

GIS for cataloging the ancient marbles of Oria (Apulia region, Southern Italy)

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Abstract - GIS is emerging as tools for controlling the territory. Today, it is recognized that they can be applied in different areas of cultural heritage. The Mediterranean area is characterized by its great use in the classical age of marbles and stones, which are widely reused in later times, a phenomenon that obeys economically viable rules. Similar destiny underwent also Oria, where many Roman city materials were used to build the medieval and modern center. The GIS for systematic mapping of the "ancient marbles" of the city of Oria has been organized so that the common features of stone articles can be detected immediately: in this perspective, appropriate tables have been written to dynamically link Artefacts and vector themes that are the subject of the analysis.

I. INTRODUCTION

The introduction to GIS in the field of science and technology for the preservation of Cultural Heritage is a relatively recent acquisition, despite the rapid development of applications in this area. The GIS for the systematic mapping of the "ancient marbles" of the city of Oria, has been organized, so that the common features of stone articles can be detected immediately: in this point of view, appropriate tables have been written, dynamically linked to the artifacts and the vector themes that are the subject of the analysis.

II. USE OF MARBLES IN ANCIENT MONUMENTS OF ORIA

The Mediterranean area is characterized by its great use of marbles in the classical age, which are widely reused in later ages. Such a fate also underwent Oria (figure 1), where many Roman city materials were used to build the

medieval and modern center. The antique piece could be appreciated in aesthetic terms, and for this reason it was placed in a prominent position, see the plaque (VIII century) of the Longobard age under the altar of the square tower of the Norman-Swabian castle of Oria (figure 2), but was sometimes attributed a political meaning, as it referred to the greatness of ancient Rome. In the Middle Ages, daily contact with the ruins of Roman monuments encouraged the spread of the practice of a "material" reuse, which was intended to save time and work by using already worked elements or still standing buildings. Apart from the "utilitarian" reuse, which uses the ancient piece to save time and work, scholars also distinguish a "prestige" reuse that instead appreciated the aesthetic qualities of the Roman spoons and therefore gave them a prominent position within of the new construction, see in this case the columns and its capitals of the Norman Cathedral of Oria, now allocated in the nearby courtyard of the episcopal palace (figure 3), or even the column stumps and their capitals currently in the Norman-Swabian castle of Oria (Figure 4) these once belonged to the aisle of the first cathedral of the Middle Ages (IX century) of the city. We also note that the re-use of monuments and ancient pieces often implies implications and meanings in the so-called "ideological" reuse. In fact, in the Norman religious architecture, the more the lair is elaborated, well preserved and reused according to precise dispositive and functional criteria, the greater the prestige conferred by its use, as the symbolic remarks to the Roman empire that it permits from time to time allow both the exaltation of the commission and the valorization of the spaces in which the garbage is reused, as in the case of granite columns in the old communal cemetery. Finally, walking in the historic center of the ancient city of Oria, we find ancient marble column pits, re-used with parachute function.



Fig. 1. Oria (Brindisi). View of Oria at the end 1700.



Fig. 4. Norman-Swabian Castle: columns and capitals of the first High-Medieval cathedral.



Fig. 2. Oria (Brindisi). Norman-Swabian Castle: Longobard slab (VIII century).



Fig. 3. Oria (Brindisi). Bishop's Palace: columns and capitals of the Norman cathedral.

III. THE G.I.S. STRUCTURE

GIS analysis does not become a mere geometric representation of artifacts or objects: what is highlighted is rather direct spatial relationships between the various elements, such as connection, adherence, or inclusion (Figure 5). In practice, the data model, in an effective interactional optics, must include the insertion of descriptive data of individual real objects, which can be defined as space attributes. These three sets of information (geometry, topology, attributes) are then effectively implemented in a GIS using a specific physical model, which is now based on relational data structures, typical of the most advanced databases, and on hardware architectures and software client / server, typically in local computer networks: in our case, the GIS software used for the implementation and subsequent data management was QGIS. However, it is necessary to distinguish the type of data. They are usually distinguished in two categories:

1. Spatial data (ie geographical positioning: in our case the ancient marbles reused in Oria monuments);
2. attribute data (that is, the set of the monument, its location, the name of the ancient marble present, the ancient marble quarry, its measure, origin, etc.) associated with spatial data. Complex data management, ie the procedures for archiving and searching information entered in a GIS, are then entrusted to a database (Figure 6) that manages the information reports. The management of the different mapping themes associated with a cultural asset has been entrusted to the overlay technique, ie coding for different layers of basic information. To conclude, after measuring the amount of ancient marble present in the city's monuments, and having implemented the data in the geodatabase, it was possible to search for the percentage of antique marbles imported into the Roman Oria, and consequently in each single monument.

