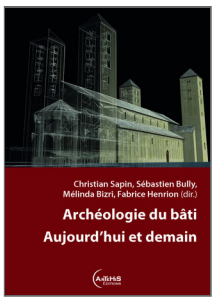


**Christian Sapin, Sébastien Bully, Mélinda Bizri et Fabrice Henrion (dir.)**

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*Les constructions hispaniques du Haut Moyen Âge comme culture matérielle : archéologie de l'architecture et technologie*

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# Early Medieval Hispanic constructions as material culture : archaeology of architecture and technology

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María de los Ángeles Utrero Agudo

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1 Understanding of late antique (6th-7th c.) and early medieval (8 th-10th c.) Hispanic churches has been updated in the last two decades thanks to the launch of different archaeological projects both focused on the excavation of sites and on the analysis of standing structures. This methodological renewal aimed firstly a deeper approach to studying this architecture and its characterization and chronology, areas traditionally examined according to stylistic criteria and written sources[1]. It aimed thereby to bring archaeological records into line with written information, leaving thus aside the previous role of the formers as mere complementary and illustrative accounts.

2 Results have made it possible gradually not only to review traditional chronologies and features, but to understand the proper impact of the movement of artisans and workshops, to comprehend the role of the commissioners, to approach consequent technological change and to revalue the traditional established links and influences

between Christian and Islamic constructions in the Iberian Peninsula[2], breaking thus traditional architectural frontiers[3].

3 In order to explain the above, this paper presents firstly some updated conceptual and methodological considerations. It shows secondly how archaeological sequences might be interpreted technologically, allowing thus to make visible the artisans, their tools, techniques and knowledge, along with the building process. All these connected aspects are explained from a methodological perspective and are illustrated by showing some results recently obtained thanks to the archaeological analysis of some early medieval churches : San Pedro de La Mata and Santa María de Melque, both sited in the province of Toledo and dated to late 8th century ; and San Cebrián de Mazote and San Miguel de Escalada, both located in the northern plateau and dated to late 9th century (Fig. 1). These examples show common and different key features for the understanding of the construction activity during this period.

Fig. 1a. San Miguel de Escalada (Gradefes, León) (cl. M.ª Á. Utrero).

Fig. 1b. San Cebrián de Mazote (San Cebrián de Mazote, Valladolid) (cl. M.ª Á. Utrero).

Fig. 1c. Santa María de Melque (San Martín de Montalbán, Toledo) (cl. M.ª Á. Utrero).

Fig. 1d. San Pedro de La Mata (Sonseca, Toledo) (cl. M.ª Á. Utrero).

## 1. Archaeological methodology and building technology: benefits and limits

4 The construction of a masonry building is a complex process involving a sequence of staged and programmed transformational activities (planning and projecting, acquisition and transport of material, working on site and building), and related production cycles of the different employed materials (stone, metal, timber...). All these activities and production cycles require besides different skills and human, material and funding resources[4].

5 However, due to the nature of the material evidences, archaeology is only able to approach some of these activities, namely the acquisition of materials and its transformation[5]. Survey to select and exploit quarries for materials or the selection of building sites are, for example, invisible parts of the process. It is in the quarry, the building and the working areas, where we can find material evidence related to the building process.

6 Early medieval Hispanic quarries (and European in general[6]) have not been so far properly analysed. Preliminary fieldwork results are promising regarding the knowledge of the masons about the selection of materials according with quality and function and about the available areas of exploitation, as it is shown below. But there is still a long way to walk[7].

7 As regards standing constructions, these are archaeological sites, since they are the result of successive construction and destruction activities happened all throughout their history, which can be recorded stratigraphically[8]. Following this method, buildings are divided into stratigraphic units, the relative chronological sequence of which may be established by identifying and characterizing those units, and by examining their physical relationships and their typologies. Stratigraphy, typology, archaeometry (when possible) and written sources (when available) all work to turn this relative chronological sequence into a succession of absolute dates, thus revealing the successive stages of construction which usually underlie a single building.

