the rectangular structure to the north of the caravanserai complex (Fig. 4);
- point clouds of storm drain fragments obtained by close-range photogrammetry;
- photographic documentation of looting pits in the central part of the south-eastern hill.

Preliminary investigation of the ceramic material obtained (mainly from looting pits) confirm the hitherto established chronological frames of the site, but more details will be presented in a separate study after examination of the fragments of vessels collected.

Yet another effect of our work was the development of a new methodology for documenting large areas where UAV cannot be used. Time-consuming as it is,

Fig. 14. W14 looting pit: documentary shot (photo by K. Sawicka)

Ultra-Low Altitude Photogrammetry or ULAPh is one of the alternatives for preparing DSMs and orthomosaics in conditions like these.

The number of looting pits recorded during the study shows that the site has been regularly falling victim to plunders (as in the case of the *thermae*). Consequently, efforts must be made to protect the site and commence excavation works in order to preserve the information hidden in archaeological strata.

The data obtained will be used as a prelude to further work, with the final effect being a comprehensive site plan, with documentation of the preserved architecture, data about archaeological artefacts, and conservation recommendations in the context of progressing degradation of the site caused by looters.

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Discovering Edom. Polish archaeological activity in southern Jordan
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Preliminary report from the excavations at the site of Qasr ed-Deir (At-Tafila) in the season of 2017

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Abstract: In southern Jordan there are many medieval monuments. They are not the most well-known objects of the region but constitute an important part of its history and have much positive potential for tourism. Many of them are still poorly researched. One of them is a castle or a fortified monastery located in the vicinity of At-Tafila city, known as Qasr ed-Deir. In 2017, archaeological research conducted by a team from the Jagiellonian University began there, providing new information about its history.

Keywords: Middle Ages, architecture, castle, monastery, southern Jordan

Among archaeological activities undertaken by Polish researchers from the Jagiellonian University in southern Jordan there is a project dedicated to study the site of Qasr ed-Deir (JADIS: 2002001, DEIR, قصر الدير, MEGA: 9200). The site is located in Tafila directorate, approximately five km southwest of the main city and approx. 1.5 km to the north of the modern town of Al Ain Al Baida and the ancient site of Sela, which is well-visible across the wadi (Fig. 1 a–c). According to the MEGA JORDAN system the site consists of two elements: Temple 58370 and Cemetery 58382. The so-called temple is an almost square (approx. 21×17 m) at least two-storey structure made of well-cut ashlars. It dominates the landscape (Fig. 2). The cemetery is located just to the east of this structure. Both its chronology and the exact area are unknown. Undoubtedly it must have been larger in antiquity since bulldozing and field clearance have destroyed parts of it (cf. MacDonald et al. 2004: 154).

Fig. 1a. Qasr ed-Deir – view from east (photo by P. Kołodziejczyk)

Fig. 1b. Qasr ed-Deir – aerial view of the site and wadi (photo by R. Banks; APAAME_20151013_REB-0128.jpg Courtesy of APAAME)

Previous research on the site

Qasr ed-Deir was recognized as an archaeological site not later than 1934 by Nelson Glueck (1935: 100), who himself suggested that this site had been described even earlier by Alois Musil. Indeed, Musil visited the region in 1900, but he mentioned the site under a different name: Deir er-Rum or Qasr el-Umeia (Musil 1907: 318).

In 1984 Stephen Hart and Robin Kenneth Faulkner collected some archaeological material from the area during their survey and dated the site to the Iron Age (II C), Roman (1st–2nd cent. AD) and Islamic (post-Ayyubid forms) periods (Hart, Faulkner 1985: 270). In 1999–2001 the area around Tafila was the subject of a large scale and detailed survey by Burton MacDonald and his team. The scientist identified the site (002: Khirbat Qasr ad-Dayr I) as a watchtower dating to the Iron Age II, Byzantine and Islamic periods (MacDonald et al. 2004: 154). Finally, in 2002 excavation, supervised by Ibrahim al-'Awdat, were conducted at the site. A brief report of that work was published in *Munjazāt* No. 3 (al-'Awdat 2002: 91–92). Al-'Awdat recognized the structure as of Byzantine origin, but noted it was later reconstructed and reused in the Mamluk period.

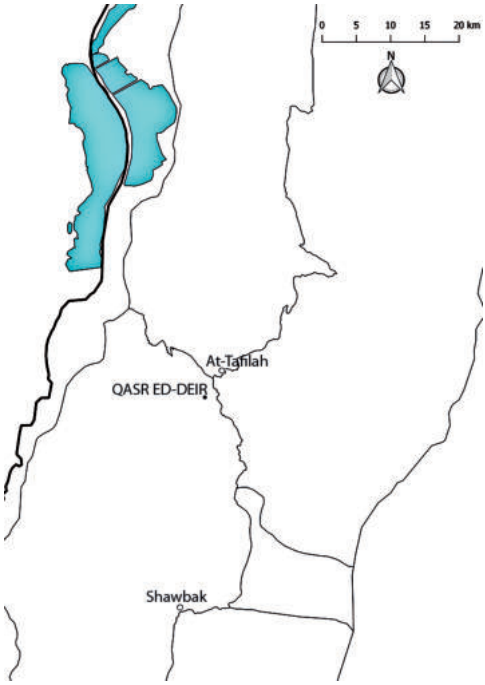

Fig. 1c. Location of the site (drawing by J. Karmowski)

Aims for the season of 2017

Research activities were planned according to the results of archaeological prospection performed on behalf of the Institute of Archaeology of the Jagiellonian University in Kraków in 2016 by Piotr Kołodziejczyk and his team (with the participation of Przemysław Nocuń and ceramologist Aleksandra Świetlicka). The main tasks for 2017 – as it was the first season of research – were the documentation of the site and some initial attempts to confirm/refine its chronology and function. The works were carried out between Oct. 16th and Nov. 2nd in accordance with Excavation Permit No. 2017/55[1].

[1] The excavation team consisted of Przemysław Nocuń, PhD – project leader, archeologists: Aleksandra Świetlicka, Agnieszka Ochał-Czarnowicz, Maciej Wacławik, Jakub Niebylski, Jan Pavelka, and students: Bartłomiej Makowiecki, Iga Wadowska and Piotr Szołdra. Ms. Arab Almuhaisen was a representative of the Department of Antiquities.

Fig. 2. Aerial view of the site (photo by I. Ruben; APAAME_20151013_IAR-0090 Courtesy of APAAME)

The most urgent aim was to document the masonry structures of Qasr ed-Deir and to record its detailed plan. In accordance with that, photographs of the building (to be used for a photogrammetric documentation and processing) as well the measurements (already in the official Jordan grid system) were taken. All of the spaces and rooms on both levels have been given identification symbols (0A, 0B, 1A, 1B etc.) to be used in further research. The detailed photogrammetric documentation was done for all facades of the building, surfaces and walls (as well as floors of its first floor and for two vaulted rooms of the ground floor). Documentation of smaller rooms and spaces of the ground floor – some of them discovered during works in 2017 – was carried out using traditional methods. Thanks to the documentary component of the works, the first preliminary plan of the structure (Fig. 3–4) was prepared and a basic 3D model created. Along with the documentation some initial archaeological activities were undertaken.

2017 Survey

The detailed surface prospection yielded approx. 900 pottery sherds. They were mostly dated to well-represented periods in the region, namely: Iron II, Nabatean/Roman, Byzantine, Late Byzantine/Early Islamic, Middle Islamic and Late Islamic

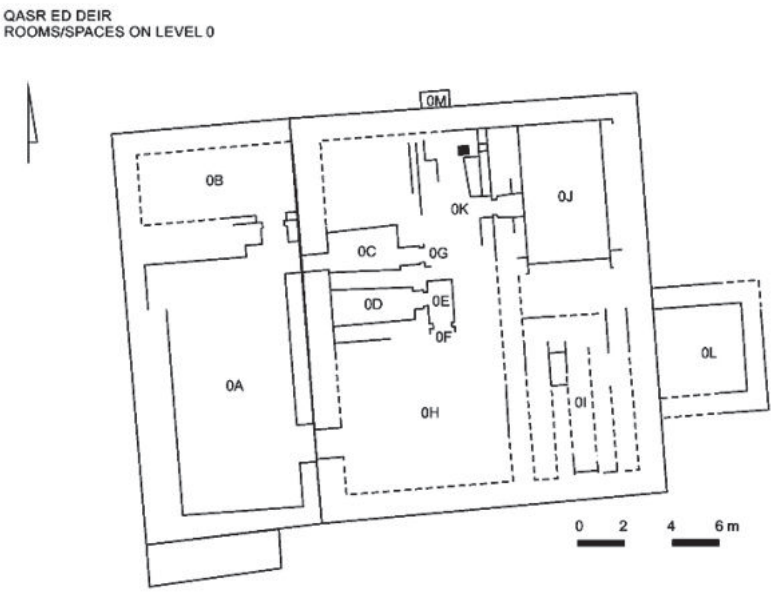

Fig. 3. Preliminary plan of the structure (drawing by P. Nocuń)

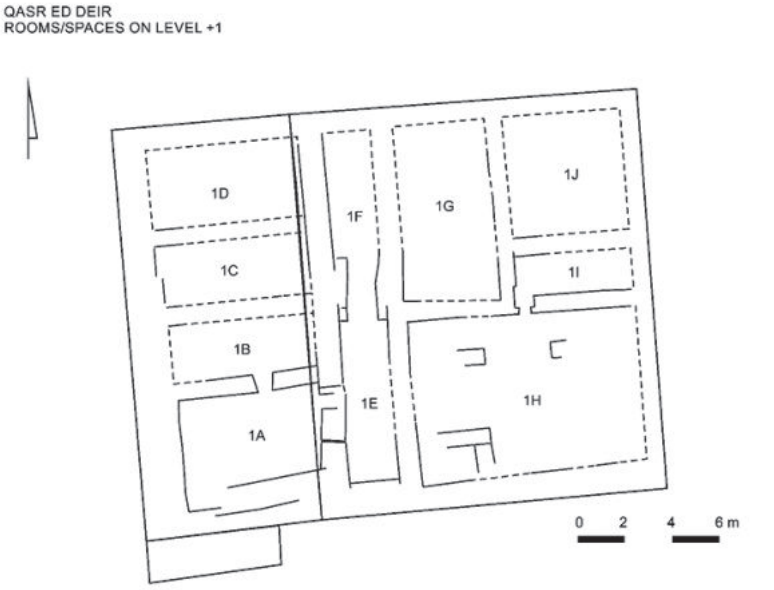

Fig. 4. Preliminary plan of the structure (drawing by P. Nocuń)

(cf. McDonald 2013: 149). The presence of some amount of pottery from the Early Bronze Age should be underlined.

Test trenches

Area I-Square G 1

The first trench was opened next to the south-western corner within the building. In this area three building elements were recognized: a) a main segment of the structure, b) a "western segment" added to it from the west, c) a buttress added to the "western segment" from the south-west (Fig. 5). The excavations were conducted with parallel observations of the standing walls. Special attention was paid to the shapes and sizes of the masonry as well as the presence of wedges and toolmarks. The stratigraphy of the trench revealed – among others aspects – layers of destruction with numerous pottery fragments, a layer from the time of reconstruction of the building, and layers related to the usage of the building in its earlier phases.

Initial observations of the main pottery features have shown that the pottery assemblage from the upper levels of excavations, including many painted and glazed

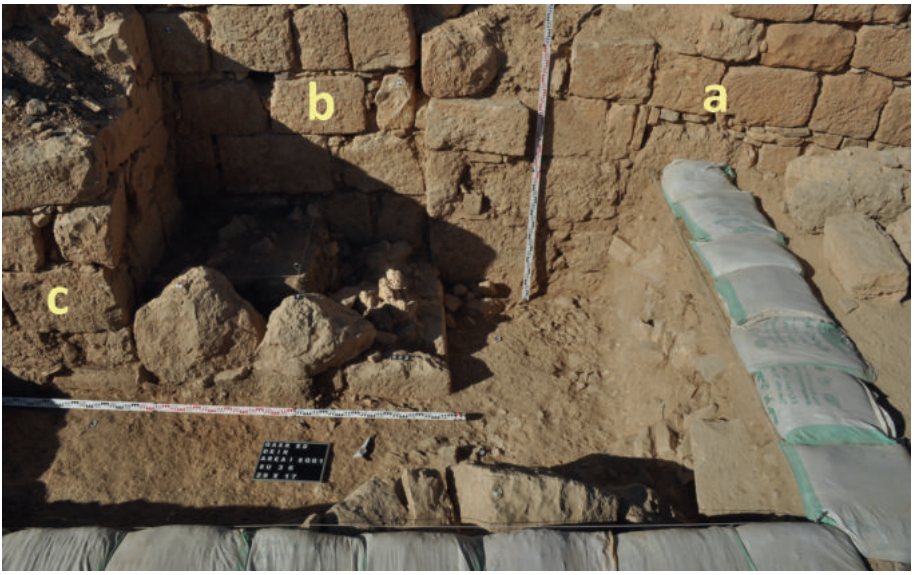

Fig. 5. Buttress – added to the "western segment" from the south-west (photo by P. Nocuń)

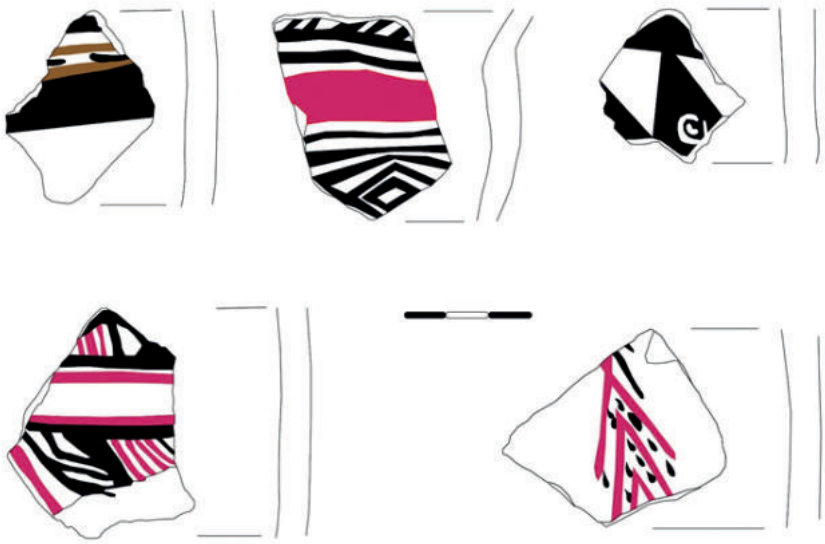

Fig. 6. Pottery assemblage from the upper levels of excavations – painted and glazed sherds, Early and Late Mamluk periods (drawing by A. Świtlicka)

sherds, can be dated to the Early and Late Mamluk periods (Fig. 6). The pottery corpus from the lower levels of the trench represents the Late Byzantine period. No whole vessels were retrieved. Among other finds a few Byzantine and Islamic glass fragments and four coins were recorded. Unfortunately the state of the coins' preservation excludes their identifications.

