

Gre za dokumentacijo o delih stavb, medtem ko drobne najdbe še niso bile odkopane. Deloma tudi zato, ker so bile kulturne plasti na delu sedanjega dvorišča uničene do geološke podlage. Kljub temu sta se avtorja pogumno lotila zbiranja ter soočanja pisnih in stavbno-arheoloških virov.

Zaradi izjemnega števila antičnih spolij avtorja domnevata, da je na hribu stala utrdba že v pozni antiki. Vsekakor so bile rimske spolije vzdane samo v glavni stolp, ne pa tudi v mlajše grajske stavbe. To bi nakazovalo, da je gradivo za stolp bilo že na kraju samem in ne nekje v sosesčini, od koder bi kamenje lahko dovažali tudi pozneje. Presenetljiva širina zidov stolpa avtorja napeljuje na misel, da so morda nastali celo že v 10. stoletju. Opozarjata na širino zgradbe na Ptujskem gradu, ki ima prav tako 4 m široko obodno poglobitev. Ker so v zadnjih desetletjih argumenti, ki so v omenjeni ptujski zgradbi videli odtis izruvanih temeljev stolpa, skopneli tako zaradi novih arheoloških odkritij na Ptujskem gradu kot tudi zaradi boljšega kontekstualnega poznavanja problematike, njuna primerjava ne pomaga k dataciji lipniškega stolpa. Vsekakor pa je lipniški stolp že stal v 12. stoletju.

S pomočjo pisnih virov in slikovnih upodobitev gradu dokumentirata nadaljnjo usodo stolpa. Konec 16. st. in na začetku 17. st. je bil stolp nadzidan in spremenjen v zvonik. 1815 se je nenadoma začel rušiti, popravilo tedaj ni bilo mogoče, zato so ga do 1831 postopoma podrli. Pri tem je prišla na dan izjemna količina rimskih spomenikov. Krajevni jurist Kasparju Harbu, članu zgodovinskega društva Štajerske, gre zasluga, da je kamne dokumentiral v sliki in besedi ter dosegel, da so jih vzdali v novi del graščine. Drugi del knjige je tako izdaja rokopisa Kasparja Harba o Lipnici in njeni okolici v času Rimljanov ter objavo njegovih risb.

Knjiga je minuciozno in skrbno delo, ki je iz razpoložljivih informacij sestavila smiselno zgodovino lipniškega starega stolpa in naredila poklon starinoslovcu Harbu. Hkrati je odlično izhodišče bodočim arheološkim raziskavam, ki jih spodbuja na najbolj inteligen način – z objavo doslej znanega.

Andrej PLETERSKI

Christopher Thomas Green: *Winding Dali's Clock. The Construction of a Fuzzy Temporal-GIS for Archaeology.* BAR International Series 2234, Archaeopress, Oxford 2011. ISBN 978-1-4073-0796-1. 159 str.

“Archaeology is fundamentally concerned with both space and time: dates, chronologies, stratigraphy, plans and maps are all routinely used by archaeologists in their work. To aid in their analysis of this material, the use of Geographic Information Systems (GIS) by archaeologists has become widespread. However, GIS are conventionally ignorant of time. ... A GIS capable of dealing with temporal data is referred to as a temporal-GIS (TGIS) ... The creation of ... TGIS is the subject of this book ...”

The marvellous Foreword of the book at hand, from which the above quotes derive, takes the effort out of writing an *in medias res* introduction, a task usually involved in writing up a review. And the rest of the book does not fall

far behind in quality. The work at hand is a publication of a PhD dissertation at the University of Leicester defended in 2008 with minor changes. Unfortunately, the figures did not “travel” well since they were clearly designed for a colour digital publication. Especially the maps in chapter six are all but illegible. Still, most of the figures get their meaning across. In view of some of the other awful imagery published by Archaeopress, this part of the book can be described as of an average quality.

