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Tájépítészeti Kar

ANETT FIRNIGL

THE EXAMINATION OF THE HISTORICAL ENVIRONMENT OF ROMAN VILLAS ON THE BALATON HIGHLAND

PHD DISSERTATION

- BOOKLET -

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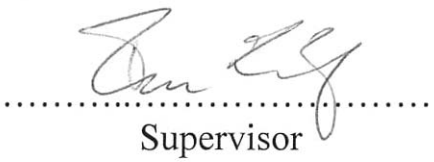

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AIMS, RESEARCH AREA

My work presents the comprehensive examination of a special Roman living area, which historical environmental importance means the so-called *villa rustica* and its harmony with the immediate and the wider envrionment. This kind of relationship of the historical landscape and built enviorenment is difficult to research, because very few elements and connection systems survived. But the significance of the localized and only partly resarched villas and other rural settlements at the Lake Balaton is outstanding, due to the effects of the lake on its environment.

My aim is to create a new topographic image of the ancient landscape with the help of collection archaeological data about the surrounding of the lake, and developing a new methodology based on using systematic data, unshattering technoligies and GIS analysis. I determined my study area in a 16 km wide zone around the eastern, northern and western shore of the Lake Balaton: cities were not developed in this zone, this way I may have a clear view about the rural life form while the examination of the find places without urban settlement forms. The presence of the Romans in Pannonia caused several changes in the landscape: they wiped out forests, they brought the lands under cultivation, they built villas and towns with channels and paved streets: they were chosen the ideal places for buildings on the proximity of the water, the wood-giving forests (using for houses and heatings), and the Roman road network. Nevertheless the Romans tried to involve in the spectable a panoramic view as beautiful as possible.

METHODS

Environmental archaeology is a fast developing multidisciplinary science in our time, the researches of which are based on comparing archaeological, historical data, and also maps and the terrain. The connections of so-called earth covered monuments (for example roads, buildings) could be explored with the help of the modern relief, from which conclusions could be drawn to the presumable historical landscape.

The detailed topographic analysis of the environment of the find places is essential to the definition of the context of the former settlements and find arts in the landscape. I examined the archaeological obejcts on my test area in two scales: I analized the direct environment and its components on micro level (e.g. the terrain conditions and the distance of the Roman settlements from the water sources), and macro level at the same time, during

which I examined the sites in wider context (e.g. the position of the villas in the Roman road network). Thus the steps of the methodology are moving from the mosaic-level of objects towards the general level, where the studies are running parallel.

Thus the historical Roman landscape becomes understandable with comparing the site and micro environment-oriented observations and their analyzing in the wider environment and in their consituent elements: parallel with the collecting of arcaheological data I started to analize the aerial photographs and the on-site examination and the detecting of condition and environmental condition of the settlements, especially on the former excavated find places. I began the GIS analysis of the Roman built environment, the traces of possibly villas after summarizing the data and the characteristic features observed on the field surveys. I won with my work a specific section between the regions of the Lake Balaton and Hill Bakony, which may provides useful lessons in these geographic and climatic divided but in their built heritage and environment unified regions. The statistical analyzes show that certain environmental circumstances were conspicuously preferred to the settlements in the Roman age: the comparison of these informations has been presented on a so-called predictive modell, which allows the localization of probable new, former not known settlements.

RESULTS

I localized 186 settlements using the extensive researches requiring methodology: I gained informations of the natural and built elements of the Roman countryside and their correlations with the detailed examination of these objects and using unshattering instruments, archaeological, map terrain and GIS data. Namely I determined the spatial position of the nearly two hundred find places, this way these objects became palpable.

In addition to the examination of the direct environment of the find places, I appointed also wider researches for the Balaton Highland, which links these sites: I was analysing the relationships of the ancient road network, the water level of the Lake Balaton, and the distances of the water source places, between the find places. Also the traces of conscious landscape modifying activities were outlined during my researches: I detected traces of dams (in Öskü and Szentkirályszabadja), artificial terrain terraces (in Örvényes), and some sites were established at strategic points (such as the relationship between the villa of Szentkirályszabadja, Romkút lies on a plateau lifted from its environment and the main road running in a valley from Veszprém to Tapolca). In conclusion each site are connected to the

Pannonian road network: I created a theoretical reconstruction taking into account of terrain conditions and the find places). Beside this, the water, this vital element is close to every Roman settlements, usually in the form of wells: in the selection of the location of villas the proximity of the waters was a crucial factor (water can be find within 500 meters at the majority of the sites). The water was utilized as much as possible. I gained informations also for the vegetation and the cultivated species from collecting the former archaeobotanical data, the agricultural artifacts and the soil characteristics: mainly cereals and their weed species were found on my research area.