Area III-Square A1-A2, B1-B2

Work in the second test trench focused on examination and documentation of a structure added to the building from the east (OL). It was a rectangular addition measuring approx. 5.5×4.5 m. The external wall was very carefully constructed with two rows of megalithic blocks. At least one layer of flat stone slabs paved the floor (Fig. 7). Unfortunately during such a short season the whole area could not be unearthed. Based on stylistic comparisons the previous interpretation of the structure of either a cistern or pool. However, it must be noted that hydraulic mortar has not been recognized and on some stone slabs (on the internal surface of the wall) signs of bluish and reddish coloration were noticed. At this moment of research both the function and the chronology of the structure remain a subject for future consideration.

Fig. 7. Structure added to the building from the east – stone slabs on the floor (photo by A. Ochał-Czarnowicz)

Cemetery

Due to the very limited scale of the project the second part of the site – the cemetery – was not included in the main research activity. The pottery collected from the surface is so mixed and fragmented that so far nothing certain can be said about its chronology. According to oral (but otherwise unconfirmed) information, glass vessels and metal bracelets were found/looted from there in the past.

The planned basic documentation of the robbed graves was limited to the edges of all the looters' trenches. A plan showing their location is planned for further discussion concerning possible borders of the cemetery.

Preliminary conclusions after the initial season of 2017

MacDonald's team classified Qasr ed-Deir as a watchtower. The prominent location on a high terrace with good visual control over the so-called Kings' Highway made such an identification possible. It could be one of the Roman frontier structures connected with the castellum in Et Thah – Toloha of the Notitia Dignitatum, an important fort

site lying on a major route across the Wadi Araba which leads to Kurnub (Mamshit) and then further on – to Jerusalem (Findlater 2003: 139).

It is too early to exclude such a function with a sufficient amount of certainty, but it seems to have been attributed based on stylistic criteria only. Nabatean and Roman material, although present at the site, is not plentiful and there is nothing pointing to its possible military character. It must also be noted that during the Tafila-Busayra Archeological Survey as many as 21 sites were featured as watchtowers (McDonald 2004: 279–280). As part of military architecture they were a subject of intensive scholarly debate (cf. Gichon 1974). The function of these structures is still ambiguous, and the evidence for both their military role and Roman dating tends to be over-interpreted in many cases (cf. Findlater 2003: 141). As Kennedy (2004: 27) notes, unlike in other parts of the empire – especially in Western Europe, where Roman military foundations can seldom be confused with the remains of any other period – the recognition of this kind of site in the archaeological record of Jordan may raise many questions. Square, well-built structures need not necessarily be Roman. It is clear that many such structures pre-date the Roman annexation. Some of them are examples of Nabatean military architecture; others – e.g., Qasr al-Balu'a – are dated no later than the Early Iron Age (Bramlett, Vincent 2018: 62). Square structures with a variety of possible functions were also erected in later periods – especially during Byzantine and Umayyad times. A significant number of sites dated to the Byzantine period have been found throughout all the surveys in the Tafila region. It appears that the resources of the area were fully exploited during that period (MacDonald 2013: 148).

Among the scholars who classified Qasr ed-Deir as a Byzantine site one can mention Fiema (cf. Fiema 1991: 283 map 9). The rich Byzantine material found in trench G1 confirms intensive occupation of the site during that period. A few elements of architectural decoration also point to the Byzantine origins of building.

In the excavation report of 2002 there is a short note stating that drawings inscribed on the stones of the vault had been discovered in the first storey of the building, and that they date to the Byzantine period. Unfortunately no such stone was seen in 2017 and there is nothing to indicate any are kept in the storage rooms of the Department of Antiquities in Tafila. However, during our research a flat stone slab with two inscribed crosses (a larger one in the middle and a smaller one in the upper-left corner) – a possible altar table – was documented (Fig. 8). In addition, a lintel decorated with a cross was found *in situ* (Fig. 9), which could hint at Byzantine origins of Qasr ed-Deir.

Fig. 8. Flat stone slab – possible altar table – with two crosses (photo by P. Nocuń)

If indeed Qasr ed-Deir was a Byzantine structure, it would not have necessarily functioned as a watchtower. The name given to the site indicates that some people believed it to have been a monastery in antiquity (McDonald 2004: 154). Recent research suggests existence of a vibrant Christian ascetic community in the area of Southern Jordan (cf. Politis 2001: 586), and also that a significant number of monasteries in Provincia Arabia and Palaestina Salutaris were built slightly apart from settlements in agricultural areas where they were associated with terraced wadies and water storage arrangements. These structures usually included a place of worship that followed a single-aisled or basilical plan,

Fig. 9. Lintel decorated with a cross, possibly of Byzantine origins (photo by P. Nocuń)

set within a larger compound of several rooms (Hamarneh 2012: 281–282). From an archaeological standpoint the identification of a monastery is not an easy task, and since most structures in Jordan are known from surveys or excavations at them were limited only to actual sanctuaries, there is a general lack of comparative material (Hamarneh 2012: 279).

If, as in the case of Qasr ed-Deir, the structure was intensively rebuilt and both inscriptions and mosaic decorations are lacking, the possible function of the structure may be proposed on the basis of a combination of detailed architectural research and archaeological evidence.

After the initial season, Qasr ed-Deir should be seen as a compact but multiphase complex process over time. Its origins are most probably dated to the Byzantine period. The complex was developed and reconstructed more than once and, as suggested by both the masonry techniques and the collected pottery, the last great alterations should be dated to the Mamluk period. The future analysis of the stratigraphy of masonry elements combined with the analysis of the archaeological material should provide more precise results concerning the chronology and function of the site.

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Archaeological tourism: a chance or a threat to southern Jordanian community. Case study of HLC Project

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Abstract: Archeology can become an important factor in the development of tourism and improving the economic situation and standards of people living in southern Jordan. As a part of the HLC Project, analyzes and surveys were made to answer the question of whether the local population treats the development of archaeological works as a threat or a positive chance. The goal of the project is not only to carry out research work but also to return the heritage of the inhabitants of the south of Jordan to their use and protect it in the optimal way.

Keywords: tourism, archaeotourism, development, southern Jordan, sociology

Introduction

Archaeological tourism, commonly known as *archaeotourism,* is one of the many components of a broader phenomenon, cultural tourism. Its main objective is to educate, i.e. disseminate knowledge about human culture and its creators since the dawn of time until this day (Jędrysiak et al. 2011: 13; Mikos v. Rohrscheidt 2010: 11–51). The phenomenon had its genesis in the seventeenth- and eighteenth-century custom of long educative journeys made with a view to improving one's knowledge about ancient cultures (Krueger 2012: 6; Whitley 2001: 20). The cognitive curiosity demonstrated by lovers of the ancient times prompted people to feel the urge to collect relics of the past, a custom which over time evolved into the need to propagate these relics among mass audience. As a result of the nineteenth-century explorations of Mesopotamia or Egypt of the Pharaohs, the newly established museums began to fill with archaeological artefacts. Then the travellers eagerly visited science centres and arrived in droves to see the newly discovered

archaeological sites, which over the next decades would be used as foundations of huge tourist complexes.

Contemporary archaeological tourism should be defined as broadening one's knowledge about the world of ancient civilisation through travelling focused on 'palpable' experiencing of the past, visiting museums or attending traditional festivals, archaeological picnics and other similar events (Mikos v. Rohrscheidt 2010: 150).

Hence, it can be concluded that today's archaeotourism has become cognitive and economic in its nature. It allows the use of archaeological sites for education and commerce and creates new jobs in trade and services to tackle unemployment. On the other hand, whilst producing educational and cognitive benefits, it is also associated with certain risks such as uncontrolled commercialisation or the loss of autonomy or the region's uniqueness (Lipe 2002: 16).

Archaeological tourism as such is a great asset available to all global citizens, which is becoming growingly necessary and desirable. With the development of civilisations and economic growth, accompanied by improvement of people's financial standing in a number of regions, travelling focused on visiting relics of huge civilisations and hard-to-reach corners of the globe has been gaining popularity.

One of the perfect places to practise such tourism is Jordan, a small country squeezed between conflicted states. Despite its inconvenient geographical location, Jordan is a land of indisputable archaeological and historical potential, where relics of the past such as Palaeolithic camps, Neolithic settlements, Roman towns, Byzantine shrines or crusader strongholds can be encountered to this day.

The country's greatest treasure is Petra, a Nabataean city rediscovered in 1812 by a Swiss traveller, Johann Burckhard (Rababen 2005: 26)[1]. Composed of more than 4,000 sites, the complex (Wedeking 2005: 151) is each year visited by millions of thrill-seeking tourists delighted to be able to set their feet in the world of adventurers and explorers of lost civilisations. The rock city is undeniably an 'El Dorado', generating profits that run into millions and making the core of the country's economy (Wójtowicz, Wójtowicz 2015: 59–60). Sadly, despite this huge income to the state's budget, Jordan remains relatively poor. Except Petra and several other tourist attractions such as Akaba, Wadi Rum, the Dead Sea or Amman (Wójtowicz, Wójtowicz 2015: 50–54), a whole lot of historic places lie fallow, even though they would make perfect building blocks for the local economy. These include, among others, ruins of biblical cities situated in neighbouring towns or remains of Byzantine shrines, whose

[1] The re-discovery was described in a publication entitled "Travels in Syria and Holy Land" of 1822 (Burckhardt 1822).

heritage presents tourists with a chance to 'touch' and understand history and residents with an opportunity to improve their living conditions.

Public consultation in South Jordan – survey characteristics

Poor management of numerous archaeological sites and lack of interest in their fate manifested by residents and by archaeologists who had for years performed excavation work in South Jordan provoked an attempt to undertake actions needed to restore the past glory of the local heritage. In order to investigate people's needs, public consultation was conducted, with a view to analysing, among others, the residents' involvement in the shaping of historical awareness. A preliminary socio-archaeological survey was carried out in autumn 2017 as part of the Jagiellonian University's HLC (Heritage – Landscape – Community) Project targeted at the verification of archaeological sites in the Al-Tafilah region, dating back to the early Bronze Age (Kołodziejczyk et al. 2018: 567–576). The public consultation was conducted in cooperation with employees of the local Department for Antiquities (a branch in Al-Tafilah), whose assistance with contacts with the local people cannot be overestimated[2].

The main objectives of the survey were to learn the opinions of local communities on the potential consequences of introduction of archaeological tourism and to verify whether they saw the development of archaeotourism more as a chance for a better life or as a threat that might bring about irreversible and unforeseeable changes. The results of the analysis will be used in the future in the process of implementing actions aimed at protection of the local archaeological heritage and adapting the ruins to tourist traffic, to serve as sources of benefits for both visitors and residents.

During the survey, particular attention was paid to communication between the local community and archaeologists. The social environment of excavation sites tends to be undeservedly overlooked by researchers practising 'art for art's sake', accustomed to promoting the results of their research exclusively among experts (Rychło 2013: 1; Lipe 2002: 20). Secluding themselves in their research circles, they do not allow the local people to learn about their heritage. Illustrative of the

[2] The works have been carried out as part of research project no. UMO-2016/22/E/HS3/00141 financed from resources of the National Science Centre (Poland). Conclusion of works on the study was possible owing to a research stay at the Leibniz Institute for the History and Culture of Eastern Europe (GWZO), Leipzig, Germany, in the framework of the activity of the Department II (Culture and Imagination; Department coordinator: Prof. A. Bartetzky, PhD).

Fig. 1. A socio-archaeological survey conducted among residents of At-Tafilah in 2017

above are expeditions whose members avoid contact with the residents and view them as 'intruders' or 'destroyers'. For the illusionary sake of protection of the heritage, they isolate themselves from the local community instead of working to promote the proper attitudes and educate the people about their past (Henson 2011: 219). Only a society which is aware of its past is able to identify with a place and its past, take due care of it, protect it and ensure its promotion both in and outside of its circles (Shacker 2004: 1–16; Little 2002: XIII–XIV; Henson 2011: 219; Rychło 2013: 21). Lack of contact and understanding between archaeologists and the society leads to degradation of the sites which fall into ruin, left on their own by researchers (McManamon 2002: 38). In view of the foregoing, it was considered crucial to listen to the residents, take their needs into account and involve them in the factual actions aimed at due management of archaeological sites. The shaping of the local people's interest in the region's past and archaeological evidence, arousing their curiosity, taking care of the heritage and introducing tourist traffic to create new jobs and improve the residents' financial status were selected as the main objectives of the joint actions.

The sociological survey was conducted for the purpose of this study and subsequent actions, aimed at protection and promotion of heritage in the tourist sector. The survey encompassed residents of 4 locations in the region (3 villages and one town), in the near vicinity of excavation works carried out by archaeologists from the Jagiellonian University. The choice of the locations was intentional. The survey was conducted among people who had immediate contact with either archaeological sites (Gharandal, Busayrah) or archaeologists (Dana) and among those who had no such contact (At-Tafilah). Going further, the analysis encompassed residents of tourist resorts (Dana) and those living in locations without actual contact with the

sector of tourism (Gharandal, Busayrah, At-Tafilah). The language of the survey was Arabic.

All in all, the socio-archaeological analyses encompassed 200 people, including 146 men aged 15–70 (73%) and 54 women aged 16–60 (27%). The number of persons surveyed in each of the locations was conditional on the accessibility of respondents and size of the village/town. Consequently, the number of respondents in individual places was as follows: At-Tafilah – 100, including 39 women; Busayrah – 50, including 4 women; Gharandal – 25, including 6 women; and Dana – 25, including 5 women. The small number of female respondents was due to poor access to this group. One needs to remember that Jordan is a Muslim country, with a male-dominated public sphere.

Table 1. Structure of respondents in individual locations by sex

		Location				Total
		Dana	Gharandal	Busayrah	At-Tafilah	
Women	Number	5	6	4	39	54
	%	9.3%	11.1%	7.4%	72.2%	100.0%
Men	Number	20	19	46	61	146
	%	13.7%	13.0%	31.5%	41.8%	100.0%
Total	Number	25	25	50	100	200
	%	12.5%	12.5%	25.0%	50.0%	100.0%

Source: own analysis

To examine correlations between different factors, respondents were asked, among others, about their educational status, assuming it might affect the answers given. The results were as follows: 39.5% (N=79) of respondents had secondary education, compared to 38% (N=76) with incomplete higher education, i.e. a BA or BSc equivalent, and 7.5% (N=15) with higher education (MA or MSc equivalent), including every tenth woman (N=6, 11.1%) and approximately every twentieth man (N=9, 6.2%). Finally, 5.5% (N=11) had primary education. In this group, men prevailed over women (N=10 to N=1, or 6.8% to 1.9%). 16.7% (N=9) of women and 4.1% (N=6) of men reported to have other education than the types mentioned above.

