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CONTRIBUTION TO THE DEFINITION OF CARTOGRAPHIC SYMBOLS FOR ARTIFICIAL CAVITIES

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Abstract
With this work we would like to contribute to the debate on the development of a series of internationally recognised conventional symbols for the cartographic representation of artificial cavities. We therefore present the selection of specific signs and symbols that the Centro Studi Sotterranei (Centre for Underground Studies) of Genoa (Italy) has identified and developed for recording topographic surveys. Our surveys were made and published during the many seasons of exploration we have carried out since 1991 in a range of underground settlements in different areas of Turkey. The symbols are designed to be immediately comprehensible to the staff of the Turkish institutions (such as the Turkish Culture Ministry) with whom we collaborate in the projects. In this contribution we have schematically reproduced the symbols; these were either created ad hoc, or borrowed from other disciplines, like archaeology and architecture, to represent the different features found in Anatolian artificial cavities. The symbols vary according to the different scales used to document the sites. The iconography we illustrate, together with abbreviations, is subdivided into different topics which refer to topographic points, surface features, water features, and morphological and architectural features. Obviously, the symbols which we propose, originating from specific experiences of Centro Studi Sotterranei, provide only a partial contribution to the problem of illustrating in a conventional and consistent way the results of the experiences of many experts on artificial cavities, from a wide range of different geographical, chronological and, of course, typological contexts.
Keywords: artificial cavities, iconography, cartography, symbols, abbreviations.

Riassunto
Questo lavoro vuole essere un contributo alla discussione per lo sviluppo di una iconografia, convenzionalmente riconosciuta ed adottata a livello internazionale, relativa alla rappresentazione cartografica delle cavità artificiali. A tale scopo si presenta la scelta di simboli e grafismi specifici che il Centro Studi Sotterranei di Genova (Italia) ha selezionato ed elaborato per la restituzione dei rilievi topografici prodotti e pubblicati nel corso delle molteplici indagini condotte, a partire dal 1991 e tutt'ora in corso, in innumerevoli insediamenti sotterranei di differenti siti della Turchia, in modo da fornire una chiave di lettura di immediata comprensione anche per gli addetti delle istituzioni turche (ad esempio il Ministero della Cultura) con le quali i progetti sono condivisi. Nel lavoro sono schematicamente riportati i simboli appositamente creati o mutuati da altre discipline, quali l'archeologia e l'architettura, per le diverse situazioni morfologiche riscontrate nelle cavità artificiali anatoliche e in funzione delle differenti scale grafiche utilizzate per la rappresentazione dei siti documentati. L'iconografia qui illustrata, che si avvale anche di sigle, è suddivisa per temi che riguardano i punti topografici, i simboli di superficie, l'idrologia, la morfologia e gli elementi architettonici. Ovviamente, i simboli cartografici qui proposti, frutto del lavoro di specifiche esperienze del Centro Studi Sotterranei, non possono che fornire un parziale contributo alle effettive necessità di una rappresentazione grafica omogenea e complessa derivante dalle esperienze di molti altri esperti nel campo delle cavità artificiali ben più vaste e diversificate per ambito geografico e cronologico oltre che, naturalmente, dal punto di vista tipologico.
Parole chiave*: cavità artificiali, iconografia, cartografia, simboli, sigle.*

Criteria

The table of symbols proposed at this conference was produced following the criteria outlined below. The symbols and abbreviations summarise the various legends for the maps and plans published in the reports made to the Turkish Ministry of Culture and Universities, documenting the investigations carried out since 1991 by Centro Studi Sotterranei (Centre for Underground Studies) experts in Turkish rock-cut sites. The sites are located across Turkey from the Aegean coast to the eastern borders, but mainly in Cappadocia (central Turkey), on Lake Van (Ahlat and Bitlis) and on the border with Armenia (Ani, eastern Turkey).

