

## **THE TIME OF CONSTANTINE THE GREAT AS AN ERA OF TECHNOLOGICAL ACHIEVEMENTS - AN OUTLINE**

The age of Constantine the Great (272/273-337, Augustus 306, Monocrator 324) is essentially regarded as an epoch of administrative and politic reforms, of religious and artistic pursuits<sup>1</sup>. History and archaeology highlight the determinative contribution and the influential perspectives released by the momentous publication of the Milan Edict (313), overlooking a realm of study that provoked fundamental transformations during his time-reign; the application of innovative devices and experimental uses of pioneering technical patterns that established the diffusion and popularization of technology, leading to labor-saving practices and the gradual decline in dependance on slavery.

The Roman heritage on advancing technical skills bequeathed a strong impact on the time when Christianity met its foremost exponent. Ingenuity included upgrading multifold aspects of social and economic circumstances, ranging from improvements in constructions, engineering, manufactures, to the exploitation of natural forces<sup>2</sup>. In the present paper we introduce a limited selection of inventions, representative, nonetheless, of their effectiveness

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The bibliography on Constantine the Great age is, as expected, extensive. Therefore we only cite as a general guide the reprinted N. Lenski (ed.), *The Cambridge Companion to the Age of Constantine*, Cambridge 2011 (2006).

<sup>2</sup> An almost complete overview of references subdivided to the various fields of technical activities on the steadily progressing topic of Late Roman technology is available in L. Lavan, E. Zanini, A. C. Sarantis (eds.), *Technology in Transition: A.D. 300-650*, Leiden 2007 and in J. P. Oleson (ed.), *The Oxford Handbook of Engineering and Technology in the Classical world*, Oxford 2008. See also the past bibliography in: K. Greene, Technology and innovation in context: the Roman background to medieval and later developments, *JRA* 7 (1994), 22-33. J. Humphrey – J. Oleson – A. Sherwood, *Greek and Roman technology: a sourcebook. Annotated translations of Greek and Latin texts and documents*, London – New York 2008 (1998), 285-330. K. D. White, *Greek and Roman technology*, New York 1984. D. Hill, *A history of engineering in classical and medieval times*, Kent 1984, 155-182. A. Wilson, Machines, Power and the Ancient Economy, *JRA* 92 (2002), 1–32.



Fig. 1 Sawmill representation, sarcophagus cover, second half of the 3rd century, Hierapolis-Phrygia (S. Wefers – F. Mangartz, *Die byzantinischen Werkstätten von Ephesos*, F. Daim – S. Ladstätter (eds.), *Ephesos in byzantinischer Zeit*, Mainz 2011, fig. 8).

Сл. 1 Приказ пиране, поклопац саркофага, друга половина III в., Хиераполис Фригија (S. Wefers – F. Mangartz, *Die byzantinischen Werkstätten von Ephesos*, F. Daim – S. Ladstätter (eds.), *Ephesos in byzantinischer Zeit*, Mainz 2011, сл. 8).

in promoting the subsistence of the so-called “*silent majority of the unprivileged masses*”<sup>3</sup>; the mechanisation of hydraulic rotated structures, the acceleration in textile production, the transformation in techniques of navigation and the radical changes in the shape of agricultural implements<sup>4</sup>.

Milling *hydrotechnology* had already behind a three-century history of utilisation when Constantine ascended to the throne. Excavated physical remains of watermills’ establishments, in operation during this period, reach more than a dozen while depictions of water-rotated machines confirm the thrust of their expansion from the 3rd up to the 5-6th century<sup>5</sup>. During the first decades

<sup>3</sup> The term was used to designate, in the best way, the material culture of peasants in medieval society. L. White Jr., *Medieval religion and technology. Collected essays*, Los Angeles 1986(1978), 133.

<sup>4</sup> In the present paper we attempt only to enumerate a raft of technologies that fall within the frame of “technical innovation”. For the discussion in terms and connotations, see L. Lavan, *Explaining technological change: innovation, stagnation, recession and replacement*, in *Technology in Transition*, op. cit., xv-xi.