The public consultation was conducted in the form of a survey (questionnaire) focused on the following: residents' satisfaction with the development of archaeological tourism, impact of archaeotourism on residents' living comfort including growth of employment, improvement of road infrastructure, increased access to water and

sanitation, directing authorities' attention to local problems and, finally, inflow of new people into the region. Furthermore, the question of loss of the region's uniqueness due to development of tourism was also analysed.

The socio-archaeological survey was conducted in the form of a questionnaire with closed-ended questions (in Arabic). Benefits of this technique include standardisation of the tools used, low costs and receipt of data suitable for statistical analysis. It must be mentioned, however, that whilst permitting comparative analyses, the above-mentioned standardisation is not a fault-free method, as it brings down the complexity of the social world to categories previously isolated by the researcher, with the result that certain important phenomena may be neglected if not included in the concept or not incorporated into the research tool. Another disadvantage of the technique is that it extorts a specific stance on the issue from the respondents, especially if they have no opinion. It must be emphasised that surveys are only suitable for examining respondents' declarations which may, but not have to be, consistent with their factual opinions or attitudes. The above is particularly visible in authoritarian states and in self-contained, conservative communities, where distinctness of opinions is not tolerated. This is what might have happened (although not necessarily) to the survey in Jordan.

The choice of respondents was intentional and based on accessibility of the community, whose structure is not fully known. The analyses carried out were contributory in nature and focused on identification of the potential benefits and hazards brought about by the development of archaeotourism, to be expanded in the future by in-depth analyses conducted with the use of dedicated instruments.

The socio-archaeological survey was conducted among representatives of different social groups, both men and women, aged 15–70, representing different professional and economic statuses. The respondents were encountered in the public sphere, i.e. in local administration offices, shops and in the streets. When collecting data, the pollsters were met with kindness and openness. None of the respondents refused filling out the questionnaire. All the persons surveyed were ensured full anonymity and support from an Arabic speaking consultant. The respondents were seen to be satisfied that they could comment on public topics. They expressed their concern about the local heritage, emphasising the necessity to duly manage archaeological sites and the need for social education on local history.

As already mentioned, the survey was conducted in 4 locations in South Jordan. Consultation in Petra, the country's biggest tourist resort, and in the neighbourhood of the Shawbak crusader castle was intentionally abandoned, to focus on locations

that need implementation of tourist traffic or historical education. A short outline of the locations where the surveys were conducted is presented below.

Fig. 2. A socio-archaeological survey conducted among residents of At-Tafilah in 2017

The first of these was Busayrah, with ruins of a biblical city known in Hebrew as Bosra, meaning a fortress or town. The biblical Bosra was once the central element of Edom (Levant). In written sources, it was mentioned as a strongly fortified town, with its palaces having been described in the Book of Amos (Am 1,12), the Book of Genesis (Gn. 36,33, 1) the Book of Chronicles (Chr. 1,44), the Book of Isaiah (Is. 34,6:63,1) and prophecies from Jeremiah (Jer. 49,13.22) (Biblia Tysiąclecia 2003: 55, 370, 889, 915, 971, 973, 1085). Excavations performed at the site in the years 1971–1974 by Crystal M. Bennett uncovered a town that flourished in the 7th and 6th centuries BC and lasted until the 4th century AD. Among other things, the works revealed an Acropolis with administrative facilities and bathhouses (Benett 1974; Bienkowski 1990: 91; 1992; 2002; Achtemeier ed. 2004: 129). Subsequent research of the early 21st century uncovered what is most likely to have been elements of a Byzantine church and a water cistern.

The present-day Busayrah is located c.a. 180 km south of Amman and 27 km away from At-Tafilah, the region's main town. The village has a population of c.a. 10,000 (c.a. 20,000 in the whole region). The majority of residents are employed in farming and public administration. The location's hallmarks include a boy school established in 1934 and abundant olive trees. Busayrah and the nearby Gharandal make a complex of settlements only 15 km away from At-Tafilah.

Situated on the outskirts of today's village, the ancient city had several names, including: Arndell in the Roman period, Ardela in the Byzantine era and Granden in Muslim times. When under the rule of Caliph Omar ibn al-Khabbat, Gharandal was the administrative centre of the Levant. Later, as a result of administrative divisions, it

was divided between several armies, among others, the soldiers of Damascus, Palestine and Jordan, with the headquarters in Gharandal.

In the 1990s, the site was excavated by the Department of Antiquities in At-Tafilah in cooperation with the Australian University of Sydney. Stretching over three seasons (1994, 1997; and 1998), the excavations revealed ruins of a Byzantine church and numerous mosaics with geometrical patterns (Walmsley 2000; Walmsley, Grey 2001; Piccirillo 1997). The explorations were resumed in 2010 and 2011, to record Roman strata, including ruins of Roman bathhouses with graffiti on their walls and remains of a tower (Darby et al. 2012). Today's Gharandal is a village with c.a. 10,000 residents, the majority of whom are employed in public institutions, military sector, agriculture and herding.

Another spot selected for our pilot survey was Dana, a small tourist village south of the complex described above. The choice was intentional, since the town serves as the accommodation base of the Polish archaeological expedition from the Jagiellonian University carrying out research on the Bronze Age in the vicinity, e.g. in Faysaliyya and Munqata'a.

Situated on the edge of Wadi Dana, with a breath-taking view of Wadi Araba, the village was established approximately 500 years ago. Several buildings dating back to the early Ottoman period have remained until this day. Until the 1960s the village was home to c.a. 300 families, who moved to and settled in a region stretching between Shawbak and At-Tafilah, driven by economic crisis, to establish a village which they named Qadissiya. Dana is the main centre of the Nature Reserve in South Jordan and the first village restored for tourist purposes. The majority of its residents are employed in services and commerce.

Finally, the survey moved to At-Tafilah, an ancient city erected by the Edomites under the name Tofel. Its existence is confirmed by the biblical Book of Deuteronomy (Deut. 1,1) (Biblia Tysiąclecia 2003: 175), in the context of the words Moses spoke to the Israelites after they left Egypt. The present-day At-Tafilah region is a genuine archaeological paradise, with traces of human occupation dating back to the Palaeolithic. As a result of historic transformations, the region was annexed to the Nabatean kingdom, only to come under Rome's authority after the Roman invasion. Finally, Tafilah came under Muslim rule, under which it has remained ever since. The contemporary town, populated by c.a. 27,000, is situated 183 km south of Amman. The region is known for having olive and fig trees and grape-vines. The present day town is organised into six districts, with people finding employment in state institutions, trade and services.

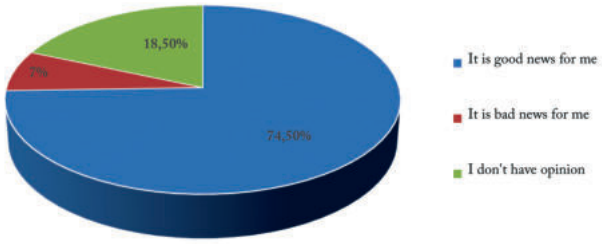
Results of analysis

This part of the study presents an analysis of selected issues included in the questionnaire used in the public consultation, focused mainly on the benefits and hazards entailed by the potential development of archaeological tourism. The respondents were asked several questions combining archaeology, tourism and infrastructure.

In the first part of the survey, they were asked whether they saw the development of archaeological tourism as good or bad news. A vast majority (N=149, 74.5%) showed satisfaction with the growth of archaeotourism in the region, with only few individuals thinking to the opposite (N=14, 7%) and every fifth respondent neither agreeing nor disagreeing (N=37, 18.5%). Observations showed that those living in rural areas gave more affirmative answers than those in the town, who were found to be much less enthusiastic about the development of tourism. The following picture emerged from the analysis of responses given by residents of the locations described above: in the village of Dana, 22 of those asked (88%) were satisfied with the potential development of archaeological tourism. In this group, the view was shared by all female respondents (N=5, 100%) and 17 men (85%). Only few of the respondents neither agreed nor disagreed. It must be remembered that Dana is a tourist resort of South Jordan, with the majority of residents employed in service or commerce. Similar responses were also obtained in the remaining two villages, Gharandal and Busayrah, which have ruins of archaeological sites within their boundaries. In both locations a large majority of respondents (Gharandal N=20, 80%; Busayrah N=40, 80%) expressed their contentment with the potential development of archaeological tourism, while two (in each) were against (Gharandal 8%, Busayrah 4%). No opinion on the subject was expressed by 3 respondents in Gharandal (12%) and 8 in Busayrah (16%). A very different situation was observed among the residents of At-Tafilah. Here, 67 (67%) respondents were satisfied, 10 (10%) were unsatisfied and every fifth participant of the study had no opinion (N=23, 23%) on the subject. Observations showed that men demonstrated a more positive attitude towards the development of tourism (N=47, 77%) than women (N=20, 51.3%), a fact particularly pronounced in negative (N=7, 17.9%) and neutral (N=12, 30.8%) answers. To compare, only 3 (4.9%) men in the group responded to the negative, with further 11 (18%) showing neutral attitude to the subject.

Afterwards, the region's residents were asked whether the potential development of archaeological tourism was likely to have impact on their lives. The issue

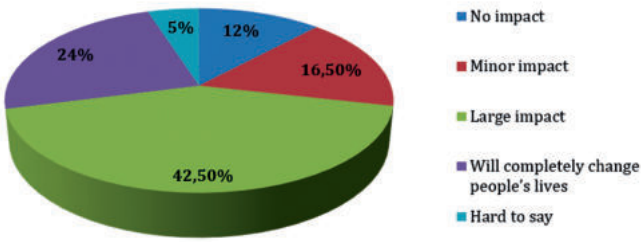
Chart 1. Satisfaction of respondents with the potential development of archaeological tourism in the vicinity



Source: own analysis

was analysed with the use of a 5-grade scale[3]. Nearly half of the people surveyed concluded that the potential development of tourism would significantly change their lives (N=85, 42.5%), while every fourth of them said that the change would be complete (N=48, 24%). A relatively small percentage of respondents were of the opinion that the development of archaeotourism would only slightly change their lives (N=33, 16.5%). Going further, one out of ten respondents said the impact on the local community would be none (N=24, 12%). Very few neither agreed nor disagreed (N=10, 5%).

Chart 2. Opinion of respondents on whether the development of archaeological tourism will have impact on the lives of local residents (N=200)



Source: own analysis

[3] The 5-grade scale included the following answers: The development of tourism: 1) will have no impact on the lives of local residents; 2) will have minor impact on the local residents; 3) will have significant impact on the lives of local residents; 4) will completely change the neighbourhood and its residents; 5) it's hard to say.

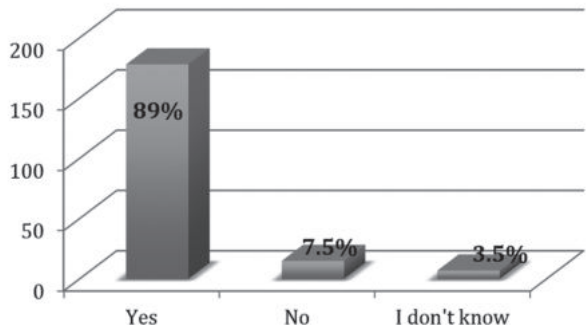
An analysis of answers obtained during the survey showed that residents of villages and town differed in their approach to the issue, a fact probably caused by differences in the intensity of contact of the local community with visiting tourists.

The survey was inaugurated in Dana, the smallest but most tourist-oriented village. Analyses showed that more than 50% of those surveyed (N=14, 56%) admitted that archaeological tourism would have a significant impact on the local population. A number of respondents had personal experiences gained through work in the sector of commerce and services and every-day contact with tourists arriving in the National Park or the village. Nearly 1/3 said their lives would be completely changed as a result of the development of archaeotourism (N=7, 28%). The majority of answers in this group were provided by women (N=4, 80% compared to N=3, 15% for men). Every tenth respondent assessed that the development of tourism would exert no impact on the lives of local communities (N=3, 12%), while one person (4%) neither agreed nor disagreed to the hypothesis put forward. The answers obtained in Busayrah, the village with ruins of a biblical city, looked different. Here, the most numerous group of respondents concluded that the development of tourism would significantly change their lives (N=20, 40%). The second most popular response, chosen by 24% (N=12), was that the impact of the tourism development would be insignificant. Still fewer respondents replied that tourism would completely change the local community (N=7, 14%) or that the impact would be none (N=8, 16%). Finally, three people (6%) had no opinion. The results obtained in Gharandal, a neighbouring village known for ruins of a Byzantine shrine, showed a slightly different picture. This time only 1/3 of respondents (N=8, 32%) believed that the development of tourism would have a significant impact on their lives, with slightly fewer stating that the impact would be none (N=7, 28%). The response suggesting that the development of tourism would only slightly affect people's lives and the one indicating a complete change won 4 supporters each (N=4, 16%). Another two respondents (8%) had no opinion. Different results were obtained in At-Tafilah, where a lot of residents believed that the development of tourism might change their lives, either significantly (N=43, 43%) or completely (N=30, 30%), while only few were convinced that the impact of changes would be insignificant (N=17, 17%) or none (N=6, 6%). Four respondents (4%) had no opinion.

Jordan is a relatively poor country, whose residents work in public administration or live on trade or farming. It was therefore found vital to ask the respondents whether the development of archaeological tourism would favour the creation of new jobs. The pollsters observed a genuine flurry of excitement in respondents when moving to this

question, resulting from their belief in improvement of their living conditions. A large majority agreed that the potential tourism development might favour the creation of new jobs (N=178, 89%), a view shared by the entire population of Dana covered by the survey (N=25, 100%), 92 respondents (92%) in Tafilah, 42 (84%) in Busayrah and 19 (76%) in Gharandal. An opposite opinion was expressed by far fewer individuals (N=15, 7.5%), i.e. 4 (16%) respondents in Gharandal, 6 (12%) in Busayrah and 5 (5%) in At-Tafilah. Further 7 (3.5%) neither agreed nor disagreed, including 2 residents each in Gharandal (8%) and Busayrah (4%) and 3 (3%) in Tafilah.