The find places can be found both in the lower regions of the Hill Bakony and at the shore of Lake Balaton, especially between the 104,5 and 150 m (above Baltic) zones. Above this zone less and less villas and villages were settled, while none were located above 400 m height. In some places the villas and estates can be found more frequently, which is related with the terrain, the quality of the soil, the nodes of the road network, and also with the cultivation methods (e. g. the fields were cultivated by tenants, whose modest settlements built beside the villas). As the final step of GIS analysis I created a so-called predictive model: with researching all the elements of the environment, I was generated the groups of the likelihood occurrence of the sites from the typical data set of the 189 find places. Thus we can calculate most likely new, previously unidentified Roman settlement sites, where the area is flat (the cathegory of the slope is between 0 and 5 %), it lies under 150 meters altitude, and its aspect is eastern, southeastern or southern (however the villas and estates can not be bounded sharply from each other with their terrain characteristics). Each of the micro-environment of the examined sites are showing minimum one from the ideal circumstances, and 51 find places have all from the best four conditions. I determined five new sites with using the predictive model: I analised their environment on aerial photographs and I made on-site examiations too.

DISSERTATION STATEMENTS

Statement I.

The various components of the historical landscape, the Roman environment become searchable, analysable with application of systematic, non-destructive devices using methodology.

The human activity, which seeks to take advantage of the circumstances and potencials of different places, has a strong sustained effect on the environment in each periods of the

history. However the nature preserves the signs of the former activities (e. g. plowing), although the later interventions and the changes of natural conditions cause usually distinct phenomena. All of these principles can be applied to the environment of the Roman villas, which were specialized for agricultural production and craft activities. The northern shore of the Lake Balaton had particularly favorable conditions for building villas. I created an unshattering methodology for researching the villas and other rural settlements at the Lake Balaton: this methodology applies archaeological data, historical maps of later ages, aerial photographs, on-site examinations, geophysical surveys, GIS data, and the comparison of all the data of the find places. This methodology can be used for the other villa groups of the former Pannonia too.

Statement II.

Valuable find places can become from the archaeological data and find arts of Roman villas only if the spatial data and the environmental attributes are known. This way we can win informations about the ancient way of life. This requires the prepartaion of a database of the Roman villas and other rural settlements around the Lake Balaton.

As the part of my methodology I collected the archaeological and with the help of GIS softwares the environmental data of the examined 186 find places defined by coordinates. The most important environmental data are the informations about slope, aspect, altitude (above Baltic), the distance from water sources, and the specific distance data of the areas. It's possible to expand this database with new informations later.

Statement III.

Certain environmental factors brought a powerful settling, high scale villa buildings on the Balaton Highland: the Romans preferred especially the flat, east-south-facing sites near waters at the establishment of their farm units.

Based on the results of GIS analyzes the Romans preferred the areas near to the ancient road network and water sources at settling on the geographic and climatic divided region between the Hill Bakony and the northern shore line of the Lake Balaton. On micro terrain level the Romans built their villas and rural settlements primarily on plane areas with eastern, southeastern or southern aspects, which areas are lying on low elevation zone rising maximum 20 or 45 meters above the current water level of the Lake Balaton. In the higher zone, farther from the river valleys we can account rather with forests on a higher rate. (I considered these endowments as ideal environmental conditions in the followings. The environment of villas and other rural settlements does not have fundamental differences.)

Statement IV.

The spatial data of the Roman settlements on the Balaton Highland and their find arts can help to reconstruct the ancient road network.

The roads are one of the most constant elements of the landscape, therefore the theoretical reconstruction of the Roman road network can be create with using the terrain conditions and archaeological data. These roads provided the connections of villas and other settlements with the other part of Pannonia province and the Roman Empire. (The cities were missing on the Balaton Highland, this way the ancient guide books didn't mention my study area: I could use only the rural settlements and the terrain.)

I determined three major routes along the Lake Balaton: although the ratio of the dated find arts is small, the early artifacts from the 1st century A. D. can be found along the natural fault line running between Veszprém and Tapolca. This is certainly evidence here the existence of a main road. The surroundings of Keszthely and Balatonfűzfő were also early settled on: an important crossing point of the lake was at Fenékpuszta, from where the road went on Sopianae (today Pécs). Beside this crossing point, an other significant crossing place was at the northern end of the lake: the main road of the Balaton Highland met here with the road running from Sopianae to Aquincum (today Budapest-Óbuda). The third main road of the examined area was running directly around the lake, at the shoreline.