<sup>5</sup> E. C. Curwen, *The problem of early water-mills*, *Antiquity* 18 (1944), 130-146. R. J. Forbes, *The Greek or Norse mill and the water-turbine*, *Studies in ancient technology*, II, Leiden 1993 (Leiden – New York – Köln 1955), 88-130. M. Bloch, *Avènement et conquête du moulin à eau*, *Annales d’histoire économique et sociale* 1935, 538-563, reprinted in *Mélanges Historiques*, II, Paris 1963 (1983), 800-821 (in English also: *The advent and the triumph of watermill*, *Land and Work in medieval Europe*, California 1967, 136-168). L. White, *Medieval technology and social change*, Oxford 1962, 80-89. T. Reynolds, *Stronger than a hundred men. A history of the vertical water mill*, Baltimore 1983, 9-41. M. J. T. Lewis, *Millstone and Hammer. The origins of water-power*, Hull 1984. Ö. Wikander, *Archaeological evidence for early water mills –an interim report*, *History of technology* 10 (1985) 151-179. Ibid, *The use of water-power in Classical Antiquity*, *Opuscula Romana* 13 (1981), 91-104. Ibid,



Fig. 2 The earliest known depiction of a horizontal loom in medieval art, illustration from the manuscript “Romance of Alexander”, f. 32b, 1250 (digital copy, Trinity College Library, Cambridge).

Сл. 2 Најранији познат приказ хоризонталног разбоја у средњовековној уметности, илустрације из рукописа „Романса Александра“, ф. 32б, 1250. (дигитални примерак, Библиотека Тринити колеџа, Кембриџ.)

of the 4th century, two circumstantially recorded incidents suggest a significant phase of their progressive urban and mechanic development; An imposing of its content inscription, found at Orcistus, in Phrygia (329-330), preserves the decree Constantine granted to the city, proclaiming the urban status of a “*civitas*” instead of the provincial “*vicus*”, owing to the large number of the watermills functioning in its precincts<sup>6</sup>. Equally intriguing in context, an excerpt from the narration *Historiarum Compedium* (compiled in the 11th century) of the Greek historian Georgios Cedrenus cites that a certain noted mechanic named Metrodorus was commissioned, in 325, to construct water-mills in India, since they were still unknown to the locals there –and obviously already diffused in the empire of Constantine<sup>7</sup>.

The constraint of water force was not only confined to grinding but met its most remarkable application in the sawmill, an apparatus that facilitated the cutting of stones or logs into boards. As a fortunate occurrence, a contemporary representation of a sawmill, dated to the second half of the 3rd century, is depicted on the relief cover of a limestone sarcophagus, commemorating in the funerary inscription the skills of a sawmill mechanic, Marcus Aurelius Ammianus, who actually operated or designed the exquisite device (**fig.1**)<sup>8</sup>.

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*Exploitation of water-power or technological stagnation? A reappraisal of the productive forces in the Roman Empire*, Lund 1984, 8-37. Ibid, Mill-channels, weirs and ponds. The environment of ancient water-mills, *Opuscula Romana* 15 (1985) 149-154. Ibid, Industrial applications of water-power, Ö. Wikander (ed.), *Handbook of ancient water technology*, Leiden 2000, 401-412. A. Wilson, Water-mills at Amida: Ammianus Marcellinus 18.8.11, *Classical Quarterly* 51(2001), 231-236. L. di Segni, The Water Supply of Roman-Byzantine Palestine in Literary and Epigraphic Sources, in D. Amit - Y. Hirschfeld - J. Patrich (eds.), *The Aqueducts of Israel*, JRA - Supplementary series 42, Portsmouth - Rhode Island 2002, 63. J. P. Brun, L' énergie hydraulique durant l'empire Romain: quel impact sur l' économie agricole, E. Lo Cascio (ed.), *Innovazione tecnica e progresso economico nel mondo romana*. Atti degli Incontri capresi di storia dell' economia antica, Bari 2003, 101–130. Ö. Wikander, Sources of energy and exploitation of power, *The Oxford Handbook of Engineering and Technology in the Classical world*, Oxford 2008, 141-152 and A. Wilson, Hydraulic Engineering, ibidem, 285-318 (with compiled past bibliography). A. Lucas, Industrial milling in the ancient and medieval worlds: A survey of the evidence for an industrial revolution in medieval Europa, *Technology and Culture* 46(2005), n.1, 1-30. R. Spain, *The power and performance of Roman water-mills: hydro-mechanical analysis of vertical-wheeled water-mills*, Oxford 2008. A. Wilson, Water, power and culture in the Roman and Byzantine worlds: an introduction, A. Wilson (ed.), *Water History* 4(2012), n.1. S. Germanidou, Απεκονίσεις υδραυλικών μηχανών στην τέχνη της Όψιμης Αρχαιότητας, *Byzantina* 32(2012), 285-299.