8 Common physical features and limits define archaeological strata. In standing walls, strata are featured and dated by building materials (stone, timber, mortar), techniques (tracing cuts, dimensions) and typology of single elements (doors, capitals, windows...). According to the stratigraphic principle of *typological identity*, strata made up of identical materials and created by similar techniques are thought to be coeval[9]. Each stratum is thus defined by a precise type, resulted from the combination of their features, which make it also possible to date the stratum. Type and stratum thus coincide, corresponding to a specific chronological period (Fig. 2)[10].

| ARCHAEOLOGICAL RECORD | TECHNOLOGICAL INTERPRETATION |
|---|---|
| STRATUM = Limits<br>Physical features = TYPE = Materials<br>Techniques<br>Tools<br>Typologies<br>... | - Building process = Planning and projecting<br>Acquisition and transport of material<br>Working on site and building<br>- Role of commissioners (resources and demand) and craftsmen (skills and knowledge) |

Fig. 2. Type, stratum and technology (M.ª Á. Utrero).

9 Early medieval building technology was a practical material and structural knowledge[11] (Fig. 3). Regarding the material aspect, technology is the knowledge owned and applied by the artisans, by using specific instruments, materials and techniques. Structurally, it is the ability of designing and projecting a building, considering likely technical problems and ensuring thereby that constructions do not collapse.

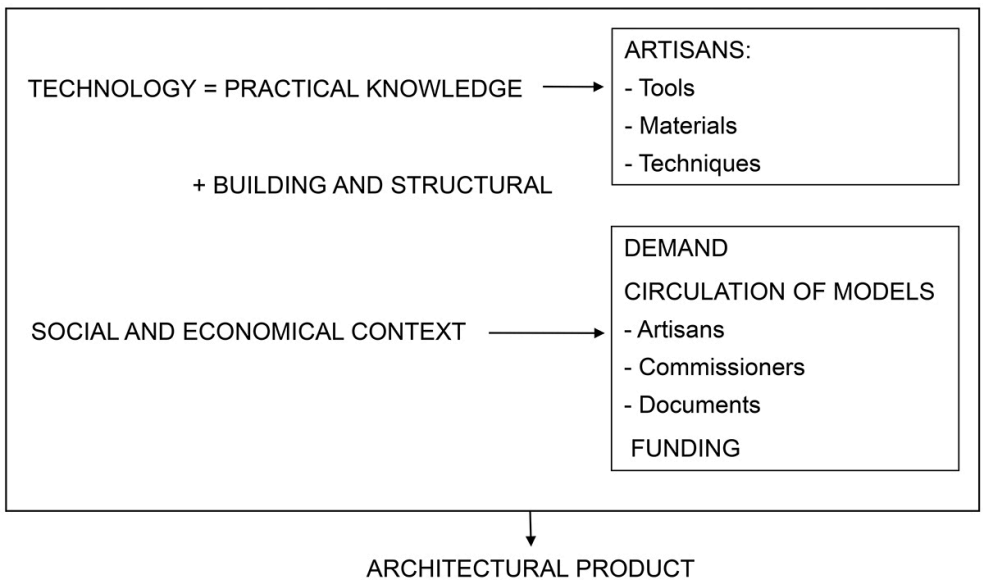


Fig. 3. Technology concept (based on UTRERO 2017).

10 Since there was no theoretical training in the early middle ages, this knowledge was based on a trial-error process and on experience, transmitted by means of the continuous activity of workshops (chain masters-apprentices) and dependent on an existing constant demand (commissioners). Their products remained the same as long as techniques, materials, instruments and artisans remained unchanged. This idea corresponds then to the stratigraphic principle of *typological identity* explained above and highlights the equivalence between stratum, type and technology (Fig. 2).

11 Taking into account these methodological and conceptual notes, it is our aim now to explain those staged and main transformational activities of the building process

(planning and projecting, acquisition and transport of material, working on site and building) by bringing together some material evidences recorded in the abovementioned early medieval temples. It is not our intention to show their complete archaeological sequences[12], but to highlight the possibility of reading and interpreting these in terms of technology.