Chart 3. Respondents' opinion on whether the potential development of archaeological tourism would favour the creation of new jobs



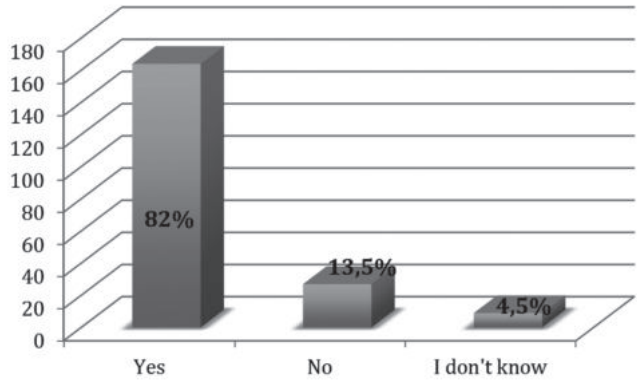
Source: own analysis

Much of Jordan is covered by desert, with towns or villages far apart from one another. The country has three airports, offering connections with a number of cities abroad, while the main land transport route is the Kings' Highway leading from Amman to Akaba (Wójtowicz, Wójtowicz 2015: 63). Except for the main transport routes, the condition of Jordan's public and local roads is unsatisfactory. Another major problem is access to water and sanitation. Interestingly, the region historically contained unusually fertile soil that used to be cultivated by early farmers. In our age, exposed to scorching hot summers, the fields have turned into wastelands and deserts. With reference to the above, the respondents, both in towns and in villages, were asked whether they believed the development of tourism would contribute to improvement of road infrastructure in the neighbourhood. The opinions were divided. Residents of Dana, those with the biggest experience in tourism from among the representation

overall, were unanimous (N=24, 96%) in their belief that the development of tourism would contribute to improvement of road infrastructure. Only one person stated the opposite (N=1, 4%). Different results, though, were obtained in Gharandal, with 4/5 of the residents surveyed stating that the potential development of archaeological tourism would cause improvement of the road infrastructure (N=20, 80%), three respondents concluding the opposite (12%) and another two (8%) responding neither yes nor no. A similar trend was observed in At-Tafilah, where the majority of respondents (N=86, 86%) saw the development of archaeotourism as a chance to improve road infrastructure, one tenth shared the opposite view (N=11, 11%) while 3 (3%) neither agreed nor disagreed. Finally, in Busayrah, the residents were sceptical about the hypothesis put forward. Only 34 (68%) respondents agreed that the development of tourism would result in better roads, nearly one person in four (N=12, 24%) answered in the negative and four people (8%) refrained from expressing their opinions. To sum up: 4/5 of the respondents (N=164, 82%) believed that the potential development of tourism might contribute to improvement of road infrastructure, compared to 13% (N=26) who negated the hypothesis and 9 (4.5%) who chose a neutral option.

As already mentioned, Jordan suffers from water scarcity and has poor access to sanitation, which is largely due to its geographical location, weather conditions and the state's economy. Therefore, the respondents were asked whether, in their opinion, the potential development of archaeological tourism would improve access to water and sanitation. 4/5 of those surveyed admitted that the sector's development would help solve the problem (N=160, 80%), with a definitely smaller number opposing that

Chart 4. Respondents' opinion on whether the potential development of archaeological tourism would contribute to improvement of road infrastructure

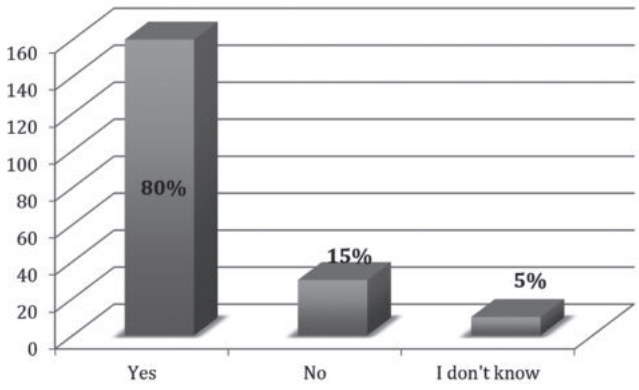


Source: own analysis

view (N=30, 15%) and 1 person in 5 staying neutral. Again, the most sceptical attitude was presented by residents of Busayrah. 35 (70%) individuals in the village believed that tourism had the potential to make a difference, while another 13 (26%) stated that there would be no improvement at all. Two respondents (4%) expressed no opinion. A similar picture was seen in Gharandal: here, 19 (76%) respondents saw tourism as a chance to improve access to water and sanitation while 5 (20%) stated that progress in the sector would not change the current situation. One person (4%) neither agreed nor disagreed. The chances for progress were perceived more enthusiastically by residents of At-Tafilah, where 82 (82%) respondents saw the development of tourism as a chance to improve accessibility of water and sanitation. Sceptical attitude was manifested by 11 (11%) people, while 7 (7%) answered 'I don't know'. In Dana, the last of the villages subjected to survey, the respondents were unanimous (N=24, 96%) that tourism would boost positive changes and improve access to water. Only 1 person (4%) was sceptical. A statistically significant regularity was observed showing that women tended to be more favourably inclined to the potential changes than men.

As the residents were seen brainstorming about social issues in their regions, a question was asked whether the inflow of tourists could stir the interest of state authorities in the problems faced by the local population. Animated discussions on the subject were witnessed during the survey, in particular among senior respondents, who ruefully admitted the need for changes and lack of interest of the local and state authorities in their fate. However, the survey showed that the society was sceptical about chances that the situation would improve, despite the declared need. The survey

Chart 5. Respondents' opinion on whether the potential development of archaeological tourism would improve access to water and sanitation



Source: own analysis

revealed that a significant percentage of respondents were unable to take any stance on the issue (N=17, 8.5%). The overall results were as follows: 149 (74.5%) hoped that the development of tourism in the region would stir the interest of authorities in problems of the population, but still, a considerable number were doubtful (N=34, 17%). The biggest number of people believing that the development of tourism would trigger positive changes was observed in Dana (N=22, 88%). No responses in the negative were reported here, with only 3 (12%) people refraining from expressing their opinion. The residents of Gharandal were more sceptical, though. Among them, approximately 4/5 (N=20, 80%) answered in the affirmative, 3 (12%) were sceptical and 2 (8%) chose the neutral option. A still weaker faith that the situation would improve was manifested by respondents in At-Tafilah, with 78 (78%) thinking tourism might trigger the interest of authorities in their problems, 15 (15%) expressing an opposing view and 7 (7%) neither agreeing nor disagreeing. However, it was in Busayrah that the respondents were the least enthusiastic. Among them, over 1/2 (N=29, 58%) hoped the interest of authorities in local issues would grow, compared to 1/3 (N=16, 32%) fearing the opposite and every tenth person (N=5, 10%) responding neither yes nor no.

Another problem highlighted by the survey, closely connected with the previous one, was the potential improvement of residents' lives due to tourism development. Therefore, the next question alluded to number one, where respondents expressed their opinions about how tourism development would change their lives, but this time the issue was tackled from a different angle. Now, the respondents were asked whether they agreed that tourism would not change their lives for the better. The results were as follows: more than half of the respondents did not agree to the above, stating that the development of archaeological tourism would favour improvement of their lives (N=122, 61%), an opinion opposed by nearly 1/3 (N=65, 32.5%). Thirteen people (6.5%) had no opinion. Analyses showed considerable differences between answers given by the respondents, depending on the location. The biggest number of opponents of the hypothesis was reported in Dana (N=21, 84%), where only 1 in 5 replied in the affirmative (N=4, 16%), stating that the development of tourism was likely to yield improved living conditions in villages. The second place was taken by residents of At-Tafilah, among whom many saw tourism as a chance to change their lives for the better (N=64, 64%). Nearly every third respondent (N=29, 29%) thought that there was no hope of the situation improving, while 7 (7%) people were neutral. The opinions on life improvement as a result of the potential development of archaeotourism shared by respondents in Gharandal and Busayrah, i.e. villages with ruins of antic cities within their boundaries, were far

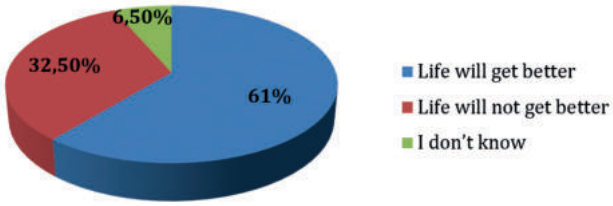
Table 2. Respondents' opinion on whether the development of tourism would stir the interest of local and state authorities in problems faced by the population

Location			Yes	No	I don't know	Total
Dana	Women	Number	4		1	5
		% of women	80.0%		20.0%	100.0%
	Men	Number	18		2	20
		% of men	90.0%		10.0%	100.0%
	Total	Number	22		3	25
		% of men + women	88.0%		12.0%	100.0%
Gharandal	Women	Number	4	0	2	6
		% of women	66.7%	0.0%	33.3%	100.0%
	Men	Number	16	3	0	19
		% of men	84.2%	15.8%	0.0%	100.0%
	Total	Number	20	3	2	25
		% of men +women	80.0%	12.0%	8.0%	100.0%
Busayrah	Women	Number	4	0	0	4
		% of women	100.0%	0.0%	0.0%	100.0%
	Men	Number	25	16	5	46
		% of men	54.3%	34.8%	10.9%	100.0%
	Total	Number	29	16	5	50
		% of men + women	58.0%	32.0%	10.0%	100.0%
Al-Tafilah	Women	Number	32	3	4	39
		% of women	82.1%	7.7%	10.3%	100.0%
	Men	Number	46	12	3	61
		% of men	75.4%	19.7%	4.9%	100.0%
	Total	Number	78	15	7	100
		% of men + women	78.0%	15.0%	7.0%	100.0%
Total	Women	Number	44	3	7	54
		% of women	81.5%	5.6%	13.0%	100.0%
	Men	Number	105	31	10	146
		% of men	71.9%	21.2%	6.8%	100.0%
	Total	Number	149	34	17	200
		% of men + women	74.5%	17.0%	8.5%	100.0%

Source: own analysis

less enthusiastic. Both locations have a considerable yet unexploited tourism potential. While approximately 50% of respondents here believed that archaeotourism would improve the lives of local residents (Gharandal N=11, 44%; Busayrah N=25, 52%), nearly an equal number was in doubt (Gharandal N=12, 48%; Busayrah N=20; 40%). Finally, two individuals (8%) in Gharandal, four in Busayrah (8%) and seven in At-Tafilah (7%) neither agreed nor disagreed to the above.

Chart 6. Respondents' opinion on whether the development of archaeological tourism would contribute to improvement of their lives

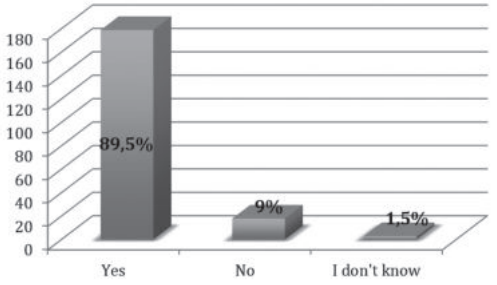


Source: own analysis

Afterwards, respondents were asked whether they thought the development of archaeotourism would favour the inflow of people representing different customs and traditions to the region. A considerable number found it very likely (N=179, 89.5%), a fact confirmed by statistics for tourists visiting Petra, among whom foreigners represent a large percentage. Only one person in ten (N=18, 9%) answered that the inflow of people from other cultural circles was unlikely, while a small percentage responded 'I don't know' (N=3, 1.5%). Answers obtained in individual villages and towns all followed a similar pattern. The trend was best illustrated by Dana, the region's main tourist resort, whose residents have for years had contact with tourists, and by At-Tafilah, South Jordan's biggest urban centre. A vast majority of respondents in Dana admitted that the development of archaeological tourism would favour the inflow of culturally diversified people (N=22, 88%), while every tenth had no opinion on the subject (N=3, 12%). In At-Tafilah, nine out of ten respondents believed that the development of archaeological tourism would cause increase in the number of visitors from different cultures and traditions (N=93, 93%), while the rest thought the opposite (N=7, 7%). Analyses of the results obtained in Gharandal and Busayrah revealed similar statistics. In both cases more than 80% of respondents decided that the development of archaeotourism would cause increase in the number of people from different traditions

and cultures visiting the region (Gharandal N=20, 80%; Busayrah N=44, 88%). One in five respondents in Gharandal (N=5, 20%) and one in ten in Busayrah (N=6; 12%) expressed an opposite opinion. Observations of the local community and the region showed that tourists rarely visit Gharandal, a small village with remains of the excavations of the 1990s as its only attraction. In fact, archaeologists may have been the only tourists from abroad visiting the place within the last few years.

Chart 7. Respondents' opinion on whether the development of archaeological tourism would favour the inflow of culturally diversified visitors



Source: own analysis

In the final part of the survey, respondents were asked whether they believed that their neighbourhood would lose its uniqueness due to the development of tourism. The answers varied depending on the location. The hypothesis was strongly negated by residents of Dana (N=21, 84%), where only small numbers agreed (N=2, 8%) or neither agreed nor disagreed (N=2, 8%) to the above. Similarly, a vast majority of residents in At-Tafilah believed that the region would not lose its uniqueness due to the development of archaeological tourism (N=69, 69%). Nearly 1/3 stated that this was plausible (N=30, 30%), while one respondent (1%) had no opinion. Different results were obtained in the remaining two locations. In Busayrah only approximately one out of three respondents (N=29, 58%) thought tourism would not change the local character of the village, with still fewer finding it likely (N=20, 40%) and one respondent refraining from expressing his/her opinion (2%). In Gharandal, a village visited by tourists only occasionally, over half of the people surveyed (N=14, 56%) stated that because of tourists, the neighbourhood would lose its uniqueness, compared to 44% (N=11) thinking the opposite and one respondent (2%) neither agreeing nor disagreeing. The disproportions observed clearly reveal people's fears. Those living in locations rarely visited by tourist are more anxious about the potential loss of uniqueness and are less open to changes, as illustrated by Gharandal. The problem seems to raise less

Table 3. Respondents' opinion on whether the development of archaeological tourism would contribute to loss of the region's uniqueness

Location			Yes	No	I don't know	Total
Dana	Women	Number	0	5	0	5
		% of women	0.0%	100.0%	0.0%	100.0%
	Men	Number	2	16	2	20
		% of men	10.0%	80.0%	10.0%	100.0%
	Total	Number	2	21	2	25
		% of men + women	8.0%	84.0%	8.0%	100.0%
Gharandal	Women	Number	4	2		6
		% of women	66.7%	33.3%		100.0%
	Men	Number	10	9		19
		% of men	52.6%	47.4%		100.0%
	Total	Number	14	11		25
		% of men + women	56.0%	44.0%		100.0%
Busayrah	Women	Number	2	1	1	4
		% of women	50.0%	25.0%	25.0%	100.0%
	Men	Number	18	28	0	46
		% of men	39.1%	60.9%	0.0%	100.0%
	Total	Number	20	29	1	50
		% of men + women	40.0%	58.0%	2.0%	100.0%
Al-Tafilah	Women	Number	11	28	0	39
		% of women	28.2%	71.8%	0.0%	100.0%
	Men	Number	19	41	1	61
		% of men	31.1%	67.2%	1.6%	100.0%
	Total	Number	30	69	1	100
		% of men + women	30.0%	69.0%	1.0%	100.0%
Total	Women	Number	17	36	1	54
		% of women	31.5%	66.7%	1.9%	100.0%
	Men	Number	49	94	3	146
		% of men	33.6%	64.4%	2.1%	100.0%
	Total	Number	66	130	4	200
		% of men + women	33.0%	65.0%	2.0%	100.0%

Source: own analysis

concern among residents of tourist regions, who tend to link the sector of tourism with the prospective benefits and are less afraid the region would lose its uniqueness (cf. Dana). Comprehensive analyses revealed that a significant number of respondents did not think the potential development of archaeological tourism would favour the loss of the region's uniqueness (N=66, 33%). Fears to this end were expressed by 1/3 (N=66, 33%) with further 4 individuals (2%) having no opinion.