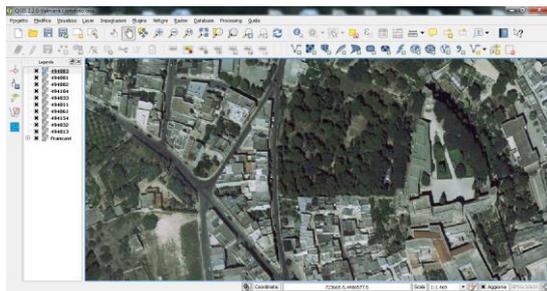


Fig. 5. Screen during a work session.

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City	MONUMENTS	LOCATION	ELEMENT	MARBLE	QUARRY	COUNTRY	MISURE
Oria	High-Medieval Cathedral	Norman-Swabian Castle	Plate	Parian	Paro Island	Greece	Base 97 cm. h. 83 cm.
Oria	High-Medieval Cathedral	Norman-Swabian Castle	Plate	Red Porphyry	Gebel Dokhan	Egypt	
Oria	High-Medieval Cathedral	Norman-Swabian Castle	Plate	Green Serpentine	Alai Bey	Greece	
Oria	High-Medieval Cathedral	Norman-Swabian Castle	Capital	Proconnesian	Marmara Island	Turkey	h.62 cm. d. base 50 cm. h. abaco 11 cm. largh. Abaco 70 cm.
Oria	High-Medieval Cathedral	Norman-Swabian Castle	Base	Proconnesian	Marmara Island	Turkey	h. 34 cm. largh. plinto 88 cm..
Oria	High-Medieval Cathedral	Norman-Swabian Castle	Base	Proconnesian	Marmara Island	Turkey	h. 47 cm. largh. Plinto 75 cm.
Oria	Norman Cathedral	Bishop's Palace	Column	Pentelicon	Atene	Greece	h. 188 cm. d. sup. 40 cm. d. inf. 43 cm.
Oria	Norman Cathedral	Bishop's Palace	Capital	Proconnesian	Marmara Island	Turkey	h.50 cm. d. base 41 cm. h. abaco 8.5 cm. largh. Abaco 53 cm.
Oria	Norman Cathedral	Bishop's Palace	Capital	Proconnesian	Marmara Island	Turkey	h.53 cm. d. base 45 cm.

							h. abaco 7.5 cm. largh. Abaco 62 cm.
Oria	Norman Cathedral	Bishop's Palace Bishop's Palace	Capital	Green marble	Tuscany	Italy	h. 25 cm. h. abaco 7 cm. h. echino 7 cm. largh. Abaco 73 cm.
Oria	Norman Cathedral	Bishop's Palace	Column	Proconnesian	Marmara Island	Turkey	h. 159 cm. d. sup. 54 cm. d. inf. 60 cm.
Oria	Norman Cathedral	Bishop's Palace	Column	Proconnesian	Marmara Island	Turchia	h. 35 cm. h. abaco 12 cm. abaco 80x89 cm.
Oria	Norman Cathedral	Bishop's Palace	Column	Proconnesian	Marmara Island	Turkey	h. 100 cm. d. 58 cm.
Oria	Norman Cathedral	Bishop's Palace	Capital	Carrara's marble	Carrara	Italy	h. 61 cm. d. base 44 cm. d. sup. 55 cm.
Oria	Norman Cathedral	Bishop's Palace	Capital	Proconnesian	Isola di Marmara	Turkey	h. 57 cm. d. base 55 cm.
Oria	Roman villa	F. Milizia street	Column	Parian	Paro Island	Greece	h. 110 cm. d. 50 cm.
Oria	Roman villa	Old cemetery	Column	Corsican Granite	Sardegna	Italy	h. 170 cm. d. 55 cm.
Oria	Roman villa	Old cemetery	Column	Corsican Granite	Sardegna	Italy	h. 170 cm. d. 55 cm.
Oria	High-Medieval Cathedral	Old cemetery	Column	Corsican Granite	Sardegna	Italy	h. 120 cm. d. 50 cm.
Oria	High-Medieval Cathedral	Norman-Swabian Castle	Column	Corsican Granite	Sardegna	Italy	h. 120 cm. d. 55 cm.
Oria	Norman Cathedral	Bishop's Palace	Column	Corsican Granite	Sardegna	Italy	h. 220 cm. d. 45 cm.
Oria	Norman Cathedral	Bishop's Palace	Column	Corsican Granite	Sardegna	Italy	h. 220 cm. d. 45 cm.
Oria	Norman Cathedral	Bishop's Palace	Column	Corsican Granite	Sardegna	Italy	h. 200 cm. d. 45 cm.
Oria	Norman Cathedral	Bishop's Palace	Lion style	Proconnesian	Marmara Island	Turkey	
Oria	Norman Cathedral	Bishop's Palace	Lion style	Proconnesian	Marmara Island	Turkey	

Fig. 6. Campi del database del GIS.