<sup>6</sup> A. Chastagnol, L' inscription constantiniennne d' Orkistus, *Mélanges de l' Ecole française de Rome, Antiquité* 93(1981), n.1, 381-416, particularly 406-409. Ibid, Les realia d' une cité d' après l' inscription constanienne d' Orkistos, *Ktema* 6(1981), 373-379.

<sup>7</sup> *Georgius Cedrenus, Ioannis Scylitzae ope*, B. G. Niebuhr – I. Bekker (ed.), I [CSHB], Bonnae 1838, 516, par. 295.

<sup>8</sup> T. Ritti – K. Grewe – P. Kessener, A relief of a water-powered stone saw mill on a sarcophagus at Hierapolis and its implications, *JRA* 20 (2007) 139-163. K. Grewe, Die Reliefdarstellungen einer antiken Steinsagemaschine aus Hierapolis in Phrygien und ihre Bedeutung für die Technikgeschichte, M. Bachmann (ed.), *Bautechnik im antiken und vorantiken Kleinasien*, *BYZAS* 9 (2009) 429-454. Worth mention, the well-known reference to the shrieking sound of a saw-mill cutting marble, dated to 364, quoted by the Christian Greco-Roman poet Ausonius, in his work *Mosella*. R. P. H. Green, *The works of Ausonius*,

**Weaving** has a long history of experimental applications; simple forms of hand-loom with vertical (high) warps were in use as early as ancient civilizations<sup>9</sup> and up to the mechanization of the apparatus during late medieval times. A hallmark in textile technology stands the attempt to promote the rate and to enrich the decorative quality of the production by developing the horizontal loom with low warps and, at a second phase, introducing multiple heddle-rods and foot-treadles. Notwithstanding, the evidence for the horizontal loom remains much scarcer than any other technology of that time; references in textual sources remain ambiguous<sup>10</sup> and the earliest illustrations date from the Middle Ages and originate from western art (**fig.2**) and the well-known miniature in folio 145v. of the byzantine but rather gothic-in-style manuscript of the Book of Job (Par. Gr. 135)<sup>11</sup>. Overcoming this discrepancy, the preserved damask textiles, originated mainly from Palmyra and Roman Britain, adorned with complex woven geometric patterns alternating warp-faced and weft-faced zones, presuppose the utilization of the horizontal loom, attesting that the radical transition in the means of weaving occurred not long before the middle of the 3<sup>rd</sup> century<sup>12</sup>.

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Oxford 1991, 501-502. B. Weis, *Ausonius Mosella*, Darmstadt 1994 (1989), 50-52, lines 360-365. P Drager, *Ausonius Mosella*, Trier 2001, 52-53, lines 360-365. Saint Gregory of Nyssa expresses few years later (370/ 390) his admiration on the function of sawmills. Gregorius, bishop of Nyssa, 'Ομιλία Γ': Εἰς τὸ δῆγιον Πάσχα, *P.G.* 46, 656C and 'Ομιλία Γ': Ἐξηγήσεις ἀκριβῆς εἰς τὸν Ἐκκλησιαστήν τοῦ Σολομώντος, *P.G.* 44, 656AC "πόσα (δε) τὰ μηχανήματα τῶν μὲν ὕδατι καὶ σιδήρῳ διαπριόντων τὰς ὕλας..." and "τῶν λίθων τῶν συνωθουμένων παρὰ τοῦ ὕδατος" while he attests the term "μύλωνα" (mill), 'Ομιλία Η': Ἐξηγήσεις ἀκριβῆς εἰς τὰ ἄσματα τῶν ἀσμάτων, *PG* 44, 760. On the past bibliography on the sawmill: Lucas, *Industrial*, op. cit., 7, footnote 15.

<sup>9</sup> R. J. Forbes, Weaving and Looms. The developed horizontal loom and the drawloom, *Studies in ancient technology*, IV, Leiden 1993 (Leiden – New York – Koln 1955), 218-221. J. Backer, *Pattern and Loom: A practical study of the development of weaving techniques in China, Western Asia and Europe*, Copenhagen 1987. E. Broody, *The Book of looms. A history of the handloom from ancient times to the present*, New Haven 1979. I. Tzachili, *Υφαντική και υφάντρες στο προϊστορικό Αιγαίο 2000-1000 π.Χ.*, Iraklio 1997, on looms types 143-160. A. Muthesius, Essential processes, looms, and technical aspects of the production of silk textiles, *The Economic History of Byzantium, from the Seventh through the Fifteenth Century*, A. E. Laiou (ed.), v. II, Washington D.C. 2002, 147-68. P. Wild, The Romans and the West, D. Jenkins (ed.), *The Cambridge History of Western textiles*, Cambridge 2003, 77-92, particularly 81-83.