These symbols were variously adopted from other cartographic sources, modified, enhanced or specially created to represent morphological features (structural, architectural, decorative, archaeological or geological)

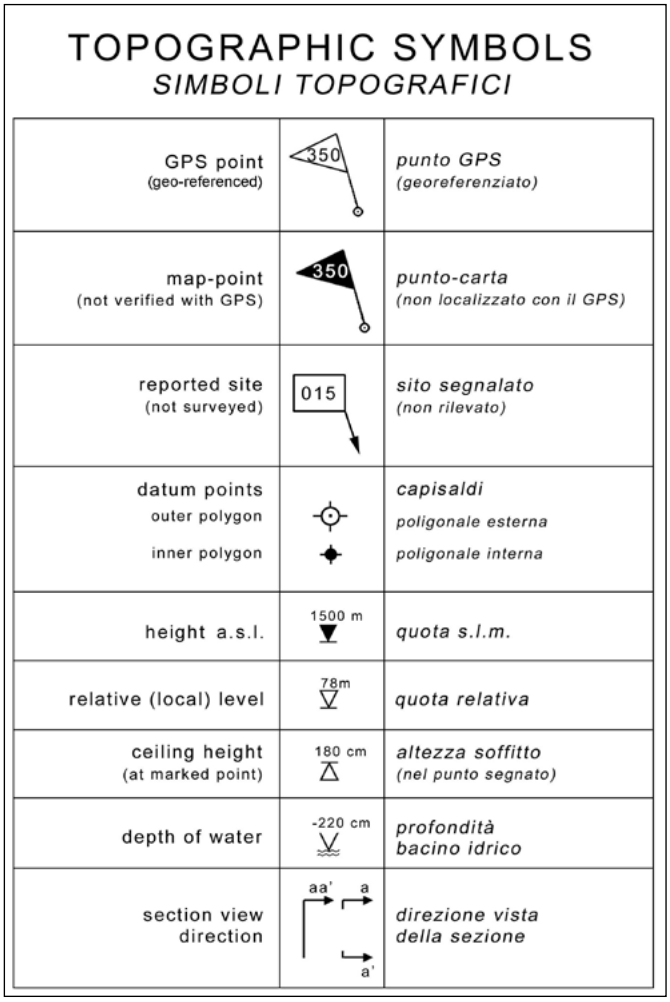

Fig. 1: topographic symbols (drawing R. Bixio).
Fig. 1: simboli topografici (grafica R. Bixio).

Fig. 2: abbreviations (drawing R. Bixio).
Fig. 2: sigle (grafica R. Bixio).

which are specific to the artificial cavities of Anatolia we documented.
It should be noted that the symbols were developed working on a large sample of rock-cut features, surveyed over a very long time period (24 years) and a wide geographical area in a considerable number (several hundred) of artificial underground structures. These were built by the many societies that have for centuries inhabited the Anatolian plateau: from Phrygians, Armenians and Carduchians, to Romans and Byzantines, Arabs, Seljuks, Mongols and Ottomans, perhaps also including the Bronze Age and the Iron Age (Hittites and Urartu).
The symbols presented in this work have been modified and adapted over the years as a result of our increasing experience and the need to make them simpler and easier to understand.

The symbols are divided into 7 sections.
- Topographic symbols (Fig. 1). These represent different classes of significant survey points: position, altitude, viewpoint.
- Abbreviations (Fig. 2). We have developed a set of abbreviations, consisting of two letters inside a frame, which represent specific elements. In our experience, we felt it sometimes appropriate to use these acronyms to avoid extended writing, or in addition to or in place of icons. Abbreviations can be added to a serial number to identify reoccurring elements at different locations.
- Roads and water (Fig. 3). Map symbols for transit routes and water features in artificially rock-cut contexts.
- Cut marks (Fig. 4). Indicating the method of excavation of an artificial cavity: direction of work, junction and divergence points.
- Underground features (Fig. 5). Symbols used to highlight particular physical features inside the artificial cavities (levels, slopes, sediments, floodings), and functional elements such as footholds, niches for lighting, blocking systems etc.
- Cavity types (Fig. 6). Map symbols (at the entrance point) allowing a first identification of the type of cavity present at the site, with reference to the main function of the structure as deduced from the evidence preserved.
- Finds (Fig. 7). Symbols for archaeological evidence.