Statement V.

The spatial data of the Roman settlements on the Balaton Highland and their find arts can help to define the former hydrographic conditions.

The water level of the Roman Lake Balaton can be obtained with the help of dated find arts and spatial data. The location of find arts is sporadic, they are both at the lake and also in the higher regions. Probably some find places were continuosly at the shore line of the Lake Balaton between the 1st and 5th century A. D., thus based on the GIS analyzes the existence of the much-debated Galerius's sluice is not justified.

At micro level the Roman settled on slightly elevated places near to water sources: one-third of the sites can be found within 100 meters of the water. Most of the sites are up to five meters higher compared to the water today. Only at some find places can be perceived a larger difference in height, mainly at the shore of the Balaton and other rivers (e. g. several sites of Balatongyörök or Balatonkenese). In the case of some high-altitude find places the excavations brought also wells to the surface (vid. the villa of Paprét in Badacsonytomaj).

Statement VI.

A predictive model of the Roman economic landscape of the Balaton Highland can be create with the help of the informations from GIS analysis.

Following the principle of settling influenced by certain environmental factors, further, previously unknown sites become assessed using the help of the most specific field data. Four probability groups were separated with the existence or lack of the ideal environmental elements of the Roman villas and rural settlements of the Balaton Highland: these ideal elements are the above mentioned flat ground, the eastern, southeastern or southern aspect, the water source with maximum 500 meters distance. I determined with the predictive model five possible settlements in the highest, and other fifteen in the medium category: these groups means the existence the favorable environmental conditions on high occurence. I examined these points designating purely only GIS softwares with archaeological materials too at the end: I found sporadic find arts close to the marked points in more cases, which confirms the right categories and the reliability of the predictive modeling.

PUBLICATIONS OF THE AUTHOR

PEER-REVIEWED JOURNAL ARTICLES

Firnigl, Anett: A Lacus Pelso – **Vízrajzi adottságok a római kori Balaton-felvidéken** (The *Lacus Pelso* in the Roman Age – The Lake Balaton and the Hydrography of the Balaton Highland)
4D Tájépítészeti és Kertművészeti Folyóirat (4D Journal of Landscape Architecture and Garden Art), 2008/12. pp. 24-33.

Firnigl, Anett: **Virtuális módszerekkel Hadrianus nyomában – Római kori villák a Balaton-felvidéki történeti tájban** (Questing for Hadrian with Virtual Methods – Roman Villas in the Historical Landscape of Balaton Highland)
Magyar Építőművészet – Utóirat (Hungarian Building Art – Post scriptum), 2008/4. pp. 21-24.

Firnigl Anett: **A római kori úthálózat nyomai a Balaton-felvidéken** (Traces of the Roman Road Networks in the Historical Landscape of Balaton Highland)
4D Tájépítészeti és Kertművészeti Folyóirat (4D Journal of Landscape Architecture and Garden Art), 2007/7. pp. 43-51.

CONFERENCE PROCEEDINGS AND ELECTRONIC PUBLICATIONS

Firnigl, Anett: **Geofizikai mérések alkalmazhatósága a Balaton-felvidéki római kori villatelepeknél – Esettanulmányok** (The Application of Geophysical Methods in Case of the Roman Villas of the Balaton Highland. Case studies)
In: Sallay, Ágnes (ed.): *Ormos Imre Tudományos Ülésszak. LOV 2009. Tájépítészeti Tanulmányok. (Proceedings of the Imre Ormos Scientific Conference. Landscape Architectural Studies.)* Corvinus University of Budapest, Faculty of Landscape Architecture, Budapest, 2010, pp. 15-27.

Firnigl, Anett: **Reconstruction Possibilities of the Roman Villas – Unshattering methods in the safeguarding and in the conservation**
2nd International Conference on Heritage and Sustainable Development. Évora, 2010. pp. 487-494.

Firnigl, Anett: **Geofizikai mérések alkalmazhatósága a Balaton-felvidéki római villák esetén** (The Application of Geophysical Methods in Case of the Roman Villas of the Balaton Highland)
In: Sallay, Ágnes (ed.): *Ormos Imre Tudományos Ülésszak. LOV 2009. (Proceedings of the Imre Ormos Scientific Conference.)* Corvinus University of Budapest, Faculty of Landscape Architecture, Budapest, 2009, pp. 10-11.

Firnigl, Anett: **Reconstruction possibilities of the Ancient Roman Villas in Pannonia**
Eclas Conference 2009, Landscape & Ruins. Genova, 2009. pp. 27-33.