## 2. Planning and projecting

12 The desires and resources of the commissioners, the skills of the qualified artisans to produce every element (such as marble and limestone capitals and stuccos in Mazote and Escalada, marble friezes in La Mata, stuccoed friezes and arches in Melque) and the requirements of the monastic sites (dimensions of churches and additional necessary rooms and infrastructures) were connected key factors conditioning the building project.

13 As explained below, the variety of quarries exploited, the combination of materials with different qualities and functions (structure, decoration), and the diversity of constructions and spaces included within these big monastic centres (church, rooms, fence...) underscore altogether the necessity of an accurate planning, with a project manager in charge of ensuring and coordinating material, human and funding resources during the project.

14 Although theoretical training was not available, recent analysis on the geometric procedures of early medieval churches reveals a basic theoretical knowledge, reflecting a likely previous theoretical project adapted to each building case and tested by practical activity and experience[13]. This knowledge was then necessary transmitted within the frame of the active workshop.

15 As regards architectural and constructive references and according to some few evidences, we must think that building planning could have made used of simple drawings, employed during the work to help complex details (voussoirs of arches and vaults ; common springers in Mazote and Escalada, probably designed in situ). These drawings appear on walls, pavements and fresh plaster (lost engraved arch in the plaster of Madīnat al-Zahrā', Córdoba, and measuring marks in the paintings of the Asturian church of San Adriano de Tuñón[14]), showing that design and construction were strength linked, adapting to each other and being modified or rethought when necessary during the process.

## 3. Acquisition and transport of material

16 Once project was demarcated, next task was to obtain the necessary construction materials. Archaeological and geological investigations reveal that there was a proper knowledge of the surrounding areas of the building site, an intentional searching for materials, an understanding of their technical features and a specific use of them according to the latter.

17 While the geological soil in La Mata was good enough to provide regular granite stones for its construction[15], it did not happen the same in Melque, where builders found this stone in quarries located almost 20 km far away from the site and use it both for building and decoration[16]. By contrast, in the churches of Escalada and Mazote[17], local

rough limestone from the nearby quarries, within a maximal distance of 5 km, was employed to build the external masonry walls. However, fine ashlar limestone was exploited in quarries located further away (Boñar, 20 km away from Escalada, and San Pelayo and Peñaflor de Hornija, 9-24 km away from Mazote), featured by a better quality to cut in the regular stones and keystones of its internal arcades and the sculptural elements (Fig. 4). Since quarries were in the nearby of the temples, there is the chance that the former were part of the monastic goods, but this hypothesis needs to be tested.

Fig. 4. San Cebrián de Mazote (Valladolid), regular keystones and reused and new elements of the internal arcades, looking westwards (cl. M.ª Á. Utrero).

18 Known quarries are small in extension and depth, having being used for a short time of period[18]. Concerning the granite of La Mata and Melque, wide exploitation fronts were open in the stone massif and irregular outcrops. Regarding limestone used in Mazote and Escalada, many hillsides' banks were quarried superficially at the same time for a unique building project, making use of wide working areas. These quarries were easily and economically worked, not only because of its mentioned vicinity, but also because natural cracks were made use of and there was not almost any waste material.

19 Geological structure of these outcrops enables also explaining the selection and use of the stone in the buildings. Regular limestones were obtained in the lowest banks of the outcrops, which are higher in dimension, while rough masonry was exploited in the upper banks, these smaller and of poorer quality. The heights of the banks (ca. 40 cm) condition then the dimension of the regular ashlar stones of Mazote. And the heterogeneous rough outcrops of Escalada explain why stones are irregular in size, form and setting. Similarly, the thickness of the sedimentary strata or the alteration and cracking process of the granites determine the form and dimensions of the ashlar stones in La Mata and Melque (Fig. 5). This correlation can be also observed between the heights of the marble imposts of La Mata and those of the geological strata at the quarry (Fig. 6).

Fig. 5a. Santa María de Melque (Toledo), granite ashlar stone (cl. M.ª Á. Utrero).