Conclusions

Conclusions show that the local communities of towns and villages in South Jordan perceive archaeology as a starting point of efforts aimed at introducing tourism into the region. People see the positive influence of archaeology on the sector and the benefits caused by archaeological excavations and presence of researchers in the neighbourhood. A considerable number of residents manifested positive attitudes to the potential development of archaeotourism, realising that the sector's growth would affect or completely change their lives, in a manner favouring improvement of their situation. They were not afraid that the region would lose its uniqueness because of the inflow of people representing different cultures or traditions. Respondents viewed the development of archaeological tourism as a chance to attract the attention of local and state authorities to problems faced by the population, and, consequently, improve the road infrastructure or access to water and sanitation.

Finally, it needs to be clearly stated that the survey is to be seen as contributory. Broader analyses seem necessary for a more in-depth examination of the demand of the local population connected with the developing sector of archaeological tourism. In the face of the above, the results presented in this study will be used as a basis of tailored actions in the field of education, promotion and protection of archaeological heritage and for adjustment of the archaeological sites excavated to tourism.

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Discovering Edom. Polish archaeological activity in southern Jordan
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Nature, science and tourism. Polish research on the natural environment of southern Jordan and the tourist potential of the region – outline and perspectives

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Abstract: The area of southern Jordan is unusual not only from an archaeological point of view but also as a natural reservoir of species and unique landscape forms. The natural and geological research conducted on this area can develop in a crucial way our knowledge about the history of the region in the far away past, but also help the local community to expand its touristic values and opportunities as well as improve economic potential of the southern Jordan. This development of awareness and potential will also contribute a lot to the protection of historical heritage.

Keywords: environmental research, geoarchaeology, active tourism, climbing, geotourism, anthropology of travel

General tourist information

Similarly as in many other countries in the region Jordan is a police state, nevertheless it has a huge tourist potential. Although this may appear a paradox, the constant presence of the law enforcement officers, both uniformed and under cover, makes travelling in Jordan for a foreign tourist much easier and safer contrary to some states where law and order is not a priority. Visiting Jordan for tourist purposes one does not experience any discomfort and in fact there is a strong feeling of safety while travelling through this interesting country.

It can be suspected that both the mode of travel, as well as the place of stay of particular foreigners is well known to the security services, although the latter rarely intervene in the travel plans of an average tourist. What is more, examples can be found where this seemingly uncomfortable situation proved to be of advantage as it secured fast response from the Jordan search and rescue teams. For example

a couple of years ago two tourists went off-track and got lost in the wadi's of the Edom Mountains losing their whole water supplies. It took only half an hour from the moment when they called their embassy for help till the moment when they were located by the search and rescue team and transported to the hospital to check their state of health and the level of dehydration. It should be stressed that they were neither interrogated or detained in any way.

On the other hand there are situations in which one should remember that he is discretely watched by the homeland security, especially where breaching regulations relating to protection of monuments, nature, good manners and non-tourist related activities are concerned. The people of the Kingdom of Jordan are organized in tribes and families and pay special attention to their traditions. In contact with foreigners this exhibits in two ways. The first common tradition is hospitality (e.g. Shryock 2004). As a consequence, being invited to a family home for a snack, or even a larger meal is not uncommon (Fig. 1). Not only is it not dangerous but refusal can even be considered as a sort of dishonor. Situations like this may occur mainly off the beaten tourist tracks. One may for example be offered water which may raise concerns from an average tourist. The host however, may try to understand these concerns and offer you bottled water, although this is certainly not a rule.

Fig. 1. Mansaf – a traditional Jordanian dish (photo by M. Wasilewski)

The guest himself in addition to his rights also has certain obligations. In most countries of the region there exist firm rules regarding the clothing and relations between certain individuals particularly of different sex (see e.g. El Feki 2013). In tourist locations the tolerance for differences in behavior of the foreign tourists, especially in relation to the way they dress, is generally high. In case of off-road excursions the situation is somewhat different. Therefore mainly for cultural reasons, as well as due to the climate and safety short skirts and shorts should be avoided. This particularly concerns women although not only them. In the terrain one should be well protected against insects, potential predators and in particular against the sun, wind and high daily amplitudes of temperature.

Planning a trip to Jordan, particularly if one is keen on active tourism, sports and adventure special caution should be given to the current weather conditions (Cordova 2007; Hamdi et al. 2009; Ababsa 2014). The best time for visiting Jordan are spring and autumn (March to May and September to November with temperatures ranging from 15 to 25 degrees Celsius). In winter period it can be rainy and sometimes snowfalls occur. In winter the temperature drops below 15 degrees Celsius. The summer is extremely dry and the temperatures during daytime reach 40 degrees Celsius (in desert areas even more). One should always have the basic safety aid kit with him. The Jordanian pharmacies are well supplied and the pharmacists usually speak English. One should only check the amount of active substances in medicines as they are usually much higher than in European countries. Specific vaccinations are not required. It is however worth vaccinating against jaundice type A and B and typhus-diphtheria-typhoid, as well as tetanus. People suffering from allergies should have their own anti-allergy kits with them. Staying outside hotels one should beware snakes, scorpions and hornets, although usually they do not pose a great threat.

Hospitals in Jordan usually have a high standard and the expertise of medical staff is on very good level (e.g. Ajlouni et al. 2013). However, it is necessary to have private insurance as hospitals are expensive and often private. The medical rescue system works efficiently. The search and rescue teams operate within civil defense structures with significant assistance from the fire brigades. In case of need, military and police helicopters are used for rescue actions.

Active tourism called also as „outdoor activity" in the Kingdom of Jordan (https://tropicaldesert.me/adventures#adventures-intro) is currently at its birth. When deciding to travel on one's own without the assistance of the tour operators one should carefully plan deposits of water and food. In particular this concerns water, it is generally recommended to use bottled water only. On sale there are various kinds of still water. It is also good to take soluble isotonic tablets. These should be brought along with you as they are generally hardly available in Jordan. The supplies of shops outside Amman and Aqaba are usually very basic and there are no supermarkets. The choice of available dry supplies and canned food is usually very limited and includes pasta, rice, canned fish and meat (no pork) and jam. The choice of fruit and vegetables is also quite modest and includes potatoes, onions, tomatoes, oranges, bananas, and less frequently: cabbage, paprika, apples, peaches, water melons, grapes, pomegranates. Packed sweets are usually of low quality. The street food is good or acceptable but sometimes could cause minor stomach problems especially at the beginning of the trip. It is caused by changing of bacterial flora.

Outdoor activities

Similarly as most other dry and semi-dry terrains the South Jordan is abundant with rocks clearly visible on the surface of the ground (Tarawneh 1988; Bandel, Salameh 2013). Along the edge of the Dead Sea Rift and in some valleys leading to the Eastern desert, walls and rock cliffs are formed (Al-Bilbisi 2014). These formations are usually accompanied by numerous boulders (Fig. 2).

Fig. 2. The area of Dana Nature Reserve – sector of limestone walls with boulder zones beneath (photo by M. Wasilewski)

The geological history resulted in the described region being dominated by the presence of the carbonate rocks (mainly limestone, less often dolomite and chalk) and sandstones (Tarawneh 1988; Bandel, Salameh 2013; Al-Bilbisi 2014). To the North and North-East basalt rocks appear. Far less frequently one may also encounter formations built of conglomerates or granite (Bandel, Salameh 2013). Planning a trip, or rock exploration one should bear in mind that the aforementioned rocks are constantly exposed to intensive weathering. The erosion is caused by both mechanical and chemical processes due to exposure to wind, water and anthropic factors. Their visual effect exhibits in screes, as well as interesting and very picturesque rock sculptures: columns, niches, holes, cracks, chimneys etc. Also speleothems can be found (Bandel, Salameh 2013). The rock sculpture appears on slabs, vertical walls and overhangs.

This intriguing and promising landscape changes upon attempt to climb these walls. Both placing belay points, as well as grapping holds is often difficult and risky. Seemingly solid rock becomes loose and proves to be significantly weathered. This does not entirely preclude rock climbing but it increases its risk and therefore the risk of injuries. In addition one should add as another factor increasing the difficulty of the climb the flora and fauna existing on the rocks (e.g. Al-Eisawi 1985; Palmer 2014). Xerothermic, spiky and hard plants at least stay still unlike hornets nesting in cracks and niches. Other animals are scarce and should not pose a threat – non-venomous snakes, shy lizards and birds.

Climbing areas in Jordan mentioned so far lay in the Northern part of the country (in total 262 routes) and in Wadi Rum (43 routes). Remaining, scarce areas with few routes are also scattered in the South of the country (in total between Kerak and Aqaba there are around 60 routes, see: https://climbingjordan.com/map/). Nevertheless there are many other places which provide considerable opportunities for setting new climbing routes. These include i.a. the areas around the Dana village (limestone, basalt rocks; Fig. 3), so-called Small Petra region (sandstone; Fig. 4), or Wadi Ghuweir (limestone, sandstone and potentially conglomerates; Fig. 5). The rock formations there give potential opportunities for setting routes 5 to 35 meters long ranging in difficulty between I (UIAA) to as least VIII (UIAA; 6c/7a – French scale).

Scarce sport and recreational tourism in the South Jordan along with aforementioned weather conditions results in rock being very loose regardless of the region (with few exceptions). Even few climbing manuals (as it would be an exaggeration to

Fig. 3. Columnar basalt lava near the border of Dana Nature Reserve (photo by M. Wasilewski)

Fig. 4. The sandstone cliffs in the Little Petra area (photo by M. Wasilewski)

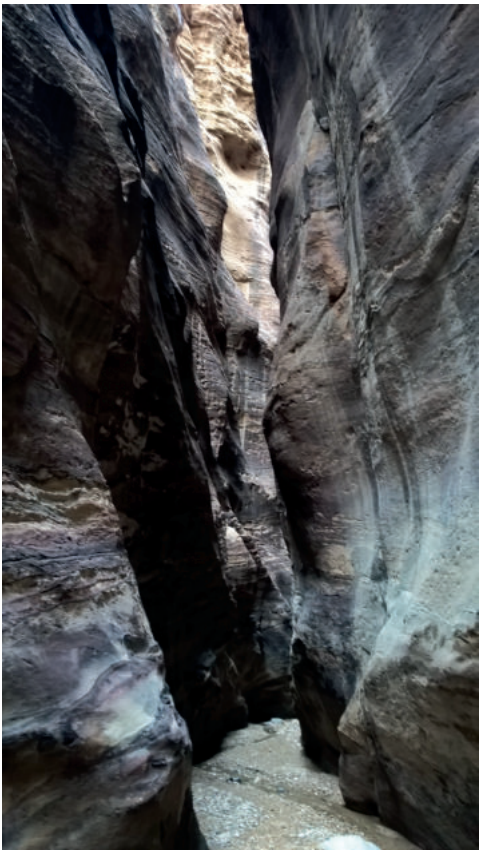

Fig. 5. The walls of the Wadi Ghuweir up to 80 m high (photo by M. Wasilewski)

call them climbing guidebooks) and Internet sources suggest that due to these circumstances the grading of the routes should always be increased by one degree in difficulty (Taylor, Howard 2011). Morphology of the rock formations (Fig. 6) is subject to constant changes, the belaying must be careful and well planned and most of the routes do not have a set of permanent belaying points.

Nevertheless, the region of the South Jordan still offers considerable climbing opportunities for those interested in easy, family-type climbing, as well as sport extremists. For the time being the climbers should get accustomed to poor terrain conditions, risky, loose rock and self-belaying on most of the routes. Only an increase in climbing traffic and preparation (including cleaning and protecting with bolts) of a larger number of climbing routes and planned publishing of a climbing guide-book by

Fig. 6. Tafone – example of weathered limestones in southern Jordan (photo by M. Wasilewski)

a Polish team of climbers will change these regions into another attractive location worth visiting.

Recently (in 2018) the first climbing-trekking organization was established in Jordan – Jordan Mountaineering Association. It organizes mountain guides and climbers as well as people practicing other forms of outdoor sports (mountaineering, canoeing, hiking, MTB). It is probably possible to use the services of members organized in this group (trained by and cooperating with other similar international organizations), however their assistance will be limited to advising on a location and transportation to a particular climbing regions. The shops with climbing gear are located only in Amman (two shops). They are supplied with little climbing gear, however, of similar quality as in Europe at rather high prices (although not exceedingly expensive). It is therefore worth bringing your own gear from home.

One of the least popular activities in the Jordan region is speleology (e.g. Kempe et al. 2006a, 2006b; Taylor, Howard 2011). Also in this aspect the country offers considerable opportunities. In its Northern region there is a vast basalt plateau in which lava caves may be found. These have been subject to exploration only since the beginning of this century. So far around 100 objects have been located such as tunnels and underground cracks. Their length varies from 7 to over 900 meters (e.g. the longest lava tunnel on the Arab Peninsula – Al-Fahda which is 923,5 meters long). The caves are a home to animals (hyenas, snakes, invertebrates) and bear numerous paleontological

findings (coprolites, bone remains and natural mummies). Due to their character, poor accessibility and scarce exploration of these objects, as well as the entire speleological activity in the Jordan is rather a domain of few scientists and sportsmen.

One particularly amazing construction connected with the North Jordan region is a 100 kilometer long system of underground tunnels located at on the current border of Syria and Jordan, perhaps linking the cities of Yarmouk and Decapolis which as some scientists believe was once used as an aqueduct in the Roman times. This system used both natural karst, as well as artificial tunnels. Although the last research questions the hypothesis about the aqueduct, it nevertheless confirms the existence of an extremely intensive underground engineering work (Kempe, Al-Malabeh 2017).

The remaining parts of the Kingdom laying along the Dead Sea Rift, as mentioned are built from carbonate rocks and sandstones. Among the first ones frequent examples of surface and underground karst can be found i.a. one of the biggest Jordan caves ever described in literature – Al-Daher Cave. This cave located in the Bergish Reserve for Ecotourism (North Jordan) was discovered in 1995. It is 300 meters long and has the area of 1,750 square meters (Kempe et al. 2006b).

The desert terrains of the East Jordan also bear examples of caves and sink-holes, their accessibility is, however, very difficult.