Firnigl, Anett: **Reconstruction possibilities of the Ancient Roman villas – based on air photogaphs, geodesical and geophysical surveys.**
III. International Conference on Remote Sensing in Archaeology 2009, Space, Time & Place, Tiruchirappalli, India, 2009
In: *British Archaeological Reports Vol. 2118*, 2010. pp. 315-323.

Firnigl, Anett: **The Lacus Pelso in the Roman Age - The Lake Balaton and the Hydrography of the Balaton Highland**
Icomos International Forum of Young Researchers and Professionals in Cultural Heritage, 'Finding the spirit of place – between the tangible and the intangible'. Quebec, 2008.

Firnigl, Anett: **Reconstruction Methods and Visualization of Roman Villas**
9th Digital Design in Landscape Architecture. Dessau, 2008. pp. 445-452.

Firnigl, Anett: **A római villagazdaságok környezeti rekonstrukciójának módszertana** (The Environmental Reconstruction Methods of the Roman Villas)
In: Sallay, Ágnes (ed.): *Ormos Imre Tudományos Ülésszak. LOV 2009. (Proceedings of the Imre Ormos Scientific Conference.)* Corvinus University of Budapest, Faculty of Landscape Architecture, Budapest, 2007, pp. 6-7.

CONFERENCE PRESENTATIONS

Firnigl, Anett: **A Balaton-felvidéki római kori villák történeti környezetének vizsgálata. A prediktív modellezés lehetőségei és tanulságai a Keszthely környéki római kori települések esetében.** (The Examination of Historical Environment of the Roman Villas on the Balaton Highland. The Capabilities and Lessons of Predictive Modeling at the Roman Settlements in the Vicinity of Keszthely; poster presentation, accepted abstract in press)
IX. Tájtörténeti Konferencia, A táj változásai a Kárpát-medencében: Történelmi emlékek a tájban (IX. Conference of Historical Landscape. The Changes of Landscape in the Carpathian Basin: Historical Monuments in the Landscape), Keszthely, 21-23. June, 2012.

Firnigl, Anett: **Reconstruction Possibilities of the Roman Villas – Unshattering methods in the safeguarding and in the conservation**
2nd International Conference on Heritage and Sustainable Development. Green Lines Institute, Évora, 22-26. June, 2010.

Firnigl, Anett: **The Application of Geophysical Methods in Case of the Roman Villas of the Balaton Highland – A case study of Gyulafirátót.** (poster presentation)
11th Digital Landscape Architecture Conference. Aschersleben, 26-30. May, 2010.

Firnigl, Anett: **Geofizikai mérések alkalmazhatósága a Balaton-felvidéki római villák esetén** (The Application of Geophysical Methods in Case of the Roman Villas of the Balaton Highland)
Ormos Imre Tudományos Ülésszak. LOV 2009. (Imre Ormos Scientific Conference) Corvinus University of Budapest, Faculty of Landscape Architecture, Budapest, 29. October, 2009.

Firnigl, Anett: **Reconstruction Possibilities of the Ancient Roman Villas in Pannonia – based on historical data and remote sensing methods**
Eclas Conference 2009, Landscape & Ruins. Genova, 23-26. September, 2009.

Firnigl, Anett: **Reconstruction Methods and Visualization of Roman Villas**
9th Digital Design in Landscape Architecture. Dessau, 30. May, 2008.

Firnigl, Anett: **Balaton-felvidéki római kori villák tájalakító hatása** (The Landscape Modifying Effects of the Roman Villas on the Balaton Highland)
Környezetvédelmi Információs Klub Egyesület (KVIK Association), Budapest, 16. April, 2008.

Firnigl, Anett: **The Environmental Reconstruction Methods of Roman Villas** (poster presentation)
The 4th Annual Ename Colloquium, Between Objects and Ideas – Re-thinking the Role of Intangible Heritage. Gent, 26-29. March, 2008.

Firnigl, Anett: **A római villagazdaságok környezeti rekonstrukciójának módszertana**
Ormos Imre Tudományos Ülésszak. LOV 2009. (Imre Ormos Scientific Conference) Corvinus University of Budapest, Faculty of Landscape Architecture, Budapest, 7. November, 2007.

Firnigl, Anett: **Római villák környezetének rekonstrukciós kísérlete** (Reconstruction Experiment of the Environment of Roman Villas)
A műemlékvédelem sajátos tárgya: a történeti táj (The Specific Object of Protection of Monuments: the Historical Landscape). Budapest, 12-13. October, 2007.