The Catacombs of San Giovanni in Syracuse: Surveying, Digital Enhancement and Revitalization of an Archaeological Landmark

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Abstract. This study is a cross-disciplinary research carried out by archaeologists, engineers and architects aimed at the knowledge and enhancement of the San Giovanni catacombs complex in Syracuse. The study uses the most innovative 3D surveying and virtual reproduction technologies and methodologies in order to broaden the understanding of the archaeological site's most peculiar features. The digital 3D models of the rooms studied here can be used to enhance the visiting experience and the online presence of the archaeological complex.

Keywords: Roman Catacombs, laser scanning, 3d modeling, knowledge, virtual fruition, virtual archaeology.

1 Introduction

This paper presents the first results of an interdisciplinary study aimed at extending our knowledge of the San Giovanni catacombs complex in Syracuse, as well as enhancing this archaeological landmark and improving its visibility.

The archaeological complex comprises the catacombs, the basilica of San Giovanni Evangelista and the crypt of San Marciano.

In Syracuse, the systematic study of collective cemeteries started many years ago and different archaeological surveys of the city's antique funerary settlements suggested many directions for research and investigation: historical-religious, economic and social. The results of the present study of the burial areas' architecture and layout will no doubt shed some new light on all these different aspects.

The study is based on general archival, bibliographical, documentary, literary and epigraphic data and it uses the most innovative 3D surveying and virtual reproduction technologies and methodologies. The digital 3D models of the rooms studied here can be used to enhance the visiting experience and the online presence of the archeological complex. The project also includes regular archaeological excavations.
After giving a brief overview of the structural aspects of the Catacombs of San Giovanni in Section 2, Section 3 will focus on the digital enhancement and visitor experience. Section 4 will then offer an in-depth look into the actual surveying and 3D modeling methods used to create accurate and detailed virtual reproductions of some areas of the Catacombs, and Section 5 will examine the results of this study and consider future developments.

Fig. 1-2. The *decumanus maximus* (on the left) and the in situ survey (on the right)

### 2 Historical and Structural Aspects of the Catacombs of San Giovanni in Syracuse

The History of the area, which was going to hold the catacombs (San Giovanni, Vigna Cassia and Santa Lucia), spanned the centuries between the classical Greek and late antique ages, gradually giving evidence of quarries (Latomie), water supply systems to the city, characterized by cisterns and aqueducts [1: 682], handcraft workshops from the beginning of the 4th/3rd century BCE and burials datable to the early and mid-Roman Empire. It is no accident that if hydraulic systems and furnaces have been found inside the three biggest catacombs. The funerary evidences prior to the creation of monumental community cemeteries are columbaria, hypogea of different sizes inserted into the catacombs or isolated from them and *sub divo* burials, all datable to the first three centuries of the Roman Empire, if not beyond, and commissioned by pagans.

Several interest will be given to structural aspect of the catacombs of S. Giovanni, practice of funeral rituals, ethnic and cultural fruition’s characters, transformation in the use, transformation in the way of using spaces for graves, to complete a general point of view about the phenomena of continuity and innovation as to previous sepulchral arrangements and, in the analysed periods, the facies belonging to the different settling, variegated in the committees’ ideological and religious themes, in choosing monumental types (like rotundas) and decorations, in self-representative aspects, in burial uses. In this perspective we will give particular importance to the study of executing techniques, of material employed, of working funerary organization. Just as in Roman catacombs, but with a bigger monumentality, the project of the catacombs of S. Giovanni involves realizing a regular urban plan for the subterranean city of the dead. In the catacombs, indeed, the exploitation of pre-existent hydraulic structures is not unusual: aqueducts, private channels, circular section well and conical or bell-shaped cisterns [2,3].