The majority of cave objects is completely undiscovered, undescribed and vastly unexplored. Therefore one may only state that Jordan indeed has the potential for speleology (for sport and science purposes), however this potential remains unrealized so far. The beginning of speleological activity may be experienced at the Dana Nature Reserve (so-called Caves Trail, however, limited to visiting cave shelters once used by the hermits).

Due to a dry climate (Ababsa 2014) the canoeing in Jordan, despite the existence of deep valleys and canyons (wadis), is not very popular. The travel offices usually mention the canyon at the Mujib Biosphere Reserve. Apart from this their tourist offer includes Wadi Zarqa, Wadi Mukheiris (with small waterfalls abseil) and Wadi Karak. For certain along the Dead Sea Rift and Wadi Araba there are tens and even hundreds of locations that can offer exciting canoeing experience. The difference in altitude of these water trails (in particular around Moab and Edom mountains) reaches 1,500 to 2,000 meters. It should be noted though that these trails are mostly unprepared and hardly accessible thus posing great risk to tourists and sportsmen. In addition to falling rocks once should add water peril. For most of the time Jordan canyons remain dry (Fig. 7). However, the precipitation increasing from the 1990s is connected with short-term but very intense rainfall (torrential rains). Their result are the flash floods (e.g. see: events in Wadi Musa

in 2018; see also Hamdi et al. 2009). The water level increases from zero to few or even 15 meters. The dynamic of the water flow is huge and the flood lasts from fifteen minutes to an hour. This phenomena can be a fatal threat to persons in the canyon not only due to the risk of drowning but also as a result of numerous rock material (including large boulders) carried by the river.

Some of the canoeing activities offered by the tourist agencies should rather be classified as hiking trails or tours (e.g. Taylor, Howard 2011). One can mention here the Wadi Mukheiris Hike, Wadi Ibn Hammad, Azraq Hiking Trail, Ajloun Hiking Trail, as well as Al-Oyoun, Dana, Dana-Petra, Feynan, Wadi Rum trekking, or a walking trail along one of the Jordan's longest canyons – Wadi Hasa. These are excursions lasting from a day to a couple of days taken with the guide.

Fig. 7. The Wadi Ghuweir gorge (photo by M. Wasilewski)

Still though, the tourist offer is very poor considering the vast potential offered by the mountains, hills and uplands of the Jordan region. As in case of other outdoor activities, also mountaineering, hiking, trekking or Nordic-walking are possible to practice on your own. Generally the terrain of the North Jordan is characterized by milder morphology and is generally greener than the rest of the country. The central and the Southern part of the country has steeper mountains, valleys and canyons. Some regions have an Alpine character (Fig. 8). These zones are scarcely vegetated with Mediterranean forests and plants. In vast majority they are dry and waterless. In addition there are no official tourist trails in Jordan. All this makes travelling off-road and on your own quite challenging. Particularly attractive and dangerous in appearance are the Moab and Edom Mountains. Dominating loose rocks, hidden trails and extensive erosion force long detours and the lack of goods maps and weak

Fig. 8. The rocky mountain ridge of Moab Mountains. View from the Wadi Araba/Dead Sea (photo by M. Wasilewski)

Fig. 9. The typical landscape of the Edom Mountains in the Shawbak District (photo by M. Wasilewski)

GPS signal results in tourist finding himself completely on his own (Fig. 9). Nevertheless, it is still worth checking out some locations described as part of the Polish project (see: http://southernjordanguide.com/en/nature-landscape/), such as and excursion to the Ghuweir gully, called also Wadi al-Nakheel (near Shawbak castle) which matches in its attractiveness the popular hike along the Wadi Mujib.

The best Jordan can offer to the bikers is the so-called Jordan Bike Trail (JBT) which is 730 kilometers long and leads from the Jordan's Northern border to Aqaba (see: https://jordanbiketrail.com/). This trail may be travelled in one part (suggested time is 12 days), or in smaller parts either on your own, or with the assistance of external tour

operators. The trail itself is considered to be varied in terms of its difficulty (the length of particular sections, differences in altitude, quality of the surface etc.) and is extremely interesting both due to the nature, as well as culture. It leads along one of the ancient trade routes (King's Trail – Via Nova Traiana), which makes it tourist hit attraction.

Other popular organized trails are the Dead Sea Circuit and the Bike Trail of Jordan. The first one costs around USD 5,200 (no bike included) and includes accommodation, food and a guide. It takes 14 days (13 nights) and is over 750 kilometers long. It leads from Jerusalem through Aqaba to the terrains of Jordan and on the way back to the West i.a. through Dana and Jericho. The daily distance is approx. 75 kilometers and the differences in altitude reach 900 meters (some sections are travelled by car). During this tour the organizers plan sightseeing of some famous historical sites (Petra, Shawbak) and natural wonders (e.g. evaporation pools by the Dead Sea, Wadi Rum) (see: https://www.spiceroads.com/tours/dead_sea/details). Most of the route on the Western side of the Dead Sea is done on bike whereas the Eastern part is largely done by car.

The second trail (price USD 2,300 without the bike, accommodation and food included) is designed as a connection of bike tours and car rides. The bike sections in total are 190 kilometers long and this distance is covered in 8 days (average daily distance by bike is 38 kilometers and the total differences in altitude are 522 meters). The trail leads from North (Amman) to Aqaba. The stops are planned in classical tourist sites such as Madaba, Dana, Wadi Musa or Wadi Rum (see: https://www.spiceroads.com/tours/jordan_trails/itinerary). The trail leads mainly on country roads (80%) and it is more difficult than the first one. The return trip to Amman is planned by car or bus.

Both offers are meant for active but not necessarily very fit persons. The majority of the car sections on the Jordan territory may result from organizer's conviction that the regions on the way are less attractive and poor in tourist infrastructure (especially in between main tourist attractions), also possibly from the concern for the safety of the bikers. The offers have a rather narrow timeline: November-December or October-November and March-April. This results from the harsh climate in other parts of the year, as mentioned above. Also due to climate throughout the day the daily excursions may start even as early as 5 AM.

Besides such organized excursions one may find various hints and ideas about more independent bike tours. Few years ago Cycling Jordan company started operating a bike rental point in Amman and simultaneously initiated a campaign aimed at promoting and providing technical assistance and guided tours (including catering) to the keen bikers. There are also other companies operating in the same sector (e.g. Experience Jordan, Terhaal Adventures, Wild Jordan and others). Everything relies on

one's own invention. The most often chosen off-road bike tracks lead from Amman to the Dead Sea (approx. 60 kilometers, almost all downhill, except one steep climb so called „the atheist's uphill"), starting from At-Tafilah down to the Feynan region near the Dead Sea (aprox 30–40 kilometers), from Wadi Feynan up to the Little Petra region (one of the most demanding, typically Alpine routes approx. 30–40 kilometers long). Easier routes on asphalt roads lead from Amman to Jerash (50 kilometers), to Madaba (30 kilometers), Kerak (100 kilometers), or around these sites.

It seems that the biking tourism until recently poorly developed is well promoted and gains popularity very fast. Nevertheless, the sight of a cyclist on the road is still rather uncommon in this country, particularly outside main towns. Similarly as in case of other outdoor activities one should remember about terrains excluded from tourist traffic (zones near the border and military zones) and areas outside the control, or poorly controlled by the state (e.g. Ma'an region). The major risk factor in a dry country such as Jordan is of course access to fresh drinking water, so special caution should be given to this aspect. Also it is always worth to have phone number to biking tour operators, as repair of the bike may be problematic in some places.

Air sports (gliding, micro lighting, para motoring, paragliding, balloon, BASE jumping) are more scrutinized due to military and safety restraints. Some companies offer hot-air balloon and microlight (moto-glide) flights over Wadi Rum. In order to safely practice such forms of activity, also due to legal restraints it is worth contacting Royal Jordanian Gliding Club or Royal Aero Sports Club of Jordan for instructions. Among regions recommended for gliding (see: https://www.paraglidingmap.com/app/site/129110?peek=true&tab=0) there are: on the North – King Talal Dam, Zai, Mount Nebo, in the central part of Jordan – Wadi Mujib South and West, and on the South – Dana and Beida. The starting points for gliding are located at 500 to 1,600 meters above the sea level. There are also many other locations, however, they may prove problematic due to wind conditions, landing safety etc.

In Shaumari Wildlife Reserve Oryx Safari is organized for tourists. This is an all-inclusive car safari. If one desires to be closer to nature camel riding or horseback riding are the alternatives (advertised as Bedouin-style riding). These attractions are offered in Wadi Rum often as a supplementary activity to sightseeing. Although in recent years the number of horse and camel riding facilities has not been changed i.e. 713 (Wójtowicz, Wójtowicz 2015: 55), in all other sectors of active tourism a considerable increase of profits may be observed.

There is also a variety of excursions to the desert offered by the local tourist agencies. It is recommended to choose one of the organized trips advertised as an authentic

experience of the Bedouin lifestyle. This kind of adventure can be experienced in the deserts of the North and North-Eastern Jordan.

The lighter adventures in Jordan can also be realized. One may take a trip to the South to observe the glorious night sky. The hotels or tourist resorts in Wadi Feynan as well as ones closer to the Little Petra (as for example Petra Bubble Luxotel; Fig. 10) are especially recommended for that purpose, however, the accommodation can be quite expensive there (starting from USD 250 per night). There are however some campsites to choose from e.g. Rummana Campsite (Dana area), Wadi Rum and in the Aqaba region (Fig. 11).

Fig. 10. The exclusive Petra Bubble Luxotel built in 2018/2019 (photo by M. Wasilewski)

Fig. 11. The individual camping is possible but usually requires the permission of the land owner. The campsite of Polish HLC Project near the Munqata'a archaeological site (Tafilah District) (photo by M. Wasilewski)

The tourist offer connected with the Dead Sea involves mainly pro-health activities (indulging in mud baths, salt pools, inhalations, leisure and wellness). Diving is very popular in the Aqaba region and beaches by the Bay. The water in this region is pleasantly warm, clean and rich in coral reefs. The sea dives there are from 20 to 200 meters deep. There are many shops which rent out snorkeling and scuba-diving gear.

You may also go fishing with a local fisherman. In the waters of Aqaba Bay there are approx. 500 species of fish out of 1.5 thousand present in the Red Sea. The water sports include also surfing and water skiing.

It can be stated that due to the specific natural environment Jordan is best for slow traveling. The guidebook to Jordan prepared by Polish researchers (http://southernjordanguide.com/en/) proves just how many things there are to see and experience just by staying in close contact with the Jordan nature. Even the commercial offer includes various slow travel activities such as bird watching in the Aqaba or Dana Nature Reserve.

Nature

Jordan territory lays in the region of the world's greatest depression – the Dead Sea Rift. This zone is extremely active from seismic and geological point of view and rich both in geological evidence of numerous earthquakes visible in rock structure, as well as archeological consequences of these disasters. Poor flora in this part of the country allows for numerous paleontological (*Micraster, Terebratula, Amonites, Nerinea, Fileolus* etc.; Fig. 12) and petrographic-mineral findings (agates, jasper, chert, gypsum, ore minerals, ochre, salts etc.; Fig. 13–16). Similarly interesting is the observation of the erosion, eolic and desert phenomena.

Fig. 12. The ammonite bearing limestone layer in the Wadi Mashra (Tafilah District) (photo by M. Wasilewski)

Fig. 13. The striped chert from the Dana Nature Reserve (photo by M. Wasilewski)

Fig. 14. The ochre layer outcrop near the road At-Tafileh-Wadi Musa (photo by M. Wasilewski)

Clear example of the richness of currently more explored biotopes of the Jordan are nature reserves including Shaumari Wildlife Reserve (NE Jordan), Azraq Wetland Reserve (NE Jordan), Mujib Nature Reserve (E Jordan), Ajloun Fores Reserve (NW Jordan), Dana Biosphere Reserve (S Jordan), Dibeen Forest Reserve (NW Jordan), and established only in 2011 Fifa Nature Reserve (SW Jordan). To this list one may add Wadi Rum and Petra which are entered onto the list of the global heritage by UNESCO.

Fig. 15. The siliceous rock layer of hydrothermal origin – Wadi Mashra (photo by M. Wasilewski)

Fig. 16. The rock crystals from the Edom Mountains (photo by M. Wasilewski)

The current territory of the Kingdom of Jordan lays partly on the South edge of the so-called fertile semi-crescent (North of the country and part of terrains adjacent to the Dead Sea Rift). The Golan Hills constitute the most Northern part of the country. This basalt plateau (rising over 1,200 meters above the sea level) has the most fertile soil in entire country. The Northern part of Jordan is also the historical land of Gilead. It used to be covered with dense forest (with oaks, cedars and terebints). Nowadays one may encounter there mainly shrubs and bushes. This region from which Moses saw the Promised Land (from the Nebo mountain) is scattered with many ruins of biblical cities. It has sharp, jerked geomorphology and high differences in altitude (800 to 1,200 meters above the sea level). Further to the South there is Moab – the historical land of Moabites and finally South of Wadi al-Hasa – Edom, the land of Edomites.

Certainly the South Jordan is today drier than North of the country but this difference does not necessarily mean the change in the attractiveness of the area. The nature differs significantly also from the West (Wadi Araba and Northern Highlands) to the East (Central Desert).

The Highlands of the Eastern Rim of the Wadi Araba – Jordan Graben form the Mountain Ridge also known as Northern Highlands. In its Southern part it is called the Hills of Moab and Edom Mountains. To the East of this geographical spine extends the Central Desert Area of East Jordan and to the West the landscape of Wadi Araba. Its morphology changing from flat sand dunes, rolling hills and shallow valleys, through sharp and inaccessible mountain ridges (up to 1,100–1,400 meters above the sea level) to deep, steep canyons with cliffs as high as tens of meters. Then comes the very hot and dry, salty and as flat as a flounder world's deepest depression of the Dead Sea (down to -150–300 meters below the sea level).

The aforementioned mountain ridges are formed by the monocline, in geology called fault-block mountains. These tectonic blocks dip gently towards the East but their fragments are slid and tilted forming very perplexed escarpment. The Moab and the Edom Mountains formed the Eastern border of the graben – the regional depression in geomorphology known as the Dead Sea Rift or Wadi Araba. It is connected and forms the northern continuation of the Red Sea Rift and the continental system of East African Rift/Great Rift Valley. The Dead See Rift itself is the boundary visible on the land surface between the two tectonic plates – Arabian and African one. It started to form about 35 million years ago. The geological transformations in this area form the horst-graben geomorphology and cause the numerous earthquakes as well as magmatic activity – intrusions. The latter form the big magmatic rock monoliths called sills, dykes, batholiths etc.