Fig. 5b. Santa María de Melque (Toledo), granite massif exploited for its construction, with wide spaces between fractures (UTRERO, ÁLVAREZ, 2018, in progress).

Fig. 6a. San Pedro de La Mata (Toledo), structure of the nearby marble quarry (cl. M.ª Á. Utrero).

Fig. 6b. San Pedro de La Mata (Toledo), frieze produced with material coming from that marble quarry (cl. M.ª Á. Utrero).

20 This aspect shows a direct relationship between the building and decorative techniques and the geology and confirms again the competence of the masons when searching for appropriate material. Since quarries for rough stone masonry are close to the construction site, there is the chance that masons were the same people at both sites, given the materials a form already at the quarry and reducing thus cutting work. This cannot be affirmed in the case of ashlar stone masonry, coming from long distances, and necessarily finished on site, as it is shown by the finishing traces on the surfaces of the elements or the incisions on the keystones.

21 The distance between quarries and building site had a direct effect on the building process and its cost. Those regular limestones (arcades of Escalada-Boñar, of Mazote-San Pelayo and Hornija ; south porch and apse of Escalada-Boñar) were more expensive, since the long distance of the quarries and the cutting work would increase the expenses on transport and time working. Rough stones employed in the perimeter wall (and in the monastic rooms) were more accessible and cheaper, being worked at the same time locally and therefore most used.

22 New quarried elements were employed along with reused one (Fig. 4). Heterogeneous in form, material and chronology, reused elements must be therefore understood not as the result of a simple plundering of old buildings, but of a specific commerce of these elements[19]. Otherwise, searching for old materials at different sites and its transport would be expensive and long and would require different skills. Among these, marble shafts were always reused. Taking into account the relevance of the supports when

modulating the buildings[20], their dimensions had to be considered by builders before obtaining the shafts.

## 4. Working on site and building

23 Archaeological sequences include material evidences to approach those abovementioned technological components (artisans, instruments, techniques and knowledge : Fig. 7 and 8).

| | Materials | Tools | Techniques | Craftsmen |
|---|---|---|---|---|
| **Melque Phase I – late 8 th c.** | Fresh granite, stucco and reused marble | Ruler, chisel and trepan. Free scaffoldings | Ashlar stone and stucco decoration. Columns currently lost | Stonemasons, sculptors (capitals, chancel screens) and stucco makers (internal friezes and panels) |
| **La Mata Phase I – late 8 th c.** | Fresh granite and marble | Ruler, chisel and trepan. Free scaffoldings | Ashlar stone and new marble sculpture. Columns currently lost | Stonemasons and sculptors (imposts) |

Fig. 7. Santa María de Melque (Toledo) and San Pedro de La Mata (Toledo), temporal and technological sequences recorded (M.ª Á. Utrero).

| | Materials | Tools | Techniques | Craftsmen |
|---|---|---|---|---|
| **Mazote Phase I – c. 900** | Fresh limestone and reused marble | Ruler, chisel and trepan | Rough and ashlar stone, new (capitals, bases) and reused (shafts, capitals, bases) elements | Stonemasons, sculptors (capitals, imposts), stucco makers and carpenters |
| **Escalada Phase I – c. 900** | Fresh limestone, reused marble and timber elements | Ruler, chisel and trepan. Inserted scaffoldings | Rough and ashlar stone, new (capitals, chancel screens, bases, altars, imposts) and reused (shafts, capitals, bases) elements | Stonemasons, sculptors (capitals, chancel screens, imposts), stucco makers (imposts) and carpenters |
| **Escalada Phase II – c. 913 (east part)** | Fresh limestone | Setsquare, chisel and trepan. Free scaffoldings | Ashlar stone and new sculpture | Stonemasons and sculptors (imposts) |
| **Escalada Phase II – c. 913 (south porch)** | Fresh limestone and marble | Set-square, chisel and trepan. Inserted scaffoldings | Ashlar stone, new elements (bases, shafts, capitals) and new sculpture | Stonemasons and sculptors (west window, capitals and shafts) |

Fig. 8. San Cebrián de Mazote (Valladolid) and San Miguel de Escalada (León; phases I and II), temporal and technological sequences recorded (M.ª Á. Utrero).