<sup>10</sup> D. L. Carroll Dating the Foot-powered loom: the Coptic evidence, *AJA* 89(1985), 168-73. J. P. Wild, The Roman horizontal loom, *AJA* 91(1987), n. 3, 459-471.

<sup>11</sup> T. Velmans, Le Parisinus Grecus 135 et quelques autres peintures de style gothique dans les manuscrits grecs à l' époque des Paléologues, *CA* 17(1967), 209-235. J. M. Andrews, Imagery in the aftermath of the Crusades: A fourteenth-century illustrated commentary on Job (Paris, Bn, ms. Graecus 135), Los Angeles – California 2002. J.M.Andrews } Eadem, Crossing Boundaries: Byzantine and Western Influence in a 14th century Illustrated Commentary on Job, Alixe Bovey and John Lowden (eds), *Under the Influence. The Concept of Influence and the Study of Illuminated Manuscripts*, Brepols 2008, 111-119. P. Ετζέογλου, «Ἐγγραφή ἐν τῷ Μυζιθρῶ». Βιβλιογραφικὲς δραστηριότητες στὸν Μυστρά κατὰ τὸν 13ο καὶ 14ο αἰ., *DCAE* per. D', v. 26(2005), 181-191. J. Ball, The Missing Link: Filling the Gap in the Evolution of Medieval Domestic Looms, *Αναθέματα Εορτικά: Studies in Honor of Thomas F. Mathews*, Mainz 2009, 38-55.

<sup>12</sup> J. P. Wild, *Textile manufacture in the northern Roman provinces*, London 1970.



Fig. 3 First depictions of the lateen sail in Byzantine art, (a) illustration, Homilies of Gregory of Nyssa, f. 367v., 879-882 (b) (digital copy, BnF) (b) illustration, Chloudov Psalter (M. V. Scepkina, *Miniatjury hludovskoi Psaltyri : Greceskii illjustrirovannyi Kodeks IX Veka*, Moskva 1977, n. 88).

Сл. 3 Први прикази латинског једра у византијској уметности, (а) илустрација, беседе Григорија Ниског, ф. 367в., 879-882 (б) дигитални примерак, БнФ (б) илустрација, Клоудов Псалтер (М. В. Сцепкина, *Miniatjury hludovskoi Psaltyri: Greceskii illjustrirovannyi Kodeks IX Veka*, Москва 1977., н. 88).

The development of **navigation** and the expansion of the settee (the quadrilateral) and the lateen (the triangular) sail was another technical accomplishment that brought about an enormous effect on the promotion of maritime transports and sea-commerce. The replacement of the traditional square sail to a triangular form modified sailing making ships much more responsive to the wind, providing them more power and less harrow, among many other advantages<sup>13</sup>. During Late Roman times, its use was limited to small boats but it was later ultimately adopted, becoming the standard rig of the Byzantine dromon war galley. Early date pictorial evidence from byzantine miniature art remains distinctive of the transitional character of the invention (**fig.3a,b**)<sup>14</sup>.

Agricultural practices underwent a significant improvement during Roman times that influenced a substantial increase of the grain yield, stimulated increase of population density and led to a primary stage of urbanisation -though it did not result in overwhelming mechanical progress. The traditional and primitive *aratrum*, the light plough (*ard* or *scratch-plough*), was added two

Ibid, Looms and weave structure, *The Oxford Handbook*, op. cit., 470-475, with past bibliography. A. Schmidt-Colinet - A. Stauffer - Khaled Al-As'ad, *Die Textilien aus Palmyra, neue und alte Funde*, Mainz am Rhein 2000.

<sup>13</sup> White, *Medieval religion and technology*, op. cit., 255-260. I. C. Campbell, The Lateen Sail in world history, *Journal of World History* 6(1995), n. 1, 1-23. L. Casson, *Ships and seamanship in the ancient world*, Princeton 1996. S. Mcgrall, Sea transport, part. 1: ships and navigation, *The Oxford handbook*, op. cit., 606-637 (with compiled bibliography). J. Whitewright, *Maritime Technological Change in the Ancient World: The invention of the lateen sail*, University of Southampton (PhD Thesis), 2008. Ibid, The Mediterranean lateen sail in Late Antiquity, *The International Journal of nautical Archaeology* 38.1(2009), 97-104.