The Moab and Edom Mountains are built of the thick complex of rock layers having over 1,500 meters. All these rocks could be grouped into two general types: the lower one formed mainly of sandstones and the upper one of carbonates (limestones etc.). The sandstones were formed from Paleozoic up to Early Jurassic (approx. 500 to 200 million years ago) and the carbonate rocks from Jurassic to Early Tertiary (approx. 200 to 23 million years ago). In the gentle slopes, steep hillsides and rocky walls the extremely interesting patchwork of rock layers is visible. The thin and thick rocks of various colors from white, through yellow, beige, rose to red, violet, brown and even green and black (Fig. 17) interweave formed by undulating, faulting, and volcanic intrusions. Perfect opportunities of observing and describing the geology are possible due to the scarcity of the flora cover.

Fig. 17. The sandstone textures – Wadi Mashra (photo by M. Wasilewski)

Although the majority of the Jordan territory is dominated by arid and semi-arid climate its bio-zones are not as monotonous. The South Jordan provides for the unique opportunity to see various biotopes over quite short distances. An example is the transitional zone between Mediterranean and Irano-Turanian biogeographical regions. It is defined as the Semi-Arid to Arid Mediterranean bioclimatic zone. This region, called steppe (or semi-steppe) seems to be the most convenient for agriculture and contemporarily is populated in 90% by the Jordanian population. The area at a first glance deprived of life is covered with several genera of plants and inhabited by various genera of animals. They are concentrated along the stream beds but also appear on the hill slopes and even the mountain ridges. From decades thanks to biological and ecological studies as well as from the historical texts we are constantly surprised with the presence of endemic or relic species of plants and animals.

Prospects of research

Despite huge potential for scientific research most territories of the contemporary Jordan have not been subject to intensive research by the Polish scientists. Few Polish publications were of a very general, or popular nature (e.g. Jarmołowicz-Szulc 2008). Their major flaw is that they were published only in Polish and therefore do not appear in international citations.

There are also singular works concerning the development of tourism on the territory of the Kingdom of Jordan (Wójtowicz, Wójtowicz 2015). The importance of this tourist destination increased when cheap plane connection was established between Kraków and Amman. The above-mentioned publication is rather too optimistic when

it comes to describing the tourist infrastructure in Jordan (Wójtowicz, Wójtowicz 2015: 49), although the authors do admit that 65% (of 519) hotels are located in Amman (Wójtowicz, Wójtowicz 2015: 55).

The nature of the Jordan region is indicated as one of its biggest tourist attractions (Jarmołowicz-Szulc 2008; Wójtowicz, Wójtowicz 2015). However, the list of potential attractions is limited at best to Aqaba, Wadi Rum, Petra, the Dead Sea and Amman. These are generally typical „tourist destinations". According to the statistics the most popular places visited in Jordan by the local and foreign tourists are: the Petra complex, Wadi Rum, as well as the Archeological Museum in Amman and Museum in Aqaba (Wójtowicz, Wójtowicz 2015: 61–62). Also it is in these cities (Amman, Aqaba, Wadi Musa near Petra) where the whole tourist infrastructure is located (hotels, shops, transport, so-called active tourism locations). As can clearly be seen there are locations in Jordan with very limited tourist traffic and scarce infrastructure.

During the last decade the major scientific research was focused mainly on the differences in the level of water in the Dead Sea and the potential ways of preventing it from drying out. However, this issue has not been greatly explored in Polish science but rather in social media and tourist publications (see: e.g. Mejer 2018).

This is not specific only for the Polish publications. Statistically speaking much more foreign publications are devoted to regions located to the West of the Dead Sea Rift, including especially the Negev Desert. This also leads to another conclusion. Among scientific works there are more devoted to the geology, geomorphology and climate of the region than biology (e.g. Al-Eisawi 1985; Cordova 2007; Hamdi et al. 2009; Danin, Fragman-Sapir 2010; Ababsa 2014; Al-Bilbisi 2014; Rajsekhar, Gorelick 2017). This seems quite obvious considering the specific features of the nature of the Kingdom of Jordan. Poor flora reveals vast terrains of rock surface of different age. In consequence, most scientific texts are devoted to geology. Even in this aspect the Polish researchers have not been present yet.

All this resulted in the Polish "HLC – Heritage, Landscape, Community" project, which has started in 2016, being so interesting and promising. As part of the Polish research it has been possible to perform initial exploration of the three natural regions: in the region where the canyon cuts into the land near At-Tafilah (Munqata'a archaeological site), in the flattening of the log mountains towering over the Dead Sea Rift (Wadi Mashra) and in the Al-Jafr drainage area (Faysallia'h archaeological site). The combination of the archeological research, geological and geomorphological analyses allow to gradually reconstruct the paleo-climate and paleo-landscape of the South Jordan at the early period of the Last Glaciation (approx. 140 ka BP).

Both sedimentological evidence, as well as archeological and historical sources allow a conclusion that for many centuries Southern Jordan was a green and fertile territory. Periodical dry episodes up to Medieval times did not cause considerable agricultural, or demographic decline of this region. Even at the beginning of the 12th century the land was scattered with vineyards and olive groves.

Not only the geoarcheological aspects are interesting and often ignored in scientific publications. Also purely geological topics deserve in Jordan a more profound scientific research. In South Jordan there are outcrops of very compound (up to 2000–2500 meters) rock complexes. These can be analyzed in the context of evident boundaries between particular periods (for example intriguing Cenomanian-Turonian transition) and allow to undertake research in the field of geological cartography and historical geology. In addition to the currently explored rock resources there is also a question of building up of compound (to 5 meters) complexes of siliceous rocks and their relation to magmatic intrusions. Also various paleontological matters call for further research.

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My encounters with the language and culture of Jordan. Polish students in Jordan

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Abstract: Participation in research conducted by Polish scientific projects in Jordan offers many opportunities for development to students of various disciplines. Most of them are students of archaeology, but there is also much work to be done and experience to be acquired for students of Arabic philology, linguistics, ethnology, cultural studies, law, political studies, sociology, and more. As a part of Kraków research activities in Jordan, some student projects concerning popularization of science, Arabic language and culture have begun. All of them take place in cooperation with the Polish Embassy in Amman and thanks to the great support of its personnel.

Keywords: students, student internships, southern Jordan, language, Jordanian culture

In 2018, a subsequent, annual expedition was organised by the Institute of Archaeology of the Jagiellonian University as a part of the project entitled "Early Bronze Age in South Jordan in the Context of Research in At-Tafilah Region" which is a part of the HLC meta-project (see e.g. Kołodziejczyk et al. 2018). The stay abounded in a number of cultural, educational and purely exploratory events. During the expedition the participants spent time primarily in the Dana Biosphere Reserve, where typical archaeological and geological research was carried out. Moreover, as part of the distribution of knowledge about archaeology among the local residents, members of our team organised educational activities for children. The most important event during the entire expedition, however, was the scientific conference at the Hashimite University in Az-Zarqa, attended by scientists from the Jagiellonian University and the University of Warsaw, and the hosts (Fig. 1). The listeners were offered a chance to learn interesting information about the Polish and Jordanian archaeological excavations conducted in Jordan, Palestine and Syria, as the speakers told about their discoveries in Southern Jordan among other places.

Fig. 1. Author of the article and Polish archaeologists from Cracow and Warsaw at the Hashemite University in Zarqa (photo by K. Radziwiłko)

I would like to focus on what distinguished this annual expedition from all other trips organised as part of that very same project. Firstly, the aforementioned classes for children were organised in the Madaba Primary School (approx. 30 km from Amman) and, secondly, linguistic studies were pursued, consisting in conversations with the local people in Arabic language and its dialects functioning presently in central Jordan (Al-Wer 2007: 1–6).

The school classes sought to disseminate archaeological knowledge among children and increase their awareness of the need to take due care of monuments in their homeland (Fig. 2). The workshops were conducted by Katarzyna Radziwiłko, specialist from the Polish Centre of Mediterranean Archaeology University of Warsaw, and were attended by nearly one hundred boys, which surpassed our most daring expectations. To facilitate interactions with the pupils, all activities were translated into Arabic. We started by explaining who an archaeologist is, what he/she does, and what monument protection is and what it entails, whereupon we smoothly moved on to identifying archaeological ages. Then, the children were shown boards with pictures typical of individual ages and images of archaeological sites in Jordan. Their task was to indicate towns or villages with the best-known research sites of Jordan on a map. To focus the attention of our demanding listeners, we also prepared games in which they eagerly participated. Among them was one of the world's oldest board games, the 5,000-year old royal game of Ur, first played in ancient Mesopotamia (Zaczek

2009: 33). Additionally, the children did jigsaws showing monuments, from, among others, the Bronze, Iron, Palaeolithic and Neolithic ages. Of course there was also mosaic creation, to allude to Madaba, a site famous for a mosaic masterpiece from the Holy Land dating to the 6th century, which can be found in the Byzantine church of Saint George (see e.g. Avi-Yonah 1954). Interestingly, the mosaic is the oldest preserved map of the region and the best topographical map originating before the birth of topography as we know it today. The young listeners lent their ears to find out more about the history of the region and of Jordan in general. This is of strategic importance, as Jordan abounds in valuable, still uncovered archaeological monuments, while social awareness remains low. It is not uncommon that archaeological sites are plundered by Jordanians, in the face of which stimulation of a sense of responsibility among the youngest generation seems even more important (see e.g. Contreras, Brodie 2010: 101–14).

Fig. 2. Author of the article with the teacher and children from primary school in Dana (photo by K. Radziwiłko).

Aside from the classes for children, these was the opportunity to conduct linguistic research on the dialects of Jordan, with particular focus on the one spoken in the central part of the country. As a student of Arabic philology at the Jagiellonian University, I saw it as an unparalleled chance to find out more about the local culture and to compare textbook knowledge with the 'living language'

A dialect is a variety of a language shared by a specific community diversified in terms of ethnic, class or geographic origin (Al-Wer 2007: 1–6). A dialect is chiefly distinguished from other dialects of the same language by grammar and vocabulary. It differs from sub-dialects (in Polish: *gwara*) in that it is also spoken by well-educated people and residents of major cities. A person's origin is irrelevant here, which is contrary to the sub-dialects, spoken mainly by agricultural communities. The Arabic

world teems with dialects, making the phenomenon much less homogeneous and much widely disseminated than in Europe. Here, in each country there are at least a dozen or so dialects. Interestingly, big cities, such as Cairo or Amman, have more than one dialect too, since people who come there from all over the country start speaking a blend of their native dialect and the local one. Finally, distinct dialects can also be encountered in different districts of the same city. In European culture, this phenomenon is extremely rare, making the interpersonal communication of the Middle East difficult for us to understand.

Another notion that must be mentioned when talking about the linguistic situation in the Arab world is diglossia, a grammatical term used to denote when the language spoken by a country's population on a daily basis is so different from the classical/official one that one might think they are two separate dialects, if not languages. In the Arab world, however, this is perfectly normal. Moreover, in countries of the Maghreb, diglossia is accompanied by plurilingualism, meaning the coexistence of several languages in a single country. In the case analysed these are Arabic, Berber (classified as a language, not a dialect, as the differences are major) and French (North African countries were once French colonies, which continues to have impact on culture and language). The discrepancies between individual regions also result from different levels of illiteracy, which is generally high in all Arab states. The higher the level of illiteracy, the simpler and less literary the language. Differences between dialects and classical Arabic (Fusha) are so significant that in Europe they would be treated as separate languages (see e.g. Versteegh 2001). Some philologists are of the opinion that certain Slavic languages share more similarities than do individual dialects of Arabic. Therefore, the question may be asked: why not systematise the dialects and consider them official languages? One of the reasons why the Arabs have not done so is the lack of complete cultural isolation. All of the region's countries share the same history and, most importantly, religion, which plays an immeasurably important role for the local people. As a matter of fact, the Quran, the holy book of the Islamic world, was written down in classical Arabic and as such serves as the model for Arabic style and grammar. Literary language remains the same for the entire community, not only Arabic, but Muslim in general. The only occasion when everyone uses the same classical spoken Arabic is in prayer. All over the world Muslims pray in Arabic, believing that the Quran must not be translated into any other language. When reciting religious formulas or quoting the holy book of Islam, it is only appropriate to use the classical language. As far as this does not cause significant problems in Arab countries, in non-Arabic Muslim states many people do not really understand the exact meaning

of the words they are uttering, as they do not know the language. Fusha does not differ from territory to territory or from one society to another, but looks the same everywhere, no matter who it is spoken by. The Arabic *diglossia*, however, is a very specific phenomenon. According to Danecki (2001: 388), it assumes huge prestige for the literary language and contempt for spoken dialectal languages, which are in fact the only languages spoken by everybody. Arab linguists work meticulously to make sure that the language is not changed or modernised. They see Arabic as more than a mere communication method, but, first of all, as the language of Islam, and therefore hold it in high respect. Obviously, borrowings from other languages are unavoidable, especially today, in the era of globalisation, when a similar challenge is presented to virtually every language of the world. It is natural that the appearance of new objects and social phenomena entails the coining of new words, whose translation is increasingly frequently abandoned, with a tendency to keep their original forms, only slightly adjusted to the target language to make their pronunciation and spelling more accessible. In fact, Arabic has undergone no major transformations in terms of morphology, inflexion or syntax since its earliest days. The grammar of contemporary texts and old Arabic writings is very similar (see e.g. Holes 2004). The situation is different with lexis, i.e. the vocabulary and phonology (phonology is a study of speech sounds of a language or, in simpler terms, the manner in which words are spoken). Interestingly, each dialectal environment has a distinct phonological system, determined by local dialects. Scientific research on the phenomenon encounters certain problems, as researchers are unable to establish unambiguously how Arabs pronounced individual words in the past, wherefore "(...) today, there are practically no standards governing the pronunciation of literary Arabic language" (Danecki 2001: 389). For this very reason, when spoken by an Iraqi, the classical language will sound different than in the mouth of a Libyan. The accents typical of individual dialects in everyday use have such a strong influence on their speech organs that when speaking Fusha they sound completely different. Although they will have no problem understanding one another, a person speaking Arabic as a second language may encounter certain difficulties.