24 At these monastic churches, local unskilled craftsmen could work together with foreign and qualified artisans, being the latter and its mobility responsible for the differences between the productions[21]. This aspect is most recognisable in the decorative features (sculpture, painting, stucco). The consulting role by architects between related monasteries and the use of common models (probably transferred in any kind of support : stone, parchment...[22]) would also explain the similarities between buildings that are distant geographically (Escalada-Mazote, 100 km in between).

25 Sequences show how different skills and professions worked together in a coordinated way. In the granite stone churches of La Mata and Melque, masons were protagonist, since all elements (walls, arches and vaults) were built in ashlar stone, being the builders responsible for providing material to make the core of the walls and for the final setting of the pieces. In the basilicas of Mazote and Escalada, builders and masons built the external rough stone masonry quoined walls, while masons mainly worked in the interior, where new and reused materials had to be carefully cut and adapted to each other to erect the internal arcades. Late reforms of Escalada, namely the southern porch and the eastern wall, were made on the contrary by masons (Fig. 9).

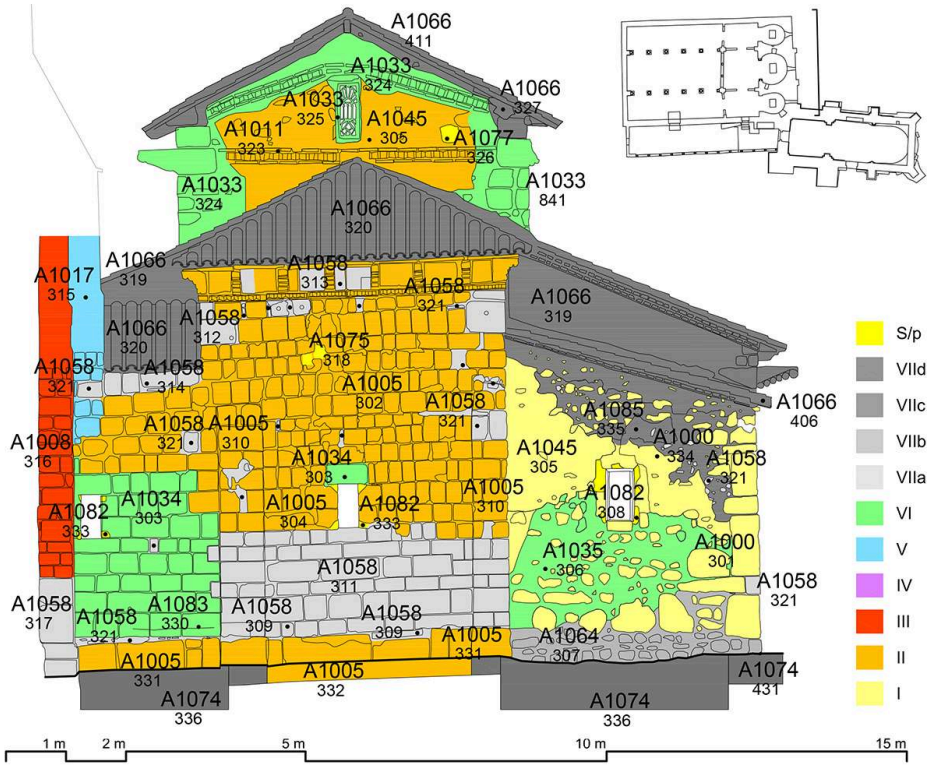


Fig. 9. San Miguel de Escalada (León), east wall, archaeological record. Phase I: rough masonry. Phase II: regular ashlar stone (UTRERO, MURILLO, 2022, in press).