It is obvious that our table is only a partial contribution to the development of a general system of symbols. Those proposed here may refer to specific elements that are not found at any other site. Conversely, symbols related to particular features present elsewhere are definitely missing.
The table can be enhanced not only by adding symbols

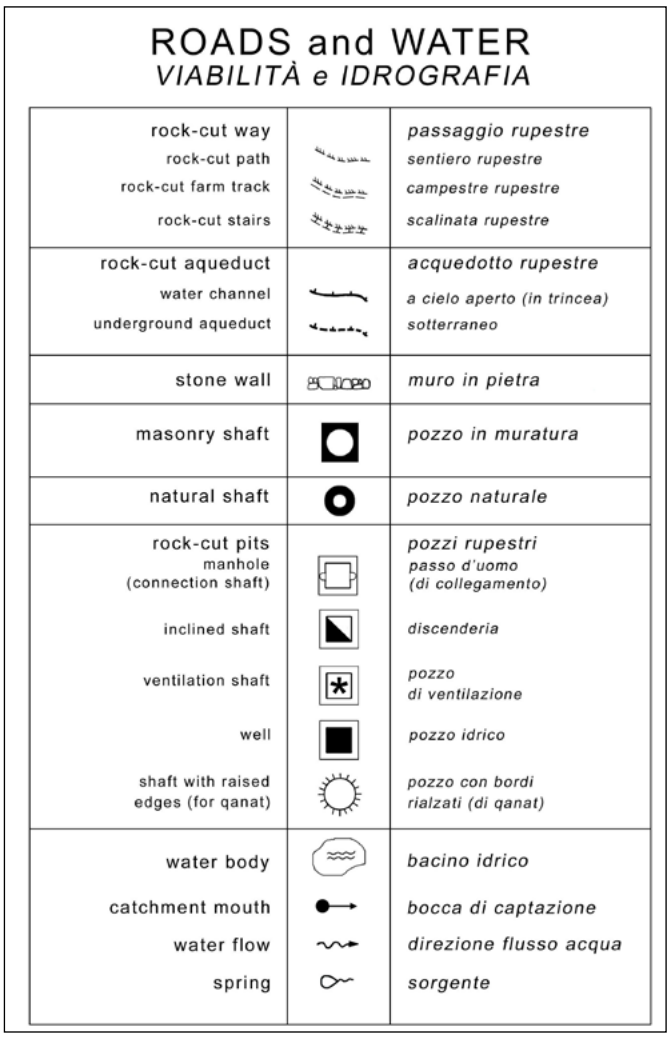

Fig. 3: roads and water (drawing R. Bixio).
Fig. 3: viabilità e idrografia (grafica R. Bixio).

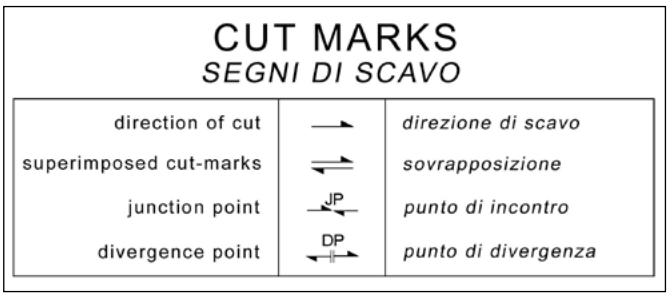

Fig. 4: cut marks (drawing R. Bixio).
Fig. 4: segni di scavo (grafica R. Bixio).

specific to other situations, but also optimising those proposed or introducing more effective symbols.

Note to plates

1) The term "rock-cut" means "artificially carved in the rock".
2) The symbols are in black and white.
3) The symbol used varies according to the scale and the level of detail.
4) Some symbols may be used for recording both surface and underground surveys.