<sup>14</sup> S. der Nersessian, The Illustrations of the Homilies of Gregory of Nazianzus: Paris Gr. 510. A Study of the Connections between Text and Images, *DOP* 16 (1962), 197-228.



Fig. 4a,b Early depiction of a *vallus/m* – a harvesting machine, Gallo-roman bas-relief, in two separate pieces, from Buzenol and Arlon, Belgium, 2<sup>nd</sup> -3<sup>rd</sup> century (digital copies, Musée Archéologique d’Arlon and Musées Gaumais).

Сл. 4а,б Рани приказ машине за жетву, галско-римски барелеф, у два посебна дела, од Бузенола и Арлона, Белгија, II - III век, (дигитални примерци, Musée Archéologique d’Arlon и Musées Gaumais).

crucial function parts that permitted sharp expansion of cultivation and fertility even in the heavy, resistant soils; an iron coulter, a vertical blade fixed in front of the asymmetrical plowshare that cut the soil vertically, and a wooden mouldboard, which turned the cut sods aside for a controlled weed waste and created a deep furrow allowing absorption of manure substances and efficient drainage. Thus, a more effective, labor-saving, heavy wheeled model of the plough (*carruca*) was achieved, that is believed to have been in operation only in west and north lands and not throughout the Byzantine empire<sup>15</sup>. The reaper (*vallus*), a harvesting apparatus, was also improved as it succeeded the cutting of the ears without mixing the straw (**fig.4a,b**) replacing effectively the menial monotonous and low-motion cutting with the sickle<sup>16</sup>. The reaper was operated by two men – one of them drove the cattle and guided the aggregate, while the other one knocked down heads from the teeth into a trough.

<sup>15</sup> West scholarship is advanced on the subject-matter while the topic remains obscure to Byzantine bibliography. E.M. Jope, *Agricultural implements*, C. Singer - E.J. Holmyard - A.R. Hall - T. I. Williams (eds), *A history of technology: Mediterranean civilizations and the Middle Ages*, v. II, Oxford 1956. L. White, *Medieval technology and social change*, Oxford 1962, 41-75. Ibid, *Medieval Religion*, op. cit. 3, 15-17. G. E. Fussel, *Ploughs and Ploughing before 1880*, *Agricultural History* 40.3(1966), 177-186. K. D. White, *Agricultural implements of the Roman World*, Cambridge 1967(2010), 123-145, 157. J. Gimpel, *The medieval machine*, New York 1977, 40-42. F. L. Pryor, *The invention of the plow*, *Comparative Studies in Society and History* 27.4(1985), 727-743. F. – J. Gies, *Cathedral, forge and waterwheel. Technology and innovation in the Middle Ages*, New York 1995, 23-24. W. H. Manning, *The plough in Roman Britain*, *JRS* 54(1964), 54-65. J. Langdon - G. Astill – J. Myrdall (eds), *Medieval Farming and Technology*, Leiden 1997. P. Fowler, *Farming in the first millennium AD*, Cambridge 2002. M. Decker, *Tilling the hateful earth: agricultural production and trade in the late antique East*, Oxford - New York 2009. B. Shaw, *Bringing in the sheaves. Economy and Metaphor in the Roman world*, Toronto 2010, 93-150. S. Rees, *Agriculture*, L. Allason-Jones (ed.), *Artefacts in Roman Britain. Their purpose and use*, Cambridge 2011, 90-113.

<sup>16</sup> The earliest extant description of the traditionally called “Gallic” reaper is attested

Late Roman era was not an easy time to live, as it is usually designated as unstable or even decadent. Notwithstanding, the selective evidence collected from archaeological, documentary and iconographic resources, dated back to the reign of Constantine the Great, became the plausible testimonies of a certain technological thrust, confined not only to the above mentioned fields but extending to a wide range of manufactures and crafts. It is true that before the spread of all these technical achievements we took for granted, people had to invest hours of time and tons of manual labor to crash materials, weave cloth, sea-trade, process raw materials.

Was there initiative on Constantine behalf for promoting technical skills? Judging from the fact that there was always a close relationship retained between political power and the advance of technology, we should credit the first Christian emperor a certain degree of patronizing mechanical arts. Constantine issued degrees according fiscal privileges and tax-exemptions to technical professions, such as mechanics, architects, geometers, applauding their contribution and persuading them to train others so as to *become enough of them*<sup>17</sup>. On the other hand, as the pagan statesman, rhetorician and philosopher Themistius (317 - c. 390) bitterly comments (*Oratio* IX, 151a), Constantine didn't seem to be interested in providing his new capital, Constantinople, the essentials means for the welfare of the population. He states that he'd rather indulge in embellishing the city with fine pieces of art, "*but letting it dying of thirst*", eloquently remarking the lack of the water provision and the related infrastructure in the New Rome<sup>18</sup>.