26 These buildings reflect as well the stone tools used. Regarding the designing devices, the use of the ruler explains why ashlar stones, and also sculptural elements (capitals) are trapezoidal, without right angles, and courses therefore not completely horizontal (Fig. 5). It was in the early 10th century that the set square was introduced, as it is shown by the mentioned constructions of the southern porch and eastern wall of Escalada (Fig. 8 and 9). This instruments makes it possible to design right angles, to build complete horizontal courses and thus to speed up the working process, because the height of the stones were already known and thereby recut and finished previously. This change can be traced both in the building and sculptural elements (Fig. 10). As regards the cutting tools, chisels were used to finish the surfaces of stones, applied to different angles to obtain different kind of surfaces, and the trepan appears again in the sculptural works[23].

Fig. 10a. San Miguel de Escalada (León), phase I capital (hall, limestone capital designed with ruler) (cl. M.ª Á. Utrero).

Fig. 10b. San Miguel de Escalada (León), phase II capital (south porch, marble capital designed with set square) (cl. M.ª Á. Utrero).

27 Structural knowledge is overall revealed by the employment of quoins within rough stone masonry walls, of common springer and horizontal voussoirs at the arches to

reduce lateral thrusts and of thick walls bonded at the angles and reinforced by buttresses, among others. And it is clearly shown through the general design and dimension of the construction[24]. The recorded employment of structural reinforcements, such as the timber beams introduced in the walls of Escalada, reveals a precise knowledge on their structural benefits as stabilizers of elements with abundant mortar[25].

28 Structural inability is also shown in the cases of La Mata and Escalada. The first one suffered an early collapse of its stone vaults due to the absence of a correct relationship between the wall thickness and the span of the spaces, being the latter five times larger than the former[26]. Archaeological analysis of Escalada records the movement of the sanctuary eastwards, probably caused by the presence of a vaulted crossing space, the weakness of the clay soil and the existence of previous structures on this area. In order to avoid the complete ruin, a new ashlar stone wall with buttresses was attached to the east wall, improving thus its thickness and stability (Fig. 9).

## 5. Final remarks

29 We are aware that we leave many architectural and constructive aspects without mention (further materials, professions, historical context, chronological features...), but it is the aim of this necessarily brief paper to highlight how archaeology of architecture has modified our knowledge of early medieval Hispanic churches and how archaeological sequences might be interpreted as technological ones. Most of these buildings had been since long analysed, but it is stratigraphy and typology which make it possible now to approach their technological aspects hitherto unconsidered. The archaeological record and the resulting sequence organise all the mentioned data in a physical and temporal related way, giving the same relevance to every single element and detail. Archaeological record must be the basis of the interpretation, never the other way round. If we proceed this way, we will be able to comprehend these constructions not as only historic-artistic monuments but above all as manufactured products, resulted from the evolution of different technologies and connected historical contexts.

30 To conclude. Is it archaeology of architecture a new science? This was the question framing the corresponding session of ABAD 2019, to which this paper belongs. In my opinion, archaeology of architecture is a new methodology, not so new though, actually almost 40 years old. However, if we apply this methodology, our science, the architectural history, will be hopefully new someday.

## NOTES

**1.** CABALLERO L., « Un canal de transmisión de lo clásico en la Alta Edad Media Española. Arquitectura y Escultura de influjo omeya en la Península Ibérica entre mediados del siglo VIII e inicios del siglo X », *Al-Qantara,* XV/2, 1994, p. 321-348 and XVI/1, 1995,

p. 107-124. CABALLERO L., « La arquitectura denominada de época visigoda, ¿es realmente tardorromana o prerrománica ? », in CABALLERO L., MATEOS P. ed., *Visigodos y Omeyas : un debate entre la Antigüedad tardía y la Alta Edad Media*, Madrid, 2000, p. 207-247.

**2.** CABALLERO L., UTRERO M.ª Á., « El ciclo constructivo de la Alta Edad Media Hispánica », *Archeologia dell'Architettura*, XVIII, 2013, p. 127-146. UTRERO M.ª Á., « The Artisans behind Visigothic Buildings : the Materiality of Identity », in *Visigothic Symposium* 2, 2017-2018, p. 99-113.