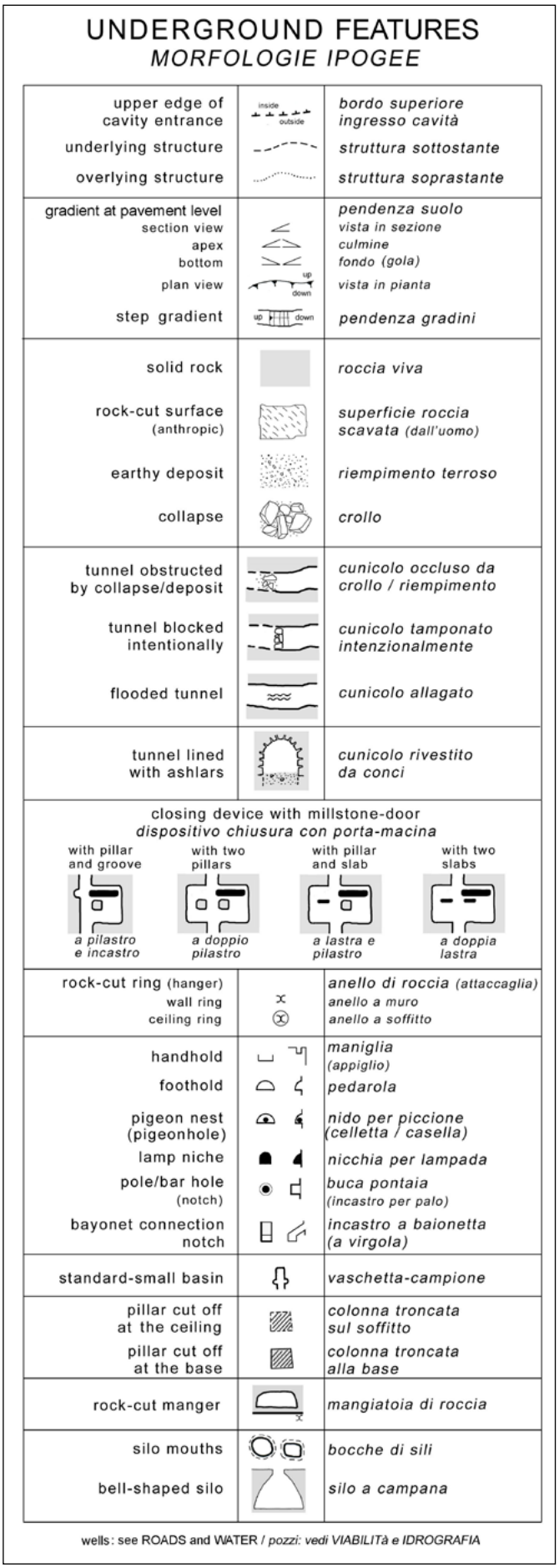

Fig. 5: underground features (drawing R. Bixio).
Fig. 5: morfologie ipogee (grafica R. Bixio).