This is in contrast with dialects, which are largely diversified, thus presenting a number of communication problems, especially to foreigners who learn Fusha or to Arabs raised in other regions or countries, even though Arabic is their mother tongue. For instance, a Moroccan and an Iraqi would never understand each other if they talked in their own dialects. This is due to the fact that the classical language is no longer in everyday use, perceived as artificial and too formal. The main factors that contribute to stratification of the language include, among others, the spheres of its

usage (professional and private), the users (profession, educational background, social status) and communication situations (unofficial vs official). As Danecki mentions, the language remains dependent on the social status of its speakers. A supervisor will use a different language when speaking with his/her subordinates than when addressing his/her children or parents (Danecki 1989: 12). When staying in Jordan, I had an occasion to talk to teachers in a boy's school in At-Tafilah about the language status in their region. In everyday contact, the residents use a dialect, as an easier and faster way of communication, while children are taught all subjects in literary Arabic. This is a perfect example of *diglossia*, with the people using two languages. TV and radio programmes are broadcast in classical Arabic (although there are some exceptions). The same is true for books and the press, including the local one, which I found quite surprising. However, in some cases TV talent shows are subtitled in classical Arabic, as the diversity of the dialects spoken would make them incomprehensible to citizens of other states of the Middle East. The contemporary literature, however, is a permitted exception to the principle that Fusha is the only language to be legitimately be used in writing, even if only to a limited extent. Dialects do appear in books written about the mid-20th century and later, but only in dialogue in which the author's intent is to emphasise the protagonist's social position and educational background, or to achieve comical effect. What is equally surprising is that "certain dialects are not restricted to a single city or country" (Danecki 2001: 390), but are used much more widely, disseminated by the mass media. In the age of the Internet, information, music, films and TV series from other countries are easily available. As regards the latter, Egypt is one of the leaders and a pioneer of the film industry of the Arabic world, popularising the Egyptian dialect among Arabs. Egyptian movies are distributed throughout the Middle East, making the dialect known to a vast majority of the region's population, with Syrian and Lebanese ones as runners-up. Although small, Lebanon is one of the most important cultural centres of the region, a feature serving as the main determinant of the dialect's popularity, more important than the size of the country or population of its users, although the latter are not without significance either.

In Jordan, people smoothly switch to the literary language, which is mainly due to the fact that the vast majority of the society is well-educated and that the Jordanian dialect is very close to the language of the Quran (Shahiditabar et al. 2017: 1–10), which makes it easy to learn. In big towns and cities dialects tend to be better systematized when compared to small-er locations, where they are rather unsophisticated and share fewer similarities with Fusha. The above is particularly true for grammar, oftentimes limited to the necessary minimum. There is nothing unusual

about it, as Arabic grammar is very difficult and incomprehensible even to native Arabs. Little wonder, therefore, that the spelling and syntax tend to be simplified. Alt-hough not a rule, some dialects have as many as dozen or so tenses, compared to a few in clas-sical Arabic. In terms of morphology, phonology and vocabulary, Jordanian dialects closely resemble Syrian, Lebanese and Palestinian ones (see e.g. Versteegh 2001). They are all situat-ed halfway between Iraqi and Egyptian dialects (Danecki 1989: 81). Compared to other dia-lects, in particular those of Maghreb, they have an extensive vowel system, making them easier to pronounce. Additionally, as the Jordanian dialects are very close to classical Arabic, their grammars are similar too, with an extended system of tenses.

At the school where I conducted my research, I was told that two bigger towns approximately 30 km away from At-Tafilah have their own dialects, which basically came down to different pronunciation of individual sounds and accents falling on different syllables. These, however, are not the only differences, since certain words are completely dissimilar as well. As a result, residents of these towns can easily tell where their interlocutors come from after only a few minutes of conversation. Obviously, this is only true for locations that are geographically close to one another. The transitions from one dialect to another are rather gentle, whereby people from the north and south of the country can communicate using dialects, although not as easily as those living in neighbouring towns or villages. It is worth mentioning that Arabs' ears are attuned to accents, as they determine the perception of their background by others. This, however, does not prevent them from communicating effectively; dialects in this part of Jordan have a sufficient degree of similarity to allow the people to understand one another without major problems.

It is worth noting that a large part of the area of my research is inhabited by Bedouins, with their dialects also leaving their mark. This, however, does not alter the fact that the Bedouins of the south of the country speak differently than those from central Jordan. Nomads have always differed from populations with a settled way of life; a phenomenon by no means exclusive to the Middle East. Bedouin accents differ depending on the tribe, with the differences being considerable. Those from central and southern Jordan can understand people from Amman, since the latter represent Jordan's most popular dialect (dialects spoken in the capital and in other big cities have always the greatest prominence) and is closest to classical Arabic. It is not that easy, however, the other way round, as a resident of Amman is very likely not to understand a Bedouin at first contact. When in Wadi Rum, I myself talked to a Bedouin using literary Arabic, since I found his dialect completely incomprehensible. Surprisingly to

some, although still leading traditional, nomadic lives, desert inhabitants speak fluent Arabic, all thanks to TV and the Internet. Watching various TV programmes, they have continuous contact with the classical language, even though they find it unnatural or even funny, as no one talks in this way on a day-to-day basis.

I heard two opinions on differences in how women and men express themselves. In At-Tafilah, I was told that everyone in a town or village speaks in the same way unless one of the parents comes from a different language, as then the children speak a blend of dialects. On the other hand, in Amman, I heard (and had it confirmed by the residents) that women had a more delicate accent than men and did not pronounce certain letters. Even so, people easily understand one another and seem not to notice this at all. To tell the truth, I cannot fully explain the origin of the phenomenon, but I believe the root cause lies in cultural differences and a more pronounced divisions between women and men than in the European culture.

Interestingly, Arabs can easily tell which Middle-eastern country a person comes from only on the basis of a short conversation. Even though ten plus dialects can be heard within one country, it is possible to isolate certain typical words, accents and styles and thereby recognise whether a person comes from Morocco, Egypt, the Levant or the Persian Gulf.

Not governed by rigid rules as much as the language of the Quran, dialects keep evolving, prone to influences from the West. In Amman, English signs, such as in shopping malls, are growing in popularity, although they are not as common as in Poland. Some Arab states are also observed as opening up to Anglicisms.

As some authors suggest, the prestige of classical Arabic, as the language of high culture and literature, the Quran and religion, is highly important to Arabs, making it the strongest tie among all Arabs (irrespective of their place of abode) (Bielawski 1971: 555). Spoken by approximately 250 million people, it is highly diversified, though. The differences within the language are mainly connected with geography, social status, educational background and many other factors. This is a completely different situation from that in Poland, where linguistic differences between individual regions are not so prominent, and it offers a large field of possibilities for linguists. Although it is impossible to write down and systematise all Arabic dialects, every single attempt to learn them brings us closer to better communication with the local people, which is invaluable for the research conducted by the Jagiellonian University, to name just one example. Two more expeditions to Jordan are planned in 2019 as part of the project, during which the participants will have an opportunity to continue the archaeological, geological, educational and linguistic research. It is certainly worth encouraging

students of various specialities to take an interest in this important and fascinating region of the Middle East.

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أيضًا عدم ملاحظة التراث الرائع الاستثنائي للعصور الوسطى بقلعة الشوبك الرائعة والمعالم الصليبية في الحبس والويري، فضلًا عن العديد من المدن والمباني البيزنطية المنتشرة في جميع أنحاء جنوب الأردن.

كان هذا المشهد الثقافي الغني لجنوب الأردن هو الذي اجتذب علماء الآثار البولنديين وعلماء الطبيعة ومروجي العلوم وأصبح مكان عملهم. منذ عدة سنوات، يقوم العلماء بأعمال التنقيب والبحوث البيئية هنا، لتوسيع معرفتنا حول تاريخ المنطقة وطبيعتها.

واسع يهدف إلى التعرف على المنطقة ووصف المشهد الثقافي ودور البيئة وتغيراتها في تحولها. سوف يساعد هذا المشروع العلماء على فهم دور ووظيفة المنطقة على مدار قرون، ولكنه يساعد أيضًا في تطويرها من خلال تحديد مناطق الجذب السياحي ولفت الأنظار نحو القيم الثقافية والبيئية الجديرة بالحماية والترويج لها.

من الجدير بالذكر أيضًا أن أعمال كاركوف البحثية التي تُجرى في الأردن منذ عام 2014 هي أول أنشطة عملية مستقلة لعلماء آثار بولنديين في هذه المنطقة. بداياتها كانت ممكنة أيضًا بفضل دعم علماء الآثار الإيطاليين الذين يعملون في الأردن منذ أكثر من 30 عامًا. قام الفريق الإيطالي، برئاسة البروفيسور غيدو فاينيني من جامعة فلورنسا ، بتوفير القاعدة للعلماء البولنديين وتبادل الخبرات في المرحلة الأولية من المشروع.

تم الاعتراف بأعمال باحثي كاركوف في الأردن من قبل المركز الوطني للعلوم، الذي قدم منحة لتوسيع أعمالهم من أجل معرفة المزيد عن تاريخ جنوب الأردن في العصر البرونزي ، الذي يعد استكشافه في الشرق الأوسط أحد المشاكل البحثية الأكثر إثارة للاهتمام في علم الآثار المعاصر. كانت هذه الفترة، التي استمرت حوالي 1750 سنة (3700-1950 قبل الميلاد) ، مليئة بالأحداث والتغيرات الحاسمة لتنمية الثقافة الإنسانية. أنشئت أول مراكز ذات طابع حضري، وازدهرت تقنية إنتاج العديد من الأشياء (مثل المعادن) وازدهرت التجارة التي كانت ترتحل فيها القوافل لمسافات بعيدة. في منطقة مصر والشرق الأوسط، كان هناك العديد من التغييرات الاجتماعية المهمة في تلك الفترة - نشأة الممالك الأولى ذات الطبيعة المركزية (مصر في فترة ما قبل الأسرات والفترة القديمة والدولة القديمة) ودول المدن (بلاد ما بين النهرين ، سوريا - فلسطين) السيطرة على المناطق الصغيرة ؛ تشكيل وتعميق التدريجي للهيكل الهرمي والعقد للمجتمعات الفردية ؛ تطوير الطوائف والعادات الجنائزية. تظهر الكتابات لأول مرة وأيديولوجيات متطورة للنفوذ والدين. هناك تحولات سكانية مرئية كما أن تأثير المجموعات البدوية المتنقلة واضح، لا سيما في منطقة جنوب الأردن ، والتي لا يمكن أن تظل ,,بقعة بيضاء'' بالقرب من المناطق المتغيرة ديناميكيًا.

يعد عمل مشاريع الأبحاث البولندية أيضًا مساهمة مهمة في حماية الآثار والمواقع الأثرية في هذه المنطقة، وغالبًا ما يتم الاستهانة بها اليوم نظرًا لطابعها المذهل البسيط نسبيًا ، ولكنه أساسي لتنمية المعرفة العلمية. يسمح البحث بجمع الموارد التي تسمح بتطوير عمل العلماء البولنديين في الأردن في السنوات القادمة.

ومع ذلك، تجدر الإشارة إلى أن جنوب الأردن لديه الكثير ليقدمه! سوف نجد هنا العشرات من الأماكن التي تتميز بوجود الإنسان من العصور القديمة حتى العصور الحديثة. هناك مواقع أثرية من العصور القديمة، والعصر الحجري الحديث ، والعصر البرونزي وعصر اكتشاف الحديد ، بالإضافة إلى عدد حصر له من آثار من الأنباط والرومان. من المستحيل

فاشتكا إمودأ ةكلمم

كانه نكامأ ةديرف نم اهعون اًقح ىلع بكوك ضرألا ـ جعت راثآب يضاملا ةجردل اهنأ اًبيرقت ددرُت ىدص نم اوشاع كانه ذنم نورق. يف ةهزن ربع ةعيبطلا ةيربلا يبونج ندرألا وأ دنع ةرايز عقاوملا ةيرثألا ةيوارحصلا يف اذه ءزجلا نم ندرألا، ال فشتكتن راثآلا وأ تامولعملا لوح ةايح تاعمتجملا ةيضاملا بسحف ، لب فشتكن اًضيأ لكاشم انرصع ةقلعتملا مهتيامحب ظافحلاو مهيلع مهرودو دقعملا يف انملاع رصاعملا يف ريثك نم نايحألا. اننوك اًزنك ةفرعملل لوح انيضام، بجي نأ نوكي بونج ندرألا ـ ضرأ مودأ ةيخيراتلا ـ اًناديم اًمئاد طاشنلل يملعلا ال نكمي نأ مدقي طقف اًراثآ وأ ملاعم ةيرثأ ةديدج نم يضاملا بسحف، نكلو اًضيأ اردق اريبك نم تامولعملا يتلا حيتت انل ةدايز انتفرعم ةنمزألاب ةميدقلا. ال رصتقي زيمت ملاع راثآلا ىلع ةسارد يضاملا لصاوتلاو عم ملاعملا ةيرثألا بسحف، لب اًضيأ جاهتبالا لامجب هذه ةقطنملا عتمتلاو بوط مركو ةفايض نم نوشيعي يف اذه ناكملا ديرفلا.

يف ماع 2014، تأدب ةلسلس نم عيراشملا ةيثحبلا ةيدنلوبلا ةديدجلا بونج ندرألا. ثيح ماق ءاملع راثآلا بالطلاو نم ةعماج نايينوليغاج ءارجإب ثاحبأ ةيحطس رفحو لخاد يتعطاقم ةليفطلا كبوشلاو. ُتدار هذه عيراشملا نم لبِق ةعومجم نم ءاملعلا نم دهعم راثآلا نم ةعماج نايينوليغاج. نواعتلاب عم ةرئاد راثآلا ةماعلا ةيندرألا، ثحبي نوثحابلا نويدنلوبلا نع راثآ طاشنلا يرشبلا يف اذه لاجملا ، يتلاو دوعي اهخيرات ىلإ رصعلا يرجحلا ىتحو روصعلا ىطسولا. عقت ةقطنم فاشكتسالا ثحبلاو برقلاب نم عقاوملا ةيرثألا ةماهلا لثم ةمصاع اريسوبلا edomites وأ فرج ةرخص Sela، كلذكو برقلاب نم يداو نانيف ـ يداو ساحنلا ريهشلا ، يتلاو تبعل اًرود ايسيئر يف جاتنإلا نم هذه داوملا ماخلا اهريدصتو ىلإ قطانملا ةرواجملا ، ةصاخو يف رصعلا يزنوربلا. دجوي يف اذه ءزجلا نم ندرألا رثكأ ملاعملا ةيرثألا ةرهش وهو ـ ءارتبلا، وأ ةنيدم طابنألا ةيرخصلا ، ةعلقلاو ةيبيلصلا يف كابوش

دعي طاشنلا يثحبلا لوطألا ءاملع راثآلا يف فوكارك اعورشم اصصخم ةقيرطب ةزيمتم ةرتفل رصعلا يزنوربلا. نكمي نأ دعاست جئاتنلا ةصلختسملا نم هذه ةرتفلا يف ةباجإلا ىلع ةلئسأ لوح دوجو طاشنو تاعومجملا ةيرشبلا لالخ هذه ةرتفلا يف مودأ. فدهلا ليوط ىدملا نم ثحبلا وه ثحبلا نع قرط تاراسمو صاخشألا نيذلا نولقتني يف تارتف ام لبق خيراتلا يف اذه لاجملا اهليلحتو، ةفاضإلاب ىلإ تاريغتلا ةيئيبلا اهريثأتو ىلع لمع اهدارفأ. نإ لك ةطشنألا ثاحبألاو يتلا مت اهؤارجإ ءزجك نم عورشملا يه ةيادب لمع