**3.** Chronological and characterization debate is common to mostly all traditional European groups occupying late antique and early medieval periods (Byzantine, Anglo-Saxon, Carolingian, etc.) The distinctive feature of the Iberian Peninsula is the Islamic arrival in such an early date (711), generating this event a new context to be considered as an archaeological challenge. Related references in UTRERO M.ª Á., « Arqueología de la producción arquitectónica en el Medievo Hispánico (siglos VII-XII). Más preguntas que respuestas », in QUIRÓS J. A. ed., *Treinta años de Arqueología Medieval en España*, Oxford, 2018, p. 365-384.

**4.** MANNONI T., GIANNICHEDDA E., *Archeologia della Produzione*, Torino, 1996. UTRERO M.ª Á., « Modelos arquitectónicos y decorativos a inicios del siglo X. Algunas certezas y varias hipótesis », *Arqueología y Territorio Medieval*, 24, 2017, p. 185-206 (p. 186).

**5.** MANNONI T., GIANNICHEDDA E., *op. cit.*, p. 64. UTRERO M.ª Á., « Arqueología de la producción arquitectónica...», *op. cit.*, p. 370.

**6.** WARD-PERKINS J. B., « Quarries and stoneworking in the Early Middle Ages: the heritage of the Ancient World », in *XVIII Settimane di Studio del Centro Italiano di studi sull'alto medioevo XVIII*, Spoleto, 1971, p. 525-544. BESSAC J.-C., « Techniques classiques de construction et de décor architectural en pierre de taille entre Orient et Occident (VI$^{e}$-IX$^{e}$ siècle) : abandon or perte ? », *Archeologia dell'Architettura*, XVIII, 2013, p. 9-23.

**7.** Previous works on early medieval Hispanic examples and references in UTRERO M.ª Á., « Modelos arquitectónicos y decorativos... », *op. cit.*, p. 197. An updated synthesis in ÁLVAREZ E., UTRERO M.ª Á., BALTUILLE J. M., *Geología y Arqueología. Estratigrafía de la Tierra, Estratigrafía del Patrimonio*, Madrid, 2017.

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**9.** CABALLERO L., « El análisis estratigráfico... », *op. cit.*, p. 60.

**10.** CABALLERO L., UTRERO M.ª Á., « Cómo funcionaban los talleres constructivos en la alta Edad Media hispánica », in ARÍZAGA B., MARIÑO D., DÍEZ C., PEÑA E., SOLÓRZANO J. Á., GUIJARRO S., AÑIBARRO J. ed., *Mundos medievales : espacios, sociedades y poder. Homenaje al profesor José Ángel García de Cortázar*, Santander, 2012, vol. 1, p. 427-440 (p. 428).

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**12.** These can be seen in : La Mata in UTRERO M.ª Á., ÁLVAREZ E., BALTUILLE J. M., MARTÍN R., MORENO F. J., MURILLO J. I., RIELO M., VILLA A., « San Pedro de la Mata (Sonseca, Toledo). Construir y decorar una iglesia altomedieval en piedra », *Archivo Español de Arqueología*,

89, 2016, p. 45-69 ; Melque in CABALLERO L., J. MORENO F., « Balatalmelc, Santa María de Melque. Un monasterio del siglo VIII en territorio toledano », in BALLESTÍN X., PASTOR E. ed., *Lo que vino de Oriente. Horizontes, praxis y dimensión material de los sistemas de dominación fiscal en Al-Andalus (ss. VII-IX)*, Oxford, 2013, p. 182-204 ; Escalada and Mazote in UTRERO M.ª Á., « Modelos arquitectónicos y decorativos... », *op. cit.*

**13.** ARIAS PÁRAMO L., « Geometría, metrología y proporción en la arquitectura altomedieval de la Meseta del Duero », in CABALLERO L., MATEOS P., GARCÍA DE CASTRO C., *Asturias entre Visigodos y Mozárabes*, Madrid, 2012, p. 353-390.

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**15.** UTRERO M.ª Á. *et al.*, « San Pedro de la Mata... », *op. cit.*, p. 58-65.