The content of the book is divided into eight chapters including the introductory chapter. Chapters two through four deal with the theoretical background. At first the theoretical basis of how archaeologists should (theoretical background on models of time) and do (time in “everyday archaeology”) perceive time are discussed. Then some of the more important previous work by both geographers and archaeologists is presented. Those who are familiar with the TGIS concepts should skip directly to the fifth chapter. There the methods for dealing with uncertainty and the construction of the new archaeological TGIS are discussed. Chapters six and seven bring two case studies from Britain, an intra-site one from the Neolithic/Early Bronze Age Period and a regional one from the Roman Period. Speaking of the chapters, a technical mishap of the book is the fact that the text constantly refers to numbered chapters, whereas in Contents the chapters are neither numbered nor does, e.g., row four correspond to chapter four but rather to Chapter one: Introduction.

Technicalities aside, let us focus on the content. Time and space are linked, since all movement in space is also movement in time. This has been long recognized in the theoretical GIS but the implementation has eluded the researchers. Enters TGIS, both a field of study and the system that results from that study. In archaeological TGIS things are further complicated by the *fuzziness* of archaeological time, which renders commercial TGIS - designed to deal with modern *linear* time - useless. The well-written introductory four chapters summarize the extensive body of theoretical work on the subject. It manages to do this without dwelling too deep on quantifying spatial and temporal dependences using Bayesian statistics. This area is adequately covered by other volumes (e.g. *Spatial Data Analysis* by Robert Haining) and is often all but incoherent to a “GIS-enabled” but statistically-challenged archaeologist such as myself. Green brings the reader fluently to the following take-home messages. (i) Archaeological TGIS needs to deal simultaneously with disparate sources of dating evidence with varying precisions and accuracies. (ii) When dealing with this uncertainty – commonly referred to as fuzziness – specific statistical methods are needed. (iii) In order for an archaeological TGIS to be of any practical use it needs to be able to integrate and/or compare fuzzy dates. Also, a practical concern is to bring all of this to the notoriously ignorant archaeological public in a nice and free package, that can be run in the most commonly used GIS environment. Or, as the author puts it politely “the software produced ought to be intuitively understandable and accessible to most GIS-aware archaeologists without them having to gaze too far beyond their current software horizons”.

Chapter five first summarizes previous attempts to achieve the above mentioned. In continuation a concise

description of the author's implementation, i.e. software package, is laid out.

Case studies in chapters six and seven adequately serve the purpose of illustrating the capabilities of the software. An interesting detail from the intra-site case is the fire clearance study that would hardly be possible by any other method known to me. It also carries an important message that C14 samples in the future should be sampled not only vertically (many samples from many layers) but also horizontally, i.e. sampling in space/landscape. Therefore, it is hard to envisage the TGIS study of intra-site data that have not been sampled with TGIS in mind. The regional chronology case study of pottery collected through field survey brings excellent results. And the best thing is that most of us can envisage carrying out a similar case study since the appropriate data sets abound in archaeology.

The best test of any software is obviously first hand experience. The software is released under GNU public licence and it comes packaged in the form of an ArcGIS 9.x template. Unfortunately though, there are no sample data provided. Since acquiring the appropriate data is not trivial but rather crucial for the useful implementation, as exemplified in case studies provided in the book, I had

to resort to watching an online tutorial. It does seem that one can start working the moment one acquires a suitable data set and a suitable set of questions to be answered. It would seem, then, that for a "GIS-aware" archaeologist who has read the book (or is otherwise familiar with TGIS concepts) there is indeed a zero learning curve.

In conclusion, this book is an excellent reader into TGIS for archaeologists, providing all the necessary tools for archaeological TGIS students and novice professionals: theoretical background, the history of methodology, case studies that help digest the absorbed knowledge and, most important of all, an actual toolset to implement it in arguably the most widely used GIS software in archaeology (fingers crossed for a version supporting ArcGIS 10.x). Those who have delved into archaeological TGIS in the past will gain precious case studies against which the future work can be compared.

Those who are too eager to wait for their own copy of the book can make the first steps into the TGIS by visiting the author's web page at <http://www.zen26819.zen.co.uk/tgis.html>.

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