Concluding this brief overview, a chance to reconstruct the ambience of this hectic in technological changes era, is a fine narration of an eminent personality, Holy Augustine of Hippo, more than half a century after Constantine death. At his work "*City of God* (Book XXII:24)"<sup>19</sup> he praises *the marvelous*

in Pliny the Elder, *Naturalis Historia*, XVIII:296b (*vallum*). Palladius, *Opus Agriculturae* VII:2.1-4, provides a more detailed account using the term *vehiculum*.

On Byzantine agricultural implements, see in general: A. Liveri, Βυζαντινά γεωργικά εργαλεία και μηχανές, *DChAE* 21(2000), per. D, 275-286. A. Harvey, *Economic Expansion in the Byzantine Empire, 900-1200*, Cambridge 2003, 120-162. A. Bryer, Byzantine agricultural implements: the evidence of medieval illustrations of Hesiod's "Works and Days", *ABSA* 81(1986), 45-80. Ibid, *The means of agricultural production: muscle and tools*, in A. Laiou (ed.), *The economic history of Byzantium: from the seventh through the fifteenth centuries*, v. I, Washington D.C. 2002, 110-112. M. Parani, *Reconstructing the Reality of Images: Byzantine Material Culture and Religious Iconography 11Th-15th Centuries*, Leiden 2003, 198-202.

<sup>17</sup> S. Cuomo, Late Antiquity, *The Oxford handbook*, op. cit., 29, citation from Cod. Theod. 13.4.1-3 and Cod. Just. 10.66.1-2.

<sup>18</sup> ...καί ἡ πόλις σοι ἀληθινῶς ἤδη πόλις καὶ οὐδέτι σκιαγραφία πολύχρυσος αὐτῆ καὶ πολυτελῆς οὐδὲ μαλλον διψήσει...W. Dindorf, *Themistii Orationes, ex codice Mediolanensi: Oratio XI (Δεκετηριανός)*, Lipsiae 1832, 179, 151a. Commented on: J. Crow, Earth, walls and water in Late Antique Constantinople, *Technology in Transition*, op. cit., 270. On Themistius and his works in general, J. Vanderspoel, *Themistius and the imperial court. Oratory, civic duty, and paideia from Constantius to Theodosius*, Michigan 1995 (1954). R. Panella, *The private orations of Themistius*, Berkeley-L.A – London 2000. P. Heather – D. Moncur, *Politics, Philosophy, and Empire in the Fourth Century: Selected Orationes of Themistius*, Liverpool 2001.

<sup>19</sup> The immense amount on Holy Augustine topics (personality, works and influence)

*variety of technologies that the human intellect discovered and put to use so as to serve real needs...what marvelous accomplishments human effort has achieved in construction and textile production, how far it has progressed in agriculture and navigation, what accomplishments in the production of vessels, statues, paintings, what medicines discovered, how eating was made a pleasure, what a number and variety of signs, words and letters for conveying thought, what skill in measuring and counting...how great the knowledge of this world humans have filled themselves with...who could, indeed, describe it?*

Софија Германиду  
ВРЕМЕ КОНСТАНТИНА ВЕЛИКОГ КАО ДОБА ТЕХНОЛОШКИХ ДОСТИГНУЋА  
– КРАТАК ПРЕГЛЕД

Током раних хришћанских времена широк спектар техничких достигнућа се или користио или се примењивао на експерименталној основи. Фокусирајући се на време Константина Великог, покушавамо да истражимо напредовање хидроградње (дифузија воденица и пилана), поморски транспорт (развој латинског једра), ткачку производњу (поновно увођење хоризонталног разбоја) и пољопривредне справе и машине (унапређена жетелица и плуг). Докази су прикупљени од оскудних археолошких остатака, двосмислене документарне литературе и оскудних иконографских извора. Крајњи циљ је да се представи друштвени и економски статус епохе кроз техничке иновације, често занемарене услед сјаја уметничке и монументалне продукције.

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is documented in the website program of Leuven University "Finding Augustine". See also A.D. Fitzgerald (ed.), *Augustine through the Ages. An encyclopedia*, Michigan 1999. Commented on and past bibliography: A. Solignac, Le bien originel chez Augustine, *Nouvelle revue théologique* 122(2000), 400-415.