**16.** Geological analytics of Melque still in progress within the project "Arquitectura Altomedieval en la Europa Occidental: la industria de su construcción", funded by CSIC (Ref. 271710I097).

**17.** ÁLVAREZ E., BALTUILLE J. M., « Materiales pétreos y canteras para la construcción de las iglesias de San Miguel de Escalada (León) y San Cebrián de Mazote (Valladolid) », *Arqueología y Territorio Medieval*, 24, 2017, p. 115-150. UTRERO M.ª Á., « Modelos arquitectónicos y decorativos... », *op. cit.*, p. 189-191.

**18.** UTRERO M.ª Á. *et al.*, « San Pedro de la Mata... », *op. cit.*, p. 58-65. ÁLVAREZ E., BALTUILLE J. M., « Materiales pétreos y canteras... », *op. cit.*, p. 131-147.

**19.** Archaeological excavations of these sites have not either revealed previous temples. UTRERO M.ª Á., « Modelos arquitectónicos y decorativos... », *op. cit.*, p. 190.

**20.** As it is shown by ARIAS PÁRAMO L., « Geometría, metrología y proporción... », *op. cit.*, p. 367.

**21.** UTRERO M.ª Á., « Modelos arquitectónicos y decorativos... », *op. cit.*, p. 198-199.

**22.** On the debate regarding the actual existence of these materials in the early middle ages, see bibliographic references in UTRERO M.ª Á., « Producción arquitectónica y decorativa... », *op. cit.*, p. 289-291.

**23.** VILLA A., « Talleres escultóricos itinerantes en el Altomedievo hispano : el llamado 'Grupo Mozárabe Leonés' », *Arqueología y Territorio Medieval*, 24, 2017, p. 151-184 (p. 179).

**24.** UTRERO M.ª Á., « Modelos arquitectónicos y decorativos... », *op. cit.*, p. 198.

**25.** Further timber elements in CABALLERO L. *et al.*, *Las iglesias asturianas de Pravia...*, *op. cit.*, p. 113-117.

**26.** Usual relationship between spaces and walls at this period is 3:1 (span:thickness). UTRERO M.ª Á. *et al.*, « San Pedro de la Mata... », *op. cit.*, p. 52-53.

## ABSTRACTS

Late antique and early medieval Hispanic constructions have been lately analysed by means of archaeological method, making this possible to obtain new data and innovative results regarding their chronologies and interpretations. It is the particular aim of this paper to show how the application of the archaeology of architecture has open new ways and venues of researching this architecture by approaching aspects hitherto unconsidered since they were almost invisible in the written sources and undervalued in the material ones. Craftsmen and their qualifications, working tools, materials and techniques, among others, make up technology and can be identified within archaeological sequences, which must be therefore also understood as technological sequences.

Les constructions hispaniques de la fin de l'Antiquité et du début du Moyen Âge ont été récemment analysées au moyen d'une méthode archéologique, ce qui a permis d'obtenir de nouvelles données et des résultats innovants concernant leurs chronologies et leurs interprétations. L'objectif particulier de cet article est de montrer comment l'application de l'archéologie du bâti a ouvert de nouvelles voies et de nouveaux lieux de recherche sur cette architecture en abordant des aspects jusqu'alors inconsidérés puisqu'ils étaient presque invisibles dans les documents écrits et sous-estimés dans les documents matériels. Les artisans et leurs qualifications, les outils de travail, les matériaux et les techniques, entre autres, constituent la technologie et peuvent être identifiés dans les séquences archéologiques, qui doivent donc être également comprises comme des séquences technologiques.

## INDEX

**Mots-clés:** églises, Mozarabe, San Pedro de La Mata, Santa María de Melque, San Cebrián de Mazote, San Miguel de Escalada, projet de construction, artisans, carrières
**Keywords:** churches, Mozarabic, San Pedro de La Mata, Santa María de Melque, San Cebrián de Mazote, San Miguel de Escalada, building project, craftsmen, quarries

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