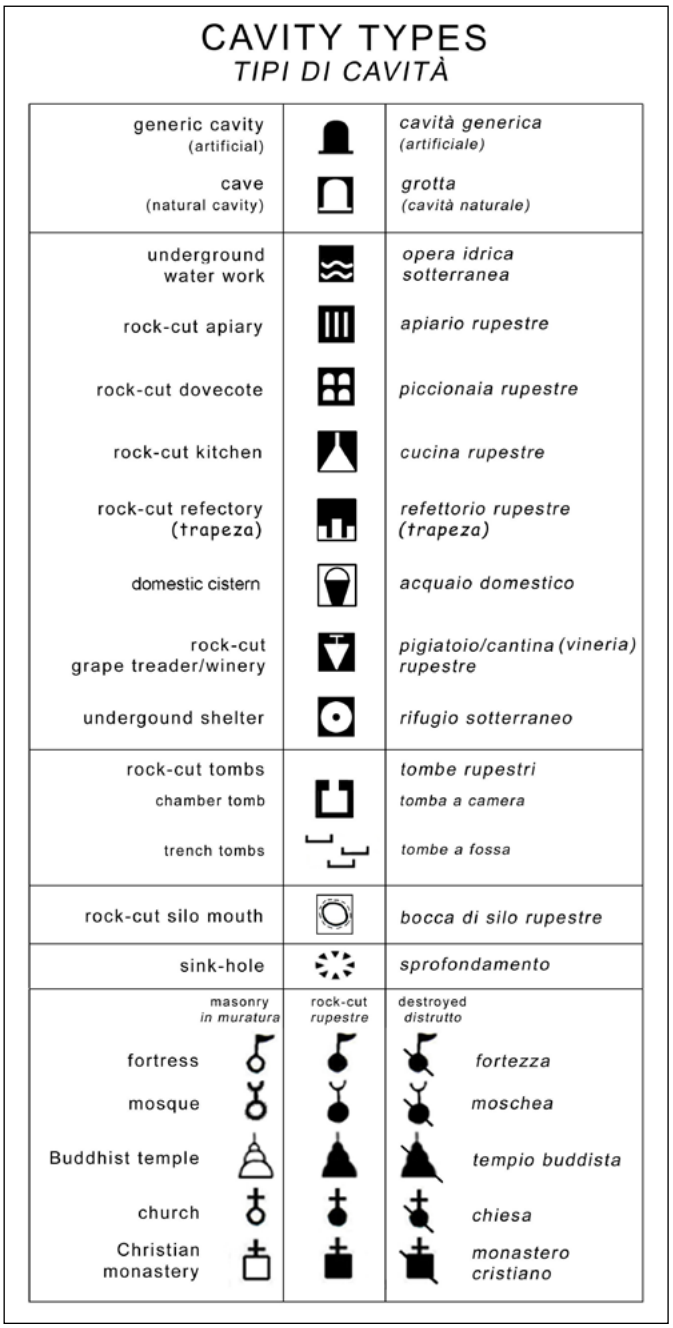

Fig. 6: cavity types (drawing R. Bixio).
Fig. 6: tipi di cavità (grafica R. Bixio).

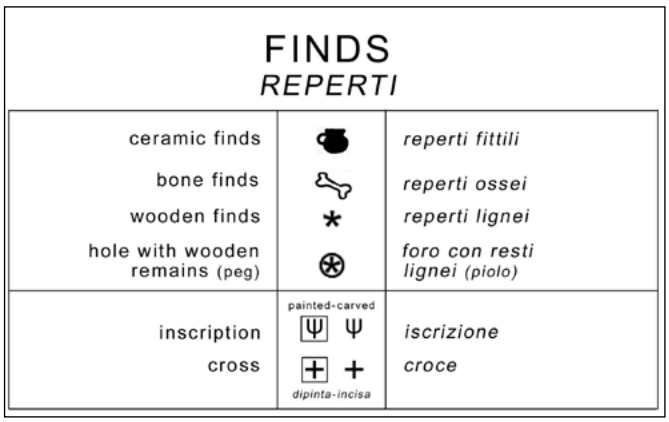

Fig. 7: finds (drawing R. Bixio).
Fig. 7: reperti (grafica R. Bixio).

References

(from which the symbols are derived)

Bixio R., Castellani V., Succhiarelli C. (Eds.), 2002, *Cappadocia, le città sotterranee*, Istituto Poligrafico e Zecca dello Stato, Roma.

Bixio R., Caloi V., Castellani V., Traverso M., 2009, *Ani 2004: surveys on the underground settlements*, British Archaeological Reports, International Series S1944, Archaeopress, Oxford.

Bixio R., De Pascale A. (Eds), 2011, *Ahlat 2007. Preliminary surveys on the underground structures*, British Archaeological Reports, International Series S2293, Archaeopress, Oxford.

Bixio R., De Pascale A., Pektaş K., 2011, *Indagini preliminari sulle strutture ipogee del Kale di Bitlis (Turchia sud-orientale,* in magazine Archeologia Medievale XXXVIII, All'Insegna del Giglio, Firenze, pp. 321-332.

Bixio R. (Ed), 2012, *Cappadocia, records of underground sites,* British Archaeological Reports, International Series S2413, Archaeopress, Oxford.

Bixio R., De Pascale A., Karamağarali N., (Eds), 2013, *Ahlat 2008. Second campaign of surveys on the underground structures*, British Archaeological Reports, International Series S2560, Archaeopress, Oxford.

De Pascale A., Bixio R., 2012, *Underground passages in defensive structures of eastern turkey: the cases of Bitlis, Ahlat and Ani*, Proceedings International Seminars CRHIMA-CINP - May 2011 Massafra - "Rupestrian settlements in the Mediterranean region", Università degli Studi di Firenze (Dip. Architettura), Firenze, pp. 139-153.